VENTURA COUNTY

PACIFIC ROCK QUARRY EXPANSION PROJECT

DRAFT ENVIRONMENTAL IMPACT REPORT

STATE CLEARINGHOUSE NO. 2017081052

VOLUME II – APPENDICES

NOVEMBER 2020

Lead Agency:
Ventura County Resource Management Agency, Planning Division

Preparer:
Benchmark Resources

V E N T U R A   C O U N T Y

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Lead Agency:
Ventura County Resource Management Agency, Planning Division
800 Victoria Avenue, Ventura, CA 93009

Preparer:
Benchmark Resources
2515 East Bidwell Street, Folsom, CA 95630

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APPENDIX A-1

PACIFIC ROCK QUARRY MINE EXPANSION PROJECT NOP

POSTED
AUG 23 2017
MARK A. LUNN
Ventura County Clerk and Recorder
By: ______, Deputy

Notice of Preparation of an EIR

County of Ventura · Resource Management Agency · Planning Division
800 S. Victoria Avenue, Ventura, CA 93009-1740 · (805) 654-2478 · ventura.org/rma/planning

Pacific Rock Quarry Mine Expansion Project

Case No. LU10-0003

The County of Ventura, Resource Management Agency, Planning Division currently is processing an application for a modification of an existing surface mining facility. A Mitigated Negative Declaration (MND) was adopted by the Ventura County Planning Commission on June 17, 1980 concurrent with the granting of Conditional Use Permit (CUP) No. 3817. The Planning Division has determined that an Environmental Impact Report (EIR) is required to evaluate the potential impacts of the proposed modifications of this facility pursuant to §15162 of the CEQA Guidelines. The purpose of this notice is to call your attention to this project, and to request that you assist the Planning Division to identify any issues that should be addressed in the EIR. Information on the proposed project and instructions on how to provide commentary on the scope of the EIR are set forth below. The public comment period for this Notice of Preparation is from August 30, 2017 to October 2, 2017.

Project Name/Number: Pacific Rock Mine Expansion Project, Case No. LU10-0003.

Project Location: The project site encompasses 204 acres of a 718-acre property located at the western edge of the Santa Monica Mountains approximately 2.0 miles south of U.S. Highway 101 in the Camarillo area. The existing mining facility is addressed as 1000 South Howard Road, Camarillo CA 93012. (Exhibit 1)

The Tax Assessor's Parcel Numbers (APNs) for the parcels that comprise the project site are 234-0-060-220 and 234-0-060-190.

Project Description:

The applicant requests that a modified Conditional Use Permit (CUP) be granted and an amended Reclamation Plan be approved to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period. These requested entitlements would authorize the following:

- An increase in the area subject to the CUP from 115.5 acres to 204.5 acres (Exhibit 2);
- An increase in the mining excavation area subject to reclamation from 55 acres to 172.5 acres (Exhibit 2);
- Increase in operational days (including material export) from 6 days per week to 7 days per week;

- **Onsite and haul truck operations from 5:30am to 10:00pm on each operational day;**
- **Continued material haul truck traffic of up to 120 one-ways truck trips (equivalent to 60 truckloads) per operational day;**
- **Peak period (7:00am-9:00am or 3:00pm to 5:00pm) truck traffic of 120 trips (60 truckloads) per operational weekday (i.e. the entire daily maximum could occur during either the am or pm peak traffic period.);**
- Excavation and export of 13.2 million tons (19.8 million cubic yards) of mined material;
- Reclamation of the mining site to end use of agriculture (grazing) on benched (near level) areas that would remain on the site and open space on the other areas of the site. Final quarry slopes would be at a 1:1 gradient or less (Exhibit 3 and Exhibit 4).
- Continuation of current mining practices.

Surface mining activities will continue to be conducted at the facility through the use of explosives to lift and loosen exposed bedrock. This material is then initially sorted into size classes by pushing the material over a steep slope with a front-end loader or a bulldozer. The heavier (larger) pieces of rock are collected from the base of the working slopes for sale as rip-rap or to be crushed for use as road base. Material is further sorted by passing through vibrating scalp screens. Material that does not pass through the screens is crushed and conveyed back to the screens for additional sorting. Materials are placed in stockpiles on the mining site and segregated by material type and grain size.

Environmental Issues to be Addressed in the EIR:

The EIR will address the potential environmental impacts associated with the proposed modifications of the existing facility, and whether the project will have any new or different impacts than were addressed in the 1980 MND. Specific areas of analysis will include: aesthetics, archeological resources, agricultural resources, air quality, biological resources, cultural resources, fire protection, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, public services, recreation, traffic and circulation, utilities and service systems and visual resources.

Staff has conducted a preliminary assessment of the proposed project and identified the following issue areas that will be addressed in detail in the EIR:

- biological resources
- noise
- visual resources

Public Input: The purpose of this notice is to call your attention to this project and to request that you assist the Planning Division identify any issues that should be addressed in the EIR. Comments on the scope of analysis of the EIR must be submitted in writing.

The public comment period for this Notice of Preparation is from August 30, 2017 to October 2, 2017. Please send your comments to:

Ventura County Resource Management Agency, Planning Division
Attn.: Brian R. Baca, Manager, Commercial and Industrial Permit Section
800 South Victoria Avenue, L#1740
Ventura, CA 93009

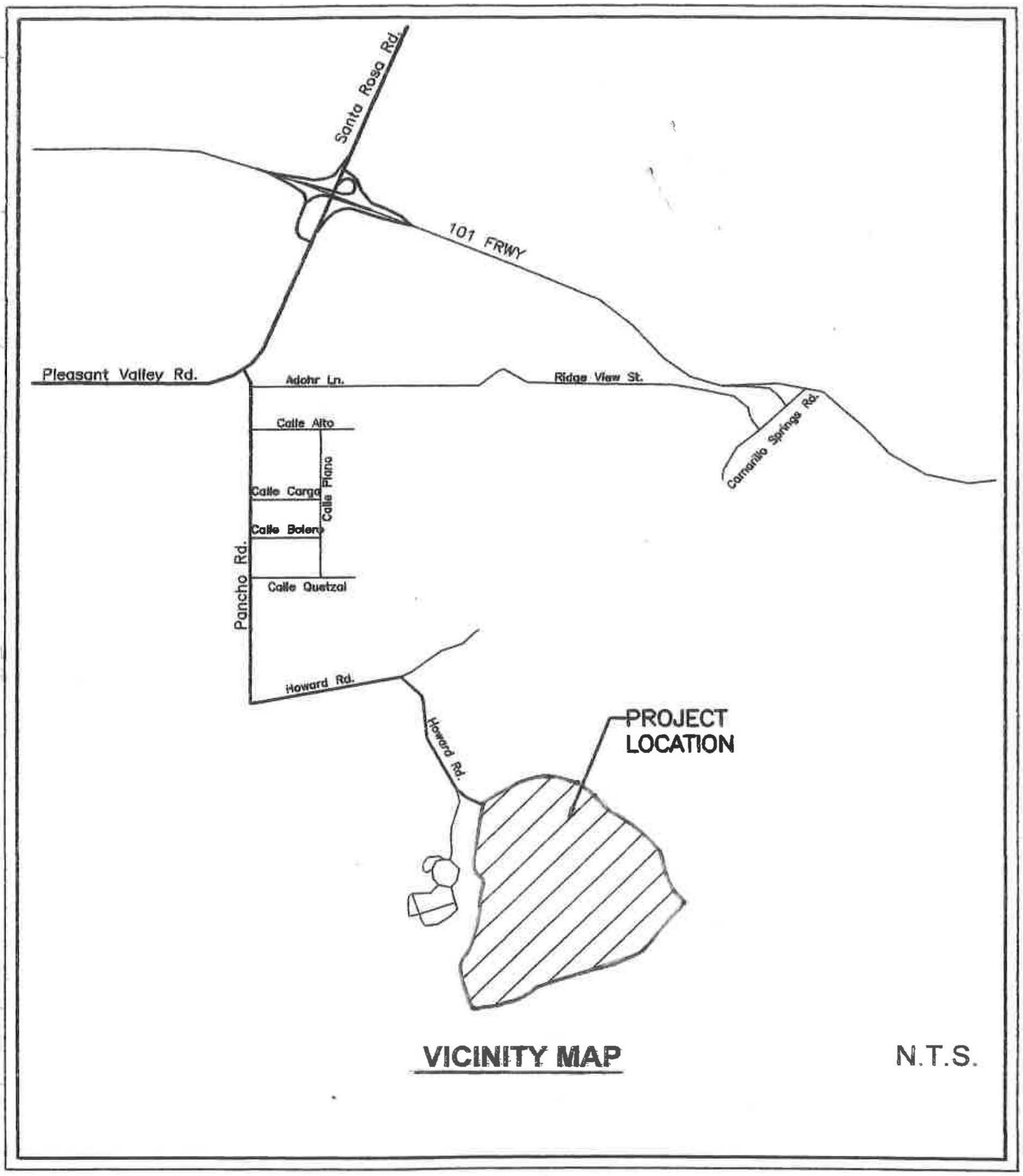
Alternatively, you may email your comments to Mr. Baca at brian.baca@ventura.org or fax them to (805) 654-2509.

Scoping Meeting: The Planning Division will be conducting a scoping meeting for the EIR on September 14, 2017 at 10:00am. The scoping meeting will be held at the County Government Center, Hall of Administration, Santa Cruz Conference Room (Room 311), 800 S. Victoria Ave. Ventura, CA 93009.

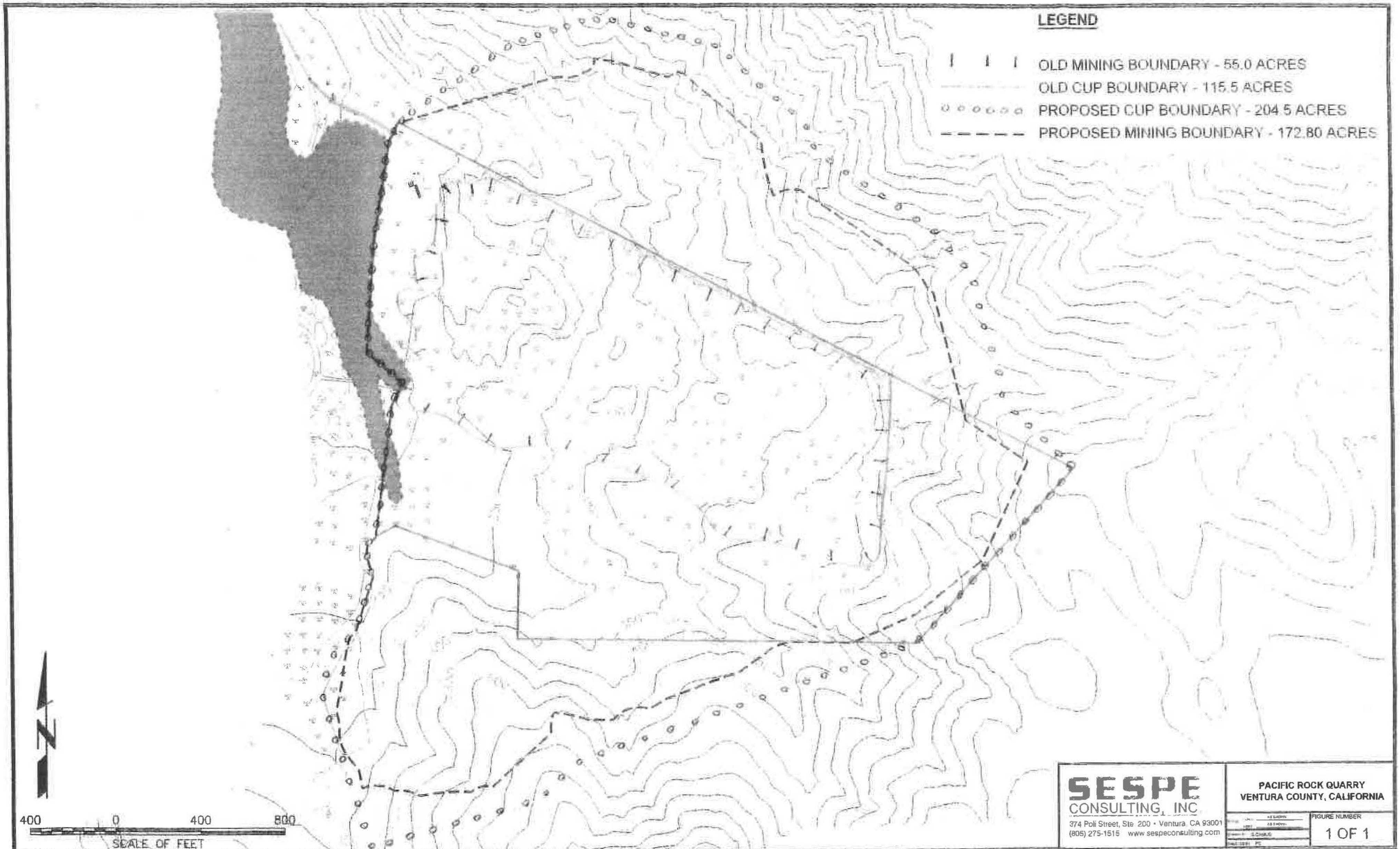
Attachments:

Exhibit 1 – Vicinity Map
Exhibit 2 – Site Plan
Exhibit 3 – Reclamation Plan map
Exhibit 4 – Reclamation Plan cross sections

The above exhibits can be viewed on the Ventura County Planning Division website at:
http://vcrma.org/planning/ceqa/nop.html



County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 1 – Vicinity Map



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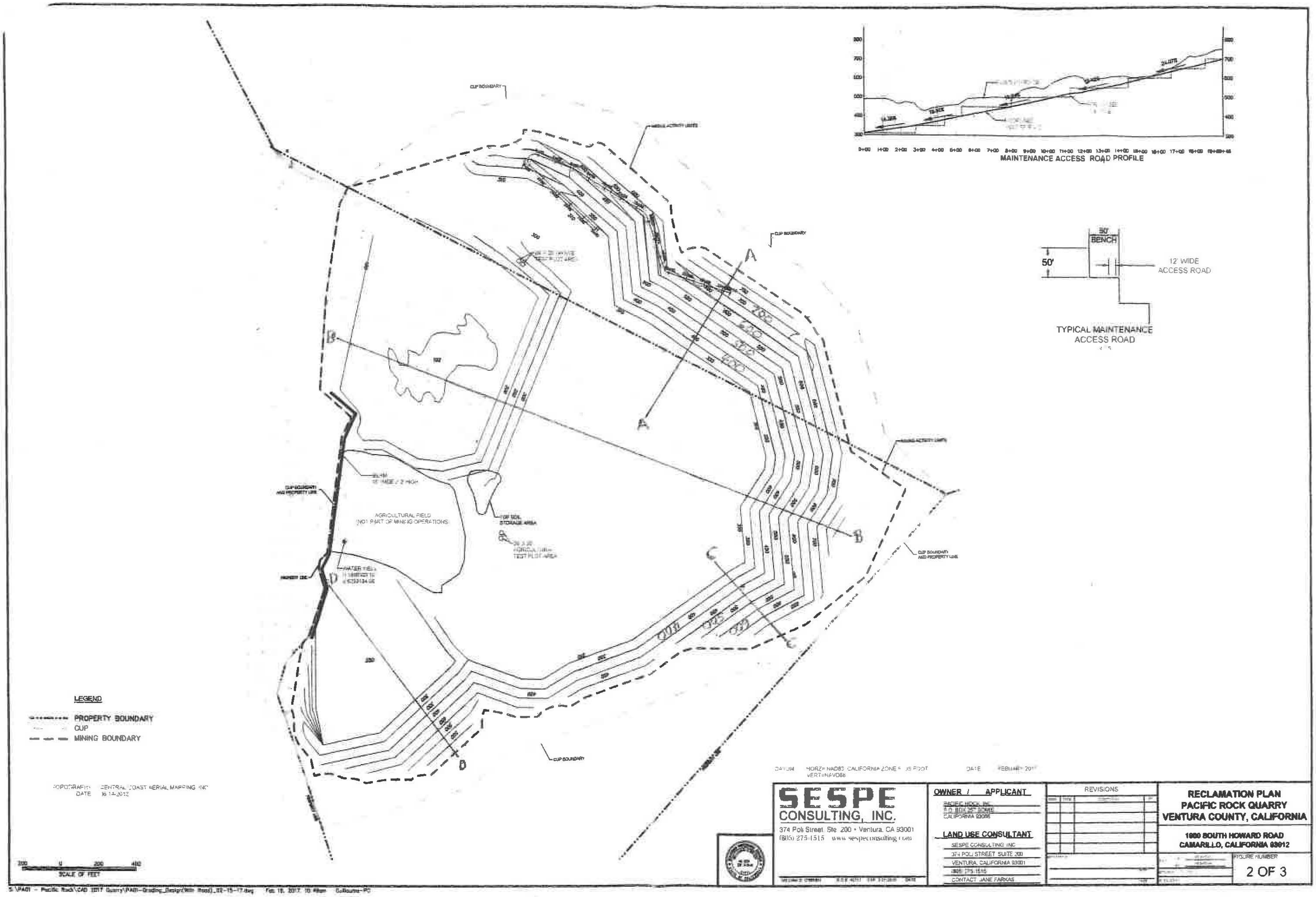
County of Ventura
Notice of Preparation for EIR
LU10-0003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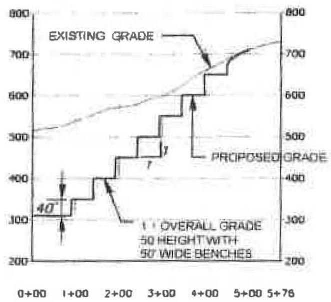
50' BENCH
50'
12' WIDE ACCESS ROAD
TYPICAL MAINTENANCE ACCESS ROAD
CUP BOUNDARY
MINING ACTIVITY LIMITS
AGRICULTURAL FIELD (NOT PART OF MINING OPERATIONS)
TOP SOIL STORAGE AREA
CUP BOUNDARY AND PROPERTY LINE
PROPERTY LINE
LEGEND
PROPERTY BOUNDARY
CUP
MINING BOUNDARY
SCALE OF FEET
SESPE CONSULTING, INC.
374 Poli Street, Ste. 200 • Ventura, CA 93001
(805) 275-1515 www.sespeconsulting.com
OWNER / APPLICANT
LAND USE CONSULTANT
SESPE CONSULTING INC
374 POLI STREET SUITE 200
VENTURA, CALIFORNIA 93001
(805) 275-1515
CONTACT: JANE FARKAS
REVISIONS
RECLAMATION PLAN
PACIFIC ROCK QUARRY
VENTURA COUNTY, CALIFORNIA
1000 SOUTH HOWARD ROAD
CAMARILLO, CALIFORNIA 93012
FIGURE NUMBER
2 OF 3

Alignment - C - C



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HORZ: 1"=200'

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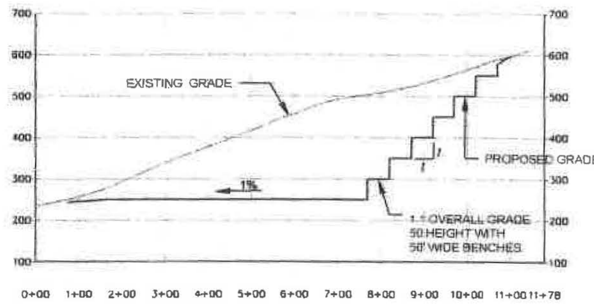

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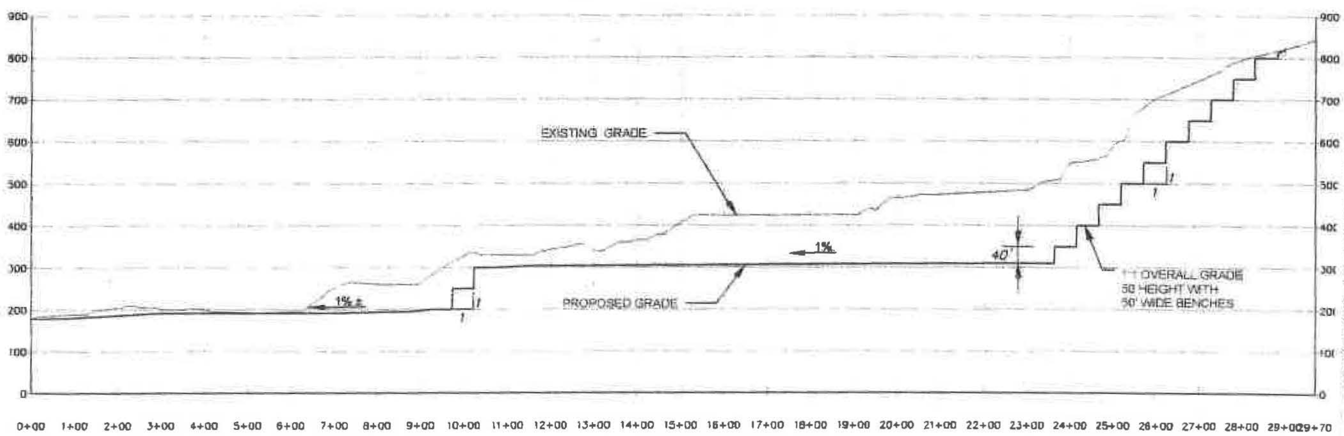

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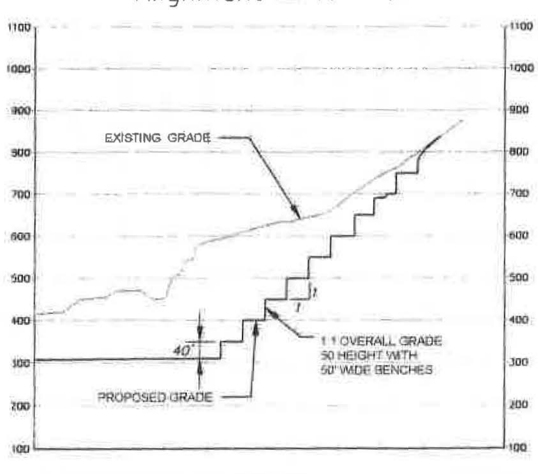
Alignment - A - A



VERT: 1"=200'
HORZ: 1"=200'

CROSS - SECTIONS
PACIFIC ROCK QUARRY
VENTURA COUNTY, CALIFORNIA

1000 SOUTH HOWARD ROAD
CAMARILLO, CALIFORNIA 93012

SCALE HORZ AS SHOWN / VERT AS SHOWN	FIGURE NUMBER
DRAWN BY G.CAMUS	3 OF 3
CHECKED BY F	

S:\PA01 - Pacific Rock\CAD 2017 Quarry\PA01-Grading_Design(With Road)_02-15-17.dwg

County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 4 – Reclamation Plan
Cross Sections

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Pacific Rock Quarry Mine Expansion Project, LU10-0003

Lead Agency: County of Ventura — Contact Person: Brian R. Baca
Mailing Address: 800 S. Victoria Avenue, — Phone: 805-654-5192
City: Ventura CA — Zip: 93009 — County: Ventura

Project Location: County: Ventura — City/Nearest Community: Camarillo
Cross Streets: Howard Road and Poncho Road — Zip Code: 93012
Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W — Total Acres: 204 acres
Assessor's Parcel No.: 234-0-060-190, -220 — Section: 8 — Twp.: 1N — Range: 20W — Base: SBBM
Within 2 Miles: State Hwy #: U.S. 101 — Waterways: Calleguas Creek
Airports: Camarillo Airport — Railways: ________ — Schools: Camarillo High School

Document Type:

CEQA: [X] NOP; [ ] Early Cons; [ ] Neg Dec; [ ] Mit Neg Dec; [ ] Draft EIR; [ ] Supplement/Subsequent EIR (Prior SCH No.) ________; Other: ________
NEPA: [ ] NOI; [ ] EA; [ ] Draft EIS; [ ] FONSI
Other: [ ] Joint Document; [ ] Final Document; [ ] Other: ________

Local Action Type:

[ ] General Plan Update; [ ] General Plan Amendment; [ ] General Plan Element; [ ] Community Plan; [ ] Specific Plan; [ ] Master Plan; [ ] Planned Unit Development; [ ] Site Plan; [ ] Rezone; [ ] Prezone; [X] Use Permit; [ ] Land Division (Subdivision, etc.); [ ] Annexation; [ ] Redevelopment; [ ] Coastal Permit; [X] Other: Rec. Plan

Development Type:

[ ] Residential: Units ____ Acres ____
[ ] Office: Sq.ft. ____ Acres ____ Employees ____
[ ] Commercial: Sq.ft. ____ Acres ____ Employees ____
[ ] Industrial: Sq.ft. ____ Acres ____ Employees ____
[ ] Educational: ________
[ ] Recreational: ________
[ ] Water Facilities: Type ________ MGD ____
[ ] Transportation: Type ________
[X] Mining: Mineral RipRap and crushed rock
[ ] Power: Type ________ MW ____
[ ] Waste Treatment: Type ________ MGD ____
[ ] Hazardous Waste: Type ________
[ ] Other: ________

Project Issues Discussed in Document:

[X] Aesthetic/Visual; [X] Agricultural Land; [X] Air Quality; [ ] Archeological/Historical; [X] Biological Resources; [ ] Coastal Zone; [X] Drainage/Absorption; [ ] Economic/Jobs; [ ] Fiscal; [X] Flood Plain/Flooding; [ ] Forest Land/Fire Hazard; [X] Geologic/Seismic; [X] Minerals; [X] Noise; [ ] Population/Housing Balance; [ ] Public Services/Facilities; [ ] Recreation/Parks; [ ] Schools/Universities; [ ] Septic Systems; [ ] Sewer Capacity; [X] Soil Erosion/Compaction/Grading; [ ] Solid Waste; [ ] Toxic/Hazardous; [X] Traffic/Circulation; [X] Vegetation; [X] Water Quality; [X] Water Supply/Groundwater; [X] Wetland/Riparian; [ ] Growth Inducement; [ ] Land Use; [ ] Cumulative Effects; [ ] Other: ________

Present Land Use/Zoning/General Plan Designation:

Existing mining facility / Agricultural Exclusive and Open Space zoning / Agriculture and Open Space General Plan designations

Project Description: *(please use a separate page if necessary)*

The applicant requests that a modified Conditional Use Permit (CUP) be granted and an amended Reclamation Plan be approved to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Pacific Rock Quarry, LU10-0003

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

X	Air Resources Board		Office of Historic Preservation
	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency		Parks & Recreation, Department of
X	California Highway Patrol		Pesticide Regulation, Department of
X	Caltrans District # 7		Public Utilities Commission
	Caltrans Division of Aeronautics	X	Regional WQCB # ____
	Caltrans Planning		Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
X	Conservation, Department of	X	Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of		SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
	Fish & Game Region # ____		Tahoe Regional Planning Agency
	Food & Agriculture, Department of		Toxic Substances Control, Department of
	Forestry and Fire Protection, Department of		Water Resources, Department of
	General Services, Department of		
	Health Services, Department of		Other:
	Housing & Community Development		Other:
X	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

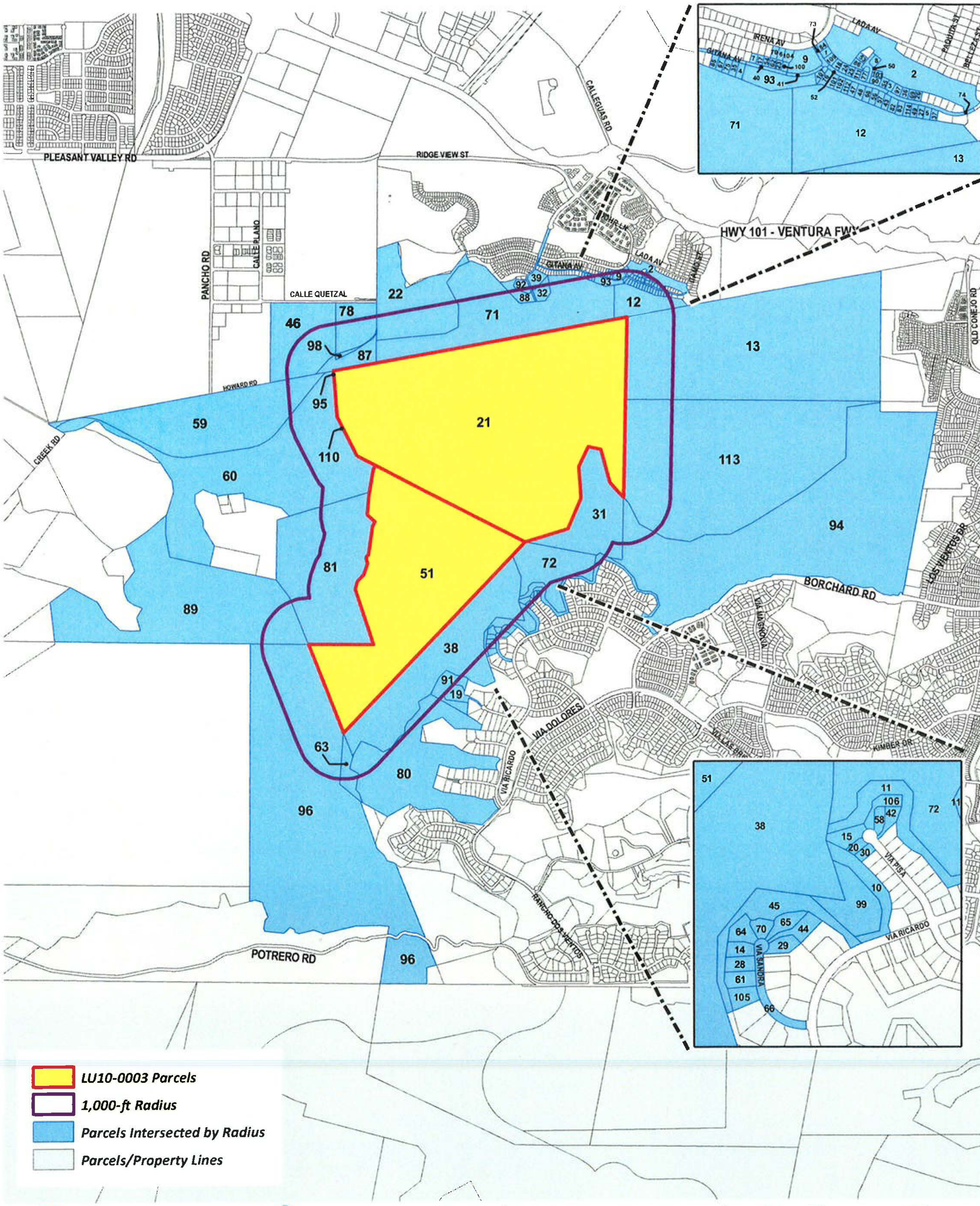
Starting Date August 30, 2017 Ending Date October 2, 2017

Lead Agency (Complete if applicable):

Consulting Firm: ____ Applicant: ____
Address: ____ Address: ____
City/State/Zip: ____ City/State/Zip: ____
Contact: ____ Phone: ____
Phone: ____

Signature of Lead Agency Representative: [signature] **Date:** 8/22/17

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.



Ventura County
Resource Management Agency
Information Systems GIS Services
Map created on 8/22/2017

RMAgis

County of Ventura
Planning Division
LU10-0003

1,000-ft Radius Map

Disclaimer: this map was created by the Ventura County Resource Management Agency Information Systems GIS, which is designed and operated solely for the convenience of the County and related public agencies. The County does not warrant the accuracy of this map and no decision involving a risk of economic loss or physical injury should be made in reliance therein

1 = 234021042
WONG STEVEN W TR
34303 MIMOSA TERR
FREMONT CA 94555

2 = common

3 = 234023027
INGRAM RALPH L-JOAN K TRUST
6901 S SEPULVEDA BLVD
WESTCHESTER CA 90045-1511

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626 B AVE
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SOMIS CA 93066

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CRAWFORD JAMES D JR SEP TR
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MALIBU CA 90265-2901

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SAN DIEGO CA 92186

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CAMARILLO SANITARY DISTRICT
PO BOX 248
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10681 FOOTHILL BL #140
RANCHO CUCAMONGA CA 91730

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STABEN THOMAS A
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SOMIS CA 93066-0257

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CAMARILLO CA 93012

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LODI CA 95242-3932

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BUTLER TODD W TR
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THOUSAND OAKS CA 91320-6887

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PLM HOLDINGS LLC ET AL ATTN STEPHEN PETIT
626 B AVE
CORONADO CA 92188

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2100 E THOUSAND OAKS BLVD
THOUSAND OAKS CA 91362-2996

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CAMARILLO CA 93011-0248

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PASADENA CA 91103

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HOUSTON TX 77056-6513

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CAMARILLO CA 93012-8146

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CAMARILLO CA 93012

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CAMARILLO CA 93012-8137

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KINSLING HARRY R TR EST ATTN H RANDALL KINSLING TTEE
5182 KINGSGROVE DR
SOMIS CA 93066-9718

86 = 234021050
FOY W CHARLES
6431 SAN COMO CT
CAMARILLO CA 93012-8144

87 = 234004085
VENTURA COUNTY FL CTRL DIST ATTN R-W AGENT
800 S VICTORIA AVE
VENTURA CA 93009-0001

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GALWAY FARMS LLC ATTN ERIC MAYER
4241 JUTLAND DR STE 207
SAN DIEGO CA 92117

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KEIM JULIA TR
6467 SAN COMO LN
CAMARILLO CA 93012

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CONEJO OPEN SPACE CNSV AGY
2100 E THOUSAND OAKS BLVD
THOUSAND OAKS CA 91362-2996

92 = common

93 = common

94 = 234036006
THOUSAND OAKS CITY OF
2100 E THOUSAND OAKS BLVD
THOUSAND OAKS CA 91362-2996

95 = 234006035
VENTURA COUNTY FL CTRL DIST ATTN R-W AGENT
800 S VICTORIA AVE
VENTURA CA 93009-0001

96 = 234007014
GALWAY FARMS LLC ATTN ERIC MAYER
4241 JUTLAND DR STE 207
SAN DIEGO CA 92117

97 = 234023026
APPEL KARL A-ELFRIEDE TRUST
6487 SAN COMO LN
CAMARILLO CA 93012-9429

98 = 234004083
VENTURA COUNTY FL CTRL DIST ATTN R-W AGENT
800 S VICTORIA AVE
VENTURA CA 93009-0001

99 = 236020001
CONEJO OPEN SPACE CNSV AGY
2100 E THOUSAND OAKS BLVD
THOUSAND OAKS CA 91362-2996

100 = 234021028
CHARI SRINIVAS-PREMA TR
6351 GITANA AV
CAMARILLO CA 93012

101 = 234021066
ZELINSKI LOWELL F-MARIAM TR
6404 SAN COMO LN
CAMARILLO CA 93012-8145

102 = 234021065
EADS PHILIP M LAWRENCE LINDA D TR
448-3 TUOLUMNE AV #3
THOUSAND OAKS CA 91360

103 = 234021055
RAPMUND ETHEL W TR
6459 SAN COMO CT
CAMARILLO CA 93012

104 = 234021018
WRISLEY GEORGE L TR
6350 IRENA AV
CAMARILLO CA 93012

105 = 236023012
FISH DANIEL-GRETCHEN
163 VIA SANDRA
THOUSAND OAKS CA 91320-6887

106 = 236020009
CALAGNA BILLY R TR
5381 VIA PISA
NEWBURY PARK CA 91320

107 = common

108 = common

109 = 234021043
KELLY ROBERT R JR-HELEN TR
6385 SAN COMO LN
CAMARILLO CA 93012-9428

110 = 234006034
CAMARILLO SANITARY DISTRICT
PO BOX 248
CAMARILLO CA 93011-0248

111 = 234021047
PALAME SALVATORE
6417 SAN COMO PL
CAMARILLO CA 93012

112 = 234021064
3 BROS REAL ESTATE LLC
10681 FOOTHILL BL #140
RANCHO CUCAMONGA CA 91730

113 = 234036007
PACIFIC ROCK INC
PO BOX 255
SOMIS CA 93066

114 = 234023032
DEWEY RICHARD A-CAROLYN J
6524 SAN COMO LN
CAMARILLO CA 93012

Pac. Rock NOP (w/duplicates)

A

APN	NAME_1	NAME_2	MAIL_ADDR	CTY_STA	ZIP	APN10	SITUS	INDEX
234021042	WONG STEVEN W TR		34303 MIMOSA TERR	FREMONT CA	94555	2340210425	6377 SAN COMO LN	1
common								2
234023027	INGRAM RALPH L-JOAN K TRUST		6901 S SEPULVEDA BLVD	WESTCHESTER CA	90045-1511	2340230275	6481 SAN COMO LN	3
234020622	HARGREAVES R-HAIMOWITZ M TR	ATTN RICHARD HARGREAVES TTEE	6330 GITANA AVE	CAMARILLO CA	93012-8127	2340206225	6330 GITANA AV	4
234023035	FRENSDORFF BODO M-NELLY TR		6574 SAN COMO LN	CAMARILLO CA	93012-8150	2340230355	6574 SAN COMO LN	5
234021017	BENIOFF KATHRYN I TR		6342 IRENA AVE	CAMARILLO CA	93012-8134	2340210175	6342 IRENA AV	6
234021023	PILCHER THOMAS C JR TR		6309 GITANA AV	CAMARILLO CA	93012-8135	2340210235	6309 GITANA AV	7
234021054	FINCH BETTY J TR		6453 SAN COMO CT	CAMARILLO CA	93012-8144	2340210545	6453 SAN COMO CT	8
common								9
common								10
common								11
163018007	PLM HOLDINGS LLC ET AL	ATTN STEPHEN PETIT	626 B AVE	CORONADO CA	92188	1630180070		12
234036008	PACIFIC ROCK INC		PO BOX 255	SOMIS CA	93066	2340360080		13
236023015	CRAWFORD JAMES D JR SEP TR		PO BOX 3162	VENTURA CA	93006	2360230155	127 VIA SANDRA	14
236020008	KHARE SANJAY D	ARORA-KHARE TARUNA	291 WHITCLEM WAY	PALO ALTO CA	94306	2360200085	5380 VIA PISA	15
common-p								16
234021025	KESTER JAMES-CYNTHIA		6329 GITANA AV	CAMARILLO CA	93012	2340210255	6329 GITANA AV	17
234021044	PITZER DIANN REV LIV TRUST		6397 SAN COMO LN	CAMARILLO CA	93012-9428	2340210445	6397 SAN COMO LN	18
236042002	STEWART JONATHAN L TR	STEWART JOSEPH D TR	PO BOX 253	NEWBURY PARK CA	91319-0253	2360420025	5519 VIA OLAS	19
236020007	JOBY ESIA-YVONNE M	MASSAIS IBRAHIM-KAMRA	5372 VIA PISA	THOUSAND OAKS CA	91320-7007	2360200075	5372 VIA PISA	20
234006019	PACIFIC ROCK INC		PO BOX 255	SOMIS CA	93066	2340060190		21
234004076	CHAMELEON SPRINGS LLC		PO BOX 11480	BEVERLY HILLS CA	90213	2340040760		22
234021027	DOEBLER PAUL D-TERRY M TR		6343 GITANA AVE	CAMARILLO CA	93012-8135	2340210275	6343 GITANA AV	23
234021045	LANG JOHN W-EUGENA M TR		6401 SAN COMO LN	CAMARILLO CA	93012-8143	2340210455	6401 SAN COMO LN	24
234021046	LUESEBRINK MARGARETE SURV TR		6411 SAN COMO LN	CAMARILLO CA	93012-8143	2340210465	6411 SAN COMO LN	25
234023023	EISLER PAUL-ANN TR		6535 SAN COMO LN	CAMARILLO CA	93012-8148	2340230235	6535 SAN COMO LN	26
234023034	GEIGER N LOU TR	ATTN DENISE C JENNINGS TTEE	6558 SAN COMO LN	CAMARILLO CA	93012-8150	2340230345	6558 SAN COMO LN	27
236023014	COTONE MARK-JANET TR		139 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230145	139 VIA SANDRA	28
236023028	MCDONNELL TODD K-CLARICE TR		134 VIA SANDRA	NEWBURY PARK CA	91320-6887	2360230285	134 VIA SANDRA	29
236020006	D SOUZA LANCY J-ASHA L TR		PO BOX 60072	PALO ALTO CA	94306	2360200065	5364 VIA PISA	30
234036003	THOUSAND OAKS CITY OF		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2340360035		31
common								32
common-p								33
common-p								34
234020621	POLLEY STEPHEN K-CAROLE L TR		6316 GITANA AVE	CAMARILLO CA	93012	2340206215	6316 GITANA AV	35
234023025	FIERRO ROBERT T	HALSELL JEAN R	6507 SAN COMO LN	CAMARILLO CA	93012-8147	2340230255	6507 SAN COMO LN	36
234023036	BAKER H-J TR	ATTN HAROLD-JULIE BAKER TTEE	6590 SAN COMO LN	CAMARILLO CA	93012	2340230365	6590 SAN COMO LN	37
234036001	MOUNTAINS REC-CNSV AUTHORITY		3750 SOLSTICE CANYON RD	MALIBU CA	90265-2901	2340360010		38
common								39
common-p								40
common-p								41
236020011	LUITHLY JOSEPH R TR		1612 ASPENWALL RD	WESTLAKE VILLAGE CA	91361	2360200115	5365 VIA PISA	42
234023029	TURNEY KATHRYN E TR		6488 SAN COMO LN	CAMARILLO CA	93012-8146	2340230295	6488 SAN COMO LN	43
236023019	BRENT ANDREW B TR	ATTN RICHARD S BRENT CO-TTEE	PO BOX 85552	SAN DIEGO CA	92186	2360230195	122 VIA SANDRA	44
common								45
234004084	CAMARILLO SANITARY DISTRICT		PO BOX 248	CAMARILLO CA	93011-0248	2340040840		46
234021063	3 BROS REAL ESTATE LLC		10681 FOOTHILL BL #140	RANCHO CUCAMONGA CA	91730	2340210635	6434 SAN COMO LN	47
234021062	STABEN THOMAS A		PO BOX 255	SOMIS CA	93066	2340210625	6446 SAN COMO LN	48
234023033	MCTHOMAS JOEL	VALENZUELA PATRICIA	6542 SAN COMO LN	CAMARILLO CA	93012-8150	2340230335	6542 SAN COMO LN	49
common-p								50
234006022	PACIFIC ROCK INC		PO BOX 257	SOMIS CA	93066-0257	2340060220		51
common-p								52
234021051	PALMER AL TR	SCHRAGE TR	6439 SAN COMO CT	CAMARILLO CA	93012-8144	2340210515	6439 SAN COMO CT	53
234021024	STABEN TOM		756 CALLE PLANO	CAMARILLO CA	93012	2340210245	6317 GITANA AV	54
234021057	HYMAN HAROLD-JUDITH M TR		6473 SAN COMO LN	CAMARILLO CA	93012	2340210575	6473 SAN COMO LN	55
234021060	SHIRAISHI GRACE E SURV TR	ATTN JAMES P SHIRAISHI TTEE	25685 PASEO LAURO CT	VALENCIA CA	91355	2340210605	6464 SAN COMO LN	56
234021059	SMITH TIMOTHY-MARY		6476 SAN COMO LN	CAMARILLO CA	93012	2340210595	6476 SAN COMO LN	57
236020010	JONES JOSHUA A-TARA T		5373 VIA PISA	THOUSAND OAKS CA	91320-7007	2360200105	5373 VIA PISA	58
234006025	MIDNIGHT SUN INC V	ATTN UBS AGRIVEST LLC	1920 TIENDA DR STE 204	LODI CA	95242-3932	2340060250		59
234006032	MIDNIGHT SUN INC V	ATTN UBS AGRIVEST LLC	1920 TIENDA DR STE 204	LODI CA	95242-3932	2340060325		60
236023013	DENNING RANDALL-KATHERINE TR		151 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230135	151 VIA SANDRA	61
234021026	BESSERT MICHAEL A	FAY LAURA	6335 GITANA AV	CAMARILLO CA	93012	2340210265	6335 GITANA AV	62
234007015	MOUNTAINS REC-CNSV AUTHORITY		3750 SOLSTICE CANYON RD	MALIBU CA	90265-2901	2340070150		63
236023016	COLLIER MATTHEW S-MARY H		115 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230165	115 VIA SANDRA	64
236023018	IRELAND MIKE L-NICOLE TRUST		110 VIA SANDRA	NEWBURY PARK CA	91320-6887	2360230185	110 VIA SANDRA	65
common-p								66

B

234020619 SHIVELY JOAN B TR		6262 GITANA AV	CAMARILLO CA	93012-8127	2340206195 6262 GITANA AV	67
234021061 RUOFF MARTHA J LIVING TR	ATTN RUSSELL AND TIM RUOFF	6458 SAN COMO LN	CAMARILLO CA	93012-8146	2340210615 6458 SAN COMO LN	68
234023024 OLMSTEAD GARY L		6521 SAN COMO LN	CAMARILLO CA	93012-8148	2340230245 6521 SAN COMO LN	69
236023017 BUTLER TODD W TR		103 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230175 103 VIA SANDRA	70
234004028 PLM HOLDINGS LLC ET AL	ATTN STEPHEN PETIT	626 B AVE	CORONADO CA	92188	2340040280	71
234036002 THOUSAND OAKS CITY OF		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2340360025	72
common-p						73
common-p						74
234020620 KILPATRICK DAVID-MARGARET TR		6276 GITANA AV	CAMARILLO CA	93012	2340206205 6276 GITANA AV	75
234021067 ELLIOTT THEODORE III-RITA TR		6390 SAN COMO LN	CAMARILLO CA	93012-8136	2340210675 6390 SAN COMO LN	76
234021048 ROSENFELD DOROTHY M TR	ROSENFELD DOROTHY M DEC TR	6425 SAN COMO LN	CAMARILLO CA	93012-8143	2340210485 6425 SAN COMO LN	77
234004082 CAMARILLO SANITARY DISTRICT		PO BOX 248	CAMARILLO CA	93011-0248	2340040820	78
234021016 GARZA-LAIRD MARTHA C TR		6334 IRENA AVE	CAMARILLO CA	93012-8134	2340210165 6334 IRENA AV	79
236042007 OPERATING ENG PENSION TR		100 E CORSON ST	PASADENA CA	91103	2360420075	80
234006012 CARRIAGE CEMETERY SERV INC	ATTN PROPERTY TAX DEPT	3040 POST OAK BLVD #300	HOUSTON TX	77056-6513	2340060120 2052 HOWARD RD	81
234023030 SPANN SUSAN C TR		6494 SAN COMO LN	CAMARILLO CA	93012-8146	2340230305 6494 SAN COMO LN	82
234023031 MILLER CALVIN G JR TR		6508 SAN COMO LN	CAMARILLO CA	93012	2340230315 6508 SAN COMO LN	83
234021041 JOHNSON EDWARD-DOROTHY V TR		6369 SAN COMO LN	CAMARILLO CA	93012-8137	2340210415 6369 SAN COMO LN	84
234020618 KINSLING HARRY R TR EST	ATTN H RANDALL KINSLING TTEE	5182 KINGSGROVE DR	SOMIS CA	93066-9718	2340206185 6248 GITANA AV	85
234021050 FOY W CHARLES		6431 SAN COMO CT	CAMARILLO CA	93012-8144	2340210505 6431 SAN COMO CT	86
234004085 VENTURA COUNTY FL CTRL DIST	ATTN R-W AGENT	800 S VICTORIA AVE	VENTURA CA	93009-0001	2340040850	87
common						88
234006038 GALWAY FARMS LLC	ATTN ERIC MAYER	4241 JUTLAND DR STE 207	SAN DIEGO CA	92117	2340060380	89
234021056 KEIM JULIA TR		6467 SAN COMO LN	CAMARILLO CA	93012	2340210565 6467 SAN COMO LN	90
236042001 CONEJO OPEN SPACE CNSV AGY		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2360420015	91
common						92
common						93
234036006 THOUSAND OAKS CITY OF		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2340360065	94
234006035 VENTURA COUNTY FL CTRL DIST	ATTN R-W AGENT	800 S VICTORIA AVE	VENTURA CA	93009-0001	2340060350	95
234007014 GALWAY FARMS LLC	ATTN ERIC MAYER	4241 JUTLAND DR STE 207	SAN DIEGO CA	92117	2340070140	96
234023026 APPEL KARL A-ELFRIEDE TRUST		6487 SAN COMO LN	CAMARILLO CA	93012-9429	2340230265 6487 SAN COMO LN	97
234004083 VENTURA COUNTY FL CTRL DIST	ATTN R-W AGENT	800 S VICTORIA AVE	VENTURA CA	93009-0001	2340040830	98
236020001 CONEJO OPEN SPACE CNSV AGY		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2360200015	99
234021028 CHARI SRINIVAS-PREMA TR		6351 GITANA AV	CAMARILLO CA	93012	2340210285 6351 GITANA AV	100
234021066 ZELINSKI LOWELL F-MARIAM TR		6404 SAN COMO LN	CAMARILLO CA	93012-8145	2340210665 6404 SAN COMO LN	101
234021065 EADS PHILIP M	LAWRENCE LINDA D TR	448-3 TUOLUMNE AV #3	THOUSAND OAKS CA	91360	2340210655 6416 SAN COMO LN	102
234021055 RAPMUND ETHEL W TR		6459 SAN COMO CT	CAMARILLO CA	93012	2340210555 6459 SAN COMO CT	103
234021018 WRISLEY GEORGE L TR		6350 IRENA AV	CAMARILLO CA	93012	2340210185 6350 IRENA AV	104
236023012 FISH DANIEL-GRETCHEN		163 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230125 163 VIA SANDRA	105
236020009 CALAGNA BILLY R TR		5381 VIA PISA	NEWBURY PARK CA	91320	2360200095 5381 VIA PISA	106
common						107
common						108
234021043 KELLY ROBERT R JR-HELEN TR		6385 SAN COMO LN	CAMARILLO CA	93012-9428	2340210435 6385 SAN COMO LN	109
234006034 CAMARILLO SANITARY DISTRICT		PO BOX 248	CAMARILLO CA	93011-0248	2340060340	110
234021047 PALAME SALVATORE		6417 SAN COMO PL	CAMARILLO CA	93012	2340210475 6417 SAN COMO LN	111
234021064 3 BROS REAL ESTATE LLC		10681 FOOTHILL BL #140	RANCHO CUCAMONGA CA	91730	2340210645 6428 SAN COMO LN	112
234036007 PACIFIC ROCK INC		PO BOX 255	SOMIS CA	93066	2340360070	113
234023032 DEWEY RICHARD A-CAROLYN J		6524 SAN COMO LN	CAMARILLO CA	93012	2340230325 6524 SAN COMO LN	114

Pac. Rock NOP (w/o duplicates)

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APN	NAME_1	NAME_2	MAIL_ADDR	CTY_STA	ZIP	APN10	SITUS	INDEX
234021042	WONG STEVEN W TR		34303 MIMOSA TERR	FREMONT CA	94555	2340210425	6377 SAN COMO LN	1
common								2
234023027	INGRAM RALPH L-JOAN K TRUST		6901 S SEPULVEDA BLVD	WESTCHESTER CA	90045-1511	2340230275	6481 SAN COMO LN	3
234020622	HARGREAVES R-HAIMOWITZ M TR	ATTN RICHARD HARGREAVES TTEE	6330 GITANA AVE	CAMARILLO CA	93012-8127	2340206225	6330 GITANA AV	4
234023035	FRENSDORFF BODO M-NELLY TR		6574 SAN COMO LN	CAMARILLO CA	93012-8150	2340230355	6574 SAN COMO LN	5
234021017	BENIOFF KATHRYN I TR		6342 IRENA AVE	CAMARILLO CA	93012-8134	2340210175	6342 IRENA AV	6
234021023	PILCHER THOMAS C JR TR		6309 GITANA AV	CAMARILLO CA	93012-8135	2340210235	6309 GITANA AV	7
234021054	FINCH BETTY J TR		6453 SAN COMO CT	CAMARILLO CA	93012-8144	2340210545	6453 SAN COMO CT	8
163018007	PLM HOLDINGS LLC ET AL	ATTN STEPHEN PETIT	626 B AVE	CORONADO CA	92188	1630180070		12
234036008	PACIFIC ROCK INC		PO BOX 255	SOMIS CA	93066	2340360080		13
236023015	CRAWFORD JAMES D JR SEP TR		PO BOX 3162	VENTURA CA	93006	2360230155	127 VIA SANDRA	14
236020008	KHARE SANJAY D	ARORA-KHARE TARUNA	291 WHITCLEM WAY	PALO ALTO CA	94306	2360200085	5380 VIA PISA	15
234021025	KESTER JAMES-CYNTHIA		6329 GITANA AV	CAMARILLO CA	93012	2340210255	6329 GITANA AV	17
234021044	PITZER DIANN REV LIV TRUST		6397 SAN COMO LN	CAMARILLO CA	93012-9428	2340210445	6397 SAN COMO LN	18
236042002	STEWART JONATHAN L TR	STEWART JOSEPH D TR	PO BOX 253	NEWBURY PARK CA	91319-0253	2360420025	5519 VIA OLAS	19
236020007	JOBY ESIA-YVONNE M	MASSAIS IBRAHIM-KAMRA	5372 VIA PISA	THOUSAND OAKS CA	91320-7007	2360200075	5372 VIA PISA	20
234004076	CHAMELEON SPRINGS LLC		PO BOX 11480	BEVERLY HILLS CA	90213	2340040760		22
234021027	DOEBLER PAUL D-TERRY M TR		6343 GITANA AVE	CAMARILLO CA	93012-8135	2340210275	6343 GITANA AV	23
234021045	LANG JOHN W-EUGENA M TR		6401 SAN COMO LN	CAMARILLO CA	93012-8143	2340210455	6401 SAN COMO LN	24
234021046	LUESEBRINK MARGARETE SURV TR		6411 SAN COMO LN	CAMARILLO CA	93012-8143	2340210465	6411 SAN COMO LN	25
234023023	EISLER PAUL-ANN TR		6535 SAN COMO LN	CAMARILLO CA	93012-8148	2340230235	6535 SAN COMO LN	26
234023034	GEIGER N LOU TR	ATTN DENISE C JENNINGS TTEE	6558 SAN COMO LN	CAMARILLO CA	93012-8150	2340230345	6558 SAN COMO LN	27
236023014	COTONE MARK-JANET TR		139 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230145	139 VIA SANDRA	28
236023028	MCDONNELL TODD K-CLARICE TR		134 VIA SANDRA	NEWBURY PARK CA	91320-6887	2360230285	134 VIA SANDRA	29
236020006	D SOUZA LANCY J-ASHA L TR		PO BOX 60072	PALO ALTO CA	94306	2360200065	5364 VIA PISA	30
234036003	THOUSAND OAKS CITY OF		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2340360035		31
234020621	POLLEY STEPHEN K-CAROLE L TR		6316 GITANA AVE	CAMARILLO CA	93012	2340206215	6316 GITANA AV	35
234023025	FIERRO ROBERT T	HALSELL JEAN R	6507 SAN COMO LN	CAMARILLO CA	93012-8147	2340230255	6507 SAN COMO LN	36
234023036	BAKER H-J TR	ATTN HAROLD-JULIE BAKER TTEE	6590 SAN COMO LN	CAMARILLO CA	93012	2340230365	6590 SAN COMO LN	37
234036001	MOUNTAINS REC-CNSV AUTHORITY		3750 SOLSTICE CANYON RD	MALIBU CA	90265-2901	2340360010		38
236020011	LUITHLY JOSEPH R TR		1612 ASPENWALL RD	WESTLAKE VILLAGE CA	91361	2360200115	5365 VIA PISA	42
234023029	TURNEY KATHRYN E TR		6488 SAN COMO LN	CAMARILLO CA	93012-8146	2340230295	6488 SAN COMO LN	43
236023019	BRENT ANDREW B TR	ATTN RICHARD S BRENT CO-TTEE	PO BOX 85552	SAN DIEGO CA	92186	2360230195	122 VIA SANDRA	44
234004084	CAMARILLO SANITARY DISTRICT		PO BOX 248	CAMARILLO CA	93011-0248	2340040840		46
234021063	3 BROS REAL ESTATE LLC		10681 FOOTHILL BL #140	RANCHO CUCAMONGA CA	91730	2340210635	6434 SAN COMO LN	47
234023033	MCTHOMAS JOEL	VALENZUELA PATRICIA	6542 SAN COMO LN	CAMARILLO CA	93012-8150	2340230335	6542 SAN COMO LN	49
234021051	PALMER AL TR	SCHRAGE TR	6439 SAN COMO CT	CAMARILLO CA	93012-8144	2340210515	6439 SAN COMO CT	53
234021024	STABEN TOM		756 CALLE PLANO	CAMARILLO CA	93012	2340210245	6317 GITANA AV	54
234021057	HYMAN HAROLD-JUDITH M TR		6473 SAN COMO LN	CAMARILLO CA	93012	2340210575	6473 SAN COMO LN	55
234021060	SHIRAISHI GRACE E SURV TR	ATTN JAMES P SHIRAISHI TTEE	25685 PASEO LAURO CT	VALENCIA CA	91355	2340210605	6464 SAN COMO LN	56
234021059	SMITH TIMOTHY-MARY		6476 SAN COMO LN	CAMARILLO CA	93012	2340210595	6476 SAN COMO LN	57
236020010	JONES JOSHUA A-TARA T		5373 VIA PISA	THOUSAND OAKS CA	91320-7007	2360200105	5373 VIA PISA	58
234006025	MIDNIGHT SUN INC V	ATTN UBS AGRIVEST LLC	1920 TIENDA DR STE 204	LODI CA	95242-3932	2340060250		59
236023013	DENNING RANDALL-KATHERINE TR		151 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230135	151 VIA SANDRA	61
234021026	BESSERT MICHAEL A	FAY LAURA	6335 GITANA AV	CAMARILLO CA	93012	2340210265	6335 GITANA AV	62
236023016	COLLIER MATTHEW S-MARY H		115 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230165	115 VIA SANDRA	64
236023018	IRELAND MIKE L-NICOLE TRUST		110 VIA SANDRA	NEWBURY PARK CA	91320-6887	2360230185	110 VIA SANDRA	65
234020619	SHIVELY JOAN B TR		6262 GITANA AV	CAMARILLO CA	93012-8127	2340206195	6262 GITANA AV	67
234021061	RUOFF MARTHA J LIVING TR	ATTN RUSSELL AND TIM RUOFF	6458 SAN COMO LN	CAMARILLO CA	93012-8146	2340210615	6458 SAN COMO LN	68
234023024	OLMSTEAD GARY L		6521 SAN COMO LN	CAMARILLO CA	93012-8148	2340230245	6521 SAN COMO LN	69
236023017	BUTLER TODD W TR		103 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230175	103 VIA SANDRA	70
234020620	KILPATRICK DAVID-MARGARET TR		6276 GITANA AV	CAMARILLO CA	93012	2340206205	6276 GITANA AV	75
234021067	ELLIOTT THEODORE III-RITA TR		6390 SAN COMO LN	CAMARILLO CA	93012-8136	2340210675	6390 SAN COMO LN	76
234021048	ROSENFELD DOROTHY M TR	ROSENFELD DOROTHY M DEC TR	6425 SAN COMO LN	CAMARILLO CA	93012-8143	2340210485	6425 SAN COMO LN	77
234021016	GARZA-LAIRD MARTHA C TR		6334 IRENA AVE	CAMARILLO CA	93012-8134	2340210165	6334 IRENA AV	79
236042007	OPERATING ENG PENSION TR		100 E CORSON ST	PASADENA CA	91103	2360420075		80
234006012	CARRIAGE CEMETERY SERV INC	ATTN PROPERTY TAX DEPT	3040 POST OAK BLVD #300	HOUSTON TX	77056-6513	2340060120	2052 HOWARD RD	81
234023030	SPANN SUSAN C TR		6494 SAN COMO LN	CAMARILLO CA	93012-8146	2340230305	6494 SAN COMO LN	82
234023031	MILLER CALVIN G JR TR		6508 SAN COMO LN	CAMARILLO CA	93012	2340230315	6508 SAN COMO LN	83
234021041	JOHNSON EDWARD-DOROTHY V TR		6369 SAN COMO LN	CAMARILLO CA	93012-8137	2340210415	6369 SAN COMO LN	84
234020618	KINSLING HARRY R TR EST	ATTN H RANDALL KINSLING TTEE	5182 KINGSGROVE DR	SOMIS CA	93066-9718	2340206185	6248 GITANA AV	85
234021050	FOY W CHARLES		6431 SAN COMO CT	CAMARILLO CA	93012-8144	2340210505	6431 SAN COMO CT	86
234004085	VENTURA COUNTY FL CTRL DIST	ATTN R-W AGENT	800 S VICTORIA AVE	VENTURA CA	93009-0001	2340040850		87
234006038	GALWAY FARMS LLC	ATTN ERIC MAYER	4241 JUTLAND DR STE 207	SAN DIEGO CA	92117	2340060380		89
234021056	KEIM JULIA TR		6467 SAN COMO LN	CAMARILLO CA	93012	2340210565	6467 SAN COMO LN	90
234023026	APPEL KARL A-ELFRIEDE TRUST		6487 SAN COMO LN	CAMARILLO CA	93012-9429	2340230265	6487 SAN COMO LN	97

234021028	CHARI SRINIVAS-PREMA TR		6351 GITANA AV	CAMARILLO CA	93012	2340210285	6351 GITANA AV	100
234021066	ZELINSKI LOWELL F-MARIAM TR		6404 SAN COMO LN	CAMARILLO CA	93012-8145	2340210665	6404 SAN COMO LN	101
234021065	EADS PHILIP M	LAWRENCE LINDA D TR	448-3 TUOLUMNE AV #3	THOUSAND OAKS CA	91360	2340210655	6416 SAN COMO LN	102
234021055	RAPMUND ETHEL W TR		6459 SAN COMO CT	CAMARILLO CA	93012	2340210555	6459 SAN COMO CT	103
234021018	WRISLEY GEORGE L TR		6350 IRENA AV	CAMARILLO CA	93012	2340210185	6350 IRENA AV	104
236023012	FISH DANIEL-GRETCHEN		163 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230125	163 VIA SANDRA	105
236020009	CALAGNA BILLY R TR		5381 VIA PISA	NEWBURY PARK CA	91320	2360200095	5381 VIA PISA	106
234021043	KELLY ROBERT R JR-HELEN TR		6385 SAN COMO LN	CAMARILLO CA	93012-9428	2340210435	6385 SAN COMO LN	109
234021047	PALAME SALVATORE		6417 SAN COMO PL	CAMARILLO CA	93012	2340210475	6417 SAN COMO LN	111
234023032	DEWEY RICHARD A-CAROLYN J		6524 SAN COMO LN	CAMARILLO CA	93012	2340230325	6524 SAN COMO LN	114

APPENDIX A-2
COMMENTS ON PACIFIC ROCK QUARRY MINE EXPANSION PROJECT NOP

Palermo Maintenance Corporation

Newbury Park, CA 91320

Ventura County Resource Management Agency
Planning Division
Attn.: Chris Stephens, Agency Director & Brian R. Baca, Manager, Commercial and Industrial Permit Section
800 South Victoria Avenue, L#1740
Ventura, CA 93009

BY FAX to 805 654 2509
E-mail: Chris.Stephens@Ventura.org
E-mail: Brian.baca@Ventura.org

September 26, 2017

Dear Sirs,

Notice of Preparation regarding Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003;

Palermo Maintenance Corporation is the Home Owners Association for the development known as Palermo and which comprises Via Sandra, Via Olas, Via Nicola and Via Mira Flores in the Dos Vientos development. There is a total of 71 homes on the four streets.

As you will see from a map, these streets are built into the hills just on the other side from the Pacific Rock Quarry. Indeed the quarry is visible from some of the properties on Via Sandra. We were surprised to see that the streets are, nevertheless not shown on the Vicinity Map which is Exhibit 1 to the Notice of Preparation which only shows streets on the same side of the hills as the quarry. That omission may result in residents being unaware of the project's relevance to them and unable to respond.

Present Situation
Noise and vibration from the quarry operations is an issue, particularly from the use of explosives to blast the bedrock and heavy equipment and vehicle operations.

The existing operations at the quarry also produce dust. Depending on wind direction the Palermo homes suffer from windblown dust. That is apparent from the fact that a layer of dust forms on outside table surfaces. It follows that residents are inhaling that dust, with as yet unknown health consequences.

Quarrying operations existed at the time that the homes in Palermo were built and sold. However, the current expansion proposal, if permitted, would significantly worsen the impact on the residents of Palermo.

Palermo Maintenance Corporation

Newbury Park, CA 91320

The Expansion Project's Negative Impacts
This proposal would:

- Expand the area that may be quarried by 77%.

- Expand the excavation area subject to reclamation by 213%. Not only increasing the scope of the project but also uses of equipment (use time and resulting noise and debris from 24/7 ongoing operations) and impact all properties located in Palermo.

- Bring the noise and vibration much closer to the Palermo streets.

- Increase dust generation and bring it closer to the Palermo streets. We consider that to be an issue which should be addressed in detail in the EIR in addition to the three suggested in the Notice

- Permit the nuisance and hazards of all the above to occur:
    - Not just 6 days every week but every day and for 16 ½ hours a day, from 5.30 a.m. until 10 p.m.; there would be not even one day's respite for the Palermo residents.
    - And for a further 25 years.

- Cut away the slope and potentially destabilize the hillside between Palermo and the quarry.

We therefore strongly urge that the application be rejected in its entirety.

Yours truly,
Palermo Maintenance Corporation
Board of Directors
c/o Community Property Management, Attn. Debbie Guthrie
751 E. Daily Dr. Suite 300
Camarillo, CA 93010
805-987-8945

Baca, Brian

From: Lindsey Johnson <lindseykate932@gmail.com>
Sent: Monday, October 02, 2017 7:09 AM
To: Baca, Brian
Subject: Pacific Rock Quarry Mining Expansion Project

Dear Mr. Baca,

This email is in regards to the Environmental Impact Report of the Pacific Rock Quarry Mining Expansion Project. I am not an expert in the field, but I am a concerned citizen who cares about our local open spaces and wildlife. I urge you to investigate the critical necessity that protected lands play in animal migrations and movements, specifically in the region slotted for mining. It had been well documented that mountain lions rely on that area to access the Santa Monica Mountains, crossing the 101 freeway. It is part of the wildlife corridor, where research has shown mountain lions move across the state. It is not just about that parcel of land we should focus on, but the greater ecosystem of Southern California, and how corporate greed can disrupt that balance. If this section of land is allowed to be mined, mountain lions will be further restricted their habitat and range. If not allowed to move freely over the land, the genetic diversity of the mountain lion could be affected - an indication which has already presented itself in groups restricted by Los Angeles' sprawl. This encroachment could lead to the species' demise in Southern California. The mountain lion is merely a single example of the type of environmental repercussions which could occur if our mountains are allowed to be mined and precious protected land is discarded. Please use this Environmental Impact Report to benefit the wildlife who depend on us to protect their habitat by preserving the wildlife corridor. I look forward to seeing a positive result of this report.

Thank you,

Lindsey Johnson

Baca, Brian

From: Robert Adams <radamsbc@gmail.com>
Sent: Monday, October 02, 2017 12:33 AM
To: Baca, Brian
Subject: Pacific Rock Quarry Mine Expansion Project

Greetings,

The proposed Pacific Rock Quarry expansion and its 37 year old EIR is completely inappropriate and absurd.

The entire EIR requires updating and will likely be challenged in court if not met to the community's satisfaction. Why would an EIR that predates any of the surrounding housing developments be considered as valid in any conceivable manner?

No alternative has been identified or proposed by Pacific Rock Quarry, which is a requirement of CEQA.

The proximity to a residential neighborhood and protected public land should be of the highest concern. How can a quarry exist within inches of protected public land, and within a few hundred feet of houses? Has any buffer zone been considered?

The amount of air pollution created from the quarry should be heavily scrutinized. Increasing the number and frequency of truck deliveries across an unpaved dirt road will inevitably increase dust and particulate volume. The prevailing wind will deposit the exhaust fumes, as well as dust from the road and the quarry activities itself into a residential neighborhood (a neighborhood that doesn't exist according to the 37 year old EIR). How will this air pollution be mitigated? Will the road be paved? Will the company use clean vehicles for delivery and operation? How will homes be sheltered from the degradation of air quality from this project? How will the state's limits on greenhouse gasses be considered in this EIR?

The noise created by the expansion of the project's boundary as well as the proposed increase in frequency of truck delivery requires attention. Thousand Oaks does not permit local deliveries before 7AM or after 9PM, and yet the project plans to increase its hours of operation to 5:30 AM and until 10PM. This is clearly outside of the realm of acceptability for a neighborhood that will be suffering the ill effects of terrible noise pollution for 16.5 hours every day, without any relief. How will this sound be mitigated? If any machine operation sound is able to be heard within the residential neighborhood, the project requires disapproval. Additionally, the proposed expansion to Sunday does a terrible disservice to the adjacent cemetery. No family member wishes to grieve the loss of their loved ones, while the preacher is yelling above the sound of bulldozers and the family is choking from the exhaust and dust particulates. Out of respect to the cemetery, no operations should exist on Sunday. Also, the hours must conform to Thousand Oaks delivery standards.

Worse yet, the project proposes using explosives as a part of their mining operations. This is absolutely inappropriate for the location. How will the community be warned of potential explosions? How will the company handle the potential relocating of families away from blast zones? How will children and veterans be affected by the sounds of explosions ripping through their backyards and shaking their entire house? Must Dos Vientos suffer the fate of a war zone just to satisfy the whims of a company who can't be bothered to find an alternative process? One must also ask how the explosives will be contained on site? What type and compound of explosives will be used, and will the explosions expose residents to any buried contaminants - such as naturally occurring asbestos?

Have any archaeological resources been identified in the subject boundary expansion? Chumash sites are located throughout the valley, and particularly along ridgelines. Pictographs have already been documented in the vicinity, and some were destroyed during the Conejo Grade projects. Has the CUP site been adequately studied?

One must ask about traffic along Howard Road. This road is shared by the Conejo Mountain Funeral Home, and Sundays (part of the proposed expansion) will witness large trucks encountering funeral processions along a very narrow road which has no medium, striping or delineation between oncoming traffic. The proposed expansion to Sunday should consider all funeral home traffic and potential conflicts between mourners and dump trucks.

How have the nearby agricultural resources been studied? Has the dust, exhaust fumes and possible contamination been studied? Will the farms be required to remove crops rather than have them destroyed by the effects of the quarry?

One must ask how the watersheds on Conejo Mountain will be protected? At least three watersheds have been identified by the state which cross the proposed project. Will this result in contamination of aquifers? How will this area be protected from flooding? Will the nearby cemetery serve as the catch basin during a 10 or 100 year flood event? How will this destabilization of Conejo Mountain affect surrounding farms, and residents? Camarillo Springs has already been subject to several landslides in recent years, what hope does this quarry expansion have of avoiding a similar fate?

Has the site been studied for Coccidioidomycosis (Valley Fever)? The spore has been found within the valley, and this project will create further exposure and potential infection from this disease. Residents cannot be exposed to potentially lethal airborne diseases from this project.

How will this project affect the potential for wildfires? We've already suffered several devastating wildfires in recent years on or around Conejo Mountain. All it will take it is a single errant flame to cause a blaze that will certainly destroy houses and blanket Dos Vientos with toxic smoke. We should not suffer this risk just for the sake of a quarry.

How will this project mitigate the visual impacts of the destroyed environment that it has created? The proposal makes no mention of remediation of quarried land back to a natural state. Will this eyesore forever remain as evidence to the small mindedness of county governance? How will the slope be returned to an acceptable level, to avoid further destabilization? How will the wasteland of a quarry be replanted so that endemic species can return and the visual impact of the quarry be eliminated?

How will the project mitigate its proposed boundary expansion versus the wildlife corridors and public land? The Santa Monica Mountains Conservancy and the Conejo Open Space Coservation Agency have both identified the subject parcels as being the highest priority for their acquisition. An existing wildlife corridor has been identified by SC Wildlands to traverse the proposed boundary location (and the county has determined wildlife corridors to be a priority concern). Will endangered and threatened endemic species be considered by this expansion project? A wildelife corridor requires half a mile to be optimally utilized by animals. The proposed expansion will reduce this corridor to feet and block the path of travel of mountain lions, deer, bobcats and other native fauna. What will be the fate of the 500 acres of land not being considered in the CUP? The EIR must require that this land is transferred to public ownership to offset the damages created by the quarry. The proposed boundary comes within inches of protected public land and within feet of a public trail. Will this expansion destabilize the trail and cause erosion of public land?

How will this expansion affect the viewshed from those recreating on public land? Will it be marred by the horrific site of a quarry? Will these very popular trails be closed due to blasting? How will the quarry protect trail users from the effects of the quarry, particularly the air issues and the risk of death from explosions? There are many trails that lead to an area within feet of the proposed blasting site - how will all of the spur trails be monitored? Will the company post guards and evacuate anyone in the area? Signs alone will not be sufficient, as they are often vandalized or removed.

How will potential blasting and air quality degradation affect public utilities? Southern California Edison have a large power line within feet of the proposed expansion. Will there be the potential for power loss to the region, due to the ill effects of the quarry and their practices?

Lastly, the owner and the quarry itself have been investigated by the state and Army Corp of Engineers for violations, including mining outside of their approved boundaries (at the site currently proposed for expansion). Why should this company be rewarded with an expansion? Given the long list of violations, how can we trust this company to even uphold the mitigation requirements that are set forth by the EIR update? How can we trust this company to properly handle explosives and hazardous materials? What will we suffer next by the illegal actions of this company? Any consultants must be handpicked by the County, and not the quarry, as there is a strong likelihood of bias if the company is allowed to perform their own studies and choose their own professionals. Please consult the following news report about the long list of violations this company has performed: http://archive.vcstar.com/news/county-contractor-mines-a-troubled-deal-ep-373753029-352567491.html

This expansion project has no place in our county and it should be clear from every possible study and impact that it should be denied. Our community deserves better than being subject to hazardous air, complete destruction of native habitats, fall under threat of erosion and flood impacts, and being within a blasting zone. Given its violation history, I doubt this company will spend the effort or time to properly mitigate anything. That they think an EIR from 1980 would be considered acceptable in the least degree is abhorrent. The entire 1980 EIR needs to be thrown out and a completely new study be done in its place. A company should not act as though a large residential community of thousands of people or an active cemetery does not exist.

Please, do every possible study and require every possible mitigation and involve the community every step of the way, including public community hearings.

We have our concerns

Robert Adams

CONEJO OPEN SPACE CONSERVATION AGENCY

September 28, 2017

Brian R. Baca – Manager, Commercial and Industrial Permit Section
Ventura County Resource Management Agency, Planning Division
800 S. Victoria Avenue, L#1740
Ventura, CA 93009

Subject: Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003

Dear Mr. Baca:

The Conejo Open Space Conservation Agency (COSCA) preserves, protects, and manages open space resources in the Conejo Valley. There are nearly 15,250 acres of protected open space within Thousand Oaks' city limits and COSCA owns and/or manages approximately 12,400 acres. The parcels (APNs 234-0-060-220 and 234-0-060-190) upon which the proposed quarry expansion would occur are located adjacent to the City of Thousand Oaks boundary, as well as COSCA and Mountains and Recreation Conservation Authority (MRCA) open space lands. They also comprise the western flank of Conejo Mountain (NOP Exhibits 1 – 4, posted 8/23/2017).

The parcels comprising Conejo Mountain (APNs 234-0-360-070 and 234-0-360-080) have been identified by COSCA as well as other agencies such as the Santa Monica Mountains Conservancy (SMMC), as a conservation priority for many reasons. With regard to biological resources, the western edge of the Conejo Valley is characterized by the distinctive topography of Conejo Mountain, which is a unit of the larger surrounding Conejo Volcanics geologic formation. The Conejo Mountain area is characterized by several sensitive habitat types and its volcanic substrate also supports many endemic plant species, including several species of *Dudleya*. The Conejo Mountain area also functions as a wildlife corridor between the Santa Monica and Santa Susana Mountains. Lastly, this area has high scenic and recreational value.

Our review of the information provided in the NOP regarding the proposed project and the associated environmental review generated several areas of concern. We request that the following issues be thoroughly addressed in the EIR:

A Joint Agency
City of Thousand Oaks/Conejo Recreation and Park District
2100 E. Thousand Oaks Blvd., Thousand Oaks, CA 91362

(805) 449-2100 (805) 495-6471

1. The mining area subject to the CUP will be tripled in size.
   The subsequent loss of habitat for native wildlife and plant species, including those that are special-status or otherwise sensitive, will be significant. What is the justification for the proposed expansion? Is there a demonstrated need for the material produced by this quarry?

2. Operational days and hours will increase.
   Increased quarry activity facilitated by more operational days and longer operational hours has significant potential to impact wildlife in the vicinity of the quarry. Light pollution associated with extended hours of night-time lighting may disrupt activities of nocturnal wildlife species. Noise and vibration associated with blasting may be disruptive to wildlife. Additionally, dust generated from blasting and subsequent sorting activities has high potential to be carried by prevailing westerly winds into adjacent habitat areas, thereby degrading existing habitat quality due to deposition of fine particulate matter.

3. Increased truck trips.
   The NOP is unclear about the current trip limit and future proposed limits. The freeway ramps (Santa Rosa Road/Pleasant Valley Road) on Highway 101 that quarry traffic will utilize are also shared by a high volume of drivers. Two sets of drivers – students from Camarillo High School and residents of the Leisure Village retirement community – may be particularly vulnerable to increased truck traffic. Clarification must be provided regarding the proposed increase in traffic.

4. Reclamation of the mining site to an end use of agricultural grazing.
   By definition, grazing is an activity performed by herbivorous species and requires the presence of grassland habitat. Such habitat is confined to areas that contain topsoil depths suitable to support grass species. Conejo Mountain and the Conejo Volcanics are not known for abundant topsoil nor expansive grassland habitat. While existing soil and overburden in the proposed expansion area may be stockpiled for the future reclamation activities, it is questionable that sufficient quantities exist with which to establish grassland habitat suitable for grazing upon implementation of proposed reclamation activities. While the applicant may have the ability to import soil from elsewhere for this purpose, it is not uncommon for soil formerly stockpiled at offsite locations to be contaminated with invasive plant seed and other material. The introduction of non-native invasive plant species in an area adjacent to native habitat puts the existing habitat area at risk for colonization by invasive species.

   In our region of California, 20 to 30 acres of grassland habitat is typically needed to support one animal, assuming the livestock are cattle. If we divide the proposed reclamation area of 173 acres by 25 acres (the midpoint in the acreage referenced above), 6.92 head of cattle could be supported. Does slightly less than 7 head of cattle constitute a viable operation? Importing non-native soil and attempting to create a habitat type which is not characteristic of the area is a questionable end condition for the site. A more appropriate end state would be the complete restoration of mined areas to habitat for native species (and thereby increasing the size of the available wildlife migration route), rather than attempting to support domestic livestock.

The final slope gradient is proposed to be 1:1 and would constitute graded benches 50 feet high and 50 feet wide. Perhaps the width of the bench is conceptualized to facilitate "agricultural grazing", however the prospect of including 50-foot high cliffs in an area conceived to support livestock appears inherently risky. It is also unlikely that these vertical faces will be conducive to vegetative establishment. As such, these rock faces will be vulnerable to erosion and the viewshed will include these unvegetated bands of sheer rock for the foreseeable future.

Lastly, reclamation to a questionable agricultural use does not provide adequate compensatory mitigation for losses to habitat and native plant species and understates the significance of project impacts. Mitigation measures that provide appropriate compensation for the impacts inherent to the proposed project are warranted and must be incorporated in the proposed project.

5. Environmental issues to be addressed in the EIR.

The NOP states, "The EIR will address the potential environmental impacts associated with the proposed modifications of the existing facility, and whether the project will have any new or different impacts than were addressed in the 1980 MND." Is this statement suggesting that a nearly 40-year old environmental document is somehow still relevant? Through the use of the word "whether", is this statement suggesting that there may not be "new or different" impacts associated with the proposed expansion? There is no question that there will be new and different impacts associated with the project – it is after all a proposed expansion, not only with regard to the project area footprint but also with regard to operational activity. Conditions in the surrounding areas have also changed in the last 37 years, so a new and thorough analysis is obligatory.

While the NOP lists the specific areas of analysis the EIR will include, it goes on to say that only biological resources, noise, visual resources will be addressed in detail. Based on the concerns presented above, we request that aesthetics, archeological resources, air quality, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, and wildlife corridors also be analyzed in detail. The proposed increases in quarry size and activity are significant. Focusing only on three assessment areas overlooks the extent to which impacts may occur in other important areas.

We look forward to the opportunity to review the draft EIR, and anticipate it will include a thorough discussion of project alternatives as well.

Thank you for your consideration,

Shelly Mason

Shelly Mason
Manager, Conejo Open Space Conservation Agency

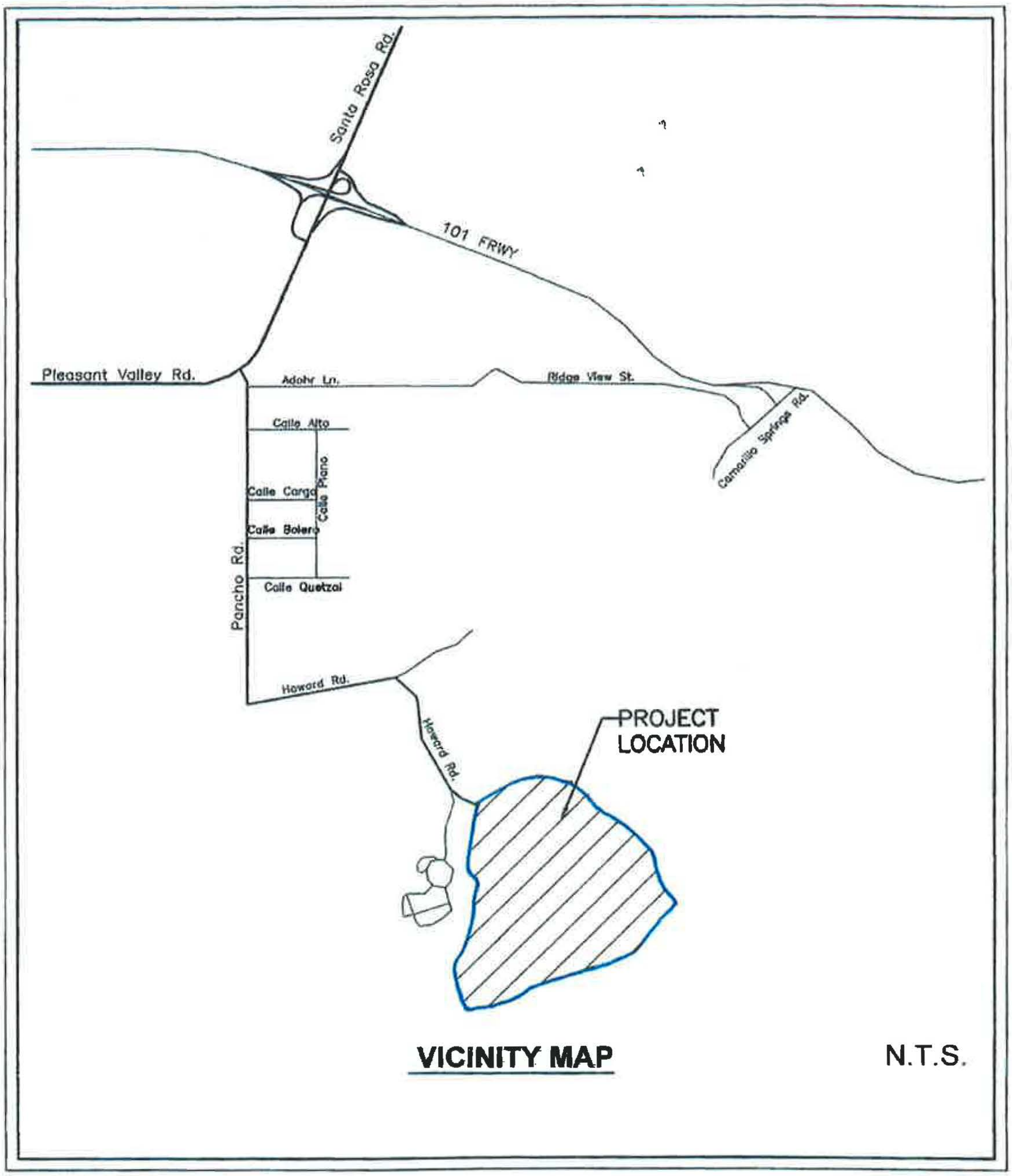
Attachments

Copy:
Mark Towne – Director, City of Thousand Oaks Community Development Department

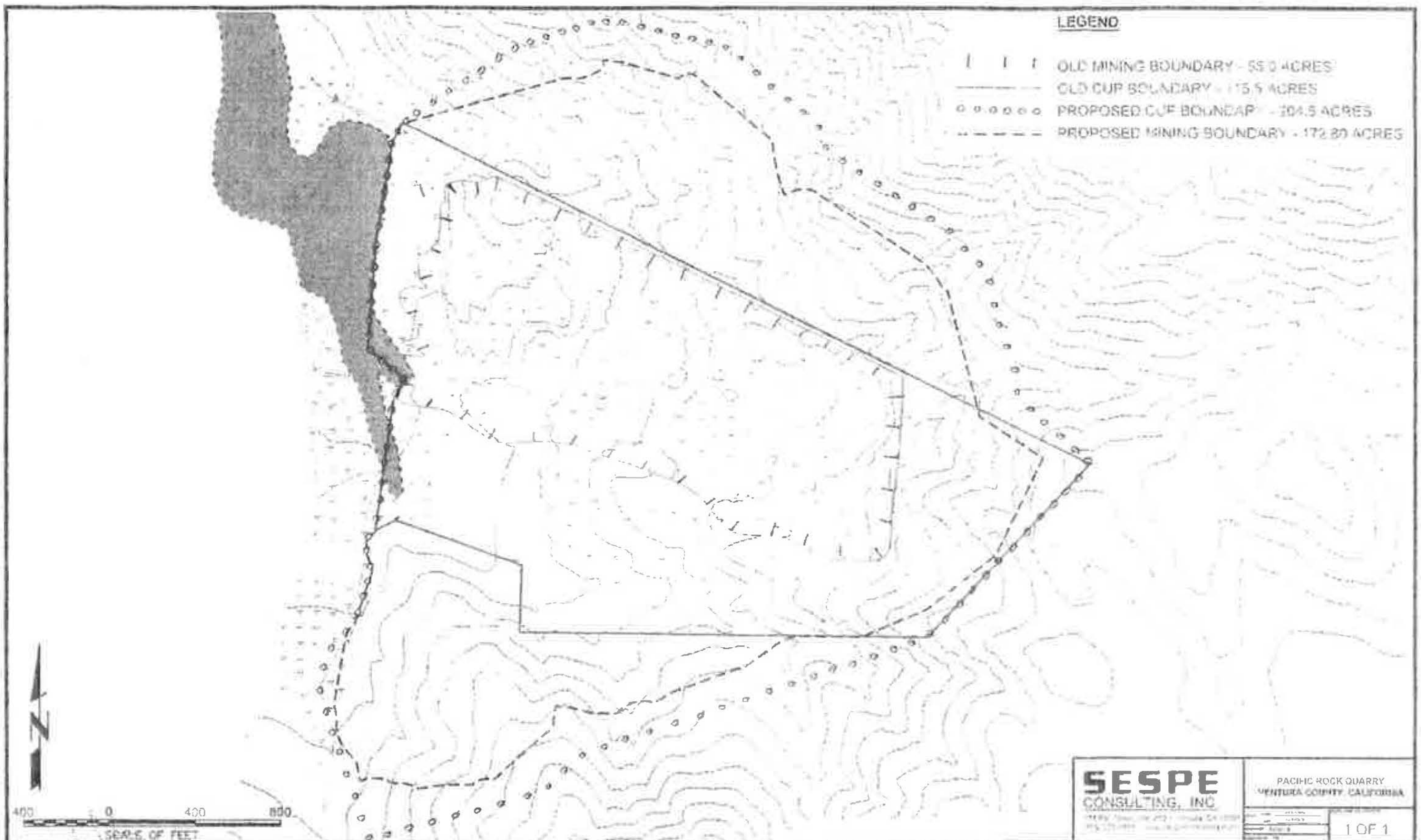
H:\COMMON\COSCA\Correspondence\Pacific Rock Quarry Expansion Comments 20170927.docx

A Joint Agency
City of Thousand Oaks/Conejo Recreation and Park District
2100 E. Thousand Oaks Blvd., Thousand Oaks, CA 91362

(805) 449-2100 (805) 495-6471



County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 1 – Vicinity Map



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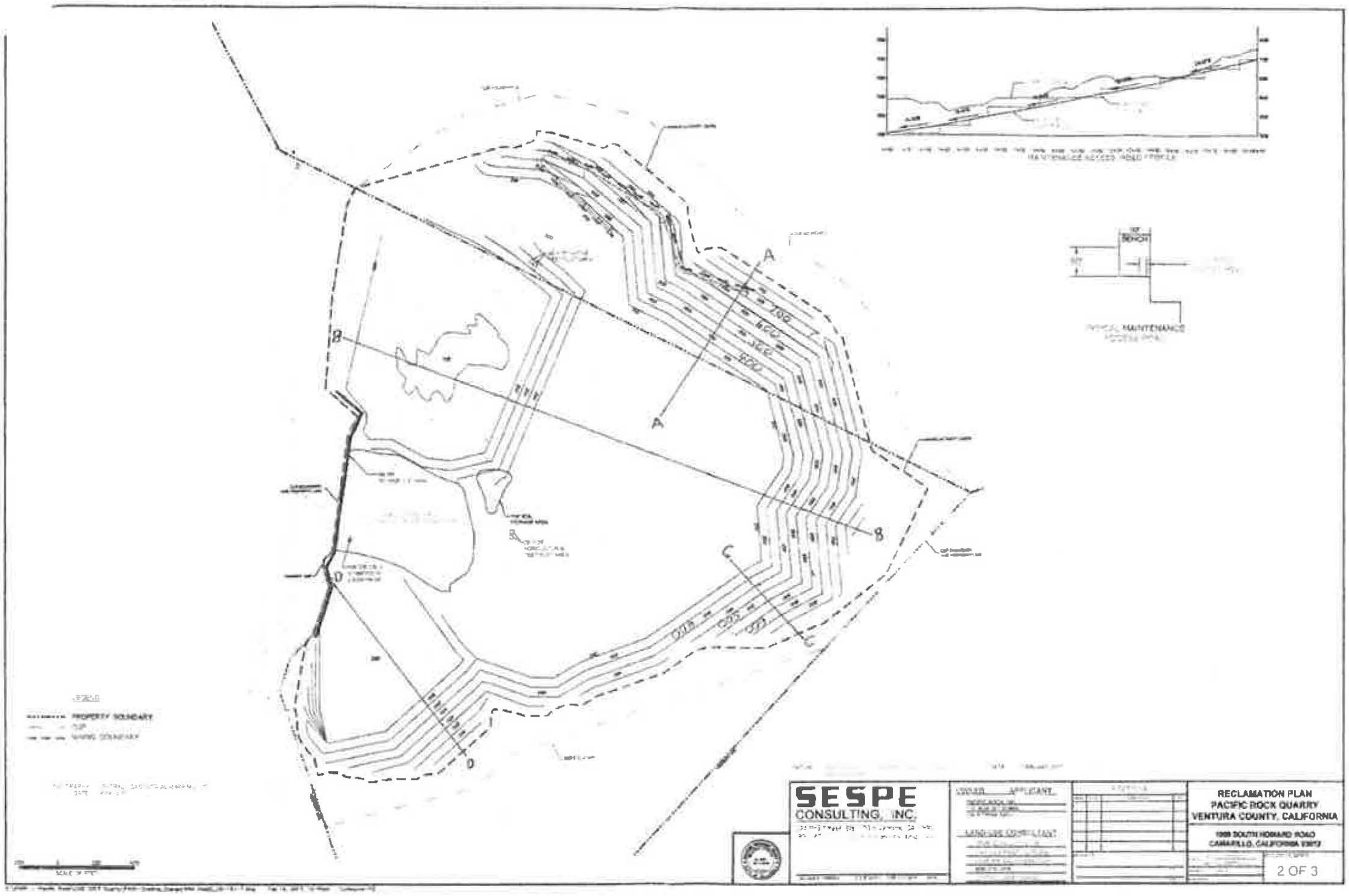
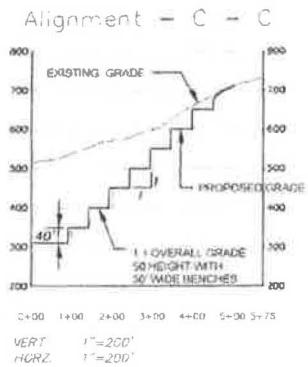
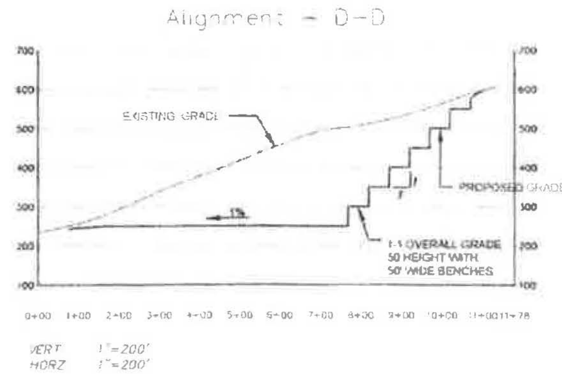
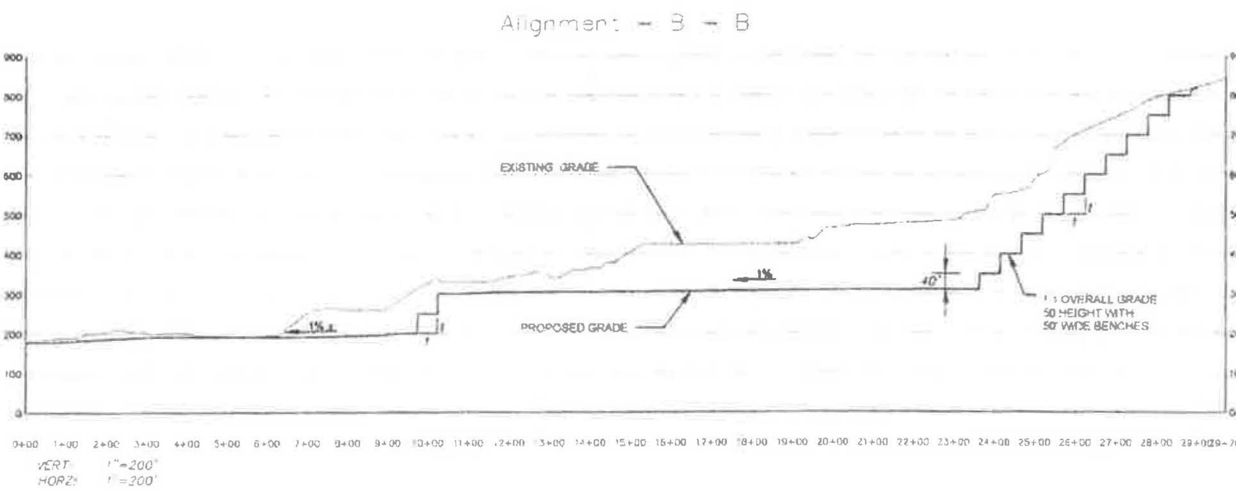
County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 2 – Site Plan

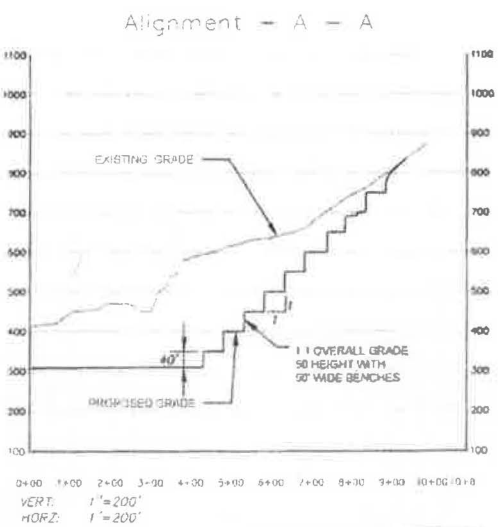


County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 3 – Reclamation Plan Map









CROSS - SECTIONS
PACIFIC ROCK QUARRY
VENTURA COUNTY, CALIFORNIA

1000 SOUTH HOWARD ROAD
CAMARILLO, CALIFORNIA 93012

FIGURE NUMBER
3 OF 3

S:\PA01 - Pacific Rock\CAD 2017 Quarry\PA01-Grading_Design(With Road)_02-15-17.dwg

County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 4 – Reclamation Plan
Cross Sections

City of Thousand Oaks

Community Development Department

2100 Thousand Oaks Boulevard • Thousand Oaks, CA 91362
Planning Division • Phone 805/449.2323 • Fax 805/449 2350 • www.toaks.org
Building Division • Phone 805/449 2500 • Fax 805/449 2575 • www.toaks.org

Mark A. Towne
Community Development Director

September 28, 2017

Brian R. Baca, Manager
Commercial and Industrial Permit Section
Ventura County Resource Management Agency
Planning Division
800 S. Victoria Avenue, L# 1740
Ventura, CA 93009

Subject: Review of Pacific Rock Quarry Mine Expansion Project – Notice of Preparation (NOP) of an Environmental Impact Report (EIR); County Case No. LU10-003
1000 South Howard Road, Camarillo CA 93012
Interagency Referral, City of Thousand Oaks No.: IRC 2017-70372

Dear ~~Mr. Baca~~: Brian

This letter is in response to the Notice of Preparation of an EIR for the Pacific Rock Mine Expansion Project. The City of Thousand Oaks is interested in this project because it is located adjacent to the City boundary and has the potential to impact nearby residential properties in the City. Specifically, the proposed mining boundary extends at least several hundred feet upslope to the City limits of Thousand Oaks and downslope from homes in the Thousand Oaks neighborhood know as Dos Vientos Ranch. Overall, the mining boundary is proposed to triple in size, from 55 acres to about 173 acres.

Project Understanding. According to the NOP, the project includes a request for approval of a modified Conditional Use Permit (CUP) and an amended Reclamation Plan to authorize expansion and continued operation of an existing surface mining facility for an additional 25-year period. For reference, the original exhibits 1-4 from Ventura County are attached. The request includes increases in the CUP boundary, mining excavation area, and operational days (from 6 to 7). Operations are proposed from 5:30 a.m. to 10:00 p.m., material haul truck traffic up to 120 one-way trips per operational day (with entire daily maximum potentially occurring during a.m. or p.m. peak traffic periods). The operation would involve excavation and export of 13.2 million tons of mined material. Finally, the request includes approval of the Reclamation Plan that results in an end use of agriculture (grazing) on benched areas and open space.

Surface mining activities would continue to be conducted at the facility using explosives to lift and loosen exposed bedrock. The material is then sorted, segregated by size and stockpiled on-site.

Potential Environmental Issues. The NOP states: "The EIR will address the potential environmental impacts associated with the proposed modifications of the existing facility, and whether the project will have any new or different impacts than were addressed in the 1980 MND." Reliance on the 1980 MND is not reasonable given that the document is outdated and unreliable for establishing baseline conditions. The updated EIR should address all issue areas in the context of the appropriate baseline conditions, the 25-year extended time frame, and the impacts of the proposed expansion of the mining excavation areas, operations and boundary.

According to the NOP, County staff has conducted a preliminary assessment of the proposed project and identified that three issue areas including biological resources, noise, and visual resources will be addressed in detail in the EIR. City staff concurs with the three identified issue areas be addressed in detail in the EIR. In addition, we request that, at minimum, the scope be expanded to include air quality, slope stability, and traffic impacts.

Detailed scoping comments. City staff requests that the specific issue areas include, at minimum, the following topics in the respective analyses:

- Project Description – Provide additional information to justify the request such as, calculated need for materials and where they will be used. Justify the necessity for 7 days/week and hours of operation. Describe the existing CUP parameters and provide a comparison of the differences in the current request, for example, days/hours of operation.
- Biological Resources – Impacts of excavation, and mining operations on native vegetation, sensitive habitat and wildlife species; analysis of effects on wildlife corridors; evaluation of reclamation plan with respect to revegetation and re-establishment of disturbed/destroyed habitat.
- Noise – Evaluation of impacts of explosives, mining operations, equipment and truck noise on adjacent residential uses.
- Visual Resources/Aesthetics – Evaluation of visual impacts of excavation and reclamation plan on adjacent residential and open space recreational areas including trails. Evaluation of lighting impacts on adjacent residential areas, freeway corridors and wildlife corridors. Provide photo simulations depicting before, during, and after views of the mined and reclaimed areas from public and adjacent residential areas.
- Air Quality – Conduct a Health Risk Assessment from truck and heavy equipment operations; analysis of truck trip air quality impacts on nearby sensitive uses, including, the effects of greenhouse gas emissions and dust.

- Traffic – Analyze the impacts of the estimated truck trips on local and state roadways; address impacts to peak hour traffic; assess the potential material destinations and vehicle miles travelled impacts.
- Alternatives and Mitigation – Evaluate potential mitigation measures and a reasonable selection of alternatives to the proposed project. Examples of alternatives include: reduced size of mined area; reduced amount of excavated material; reduced operational hours; alternative locations; restrictions on delivery distances; reduction of request on this site plus a second site with similar resources; and, modified reclamation plan.

Thank you for the opportunity to comment on the NOP for this project. We look forward to reviewing the Draft EIR.

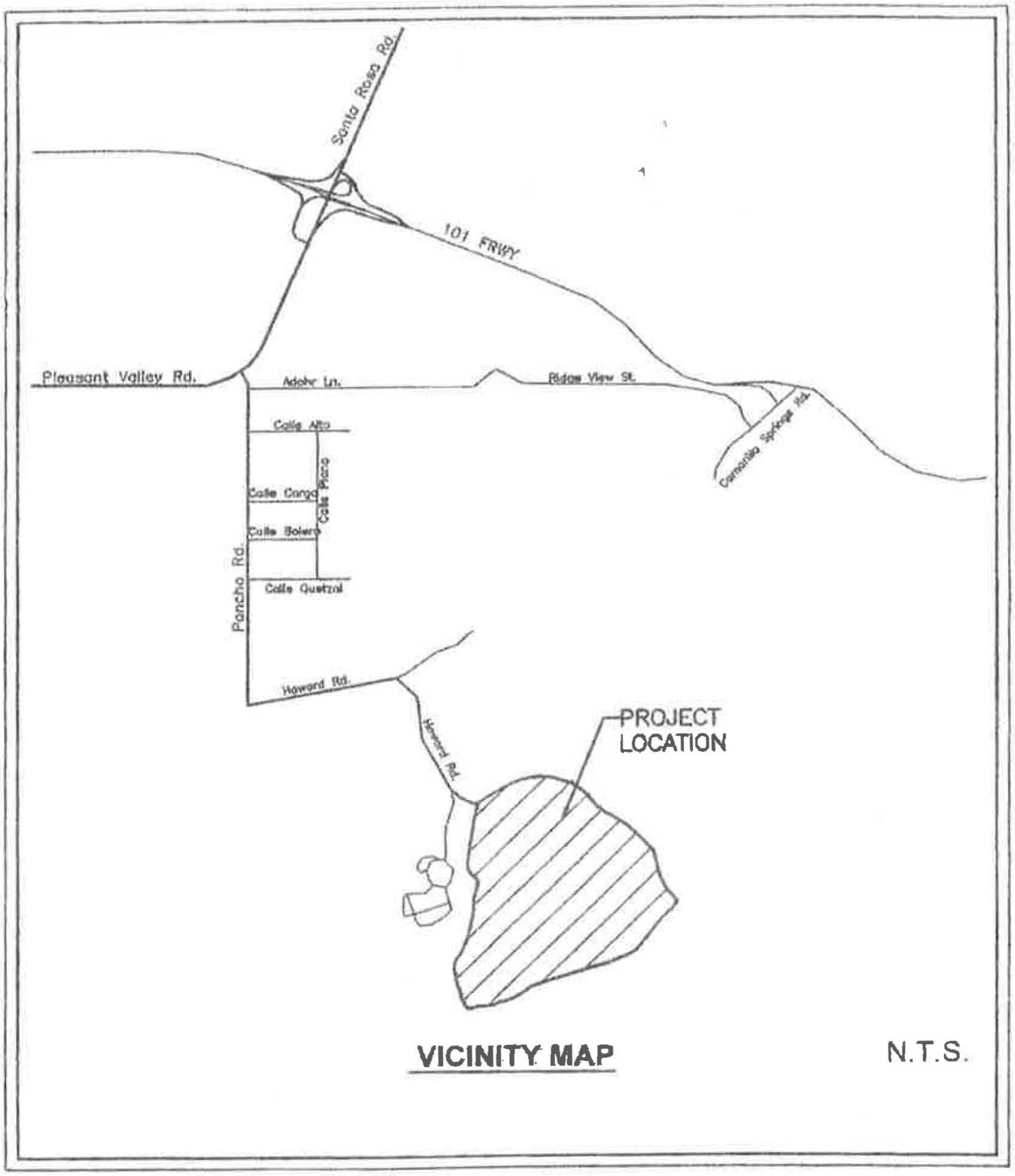
Sincerely,

Kari Finley

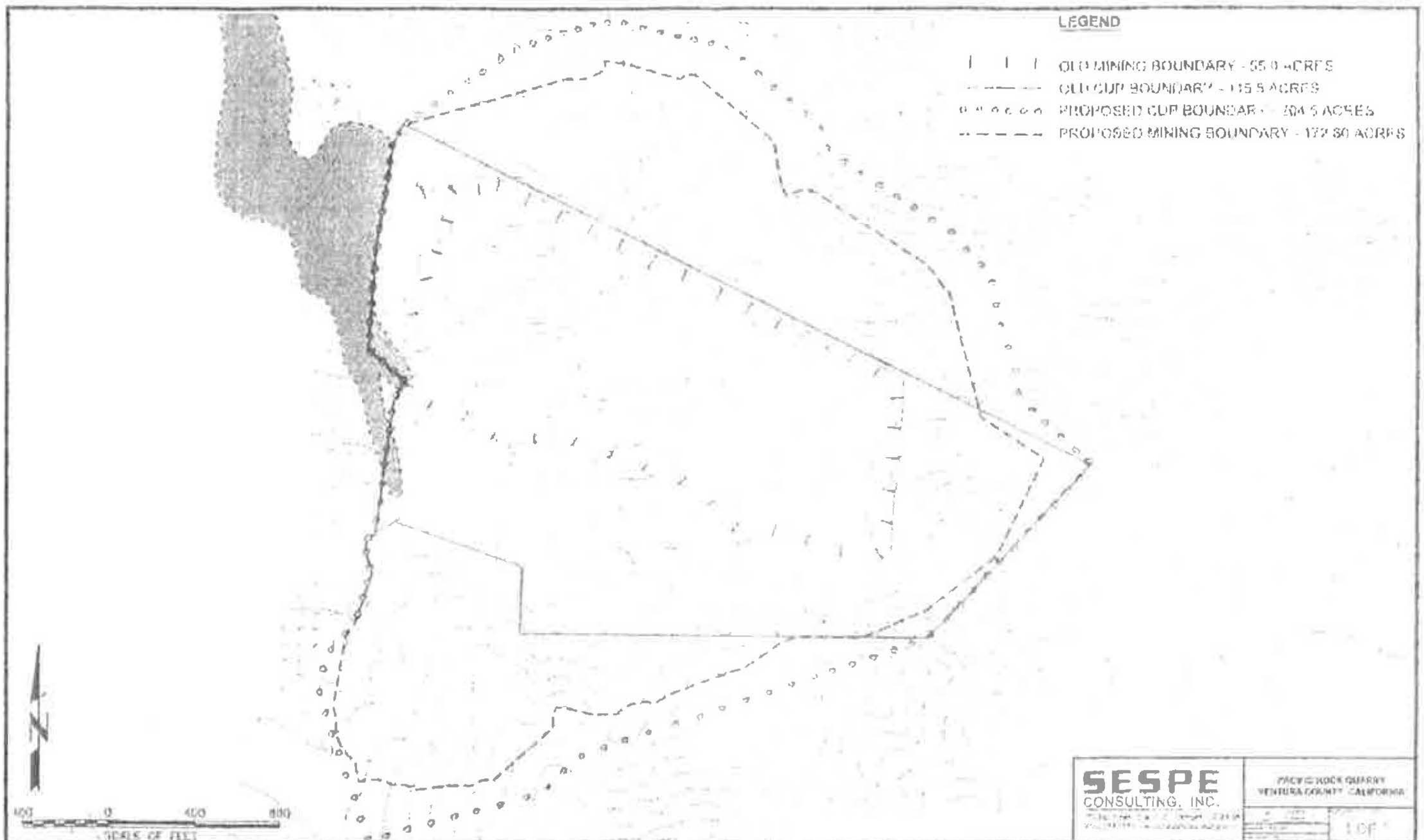
Kari Finley, Senior Planner

Attachments (Ventura County NOP exhibits 1-4)

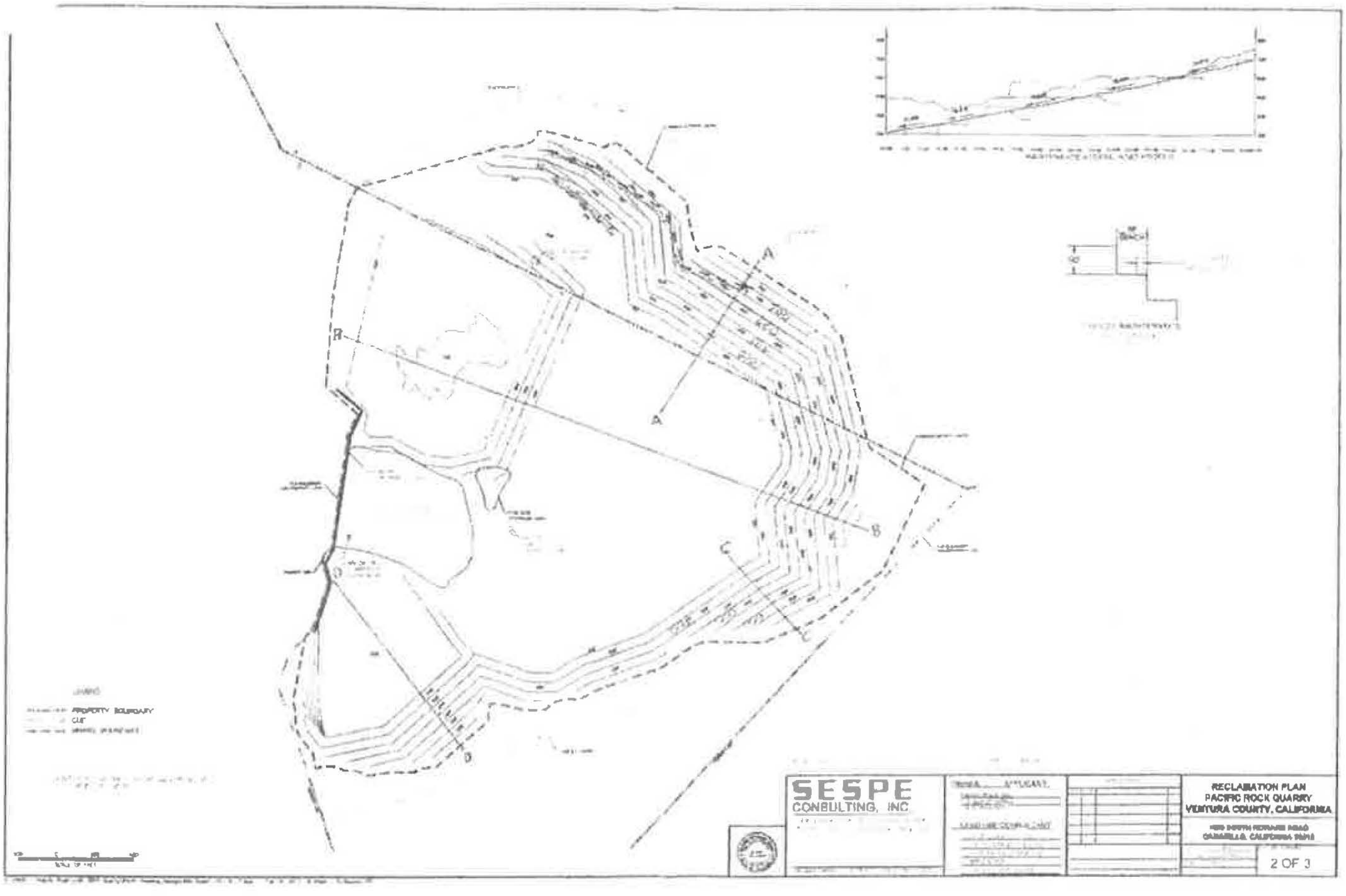
Copy:
Mark Towne – Director, Community Development Department



County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 1 – Vicinity Map

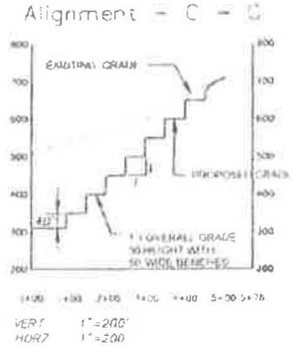


County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 2 – Site Plan

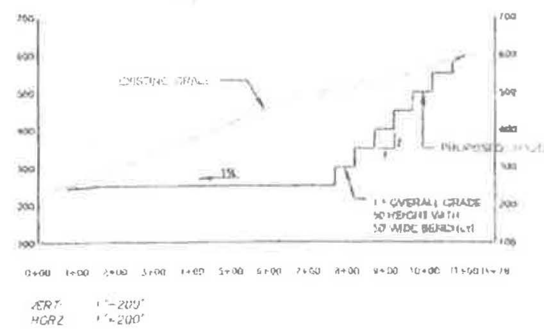


County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 3 – Reclamation Plan Map

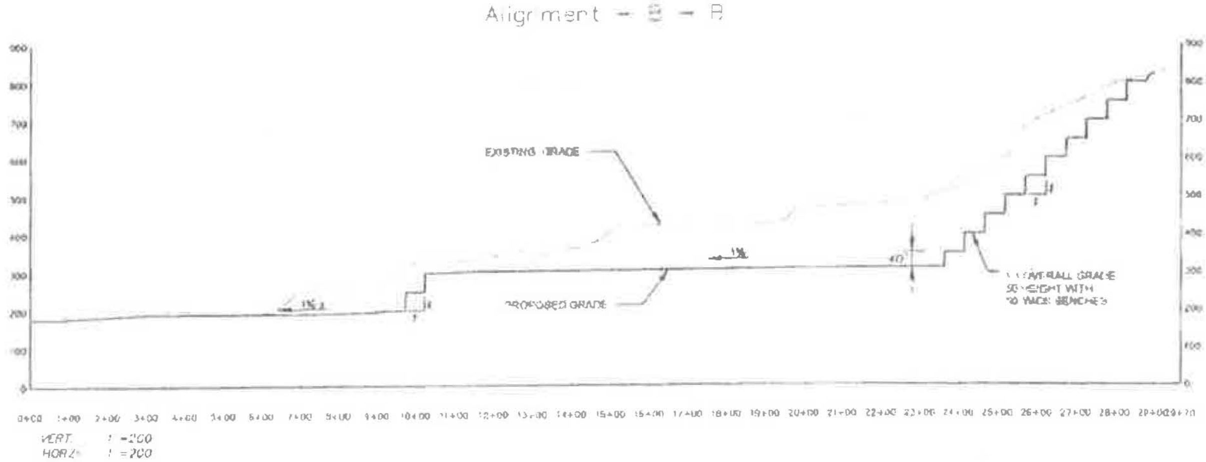
Alignment – C – C



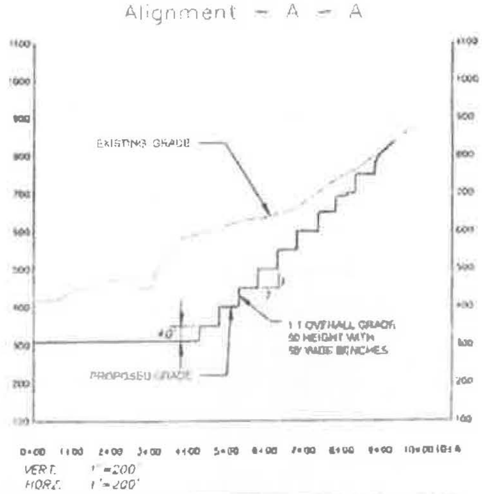
Alignment – D – D



Alignment – B – B



Alignment – A – A



CROSS - SECTIONS
PACIFIC ROCK QUARRY
VENTURA COUNTY, CALIFORNIA

1000 SOUTH HOWARD ROAD
CAMARILLO, CALIFORNIA 93012

FIGURE NUMBER

3 OF 3

County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 4 – Reclamation Plan
Cross Sections

Baca, Brian

From:	Randy Denning <denningemail@gmail.com>
Sent:	Friday, September 29, 2017 2:46 PM
To:	Baca, Brian
Subject:	Comments Regarding the Pacific Rock Quarry Mine Expansion Project (Case No. LU10-0003)
Attachments:	Comments Re. Case LU10-0003.pdf

Dear Mr. Baca,

The attached letter is provided in response to the "Notice of Preparation of an EIR" (Case No. KU10-0003). My family and I live almost directly above the quarry, and as would be expected neither my family nor any of my neighbors that I have spoken to are in favor of the proposed quarry expansion. I appreciate the opportunity to provide my comments and input, and it is my hope that the impact of these changes on the surrounding homes and natural area will be a significant consideration in the decision whether to allow the expansion. I don't know how many comments you have received on this issue, but as I stated in my letter I believe that most homeowners in Dos Vientos are not aware of the changes being considered and would not be in favor.

Thank you for your time.

Randy Denning
151 Via Sandra
Newbury Park, CA 91320
805.373.4022

September 29, 2017

Ventura County Resource Management Agency, Planning Division
Attn.: Bria R. Baca, Manager, Commercial and Industrial
800 South Victoria Avenue, L#1740
Ventura, CA 93009

Subject: Comments Regarding the Pacific Rock Quarry Mine Expansion Project (Case No. LU10-0003)

Dear Mr. Baca,

I am writing in order to provide my opinion and strong objection to the request for expansion and continued operation of the Pacific Rock Mine surface mining facility for an additional 25-year period.

My home is located above the quarry, and the quarry is clearly visible from my house and yard as well as for others on my street. I purchased my home knowing that the quarry existed, and was willing to live with the inconveniences that it brought with it. However, an expansion would bring the quarry much closer to existing $1.5 - $2.5 million homes than any of us envisioned, and would significantly affect our quality of life. The issues surrounding these changes are significant:

- Allowing work to continue until 10 p.m., and in an expanded area, would require lights which add to light pollution and would be visible to roughly 7 to 12 homes on my street.
- The added dust, dirt, noise until 10:00 p.m. would affect our quality of life, and of those in adjacent neighborhoods.
- Current restrictions on landscaping and other outdoor activities do not allow noise before 7:00 a.m. or past 7:00 p.m., so I can't understand why operation from 5:30 a.m. until 10:00 p.m. with the noise that it would generate is even an option.
- Blasting would be required closer to our homes, and I would question why, for both safety and noise reasons, would be allowed so close to homes and in an area that receives very heavy use from hikers and cyclists.

In summary, the changes requested would significantly affect our quality of life, and possibly our home values. The quarry as it sits now already has a huge visual impact on an otherwise beautiful area with wildlife and many different types of plant material; allowing a significant enlargement of the footprint will just further increase the mines' negative visual impact, as viewed from both above and below it.

As a side note it was an accident that I happened to hear about this proposed change. My guess is that there are many people that would be negatively affected that won't be aware of the changes until it's too late and they have been approved. I ask that you consider the above as you are considering changes that benefit one person (the quarry owner), while negatively affecting many people, families, and neighborhoods.

Thanks for considering my comments.

Randall Denning

Randall Denning
151 Via Sandra
Newbury Park, CA 91320

Baca, Brian

From: Carolyn dewey <carolynjdewey@gmail.com>
Sent: Friday, September 22, 2017 3:43 PM
To: Baca, Brian
Subject: Public Comments -- Pacific Rock Quarry Mine Expansion Project

ATTN: Mr. Brian R. Baca, Ventura County Resource Management Agency, Planning Division

Public Comment for Notice of Preparation of an EIR - case No LU10-0003.

I am a resident of Camarillo Springs, a community north of the subject property and am in complete opposition to the subject Project, Case No LU10-0003. I oppose all requested entitlements as outlined in the project description of the Notice of Preparation of an EIR. It is my opinion that the increases in operational days and hours, truck traffic, sizes of mining excavation area, excavation and export of material and loss of agricultural areas are beyond the scope of what the citizens and land can bare. To think Ventura County would even consider subjecting residents to explosives, excavation and rock-hauling trucks from 5:30 am to 10:00 pm goes beyond all reasonableness.

Concerns to include in the EIR:
1. Stability of Conejo Mountain. The mountain has already endured extreme heat from the fire of 2013, which fractured its construct, according to geological reports. Explosives and excavation would only further endanger the surrounding community and put us at risk of mudslides and debris flow.

2. Traffic and road impacts from rock-hauling trucks would add further wear and tear to Conejo Mountain Road, Pancho Road, Pleasant Valley Road, as well as highway 101. Freeway traffic, which is already badly impacted from Camarillo Springs Road north and south, would be further impacted by large vehicles and rock. Potentially, residents of Camarillo Springs would have no roads north without contending with rock-hauling trucks. That presents accidents and safety issues ready to happen.

3. Air quality is generally good in this area. Please don't contaminate it with emissions from rock-hauling trucks and excavation equipment.

4. Aesthetics of the general area and particularly Conejo Mountain Cemetery are of particular concern. Conejo Mountain has already been scarred by excavation. To continue the use of explosives and the noise of excavation near this beautiful cemetery, which is a place of solace and comfort to those who mourn, is to be lacking in compassion.

5. Operational days and hours and noise. I repeat! It is beyond reasonableness to subject a community to explosives seven days a week from 5:30am to 10:00pm! And for 25 years!

Respectfully,
Carolyn Dewey
6524 San Como Lane
Camarillo
805-551-9556
carolyndewey@gmail.com

Sent from my iPad

Baca, Brian

From: Ron Kester <ronkester99@gmail.com>
Sent: Thursday, September 14, 2017 9:10 AM
To: Baca, Brian; Ron Kester
Subject: Pacific Rock Quarry Mine Expansion project (LU10-0003)... Comment

Greetings..

I am a resident of Camarillo Springs, that backs the north side of Conejo Mountain, and also the HOA Board president for The Springs , a community of over 500 retired citizens.

Besides the issues cited in your letter for the EIR, our primary concers are1. the Geological imopt to the moutain's stability, 2.Increased traffic volume and congestion along the entrance to Conejo Mountain Rd./PanchoRd, and ultimately Pleasant Valley Road.and 3. Impact on wildlife

1. Geological Impact... Our geological engineering firm found that the fire of 2013 burned so hot that it changed the surface geological construct of Conejo Mountain. The mountain fractured , and rocks literally exploded. Our concern is that any removal of mountain mass, or blasting may further destabilize the mountain, increasing the likelihood of landslides and debris flows.

2. Traffic....The increased truck traffic requested will further congest an already overloaded surrounding road system. The Conejo Mountain Rd. is the only ingress/egress to the industrial park and the Conejo Mountain Cemetary. Also the weight of the trucks will further damage those roads. The affect on Pleasant Valley Rd. will add congestion and danger to the only ingress/egress for over 2000 homes, and the incresed traffic on the rfreeway ramps will greatly increase the congestion and danger of freeway traffic.. which is already horrendous.

3. Wildlife.... Conejo Mountain acts as the only wildlife corridor from the Santa Monica Mountain Conservancy range to the Conejo Creef, and under the freeway to the northern areas. This corrodor is vital to continued wildlife migration, and a diverse wildlife population.
Noise from blasting, increased traffic and removal of mountain topography will negatively impact the already fragile ecosystem.

We request that the above study areas be added to the EIR scope,

We oppose the expansion, on the above grounds/concerns; and the added doubt that pacific Rock will abide by any ecological orenvironmental restrictions that may be defined. it is well documented by way of past Stae and County violations.

Thank you for your consideration of our concerns and suggestions

James R. Kester
6329 Gitana Ave
Camarillo, CA 93012

805 458 9095

ronkester99@gmail.com

CARRIAGE SERVICES

October 2, 2017

Ventura County Resource Management Agency
Planning Division
Attn: Brian R. Baca, Manager
Commercial & Industrial Permit Section
800 South Victoria Avenue, L#1740
Ventura, CA 93009

Via Email (brian.baca@ventura.org)
Via Fax (805-654-2509)

Re: Notice of Preparation of an EIR
Pacific Rock Quarry Mine Expansion
Project Case No. LU10-0003

Dear Mr. Baca:

I write this letter in response to the Notice of Preparation of an EIR, Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003 and on behalf of Conejo Mountain Funeral Home, Memorial Park, and Crematory ("Conejo Mountain"). Thank you in advance for your consideration of our comments.

By way of introduction, Conejo Mountain has been serving the Camarillo community since 1963. Conejo Mountain and I are committed to being the most professional and highest quality funeral home and cemetery services organization in our industry and community. Client families choose to celebrate their loved ones at Conejo Mountain due to the area's natural beauty and serenity. It is from this perspective that we have deep concerns over the proposed Pacific Rock Quarry Mine Expansion Project ("Expansion Project").

GENERAL FACTUAL BACKROUND

Conejo Mountain and Pacific Rock Quarry share an access road and, although a blue line creek is, in part, on Conejo Mountain land, the blue line creek drains runoff from both properties. As Pacific Rock Quarry operates, its work directly impacts Conejo Mountain and its client families via, among other things, dynamite noise, dust, shaking, large trucks, and un-aesthetic changes to the mountainside, and by the publicly viewable mining operation equipment and debris.

Over the years, work done by Pacific Rock Quarry on its property has directly affected Conejo Mountain, including potentially causing a devastating flood in 2014. Pacific Rock Quarry has a "reservoir" on its land, and Conejo Mountain has seen Pacific Rock remove natural rock formations that has altered the natural flow of water in rains. Expansion of Pacific Rock Quarry's operations could lead to significant future problems for Conejo Mountain, a site at which the dead are laid to rest in peace.

3040 Post Oak Boulevard Suite 300 Houston, Texas 77056 Phone (713) 332-8400 Fax (713) 332-8401

Comment to: "An Increase in the Area Subject to the CUP from 115.5 Acres to 204.5 Acres" & "An Increase in the Mining Excavation Area Subject to Reclamation from 55 Acres to 172.5 Acres"

A significant portion of the work Pacific Rock Quarry does is upslope from Conejo Mountain, and historical wind data suggests that dust and other pollutants from the mining operation head toward Conejo Mountain.[1] Exhibits 1, 2, and 3 of the Notice of Preparation of an EIR all show that a wind from the northeast will blow toward or near Conejo Mountain, especially given the basin on the north side of the mountain and Conejo Mountain's location in that basin. Consideration should be given to the impacts on Conejo Mountain, the deceased, and the families that visit their loved ones with respect to airborne pollutants, noise, and other activity by Pacific Rock Quarry.

In addition, Exhibits 2, 3, and 4 to the Notice of Preparation of an EIR provide elevation data for the site. All rain water runs downslope toward Conejo Mountain and threatens Conejo Mountain. Conejo Mountain should be assured that drainage — even heavy rain runoff — will not impact it as a result of the mining operation, and Pacific Rock Quarry should be required to create appropriate drainage channels to protect its downstream neighbor.

Of further note, the continued mining of the mountain destroys the natural beauty of the landscape, leaves piles of rock and debris in public view, and necessitates the storing of heavy earth moving equipment on site. None of these are, unfortunately, aesthetically pleasing or a service to the landscape.

Comment to: "Increase in Operational Days . . . from 6 Days per Week to 7 Days per Week."

Pacific Rock Quarry's activities impact Conejo Mountain, its client families, and the peaceful resting of the deceased — although Conejo Mountain understands that it and its community must co-exist with lawful mining operations that were in effect in a lesser proposed scope before Conejo Mountain was created. To be clear, Pacific Rock Quarry's mining operations includes use of dynamite, the loud movement of rock, dust and other air pollutants, and the usage of heavy trucks down the shared access road.

Comment to: Truck Haul Operations

Any increase in truck haul operations negatively impacts Conejo Mountain and may damage the access road. Pacific Rock Quarry trucks are loud (engine noise, loading) and make it more difficult for passenger vehicles to navigate the shared access road. The pm "Peak Period" (3:00 pm to 5:00 pm) during which it is proposed that Pacific Rock Quarry be entitled to 120 trips is when services occur and when many client families come to visit their loved ones and watch the sun lower. Conejo Mountain would ask for more limited truck haul operational guidelines.

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[1] https://www.windfinder.com/windstatistics/ventura_county_goverment_center (last visited 9/27/2017)

Comment to: "Reclamation of the Mining Site to End Use of Agriculture (grazing) on Benched (near level) Areas that Would Remain on the Site and Open Space on the other Areas of the Site."

It is difficult to describe the impact that "grazing" activities would have on Conejo Mountain, its client families, and the deceased that rest in peace. Livestock cause noise, smells, biological waste, and impact runoff. Moreover, it is not clear what such grazing or other agricultural activities would have to the downslope neighbor, especially when operated by a company that specializes in mining and not agriculture/livestock. Conejo Mountain asks that a careful analysis be done of all of these concerns before any end use of agriculture (grazing) is approved.

Should you have any questions, or need any additional information, please feel free to contact me at 713-332-8452.

Respectfully submitted,

Michael G. Elliott
Legal Counsel

CARRIAGE SERVICES

October 2, 2017

Ventura County Resource Management Agency
Planning Division
Attn: Brian R. Baca, Manager
Commercial & Industrial Permit Section
800 South Victoria Avenue, L#1740
Ventura, CA 93009

Via Email (brian.baca@ventura.org)
Via Fax (805-654-2509)

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Pacific Rock Quarry Mine Expansion
Project Case No. LU10-0003

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Should you have any questions, or need any additional information, please feel free to contact me at 713-332-8452.

Respectfully submitted,

Michael G. Elliott
Legal Counsel

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
www.wildlife.ca.gov

October 2, 2017

Mr. Brian Baca, Manager
Commercial and Industrial Permit Section
Ventura County Resource Management Agency Planning Division
800 South Victoria Avenue, L#1740
Ventura, CA 93009
brian.baca@ventura.org

**Subject: Pacific Rock Mine Expansion Project, Case No. LU10-0003
Notice of Preparation of an Environmental Impact Report
Ventura County, California**

Dear Mr. Baca:

The California Department of Fish and Wildlife (Department, CDFW) has reviewed the above-referenced Notice of Preparation (NOP) of an Environmental Impact Report for the Pacific Rock Mine Expansion Project (Project). The existing mine facility is located on the western edge of the Santa Monica Mountains about two miles south of Highway 101. The address is: 1000 South Howard Road, Camarillo, CA 93012.

The mining area is located on the south flank/base of Conejo Mountain. Adjacent land uses include agriculture and a memorial park to the west, and extensive open space supporting wildlife habitat to the north, east and south. The existing mine was approved on June 17, 1980 under a Mitigated Negative Declaration and operates with a Conditional Use Permit (CUP).

The applicant requests that Ventura County, as lead agency, grant a modified CUP authorizing expansion and continued operation of a surface mining facility for an additional 25 years. The area subject to the existing CUP is about 115.5 acres, and the applicant requests to increase that area to 204.5 acres. Excavated material would total 13.2 million tons (or 19.8 million cubic yards) which would be exported from the site via trucks. Reclamation of the mining site would result in an end use of agriculture (grazing). Final quarry slopes would be at a 1:1 gradient. Other aspects of the proposed Project include increasing the days of operation, and amendment of the Reclamation Plan to increase the area subject to reclamation from 55 acres to 172.5 acres.

The following comments and recommendations have been prepared pursuant to the Department's authority as a Responsible Agency under CEQA Guidelines section 15381 over those aspects of the proposed project that come under the purview of the California Endangered Species Act (CESA; Fish and Game Code § 2050 *et seq.*), the Native Plant Protection Act (NPPA, Fish and Game Code § 1900 et seq.) and Fish and Game Code section 1600 *et seq*., and pursuant to our authority as Trustee Agency with jurisdiction over natural resources affected by the project (California Environmental Quality Act, [CEQA] Guidelines § 15386) to assist the Lead Agency in avoiding or minimizing potential project impacts on biological resources.

Specific Comments

1. **Conejo buckwheat (*Eriogonum crocatum*)**. The Project is located in a region that supports the Conejo buckwheat, a Ventura County endemic species and designated as a state-listed rare plant pursuant to the NPPA. A Conejo buckwheat population is known to occur in the Project area and adjacent habitats (BioResources Consultants, 2017). The NPPA prohibits the take and/or possession of state-listed rare plants unless authorized by the Department or in certain limited circumstances. Take of Conejo buckwheat or other state-listed rare plants that could occur as a result of the Project may only be permitted through an incidental take permit (ITP) or other authorization issued by the Department pursuant to California Code of Regulations, Title 14, section 786.9 subdivision (b). The Department recommends early consultation for NPPA and CESA listed species.

   The Department recommends conducting surveys for Conejo buckwheat, in addition to any other rare, threatened or endangered plant that has the potential to occur in the region, and include survey results in the Project DEIR along with any proposed avoidance and minimization measures. Potentially suitable habitat for Conejo buckwheat should also be identified and avoided.

   Vegetation in this region was affected by the spring wildfire in 2013 and extended drought has hampered recovery in this area for species affected by the fire. The Department considers habitats capable of supporting Conejo buckwheat, and other sensitive plants, to include areas historically occupied, including areas that maintain a seed bank, which may allow population recovery once the current drought cycle ends. Past botanical assessments conducted before the Spring 2013 wildfire will therefore be important to include in establishing the environmental setting in the Project area.

   Regulations under NPPA require that impacts to Conejo buckwheat be fully mitigated. Where direct impacts cannot be avoided and where incidental take, if authorized, does not lead to jeopardy; the Department typically requires compensatory habitat be permanently protected using Conservation Easements, and managed to compensate for losses elsewhere.

   Botanical surveys for Conejo buckwheat should include: a) assessing areas that could be directly or indirectly impacted by the proposed Project; and b) assessing areas that may serve as proposed compensatory mitigation sites. Botanical assessments documented in the Initial Study Biological Assessment (ISBA)(BioResources Consultants, 2017) extended about 300 feet beyond the Project boundary; an area proposed for mining expansion upslope of the existing quarry is shown as "inaccessible" on a map and presumably was not surveyed (BioResources Consultants, 2017 Site and Survey Area Map). This area is shown as supporting numerous rare plants including Conejo buckwheat and federally listed threatened and/or endangered species of dudleyas.

   Expanded mining northward will encroach further into steep terrain on Conejo Mountain, could have adverse direct and indirect effects to biological resources, and could destabilize geologic features which support biological resources on upslope habitats beyond the Project area. CDFW recommends that expansion northward be deleted from the proposed Project and the EIR should include this as a Project alternative.

2. **Alteration of Streams**. The existing quarry operation has removed numerous ephemeral and intermittent streams in the Project area and two streams flow into existing culverts. On-site runoff from these two streams is generally directed into an existing pond and used for agricultural irrigation. CDFW has no records of Notification for stream alterations and or stream diversions in the Project area.

   In addition, there appear to be habitat disturbances beyond the perimeter of the existing CUP area affecting streams. The EIR should identify non-compliance issues resulting in impacts to sensitive species, habitats, and streams beyond the existing CUP area, and include effective compensatory mitigation and restoration of damaged areas associated with direct, indirect, temporal and cumulative impacts.

3. **Wildlife Movement and Protected Open Space**. The proposed Project includes expansion 250-500 feet upslope in an easterly direction beyond the existing quarry disturbance. The proposed construction footprint extends close to the edge of the parcel boundary, and adjoins protected open space on parcel 234-0-080-380 managed by the Mountains Recreation and Conservation Authority (MRCA) (103 acres).

   The MRCA open space parcel and adjacent wildlife habitats lie between the existing quarry footprint and the Dos Vientos residential housing tract; the habitat is about 1000 feet wide at its narrowest under current conditions. This location represents a functioning wildlife movement area allowing plant and animal species to reside there and move spatially between Conejo Mountain and the western Santa Monica Mountains.

   Proposed quarry expansion would remove habitat in this area, further reducing the width of this movement corridor by 1/3 or more. The MRCA open space parcel would not be providing an effective buffer to neutralize adverse edge effects associated with the nearby mining. These impacts will degrade the current wildlife values in this location.

   Habitats east of the existing CUP boundary proposed for mining expansion were documented in 2010 as supporting the state listed rare Conejo buckwheat and other rare, threatened and/or endangered plant species (BioResources Consultants, 2017).

   CDFW recommends that the DEIR include alternatives that eliminate mining expansion eastward to maintain and buffer protected open space values, existing wildlife movement corridors, and sensitive plant populations.

General Comments

1) Project Description and Alternatives. To enable the Department to adequately review and comment on the proposed project from the standpoint of the protection of plants, fish, and wildlife, we recommend the following information be included in the DEIR.

   a) A complete discussion of the purpose and need for, and description of, the proposed project, including all staging areas and access routes to the construction and staging areas.

   b) A range of feasible alternatives to project component location and design features to ensure that alternatives to the proposed project are fully considered and evaluated. The alternatives should avoid or otherwise minimize direct and indirect impacts to sensitive biological resources and wildlife movement areas.

2) Lake and Streambed Alteration Agreements (LSA). As a Responsible Agency under CEQA Guidelines section 15381, the Department has authority over activities in streams and/or lakes that will divert or obstruct the natural flow, or change the bed, channel, or bank (including vegetation associated with the stream or lake) of a river or stream, or use material from a streambed. For any such activities, the project applicant (or "entity") must provide written notification to the Department pursuant to section 1600 et seq. of the Fish and Game Code. Based on this notification and other information, the Department determines whether a Lake and Streambed Alteration Agreement (LSA) with the applicant is required prior to conducting the proposed activities. The Department's issuance of a LSA for a project that is subject to CEQA will require CEQA compliance actions by the Department as a Responsible Agency. As a Responsible Agency, the Department may consider the Environmental Impact Report of the local jurisdiction (Lead Agency) for the project. To minimize additional requirements by the Department pursuant to section 1600 *et seq.* and/or under CEQA, the document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the LSA.[1]

   a) The project area supports aquatic, riparian, and wetland habitats; therefore, a preliminary jurisdictional delineation of the streams and their associated riparian habitats should be included in the DEIR. The delineation should be conducted pursuant to the U. S. Fish and Wildlife Service wetland definition adopted by the Department.[2] Some wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers' Section 404 permit and Regional Water Quality Control Board Section 401 Certification.

   b) In project areas which support ephemeral streams, herbaceous vegetation, woody vegetation, and woodlands also serve to protect the integrity of ephemeral channels and help maintain natural sedimentation processes; therefore, the Department recommends effective setbacks be established to maintain appropriately-sized vegetated buffer areas adjoining ephemeral drainages.

   c) Project-related changes in drainage patterns, runoff, and sedimentation should be included and evaluated in the environmental document.

3) Wetlands Resources. The Department, as described in Fish & Game Code § 703(a) is guided by the Fish and Game Commission's policies. The Wetlands Resources policy (http://www.fgc.ca.gov/policy/) of the Fish and Game Commission "...seek[s] to provide for the protection, preservation, restoration, enhancement and expansion of wetland habitat in California. Further, it is the policy of the Fish and Game Commission to strongly discourage

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[1] A notification package for a LSA may be obtained by accessing the Department's web site at www.wildlife.ca.gov/habcon/1600.

[2] Cowardin, Lewis M., et al. 1970. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service.

development in or conversion of wetlands. It opposes, consistent with its legal authority, any development or conversion which would result in a reduction of wetland acreage or wetland habitat values. To that end, the Commission opposes wetland development proposals unless, at a minimum, project mitigation assures there will be "no net loss" of either wetland habitat values or acreage. The Commission strongly prefers mitigation which would achieve expansion of wetland acreage and enhancement of wetland habitat values.

The Wetlands Resources policy provides a framework for maintaining wetland resources and establishes mitigation guidance. The Department encourages avoidance of wetland resources as a primary mitigation measure and discourages the development or type conversion of wetlands to uplands. The Department encourages activities that would avoid the reduction of wetland acreage, function, or habitat values. Once avoidance and minimization measures have been exhausted, the project must include mitigation measures to assure a "no net loss" of either wetland habitat values, or acreage, for unavoidable impacts to wetland resources. Conversions include, but are not limited to, conversion to subsurface drains, placement of fill or building of structures within the wetland, and channelization or removal of materials from the streambed.

All wetlands and watercourses, whether ephemeral, intermittent, or perennial, should be retained and provided with substantial setbacks, which preserve the riparian and aquatic values and functions for the benefit of on-site and off-site wildlife populations. The Department recommends mitigation measures to compensate for unavoidable impacts be included in the DEIR and these measures should compensate for the loss of function and value.

4) California Endangered Species Act (CESA) and Native Plant Protection Act (NPPA). The Department considers adverse impacts to a species protected by CESA or NPPA, for the purposes of CEQA, to be significant without mitigation. Take of any endangered, threatened, candidate species, or state-listed rare plant species that results from the project is prohibited, except as authorized by state law (Fish and Game Code, §§ 1908, 2080, 2085; Cal. Code Regs., tit. 14, §783.2; § 786.9(b)). Consequently, if the project, project construction, or any project-related activity during the life of the project will result in take of a species designated as endangered or threatened, rare or a candidate for listing under CESA or the NPPA, the Department recommends that the project proponent seek appropriate take authorization prior to implementing the project.

   Appropriate authorization from the Department may include an Incidental Take Permit (ITP) or a consistency determination in certain circumstances, among other options (Fish and Game Code §§ 2080.1, 2081, subds. (b), (c)). Early consultation is encouraged, as significant modification to a project and mitigation measures may be required in order to obtain a CESA or NPPA incidental take permit. Revisions to the Fish and Game Code, effective January 1998, may require that the Department issue a separate CEQA document for the issuance of an ITP unless the Project CEQA document addresses all project impacts to state-listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of an ITP. For these reasons, biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for an ITP.

5) Biological Baseline Assessment. To provide a complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, sensitive, regionally and locally unique species, and sensitive habitats, the DEIR should include the following information.

   a) Information on the regional setting is critical to an assessment of environmental impacts; special emphasis should be placed on resources that are rare or unique to the region (CEQA Guidelines § 15125[c]).

   b) A thorough, recent, floristic-based assessment of special status plants and natural communities, following the Department's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (see http://www.dfg.ca.gov/habcon/plant/).

   c) Floristic, alliance- and/or association-based mapping and vegetation impact assessments conducted at the project site and within the neighboring vicinity. *The Manual of California Vegetation*, second edition, should be used to inform this mapping and assessment (Sawyer et al. 2009); Keeler-Wolf and Evens (2006) classification for the Santa Monica Mountains contains alliance and association-based keys applicable to the project area and should also be used. Adjoining habitat areas should be included in this assessment where site activities could lead to direct or indirect impacts offsite. Habitat mapping at the alliance level will help establish baseline vegetation conditions.

   d) A complete, recent, assessment of the biological resources associated with each habitat type on site and within adjacent areas that could also be affected by the project. The Department's California Natural Diversity Data Base (CNDDB) in Sacramento should be contacted to obtain current and historic information on any previously reported sensitive species and habitat. The Department recommends that CNDDB Field Survey Forms be completed and submitted to CNDDB to document survey results. Online forms can be obtained and submitted at http://www.dfg.ca.gov/biogeodata/cnddb/submitting_data_to_cnddb.asp.

   e) A complete, recent assessment of rare, threatened, and endangered, and other sensitive species on site and within the area of potential effect, including California Species of Special Concern (CSSC) and California Fully Protected Species (Fish and Game Code § 3511). Species to be addressed should include all those which meet the CEQA definition (see CEQA Guidelines § 15380). Seasonal variations in use of the project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and the U.S. Fish and Wildlife Service.

   f) Some aspects of the proposed project may warrant periodic updated surveys for certain sensitive taxa, particularly if quarry operations occur over a protracted time frame, or in phases.

6) Biological Direct, Indirect, and Cumulative Impacts. A thorough discussion of adverse direct, indirect, and cumulative impacts expected to affect biological resources, with specific

measures to offset such impacts should be addressed in the DEIR and include the following.

a) A discussion of potential adverse impacts from lighting, noise, fugitive dust, human activity, exotic species, and drainage. The latter subject should address project-related changes on drainage patterns onsite and downstream of the project area; the volume, velocity, and frequency of existing and post-project surface flows; polluted runoff; soil erosion and/or sedimentation in streams and water bodies; and post-project fate of runoff from the project site. The discussion should also address the proximity of the extraction activities to the water table, whether dewatering would be necessary and the potential resulting impacts on the habitat, if any, supported by the groundwater. Mitigation measures proposed to alleviate such impacts should be included.

b) A discussion regarding indirect project impacts to biological resources, including resources on nearby public lands, open space, adjacent natural habitats, riparian ecosystems, and any designated and/or proposed or existing reserve lands. Impacts on, and maintenance of, wildlife corridor/movement areas, including access to undisturbed habitats in adjacent areas, should be fully evaluated in the DEIR.

c) A cumulative effects analysis, as described under CEQA Guidelines section 15130, should be included. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats. Unauthorized impacts from quarry activities outside their approved CUP boundary should also be addressed.

7) Avoidance, Minimization, and Mitigation for Sensitive Plants Communities. The DEIR should include measures to fully avoid and otherwise protect sensitive plant communities from project-related direct and indirect impacts. The Department considers these communities to be imperiled habitats having both local and regional significance. Plant communities, alliances, and associations with a statewide ranking of S-1, S-2, S-3 and S-4 should be considered sensitive and declining at the local and regional level. These ranks can be obtained by querying the CNDDB and are included in *The Manual of California Vegetation* (Sawyer et al. 2009), and Keeler-Wolf and Evens (2006).

8) Compensatory Mitigation. The DEIR should include mitigation measures for adverse project-related impacts to sensitive plants, animals, and habitats, including pollinator habitat. Mitigation measures should emphasize avoidance and reduction of project impacts. For unavoidable impacts, compensatory off-site habitat protection, which would permanently preserve and protect the suite of common and sensitive species adversely affected by mining, should be provided. Reclamation of the mining pit, which would occur many years into the future once mining ceases, does not constitute effective mitigation for habitat loss.

   Compensatory habitat should be of high quality and contain effectively buffered core habitat that can be preserved in perpetuity. Setbacks several hundred feet distant from quarry activities are appropriate.

9) Long-Term Management of Mitigation Lands. For proposed preservation and/or restoration, the DEIR should include measures to protect the targeted habitat values from direct and indirect negative impacts in perpetuity. The objective should be to offset the project-induced qualitative and quantitative losses of wildlife habitat values. Issues that should be

addressed include, but are not limited to, restrictions on access, proposed land dedications, monitoring and management programs, control of illegal dumping, water pollution, and increased human intrusion. An appropriate non-wasting endowment should be set aside to provide for long-term management of mitigation lands.

10) Nesting Birds. The Department recommends that measures be taken to avoid project impacts to nesting birds. Migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (Title 50, § 10.13, Code of Federal Regulations). Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA). Proposed project activities (including, but not limited to, vegetation grubbing and grading) should occur outside of the avian breeding season which generally runs from February 1st through September 1st (as early as January 1st for some raptors) to avoid take of birds or their eggs. If avoidance of the avian breeding season is not feasible, the Department recommends surveys by a qualified biologist with experience in conducting breeding bird surveys to detect protected native birds occurring in suitable nesting habitat that is to be disturbed and any other such habitat within 300 feet of the disturbance area (within 500 feet for raptors). Project personnel, including all contractors working on site, should be instructed on the sensitivity of the area. Reductions in the nest buffer distance may be appropriate depending on the avian species involved, ambient levels of human activity, screening vegetation, or possibly other factors.

11) Translocation/Salvage of Plants and Animal Species. Translocation and transplantation is the process of moving an individual from the project site and permanently moving it to a new location. The Department generally does not support the use of translocation or transplantation as the primary mitigation strategy for unavoidable impacts to rare, threatened, or endangered plant or animal species. Studies have shown that these efforts are experimental and the outcome unreliable. The Department has found that permanent preservation and management of habitat capable of supporting these species is often a more effective long-term strategy for conserving sensitive plants, animals, and their habitats.

12) Moving out of Harm's Way. The proposed project is likely to result in clearing of natural habitats that support indigenous wildlife. To avoid direct mortality, the Department recommends a qualified biological monitor approved by the Department be on site prior to and during vegetation grubbing and ground disturbing activities to move out of harm's way special status species or other wildlife of low mobility that would be injured or killed by grubbing or project-related construction activities. It should be noted that the temporary relocation of on-site wildlife does not constitute effective mitigation for the purposes of offsetting project impacts associated with habitat loss.

13) Wildlife Movement and Connectivity. The project area supports significant biological resources and is located adjacent to a regional wildlife movement corridor. The project area contains habitat connections and supports movement across the broader landscape, sustaining both transitory and permanent wildlife populations. On-site features, which contribute to habitat connectivity, should be evaluated and maintained. Aspects of the project could create physical barriers to wildlife movement from direct or indirect project-related activities. Indirect impacts from lighting, noise, dust, and increased human activity may displace wildlife in the general area.

14) Reclamation Plan. Amendment of the existing Reclamation Plan is included in the Project description. Only 55 acres of the existing 115.5 acres CUP area is currently included in the existing Reclamation Plan. The proposed Project would expand quarry operations and when mining ends, 172.5.acres would be reclaimed. The quarry's location and proximity to sensitive species and wildlife habitats affiliated with Conejo Mountain suggest that reclamation may not be adequate to ensure that the site is stable, fully vegetated, and not subject to weed invasions which could spread to adjacent areas. About 60 acres of quarried land would not be subject to reclamation. The DEIR should evaluate adverse effects from weed invasion likely to occur on disturbed quarry lands not subject to reclamation. The potential end use as livestock grazing also suggests that the reclaimed site would not successfully be revegetated to a stable, native plant community and weeds are likely to establish.

We appreciate the opportunity to comment on the referenced NOP. Questions regarding this letter and further coordination on these issues should be directed to Ms. Mary Meyer, Senior Environmental Scientist (Specialist), at (805) 640-8019 or Mary.Meyer@wildlife.ca.gov.

Sincerely,

Betty J. Courtney

Betty J. Courtney
Environmental Program Manager I
South Coast Region

ec. Christine Found-Jackson, Newbury Park
Mary Meyer, Ojai
Brock Warmuth, Ventura
Roger Root, Ventura Field Office, USFWS
Scott Morgan, State Clearinghouse

Literature Cited

BioResources Consultants, February 16, 2017. Initial Study Biological Assessment. Prepared for the County of Ventura. 76 pp.

Keeler-Wolf, T, and J. Evens. 2006. Vegetation classification of the Santa Monica Mountains National Recreation Area and environs in Ventura and Los Angeles counties, California. Unpublished report to the National Park Service. California Department of Fish and Game and California Native Plant Society, Sacramento CA. 711 pp.

Sawyer, John G., Todd Keeler-Wolf, Julie Evens, 2009, A Manual of California Vegetation. 2nd ed. California Native Plant Society Press. 1300 pp.

Baca, Brian

From: Dan Bonfiglio <dan@mrdosvientos.com>
Sent: Monday, October 02, 2017 3:45 PM
To: Baca, Brian
Subject: RE: DOS VIENTOS RANCH COMMUNITY ASSOCIATION -Pacific Rock Quarry Notice Attached

I would like to register my vehement opposition to granting Pacific Rock an expansion of their mining operation. They have been there long enough (and on an expired permit, as I understand). This 319% expansion will affect our environment, health and property values.

Please, please, please deny their application!

Dan Bonfiglio
Former President of the Dos Vientos Ranch Community Association
and Broker Associate
Keller Williams Realty
CalBRE 10106916
805-402-9383 cell/text

Baca, Brian

From:	Brian Buck <brian@bucksinla.com>
Sent:	Monday, October 02, 2017 3:57 PM
To:	Baca, Brian
Subject:	Deny: Pacific Rock Quarry Mine Expansion Project

Dear Mr. Baca,

This is in regard to the application for modification of the Pacific Rock Quarry Mine Expansion Project, Case No. LU10-003. As a resident of the area and long-time Ventura County resident, I'm requesting that you deny the expansion of this project.

I recently became aware of this request and find it will irrefutably create lasting harm to our community, property values, and the overall environmental balance of our beautiful county. At no point in time has mining ever contributed to the long-term health and welfare of a community. This project is no different. The expansion of this project will do nothing for our residents and will only benefit Pacific Rock while leading to long-term devastation of our community.

Each element of this project should be denied for the following reasons:

- Increasing the size of this project by 77% is an irresponsible expansion that only benefits Pacific Rock.
- Increasing excavation by 213% is excessive and will create irreversible harm to our environment.
- Increasing operational days to allow it to run 7 days will set a precedent for other similar projects.
- Allowing hauling between 530A - 10P only furthers disrupts the tranquil nature of our community and surrounding neighborhoods.
- Allowing continued truck traffic will lead to unwanted traffic congestion.
- Allowing peak period truck hauling will have unwanted impact on morning and evening commutes.
- Increased excavations allowance will promote the rapid decay of the surrounding environment.
- Ending the use of agricultural use will continue to undermine the delicate agriculture community our county was founded on.

As a resident of Newbury Park who shares the same Santa Monica mountains as this mining project, I beg you to deny this expansion. It might be the right thing to do for Pacific Rock Quarry but it's not the right thing to do for the residents of my neighborhood and our community. Please put the people of Ventura before the wants of one business.

Thank you for considering my request.

Brian Buck
Newbury Park Resident
35+ year Ventura County Resident

Brian Buck
310-567-6573
brian@bucksinla.com

Baca, Brian

From: RosaLinda Diaz <prism4@me.com>
Sent: Monday, October 02, 2017 4:09 PM
To: Baca, Brian
Subject: RE: Pacific Rock Mining in Newbury Park and Camarillo

Dear Mr. Baca,
Please do not approve Pacific Rock's request to expand their mining operations in our beautiful community. I live in Newbury Park. With the exception of the recent LAX flight diversions over our airspace - this is a lovely and quiet community. It is a place to find solace and peace. A place to hike and be in wonderment of nature - not a place where our natural resources - yes, I'm counting the quietness of our community as a natural resource — should be disrupted for the sake of business operations. Please deny Pacific Rock's request.

Sincerely,
RosaLinda Diaz
Newbury Park resident of 12 years.

City of Camarillo

Department of Community Development

601 Carmen Drive, Camarillo CA 93010 | 805.388.5360 p | 805.388.5388 f

October 2, 2017

Brian R. Baca, Manager, Commercial and Industrial Permit Section
Ventura County Resource Management Agency, Planning Division
800 S. Victoria Avenue, L#1740
Ventura, CA 93009

Subject: Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003, Notice of Preparation

Dear Mr. Baca:

The purpose of this letter is to provide written comments to the Ventura County Resource Management Agency, Planning Division, in response to the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for Pacific Rock Quarry Mine Expansion Project. The City of Camarillo understands that the applicant request a modification to the existing Conditional Use Permit (CUP) be granted along with an amended Reclamation Plan to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period.

The NOP explains that staff has conducted a preliminary assessment of the proposed project and plans to address biological resources, noise, and visual resources in detail in the EIR. In addition to those items, the City respectfully requests that the following environmental issues also be addressed in detail in the EIR, for the reasons listed below:

- Traffic and Circulation
- Aesthetics
- Geology and Soils

Traffic and Circulation

Pleasant Valley Road and Santa Rosa Road are both designated as primary arterial streets in the Circulation Element of the City of Camarillo's General Plan. Primary arterial streets are intended to provide for the movement of large volumes of traffic between major traffic generators. Direct vehicular access should be provided to and from these arterials at limited intervals, through the use of well-designed, controlled, and safe intersections. The primary arterial is designed to accommodate four to six lanes of traffic with a capacity of 30,000 to 45,000 ADT (Average Daily Trips). A LOS (Level of Service) of "C" can accommodate between 24,000 and 36,000 ADT. The EIR should address the additional trips on Pleasant Valley Road and Santa Rosa Road as a result of the proposed project.

In addition to daily traffic impacts to Pleasant Valley Road and to Santa Rosa Road, the EIR should address typical weekday peak hour traffic impacts. Of major concern is the statement in the NOP that the entire daily maximum truck traffic of 120 trips per operational weekday could occur during either the AM or PM street peak traffic period. Since all project traffic must utilize the intersection of Pleasant Valley Road and Pancho Road, the EIR needs to include analyses of peak hour traffic impacts at that intersection.

Circulation Element Objective 8.1 is to promote safe and efficient movement of goods via truck and rail with minimum disruptions to residential areas. Circulation Element Policy 8.1.1 states that the City shall identify truck routes that sustain an effective transport of commodities while minimizing the negative impacts on local circulation and on noise-sensitive land uses. The EIR should address the truck route to and from the quarry through the City and disclose any impacts to the noise-sensitive land uses along the route.

Aesthetics

Section 10.2.2 of the City's Community Design Element defines our community character, in part, by Camarillo's setting, which is surrounded by open space that is protected by SOAR, CURB initiatives and CURB Element, as well as by the Camarillo Hills, Calleguas Mountains, and Conejo Mountain which provides a dramatic backdrop for the city. The EIR should address any aesthetic impacts that will result from the proposed project.

Geology and Soils

Exhibit 11-4 of the City's Safety Element demonstrates that this project site is located within an area susceptible to liquefaction. The EIR should address any potential liquefaction hazard and disclose any potential significant impacts resulting from the proposed project.

We appreciate receiving a copy of the NOP for this project. Please provide the City with notification when the Draft EIR is posted for public review. If you have any additional questions, please contact me at 805.388.5362.

Sincerely,

J.R. Vacca

Joseph R. Vacca, Director
Department of Community Development
City of Camarillo

cc: Dave Klotzle, Director of Public Works
Bill Golubics, Deputy Director/Transportation

Baca, Brian

From: Lin, Sharon <Sharon_Lin@intuit.com>
Sent: Monday, October 02, 2017 4:26 PM
To: Baca, Brian
Subject: Please no more mining!

The residents of Dos Vientos are already suffering from increased nightly noise pollution from the recent air traffic patterns. I own two homes and I am deeply concerned about my quality of life and our property values.

Please say no to more mining, longer hours, and weekend operation. We can't take any more!

Sharon Lin
Group Operations Manager, Small Business Group

O 818-436-7925 **M** 818-585-7073
Twitter | LinkedIn | Facebook
intuit.com

Intuit Inc.

Baca, Brian

From: JOHN SANDSTROM <johnsandstrom@icloud.com>
Sent: Monday, October 02, 2017 4:30 PM
To: Baca, Brian
Subject: Pacific Rock

Dear Brian,

I am a resident of Newbury Park living at 5015 via Santana. Please do not allow Pacific Rock to expand its hours and days of operations. Noise created on weekends early hours of the morning and late evenings is unreasonable. We moved into this neighborhood for the quiet environment. What is being asked by Pacific Rock is unreasonable.

Sincerely, John Sandstrom

Sent from my iPhone

Baca, Brian

From: Julie Ganner <jganner1@aol.com>
Sent: Monday, October 02, 2017 4:32 PM
To: Baca, Brian
Subject: Conejo Mountain Rock Expansion

PLEASE DO NOT allow this man to expand his mining operation. He has no regard for his surrounding community, the environment, or causing a public noise nuisance.
Please do not allow him to expand the land used for mining or his hours of operation.
We beg you to take all the negative factors into consideration that this expansion will cause Ventura county and its neighbors. His mining practice is already a nightmare to deal with for local neighbors in Newbury Park.
Sincerely,
Julie Ganner
818-399-6715
Jganner1@aol.com

Sent from my iPhone

Baca, Brian

From: Talksalot <talksalot@earthlink.net>
Sent: Monday, October 02, 2017 4:35 PM
To: Baca, Brian
Subject: Pacific Rock

Dear Mr Baca,

I write to you today, as a resident of Newbury Park, to voice my concern over the proposed expansion of the Pacific Rock site as well as their request to reduce the clean up protocol. This is dangerous! This is unacceptable! This is NOT in the best interests of the men, women and children who call this area our home and we expect our government to protect us from the reaches of a business enterprise that so clearly impacts the health of our beautiful lands and the health of our families.

Regards,
Martha Malamis Coronado

Baca, Brian

From: Jennifer St. Amand <jenstamand@hotmail.com>
Sent: Monday, October 02, 2017 4:41 PM
To: Baca, Brian
Subject: Please do not support Pacific Rock!

Dear Mr. Baca,
I am a resident of Dos Vientos in Newbury Park. I am writing to express my horror that Pacific Rock may be allowed to expand their operations on Conejo Mountain. I am gravely concerned about an expansion of either the hours of operation or, most certainly, the scope of the mining/acreage involved.
Please do not allow this damage to our land, natural habitats, property values, and quality of life to occur.

I appreciate your willingness to hear the concerns of Ventura County residents.

Sincerely,
Jennifer St. Amand
Newbury Park

Sent from my iPhone

Baca, Brian

From:	Keith <kbstamand@hotmail.com>
Sent:	Monday, October 02, 2017 4:40 PM
To:	Baca, Brian
Subject:	Opposed to expansion of Pacific Rock mining

Hi Mr. Baca,

I am writing to voice my opposition to the expansion of mining by the Pacific Rock company on Conejo Mountain.

This is based on concerns regarding the additional noise, adverse environmental impact, and declining property values and natural beauty of the area that would ensue if the sought after expansion permit is granted.

Thank you for your consideration.

Kind regards,

Keith St. Amand, MD
Dos Vientos/Newbury Park resident x 4.5 yrs

From:	Manny Garcia <themannygarcia@yahoo.com>
Sent:	Monday, October 02, 2017 4:50 PM
To:	Baca, Brian
Cc:	Maurice Garcia
Subject:	RE: Pacific Rock Quarry Mine expansion

Mr. Baca

My wife and I are residents of Dos Vientos and wish to be placed on your mailing/notification lists for information/action regarding the Pacific Rock Quarry Mine Expansion Project.

Our preliminary objections to the Application include but are not limited to the intrusion on open space , noise, pollution, dirt, damage to the mountain and possibly to nearby homes and the effect of property values.

Thank you for consideration of the foregoing. Kindly acknowledge receipt of this e mail.

Maurice and Judith Garcia
5478 Via Nicola
Newbury Park CA 91320

e mail: themannygarcia@yahoo.com

Baca, Brian

From: Daniel Gavin <gotgavin@verizon.net>
Sent: Monday, October 02, 2017 4:50 PM
To: Baca, Brian
Subject: Comment - Pacific Rock Mine

I live near the mine/quarry and have HIGH CONCERNS about the expansion application. I would like to be informed of any hearings on the matter, studies submitted, etc.

Thank you.
Dan Gavin
135 Via Ricardo

Baca, Brian

From: Katie Yant <ky74261@gmail.com>
Sent: Monday, October 02, 2017 4:56 PM
To: Baca, Brian
Subject: No mining expansion

I oppose the expansion of Pacific Rock mining operation.
I am a Newbury Park resident.
Thank you.
- Katie Yant

Baca, Brian

From: Stacy M Gleason <smdoscher@icloud.com>
Sent: Monday, October 02, 2017 5:06 PM
To: Baca, Brian
Subject: Against the mining and expansion

Please note that I am a resident here and would like to make my opinion known that I am against the expansion of Pacific Rock mining.

I am not sure what other information you might need from me but please feel free to contact me.

Sincerely,

Stacy Gleason

Sent from my iPhone

Baca, Brian

From: Mark Goldstein <MGoldstein@socalip.com>
Sent: Monday, October 02, 2017 5:12 PM
To: Baca, Brian
Subject: Pacific Rock expansion Ca no. LU10-0003

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 5261 Via Rincon, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased used of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,

/mark/
Mark A. Goldstein
5261 Via Rincon
Newbury Park, CA 91320
mobile 818-636-5796

Baca, Brian

From: Vicki Brill <vickibrill@verizon.net>
Sent: Monday, October 02, 2017 5:32 PM
To: Baca, Brian
Subject: Mining expansion application

Hi Brian –
Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 3339 Michael Dr, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank you for your consideration

Vicki Brill

Sent from AOL Mobile Mail

Baca, Brian

From:	thekarencollins@gmail.com
Sent:	Monday, October 02, 2017 5:35 PM
To:	Baca, Brian
Subject:	Conejo mountain rock

I live around the corner from this site. They are not an environmentally friendly company and are petitioning to minimize cleaning up after they finish mining. We are 100% against this 319% expansion.
Milt Dorsey & Karen Collins
875 Corte Safiro
Camarillo CA 93012

Baca, Brian

From: Shafferlaw@gmail.com
Sent: Monday, October 02, 2017 5:40 PM
To: Baca, Brian
Subject: Pacific Rock Excavation

Dear Mr. Baca:

My family and I live in Dos Vientos and were just informed today that Pacific Rock has applied to expand its project, which will negatively impact our neighborhood.

I am wondering why our residents were not given proper notice about this nuisance?

Please advise regarding the status of this matter and what is being to protect our neighborhood.

Sincerely,

Christina Shaffer,
Attorney at Law

Sent from my iPhone

Baca, Brian

From:	Lesley Moresi <moresiphotography@gmail.com>
Sent:	Monday, October 02, 2017 5:43 PM
To:	Baca, Brian
Subject:	Please deny expasion of Pacific Rock

Brian,
I just received news today that Pacific Rock has a request to expand their mining operation by 319%. My home in Dos Vientos is just over the hill from this site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts on us and our children.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the request expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.
Lesley Moresi

Baca, Brian

From:	MyDcTv puppy <mydctv1@gmail.com>
Sent:	Monday, October 02, 2017 5:44 PM
To:	Baca, Brian
Subject:	Pacific Rock - please deny

Brian,
I just received news today that Pacific Rock has a request to expand their mining operation by 319%. My home in Dos Vientos is just over the hill from this site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts on us and our children.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the request expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.
Thank you

Baca, Brian

From: Deborahann Sankovich <deborahannsankovich@gmail.com>
Sent: Monday, October 02, 2017 5:45 PM
To: Baca, Brian
Subject: Pacific Rock Mining Operation

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home in Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank You,

Deborahann Sankovich

Baca, Brian

From: Jolina Fizdale <jolina@dwconline.net>
Sent: Monday, October 02, 2017 5:53 PM
To: Baca, Brian
Subject: RE: DOS VIENTOS RANCH COMMUNITY ASSOCIATION -Pacific Rock Quarry Notice Attached

Hi Brian,

We are residents of Dos Vientos and we have just been notified today that Pacific Rock wants to expand mining near our community. I strongly oppose this, as it will certainly negatively affect our community, and could pose serious health concerns.

I am requesting that this application for expansion is denied, that our community is properly notified, and that a thorough environmental impact study is done and disclosed to all Dos Vientos residents prior to any future mining.

Thank you,

Gregory and Jolina Elia

Sent from my iPhone

Baca, Brian

From:	Sharon Selinski <okenogirl@gmail.com>
Sent:	Monday, October 02, 2017 5:56 PM
To:	Baca, Brian
Subject:	Conejo Mountain mining. . .

Dear Sir:

Our lovely little town is no longer the quiet peaceful village it was. We now have airliners flying at low altitude starting at 4:00 a.m. We may have to endure another assault to our ears and noses with mining operations starting in the wee hours all seven days of the week.

An expansion of operations of more than 300% is outrageous. Please do not allow this to proceed.

--
Have a nice day!

Sharon
Selinski
72 Donald Avenue
Newbury Park, CA 91320

Baca, Brian

From: Bre Collier <brecollier@aol.com>
Sent: Monday, October 02, 2017 5:56 PM
To: Baca, Brian
Subject: Mining

I just received word today from our HOA that Pacific Rock has a request to expand their mining operation by 319%. I live at 5297 Via Capote Newbury Park and I am vehemently opposed to the expansion. The air and noise from the Pacific Rock site to my neighborhood in Dos Vientos would be adversely impacted. The increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, I would like to suggest this request be denied.

Thank you,

Bre Collier
805-375-1937

Baca, Brian

From: Harriet <bklyndame@aol.com>
Sent: Monday, October 02, 2017 5:45 PM
To: Baca, Brian
Subject: Against Pacific Rock Expansion

We live in Dos Vientos, Newbury Park and have just learned of Pacific Rock intention to destroy our quality of life with the application of expansion.

We are against the application from Pacific Rock to expand their mining operations and increasing the scope of the number of acres as well as adding hours of operations and additional days. We are outraged and disappointed that not only will this company make the environment a disaster for 25 years, but also have the gall to not clean up the area to the standards that they currently have to do based on their current contract.

Please, please DO NOT ALLOW THIS COMPANY to destroy why most people have moved here for. Our health, additional noise till late at night, 7 days a week, and the loss of our property values are all at stake.

Harriet and David Sheinberg
465 Via Del Lago
Newbury Park, CA 91320

Harriet

Sent from my iPad

Baca, Brian

From: Rahul Jindani <rahuljindani@gmail.com>
Sent: Monday, October 02, 2017 5:59 PM
To: Baca, Brian
Subject: LU10-0003 Notice of Preparation EIR. Pacific Rock Quarry Mine, applicant

Hi Mr. Brian Baca,

This email is regarding LU10-0003 application.
I live in Dos Vientos and am concerned with this application for two reasons:
a. Environmentally, changing the natural landscape by removing hills/ mountains is not a good idea. We need to protect our environment for future generations. There is lot of other land in the country where we can create land for Agriculture. In majority (or all) of those areas, you will not be able to raise a hill or mountain, similar to one which we are breaking apart.

b. It is not a good idea to consider the planned activities as safe. We could be introducing small cracks which may seem trivial, but when an Earth Quake or Land slide occurs those human introduced activities could cause disaster that could have been avoided. Since I live close to the area of activity, I am concerned about the impact it will have on my neighbors and me. I am hoping you will never hear about one of you wrote to you to not approve this does not die in one of such incidents.

I strongly request to not only cancel this request, but cancel the entire mining activity. You will be doing a big favor to generations to come.

Sincerely,

Rahul Jindani
Phone 805-277-5101

Baca, Brian

From:	Penny Brady <lyriclines@gmail.com>
Sent:	Monday, October 02, 2017 6:27 PM
To:	Baca, Brian
Subject:	Pacific Rock expansion

to: brian.baca@ventura.org Brian
I just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 216 Via Antonio, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As someone with asthma, I do not need more dust in the air! As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,
Penny Brady
216 Via Antonio,
Newbury Park, CA

Baca, Brian

From: merleen gholdston <gholdston.m@gmail.com>
Sent: Monday, October 02, 2017 6:30 PM
To: Baca, Brian

Subject: Pacific Rock expanding near Conejo grade

I live in the Oakridge Estates Tract of homes north of the Conejo grade. Has consideration been given to the impacts of expanded mining operations by Pacific Rock? It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank you,
Merleen Gholdston

Baca, Brian

From: Margaret Wiesehan <peglondon@icloud.com>
Sent: Tuesday, October 03, 2017 12:25 PM
To: Baca, Brian
Subject: Increasing digging in Newbury Park

Please do not allow the expansion of this company's work plan in our community. Seven days a week?! 5:30am- 10pm?! Please let those of us who live and make this community the lovely place it is maintain the quality of life we work hard to maintain here.
Thank you.

Baca, Brian

From: Laura Grieder <thegrieders@yahoo.com>
Sent: Tuesday, October 03, 2017 3:25 PM
To: Baca, Brian

Brian –

Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at Via Mira Flores, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank you,

Grieder Family

Baca, Brian

From: Fred Medick <fredm04@gmail.com>
Sent: Tuesday, October 03, 2017 3:43 PM
To: Baca, Brian
Cc: Daniela Pallafacchina
Subject: Pacific Rock mining

Brian,

I just learned today that Pacific Rock has a request to expand their mining operation by 319%. My home at 4571 Via Pluma, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,

Fred Medick

Baca, Brian

From: Conor Logan <conorlogan@gmail.com>
Sent: Tuesday, October 03, 2017 3:48 PM
To: Baca, Brian
Subject: NO to Conejo Rock Mining

A big vote NO to their continued claim and attempt to widen scope and hours/days of operations.

Thanks

Conor

Baca, Brian

From: Steve Johnson <sfjohnso@gmail.com>
Sent: Tuesday, October 03, 2017 3:54 PM
To: Parks, Linda
Cc: Baca, Brian
Subject: Re: Pacific Rock: Continued operation, Expanded operation

Dear Ms. Parks, Mr. Baca -

I have heard from our Nextdoor.com community that Pacific Rock is applying once again for permission to expand mining operations. Can this possibly correct?

If so, my objections to their continued operation, let alone expansion, still stand. It's time to get the Santa Monica Mountains Conservancy to acquire that land, and put this to rest permanently.

Again, I would welcome the opportunity to make public comments at any upcoming hearing, as, I'm sure, would other hikers in our community.

Thanks again for your continued attention to this matter on behalf of your constituents.

Steven F. Johnson
483 Highview Street
Newbury Park, California 91320

On Fri, Aug 12, 2016 at 4:18 PM, Parks, Linda <Linda.Parks@ventura.org> wrote:

Dear Mr. Johnson,

Thank you for your email expressing concern with the operation of Pacific Rock Quarry on Conejo Mountain. I share your concern regarding the impact to natural resources there and the potential to allow for the operation to occur as a vested right without County regulation on its permit. I apologize for the length of time it took to respond, however I wanted to have full information on this issue, which was in flux at the time I received your email.

I'm happy to report that the application for Vested Rights is being withdrawn. This was reported to me by the Planning Director earlier this week.

Pacific Rock Quarry is operating under the provisions of a compliance agreement which requires the operator to operate the facility pursuant to specific conditions (CUP 3817-3). Under the provisions of the compliance agreement, the Operator will be submitting a revised modification application by December 16, 2016 to address previous incomplete items required by the Planning Division.

The Planning Division has created a notification list for people interested in updates on Conejo Mountain permits. You can be added to the list to receive information on the required December 16, 2016 submittal and other public notices relative to the Pacific Rock modification application (Case No. LU10-003). To get on the interested party list sign up at:

http://vcrma.org/planning/programs/smara/index.html

Thank you so much for taking the time to provide input, and for continuing to follow this issue.

--Linda

Linda Parks

Supervisor, District 2

625 West Hillcrest Drive

Thousand Oaks, CA 91360

(805) 214-2510

From: Steve Johnson [mailto:sfjohnso@gmail.com]
Sent: Tuesday, June 21, 2016 7:13 PM
To: Parks, Linda <Linda.Parks@ventura.org>
Subject: Pacific Rock Vested Rights application

Dear Ms. Parks -

It's been my pleasure to live in Newbury Park and enjoy the abundant outdoor recreation opportunities in the area, and I thank you for your contributions in this regard.

I understand that Pacific Rock has applied for a Vested Rights declaration to release them from supervision and permitting for their quarry operation on Conejo Mountain. While I respect their right to do so, I also respect the fact that a previous agreement was to have them cease operations by 2010, restore the property, and allocate it to recreational use.

Please do your utmost to ensure that Pacific Rock does not obtain the Vested Rights declaration, that the company continue to remain subject to supervision and permitting, and that it is converted appropriately to its previously intended use, as soon as possible.

With my best regards,

- Steve

Steven F. Johnson

483 Highview Street

Newbury Park, CA 91320

805-279-4665

Baca, Brian

From: Lisa Campbell <lisa.c.campbell99@gmail.com>
Sent: Tuesday, October 03, 2017 5:01 PM
To: Baca, Brian
Subject: Pacific Rock Mining

Brian,
Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 814 Verna Ave, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Casa Conejo. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank you,
Lisa Campbell

Baca, Brian

From: Barbara Williams <barbsk80@icloud.com>
Sent: Tuesday, October 03, 2017 6:18 PM
To: Baca, Brian
Subject: No to Pacific Rock

I adamantly oppose any expansion to either the operations or hours for Pacific Rock. Staben has not been a good neighbor to us in Camarillo Springs. Pacific Rock changed the creek between them and Conejo Mountain Memorial Park causing damage. They even delayed fixing what they screwed up. We in Camarillo Springs value our piece and quiet and do not need additional noise and dust.

Staben jerked around Camarillo Springs when trying to win a contract with the City of Camarillo for additional work on the Conejo Mountain debris platforms. Staben took rock from the debris flow rock and debris removal, which was paid for by the City of Camarillo/Natural Resources Conservation Service and resold it. None of that profit was used to help the community in which he purchased damaged homes for pennies on the dollar. Yes, he took advantage of people devastated by the December 2014 debris flows.

Think of the people visiting loved ones at Conejo Mountain Memorial Park or trying to have a service. Please deny the request.

Barbara Williams
Camarillo Springs

Sent from my iPad

Baca, Brian

From: Diane Gudermuth <diane_gudermuth@yahoo.com>
Sent: Tuesday, October 03, 2017 9:58 PM
To: Baca, Brian
Subject: Conejo ROCK ...

Please don't give these guys free range to spoil our way of life further! I'm getting so discoraged, rethinking staying around here for retirement. 5 am to 10 pm, tractors tearing into the terrain, 25 years, no clean up? Sounds like a nightmare. Hope I'm just adding mine to lots of voices. Heard last minute. Shouldn't we have received something in the mail given the impact on property values, etc.?

Diane Gudermuth
Homeowner, Business owner, Voter

Sent from Yahoo Mail on Android

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor
NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Fax (916) 373-5471
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

SEP 20 2017

September 14, 2017

Brian R. Baca
Ventura County
800 South Victoria Ave.
Ventura, CA 93009

RE: SCH#2017081052 Pacific Rock Quarry Mine Expansion Project, Ventura County

Dear Mr. Baca,

The Native American Heritage Commission has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b) (CEQA Guidelines Section 15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared. (Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd.(a)(1) (CEQA Guidelines § 15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code § 21074) and provides that 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. (Pub. Resources Code § 21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code § 21084.3 (a)). **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. § 800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments. **Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.**

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
    a. A brief description of the project.
    b. The lead agency contact information.
    c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code § 21080.3.1 (d)).
    d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code § 21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code § 21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or environmental impact report. (Pub. Resources Code § 21080.3.1(b)).
    a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18). (Pub. Resources Code § 21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
    a. Alternatives to the project.
    b. Recommended mitigation measures.
    c. Significant effects. (Pub. Resources Code § 21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
    a. Type of environmental review necessary.
    b. Significance of the tribal cultural resources.
    c. Significance of the project's impacts on tribal cultural resources.
    d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code § 21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code § 21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
    a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
    b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code § 21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code § 21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code § 21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code section 21084.3 (b). (Pub. Resources Code § 21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code § 21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a nonfederally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code § 815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code § 5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An environmental impact report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code § 21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code § 65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code section 65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction. (Gov. Code § 65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
   a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
   b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
   a. If part or all of the APE has been previously surveyed for cultural resources.
   b. If any known cultural resources have been already been recorded on or adjacent to the APE.
   c. If the probability is low, moderate, or high that cultural resources are located in the APE.
   d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
   a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions, please contact me at my email address: frank.lienert@nahc.ca.gov

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

cc: State Clearinghouse

OCT 0 2 2017

SANTA MONICA MOUNTAINS CONSERVANCY
RAMIREZ CANYON PARK
5750 RAMIREZ CANYON ROAD
MALIBU, CALIFORNIA 90265
PHONE (310) 589-3200
FAX (310) 589-3207
WWW.SMMC.CA.GOV

September 25, 2017

Brian R. Baca, Manager, Commercial and Industrial Permit Section
Ventura County Resource Management Agency
Planning Division
800 South Victoria Avenue, L#1740
Ventura, California 93009

Notice of Preparation Comments - Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003, SCH NO. 2017081052

Dear Mr. Baca:

The Santa Monica Mountains Conservancy (Conservancy) offers the following comments on the Notice of Preparation (NOP) of a draft Environmental Impact Report (DEIR) for the proposed Pacific Rock Quarry Mine Expansion Project on 204.5 acres near Camarillo. The MRCA owns an open space parcel (APN 234-0-080-380) that abuts the subject property. The quarry also abuts Conejo Open Space Conservation Authority (COSCA) open space.

The proposed expansion of mining operations would more than triple the total area subject to mining activity (from 55 acres to 172.5 acres). The proposed eastward mining perimeter expansion would be less than 50 feet from MRCA and COSCA parkland. This expansion would likely result in significant adverse impacts to open space and habitat values and the ground water retention capability of the public parkland due to the increased noise, dust, and disturbance over long time periods. The DEIR must consider project alternatives that provide for minimum 750-foot-wide, non-disturbance buffers from all adjacent parkland. If any existing mining boundary is less than 750 feet from parkland, that boundary must be maintained and not reduced.

The DEIR should analyze the delineation of zones of planned mining activity and non-activity on a rolling five-year basis over the course of the Conditional Use Permit (CUP) in order to minimize disturbance of adjacent habitat areas. Those areas identified as non-active within the proposed mining area should remain native habitat prior to active mining and be reclaimed as native habitat as quickly as feasible following mining cessation.

Additionally, the proposed project anticipates increasing operational days to 7 days per week with up to 120 one-way truck trips per operational day. This increase in operational hours and truck traffic will generate more dust and diesel exhaust emissions. EIR project alternatives should consider a paving plan for the unpaved portions of the quarry that receive the bulk of the truck traffic for the anticipated 25-year extension of the CUP.

Because there are several unnamed tributaries to Conejo Creek in the heart of the proposed project disturbance zone, and the proposed project anticipates expanding into the steep slopes of Conejo Mountain, DEIR alternatives should evaluate the use of over-sized, concrete-free drainage detention basins to minimize sedimentation of downstream waterways. The recent fire and mudslides to affect this area (2013 and 2014, respectively) are evidence that Conejo Mountain and the surrounding hillsides are susceptible to debris flow events. The soft-bottom, concrete-free detention basins should be over-sized to capture sediment for a 100-year, 24-hour storm event and to dramatically reduce (or eliminate) sediment removal intervals. Examination of Ventura County's GIS CountyView indicates a portion of the existing active mining area is already with a 100-year Floodplain area, thus potential flood impacts to adjacent properties must also be analyzed in the DEIR.

Conejo Mountain is the last remaining undeveloped open space between the western Santa Monica Mountains and the Santa Rosa Valley. Therefore, the EIR must include alternatives that permanently preserve viable habitat for north-south wildlife passage between Conejo Creek and the Dos Vientos subdivision. The Conservancy requests that DEIR alternatives include a permanently protected contiguous habitat area along the northern, eastern, and southern boundaries of the property. Permanent protection can only be achieved via a fee simple or conservation easement dedication to a public agency. Permanent protection of all areas outside of the proposed and existing disturbance footprints is essential assure that no further development of the property occurs.

Any areas that are no longer part of the active mining operation must be required to be rehabilitated to as close to natural conditions as possible and remain permanently free of all fencing and wildlife movement barriers.

The Conservancy recommends that any new project approvals include the requirement for a large bond or endowment to absolutely insure that sufficient funds will be available to adequately rehabilitate the site at the expiration of the mining operation. Such a requirement must be adjusted for inflation to guarantee adequate reclamation.

Please address any questions or future correspondence to Paul Edelman by phone at (310) 589-3200 ext. 128, at the above letterhead address, or by email at edelman@smmc.ca.gov.

Sincerely,

IRMA MUÑOZ
Chairperson

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2017-CPA-0226

September 29, 2017

Brian R. Baca, Manager,
Ventura County Resource Management Agency
Planning Division
800 South Victoria Avenue, L#1740
Ventura, California 93009

Subject: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Pacific Rock Quarry Mine Expansion Project (Case No. LU10-0003), Ventura County, California

Dear Mr. Baca:

This letter provides the U.S. Fish and Wildlife Service's (Service) comments on the Notice of Preparation (NOP) regarding the Draft Environmental Impact Report (DEIR) for the Pacific Rock Quarry Mine Expansion Project (Project), located at the western edge of the Santa Monica Mountains, approximately 2.0 miles south of U.S. Highway 101 in the Camarillo area, Ventura County (County), California. Pacific Rock, Inc. is proposing to expand an existing surface mining facility from 115.5 acres to 204.5 acres and to continue operations under a modified Conditional Use Permit (CUP) for an additional 25-year period.

The mission of the U.S. Fish and Wildlife Service (Service) is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. To assist in meeting this goal, the Service provides comments on public notices issued for projects that may have an impact on those resources, especially federally-listed plants and wildlife. The Service's responsibilities include administering the Endangered Species Act of 1973, as amended (Act), including sections 7, 9, and 10.

According to the NOP, the DEIR would address the potential environmental impacts associated with the proposed modifications of the existing facility, and whether the Project will have any new or different impacts than were addressed in the 1980 Mitigated Negative Declaration. In the NOP, the County requested the public to assist the Planning Division identify any issues that should be addressed in the DEIR. The NOP identifies issues in the areas of biological resources, noise, and visual resources that will be analyzed in the DEIR. We encourage you to work with us and the California Department of Fish and Wildlife to ensure that you have the most recent information regarding resources under our respective jurisdictions, to help avoid adverse impacts to listed species, and to provide an accurate depiction of Federal and State permitting processes.

City of Camarillo

Department of Community Development
601 Carmen Drive, Camarillo CA 93010 | 805.388.5360 p | 805.388.5388 f

October 2, 2017

Brian R. Baca, Manager, Commercial and Industrial Permit Section
Ventura County Resource Management Agency, Planning Division
800 S. Victoria Avenue, L#1740
Ventura, CA 93009

Subject: Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003, Notice of Preparation

Dear Mr. Baca:

The purpose of this letter is to provide written comments to the Ventura County Resource Management Agency, Planning Division, in response to the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for Pacific Rock Quarry Mine Expansion Project. The City of Camarillo understands that the applicant request a modification to the existing Conditional Use Permit (CUP) be granted along with an amended Reclamation Plan to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period.

The NOP explains that staff has conducted a preliminary assessment of the proposed project and plans to address biological resources, noise, and visual resources in detail in the EIR. In addition to those items, the City respectfully requests that the following environmental issues also be addressed in detail in the EIR, for the reasons listed below:

- Traffic and Circulation
- Aesthetics
- Geology and Soils

Traffic and Circulation

Pleasant Valley Road and Santa Rosa Road are both designated as primary arterial streets in the Circulation Element of the City of Camarillo's General Plan. Primary arterial streets are intended to provide for the movement of large volumes of traffic between major traffic generators. Direct vehicular access should be provided to and from these arterials at limited intervals, through the use of well-designed, controlled, and safe intersections. The primary arterial is designed to accommodate four to six lanes of traffic with a capacity of 30,000 to 45,000 ADT (Average Daily Trips). A LOS (Level of Service) of "C" can accommodate between 24,000 and 36,000 ADT. The EIR should address the additional trips on Pleasant Valley Road and Santa Rosa Road as a result of the proposed project.

In addition to daily traffic impacts to Pleasant Valley Road and to Santa Rosa Road, the EIR should address typical weekday peak hour traffic impacts. Of major concern is the statement in the NOP that the entire daily maximum truck traffic of 120 trips per operational weekday could occur during either the AM or PM street peak traffic period. Since all project traffic must utilize the intersection of Pleasant Valley Road and Pancho Road, the EIR needs to include analyses of peak hour traffic impacts at that intersection.

Circulation Element Objective 8.1 is to promote safe and efficient movement of goods via truck and rail with minimum disruptions to residential areas. Circulation Element Policy 8.1.1 states that the City shall identify truck routes that sustain an effective transport of commodities while minimizing the negative impacts on local circulation and on noise-sensitive land uses. The EIR should address the truck route to and from the quarry through the City and disclose any impacts to the noise-sensitive land uses along the route.

Aesthetics

Section 10.2.2 of the City's Community Design Element defines our community character, in part, by Camarillo's setting, which is surrounded by open space that is protected by SOAR, CURB initiatives and CURB Element, as well as by the Camarillo Hills, Calleguas Mountains, and Conejo Mountain which provides a dramatic backdrop for the city. The EIR should address any aesthetic impacts that will result from the proposed project.

Geology and Soils

Exhibit 11-4 of the City's Safety Element demonstrates that this project site is located within an area susceptible to liquefaction. The EIR should address any potential liquefaction hazard and disclose any potential significant impacts resulting from the proposed project.

We appreciate receiving a copy of the NOP for this project. Please provide the City with notification when the Draft EIR is posted for public review. If you have any additional questions, please contact me at 805.388.5362.

Sincerely,

Joseph R. Vacca, Director
Department of Community Development
City of Camarillo

cc: Dave Klotzle, Director of Public Works
Bill Golubics, Deputy Director/Transportation

DEPARTMENT OF TRANSPORTATION
DISTRICT 7
100 S. MAIN STREET, MS 16
LOS ANGELES, CA 90012
PHONE (213) 897-8391
FAX (213) 897-1337
TTY 711
www.dot.ca.gov

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Serious Drought.
Making Conservation
a California Way of Life.

September 27, 2017

Mr. Brian R. Baca
Ventura County
800 South Victoria Avenue
Ventura, CA 93009

RE: Pacific Rock Quarry Mine Expansion
Project, LU10-0003
Vic. LA-101/ PM 10.764 to 12.297
SCH # 2017081052
GTS # VEN-2017-00080AL-NOP

Dear Mr. Baca:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced project. The Project to modify Conditional use Permit (CUP) be granted and an amended Reclamation plan be approved to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period.

The mission of Caltrans is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. We provide these comments consistent with the State's smart mobility goals that support a vibrant economy, and build communities, not sprawl.

However, the development is in a suburban/rural area, where vehicles are a dominant mode choice. Caltrans is aware of challenges that the region faces in identifying viable solutions to alleviating congestion on State and Local facilities. With limited room to expand vehicular capacity, any development should incorporate multi-modal and complete streets transportation elements that will actively promote alternatives to car/truck use and better manage existing parking assets. Prioritizing and allocating space to efficient modes of travel such as bicycling and public transit can allow streets to transport more people in a fixed amount of right-of-way.

While the State is in transition to VMT per capita for traffic analysis, we would like to provide the following suggested comment for your consideration in the interim.

For any future project, we encourage the Lead Agency to integrate transportation and land use in a way that reduces Vehicle Miles Traveled (VMT) and Greenhouse Gas (GHG) emissions by

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facilitating the provision of more proximate goods and services to shorten trip lengths, and achieve a high level of non-motorized travel and transit use. We also encourage the Lead Agency to evaluate the potential of Transportation Demand Management (TDM) strategies and Intelligent Transportation System (ITS) applications in order to better manage the transportation network, as well as transit service and bicycle or pedestrian connectivity improvements.

Given that Caltrans current guidelines are in the process of being updated, and if the Lead Agency is still using LOS methodology, an operation impact analysis should be prepared to analyze the following information:

1. Construction/truck/operation traffic impacts on US-101 and all significantly impacted streets, crossroads and controlling intersections at the State facilities.
2. Off-ramp queuing analysis including US-101 NB/SB to Santa Rosa Rd./Pleasant Valley Rd. and to Camarillo Spring Rd. Such queuing analysis at the off-ramp during AM/PM peak hours should be conducted based on HCM for existing condition, existing plus project condition, and future (cumulative) plus project condition. The Lead Agency may contact Caltrans for further queuing analysis requirements.
3. Convert truck volume to PCE, Passenger Car Equivalent.
4. Traffic volume counts that include anticipated AM and PM peak-hour volumes.
5. Level of service (LOS) before and after expansion.
6. Discussion of mitigation measures appropriate to alleviate anticipated truck/operation traffic impacts.
7. A truck management policy limiting truck utilizing on/off ramps during the peak hours to reduce the potential for truck platooning that may negatively affect merge movements.

Analysis should include existing traffic, traffic generated by the project, existing plus project, and cumulative traffic generated from all specific planning developments in the area, and traffic growth other than from the project and developments, if any.

If you have any questions, please feel free to contact Mr. Alan Lin the project coordinator at (213) 897-8391 and refer to GTS # VEN-2017-00080-AL.

Sincerely,

For

DIANNA WATSON
IGR/CEQA Branch Chief

cc: Scott Morgan, State Clearinghouse

Baca, Brian

From: Mike Mesko <Mike.Mesko@patagonia.com>
Sent: Monday, October 02, 2017 7:23 PM
To: Baca, Brian
Subject: no more mining

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at [***], Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Baca, Brian

From: Steve and Linda Allen <STELIN@VERIZON.NET>
Sent: Monday, October 02, 2017 7:27 PM
To: Baca, Brian
Subject: Pacific Rock Quarry Mine Expansion Case No LU 10-0003

Dear Mr. Baca:

We oppose the proposed Expansion of the Pacific Rock Quarry on Conejo Mountain.

Thank you for your kind attention to this matter, Mr. Steven and Mrs. Linda Allen
4820 Via don Luis
Newbury Park, CA 91320
Dos Vientos Ranch

Baca, Brian

From: Herman Colligan <namreh57@gmail.com>
Sent: Monday, October 02, 2017 7:41 PM
To: Baca, Brian
Subject: RE: DOS VIENTOS RANCH COMMUNITY ASSOCIATION -Pacific Rock Quarry Notice Attached

As a resident of Newbury Park, I object to the expansion of this rock quarry and its expanded operation. I urge the rejection of this proposal as I believe it will have an impact on the lives of surrounding residents.

Thanks,

Herman Colligan
5248 Via Capote
Newbury Park, CA. 91320

Sent from my iPhone

Baca, Brian

From: Michelle Endler <endlers4@icloud.com>
Sent: Monday, October 02, 2017 8:05 PM
To: Baca, Brian
Subject: Pacific Rock

I live in Dos Vientos and I am against the expansion of the rock mining. Little has been published to the public on this matter; especially considering the impact it will have on our living.
Please find a more remote location for such a large mining project.
Michelle Endler

Sent from my iPhone

Baca, Brian

From: Scott Vroman <ksvkav@yahoo.com>
Sent: Monday, October 02, 2017 8:34 PM
To: Baca, Brian
Cc: Rich Woolf; Dan Bonfiglio
Subject: Conejo Mountain Rock Quarry, Pacific Rock

Dear Mr. Baca,

The Dos Vientos community sits on top of this operation. I would like to know why this application for expansion is just now being publicized and DV has not been given time for proper public input.

I have great concerns with how Mr. Staben has operated in the past both on his farm in Moorpark and his rock plant. He over blasted his quarry several years ago and also expanded his home in Moorpark without permits. Due to the proximity of the quarry to our community and his past business practices, I feel the hours if operation from 5:00 Am to 10:00 PM seven days a week constitutes a public nuisance when considering blasting, crushing and hauling operations.

Regards,

K. Scott Vroman
Newbury Park resident

Baca, Brian

From: Nissim, Tina (ES) <Tina.Nissim@adp.com>
Sent: Monday, October 02, 2017 8:37 PM
To: Baca, Brian
Subject: Mining in newbury park

Brian – as you may know Pacific Rock has a request to expand their mining operation by 319%. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

We have the right to be involved in these decisions in our neighborhood. Thank you
Tina Nissim.

Sent from my iPhone

Baca, Brian

From: Julie Woolley <juliewoolley@verizon.net>
Sent: Monday, October 02, 2017 8:57 PM
To: Baca, Brian
Subject: Pacific Rock expansion application should be DENIED!

Brian,
Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 4363 Via Entrada, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.
Thank you,
Julie Woolley

Baca, Brian

From: Karen Kurtenbach <kkrtnbch@aol.com>
Sent: Monday, October 02, 2017 9:00 PM
To: Baca, Brian
Subject: Pacific Rock

Brian – Just received word today from a neighbor that Pacific Rock has a request to expand their mining operation by 319%. My home on Via Mirabella, in Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Karen and Jeff Kurtenbach
47 Via Mirabella
Newbury Park, CA 91320

Baca, Brian

From: Leigh Rens <leigh.rens@gmail.com>
Sent: Monday, October 02, 2017 9:04 PM
To: Baca, Brian
Subject: Pacific Rock mining application

This e-mail it sent to oppose the application of Pacific Rock'

The land belongs to the public and is not in a rural area but will affect and impact our neighborhood negatively'

- they plan to mine 24/7 - noise dust, rock blasting near fault lines
- they plan to minimize cleanup leaving who knows what chemicals seaping into our groundwater
- they have no regard for environment or the esthetic value of the surroundings so close to our neighborhoods
- they will negatively impact the value of our homes and city
- they are seeking a huge land use grant at our expense when they have already proven to be unreliable(removed from the good guys list)

We say NO!

Kind regards'

Mr L Rens - 186 Via Katrina, Newbury Park, CA, 91320 - 310 497-7187

Baca, Brian

From:	ashlianderic@aol.com
Sent:	Monday, October 02, 2017 9:19 PM
To:	Baca, Brian
Subject:	pacific rock mining

Dear Brian Baca,

It has been brought to my attention by a nieghbour that there is an application from Pacific Rock to expand their mining operation. Including the expanding of their hours or operation from 5:50 am to 10:00 pm, increasing the scope of operations from 55 acres to 172, and increasing the number of work days to seven days a week. Their request also apparently includes a modification to the existing reclamation requirement when they're done - meaning they want to minimize their clean-up.

This is certainly not what the resident of Newbury Park are happy to hear. There is the potential for health risks with airbourne waste, noise pollution, property values decreasing, wildlife disruption etc... We moved to Conejo Valley becasue of the proximity to nature, the protected open space - let's keep the peace and quiet and natural environment.

Most sincerely,
Ashli Shapiro
805.376.9449

Baca, Brian

From: Lisa Gunn <helobrew@aol.com>
Sent: Monday, October 02, 2017 9:34 PM
To: Baca, Brian
Subject: Mining project.

Hello I live here in Dos Vientos and what this mining company is requesting to expand is absolutely ridiculous. People live on that ridge line. This expansion is far to much 319%?? Come on. We won't stand for this. This needs to be reviewed and redirected. I've been watching this for 25 years and it's just getting bigger by the month and not to mention the unsightly entrance as we go into the cemetery there. You people have no respect.

Home Owner Of DV for 19 years now..
Have a Happy Day,
Lisa Gunn ☺

Baca, Brian

From: Lisa Hansen <dr_lhansen@yahoo.com>
Sent: Monday, October 02, 2017 9:35 PM
To: Baca, Brian
Subject: Stop Pacific Rock Mining

Dear Mr. Baca,

Please stop the expansion of Pacific Rock mining permit! This is a disaster for the health of our citizens and property values of our community.
I am a resident of Dos Vientos in Newbury Park.

Lisa E. Hansen, D.D.S.
Cosmetic, General and Implant Dentistry
1987 Royal Ave, Suite 4
Simi Valley, CA 93065
(805) 527-3306

Baca, Brian

From: Gina <younggina2@aol.com>
Sent: Monday, October 02, 2017 9:41 PM
To: Baca, Brian
Subject: Mining

I completely object to the increase in the mining at Conejo Mountain. They cannot be allowed to destroy our beautiful Conejo Valley. I hope you seriously consider my opinion and the opinions of the members of this beautiful area. Sincerely, Gina Young.

Sent from my iPhone

Baca, Brian

From: Sherry Shoop <boyd_shoop@yahoo.com>
Sent: Monday, October 02, 2017 9:42 PM
To: Baca, Brian
Subject: Pacific Rock protest

Dear Brian,
I am in string disagreement with Pacific Rock's application to expand their operations in land use as well as constant operations as they expand hours and days. Many of us purchased homes in Newbury Park for the pastoral beauty and peace. This is not only an intrusion on this, but to think it could continue for 25 years potentially is unsettling. As a company that has also fallen off the "Good Guy" list, I don't have much faith that a deal with them will benefit anyone other than them.

I appreciate your consideration in this request.

Sincerely,
Cheryl Shoop

Sent from my iPhone

Baca, Brian

From: Bruce Irish <bwirish@gmail.com>
Sent: Monday, October 02, 2017 9:49 PM
To: Baca, Brian
Cc: Bruce Irish
Subject: Resident concerns over Pacific Rock Plans

Greetings Brian,

I just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 5288 Via Dolores, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

I am also a COSCA volunteer for the Powerline trail (Edison Road) which skirts very close to the existing mining area - there are warning signs adjoining the trail. As a frequent hiker and guide on this trail multiple times a week, I also have concerns that the impacts on the adjoining open space protected by COSCA and set aside for peaceful, quiet enjoyment and healthful activity may be negatively impacted by increased mining noise and air quality. In particular, these concerns are heightened with the planned mining increase to essentially a daily dawn-to-dusk activity.

I haven't seen an indication that COSCA has been consulted in the planning as would be expected. For this reason as well, the plan should be denied due to incomplete consultation with relevant stakeholders and nearby residents.

Thank you.

Regards,
Bruce

Sent from my iPad

Baca, Brian

From: Jaime Taylor <jaimeataylor@gmail.com>
Sent: Monday, October 02, 2017 10:23 PM
To: Baca, Brian
Subject: Pacific Rock

Please, just say 'No' to the expansion.

Baca, Brian

From: Judy Lloyd <jl@dlloyd.com>
Sent: Monday, October 02, 2017 10:26 PM
To: Baca, Brian
Subject: Pacific Rock Mining Expansion

Dear Mr. Baca,
I understand that Pacific Rock Mining has applied to increase the size and scope of its operations in the Conejo mountains. I am opposed to this. We need to preserve what is left of this mountain. This type of operation should be located in an isolated area or the desert, not here. There is already a huge scar on the mountains from their operation, and they should not be allowed to make it bigger. Please do not allow this expansion.
Sincerely,
Judy Lloyd,
Newbury Park

Baca, Brian

From: Jo-Anne <wizozzy3@gmail.com>
Sent: Monday, October 02, 2017 10:48 PM
To: Baca, Brian
Subject: Pacific rock expansion

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 4678 Calle San Juan, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. Already impacted by the dust and dirt, it seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will further negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Jo-Anne Guerriere
Sent from my iPhone

Baca, Brian

From: Julie Goldstein <jblgmom13@gmail.com>
Sent: Monday, October 02, 2017 10:59 PM
To: Baca, Brian
Subject: Pacific Rock Expansion Case no. LU10-0003

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 5261 Via Rincon, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased used of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,

Julie Goldstein

5261 Via Rincon

Newbury Park, CA 91320

mobile 818-634-1263

Baca, Brian

From: Mike McMaster <mikemcmaster33@gmail.com>
Sent: Tuesday, October 03, 2017 12:07 AM
To: Baca, Brian
Subject: Conejo mining

Can you please let me know if residents of Dos Vientos were notified of this mining renewal? I know very little with no information I would oppose the renewal. With education I may feel different but I just learned about it today through neighbors.

Thanks

Mike Mcmaster
4998 Via Santana

Sent from my iPhone

Baca, Brian

From: Kristen <kristenwatts@yahoo.com>
Sent: Tuesday, October 03, 2017 4:01 AM
To: Baca, Brian
Subject: Pacific Rock

Hi Brian,

I live in Dos Vientos and have concerns about the mining project. As a community we have received little to no information have concerns with the noise, pollution and health risks to our family and children.

You have provided no opportunity in a venue to allow neighbors to understand be educated and weigh in on the mining project that is in or back yard.

Please provide additional information and include our voiced concerns with this project.

Warm Regards,

Kristen Watts
Find your new wellness!
Associate #347437
http://voxxlife.com/KristenWatts/
http://www.ylwebsite.com/watts
805-405-6942

Baca, Brian

From: J C <skrappostpapperskorg@gmail.com>
Sent: Tuesday, October 03, 2017 4:54 AM
To: Baca, Brian
Subject: Pacific Rock mining expansion

Good Morning Brian,

From my understanding, you are the Surface Mining and Reclamation Program Coordinator for Ventura County.

This week you've definitely had an increase in emails from residents and home owners about Pacific Rock. We live in the surrounding areas of Newbury Park and Camarillo are extremely concerned about the news that they are expanding.

Many of us found out today that Pacific Rock has a request to expand their mining operation by 319%! My neighborhood in Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to this area. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and
reported to neighboring property owners.

Thank you for your time and service to the county.

Jason Carroll

Sent from my iPhone

Baca, Brian

From: Marion Ried <marion.ried@verizon.net>
Sent: Tuesday, October 03, 2017 5:40 AM
To: Baca, Brian
Subject: Conejo Mtn

We have lived in Newbury Park since 1977 and have watched the progression of development over the past 40+ years. We own an home on Coronado Cir (in which our son, brother, and father reside) and one on Calle Linda Vista. It is unimaginable that these hills could be slated for further mining and destruction rather than being added to the Conservancy as was suggested months ago.
These hills are the focal point of this community through the spring blooming and 'greening' to the fall burning with the wildfires and Santana Winds. My son has grown up hiking and bicycling in those hills and my husband (now retired firefighter LA Co.) has fought those wildfires in an effort to preserve them for all of us. The flags of patriotism placed up there are a symbol of how the community feels about them with all of their beauty. The mining and destruction certainly cannot be the fate of our community's last bastions of open space and the homes of our wildlife critters and foliage.
Please know that we do NOT support this expansion of mining and are in favor of the Conservancy acquisition. It is sad that the community is not made more aware of situations like this before it becomes too late to voice an opinion.
Marion and Peter Ried
3809 Calle linda Vista
Newbury Park, CA 91320

Baca, Brian

From: Lynn <lynnmariesavoie@yahoo.com>
Sent: Tuesday, October 03, 2017 6:43 AM
To: Baca, Brian
Subject: Pacific Rock

Brian,
I Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 874 Fernhill Court , Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood next to Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, I/we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Respectfully,

Lynn Savoie
874 Fernhill Court
Newbury Park, CA 91320

Baca, Brian

From: Roy Nissim, D.C. <rnissimdc@gmail.com>
Sent: Tuesday, October 03, 2017 6:47 AM
To: Baca, Brian
Subject: Mining in Newbury Park

Brian.

Pacific Rock has a request to expand their mining operation by 319%. Importantly, the prevailing westerly winds carry air and noise pollution from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increase sound, dust and related pollution from the increase use of explosives and equipment will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have not received any information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to the neighboring property owners.

Thank you.

--
Roy Nissim, D.C., A.R.T.

Baca, Brian

From: Josephine Louie <josephine.louie@gmail.com>
Sent: Tuesday, October 03, 2017 8:59 AM
To: Baca, Brian
Subject: opposition to Pacific Rock Mine's request for expansion

Dear Mr. Baca,

As residents of Newbury Park in Dos Vientos, we are writing in full opposition of Pacific Rock Mine's request for expansion of their mining operation.

We express our complete support to recognize the original intent of the Conditional Use Permit of 2000 to close the quarrying operation of Conejo Mountain in 2010 and make the area open space land.

Conejo Mountain is a beautiful and important part of our local Conejo Valley/Camarillo ecosystem. We feel strongly that it is pertinent for this area to remain in its natural state for the fantastic wildlife in the area, its natural beauty, as well as recreational value. This is what attracted us to move here 15 years ago. We want to see this beauty preserved and protected for generations to come.

Please do not further delay the reclamation process of Conejo Mountain. It is long overdue and needs to take place immediately. Thank you.

Sincerely,

Andrew and Josephine Louie

Baca, Brian

From: Susie Ellis <susiellis@verizon.net>
Sent: Friday, October 06, 2017 8:37 PM
To: Baca, Brian
Subject: Re: Pacific Rock mining

Dear Brian,

I just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 2940 Felton Street in Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,

Susie Ellis

Baca, Brian

From:	Sheryl Hall <hallrns@gmail.com>
Sent:	Friday, October 06, 2017 9:18 PM
To:	Baca, Brian
Subject:	Pacific Rock

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. Our home at 652 Martinique Place , Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,
Ron and Sheryl Hall

Sent from my iPhone

Baca, Brian

From: Charlene Ohlrich <charohlrich@sbcglobal.net>
Sent: Saturday, October 07, 2017 6:51 AM
To: Baca, Brian
Subject: Conejo Mountain Rock Mining Expansion

Hello Brian:

The information on rock mining expansion on Conejo mountain is circulating throughout Camarillo, Newbury Park and other communities on social media sites. Disastrous if allowed to happen in this region for so many reasons - even tsunsmis!!

This destruction cannot be approved.

Charlene Ohlrich
6118 Paseo Encantada
Camarillo, CA 93012

Baca, Brian

From: Jan Martin <jan@mrplogistics.com>
Sent: Friday, October 06, 2017 4:04 PM
To: Baca, Brian
Subject: Pacific Rock Mining expansion proposal

Brian –

Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 3940 Maurice Drive, Newbury Park is just over the hill from the Pacific Rock site.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Jan Martin

Baca, Brian

From: Matt Barker <mattbarkerfilms@gmail.com>
Sent: Wednesday, October 04, 2017 1:33 PM
To: Baca, Brian
Subject: Pacific Rock

Dear Mr. Baca,

Please do not approve the proposed permit for Pacific Rock increasing hours and size. I live adjacent to Pacific Rock in Newbury Park and this will dramatically lower our quality of living with larger noise, dust, and dirt impacts. Pacific Rock will adversely impact the neighborhoods of Ventura County.

Thanks for your kind consideration.

Matt Barker

APPENDIX A-3

SCOPING MEETING SIGN-IN AND NOTES

EIR Scoping Meeting - Attendance Roster

County of Ventura · Resource Management Agency · Planning Division
800 S. Victoria Avenue, Ventura, CA 93009-1740 · (805) 654-2478 · ventura.org/rma/planning

Meeting Topic: Pacific Rock, LU10-0003

Date: September 14, 2017 **Place: Room 311, Government Center** **Time: 10:00 a.m.**

NAME (Please Print)	REPRESENTING	PHONE	E-MAIL	Do you wish to be notified of the decision?
Tom Pilcher	Self	805 987 2311	Ronkester99@gmail.com	Yes
Michelle D'Anna	City of Camarillo	805-388-5370	mdanna@cityofcamarillo.org	Yes

Pac Rock Scoping meeting
9-14-17

① Michelle D'Anna - City of Camarillo

② Thomas Pilscher (Camarillo Springs)
- Ron Kester has sent in an email
- Traffic
- Geological impact: Any further blasting will cause landsliding on the other side
- 2014-15 landslides in Camarillo Springs (debris flows)
- Heavy steel nets we installed

- Traffic
  - PV Road / Pancho and Ridgeview Road Serious congestion at peak hour
  - Adding 120 trips/day

Ridgeview & ~~101~~ 101 are the two access points out of Camarillo springs

APPENDIX B-1

AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

BENCHMARK RESOURCES

SESPE
CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

Pacific Rock Quarry Expansion Project
Ventura County, California

March 29, 2019

Prepared for: Pacific Rock, Inc.
P.O. Box 257
Somis, CA 93066

Prepared by:

Scott D. Cohen

Scott Cohen P.E., C.I.H. – Project Manager III

Andre Almeida 3/29/2019

Andre Almeida – Engineer II

Sespe Consulting, Inc.
374 Poli Street, Suite 200
Ventura, California 93001
(805) 275-1515

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SESPE CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

Pacific Rock Quarry CUP Application
Ventura County California

March 29, 2019

EXECUTIVE SUMMARY

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 mining area expansion and annual production increase proposed in the Conditional Use Permit Modification Application (Project) for the Pacific Rock Quarry in unincorporated portion of Ventura County between the cities of Camarillo and Thousand Oaks.

The following Project features would affect emissions characteristics from sources associated with the Project and are assessed herein:

- Change of the excavation area to include areas outside of the existing mine.
- Increase in annual production to a maximum of 468,000 tons per year while maintaining hourly and daily maximum production rates equal to or less than historical levels.
- Allow various portable concrete crushing plant(s) to operate on-site and process up to 50,000 cubic yards or approximately 100,000 tons per year based on the bulk density of Portland cement concrete found in EPA AP-42 emissions inventory guidance.
- Allow import of up to 100,000 cubic yards or approximately 150,000 tons per year of fill material needed for reclamation of the site.
- Ensure that daily and hourly maximum production remains unchanged. These values are derived from historical maximum daily truck trip value of 60 trips per day (i.e., 30 loads x 2 trips per load) and assuming 25-tons of material hauled per load. Each newly proposed material identified above would substitute for native aggregates that were shipped in the past.

Project emissions were quantified using CalEEMod and EMFAC2017 emissions factors and equipment descriptions provided by the Applicant (e.g., off-road vehicle quantity, types, and engine specifications). This Report uses Ventura County Air Pollution Control District (VCAPCD) calculation methods in combination with current best practices such as methodology in the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments* (HRA Guidelines, 2015) to quantify Project impacts on global, regional, and local environmental conditions. Project emissions are compared to VCAPCD recommended criteria for each significance threshold analyzed. Local pollutant concentrations of toxic air contaminants (TAC) were calculated using EPA AERMOD (dispersion) and CARB HARP2 (health risk) modeling software.

This Report presents a conservative assessment of chronic health impacts by assessing the annual emissions as if they would be occurring on a greenfield site. Alternatively, the Report could have subtracted the baseline annual emissions from the future annual emissions with the Project to determine the Project's contribution to chronic health impacts. On an hourly basis, the HRA modeled the change in location of mining with no change in the activity level from the baseline level (i.e., 60 truck-trips per day).

Air Quality and Greenhouse Gasses (GHG) significance thresholds in the Ventura County Air Quality Assessment Guidelines (VCAPCD, 2003) which correspond to the State CEQA Guidelines Appendix G Environmental Checklist Form Items (California Code of Regulations, Title 14) and are listed below along with associated criteria recommended by Ventura County:

1. Air Quality

a) The Project would not conflict with or obstruct implementation of any applicable air quality plan because the Project does not induce population growth (see Section 2.5.1).

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. Project non-attainment pollutant emissions were evaluated using ozone precursor daily thresholds of 25 lb/day NOx and 25 lb/day VOC and considering that daily emissions would continue to be limited to historical levels by ensuring that daily truck trips would remain unchanged by the Project (see Section 2.5.2).

c) The Project would not expose sensitive receptors to substantial pollutant concentrations which are assessed in terms of human health risk reported in Table ES1 (see Section 2.5.3).

Table ES1. Project Health Risk Impacts and Comparison to Significance Thresholds

Model Receptor # – Type – Location	Excess Cancer Cases per Million People Exposed	Max Chronic Hazard Index	Max Acute Hazard Index
136 – MEIR (Cancer, Chronic) – North of Project	1.0	0.024	< 0.010
109 – MEIR (Acute) – East of Project	0.33	0.0057	< 0.010
103 – MEIW (Cancer, Chronic, Acute) – Funeral Home	1.4	0.26	0.021
194 – PMI – Project Boundary (UTM 316339, 3783949)	N/A	N/A	0.079
Significance Criteria	**10**	**1.0**	**1.0**
Threshold Exceeded?	**No**	**No**	**No**

Source: Appendix D

Note: These receptors represent locations of highest exposure. Discrepancies between table and appendix values may exist due to rounding. MEIR: Maximum Exposed Individual Receptor; MEIW: Maximum Exposed Individual Worker; PMI: Point of Maximum Impact

d) Project emissions would not result in other effects (e.g., odor) that may adversely affect a substantial number of people. Historical effects (e.g., odor from diesel-fueled equipment) were not the subject of complaints and new/additional activities with such effects are not proposed by the Project (see Section 2.5.4)

2. Greenhouse Gasses

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).

Greenhouse gas emissions from the project are displayed in Table ES2 below, primarily for disclosure purposes. The Project would emit GHGs from electricity use and fuel burned in vehicle engines. Electricity and 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 AB 32 Scoping Plan. Thus, the emissions reductions will occur at a level in the supply chain above the Project, which will have no choice but to use fuel and electricity having GHG intensities that are consistent with the Scoping Plan.

Table ES2. Project Greenhouse Gas Emissions

Activity	**CO_2e (MT/yr)**
Electricity Use	1,184.5
Vehicle Engine Emissions	2,075.2
Project Emissions – Total	3,259.7

Source: Appendix D

Note: Values above may differ from values in Appendix D due to rounding and conversion to Metric Tons

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).

The discussion for impact 2.a. above addresses this impact also. Consistency with the applicable plan (AB 32 Scoping Plan) will be ensured for electricity and transportation fuels used by the Project by producers and importers of those energy sources thought compliance with the Cap-and-Trade Program. Therefore, consistency with the applicable plan is assured and the Project GHG impact is less than significant.

SESPE CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

Air Quality and Climate Change Impact Assessment

Pacific Rock Quarry CUP Application
Ventura County California

March 29, 2019

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APPENDICES

1.0 INTRODUCTION AND PROJECT DESCRIPTION

The Applicant is submitting this Conditional Use Permit Modification Application to continue the existing permitted operations approved under CUP 3817-3. Proposed modifications to CUP 3817-3 include: extend the life of the existing permitted operations for approximately 30 years; expand the mining area, extend the operational days from 6 to 7 days per week (to include material load out on Sundays) with additional material load out hours and limited extended 24 hour operations (60 days maximum per year); allow construction and mobile mining equipment in outdoor storage areas; replace an existing mobile home to be used as a primary residence; increase total annual production to 468,000 tons per year.

The following Project features specified by The Application would affect air emissions and were assessed in this HRA.

- Change of the excavation area to include areas outside of the existing mine.
- Increase in production to a maximum of 468,000 tons per year.

The proposed actions are analyzed in this Air Quality and Climate Change Impact Report (Report) and heretofore referred to as the "Project". The features described in this report are those that affect air quality.

This Report presents technical information and analysis describing reasonably foreseeable changes to the environment that would occur with the Project. Project impacts on regional and local environmental setting are assessed for operation phases of the project using current standard practices and the State CEQA Guidelines (14 CCR §15000 et. seq.). This Report follows the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments* (OEHHA, 2015).

This report has two primary sections: air quality and greenhouse gas (GHG). Each is divided into the following sub-sections:

- **Regulatory Setting**. This subsection describes the characteristics of pollutants as well as federal, state[1], and local regulations that apply to the Project.
- **Environmental Setting**. This subsection describes the existing physical environment (i.e., CEQA baseline)[2] for the region and areas adjacent to the Project site.
- **Significance Thresholds**. This subsection presents the state CEQA Guidelines Appendix G checklist items which are the primary thresholds used along with the VCAPCD significance criteria that are applied to determine the significance of the Project.

[1] The words "federal," "national," and "state" are capitalized when referring to a specific rule, regulation or other item that could be unique (e.g., State CEQA Guidelines in preceding paragraph). The words are not capitalized when describing items in general terms not specific to this nation or state. As presented in this bullet; federal, state and local are levels of government/regulation; and thus, are not capitalized.

[2] The word "baseline" is capitalized in this report when referring to the Project Baseline and is not capitalized when referring to the concept of baseline under CEQA and/or baselines for other projects, plans, regulations, etc.

- **Methodology**. This subsection describes the design features of the Project, emissions calculation methods, emissions that are in the Baseline for the Project, and health risk assessment (HRA) methods.
- **Project-Level Impacts and Mitigation Measures**. This subsection presents the results of Project impact analyses; compares each impact to significance thresholds; determines significance of project effects; proposes mitigation measures to reduce significant impacts to less than significant levels or the maximum extent feasible.

2.0 AIR QUALITY

This AQCCIA follows the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments* (OEHHA, 2015).

2.1 Regulatory Setting

2.1.1 Characteristics of Air Pollutants

Both the state and the federal governments 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 criteria pollutant is described more fully below and associated AAQS are presented in Table 1.

Many constituents in air emissions other than criteria pollutants may 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 below. Appendix C contains information from the American Thoracic Society (ATS) on what constitutes an adverse health effect from air pollution which is the standard used by the Office of Environmental Health Hazard Assessment (OEHHA) and CARB in setting AAQS and exposure levels used for health risk assessment (HRA).

Ozone – Ozone (smog) is formed by photochemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds (VOC), rather than being directly emitted. Generally, air districts prioritize NOx reductions over VOC reductions because NOx 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 may 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 that may be more sensitive to CO exposure include those having an existing cardiovascular disease or anemia; fetuses of pregnant women; smokers; and persons exposed to methylene chloride.

Nitrogen Oxides – Nitrogen oxides (NO_X) is a generic term for the mono-nitrogen oxides which include nitric oxide (NO) and nitrogen dioxide (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 (SO_2) 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. People with asthma and children are particularly sensitive to and are at increased risk from the effects of SO_2 air pollution

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. In addition, it is now believed that $PM_{2.5}$ concentrations are highly dependent on several precursors which, like NOx and ROG for ozone, undergo chemical reactions in the environment that changes them to $PM_{2.5}$.

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 United States.

Respirable Crystalline Silica – Respirable crystalline silica (RCS) refers to crystalline silicon dioxide with aerodynamic diameter less than four (4) microns (i.e., 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 to reach the 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.

Diesel Particulate Matter – Diesel particulate matter (DPM) is used as a surrogate for the mixture of compounds in diesel exhaust that have the potential to contribute to mutations in cells that can lead to cancer. These compounds include, but are not limited to, arsenic, benzene, formaldehyde, and nickel.

Long-term exposure to diesel exhaust particles poses the highest cancer risk of any TAC evaluated by OEHHA. 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 (NIOSH), have calculated similar cancer risks from diesel exhaust as those calculated by OEHHA.

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. People with allergies, existing cardiovascular disease, the elderly, and children considered sensitive populations for DPM exposure. 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.

2.1.2 Federal

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. Table 1 presents Federal and State AAQS. "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 2 also identifies how the CAA applies to the Project.

New Source Performance Standards – Title 40, Code of Federal Regulations (CFR), Part 60

<u>Subpart OOO (Nonmetallic Mineral Processing Plants)</u> is applicable to new, modified, or reconstructed nonmetallic mineral processing facilities (with certain exceptions, such as fixed sand and gravel plants and crushed stone plants with capacities of 25 tons per hour or less, or portable sand and gravel plants and crushed stone plants with capacities of 150 tons per hour or less). Subpart OOO restricts emissions from affected facilities equipped with capture systems used to capture and transport particulate matter to a control device. Emissions are prohibited in excess of 0.032 grams per dry standard cubic meter (g/dscm) (0.014 grains per dry standard cubic feet (gr/dscf)), and from exhibiting visible emissions based on quarterly monitoring. Subpart OOO also prohibits the discharge of any fugitive emissions from affected facilities without capture systems and the discharge of fugitive emissions escaping capture systems that exhibit greater than 7 percent opacity (12 percent for crushers without capture systems).

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 combustion emissions.

2.1.3 State

2.1.3.1 Criteria Pollutants

The State of California began to set California ambient air quality standards (CAAQS) in 1969. The CAAQS are generally more stringent than the NAAQS. 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 listed in Table 1.

Originally, there were no attainment deadlines for the CAAQS. However, the California Clean Air Act (CCAA) provided a timeframe and a planning structure to promote their attainment. The CCAA required nonattainment areas in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan. CAAQS attainment plans require a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented.

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)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
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 14	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 μg/m^3	Ion Chromatography			
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			

Footnotes on next page. Source: CARB, May 4, 2016

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 µg/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 VCAPCD 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 VCAPCD programs and rules that maintain attainment.
Preserve clean air in attainment areas.	Yes, the Project would comply with VCAPCD programs and rules that preserve attainment.
Adopt National standards for new stationary sources.	Yes, the project will comply with federal law.
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 located on the Outer Continental Shelf.
Regulate hazardous air pollutants.	Yes, see **Impact AQ-2**.
Protect visibility in National parks by regulating regional haze.	No, 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.

Source: (EPA, 2013).

2.1.3.2 Toxic Air Contaminants

California's 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 when prioritizing pollutants for 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 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, industrial 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 methodologies from the AB 2588 Program are used in this AQCCIA as discussed in the methodology subchapter (Sections 2.4).

Diesel Emissions

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 requires that fleets meet requirements for NO_x and particulate matter emissions rates. Where fleet average requirements cannot be met, best available control technology (BACT) requirements apply. The regulation also includes recordkeeping and reporting requirements. In response to AB 8 2X, the regulation was revised in July 2009 (effective December 3, 2009) to postpone compliance in 2011 and 2012 for existing fleets. On December 17, 2010, CARB adopted additional revisions to further delay the compliance deadlines, reflect reductions in diesel emissions due to the poor economy, and rectify overestimates of diesel emissions that supported previous rule making. The 2010 revisions delayed the first compliance date until January 1, 2014 for large fleets, with final compliance by January 1, 2023. The compliance dates for medium fleets were delayed until January 1, 2017, and final compliance date of January 1, 2023. The compliance dates for small fleets were delayed until January 1, 2019, and final compliance date of January 1, 2028. The fleet average targets were made more stringent in future compliance years, to compensate for reductions that would not occur in early years. The revisions also accelerate the phase-out of equipment, preventing older equipment from being added to fleets over time.

On October 28, 2011 (effective December 14, 2011), the Executive Officer of CARB approved amendments to the ATCM regulation that included revisions to the applicability section, definitions, and fleet average schedule by combining the PM and NO_x fleet average targets. The amended fleet average targets are based on the NO_x fleet average emissions factors from previous versions of the rule with credit given for PM reduction. The PM performance requirements were removed. The BACT requirements, which apply when a fleet cannot comply with the fleet average requirements, were restructured and clarified. Other amendments to the regulations included minor administrative changes.

Naturally Occurring Asbestos (NOA)

ATCMs for naturally-occurring asbestos (NOA) that have been adopted by CARB include the following:

- Asbestos ATCM for Surfacing Applications (17 CCR § 93106) restricts the asbestos content of material used in surfacing applications such as unpaved roads, parking lots, driveways, and walkways. The ATCM excludes "sand and gravel operations" from requirements except for those allowing the Air Pollution Control Officer (APCO) to require geologic evaluation or asbestos testing. "Sand and gravel operation" means any aggregate-producing facility operating in alluvial deposits.
- 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. Applicable to the South Site 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."

While previous mining took place only within alluvial deposits, on the North Site, the Project proposes to mine underlying hard rock and therefore is no longer excluded from 17 CCR § 93105. Additionally, it is possible that geologic evaluation or asbestos testing may be required by the APCO.

2.1.4 Ventura County Air Pollution Control District

The Ventura County Air Quality Assessment Guidelines (VCAPCD, 2003) contains the following information related to HRA for TACs.

> *"Toxic air contaminants (TACs), also referred to as hazardous air pollutants, are air pollutants (excluding O_3, CO, SO_2, and NO_2) that may reasonably be anticipated to cause cancer, developmental effects, reproductive dysfunction, neurological disorders, heritable gene mutations, or other serious or irreversible acute or chronic health effects in humans.*
>
> *TACs are regulated under different federal and state regulatory processes than ozone and the other criteria air pollutants. Health effects of TACs may occur at extremely low levels and it is typically difficult to identify levels of exposure that do not produce adverse health effects.*
>
> *TACs generally consist of four types: organic chemicals, such as benzene, dioxins, toluene, and percholorethylene; inorganic chemicals such as chlorine and arsenic; fibers such as asbestos; and metals such as mercury, cadmium, chromium, and nickel. These air contaminants are defined by the U.S. EPA, the State of California, and other governmental agencies. Currently, more than 900 substances are regulated TACs under federal, state, and local regulations. Appendix D, Major Toxic Air Contaminant Regulations and Common Toxic Air Contaminant*

Sources and Substances, presents the major federal and state programs and regulations to reduce toxic air contaminant emissions.

Sources: *Toxic air contaminants are produced by a great variety of sources, including industrial facilities such as refineries, chemical plants, chrome plating operations, and surface coating operations; commercial facilities such as dry cleaners and gasoline stations, motor vehicles, especially diesel-powered vehicles; and, consumer products. TACs can be released as a result of normal industrial operations, as well as from accidental releases during process upset conditions.*

Effects: *Health effects from TACs vary with the type of pollutant, the concentration of the pollutant, the duration of exposure, and the exposure pathway. TACs usually get into the body through breathing, although they can also be ingested, or absorbed through the skin.*

Adverse effects on people tend to be either acute (short-term) or chronic (long-term). Acute effects result from short-term, high levels of airborne toxic substances. These effects may include nausea, skin irritation, caridiopulomary distress, and even death. Chronic effects result from long-term, low level exposure to airborne toxic substances. Effects can range from relatively minor to life-threatening. Less serious chronic effects can include skin rashes, dry skin, coughing throat irritation, and headaches. More serious chronic effects can include lung, liver, and kidney damage; nervous system damage; miscarriages, and genetic and birth defects; and, cancer. Many TACs can have both carcinogenic and non-carcinogenic health effects.

With regards to criteria pollutants, the Ventura County Air Quality Assessment Guidelines include thresholds for Reactive Organic Compounds and Nitrogen Oxides in units of pounds per day of emissions, in addition to specifying that causing an exceedances of state or federal standards constitutes a significant adverse air quality impact.

2.2 Environmental Setting

The environmental setting includes the existing physical setting that is compared to future conditions with the Project to determine the Project's impact. Besides emissions, the air quality environment is affected by terrain and meteorology (weather).

Terrain plays a role in air dispersion mechanics, and therefore the resulting levels of air pollutants in a given area. Mountains that surround valley areas tend to retain air within the valley and limit the dispersion of pollutants. Meteorology causes year-to-year changes in air quality trends that can mask or overstate the benefits of emission reductions. Unlike terrain, meteorology affects pollutant concentrations differently depending upon the pollutant as discussed in the following examples:

- Ozone is formed in the atmosphere as sunlight initiates a complex set of chemical reactions. On hot sunny days, the abundant sunlight starts the ozone-forming processes and high temperatures promote fast chemical reactions. If the air is stagnant, the ozone formed is not dispersed or diluted by cleaner air from outside the area, thus, the highest ozone concentrations usually occur on hot and sunny days with light breezes or calm air. In some areas, high ozone levels may result from transport of pollutants from upwind regions. Since hot and sunny summer days typically lead to high ozone, it is un-surprising that cold and cloudy winter days have much lower ozone concentrations. (CARB, 2014).

- Ambient PM is comprised of primary PM that is directly emitted and secondary PM that forms in the atmosphere through chemical and physical processes. Primary PM includes dust and soot, while secondary PM includes particulate nitrates and sulfates. Some areas are subject to strong winds that lift dust into the air resulting in high concentrations of primary PM. In other situations, cold, calm, and humid air can promote the buildup of secondary PM. Relatively high PM levels in valley areas usually occur in the winter under these meteorological conditions. The lowest PM concentrations often occur on rainy winter days when winds disperse PM and rain washes PM out of the air. (CARB, 2014).

2.2.1 Regional Setting

Ventura County APCD describes the meteorology of the southern portion of the South Central Coast Air Basin (SCCAB) which also includes Santa Barbara and San Luis Obispo Counties as followings:

> *The air above Ventura County often exhibits weak vertical and horizontal dispersion characteristics, which limit the dispersion of emissions and cause increased ambient air pollutant levels. Persistent temperature inversions prevent vertical dispersion. The inversions act as a "ceiling" that prevents pollutants from rising and dispersing. Mountain ranges act as "walls" that inhibit horizontal dispersion of air pollutants.*
>
> *The diurnal land/sea breeze pattern common in Ventura County recirculates air contaminants. Air pollutants are pushed toward the ocean during the early morning by the land breeze, and toward the east during the afternoon, by the sea breeze. This creates a "sloshing" effect, causing pollutants to remain in the area for several days. Residual emissions from previous days accumulate and chemically react with new emissions in the presence of sunlight, thereby increasing ambient air pollutant levels*
>
> *This pollutant "sloshing" effect happens most predominantly from May through October ("smog" season). Air temperatures are usually higher and sunlight more intense during the "smog" season. This explains why Ventura County experiences the most exceedances of the state and federal ozone standards during this six-month period. (VCAPCD, 2003)*.

Local wind data are compiled and processed by VCAPCD into electronic files suitable for use in a plume dispersion model. A windrose from Camarillo Airport data files downloaded from CARB and used in the modeling for this Project is presented in Figure 6 (Appendix A). The receptors modeled are shown in Figure 4 and Figure 5.

2.2.2 Project Site and Local Setting

Table 3 Number of Days Exceeding Air Quality Standards

Area	Year	Days Exceeding State 1-Hour O_3	Days Exceeding State 8-Hour O_3	Days Exceeding Federal 0.08 ppm 8-Hour O_3	Days Exceeding State 24-Hour PM_{10}[a]	Days Exceeding Federal 24-Hour $PM_{2.5}$[a]
South Central Coast Air Basin	2013	3	12	2	98.1	2.9
	2014	3	16	2	88.3	1.9
	2015	1	14	0	69.2	0
	2016	2	11	1	77.1	9.5
	2017	3	22	3	29.5	9.7

Source: CARB iADAM Statistical Analysis Tool

a Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and 3 days, respectively. "Number of days exceeding the standards" are mathematical estimates.

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).

The 2000 ATS publication (see copy in Appendix C) recommends that the following "dimensions" of adverse effects be considered when determining whether an effect is an adverse health effect:

1. Biomarkers*: 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. Quality of life*: 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. *<u>Population health versus individual risk</u>: 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 ATS recommendations above, 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. A copy of the relevant ATS document, "WHAT CONSTITUTES AN ADVERSE HEALTH EFFECT OF AIR POLLUTION?" is provided in Appendix C.

2.3 Significance Thresholds

The CEQA Guideline Appendix G checklist was used along with both VCAPCD and SJVAPCD CEQA Guidelines and the GAMAQI to determine whether the Project would result in a significant air quality impact. Project impacts represent the change between baseline and the future conditions associated with the proposed operations, and are the metrics compared to thresholds to determine significance.

2.3.1 CEQA Guidelines Appendix G

The 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 Report considers the following Environmental Checklist Form questions to be the Significance Thresholds against which Project air quality impacts are judged.

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?

2.3.2 CEQA Significance Criteria

As specified in section 2.1.4, the VCAPCD outlines TAC based health impact thresholds. In order to appropriately categories the relative significance of criteria pollutant emissions, this Report also references thresholds outlined by the SJVAPCD under CEQA. The combined set of Significance Criteria are presented in Table 4 and used to evaluate the Environmental Checklist Form questions in Section 3.3.1 above.

Table 4 Air Quality Significance Thresholds

Recommended Toxic Air Contaminants (TACs), Odor Thresholds (VCAPCD) [b]	
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 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.
Ambient Air Quality Standards (SJVAPCD) [d]	
Screening Criteria	100 lb/day of any criteria pollutant after implementation of mitigation measures.

Recommended Toxic Air Contaminants (TACs), Odor Thresholds (VCAPCD) [b]	
Modeling Criteria	If modeling is required because emissions exceed the screening criteria, 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 (see Table 1 above) or Significant Impact Level in cases where background concentration already exceeds or nearly exceeds the AAQS.

Based on VCAPCD "Ventura County Air Quality Assessment Guidelines". (VCAPCD, 2003, p. 3.5)
and SJVAPCD "Air Quality Thresholds of Significance – Criteria Pollutants". (San Joaquin Valley Air Pollution Control District, 2015)

2.4 Methodology

This Report evaluates historical and potential future emissions from on-site sources including aggregates mining and aggregates processing.

2.4.1 Project Design Features and Assumptions

Impacts 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 (e.g., ATCM) including establishment of an idling policy, and limiting idle time to less than five minutes (13 CCR §2449).
  - Fugitive dust emissions would be controlled through implementation of controls and compliance measures as outlined in VCAPCD Permit 00489.
- The Project would not store hazardous substances or acutely hazardous substances in quantities that would trigger chemical accident prevention provisions of the CAA or the implementing regulation (40 CFR Part 68).

Design features of the Project include:

- Emissions characteristics of off-road vehicle engines in any particular year match those in CalEEmod. Specific assumptions with for vehicle engines are in Appendix D.

2.4.2 Emissions Calculations Methodologies

Emissions from combustion sources associated with the Project primarily consist of non-road diesel engines in off-road vehicles. Emissions from dust sources associated with Project include windblown dust and other storage pile area emissions (e.g., loading and handling), dozer/quarrying emissions, drop emissions from material transfer, and processing plants. Emissions are calculated in Appendix D using the methods presented below.

Non-Road Engines

Emissions from off-road engines 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 ATCM). Appendix A of the CalEEMod User's Guide 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 (g/bhp-hr) as processed from OFFROAD2011 or engine data.
Pop	=	Population, or the number of pieces of equipment.
AvgHP	=	Maximum rated average horsepower.
Load	=	Load factor.
Activity	=	Hours of operation.
i	=	Equipment type.

Quarrying

Quarrying emissions calculations used San Diego Air Pollution Control District (SDAPCD) standard emissions factors. Quarrying/mining emissions were calculated using the SDAPCD standard mining emissions factor (0.021 lbs fugitive dust per ton quarried).

Storage Pile Emissions

Storage pile emissions were calculated using the Storage Cycle* Emission Factor from AP42 13.2.4

Storage Pile and Aggregates Handling Emissions

Storage pile and Aggregates Handling emissions were calculated using the Storage Cycle Emission Factor from AP-42 Section 13.2.4. The mean wind speed variable in this report was assumed to be the CalEEMod default appendix value for the project area.

$$EF = k(0.0032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

Where: EF = 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 (%).

Travel on Roads

Road dust emissions are calculated using AP-42 equations (Appendix D). AP-42 Section 13.2.2 (for unpaved roads) and Section 13.2.1 (for paved roads).

$$(Unpaved)\ \ E_{ext} = \left[k\left(\frac{s}{12}\right)^{0.9} \times \left(\frac{W}{3}\right)^{0.45}\right]$$

$$(Paved)\ \ EF\ (\frac{lb}{vmt}) = [k(sL)^{0.91} \times (W)^{01.02}]$$

Where for Unpaved Roads:

Eext = 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 (%), and

W = average weight (tons) of the vehicles traveling the road

Where for Paved Roads:

K = particle size multiplier (having units of lb/vmt),

sL = road surface silt loading (g/m^2), and

W = average truck weight.

A control factor of 80% was applied based on facility air permit compliance regarding road based fugitive dust emissions. All parameters for road dust calculations are available in the Appendix D.

2.4.3 CEQA Baseline

Baseline consists of physical conditions prior to preparing this Report. Sespe calculated the Baseline emissions by analyzing engine information and production records provided by Pacific Rock.

It was conservatively assumed that there were no baseline emissions Annually. As the project is not proposing to increase operations on an hourly standpoint, no increases were modeled on an hourly basis. This effectively establishes the baseline as the current operational level of 500 tons of production per hour.

2.4.4 Operation Phase Emissions

Maximum operation phase activity is outlined in Table 5.

Table 5 Operation Phase Maximum Activity

Material Produced	Max Hour	Annual
Aggregate	500 tons	3,000,000 tons

Emissions are quantified in Table 6 and Table 7, and in Appendix D using the methodology and assumptions discussed above. Significance of the operation phase emissions is determined in Section 2.5.

Table 6 Operation Phase Maximum Hour Emissions

	Max Project lb/hr					
Source	**ROG**	**CO**	**NOX**	**PM10**	**PM2.5**	**SOX**
Quarrying Fugitive Emissions	-	-	-	5.25	1.53	-
Quarrying Engine Emissions	0.17	1.20	2.05	0.075	0.069	0.0038
Off-Road Haul - Mine to Processing Area (Fugitive)	-	-	-	8.39	1.78	-
Off-Road Haul - Mine to Processing Area (Engine)	0.18	0.99	1.78	0.065	0.059	0.0033
Processing Area Drop/Storage	0.17	1.07	1.77	0.46	0.18	0.0027
Plant/Aggregate Processing	-	-	-	3.09	0.90	-
Loadout Processing Area Drop/Storage	-	-	-	0.39	0.11	-
On-road Onsite Haul Engine Emissions	0.0054	0.023	0.14	0.0049	0.0033	0.0003
On-road Onsite Haul Fugitive Emissions	-	-	-	15.38	3.26	-
Total	0.52	3.29	5.74	33.11	7.90	0.010

Source: Appendix D

Note: Numbers in table may differ slightly from calculation results due to rounding.

Table 7 Operation Phase Maximum Year Emissions

	Max Project ton/yr					
Source	**ROG**	**CO**	**NOX**	**PM10**	**PM2.5**	**SOX**
Quarrying Fugitive Emissions	-	-	-	2.46	0.72	-
Quarrying Engine Emissions	0.027	0.19	0.32	0.012	0.011	0.00059
Off-Road Haul - Mine to Processing Area (Fugitive)	-	-	-	3.93	0.83	-
Off-Road Haul - Mine to Processing Area (Engine)	0.08	0.46	0.83	0.030	0.028	0.002
Processing Area Drop/Storage	-	-	-	0.18	0.053	-
Plant/Aggregate Processing	0.076	0.559	0.799	1.49	0.46	0.001
Loadout Processing Area Drop/Storage	-	-	-	0.18	0.05	-
On-road Onsite Haul Engine Emissions	0.003	0.011	0.064	0.002	0.002	0.000159
On-road Onsite Haul Fugitive Emissions	-	-	-	7.20	1.53	-
Total	0.28	1.61	4.35	15.56	3.73	0.0093

Source: Appendix D

Note: Numbers in table may differ slightly from calculation results due to rounding.

2.4.5 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 subchapters 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.

DPM is the primary TAC emitted by off-road engines used in mining projects. DPM has an assigned cancer potency factor (CPF) and a non-cancer reference exposure level (REL) that are used to evaluate the health risk.

Soil Sampling

Fugitive dust is generally inert but does contain trace metals and RCS. In absence of site-specific soil data, air district or ARB standard TAC speciations are used to determine the health risk associated with fugitive dust emissions. These speciations are intentionally conservative, and replacing them with more accurate data obtained via sampling allows for a more accurate HRA. Table 8 shows Arsenic and Nickel TAC concentrations in soil assumed in this analysis. Concentrations are based on San Diego APCD Standards as well as soil sample studies available in Appendix B.

Table 8 Fugitive TAC Speciation Assumptions

Emission Source	Constituent (TAC)	SDAPCD Standard Value (ppm)	Value Used in HRA (ppm)
Road Dust	Arsenic	21.0	10.0
Road Dust	Nickel	19.0	10.0
Aggregate Processing	Arsenic	22.0	10.0
Aggregate Processing	Nickel	28.0	10.0
Quarrying	Arsenic	20.0	10.0
Quarrying	Nickel	20.0	10.0

SDAPCD standard speciation profiles and data described in Table 8 were combined with calculated PM10 emissions to determine the mass of each TAC, and dispersion coefficients to quantitatively predict the ground level concentration (GLC) of each TAC, to which individuals may be exposed (see exposure assessment subsection below). The concentrations were then combined with exposure parameters to quantify the dose received by each receptor and for each exposure pathway. In the case of non-cancer risk, the exposures were then summed on a target organ by target organ basis using HARP2 to determine the maximum hazard index (HI) among the target organs in the body. The maximum target organ HI was then compared to the non-cancer significance criteria (i.e., 1.0 HI) as discussed in the following subsections.

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 asbestos is unlikely to be a concern.

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 gaussian 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 HRA performed under Hot Spots risk assessments (OEHHA, 2015).

In this HRA, the air dispersion modeling was performed using AERMOD View by Lakes Environmental (Version 9.4.0 running AERMOD executable Version 16216r). Pollutant GLC plot files were generated using the multi-chemical batcher function of AERMOD View. The HARP2 Risk Module was invoked by command line call to generate risk plot files as described in the Appendix E of the *User Manual for the Health Risk Assessment Standalone Tool* (CARB, 2015). Air dispersion modeling consisted of four steps:

:

1. Annual average and maximum one-hour GLCs are estimated. Air dispersion modeling results are expressed as concentration for each source receptor combination per amount of substance emitted per time in units of micrograms per cubic meter per gram per second, or (µg/m^3)/(g/s). This value, referred to as Chi over Q and sometimes written as (X/Q) is 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 (hourly wind speed and direction, surface and upper air files provided by ARB), and output file options.

The Control Pathway of AERMOD was set to provide output in concentration units of $\mu g/m^3$; and both wet and dry plume depletion were disabled. Terrain Options within AERMOD were set to “Flat & Elevated” and digital terrain files were downloaded through AERMOD from the National Elevation Database in geotiff format “NED GEOTIFF”. Averaging options were set to 1-hour and the period of the meteorological data file (i.e., five years) as provided by ARB. The rural dispersion coefficient was used. Algorithms to include deposition, exponential decay and low wind (beta) were not used.

Receptors were modeled at ground level (i.e. no flagpole height). 100 cartesian grid receptors, 63 discrete receptors, and 44 fence-line/plant boundary receptors were modeled. Residential receptors can be found in Table 9 Receptors that were modeled are identified in Figures 4 and 5 (Appendix A). Source parameters are summarized in Table 10. In order to obtain the most conservative possible health risk assessment, the model assumes mining takes place as close as possible to residential receptors, and emit TACs 24 hours per day, 7 days per week, 365 days per year.

The model was segmented into three (3) intervals based on the Project specifications and HRA best practices (see “Inhaltion Dose” in section 2.4.5). The segments represent project years 1 – 2, years 3 – 16, and years 17 - 30. Worker receptors were modeled for a total of 25 years per ARB guidelines.

Output of the dispersion model in the form of plot files, one for each combination of source and averaging period, containing X/Q values were combined with pollutant emissions rate by the AERMOD View multichemical batcher. Exposure parameters discussed below were assigned to HRACalc.exe input file (HRAInput.hra) that was used with the GLC plot files to predict the cancer and non-cancer risk at each receptor. Modeling files are provided in electronic format Appendix E.

Table 9 Discrete Residential Receptors

ID Number	UTM Coordinates (meters E, meters N)	Description
109	316741.78, 3783884.46	Residence
110	316657.97, 3783802.75	Residence
111	316454.72, 3783619.41	Residence
112	316525.25, 3783638.32	Residence
113	316723.76, 3783842.96	Residence
114	316481.83, 3783625.37	Residence
115	316435.19, 3783583.44	Residence
116	316934.9, 3783882.22	Residence
117	316935.15, 3783866.62	Residence
118	316941.95, 3783914.2	Residence
119	316968.41, 3783922.94	Residence
120	316997.06, 3783921.25	Residence
121	316357.58, 3783157.78	Residence
122	316401.07, 3783150.27	Residence
123	316145.9, 3782939.71	Residence
124	316295.72, 3782903.87	Residence
125	315900.97, 3782417.69	Residence
126	315792.12, 3782243.53	Residence
127	317133.07, 3783905.51	Residence
128	317142.37, 3783933.43	Residence
129	317147.3, 3783979.41	Residence
130	317154.42, 3784013.35	Residence
131	317170.84, 3784042.91	Residence
132	316319.16, 3786096.79	Residence
133	316417.7, 3786055.57	Residence
134	316473.73, 3786011.78	Residence
135	316507.87, 3785967.34	Residence
136	316534.27, 3785931.27	Residence
137	316594.81, 3785966.69	Residence

ID Number	UTM Coordinates (meters E, meters N)	Description
138	316646.98, 3785969.27	Residence
139	316687.85, 3785960.36	Residence
140	316764.71, 3785995.2	Residence
141	316798.67, 3785975.02	Residence
142	316851.45, 3785958.88	Residence
143	316903.9, 3785950.81	Residence
144	316952.32, 3785954.85	Residence
145	317008.02, 3785953.4	Residence
146	317065.38, 3785943.12	Residence
147	317116.8, 3785926.5	Residence
148	317246.77, 3785925.13	Residence
149	317371.82, 3785893.3	Residence
150	317471.86, 3785853.13	Residence
151	317579.48, 3785808.41	Residence
152	317778.8, 3785801.59	Residence
153	319270, 3783853.6	Residence
154	319338.56, 3784028.55	Residence
155	319303.1, 3784177.5	Residence
156	319513.52, 3784378.46	Residence
157	319364.57, 3784638.53	Residence
158	319336.2, 3784837.13	Residence
159	319383.48, 3785054.64	Residence
160	319303.1, 3785094.84	Residence
161	319128.14, 3785440.02	Residence
162	319140.86, 3785661.43	Residence

Note: Project is in UTM Zone 11N.

Table 10 Model Source Object Parameters

AERMOD ID	Project Segment	Emissions Description	Type
BM	Baseline	Baseline Mining Sink	Volume Source
ONRD	Future	On-Road Vehicle Emissions	Volume Line Source
OFRD	Future	Off-Road Vehicle Emissions	Volume Line Source
PLNT	Future	Processing Plant Emissions	Volume Source
FMHE	Future	Mining Max Hour (East)	Volume Source
FMHSW	Future	Mining Max Hour (South-West)	Volume Source
FMHN	Future	Mining Max Hour (North)	Volume Source
FMHS	Future	Mining Max Hour (South)	Volume Source
LDOT	Future	Loadout Area Emissions	Volume Source
FMY1	Future	Mining Max Year (North East)	Volume Source
FMY2	Future	Mining Max Year (East)	Volume Source
FMY3	Future	Mining Max Year (South-West)	Volume Source
FMY4	Future	Mining Max Year (North)	Volume Source

Note: Not all modeling object were utilized for HRA results. See modeling files (Appendix E).

After emissions exit the source, the substances are dispersed in the air. In addition to being inhaled, particulates deposit on vegetation, on soil, and in water at a rate that is dependent on the particle size. A deposition rate of 0.02 m/s was used for the Project HRA. Other model pathways used to estimate concentrations in environmental media include air, soil, water, vegetation, and animal products.

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. Concentrations in vegetation, animal products, and mother's milk are predicated on the concentrations estimate 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. Semi and non-volatile multi-pathway substances (e.g., earth metals in fugitive dust), the soil ingestion pathway and the dermal soil exposure pathway are assessed. The mother's milk pathway is used depending on the multi-pathway substance released. The Project HRA assessed each of these four pathways.

Inhalation Dose

The dose through the inhalation route is estimated for cancer risk assessment and noncancer hazard assessment. Both residential and off-site 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), treating all receptors as residential results in a conservative assessment of health risk.

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 typically calculated for each of these age groups: 3rd trimester, 0<2, 2<9, 9<16, 16<30 and 16-70 years though short projects may not affect all age groups. 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

The breathing rate normalized to body weight term, {BR/BW}, has several values used to assess cancer risk for each age bin designated in the HRA Guidelines (i.e., third trimester, 0 to 2, 2 to 16 and 16 to 70 years). These values and the parametric model distributions from which they are derived 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 CPF for the substance is based. Exposure frequency is recommended to be 350 days for residential exposures. Table 11 presents the mean and high-end point estimates for intake rates that were assumed in the Project HRA.

Table 11 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.

Non-cancer health risks were unaffected by age and 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 in 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.

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, and determined to be acceptable because schools are located beyond the 1 in one million cancer risk contour.

Inhalation dose of each pollutant at each receptor 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 60 years total and exposure was assessed using OEHHA Derived Method.

The Derived Method of dose calculation in HARP2 was used. It consists of the high-end point estimate (i.e., 95th percentile) for the two driving (dominant) exposure pathways (e.g., soil and breast milk) and the mean (65th percentile) point estimate for the remaining pathways. In non-cancer chronic assessments, the inhalation pathway is always considered a driving pathway, the next two risk driving pathways will use the 95th percentile, and the remaining pathways will use the mean intake rate.

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. As discussed above, the controlled deposition rate (0.02 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 dose from residential soil ingestion 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 estimates are shown in Table 12.

Table 12 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 13 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., 30-year residency) using equations presented in the HRA Guidelines (pg. 5-41) to estimate the dermal dose for each residential receptor. Worker receptors used the adult ADL and a 25-year exposure duration for the health risk calculation.

Mother's Milk Pathway

Estimates of the concentration of pollutants in 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 assumed to be 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 each pathway 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 intensity of the 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., (mg/kg BW/day)$^{-1}$) and as a Unit Risk Factor (URF) for a 70-year lifetime exposure in units of inverse concentration (e.g., (µg/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, repeated 8-hour, and continuous exposure Reference Exposure Levels (RELs). The non-cancer 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 when 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 less than the threshold for health effects in the general population. (OEHHA, 2015).

The actual threshold for health effects in the general population is generally not known with 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 ensure that the RELs are set lower than the threshold for health effects in nearly all individuals.

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 at each receptor. OEHHA conducts the dose-response assessment during the development of CPFs and RELs. These are used in conjunction with the exposure estimates to assess cancer risk and hazard from noncancer toxicity of emitted chemicals. Under the Hot Spots program, risk characterizations present both individual and population-wide health risks.

A general summary of the risk characterization components includes the following:

- The locations of the point of maximum impact (PMI), the maximum exposed individual receptor (MEIR), and the maximum exposed individual worker (MEIW) are identified. The PMI, MEIW, and MEIR for cancer risk and for noncancer hazard indices may not occur at the same location; and should be identified.

- The location of any specified sensitive receptors (e.g., schools, hospitals, daycare, or eldercare facilities) are identified.
- Estimates of population-wide cancer burden are assessed.

Cancer Risk

Cancer risk is calculated by multiplying the daily inhalation or oral dose, by a CPF, the age sensitivity factor (ASF), the frequency of time spent at home (FAH) (for residents only), and the exposure duration divided by averaging time, to yield the excess cancer risk. As described below, excess cancer risk is calculated separately for each age grouping and 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 exposure 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 exposure duration. Cancer risk is 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 non-continuous sources) and amount of time the off-site worker’s schedule overlaps with the facility’s emission schedule. Additional consideration for off-site 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 if the facility impacts that exposure medium and the receptor under evaluation can be exposed to that medium or pathway. For example, if the facility does not impact a fishable body of water, or the impacted water body does not sustain fish that are consumed by anglers, then the fish pathway will not be considered for that facility or receptor.

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 each exposure pathway is 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 milk 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.

For facilities with large emission footprints (e.g., refineries, ports, or rail yards, etc.), population-based health impacts provide a better illustration of the potential population-wide impacts of emissions since large numbers of people may be exposed to the emissions. The individual cancer risk approach discussed up to this point has some inherent limitations in terms of protecting public health. A small facility with a single stack can impact a few individuals with an individual cancer risk that is unacceptable, whereas a large facility may have an individual cancer risk that is less than the acceptable limit for individual risk but exposes many more people. Thus, the population-wide impacts are larger for the large facility. Population-wide risk is independent of individual risk, and assumes that a population (not necessarily the same individuals) will live in the impacted zone over a 70-year period.

To evaluate population risk, the cancer burden method accounts for the number of excess cancer cases that could occur in a population. The cancer burden is calculated by multiplying the cancer risk at a census block centroid by the number of people who live in the census block, and adding up the estimated number of potential cancer cases across the zone of impact. The result of this calculation is a single number that is intended to estimate of the number of potential cancer cases within the population that was exposed to the emissions.

Cancer burden is independent of how many people move in or out of the vicinity of an individual facility. For example, if 10,000 people are exposed to a carcinogen at a concentration with a 1×10^{-5} cancer risk for a lifetime the cancer burden is 0.1, and if 100,000 people are exposed to a 1×10^{-5} risk the cancer burden is 1.

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.

Emissions calculated for the Baseline (see Section 2.4.3) and Project (see Section 2.4.4) were determined for each time segment during the Project's life corresponding to cancer risk age bins. Cancer risk results for each time segment were then summed to determine the Project cancer risk impact at each receptor.

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 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 chronic, and continuous chronic exposures to a number of substances.

Acute RELs are designed to protect against the maximum 1-hour ground level concentration at a receptor. Chronic RELs protect against long-term exposure to the annual average air concentration spread over 24 hours/day, 7 days/week. 8-hour RELs are designed to protect people with daily 8-hour schedules, such as off-site workers, in an impacted zone. The 8-hour RELs are used for typical daily work shifts of 8 hours and represent concentrations at or below which health impacts would not be expected even for sensitive subpopulations in the general population with repeated chronic daily 8-hour exposures. The 8-hour RELs can be used to evaluate the potential for health impacts (including effects of repeated exposures) in off-site 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 units of 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 but relative 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 skin, the nervous system, and the cardiovascular system.

2.5 Project-Level Impacts and Mitigation Measures

Project impact is compared to each threshold of significance (Section 2.3) and is evaluated in the following subsections. Mitigation measures are proposed for impacts if project impact is predicted to exceed a threshold. Mitigated impact is then assessed to evaluate the effect of the mitigation and determine if additional mitigation is necessary.

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

> *An environmental document for a proposed project must address project consistency with the AQMP. Project consistency with the AQMP can be determined by comparing the actual population growth in the county with the projected growth rates used in the AQMP. The projected growth rate in population is used as an indicator of future emissions from population-related emission categories in the AQMP. These emission estimates are used, in part, to project the date by which Ventura County will attain the federal ozone standard. The County of Ventura Planning Division maintains an ongoing population tracking system. Therefore, a demonstration of consistency with the population forecasts used in the most recently adopted AQMP should be used for assessing project consistency with the AQMP.*

In summary, the Project would not conflict with or obstruct specific control measures and generally would not affect attainment goals in an air quality plan. The AQMPs represent a broader legislative agenda which can be represented in the form of district rules and thresholds such as the ones which are analyzed in this Report.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

2.5.2 Net Increase of any Criteria Pollutant

Impact Statement

Impact AQ-3: *Would the Project 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?* **(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 VCAPCD's attainment plans. Consequently, the VCAPCD'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. Regional impacts on criteria pollutants are determined by assessing emissions from permit-exempt sources only (e.g., vehicular engines) as discussed in the following passage:

> *Emissions from equipment or operations requiring APCD permits are not counted towards the air quality significance thresholds. This is for two reasons. First, such equipment or processes are subject to the District's New Source Review permit system, which is designed to produce a net air quality improvement. Second, facilities are required to mitigate emissions from equipment or processes subject to APCD permit by using emission offsets and by installing Best Available Control Technology (BACT) on the process or equipment. (VCAPCD, 2003, pp. 1-1 to 1-2).*

As specified in Section 2.3, Significance thresholds for Criteria pollutants outlined by the VCAPCD are stated in terms of health risk and daily increase. The project does not propose a daily increase in criteria pollutants and Health risk concerns are addressed in Section 2.5.3.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

2.5.3 Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

Impact Statement

Impact AQ-4: *Would the Project expose sensitive receptors to substantial pollutant concentrations?* **(Appendix G Threshold Criteria (d))**

Impact Analysis

Determination of whether project emissions would expose sensitive receptors to substantial pollutant concentrations is a function of assessing potential health risks. Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. 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.

Health Risk Assessment was performed as discussed in Section 2.4.5 to evaluate the effects of TACs including DPM from vehicles and various substances found in fugitive dust emissions (i.e., metals and crystalline silica). Health risks from operation of the Project are presented in Table 14.

Table 14 Health Risk Impacts

Model Receptor # – Type – Location	Excess Cancer Cases per Million People Exposed	Max Chronic Hazard Index	Max Acute Hazard Index
136 – MEIR (Cancer, Chronic) – North of Project	1.0	0.024	< 0.010
109 – MEIR (Acute) – East of Project	0.33	0.0057	< 0.010
103 – MEIW (Cancer, Chronic, Acute) – Funeral Home	1.4	0.26	0.021
194 – PMI – Project Boundary (UTM 316339, 3783949)	N/A	N/A	0.079
Significance Criteria	**10**	**1.0**	**1.0**
Threshold Exceeded?	**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. MEIR: Maximum Exposed Individual Receptor; MEIW: Maximum Exposed Individual Worker; PMI: Point of Maximum Impact

Level of Significance Before Mitigation

Less than significant.

2.5.4 Other Emissions Affecting a Substantial Number of People

Impact Statement

Impact AQ-5: *Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?* **(Appendix G Threshold Criteria (e))**

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.

The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions 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. Given the large site upon which the odors will dissipate, and the fact that the existing facility has not generated an odor that generated complaints in the past; objectionable odors affecting a substantial number of people are unlikely to result from the Project.

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 GHG impacts of the Project. The methodologies used and the information provided in this section are supported by calculations in Appendix D.

3.1 Regulatory Setting

3.1.1 Characteristics of Climate 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). The following six GHGs are recognized under the Kyoto Protocol and have been found by the International Panel on Climate Change (IPCC) to have an effect on global climate change. In addition, California has identified "short-lived" climate pollutants.

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 25.

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 298.

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.

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 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.

Methane (CH_4) is the principal component of natural gas. Its emissions contribute to background ozone in the lower atmosphere (troposphere), which itself is a powerful greenhouse gas and contributes to ground level air pollution. The atmospheric concentration of methane is growing as a result of human activities in the agricultural, waste treatment, and oil and gas sectors. Capturing methane from these sources can improve pipeline safety, and provide fuel for vehicles and industrial operations that displaces fossil natural gas use.

3.1.2 Federal

In 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. Since, 04 CFR Part 98 has been amended to require collection of GHG data to inform future policy decision.

3.1.3 State

The following tables were copied from the California government website for climate change (climatechange.ca.gov) and list the California legislation (Table 15), regulations, (Table 16), and executive orders (Table 17) through the end of 2015. More recent developments are discussed immediately following the tables.

Table 15 California Climate Change Legislation

Date	Legislation	Description
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 Bill1204 (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.
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.

Date	Legislation	Description
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.
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.

Date	Legislation	Description
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.
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.

Date	Legislation	Description
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.
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: (climatechange.ca.gov, 2017)

Table 16 California Climate Change Regulations

Regulations	Description
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 and 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.
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 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.

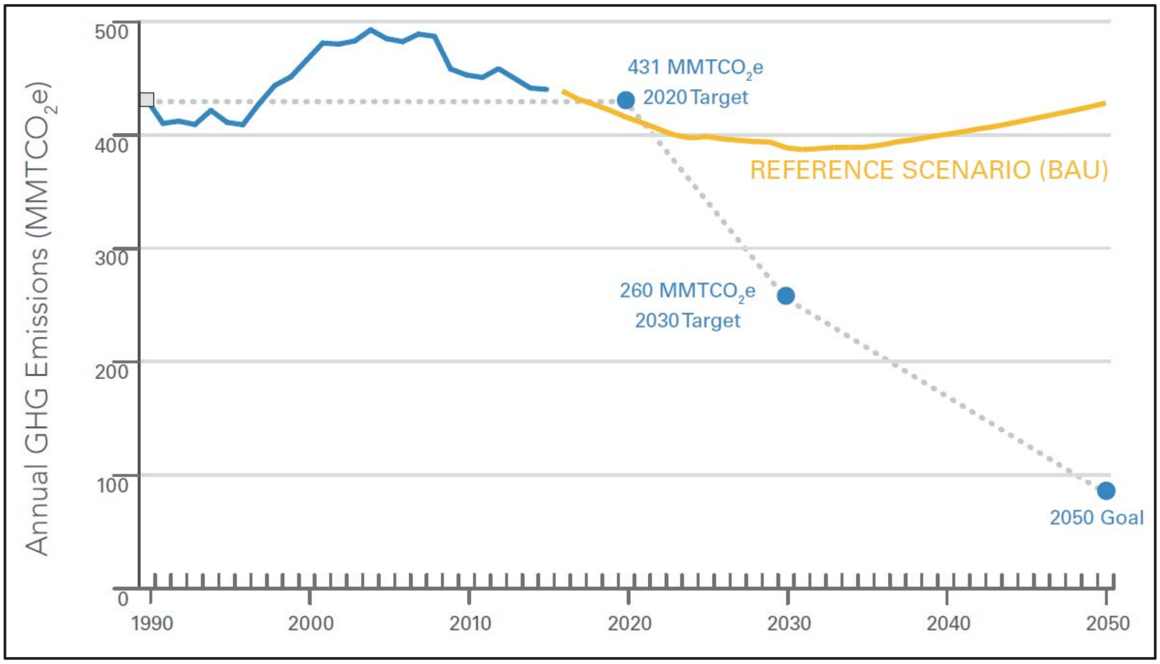
Table 17 California Climate Change Executive Orders

Date	Executive Order	Description
April 29, 2015	B-30-15	EO-B-30-15 sets a 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.
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.

Source: (climatechange.ca.gov, 2017)

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).

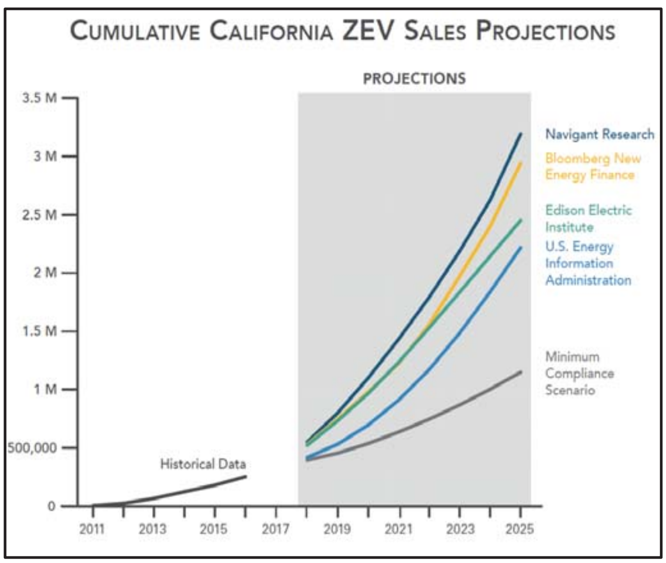
The Scoping Plan states that the California Legislature has shaped the State's climate change program, setting out clear policy objectives over the next decade including:

- *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.*

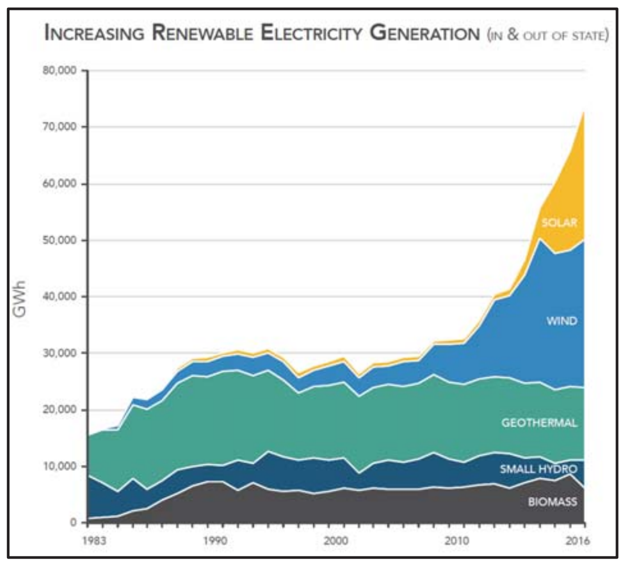
(2017 Scoping Plan, p. ES6).

Illustrations from the Scoping Plan that pertain to future emissions from the sectors representing the greatest GHG emissions, transportation and electricity use, are reproduced below.

Chart 2 2017 Scoping Plan GHG Exhibits



Source: **(2017 Scoping Plan, p. ES5)**



Source: (2017 Scoping Plan, p. ES9)

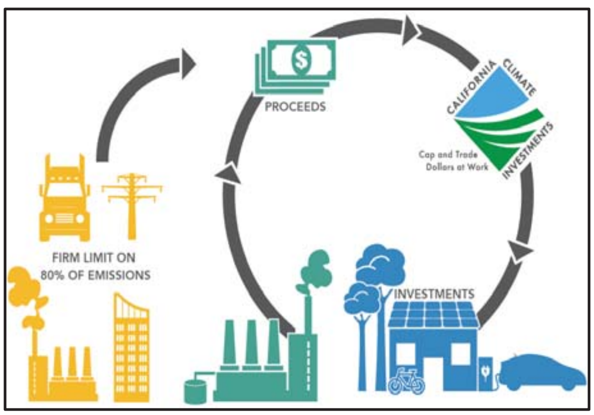
In addition to technology forcing and incentivizing regulations, the Cap-and-Trade Program is critical to meeting the Scoping Plan objectives. CARB states:

The Cap-and-Trade Program is fundamental to meeting California's long-range climate targets at low cost. The Cap-and-Trade Program includes GHG emissions from transportation, electricity, industrial, agricultural, waste, residential and commercial sources, and caps them while complementing the other measures needed to meet the 2030 GHG target. Altogether,

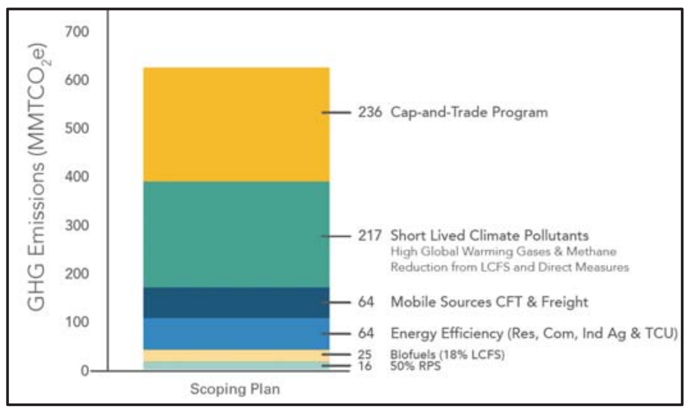
> *the emissions covered by the Cap-and-Trade program total 80 percent of all GHG emissions in California. California's response to climate change has led to many innovative programs designed to reduce GHG emissions, including the Renewable Portfolio and Low Carbon Transportation Standards, but the Cap-and-Trade Program guarantees GHG emissions reductions through a strict overall emissions limit that decreases each year, while trading provides businesses with flexibility in their approach to reducing emissions. The Cap-and-Trade Program also generates revenue when the allowances to emit pollution are auctioned. Some of the revenue is returned directly to electricity ratepayers, and the rest is dedicated to reducing GHG emissions by making Legislatively directed investments in California with an emphasis on programs or projects that benefit disadvantaged and low-income communities.* (2017 Scoping Plan, p. ES16).

The following illustrations presents how CARB believes money will flow from the Cap-and-Trade program to enable state-funded investments and the amount of GHG emissions reduction that will be achieved overall and from Cap-and-Trade which is required to cover the gap between reductions from other measures in the Scoping Plan and the 2030 Target.

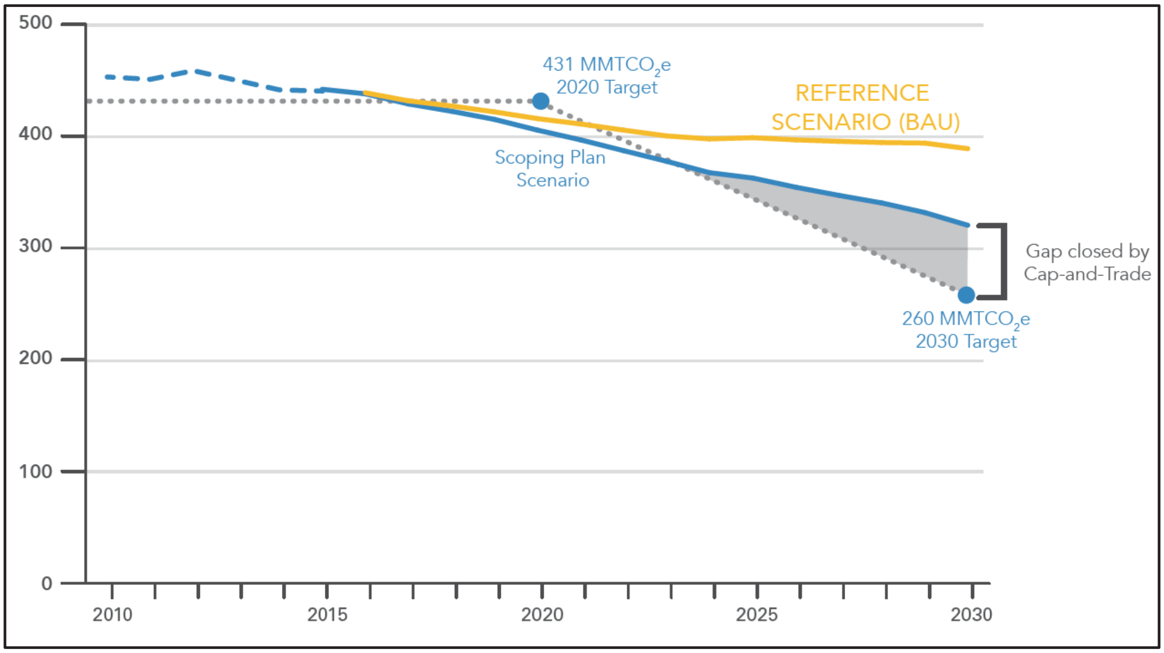
Chart 3 2017 Scoping Plan Cap-and-Trade Exhibits



Source: California's Carbon Pricing and Investment Overview (2017 Scoping Plan, p. ES16).



Source: Scoping Plan Scenario – Estimated Cumulative GHG Reductions by Measure (2021 – 2030) (2017 Scoping Plan, p. 28).



Source: 2017 Scoping Plan Reference Scenario (2017 Scoping Plan, p. 24).

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 18 Climate Change Policies and Measures

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.

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).

Table 19 shows the amount of change in GHG emissions by Scoping Plan sector. Note that Project sources mainly fall into the electric power and transportation sectors with exception of the portable generator which would be in the industrial sector but is likely to be owned and operated by a contractor.

Table 19 Estimated Change in GHG Emissions by Sector

Scoping Plan Category	1990 ($MMTCO_2e$)	2030 Scoping Plan Ranges ($MMTCO_2e$)
Agriculture	26	24–25
Residential and Commercial	44	38–40
Electric Power	108	30–53
High GWP	3	8–11
Industrial	98	83–90
Recycling and Waste	7	8–9
Transportation (Including TCU)	152	103–111
Natural Working Lands Net Sink*	-7***	TBD
Sub Total	431	294–339
Cap-and-Trade Program	n/a	34–79
Total	**431**	**260**

Source: (2017 Scoping Plan, p. 31).

* Work is underway through 2017 to estimate the range of potential sequestration benefits from the natural and working lands sector.

** The SLCP will reduce emissions in this sector by 40 percent from 2013 levels. However, the 2030 levels are still higher than the 1990 levels as emissions in this sector have grown between 1990 and 2013.

*** This number reflects net results and is different than the intervention targets discussed in Chapter 4.

3.1.4 Ventura County Air Pollution Control District

VCAPCD provided guidance to lead agencies in Ventura County in a report to the Board entitled Greenhouse Gas Thresholds of Significance Options for Land Use Development Projects in Ventura County (VCAPCD, 11/8/2011). The report concludes:

> "*The most common approach is a tiered approach involving first, applicability of any CEQA exemptions, followed by project consistency with a local climate action plan, and then an efficiency-based threshold (Threshold Option 2.7) and/or a bright line gap-based threshold (Threshold Option 3.2).*"

Review of the Wayne J Sand and Gravel Re-circulated Draft EIR (March, 2015) reveals that, Ventura County used a screening threshold of 10,000 metric tonnes of carbon dioxide equivalent per year ($MTCO_2e$/yr) which is based upon thresholds adopted by neighboring air districts (i.e., Santa Barbara, South Coast) and consistent with the tiered significance threshold approach used in SCAQMD.

3.2 Environmental Setting

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.

Climate change refers to global changes in the average weather of the Earth as measured by changes in wind patterns, storms, precipitation, and temperature. While climate change is global in scale, California-specific impacts from predicted changes in 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.

3.2.1 Effects Attributed to GHG Emissions

The most recent GHG policy document issued by CARB is the next Scoping Plan update published in November 2017 (2017 Scoping Plan). This document Reports updates findings in the field of climate science since the last Scoping Plan update and is the source of the quoted text below (footnotes omitted, see https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf for a complete copy).

> *"Climate scientists agree that global warming and other shifts in the climate system observed over the past century are caused by human activities. These recorded changes are occurring at an unprecedented rate.11 According to new research, unabated GHG emissions could allow sea levels to rise up to ten feet by the end of this century–an outcome that could devastate coastal communities in California and around the world.*
>
> *California is already feeling the effects of climate change, and projections show that these effects will continue and worsen over the coming centuries. The impacts of climate change have been documented by the Office of Environmental Health Hazard Assessment (OEHHA) in the Indicators of Climate Change Report, which details the following changes that are occurring already:*

- *A recorded increase in annual average temperatures, as well as increases in daily minimum and maximum temperatures.*
- *An increase in the occurrence of extreme events, including wildfire and heat waves.*
- *A reduction in spring runoff volumes, as a result of declining snowpack.*
- *A decrease in winter chill hours, necessary for the production of high-value fruit and nut crops.*
- *Changes in the timing and location of species sightings, including migration upslope of flora and fauna, and earlier appearance of Central Valley butterflies.*

In addition to these trends, the State's current conditions point to a changing climate. California's recent historic drought incited land subsidence, pest invasions that killed over 100 million trees, and water shortages throughout the State. Recent scientific studies show that such extreme drought conditions are more likely to occur under a changing climate. The total statewide economic cost of the 2013–2014 drought was estimated at $2.2 billion, with a total loss of 17,100 jobs. In the Central Valley, the drought cost California agriculture about $2.7 billion and more than 20,000 jobs in 2015, which highlights the critical need for developing drought resilience. Drought affects other sectors as well. An analysis of the amount of water consumed in meeting California's energy needs between 1990 and 2012 shows that while California's energy policies have supported climate mitigation efforts, the performance of these policies have increased vulnerability to climate impacts, especially greater hydrologic uncertainty.

Several publications carefully examined the potential role of climate change in the recent California drought. One study examined both precipitation and runoff in the Sacramento and San Joaquin River basins, and found that 10 of the past 14 years between 2000 and 2014 have been below normal, and recent years have been the driest and hottest in the full instrumental record from 1895 through November 2014. In another study, the authors show that the increasing co-occurrence of dry years with warm years raises the risk of drought, highlighting the critical role of elevated temperatures in altering water availability and increasing overall drought intensity and impact. Generally, there is growing risk of unprecedented drought in the western United States driven primarily by rising temperatures, regardless of whether or not there is a clear precipitation trend.

According to the U.S. Forest Service Report, National Insect and Disease Forest Risk Assessment, 2013– 2027, California is at risk of losing 12 percent of the total area of forests and woodlands in the State due to insects and disease, or over 5.7 million acres. Some species are expected to lose significant amounts of their total basal area (e.g., whitebark pine is projected to lose 60 percent of its basal area; and lodgepole pine is projected to lose 40 percent). While future climate change is not modeled within the risk assessment, and current drought conditions are not accounted for in these estimates, the projected climate changes over a 15 year period (2013-2027) are expected to significantly increase the number of acres at risk, and will increase the risk from already highly destructive pests such as the mountain pine beetle. Extensive tree mortality is already prevalent in California. The western pine beetle and other bark beetles have killed a majority of the ponderosa pine in the foothills of *the central and southern Sierra Nevada Mountains. A recent aerial survey by the U.S. Forest Service identified more than 100 million dead trees in California. As there is usually a lag time between drought years and tree mortality, we are now beginning to see a sharp rise in mortality from the past four years of drought. In response to the very high levels of tree mortality, Governor Brown issued an Emergency Proclamation on October 30, 2015, that directed state agencies to identify and take action to reduce wildfire risk through the removal and use of the dead trees.*

A warming climate also causes sea level to rise; first, by warming the oceans which causes the water to expand, and second, by melting land ice which transfers water to the ocean. Even if storms do not become more intense or frequent, sea level rise itself will magnify the adverse impact of any storm surge and high waves on the California coast. Some observational studies Report that the largest waves are already getting higher and winds are getting stronger. Further, as temperatures warm and GHG concentrations increase more carbon dioxide dissolves in the ocean, making it more acidic. More acidic ocean water affects a wide variety of marine species, including species that people rely on for food. Recent projections indicate that if no significant GHG mitigation efforts are taken, the San Francisco Bay Area may experience sea level rise between 1.6 to 3.4 feet, and in an extreme scenario involving the rapid loss of the Antarctic ice sheet, sea levels along California's coastline could rise up to 10 feet by 2100. This change is likely to have substantial ecological and economic consequences in California and worldwide.

While more intense dry periods are anticipated under warmer conditions, extremes on the wet end of the spectrum are also expected to increase due to more frequent warm, wet atmospheric river events and a higher proportion of precipitation falling as rain instead of snow. In recent years, atmospheric rivers have also been recognized as the cause of the large majority of major floods in rivers all along the U.S. West Coast and as the source of 30-50 percent of all precipitation in the same region. These extreme precipitation events, together with the rising snowline, often cause devastating floods in major river basins (e.g., California's Russian River). It was estimated that the top 50 observed floods in the U.S. Pacific Northwest were due to atmospheric rivers. Looking ahead, the frequency and severity of atmospheric rivers on the U.S. West Coast will increase due to higher atmospheric water vapor that occurs with rising temperature, leading to more frequent flooding.

Climate change can drive extreme weather events such as coastal storm surges, drought, wildfires, floods, and heat waves, and disrupt environmental systems including our forests and oceans. As GHG emissions continue to accumulate and climate disruption grows, such destructive events will become more frequent. Several recent studies project increased precipitation within hurricanes over ocean regions. The primary physical mechanism for this increase is higher water vapor in the warmer atmosphere, which enhances moisture convergence in a storm for a given circulation strength. Since hurricanes are responsible for many of the most extreme precipitation events, such events are likely to become more extreme. Anthropogenic warming by the end of the 21st century will likely cause tropical cyclones globally to become more intense on average. This change implies an even larger percentage increase in the destructive potential per storm, assuming no changes in storm *size. Thus, the historical record, which once set our expectations for the traditional range of weather and other natural events, is becoming an increasingly unreliable predictor of the conditions we will face in the future. Consequently, the best available science must drive effective climate policy.*

California is committed to further supporting new research on ways to mitigate climate change and how to understand its ongoing and projected impacts. California's Fourth Climate Change Assessment and Indicators of Change Report will further update our understanding of the many impacts from climate change in a way that directly informs State agencies' efforts to safeguard the State's people, economy, and environment.

Together, historical data, current conditions, and future projections provide a picture of California's changing climate, with two important messages:

- *Change is already being experienced and documented across California, and some of these changes have been directly linked to changing climatic conditions.*
- *Even with the uncertainty in future climate conditions, every scenario estimates further change in future conditions.*

It is critical that California continue to take steps to reduce GHG emissions in order to avoid the worst of the projected impacts of climate change. At the same time, the State is taking steps to make the State more resilient to ongoing and projected climate impacts as laid out by the Safeguarding California Plan.37 The Safeguarding California Plan is being updated in 2017 to present new policy recommendations and provide a roadmap of all the actions and next steps that state government is taking to adapt to the ongoing and inevitable effects of climate change. The Draft Safeguarding California Plan38 is available and will be finalized after workshops and public comments. California's continuing efforts are vital steps toward minimizing the impact of GHG emissions and a three-pronged approach of reducing emissions, preparing for impacts, and conducting cutting-edge research can serve as a model for action. " (CARB, 2017).

3.2.2 Emissions Inventories

CARB's most recent GHG emission inventory, the 2016 Edition, tracks the emissions of seven GHGs identified in the California Health and Safety Code for years 2000 to 2014. In 2014, total GHG emissions were 441.5 $MMTCO_2e$, a decrease of 2.8 $MMTCO_2e$ compared to 2013. This represents an overall decrease of 9.4% since peak levels in 2004. During the 2000 to 2014 period, per capita GHG emissions in California dropped from a peak in 2001 of 13.9 tonnes per person to 11.4 tonnes per person in 2014; an 18% decrease. 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 28% decline since the 2001 peak, while the State's GDP has grown 28% during this period (Trend Report, 2016, p. 1).

The transportation sector remains the largest source of GHG emissions in the State, accounting for 36% of the inventory, and shows a small increase in emissions in 2014. Emissions from the electricity sector continue to decline due to growing zero-GHG energy generation sources. 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, 2016, p. 2).

3.3 Significance Thresholds

The 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 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

This Report conservatively assumes no baseline emissions.

3.4.2 Operation Phase

Operation Phase aggregate plant electricity use and engine emissions have been converted to CO2e emissions and combined in Appendix D. They are are summarized in Table 20 below.

Table 20 Operation Phase Max Year GHG Emissions

Activity	CO_2e (MT/yr)
Electricity Use	1,184.5
Vehicle Engine Emissions	2,075.2
Project Emissions – Total	3,259.7

Source: Appendix D

Note: Values in Table may differ slightly from appendix values as they have been converted to Metric Tons.

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 emissions of GHGs are presented in Table 21 primarily for purposes of disclosure. Electricity and 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 AB 32 Scoping Plan. Thus, the emissions reductions will occur at a level in the supply chain above the Project which will have no choice but to use fuel and electricity having GHG intensities that are consistent with the Scoping Plan. Additionally, the total project emissions do not exceed the SCAQMD screening threshold of 10,000 MT/yr.

Table 21 Project Greenhouse Gas Emissions

Activity	CO_2e (MT/yr)
Electricity Use	1,184.5
Vehicle Engine Emissions	2,075.2
Project Emissions – Total	3,259.7

Source: Appendix D

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-1: *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 are evaluated with respect to consistency with the following plans and policies that have been adopted to reduce GHG emissions:

Table 22 Adopted Greenhouse Gas Policies

Plan/Policy	Consistent?
A local jurisdiction's qualified climate action plan or GHG reduction plan.	As detailed in section 4.1.5, the project is consistent because no local climate action or GHG reduction plans apply to the project.
AB 32, SB 32 and the Scoping Plan,	As described previously, AB 32 requires that the CARB adopt regulations to require the reporting and verification of statewide greenhouse emissions and monitor and enforce compliance with the program. The 2017 Scoping Plan is the most recent GHG policy document issued by CARB. Currently, in accordance with AB 32, the SCAQMD has set an interim GHG screening threshold of 10,000 $MTCO_2e/yr$ is for industrial projects. Referring to Section 3.5.1 above, total Project GHG emissions are estimated to be below the 10,000 $MTCO_2e/yr$ threshold. As such, the Project is consistent with the emissions reductions targets outlined in AB 32 and the 2017 Scoping Plan.
Executive Order B-30-15 goals.	The Project is consistent with the Executive Order B-30-15 goals which apply to the fuel and electricity sectors as a whole. The fuels and electricity used by the Project would be subject to the cap-and-trade program as well as other Scoping Plans and related control measures (e.g., renewable energy portfolio, low carbon fuel standard) that are applied higher up in the supply chain. There is no plan, policy or regulation adopted for the purpose of reducing emissions of GHGs specifically from mining projects. Thus, the sources that are affected by such plans and policies would be consistent with those plans, policies, and/or regulations by virtue of using fuels and electricity that has been produced for consumption within California.

The discussion for impact GHG-1 above addresses this impact also. Consistency with the applicable plan (AB 32 Scoping Plan) will be ensured for electricity and transportation fuels used by the Project by producers and importers of those energy sources thought compliance with the Cap-and-Trade Program. Therefore, consistency with the applicable plan is assured and the Project GHG impact 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
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
SJVAPCD	South Coast Air Quality Management 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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APPENDEIX A FIGURES

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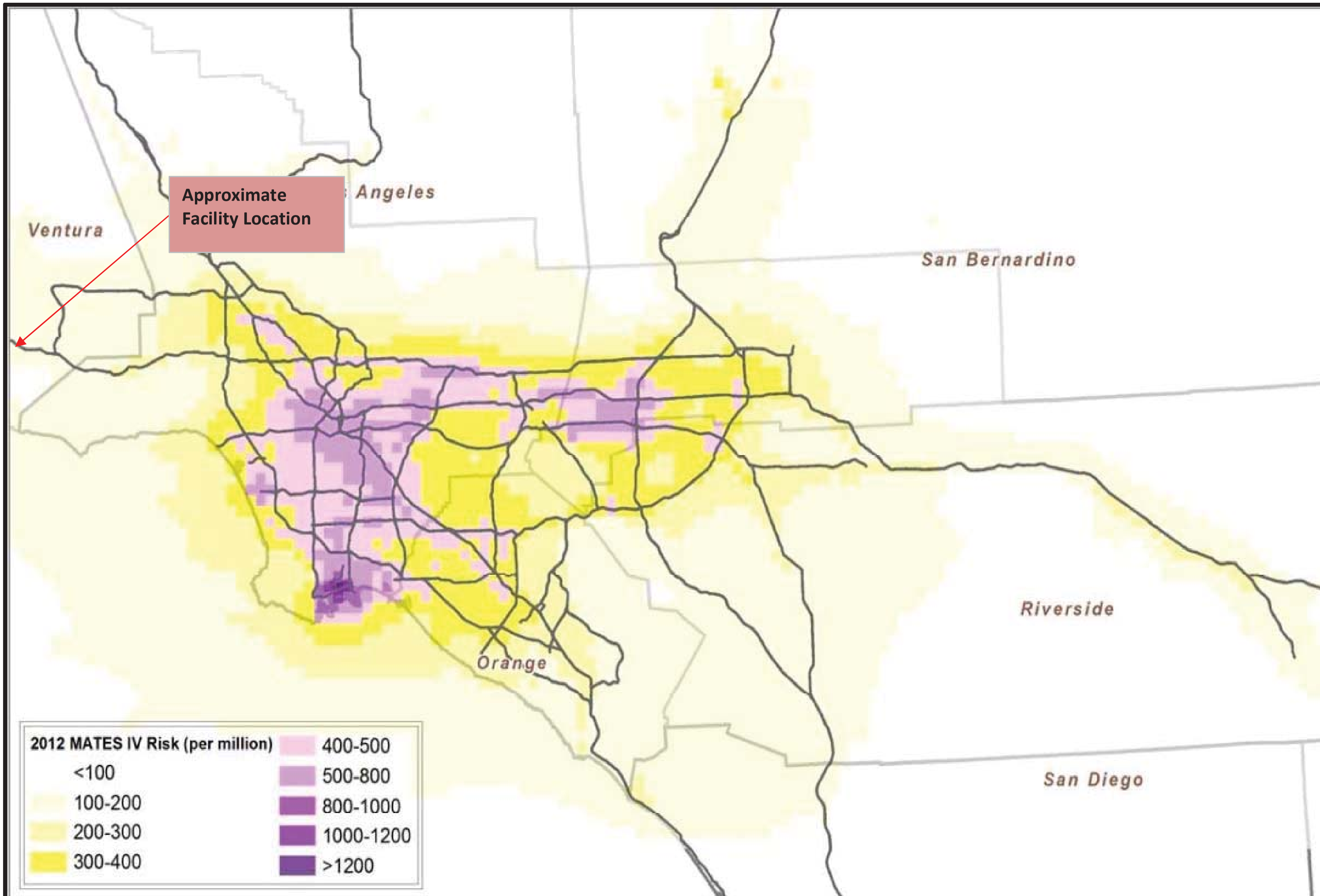


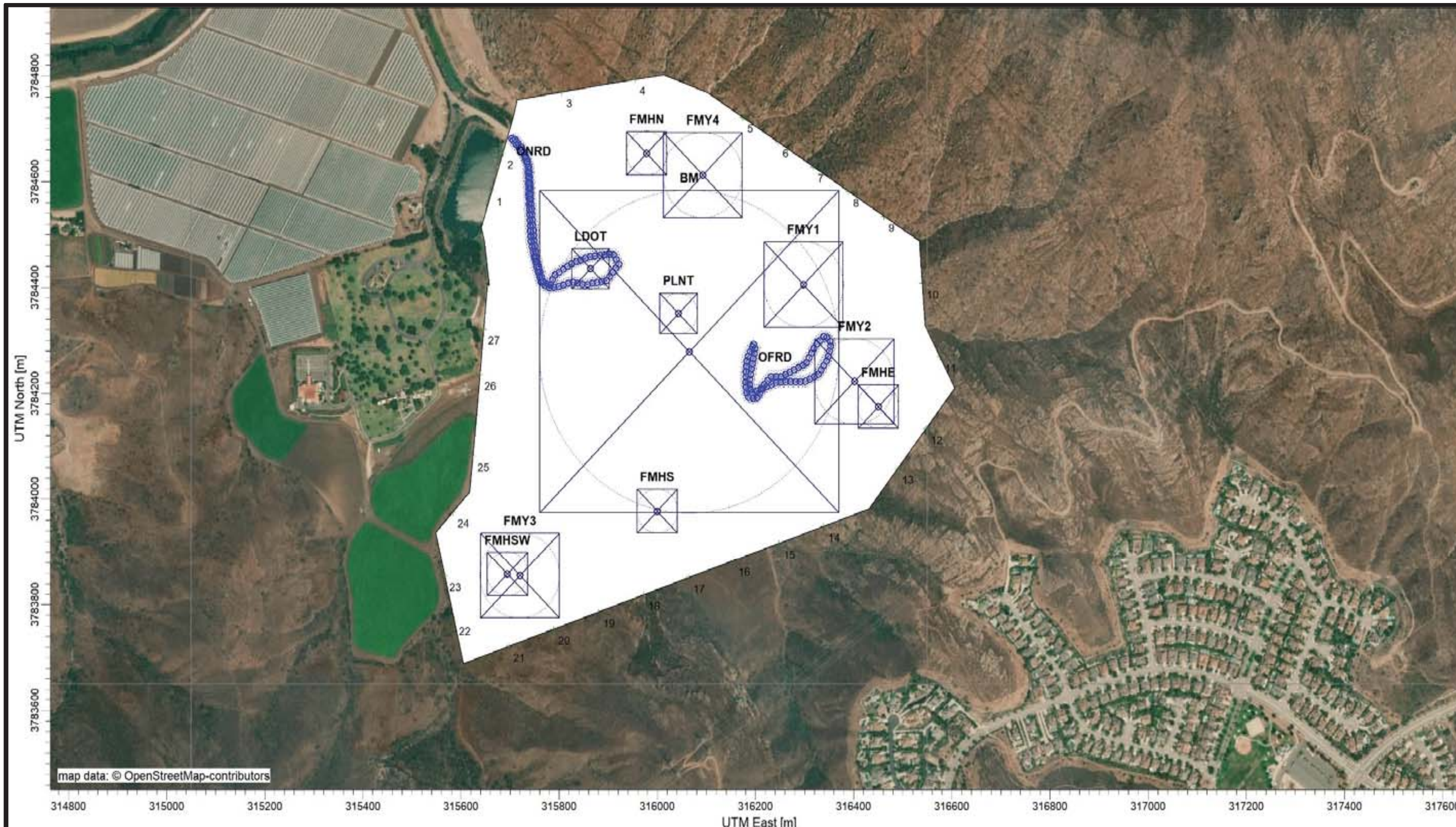
Source: Multiple Air Toxics Exposure Study in the South Coast Air Basin MATES IV Final Report, South Coast AQMD, May 2015	SESPE CONSULTING, INC.	**FIGURE** 1	**2012 MATES IV Cancer Risk** Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012	
		PROJECT #:	PA01.09.01	DATE: 3/21/19
		SCALE:	NOT TO SCALE	DRAWN BY: ADA

PA01_Pacific_Rock_CUP_HRA_Figures.xlsx

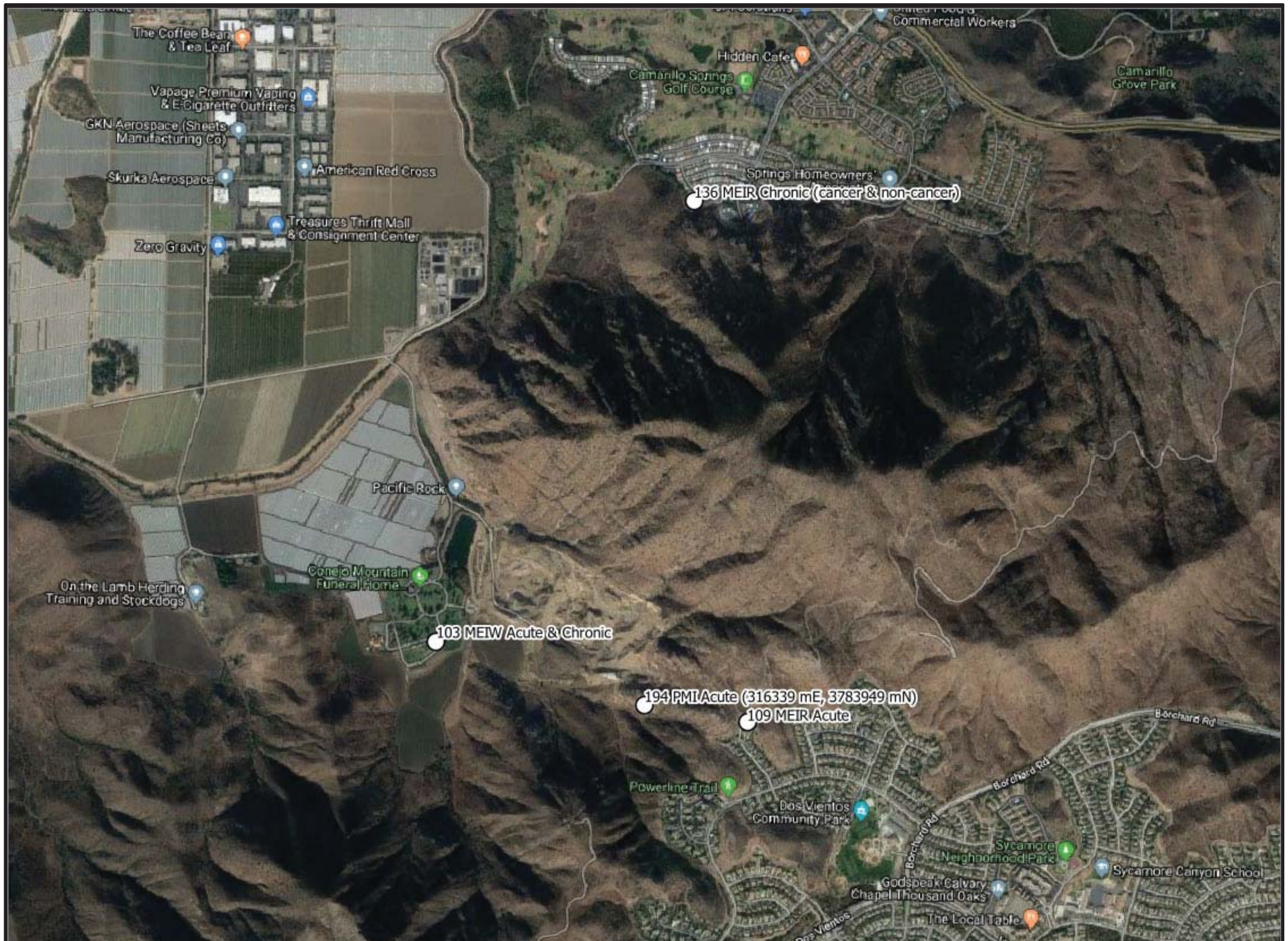
Source: Google Earth

SESPE CONSULTING, INC.

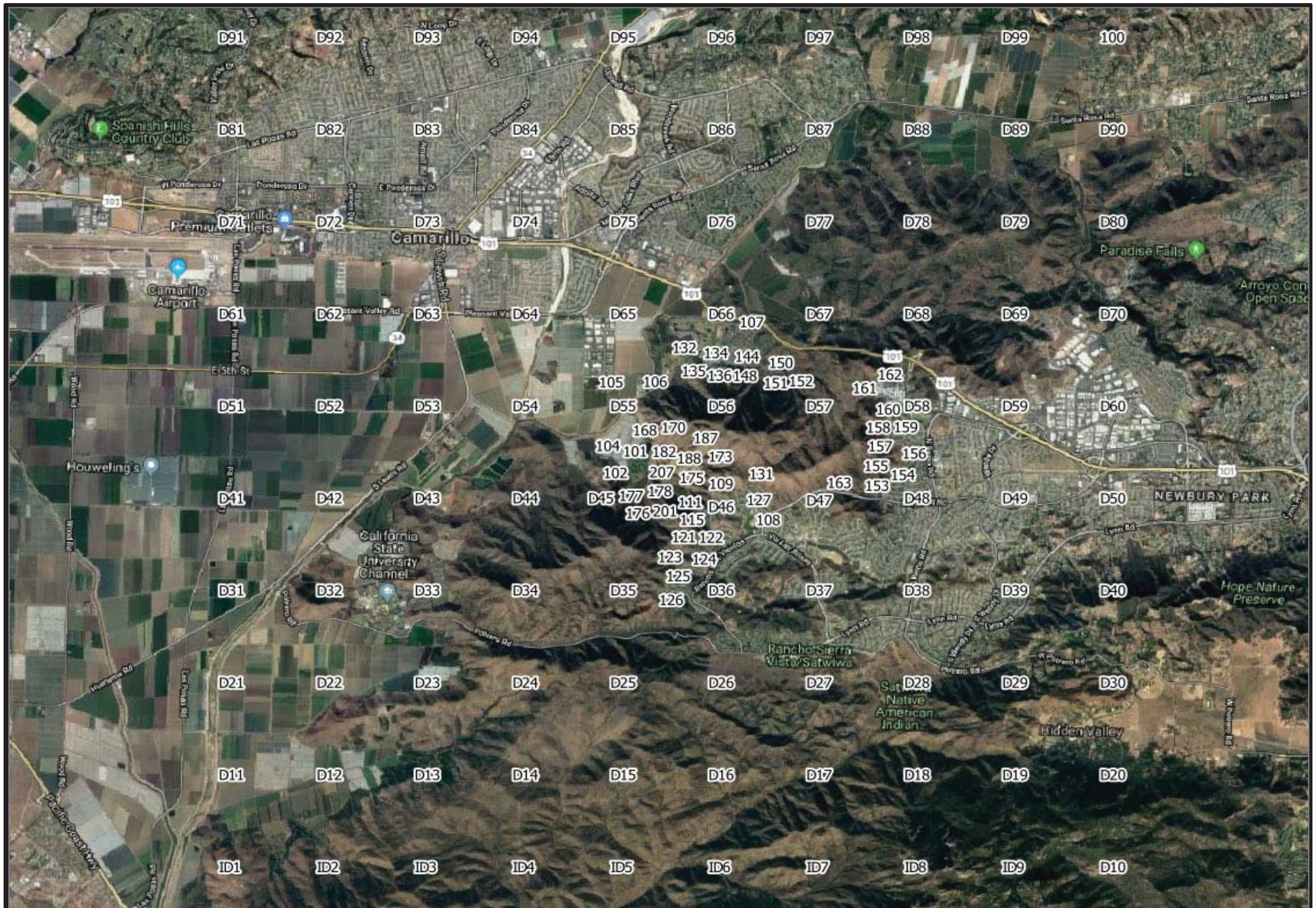
FIGURE	On-Site Haul Routes		
2	Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012		
PROJECT #:	PA01.09.01	DATE:	3/21/19
SCALE:	AS SHOWN	DRAWN BY:	ADA



Source: Lakes AERMOD View	SESPE CONSULTING, INC.	**FIGURE** 3	**Model Source Objects** Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012	
		PROJECT #:	PA01.09.01	DATE: 3/21/19
		SCALE:	AS SHOWN	DRAWN BY: ADA



Source: Google Earth	SESPE CONSULTING, INC.	FIGURE 4	Modeled Receptors (Local) Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012		
		PROJECT #:	PA01.09.01	DATE:	3/21/19
		SCALE:	NOT TO SCALE	DRAWN BY:	ADA



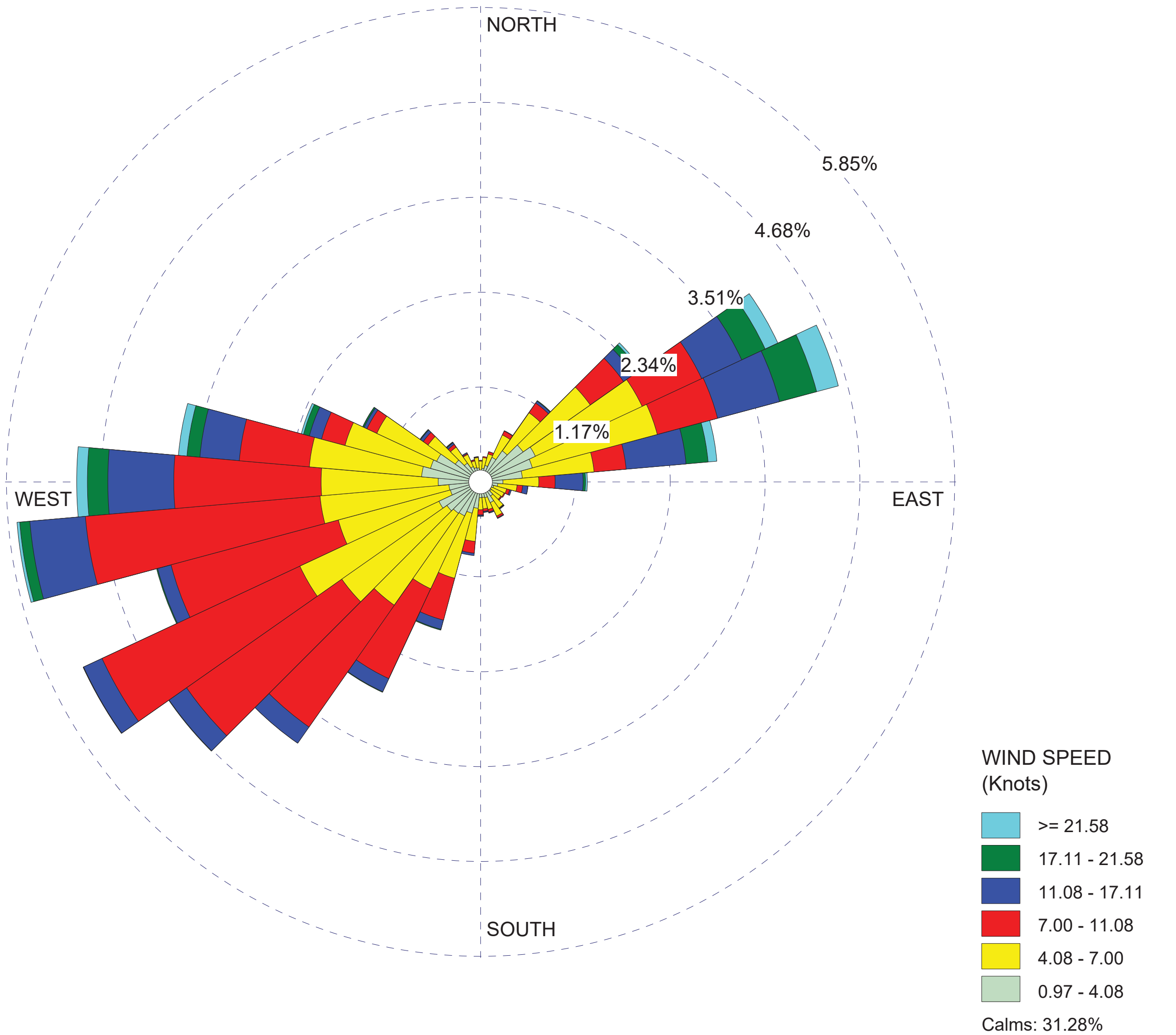
Source: Google Earth	SESPE CONSULTING, INC.	FIGURE 5	Modeled Receptors (Regional) Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012		
		PROJECT #:	PA01.09.01	DATE:	3/21/19
		SCALE:	NOT TO SCALE	DRAWN BY:	ADA

WIND ROSE PLOT:

Figure 6: Windrose for Station 23136

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Meterorological Data from California Air Resources Board	**Start Date: 1/1/2009 - 00:00** **End Date: 1/2/2014 - 23:59**	Sespe Consulting, Inc.	
		MODELER: ADA	
	CALM WINDS: **31.28%**	TOTAL COUNT: **42907 hrs.**	
	AVG. WIND SPEED: **5.06 Knots**	DATE: **3/28/2019**	PROJECT NO.: **PA01.09.01**

WRPLOT View - Lakes Environmental Software

APPENDEIX B LITERATURE REGARDING AGGREGATES

A Note on the Environmental Costs of Aggregates
Map Sheet 52 Report
Open File Report 99-09 (Partial)
Caltrans Aggregate Availability Memo
DTSC Report: Inorganic Chemicals in Ground Water and Soil
DTSC Report: Determination of a southern California Regional Background Arsenic Concentration in Soil

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DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS AND POLICY
DIVISION OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF CALIFORNIA AT BERKELEY

WORKING PAPER NO. 994

A NOTE ON THE ENVIRONMENTAL COSTS OF AGGREGATES

by

Peter Berck

California Agricultural Experiment Station
Giannini Foundation of Agricultural Economics
January 2005

A Note on the Environmental Costs of Aggregates

by Peter Berck*
January 10, 2005

Abstract:

The opening of a new site for the production of aggregates has both direct and indirect impacts on the environment. The indirect impacts include changes in the environmental costs of hauling aggregates and possible changes in the level of construction activity. In this note, we show that the most likely effect of a new aggregate site is to reduce the truck miles used for aggregate hauling, which is an environmental benefit. We also show that the change in construction activity induced by a new site is likely to be extremely small.

---

* Peter Berck is Professor of Agricultural and Resource Economics. I would like to thank Atanu Dey for able research assistance. The remaining errors are mine.

A Note on the Environmental Costs of Aggregates

The opening of a new quarry for aggregates will change the pattern of transportation of aggregates in the area served by the quarry. In this note, we will show that, so long as aggregate producers are cost minimizing, the new pattern of transportation requires less truck transport than the pattern of transportation that existed before the opening of the new quarry. Since the costs of providing aggregates falls, it is reasonable to assume that the price of delivered aggregates also will fall. This note also shows that the demand expansion effect is of very small magnitude. Since the demand increase from a new quarry is quite small, the dominant effect is that the quarries are on average closer to the users of aggregates and, as a result, the truck mileage for aggregate hauling decreases. To summarize the effects of a new quarry project:

> a) The project in itself will not significantly increase the demand for construction materials in the region through market forces, which include the downward pressure on pricing.
>
> b) Truck traffic (i.e. vehicle miles traveled) in the region will not increase and may decrease as a result of the project.

As a result, the effect of a new quarry project will be to reduce the air emissions from aggregate trucking. The reduction in emissions should be included as a positive impact of a quarry project in any analysis of the environmental consequences of a new quarry.

The remainder of this note provides a brief description of the economics of construction materials and explains why these points must be true.

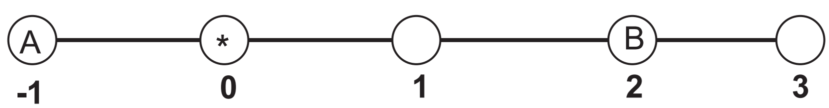
Based upon the available evidence, a project would decrease haul distances for aggregates and would therefore decrease emissions from trucks, rather than increase them.

There are two economic facts that are important to understand in evaluating the likely addition or subtraction to truck traffic from a new quarry. One is the economics of location. The second is the demand for aggregates, which is the quantity of aggregates used as a function of price.

That a new site leads to smaller haul distance is a matter of geometry and economics. Transportation is a major element in the cost of delivered aggregate, so new sites are chosen, within the limits placed by the natural availability of aggregates, to minimize transport costs.

An example should make this fact clear. Consider diagram 1. Circles represent aggregate-using projects of equal size. The five projects shown are located at miles marked –1, 0, 1, 2, and 3. Two of the project sites are marked with the letters A and B, and they are potential locations for aggregate production. The location at mile 0 is an existing aggregate production site and it is marked by an asterisk (*). The scale is in miles. For simplicity, each project uses one unit of aggregate.

Diagram 1



With only one aggregate production site at mile 0, the miles traveled to supply the five projects is seven: zero miles for project at mile 0, one mile for each for the projects at mile –1 and 1, two miles for the project at 2 and three miles for the project at 3 for a total of 7 miles. If an additional aggregate production site is started at A, the miles traveled decreases to six, because there is no transportation required for the aggregate-using project at A and all other projects are served by the original site. However, if the new site is placed at B instead of being placed at A, transport distance falls to three miles because then two projects have aggregate production at their location and thus have zero transportation requirements, and the three remaining sites each require a one-mile transport. Each aggregate production site supplies 2.5 units of aggregates, that is, half the total required by the five projects. Since cost depends on distance and, markets minimize costs, the free market system always will choose a point like B, the one with the lowest cost. In this case it is also the lowest transport distance.

Other forms of industrial organization lead to higher prices being charged for aggregates, but the effect of additional suppliers is to lower prices and haul distances. Appendix A elucidates the case where the price depends upon the delivered costs of the second most efficient producer.

The second issue for the siting of aggregate production is the possibility that lower delivered costs lead to more projects or more use of aggregates in existing projects. The degree to which decrease in the price of a good, in this case construction material, leads to an increase in the quantity of that material used is described by the elasticity of demand. The elasticity of demand is the percent increase in use caused by a one percent decrease in price.

A search of the economic literature found no articles estimating a positive elasticity of demand for aggregates. A review by the Susan Kohler[†] finds that only population and not price is correlated with aggregate usage. In other words, a reduction in the price of aggregate does not lead to an increase in demand for it.

While it is a theoretical possibility that the quantity of aggregates demanded (that is, the quantity used in projects) is responsive to price, two facts about construction make this unlikely. First, the cost of aggregates is usually a tenth or less of the cost of a project. Second, the building of projects -- housing, roads, and commercial construction -- is not very sensitive to the costs of producing them.

[†] *Map Sheet 52. Aggregate Availability in California.* by Susan L. Kohler. California Department of Conservation. California Geological Survey. Sacramento. 2002.

Although we have not found literature on the elasticity of demand for either public projects or contract construction, there is an empirical literature on the elasticity of demand for housing[‡]. In these studies, a one percent change in the price leads to about a half percent change in the quantity of housing consumed. Public projects, like roads, are budgeted, often from specials funds, like road taxes. In that case, a one percent decrease in the costs of *all* projects in a taxing jurisdiction would lead to a one percent increase in the quantity of roads built. Since aggregates are very expensive to ship, the quarry being considered likely would only change the costs of nearby road construction, perhaps for just one county.

For example, Monterey County has a population of 400,000 while the state population is 33.9 million people.[§] Assuming that road construction is roughly proportional to population, about 1.2 percent of road construction would be in Monterey. So, if a new quarry in Monterrey decreased the price of aggregates in Monterrey by 1 percent and left the price the same in the rest of the state, then the average price in the whole state would fall by about 0.01 percent, which is negligible. A project that affects only a small part of a taxing jurisdiction has only a small effect on that jurisdiction's costs and can have no major affect on the quantity of services supplied by that jurisdiction.

We know of no evidence of elasticities for construction work as high as one. We estimate the elasticity of demand for projects using aggregates to be much less than one, likely under a half in the private sector and near zero in the public sector.

Given that projects will be built, there is some possibility of substituting of other structural materials for aggregates in buildings. However these substitute materials too would be trucked. The realistic possibility for roads is that there are no materials to substitute for aggregates. I do not believe this pathway to greater use of aggregates in building would be triggered by the transport savings from a new aggregate source or that it would result in an increase in net truck miles.

[‡] Hanushek, Eric A., John Quigley. "What is the price elasticity of housing demand?" *Review of Economics and Statistics.* August, 1980.
[§] Population figures are for the year 2000.

Since a change in price of aggregates does not lead to either a substantial substitution of other materials for aggregates or a substantial increase in the quantity of projects, the demand for aggregates is very inelastic. This inelasticity of demand is exactly the reason that the State of California can use a fixed per-capita consumption rate for forecasting the need for construction materials.

An example will make clear how the transport advantage and elasticity of demand arguments fit together. Let us consider a new quarry that, through its transportation advantage over existing quarries, would save 12.5 miles of trucking on each and every project in the study area. We shall assume that the average truck haul pre-project was 25 miles.

According to the *Map Sheet 52: Aggregate Availability in California,* the cost of construction aggregate doubles every 25-35 miles from the point of production. The following calculations are carried out assuming that a 25 mile haul doubles the cost. Assuming that a unit of aggregate costs $1 at the production site, then its delivered cost at a project site 25 miles away is $2. If the haul distance were to be reduced to 12.5 miles due to a new quarry, then half of the transportation costs – or $0.50 – would be saved. This represents a cost savings of 25 percent in the delivered cost of aggregate and is entirely due to a 50 percent decrease in miles traveled.

The only way for a new quarry to influence the quantity of construction is through the price of aggregates. This example presents the competitive case, where the delivered price decreases by the full amount of the transport cost savings. In the competitive case, the effect on the quantity of construction will be extremely moderate, as demonstrated below. (Appendix A presents a less than perfectly competitive example.)

In keeping with the fact that the cost of aggregate accounts for less than 10 percent of the total cost of a construction project, a price reduction of 25 percent on aggregate is a cost saving of 2.5 percent or less on the project. Let us assume a very liberal price elasticity of demand for construction of 0.5. In other words, 2.5 percent reduction in the cost of construction would lead to 1.25 percent increase in the quantity of construction demanded. This increased quantity of delivered aggregate leads to additional truck haul miles. The number of increased miles from the increased aggregate sales is 1.25 percent of the original quantity times the new haul distance which is 50% of the original distance. Therefore, the percentage increase in truck haul miles occasioned by a decrease in aggregate price will be 0.625 percent because the new aggregate location is only half as far away.

In this example, the new quarry saves 50 percent of truck trip miles through location and contributes 0.625 percent of new truck trip miles from demand increase. This leads to a net decrease of 49.375 percent in truck miles. The following Table 1 summarizes the net reduction of truck haul miles for three different scenarios – the new aggregate project site located at 12.5, 6.25, and 2.5 miles from a construction site.

Table 1

Distance to New Quarry (miles)	**Decrease in haul miles (%)[**]**	**Decrease in delivered aggregate cost (%)**	**Decrease in construction cost (%)**	**Increase in construction quantity (%)**	**Increase in haul miles from additional construction(%)[††]**	**Net decrease in miles hauled (%)**
12.5	50	25	2.5	1.25	0.62	**49.4**
6.25	25	37.5	3.75	1.85	0.46	**74.5**
2.5 miles	90	45	4.5	2.25	0.22	**89.8**

There is a general rule to be deduced from the example: The percent decrease in cost for the delivery of aggregates equals the percent decrease in miles driven, while the increase in the use of aggregates equals the elasticity of demand for a final product (such as roads) times the cost share of aggregates in making the product times the decrease in cost. Since the elasticity of demand for a final product is much less than one, and the cost

[**] This decrease is with respect to the pre-project haul miles.
[††] This increase is with respect to the pre-project haul miles.

share of aggregates in making the product is about 8 percent, a new quarry must decrease truck miles and decrease NOX and other emissions from trucks.

Appendix A

Spatial Models with Imperfect Competition

When a producer has a price advantage over other producers because of lower transport costs, the producer can exploit that advantage by charging consumers a price greater than its marginal cost. Marginal cost is the cost of producing one incremental unit.
In this appendix, I will briefly investigate one model of spatial competition that is derived from a classical model of Hotelling [‡‡]

In Hotelling's model, two stores (which are analogous to production sites) can relocate at no cost and then compete based on price. Since consumers are some distance from the store, they see the price of a product as the amount they pay for the product plus the cost of travel. They go to the store with the least total cost (cost of product plus cost of travel). The stores seek to make the most money they can make. The price the consumer will pay is the largest price that the store the consumer goes to can charge without losing the customer to the other store.[§§] In Hotelling's model, the two stores will locate next to each other, split the market in half, and charge the competitive price. While the pricing rule of the Hotelling model may well apply to aggregates, the assumption of complete location flexibility is not applicable.

Returning to the model of diagram 1, shown above., I now consider the effects on pricing of adding one aggregate production site with competition in prices. Consider the case where both aggregate production sites and aggregate-using projects exist at location A and *. The production site at * would be willing to supply the project at location A at its marginal cost of production (mc) plus the cost of transport for one mile, for a total of mc + 1 c. This is higher than the marginal plus transport costs that production site A has for

---

[5] Hotelling, Harold. 1929. "Stability in Competition." Economic Journal 39:41-57

[6] Salop, Steven C. 1979. "Monopolistic Competition with Outside Goods." *The Bell Journal of Economics.* Salop models the competition between stores in terms of quantity, so that the price for consumers near a store is determined as a monopolist would determine price. With a very low elasticity of demand as is true for aggregates, the price competition model of Hotelling seems more appropriate.

supplying the project at A. However, the site at A can charge up to mc+c without losing the customer. The site charges mc+c while its costs are mc and makes c units of pure profit. The site at * prices in the same way—a price just high enough to avoid the site at A from taking the customer. For the sites to the right of *, the prices are mc+2, mc+3, and mc+ 4. In each case, this is the highest price site * can charge without losing the customer to site A.

In this model, one of the best places for a new site would be at B. The new site would sell ½ unit to the project between it and * at a price of mc + c, a whole unit to the project located at B at a price of mc + 2c (the price at which the site at * would be willing to supply aggregate), and a whole unit to the project located to its right at a price of mc + 3c. The result of adding the new site would be that the price for each project to the right of the project at * fell by c.

With competitive (marginal cost) pricing as described in the body of the note, the addition of the new site at B would result in the prices paid by projects decreasing by four, while with imperfect competition as described in this appendix, the new site would result in the prices paid by projects decreasing only by three. Compared to the competitive case cited above, the imperfect competition example results in smaller changes in prices and therefore a larger decrease in truck traffic.

MAP SHEET 52

(UPDATED 2018)

AGGREGATE SUSTAINABILITY IN CALIFORNIA

2018

CALIFORNIA GEOLOGICAL SURVEY
Department of Conservation

STATE OF CALIFORNIA
EDMUND G. BROWN, JR.
GOVERNOR

THE NATURAL RESOURCES AGENCY
JOHN LAIRD
SECRETARY FOR RESOURCES

DEPARTMENT OF CONSERVATION
DAVID BUNN
DIRECTOR

CALIFORNIA GEOLOGICAL SURVEY
JOHN G. PARRISH, PH.D., *STATE GEOLOGIST*

MAP SHEET 52

(UPDATED 2018)

AGGREGATE SUSTAINABILITY IN CALIFORNIA

By

John P. Clinkenbeard (PG #4731)
and
Fred W. Gius (PG #7788)

2018

CALIFORNIA GEOLOGICAL SURVEY'S PUBLIC INFORMATION OFFICES:

Southern California Regional Office
320 West 4th Street, Suite 850
Los Angeles, CA 90013
(213) 239-0878

Library and Headquarters Office
801 K Street, MS 14-31
Sacramento, CA 95814-3531
(916) 327-1850

Bay Area Regional Office
1900 South Norfolk Street, Suite 300
San Mateo, CA 94403
(650) 350-7301

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TABLES

INTRODUCTION

Sand, gravel, and crushed stone are “construction materials.” These commodities, collectively referred to as aggregate, provide the bulk and strength to Portland Cement Concrete (PCC), Asphaltic Concrete (AC, commonly called “black top”), plaster, and stucco. Aggregate is also used as road base, subbase, railroad ballast, and fill. Aggregate normally provides 80 to 100 percent of the material volume in the above uses.

The building and paving industries in California consume large quantities of aggregate and future demand for this commodity is expected to increase throughout California. Aggregate materials are essential to modern society, both to maintain the existing infrastructure and to provide for new construction. Therefore, aggregate materials are a resource of great importance to the economy of any area. Because aggregate is a low unit-value, high-bulk-weight commodity, it must be obtained from nearby sources to minimize economic and environmental costs associated with transportation. If nearby sources do not exist, then transportation costs can quickly exceed the value of the aggregate. Transporting aggregate from distant sources results in increased construction costs, fuel consumption, greenhouse gas emissions, air pollution, traffic congestion, and road maintenance.

To give an idea of the scale of these impacts, from 1987 to 2016, California consumed an average of about 180 million tons of construction aggregate (all grades) per year. Moving in 25 ton truckloads that is 7.2 million truck trips per year. With an average 25-mile haul (50-mile round trip) that amounts to 360 million truck miles traveled, more than 51 million gallons of diesel fuel used, and more than 570,000 tons of carbon dioxide emissions produced annually. If the haul distance is doubled to 50 miles (100-mile round trip) the numbers double to 720 million truck miles traveled, more than 102 million gallons of diesel fuel used, and over 1.1 million tons of carbon dioxide emissions produced.

Land-use planners and decision makers in California are faced with balancing a wide variety of needs in planning for a sustainable future for their communities and regions. Mining is often seen as a controversial land use during the permitting process. However, there are benefits to having local sources of construction aggregate. Increasingly, as existing permitted aggregate supplies are depleted, local land-use decisions regarding aggregate resources can have regional impacts that go beyond local jurisdictional boundaries.

These factors, universal need, increasing demand, the economic and environmental costs of transportation, and multiple land-use pressures make information about the availability and demand for aggregate valuable to land-use planners and decision makers charged with planning for a sustainable future for California’s citizens.

California Geological Survey (CGS) Map Sheet 52 and this accompanying report provide general information about the current availability of, and future demand for, California’s permitted aggregate reserves. Map Sheet 52 was originally published in 2002 (Kohler, 2002) and subsequently updated in 2006 (Kohler, 2006) and 2012 (Clinkenbeard, 2012). Map Sheet 52 (2018) is an update of the version published in 2012.

Map Sheet 52 updates data from 49 reports compiled by the CGS for more than 30 aggregate study areas throughout the state (see Appendix). These study areas cover about 30 percent of the state and provide aggregate for about 85 percent of California's population. This report is divided into three parts:

- Part I - provides data sources and methods used to derive the information presented.
- Part II - compares the updated 2018 Map Sheet 52 to the prior (2012) map.
- Part III - an overview of construction aggregate.

All aggregate data and any reference to "aggregate" in this report and on the map, pertain to "construction aggregate," defined as alluvial sand and gravel or crushed stone that meets standard specifications for use in PCC or AC unless otherwise noted.

The estimates of permitted resources, aggregate demand, and years of permitted reserves remaining on Map Sheet 52 (2018) and in this report, are based on conditions as of January 1, 2017 and do not reflect changes, such as production, mine closures, or new or expanded permits, that may have occurred since that time. Although the statewide and regional information presented on the map and in this report may be useful to decision-makers, it should not be used as a basis for local land-use decisions. The more detailed information on the location and estimated amounts of permitted and non-permitted resources, and future regional demands contained in each of the aggregate studies employed in the compilation of Map Sheet 52 should be used for local land-use and decision-making purposes.

PART I: DESCRIPTION OF MAP SHEET 52, AGGREGATE SUSTAINABILITY IN CALIFORNIA

Map Sheet 52 is a statewide map showing a compilation of data about aggregate availability collected over a period of about 40 years and updated to January 1, 2017. The purpose of the map is to compare projected aggregate demand for the next 50 years with currently permitted aggregate reserves in various regions of the state. The map also shows the projected years of permitted reserves remaining and highlights regions where less than 10 years of permitted aggregate supply remain. The following sections describe data sources and methodology used in the development of the map.

Mineral Land Classification Reports and Aggregate Studies

Aggregate reserves and projected aggregate demand shown on Map Sheet 52 are updated from mineral land classification reports published by CGS between 1979 and 2017 (see Appendix). They were prepared in response to California's Surface Mining and Reclamation Act of 1975 (SMARA) that requires the State Geologist to classify land based on the known or inferred mineral resource potential of that land. SMARA, its regulations and guidelines, are described in Special Publication 51 (State Mining and Geology Board, 2000). The regulations and guidelines can be found on the State Mining and Geology Board website at http://www.conservation.ca.gov/smgb.

The Mineral Land Classification process identifies lands that contain economically significant mineral deposits. The primary goal of mineral land classification is to ensure that the mineral resource potential of lands is recognized and considered in land-use planning. The classification process includes an assessment of the quantity, quality, and extent of aggregate deposits in a study area.

Mineral land classification reports may be specific to aggregate resources, may contain information about both aggregate and other mineral resources, or they may only contain information on minerals other than aggregate. Reports that focus on aggregate include aggregate resource classification and mapping, estimates of permitted and non-permitted aggregate resources, projected 50-year demand for aggregate resources, and an estimate of when the permitted reserves will be depleted. Map Sheet 52 is a statewide updated summary of 50-year demands and permitted resources for all regional SMARA classification reports pertaining to construction aggregate.

Mineral land classification studies for aggregate may use either a Production-Consumption (P-C) region or a county as the study area boundary. A P-C region is one or more aggregate production districts (a group of producing aggregate mines) and the market area they serve. P-C regions sometimes cross county boundaries. Mineral land classification reports include information from one or more P-C regions, or from a county. For ease in discussion, the area covered by each P-C region or county aggregate study is referred to as an "aggregate study area." SMARA guidelines recommend that the State Geologist periodically review the mineral land classification in defined study regions to determine if new classifications are necessary. The projected 50-year forecast of aggregate demand in the region may also be revised.

The index map of aggregate studies shown in the lower left-hand corner of Map Sheet 52 shows the latest reports that cover an aggregate study area. Earlier reports covering the same areas or portions of areas are referenced in the Appendix with an asterisk (“*”). Original mineral land classification reports and update reports are listed in the Appendix and can be found on the CGS Information Warehouse at http://maps.conservation.ca.gov/cgs/informationwarehouse/.

Fifty-Year Aggregate Demand Forecast

The fifty-year aggregate demand forecast for each of the aggregate study areas is presented on Map Sheet 52 as a pie chart (See *Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves* section), and is presented in Table 1 of this report. The demand information may be new, or updated from previously published mineral land classification reports. The demand forecast information depicted on Map Sheet 52 is for the period January 1, 2017 through December 2066.

The aggregate study areas with the greatest projected future demand for aggregate are the South San Francisco Bay and Temescal Valley-Orange County areas. Each is expected to require more than a billion tons of aggregate by the end of 2066. Other areas with projected high demands are Western San Diego County, San Gabriel Valley, San Bernardino, Sacramento County, and Palmdale. Each of these areas is projected to need more than 500 million tons of aggregate in the next 50 years. Aggregate study areas having smaller demands generally are in rural, less populated areas. The aggregate study areas of El Dorado County, Glenn County, Nevada County, Shasta County, and Tehama County are all projected to require less than 100 million tons of aggregate over the next 50 years.

Methodology

The steps used for forecasting California’s 50-year aggregate needs using the per capita consumption model are:

1. Collecting yearly historical production and population data.

2. Dividing yearly aggregate production by the population for that same year to determine annual historical per capita consumption.

3. Determining the average of the annual historical per capita consumption values for the range of years being used.

4. Projecting yearly population for a 50-year period from the beginning of 2017 through 2066.

5. Multiplying each year of projected population by the average historical per capita consumption and adding the results for each year to obtain the 50-year aggregate demand.

Table 1. Comparison of 50-Year Demand to Permitted Aggregate Reserves for Aggregate Study Areas as of January 1, 2017.

AGGREGATE STUDY AREA[1]	50-Year Demand (million tons)	Permitted Aggregate Reserves (million tons)	Permitted Aggregate Reserves Compared to 50-Year Demand (percent)	Projected Years Remaining
Bakersfield P-C Region	338	1,708	505	More than 50
Barstow-Victorville P-C Region	163	117	72	31 to 40
Claremont-Upland P-C Region	202	90	45	21 to 30
El Dorado County	82	15	18	11 to 20
Fresno P-C Region	305	556	182	More than 50
Glenn County	41	22	54	21 to 30
Merced County	154	61	40	21 to 30
Monterey Bay P-C Region	333	297	89	41 to 50
Nevada County	41	52	127	More than 50
North San Francisco Bay P-C Region	492	263	53	21 to 30
Palmdale P-C Region	569	163	29	11 to 20
Palm Springs P-C Region	238	163	68	31 to 40
Placer County	188	387	206	More than 50
Sacramento County	724	327	45	21 to 30
Sacramento-Fairfield P-C Region	295	109	37	21 to 30
San Bernardino P-C Region	939	156	17	11 to 20
San Fernando Valley/ Saugus-Newhall[2]	**387**	**17**	**4**	**10 or fewer**
San Gabriel Valley P-C Region	751	297	40	21 to 30
San Luis Obispo-Santa Barbara P-C Region	226	58	26	11 to 20
Shasta County	82	49	60	31 to 40
South San Francisco Bay P-C Region	1,320	506	38	21 to 30
Stanislaus County	160	39	24	11 to 20
Stockton-Lodi P-C Region	409	203	50	21 to 30
Tehama County	49	30	61	31 to 40
Temescal Valley-Orange County[2]	1,079	862	80	41 to 50
Tulare County	130	53	41	21 to 30
Ventura County[2]	241	84	35	11 to 20
Western San Diego County P-C Region	763	265	35	11 to 20
Yuba City-Marysville P-C Region	344	679	197	More than 50
Total	11,045	7,628	69	

[1] Aggregate study areas follow either a Production-Consumption (P-C) region boundary or a county boundary. A P-C region includes one or more aggregate production districts and the market area that those districts serve. Aggregate resources are evaluated within the boundaries of the P-C Region. County studies evaluate all aggregate resources within the county boundary.

[2] Two P-C regions have been combined into one study area.

Bold = study area with ten or fewer years of permitted reserves.

For this update, the range of years of historical production and population data used were generally from 1980-2016.

The per capita consumption model has proved to be effective for projecting aggregate demand in major metropolitan areas. However, the per capita model may not work well in county aggregate studies or in P-C regions that import or export a large percentage of aggregate resulting in a low correlation between P-C region production and population. In such areas, projections may be made based on historical production or, multiple projections based on differing assumptions may be used to better characterize a range of future demand.

For regions that export large amounts of aggregate to neighboring P-C regions, projections are based on an historical production model where 50-year aggregate demand is determined by extending a best-fit line of historical aggregate production data for a county or region. This model was used to project Yuba City-Marysville's 50-year demand because the region exports about 70 percent of its aggregate into neighboring areas such as Sacramento County and Placer County. The 50-year demand for Glenn and Tehama counties, the Palmdale P-C Region, and the Temescal Valley-Orange County area was also projected using this method.

Permitted Aggregate Reserves

Approximately 7.6 billion tons of permitted aggregate reserves lie within the aggregate study areas shown on Map Sheet 52. Permitted aggregate reserves are aggregate deposits that have been determined to be acceptable for commercial use, exist within properties owned or leased by aggregate producing companies, and have permits allowing mining of aggregate material. A "permit" is a legal authorization or approval by a lead agency, the absence of which would preclude mining operations. Although some permitted reserves face legal challenges, these reserves are included in this study pending resolution of those challenges.

In California, mining permits usually are issued by local lead agencies (county or city governments). Map Sheet 52 shows permitted aggregate reserves as a percentage of the 50-year demand on each pie chart (See *Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves* section). Beneath the study area name located next to its corresponding pie chart is the permitted resource in tons along with the 50-year demand. These figures are also given in Table 1.

Permitted aggregate resource calculations shown on the map and in Table 1 initially were determined from information provided in reclamation plans, mining plans, and use permits issued by the lead agencies. When information was inadequate to make reliable independent calculations, CGS staff used resource estimates provided by mine operators or owners. These data were checked against rough calculations made by CGS staff, and any major discrepancies were discussed with the mine operators or owners. Permitted reserve calculations have been updated to account for production from 2010-2016 and are current as of the beginning of 2017.

Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves

Fifty-year aggregate demand compared to the currently permitted aggregate reserves is represented by a pie chart for each aggregate study area on Map Sheet 52. Each pie chart is in the approximate center of the aggregate study area it represents. There are four different sizes of charts, each representing a 50-year demand range. The smallest pie chart represents 50-year demands of less than 200 million tons, while the largest chart represents demands of over 800 million tons. The 50-year demand (in tons) is shown on the map with the amount of permitted reserves beneath the study area name located next to its corresponding pie chart (permitted reserves, left / 50-year demand, right). The whole pie represents the total 50-year aggregate demand for a particular aggregate study area. The blue portion of the pie represents the permitted aggregate resource (shown as a percentage of the 50-year demand) while the purple-colored portion of the pie represents that portion of the 50-year demand that will not be met by the currently permitted reserves. For example, if the blue portion is 25 percent and the purple portion is 75 percent of a pie chart that represents a total demand of 400 million tons, the permitted reserves are 100 million tons, and the region will need an additional 300 million tons of aggregate to supply the area for the next 50 years. The pie representing the Bakersfield aggregate study area is completely colored blue, showing permitted aggregate reserves are equal to or greater than the area’s 50-year aggregate demand. Detailed examples are provided in the legend of Map Sheet 52.

Except for the Bakersfield P-C Region, Fresno P-C Region, Nevada County, Placer County, and the Yuba City-Marysville P-C Region, all the aggregate study areas have less permitted aggregate reserves than they are projected to need for the next 50 years. Fifteen of the aggregate study areas shown on the map have less than half of the permitted reserves they are projected to need in the next 50 years.

Estimates of Years of Permitted Reserves Remaining

The right-hand column of Table 1 indicates the projected years of permitted reserves remaining for the various aggregate study areas. Calculations of depletion years are made by comparing the currently permitted reserves to the projected annual aggregate consumption in the study area on a year-by-year basis. This is not the same as dividing the total projected 50-year demand for aggregate by 50 because, as population increases, so does the projected annual consumption of aggregate for a study area. Data are presented as ranges; 10 or fewer, 11-20, 21-30, 31-40, 41-50, and more than 50 years. This information is included on Map Sheet 52 beneath the study area name along with the permitted reserves and the projected 50-year demand. These estimates are based on conditions as of January 1, 2017 and do not reflect changes, such as new or expanded permits, that may have occurred since that time.

Only one of the aggregate study areas in Table 1, the San Fernando Valley-Saugus Newhall area, is projected to have less than 10 years of permitted aggregate reserves remaining as of January 1, 2017.

Seven of the aggregate study areas in Table 1 have between 11 and 20 years of permitted aggregate reserves remaining, ten have between 21 and 30 years of permitted aggregate reserves remaining, four have 31 to 40 years remaining, two have 41 to 50 years, and five have more than 50 years of permitted reserves remaining.

These numbers are estimates and the actual lifespan of existing permitted reserves in a study area can be influenced by many factors. In periods of high economic growth, demand may increase, shortening the life of permitted reserves. Large projects, such as the construction or maintenance of major infrastructure, or rebuilding after a disaster such as an earthquake could also deplete permitted reserves more rapidly. Increased demand from neighboring regions with dwindling or depleted permitted reserves may also accelerate the depletion of permitted reserves in a study area. Conversely, a slow economy may reduce demand for a period of time, extending the life of permitted reserves, or new or expanded permits may be granted in a study area, increasing the permitted reserves and the lifespan of permitted reserves in that area.

Non-Permitted Aggregate Resources

Non-permitted aggregate resources are deposits that may meet specifications for construction aggregate, are recoverable with existing technology, have no land use overlying them that is incompatible with mining, and currently are not permitted for mining. While not shown on Map Sheet 52, non-permitted aggregate resources are identified and discussed in each of the mineral land classification reports used to compile the map (See Appendix).

There are approximately 74 billion tons of non-permitted construction aggregate resources in the aggregate study areas shown on Map Sheet 52. While this number seems large, it is unlikely that all of these resources will ever be mined because of social, environmental, or economic factors. The location of aggregate resources too close to urban or environmentally sensitive areas can limit or prevent their development. Resources may also be located too far from a potential market to be economic. Despite such possible constraints, non-permitted aggregate resources are the most likely future sources of construction aggregate potentially available to meet California's continuing demand. Factors used to calculate non-permitted resource amounts and to determine the aerial extent of these resources, are given in each of the mineral land classification reports listed in the Appendix.

Aggregate Production Areas and Districts

Aggregate production areas are shown on Map Sheet 52 by five different sizes of triangle. A triangle may represent one or more active aggregate mines. The relative size of each symbol corresponds to the amount of yearly production for each mine or group of mines. Yearly production was based on data from the Department of Conservation's Division of Mine Reclamation (DMR) records for the calendar year 2016.

The smallest triangle represents an area that produced less than 0.5 million tons of aggregate in 2016. These triangles often represent a single mine operation and many are in rural parts of the state. The largest triangle represents aggregate mining districts with production of more than 5 million tons in 2016. Only two aggregate production districts fall into this category – the Temescal Valley District in western Riverside County and the San Gabriel Valley District in Los Angeles County.

PART II: COMPARISONS BETWEEN THE PRIOR (2012) AND THE UPDATED (2018) MAP SHEET 52

The prior version of Map Sheet 52 was published in 2012. Permitted aggregate resource data for that map were current as of January 1, 2011. Work conducted for that study took place during 2011/2012. The latest aggregate production and location data available for the prior map were from 2010 records. The aggregate demand projections for the prior map were based on California Department of Finance (DOF) county population projections from the 2010 U.S. census. Fifty-year aggregate demand from January 1, 2011 through the year 2060 was determined for the included study areas.

This updated Map Sheet 52 was completed and published in 2018. Permitted aggregate resource data for the updated map is current as of January 1, 2017. All work conducted for the updated study took place during 2017/2018. The latest aggregate production and location data available for the updated map are from 2016 records. The aggregate demand projections for the updated map were based on DOF county population estimates and projections for 2010 to 2060 (DOF, 2018). Fifty-year aggregate demand from January 1, 2017 through the year 2066 was determined for the included study areas.

Changes have occurred in both aggregate supplies (permitted aggregate reserves) and in 50-year aggregate demand since Map Sheet 52 (2012) was completed. Changes in permitted aggregate reserves are shown in Table 2. Changes in 50-year demand are shown in Table 3.

Aggregate Study Area Changes

Six aggregate study areas on the original (2002) Map Sheet 52 were modified for the 2006 map, resulting in three fewer study areas. They included the Southern California P-C regions of Orange County, Temescal Valley, San Fernando Valley, Saugus-Newhall, Western Ventura County, and Simi Valley. These regions were combined into three regions when they began to run out of permitted reserves and became dependent on aggregate sources from neighboring regions. The importation of aggregate from neighboring regions typically results in longer haul distances, higher costs, and increased carbon dioxide emissions, air pollution, traffic congestion, and highway maintenance. The shift in supply area also results in more rapid depletion of permitted reserves in neighboring regions.

In the 2006 and 2012 versions of Map Sheet 52, information for eastern and western Merced County and northern and southern Tulare county were reported. This was because separate market regions existed in those study areas. While those separate market regions may still exist, in this update, information is reported for Merced and Tulare counties and not for the eastern and western or northern and southern areas, respectively.

Table 2. Comparison of Permitted Aggregate Reserves Between Map Sheet 52, 2012 and Map Sheet 52, 2018.

AGGREGATE STUDY AREA	Map Sheet 52, 2012 Permitted Aggregate Reserves as of 1/1/11 (million tons)	Map Sheet 52, 2018 Permitted Aggregate Reserves as of 1/1/17 (million tons)	Percent Difference
Bakersfield P-C Region	143	1,708	1,094
Barstow Victorville P-C Region	124	117	-6
Claremont-Upland P-C Region	109	90	-17
El Dorado County	18	15	-17
Fresno P-C Region	46	556	1,109
Glenn County	33	22	-33
Merced County**	N/A**	61	N/A**
Monterey Bay P-C Region	323	297	-8
Nevada County	26	52	100
North San Francisco Bay P-C Region	110	263	139
Palmdale P-C Region	152	163	7
Palm Springs P-C Region	152	163	7
Placer County	152	387	155
Sacramento County	42	327	679
Sacramento-Fairfield P-C Region	128	109	-15
San Bernardino P-C Region	241	156	-35
San Fernando Valley/Saugus-Newhall*	77	17	-78
San Gabriel Valley P-C Region	322	297	-8
San Luis Obispo-Santa Barbara P-C Region	75	58	-23
Shasta County	52	49	-6
South San Francisco Bay P-C Region	404	506	25
Stanislaus County	45	39	-13
Stockton Lodi P-C Region	232	203	-13
Tehama County	32	30	-6
Temescal Valley-Orange County*	297	862	190
Tulare County**	N/A**	53	N/A**
Ventura County (combined Western Ventura County and Simi Valley P-C Region)*	96	84	-13
Western San Diego County P-C Region	167	265	59
Yuba City-Marysville P-C Region	392	679	73
Total	4,067	7,628	88

* Two P-C Regions have been combined into one study area.
** In Map Sheet 52 (2012) separate values for east and west Merced County and north and south Tulare County were presented. In this update, information is given only for the counties as a whole and not the parts.

Table 3. Comparison of 50-Year Demand Between Map Sheet 52, 2012 and Map Sheet 52, 2018.

AGGREGATE STUDY AREA	Map Sheet 52, 2012 50-Year Demand as of 1/1/11 (million tons)	Map Sheet 52, 2018 50-Year Demand as of 1/1/17 (million tons)	Percent Difference
Bakersfield P-C Region	438	338	-23
Barstow-Victorville P-C Region	159	163	3
Claremont-Upland P-C Region	203	202	0
El Dorado County	76	82	8
Fresno P-C Region	435	305	-30
Glenn County	59	41	-31
Merced County**	N/A**	154	N/A**
Monterey Bay P-C Region	346	333	-4
Nevada County	100	41	-59
North San Francisco Bay P-C Region	521	492	-6
Palmdale P-C Region	577	569	-1
Placer County	151	238	58
Palm Springs P-C Region	295	188	-36
Sacramento County	670	724	8
Sacramento-Fairfield P-C Region	196	295	51
San Bernardino P-C Region	993	939	-5
San Fernando Valley/Saugus-Newhall*	476	387	-19
San Gabriel Valley P-C Region	809	751	-7
San Luis Obispo-Santa Barbara P-C Region	240	226	-6
Shasta County	93	82	-12
South San Francisco Bay P-C Region	1,381	1,320	-4
Stanislaus County	214	160	-25
Stockton Lodi P-C Region	436	409	-6
Tehama County	62	49	-21
Temescal Valley-Orange County*	1,077	1,079	0
Tulare County **	N/A**	130	N/A**
Ventura County (combined Western Ventura County and Simi Valley P-C Regions)*	298	241	-19
Western San Diego County P-C Region	1,014	763	-25
Yuba City-Marysville P-C Region	403	344	-15
Total	12,047	11,045	-8

* Two P-C Regions have been combined into one study area.
** In Map Sheet 52 (2012) separate values for east and west Merced County and north and south Tulare County were presented. In this update, information is given only for the counties as a whole and not the parts.

No additional study areas have been combined in this update. It is likely that in some future update the San Fernando Valley-Saugus Newhall aggregate study area and the Palmdale study area may be combined as permitted reserves in the San Fernando Valley-Saugus Newhall aggregate study area are depleted. In addition, a study of the Greater Sacramento Area currently nearing completion will likely result in the combination of several previously existing study areas.

Changes in Permitted Aggregate Reserves

Fifteen of the study areas shown on the updated map experienced a decrease in permitted aggregate reserves since the 2012 map was completed (See Table 2). Most of these decreases likely represent aggregate production within those study areas since the last update of Map Sheet 52.

A large part of the reduction in the San Fernando Valley-Saugus Newhall study area is due to the subtraction of the 56 million tons of permitted aggregate reserves previously associated with the CEMEX Soledad Canyon Sand and Gravel Mining Project. In 2015, the Bureau of Land Management withdrew the contracts that would have allowed mining. The issue is currently under appeal with the Interior Board of Land Appeals. If, at a future date, the contracts are restored then the permitted reserves will be restored.

Twelve of the study areas shown on the updated map had increases in permitted aggregate reserves. Most of these increases are because of newly permitted or expanded mining operations within the various study areas. An expansion may increase the footprint of the mine or increase permitted mining depth. Some of these increases may be the result of recalculation of the permitted aggregate reserves in a study area.

Total permitted reserves for all the included study areas increased to 7,628 million tons from 4,067 million tons – an apparent increase of 3,561 million tons. The actual increase was likely slightly more because of production since 2010. Approximately two-thirds of the increase is due to permitting activities in the Bakersfield, Fresno, and Sacramento study areas.

Changes in Fifty-Year Demand

Of the study areas shown on the updated Map Sheet 52, five had increases in 50-year demand, two had less than a one percent change, and 20 showed decreases in projected 50-year demand (See Table 3). The large number of study areas with decreasing 50-year demand is likely due in part to incorporation of lower per capita consumption rates caused by the slow recovery of the construction industry in California in the years following the economic recession of 2007-2009.

Comparison of Areas with Less than 10-Years of Permitted Aggregate Reserves

The 2018 Map Sheet 52 shows only one aggregate study area with less than a 10-year supply of permitted aggregate reserves – San Fernando Valley-Saugus Newhall.

Compared to the 2012 version of the map, which showed four aggregate study areas with less than a 10-year supply of aggregate – Sacramento County and the Fresno, San Fernando Valley-Saugus Newhall, and Western San Diego P-C regions.

PART III: OVERVIEW OF CONSTRUCTION AGGREGATE

Construction aggregate was the leading non-fuel mineral commodity produced in California in 2016. Valued at $1.42 billion, aggregate made up about 42 percent of California's $3.4 billion non-fuel mineral production in 2016.

Aggregate Quality and Use

Aggregate normally makes up 80 to 100 percent of the material volume in PCC and AC and provides the bulk and strength to these materials. Rarely, even from the highest-grade deposits, is in-place aggregate physically or chemically suited for every type of aggregate use. Every potential deposit must be tested to determine how much of the material can meet specifications for a particular use, and what processing is required. Specifications for PCC, AC, and various other uses of aggregate have been established by several agencies, such as the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers, and the California Department of Transportation to ensure that aggregate is satisfactory for specific uses. These agencies and other major consumers test aggregate using standard procedures of the American Society for Testing Materials (ASTM), the American Association of State Highway Officials, and other organizations.

Most PCC and AC aggregate specifications have been established to ensure the manufacture of strong, durable structures capable of withstanding the physical and chemical effects of weathering and use. For example, specifications for PCC and concrete products prohibit or limit the use of rock materials containing mineral substances such as gypsum, pyrite, zeolite, opal, chalcedony, chert, siliceous shale, volcanic glass, and some high-silica volcanic rocks. Gypsum retards the setting time of portland cement; pyrite dissociates to yield sulfuric acid and an iron oxide stain; and other substances contain silica in a form that reacts with alkali substances in the cement, resulting in cracks and "pop-outs."

Specifications also call for precise particle-size distribution for the various uses of aggregate that is commonly classified into two general sizes: coarse and fine. Coarse aggregate is rock retained on a 3/8-inch or a #4 U.S. sieve. Fine aggregate passes a 3/8-inch sieve and is retained on a #200 U.S. sieve (a sieve with 200 weaves per inch). For some uses, such as asphalt paving, particle shape is specified. Aggregate material used with bituminous binder (asphalt) to form sealing coats on road surfaces shall consist of at least 90 percent by weight of crushed particles. Crushed stone is preferable to natural gravel in AC because asphalt adheres better to broken surfaces than to rounded surfaces and the interlocking of angular particles strengthens the AC and road base.

The material specifications for PCC and AC aggregate are more restrictive than specifications for other applications such as Class II base, subbase, and fill. These restrictive specifications make deposits acceptable for use as PCC or AC aggregate the scarcest and most valuable aggregate resources. Aggregate produced from such deposits can be, and commonly is, used in applications other than concrete. PCC- and AC-grade aggregate deposits are of major importance when planning for future availability of aggregate commodities because of their versatility, value, and relative scarcity.

Factors Affecting Aggregate Deposit Quality

The major factors that affect the quality of construction aggregate are the rock type and the degree of weathering of the deposit. Rock type determines the hardness, durability, and potential chemical reactivity of the rock when mixed with cement to make concrete. In alluvial sand and gravel deposits, rock type is variable and reflects the rocks present in the drainage basin of the stream or river. In crushed stone deposits, rock type is typically less variable, although in some types of deposits, such as sandstones or volcanic rocks, there may be significant variability of rock type. Rock type may also influence aggregate shape. For example, some metamorphic rocks such as slates tend to break into thin platy fragments that are unsuitable for many aggregate uses, while many volcanic and granitic rocks break into blocky fragments more suited to a wide variety of aggregate uses. Deposit type also affects aggregate shape. For example, in alluvial sand and gravel deposits, the natural abrasive action of the stream rounds the edges of rock particles, in contrast to the sharp edges of particles from crushed stone deposits.

Weathering is the in-place physical or chemical decay of rock materials at or near the Earth's surface. Weathering commonly decreases the physical strength of the rock and may make the material unsuitable for high strength and durability uses. Weathering may also alter the chemical composition of the aggregate, making it less suitable for some aggregate uses. If weathering is severe enough, the material may not be suitable for use as PCC or AC aggregate. Typically, the older a deposit is, the more likely it has been subjected to weathering. The severity of weathering commonly increases with increasing age of the deposit.

Comparison of Alluvial Sand and Gravel to Crushed Stone Aggregate

The preferred use of one aggregate material over another in construction practices depends not only on specification standards, but also on economic considerations. Alluvial gravel is typically preferred to crushed stone for PCC aggregate because the rounded particles of alluvial sand and gravel result in a wet mix that is easier to work than a mix made of angular fragments. Also, crushed stone is less desirable in applications where the concrete is placed by pumping because sharp edges will increase wear and damage to the pumping equipment. The workability of a mix consisting of portland cement with crushed stone aggregate can be improved by adding more sand and water, but more cement must then be added to the mix to meet concrete durability standards. This results in a more expensive concrete mix and a higher cost to the consumer.

In addition, aggregate from a crushed stone deposit is typically more expensive than that from an alluvial deposit due to the additional costs associated with the ripping, drilling and blasting necessary to remove material from most quarries and the additional crushing required to produce the various sizes of aggregate. Manufacturing sand by crushing is costlier than mining and processing naturally occurring sand. Although more care is required in pouring and placing a wet mix containing crushed stone, PCC made with this aggregate is as satisfactory as that made with alluvial sand and gravel of comparable rock quality. Owing to environmental concerns and regulatory constraints in many areas of the state, it is likely that extraction of sand and gravel resources from instream and floodplain areas will become less common in the future. If this trend continues, crushed stone may become increasingly important to the California market.

Aggregate Price

The price of aggregate throughout California varies considerably depending on location, quality, and supply and demand. The highest quality aggregate, and typically most costly, is that which meets the specifications for use in PCC or AC. All prices discussed in this section are for PCC/AC-grade aggregate at the plant site or FOB (freight on board). Transportation cost, which adds to the final cost of aggregate, is discussed in the next section.

Regional variations make it difficult to estimate the average price of PCC-grade aggregate for the state. Over the last decade, prices have varied from more than $20 per ton in areas with depleting or depleted aggregate supplies and high demands such as San Diego and parts of the Bay Area, to $9 to $12 per ton in areas such as Yuba City-Marysville with abundant aggregate supplies and low to moderate demands. In many areas of the state it is likely that prices fall between these two endmembers.

Transportation and Increasing Haul Distances

Transportation plays a major role in the cost of aggregate to the consumer. Aggregate is a low-unit-value, high-bulk-weight commodity, and it must be obtained from nearby sources to minimize both the dollar cost to the aggregate consumer and other environmental and economic costs associated with transportation. If nearby sources do not exist, then transportation costs may significantly increase the cost of the aggregate by the time it reaches the consumer.

This makes the mining of aggregate much more competitive than most other mined commodities. The location, distance to market, and access to major transportation routes greatly influence the economic feasibility of an aggregate mine.

Most aggregate in California moves to its final point of use by truck. Trucking is typically charged at an hourly rate and rates may vary in different regions of the state. The typical distance traveled per hour may also vary, being greater in less congested or more rural areas, and less in densely populated urban areas. Other factors that affect hauling rates include fuel costs, toll bridges and toll roads, road conditions, and terrain. Transportation cost is the principal constraint defining the market area for an aggregate mining operation and the cost of transporting aggregate over long distances can equal or exceed the base cost of the aggregate.

Throughout California, aggregate haul distances have gradually increased as more local sources of aggregate diminish. Consequently, older P-C regions, most of which were established in the late 1970s, have changed considerably since their boundaries were drawn. This is especially evident in Los Angeles, Orange, and Ventura counties where aggregate shortages have led to the merging of six P-C regions shown on the original

(2002) map into three regions for the updated maps. In some parts of the state, one-way haul distances that were 20-30 miles decades ago are now sometimes 100 miles or more. Increased aggregate haul distances not only increase the cost of aggregate to the consumer, but also increase environmental and societal impacts such as increased fuel consumption, carbon dioxide (CO_2) emissions, air pollution, traffic congestion, and road maintenance.

Imported Aggregate

In some regions, local aggregate production is sufficient to meet the local demand, but in others, there is more demand than can be met by local production leading to a shortfall that is typically met by importing construction aggregate from neighboring aggregate producing regions.

There are both advantages and disadvantages to importing construction aggregate. Imports can provide needed aggregate in areas with depleted reserves/resources and can supply specific types of aggregate that are in short supply in the region. However, imported aggregate is often more expensive because of additional transportation costs. Increased costs for aggregate leads to more expensive construction projects in both the public and private sectors. Importing aggregate from neighboring regions also leads to more rapid depletion of reserves/resources in those regions, potentially contributing to price increases or aggregate shortages in those regions.

In addition to the greater economic costs, there are often increased environmental and societal costs associated with the import of aggregate when compared to local production. The environmental impacts include higher emissions of greenhouse gases, such as CO_2, and air pollution. The societal impacts include increased traffic congestion and road wear and maintenance due to increased truck traffic. In the case of imports, these environmental and societal impacts occur both within the importing region and in the neighboring regions that supply the material and through which the material is transported.

Currently almost all aggregate produced or imported into California is transported to its final point of use by truck. In discussions of aggregate import, other modes of transportation such as rail, barge, or ship are often mentioned as alternative methods of moving aggregate. In 2011, the San Diego Association of Governments (SANDAG) Service Bureau published the San Diego Region Aggregate Supply Study (SANDAG Service Bureau, 2011). This study included an evaluation of fuel use and CO_2 emissions for several scenarios involving different transport options for importing aggregate into the San Diego area. While the published study is specific to the San Diego region, it provides an interesting analysis of the impacts of importing construction aggregate. The following discussion is adapted from Special Report 240 (Gius, Busch, and Miller, 2017).

The SANDAG study looked at the impacts based on various combinations of transport options for the following five scenarios:

- In region production
- Import by truck from neighboring regions
- Import by rail/truck from San Bernardino County
- Import by barge/truck from Baja California, Mexico
- Import by ship/truck from British Columbia, Canada.

Fuel consumption, CO_2 emissions, and some other pollutant emissions (nitrogen oxides (NO_x) and particulate matter (PM)) were estimated based on round-trip travel, with aggregate transported to the point of use and the vehicle returning empty. For scenarios involving non-truck transport (rail, barge, and ship), delivery to the final point of use by truck was included. The transport scenarios and transport type and mileage considerations are presented in Table 4. More detail can be found in the SANDAG study (SANDAG Service Bureau, 2011).

Table 4. Summary of SANDAG Aggregate Transport Scenarios

SANDAG AGGREGATE TRANSPORT SCENARIOS	
TRANSPORT OPTION	MILEAGE BY MODE
Local: Truck	26 miles one way / 52 miles round trip
Import: Truck	100 miles one way / 200 miles round trip
Import: Rail + Truck	Rail: 200 miles one way / 400 miles round trip Truck: 20 miles one way / 40 miles round trip
Import: Barge + Truck	Barge: 70 miles one way / 140 miles round trip Truck: 20 miles one way / 40 miles round trip
Import: Ship + Truck	Ship: 1,540 miles one way / 3,080 miles round trip Truck: 20 miles one way / 40 miles round trip

Adapted from SANDAG Service Bureau, 2011

Transportation methods that move larger amounts of aggregate per load can be more efficient in terms of fuel consumption (gallons of fuel consumed per net ton-mile traveled) and CO_2, NO_x, and PM emissions (grams of CO_2, NO_x, and PM emitted per net ton-mile traveled). However, even though these transport options may be more efficient on a net ton-mile basis, the total fuel consumption and emissions are dependent on the distance traveled. If those distances are large, total fuel consumption and emissions may exceed those of less efficient transportation methods over shorter distances. This is demonstrated by SANDAG's findings. Even though transport by rail, barge, and ship have lower fuel consumption and CO_2 emissions per net ton-mile than transport by truck (Table 5), the total fuel usage and CO_2 emissions for those transport scenarios are greater than in-region production with truck delivery because of the distances involved (Table 6).

Table 5. Fuel Consumption and CO_2 Emissions from Aggregate Transport with Payload

Mode	Payload	Fuel Consumption (gallons/net ton per mile)	CO_2 Emissions (grams/net ton per mile)
Truck	25 tons	0.0086	86.9
Rail	100 tons per hopper car	0.0021	21.4
Barge	1,500 tons	0.0068	69.6
Ship	72,786 tons	0.0004	5.3

Adapted from Tables 4-2 and 4-4, SANDAG Service Bureau, 2011

Table 6. Fuel Consumption and Emissions for Aggregate Transport Scenarios – Estimates per Million Tons of Aggregate Transported

Transport Option	Total Fuel Consumption (gallons)	Total CO_2 Emissions (metric tons)	Total NO_x Emissions (metric tons)	Total PM Emissions (metric tons)
Local: Truck	296,000	3,000	26.5	1.1
Import: Truck	1,138,000	11,537	102	4.4
Import: Rail + Truck	788,000	7,985	120.4	3.3
Import: Barge + Truck	804,000	8,210	147.1	5.1
Import: Ship + Truck	1,406,000	16,703	282.2	16.3

Adapted from SANDAG Service Bureau, 2011

Table 6 shows that, per million tons of aggregate transported, local production with transport by truck consumes less fuel and produces less CO_2, NOx, and PM than the other transport options investigated by SANDAG. Transport Option 2, import of one million tons of aggregate by truck from neighboring regions, consumes almost four times as much fuel and produces almost four times the emissions as the local production and delivery of a similar amount of aggregate. In addition, the impacts occur not only in the Western San Diego County P-C Region, but in neighboring regions through which the materials are transported.

While this analysis pertains to San Diego County, similar analyses, with appropriate parameters, could be done for other regions. What it does point out is that, even though some methods of transportation may be more efficient on a per ton-mile basis, if the transport distances are great enough, the overall impacts may be greater than those of local production.

Factors Affecting Aggregate Demand

Several factors may influence aggregate demand. In periods of high economic growth, demand may increase, depleting permitted reserves more rapidly than expected. Large projects, such as the construction or maintenance of major infrastructure, or rebuilding after a disaster such as an earthquake could also deplete permitted reserves more rapidly. Increased demand from neighboring regions with dwindling or depleted permitted reserves may also accelerate the depletion of permitted reserves in a study area. Conversely, a period of declining economy or of low economic growth, such as that during the recession of 2007 to 2009 and the subsequent slow economic recovery, can reduce demand for a period of time, extending the life of permitted reserves. In some cases, importation of aggregate from other areas may extend the life of a region's permitted reserves.

SUMMARY AND CONCLUSIONS

Aggregate is essential to the needs of modern society, providing material for the construction and maintenance of roadways, dams, canals, buildings, and other parts of California's infrastructure. Aggregate is also found in homes, schools, hospitals, and shopping centers.

In the 30-year period from 1987 to 2016, Californians consumed an average of about 180 million tons of construction aggregate (all grades) per year or about 5.3 tons per person per year. Demand for aggregate is expected to increase as the state's population continues to grow and infrastructure is maintained, improved, and expanded. For example, the Road Repair and Accountability Act of 2017 (SB1) will provide approximately 5 billion dollars annually for a variety of maintenance, rehabilitation, and other transportation related projects over the next decade. Because aggregate is a low unit-value, high-bulk-weight commodity, it must be obtained from nearby sources to minimize the dollar cost to the aggregate consumer and other environmental and economic costs associated with transportation.

Comparing regional needs to available reserves and resources demonstrates the important aggregate resource issues facing lead agencies in California. These issues include the need to plan carefully for the use of lands containing these resources and the need to consider the permitting of additional aggregate resources before currently permitted deposits are depleted.

Increasingly, as existing permitted aggregate supplies are depleted, local land-use decisions regarding aggregate resources are having regional impacts that go beyond local jurisdictional boundaries. Planning for future construction aggregate needs in our communities should take into consideration not only the needs of the community, but also the needs of the region and neighboring regions. Importing aggregate from neighboring regions leads to more rapid depletion of reserves/resources in those regions, potentially contributing to price increases or aggregate shortages in those regions.

In addition to the greater economic costs, there are often increased environmental and societal costs associated with the import of aggregate when compared to local production. The environmental impacts include higher emissions of greenhouse gases, such as CO_2, and air pollution. The societal impacts include increased traffic congestion and road maintenance due to increased truck traffic. In the case of imports, these environmental and societal impacts occur both within the importing region and in the neighboring regions that supply the material and through which the material is transported. Finally, reliance on imports places responsibility and authority for permitting related to the local aggregate supply in the hands of decision makers in other jurisdictions.

For more than 40 years, under SMARA, CGS has conducted on-going studies that identify and evaluate aggregate resources throughout the state. Map Sheet 52 (2018) is an updated summary of supply and demand data from these studies. The map presents a statewide overview of projected future aggregate needs and currently permitted reserves.

The following conclusions can be drawn from Map Sheet 52 (2018) and this accompanying report:

- In the next 50 years, the study areas identified on Map Sheet 52 (2018) will need approximately 11 billion tons of aggregate.
- The study areas shown on Map Sheet 52 currently have about 7.6 billion tons of permitted reserves, which is about 69 percent of the total projected 50-year aggregate demand identified for these study areas. This is about 10 percent of the total aggregate resources located within the study areas.
- One aggregate study area is projected to have 10 or fewer years of permitted aggregate reserves remaining as of January 2017 (San Fernando Valley / Saugus Newhall area).
- Seven aggregate study areas have between 11 and 20 years of aggregate reserves remaining.
- Ten aggregate study areas have between 21 and 30 years of aggregate reserves remaining.
- Four aggregate study areas have between 31 and 40 years of aggregate reserves remaining.
- Two aggregate study areas have between 41 and 50 years of aggregate reserves remaining.
- Five aggregate study areas (Bakersfield, Fresno, and Yuba City-Marysville P-C regions, and Nevada and Placer counties) have more than 50 years of aggregate reserves remaining.

The information presented on Map Sheet 52 (2018) and in the referenced reports is provided to assist land use planners and decision makers in identifying those areas containing construction aggregate resources, and to estimate potential future demand for these resources in different regions of the state. This information is intended to help planners and decision makers balance the need for construction aggregate with the many other competing land use issues in their jurisdictions, and to provide for adequate supplies of construction aggregate to meet future needs.

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Gius, F.W., Busch, L.L., and Miller, R.V., 2017, Update of Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Western San Diego County Production-Consumption Region, California. California Geological Survey, Special Report 240, 50p.

Kohler, S.L., 2002, Aggregate Availability in California, California Geological Survey, Map Sheet 52, scale 1:1,100,000, 26p.

Kohler, S.L., 2006, Aggregate Availability in California, California Geological Survey, Map Sheet 52 (Updated 2006), scale 1:1,100,000, 26p.

San Diego Association of Governments Service Bureau, January 2011, San Diego Region Aggregate Supply Study: 118 p., http://www.sandag.org/uploads/publicationid/publicationid_1558_12638.pdf.

California Department of Finance, Demographic Research Unit, *Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 1-year increments.* January 2018.

APPENDIX: MINERAL LAND CLASSIFICATION REPORTS BY THE CALIFORNIA GEOLOGICAL SURVEY (Special Reports and Open-File Reports, with information on aggregate resources)

SPECIAL REPORTS

SR 132: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Yuba City-Marysville Production-Consumption Region. By Habel, R.S., and Campion, L.F., 1986.

*SR 143: Part I: Mineral Land Classification of the Greater Los Angeles Area: Description of the Mineral Land Classification Project of the Greater Los Angeles Area._By Anderson T. P., Loyd, R.C., Clark, W.B., Miller, R.M., Corbaley, R., Kohler, S.L., and Bushnell, M.M., 1979.

*SR 143: Part II: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Fernando Valley Production-Consumption Region. By Anderson T.P., Loyd, R.C., Clark, W.B., Miller, R.M., Corbaley, R., Kohler, S.L., and Bushnell, M.M., 1979.

*SR 143: Part III: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Orange County-Temescal Valley Production-Consumption Region. By Miller, R.V., and Corbaley, R., 1981.

*SR 143: Part IV: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Gabriel Valley Production-Consumption Region. By Kohler, S.L., 1982.

*SR 143: Part V: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Saugus-Newhall Production-Consumption Region and Palmdale Production-Consumption Region. By Joseph, S.E, Miller, R.V., Tan, S.S., and Goodman, R.W., 1987.

*SR 143: Part VI: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Claremont-Upland Production-Consumption Region. By Cole, J.W., 1987.

*SR 143: Part VII: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region. By Miller, R.V., 1987.

*SR 145: Part I: Mineral Land Classification of Ventura County: Description of the Mineral Land Classification Project of Ventura County. By Anderson, T.P., Loyd, R.C., Kiessling, E.W., Kohler, S.L., and Miller, R.V., 1981.

*SR 145: Part II: Mineral Land Classification of Ventura County: Classification of the Sand, Gravel, and Crushed Rock Resource Areas, Simi Production-Consumption Region. By Anderson, T.P., Loyd, R.C., Kiessling, E.W., Kohler, S.L., and Miller, R.V., 1981.

*SR 145: Part III: Mineral Land Classification of Ventura County: Classification of the Sand and Gravel, and Crushed Rock Resource Areas, Western Ventura County Production-Consumption Region. By Anderson, T.P., Loyd, R.C., Kiessling, E.W., Kohler, S.L., and Miller, R. V., 1981.

*SR 146: Part I: Mineral Land Classification: Project Description: Mineral Land Classification for Construction Aggregate in the San Francisco-Monterey Bay Area. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part II: Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part III: Mineral Land Classification: Aggregate Materials in the North San Francisco Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part IV: Mineral Land Classification: Aggregate Materials in the Monterey Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 147: Mineral Land Classification: Aggregate Materials in the Bakersfield Production-Consumption Region. By Cole, J.W., 1988.

*SR 153: Mineral Land Classification: Aggregate Materials in the Western San Diego County Production-Consumption Region. By Kohler, S.L., and Miller, R.V., 1982.

SR 156: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento-Fairfield Production-Consumption Region. By Dupras, D.L., 1988.

*SR 158: Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region. By Cole, J.W., and Fuller, D.R., 1986.

*SR 159: Mineral Land Classification: Aggregate Materials in the Palm Springs Production-Consumption Region. By Miller, R.V., 1987.

*SR 160: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Stockton-Lodi Production-Consumption Region. By Jensen, L.S., and Silva, M.A., 1989.

*SR 162: Mineral Land Classification: Portland Cement Concrete Aggregate and Active Mines of All Other Mineral Commodities in the San Luis Obispo-Santa Barbara Production-Consumption Region. By Miller, R.V., Cole, J.W., and Clinkenbeard, J.P., 1989.

SR 164: Mineral Land Classification of Nevada County, California. By Loyd, R.C., and Clinkenbeard, J.P., 1990.

*SR 165: Mineral Land Classification of the Temescal Valley Area, Riverside County, California. By Miller, R.V., Shumway, D.O., and Hill, R.L., 1991.

SR 173: Mineral Land Classification of Stanislaus County, California. By Higgins, C.T., and Dupras, D.L., 1993.

SR 198: Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Palm Springs Production-Consumption Region, Riverside County, California. Busch, L.L., 2007.

SR 199: Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Stockton-Lodi Production-Consumption Region, San Joaquin and Stanislaus Counties, California. Smith, J.D. and Clinkenbeard J.P., 2012.

SR202 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Claremont-Upland Production-Consumption Region, Los Angeles and San Bernardino Counties, California. Miller, R.V. and Busch, L.L., 2007.

SR 205 Update of Mineral Land Classification of Aggregate Resources in the North San Francisco Bay P-C Region: Sonoma, Napa, and Marin Counties and Southwestern Solano County, California. Miller, R.V. and Busch, L.L., 2013

SR 206 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the San Bernardino Production-Consumption Region, San Bernardino and Riverside Counties, California. Miller, R.V. and Busch, L.L., 2008.

SR 209 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the San Gabriel Valley Production-Consumption Region, Los Angeles County, California. Kohler, S.L., 2010.

SR 210 Update of Mineral Land Classification: Aggregate Materials in the Bakersfield Production-Consumption Region, Kern County, California. Busch, L.L., 2009.

SR 215 Update of Mineral Land Classification: Aggregate Materials in the San Luis Obispo-Santa Barbara Production-Consumption Region, California. Busch, L.L. and Miller, R.V., 2011.

SR 231 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Temescal Valley Production Area, Riverside County, California. Miller, R.V. and Busch, L.L., 2014.

SR 240 Update of Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Western San Diego County Production-Consumption Region, California. Gius, F.W., Busch, L.L., and Miller, R.V. 2017.

* These Mineral Land Classification reports have been updated and are not shown on the index map (lower left-hand corner of Map Sheet 52).

OPEN-FILE REPORTS

OFR 92-06: Mineral Land Classification of Concrete Aggregate Resources in the Barstow-Victorville Area. By Miller, R.V., 1993.

OFR 93-10: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part I - Ventura County. By Miller, R.V., 1993.

OFR 94-14: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part II - Los Angeles County. By Miller, R.V., 1994.

OFR 94-15: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part III - Orange County. By Miller, R.V., 1995.

OFR 95-10: Mineral Land Classification of Placer County, California. By Loyd, R.C., 1995.

OFR 96-03: Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region. By Kohler-Antablin, S.L., 1996.

*OFR 96-04: Update of Mineral Land Classification: Aggregate Materials in the Western San Diego County Production-Consumption Region. By Miller, R.V., 1996.

OFR 97-01: Mineral Land Classification of Concrete Aggregate Resources in the Tulare County Production-Consumption Region, California. By Taylor, G.C., 1997.

OFR 97-02: Mineral Land Classification of Concrete-Grade Aggregate Resources in Glenn County, California. By Shumway, D.O., 1997.

OFR 97-03: Mineral Land Classification of Alluvial Sand and Gravel, Crushed Stone, Volcanic Cinders, Limestone, and Diatomite within Shasta County, California. By Dupras, D.L, 1997.

OFR 99-01: Update of Mineral Land Classification: Aggregate Materials in the Monterey Bay Production-Consumption Region, California. By Kohler-Antablin, S.L., 1999.

OFR 99-02: Update of Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region, California. By Youngs, L.G. and Miller, R.V., 1999.

OFR 99-08: Mineral Land Classification of Merced County, California. By Clinkenbeard, J.P., 1999.

OFR 99-09: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate and Clay Resources in Sacramento County, California. By Dupras, D.L., 1999.

OFR 2000-03: Mineral Land Classification of El Dorado County, California. By Busch, L. L., 2001

OFR 2000-18: Mineral Land Classification of Concrete-Grade Aggregate Resources in Tehama County, California. By Foster, B.D., 2001

* These Mineral Land Classification reports have been updated and are not shown on the index map (lower left-hand corner of Map Sheet 52).


CALIFORNIA GEOLOGICAL SURVEY
AGGREGATE SUSTAINABILITY IN CALIFORNIA
Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves
By
John P. Clinkenbeard (PG #4731)
and Fred W. Gius (PG #7788)
2018
Contributions By:
Matt O'Neal, Joshua Goodwin
and Lawrence L. Busch
GIS Design and Map Layout By:
Milton Fonseca
Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves*
The pie charts show the projected 50-year demand for aggregate as of January 2017 compared to currently permitted aggregate reserves (in short tons). The 50-year demand for a particular study area is graphically represented by one of four pie diagram sizes. Study area boundaries are shown on the index map of aggregate studies (lower left).
* Permitted aggregate reserves are those portions of the resources for which local lead agencies (counties and cities) have issued mining permits. Non-permitted aggregate resource information is given in each aggregate study report. See accompanying text for references to these reports.
LEGEND
50-year demand that will not be met by existing permitted reserves.
Permitted aggregate reserves.
50-year demand is < 200 million tons.
50-year demand is > 200 to 500 million tons.
50-year demand is > 500 to 800 million tons.
50-year demand is more than 800 million tons.
Examples
50-year demand for aggregate is 100 million tons; permitted reserves total 25 million tons of the 50-year demand.
25/100 Million Tons (permitted reserves/ 50-year demand)
11 to 20 Years (years of permitted reserves remaining)
50-year demand for aggregate is 510 million tons; permitted reserves are greater than or equal to the 50-year demand.
550/510 Million Tons (permited reserves/ 50-year demand)
More Than 50 Years (years of permitted reserves remaining)
Areas With Short Term Aggregate Supply
< 10 years of permitted reserves remaining in the study area.
Aggregate Production Areas
(Symbols represent one or more aggregate mines, tonnage represents 2016 annual production)
< 0.5 Million Tons per Year
> 0.5 - 1.5 Million Tons per Year
> 1.5 - 3 Million Tons per Year
> 3 - 5 Million Tons per Year
> 5 Million Tons per Year
Population
1 Dot = 100 Persons
(based on 2010 Census Data)
City
Interstate Route
U.S. Route
State Route
Primary Highway
Secondary Highway
County Boundary
River
Lake/ Ocean
Miles
0 10 20 40 60
Kilometers
0 20 40 80
Scale: 1:1,100,000
Projection: Teale Albers
Datum: NAD 83
Map Usage and Limitations
This map is intended to provide general information about the current availability of California's permitted construction aggregate reserves to state, regional, and local land-use planners and decision-makers. It is designed to assist planning agencies in considering construction aggregate needs in the regional planning process. However, the map is not intended to be used as the sole source of information about construction aggregate availability, or as the basis for site-specific land-use decisions. Although the statewide and regional information on this map may be useful to local decision-makers, the more detailed information contained in the referenced aggregate studies should be used for local land-use decision-making purposes.
Shasta County
49/82 Million Tons
31 to 40 Years
Tehama County
30/49 Million Tons
31 to 40 Years
Glenn County
22/41 Million Tons
21 to 30 Years
Yuba City-Marysville
679/344 Million Tons
More Than 50 Years
Nevada County
52/41 Million Tons
More Than 50 Years
Placer County
387/188 Million Tons
More Than 50 Years
Sacramento-Fairfield
109/295 Million Tons
21 to 30 Years
El Dorado County
15/82 Million Tons
11 to 20 Years
Sacramento County
327/724 Million Tons
21 to 30 Years
North San Francisco
263/492 Million Tons
21 to 30 Years
Stockton Lodi
203/409 Million Tons
21 to 30 Years
South San Francisco
506/1,320 Million Tons
21 to 30 Years
Stanislaus County
39/160 Million Tons
11 to 20 Years
Merced County
61/154 Million Tons
11 to 20 Years
Monterey Bay
297/333 Million Tons
41 to 50 Years
Fresno
556/305 Million Tons
More Than 50 Years
Tulare County
53/130 Million Tons
21 to 30 Years
Bakersfield
1,708/338 Million Tons
More Than 50 Years
San Luis Obispo-Santa Barbara
58/226 Million Tons
11 to 20 Years
Palmdale
163/569 Million Tons
11 to 20 Years
Barstow Victorville
117/163 Million Tons
31 to 40 Years
Ventura County
84/241 Million Tons
11 to 20 Years
Claremont-Upland
90/202 Million Tons
21 to 30 Years
San Bernardino
156/939 Million Tons
11 to 20 Years
Palm Springs
163/238 Million Tons
31 to 40 Years
San Fernando Valley-Saugus Newhall
17/387 Million Tons
10 or Fewer Years
San Gabriel Valley
297/751 Million Tons
21 to 30 Years
Temescal Valley-Orange County
862/1,079 Million Tons
41 to 50 Years
Western San Diego County
265/763 Million Tons
11 to 20 Years
Aggregate Studies by California Geological Survey [1]
Shasta
OFR - 97-03 (1997)
Tehama
OFR 2000-18 (2001)
Glenn
OFR 97-02 (1997)
Sacramento-Fairfield
SR 156 (1988)
North San Francisco Bay
SR 205
Stockton- Lodi
SR 199 (2012)
South San Francisco Bay
OFR 96-03 (1996)
Monterey Bay
OFR 99-01 (1999)
Tulare
OFR 97-01 (1997)
San Luis Obispo- Santa Barbara
SR 215 (2011)
Saugus-Newhall
OFR 94-14 (1994)
Western Ventura
OFR 93-10 Part I (1993)
Simi Valley
OFR 93-10 Part I (1993)
San Fernando Valley
OFR 94-14 (1994)
San Gabriel Valley
SR 209 (2010)
Orange-Temescal
OFR 94-15 (1995)
Orange
OFR 94-15 (1995)
San Diego
SR 240 (2017)
Temescal Valley
SR 231 (2014)
Palm Springs
SR 198 (2007)
San Bernardino
SR 206 (2008)
Claremont-Upland
SR 202 (2007)
Barstow-Victorville
OFR 92-06 (1993)
Palmdale
OFR 94-14 (1994)
Bakersfield
SR 210 (2009)
Fresno
OFR 99-02 (1999)
Merced
OFR 99-08 (1999)
Stanislaus
SR 173 (1993)
Sacramento
OFR 99-09 (1999)
El Dorado
OFR 2000-03 (2001)
Placer
OFR 95-10 (1995)
Nevada
SR 164 (1990)
Yuba City-Marysville
SR 132 (1986)
OFR = Open File Report [2]
SR = Special Report [2]
Footnotes:
[1] Study areas are displayed in several colors for clarity purposes.
[2] These reports can be obtained at:
Geologic Information and Publications
California Geological Survey
801 K Street, MS 14-34
Sacramento, CA 95814-3532
Tel: (916) 327-1850
Or visit our website:
http://www.conservation.ca.gov/
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SPECIAL REPORT 206

UPDATE OF MINERAL LAND CLASSIFICATION FOR PORTLAND CEMENT CONCRETE-GRADE AGGREGATE IN THE SAN BERNARDINO PRODUCTION-CONSUMPTION REGION, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA

2008

CALIFORNIA GEOLOGICAL SURVEY
Department of Conservation

STATE OF CALIFORNIA
ARNOLD SCHWARZENEGGER
GOVERNOR

THE RESOURCES AGENCY
MIKE CHRISMAN
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DEPARTMENT OF CONSERVATION
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CALIFORNIA GEOLOGICAL SURVEY
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SPECIAL REPORT 206

UPDATE OF MINERAL LAND CLASSIFICATION FOR PORTLAND CEMENT CONCRETE-GRADE AGGREGATE IN THE SAN BERNARDINO PRODUCTION-CONSUMPTION REGION, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA

By

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and

Lawrence L. Busch, PG #6440

2008

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Tables

Plates (In Pocket)

EXECUTIVE SUMMARY

This report updates information presented in a classification report on portland cement concrete-grade (PCC) aggregate in the San Bernardino Production-Consumption (P-C) Region first published in 1984. That report was published by the California Department of Conservation's Division of Mines and Geology (now California Geological Survey) as Special Report 143, Part VII (SR 143, Part VII) – *Mineral Land Classification of the Greater Los Angeles Area, Part VII, Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region* (Miller, 1984).

Sand and gravel deposits having material suitable for use as PCC aggregate are classified in this update report. Deposits suitable for lower grades of aggregate use, such as asphaltic aggregate, base, subbase, and fill were not considered in this classification process because of their general abundance in the San Bernardino P-C Region. However, all of the mines that produce PCC aggregate in the region also produce lower grades of aggregate.

SR 143, Part VII assisted the State Mining and Geology Board (Board) in a subsequent process called *designation*. Designation is the formal recognition by the Board of lands containing mineral resources of regional or statewide significance that are needed to meet the demands of the future. The Board's designation of lands in the San Bernardino P-C Region was published in 1987 as SMARA Designation Report No. 5 (California Department of Conservation, 1987). This update classification report does not change that designation.

In this update report, the following conclusions are reached:

- The permitted reserves are projected to last until the year 2024, 16 years from the present (2008).
- Two new areas, Sectors J and K, are identified. Sector J contains a total of 334 million tons of additional aggregate resources. The resource figure for Sector K is proprietary.
- About 18 percent, or 4,427 acres, of the 24,656 acres of lands designated by the Board in 1987 has been lost to land uses incompatible with mining. This equates to 959 million tons of PCC-grade aggregate resources lost.
- The anticipated consumption of aggregate in the San Bernardino P-C Region for the next 50 years (through the year 2057) is estimated to be 1,131 million tons, of which 735 million tons must be PCC quality. This is more than twice the previous 50-year projection.
- There remain an estimated 5,986 million tons of unpermitted PCC-grade aggregate resources in the San Bernardino P-C Region.
- From 1987 to 2007, about 109 million tons of new PCC-grade aggregate reserves have been permitted.

PART I - INTRODUCTION

In 1984, a report titled "Mineral Land Classification of the Greater Los Angeles Area, Part VII, Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region" (Miller, 1984 – second printing in 1987) was published by the California Division of Mines and Geology (predecessor to the California Geological Survey or "CGS"). It is referred to in this update report as SR 143, Part VII. In SR 143, Part VII, a part of southwestern San Bernardino County and a part of eastern Riverside County were classified for portland cement concrete-grade (PCC) aggregate (see Figure 1). The region is covered by all or part of 26 U.S. Geological Survey 7-1/2 minute quadrangle maps as shown on Figure 2.

Subsequent to the publication of SR 143, Part VII, and completion of an Environmental Impact Report (California Department of Conservation, 1985) the State Mining and Geology Board (Board) designated approximately 40 square miles of land within the San Bernardino Production-Consumption (P-C) Region as having mineral resources of statewide or regional significance (California Department of Conservation, 1987).

This report presents a reevaluation and update of SR 143, Part VII, and a review of the areas designated by the Board, for the benefit of local lead agencies in the San Bernardino P-C Region (see Table 1 for a list of lead agencies). This report is intended as an update to and not a replacement for SR 143, Part VII. In addition, this report does not alter the previous designation of lands in the San Bernardino P-C Region.

BACKGROUND

SR 143, Part VII and this update were produced by the State Geologist as specified by the Surface Mining and Reclamation Act (SMARA) of 1975. SMARA was passed by the California State Legislature in response to the loss of significant mineral resources due to urban expansion, the need for current information concerning the location and quantity of essential mineral deposits, and to ensure adequate mined-land reclamation. To address mineral resource conservation, SMARA mandated a two-phase process called *classification-designation*.

The objective of the classification-designation process is to ensure, through appropriate local lead agency policies and procedures, that mineral materials will be available when needed and do not become inaccessible as a result of inadequate information during the land-use decision-making process.

SMARA mandates that the Board develop guidelines for mineral land classification. The Board adopted SMARA guidelines on June 30, 1978 and revised them in 2000. The guidelines are available on the California Department of Conservation website at http:/www.consrv.ca.gov/SMGB/Guidelines/ClassDesig.pdf.

The guidelines require the State Geologist to classify specified areas into Mineral Resource Zones (MRZs). The guidelines also require that classification reports for construction aggregate resources include the following additional information: (1) the location and estimated total

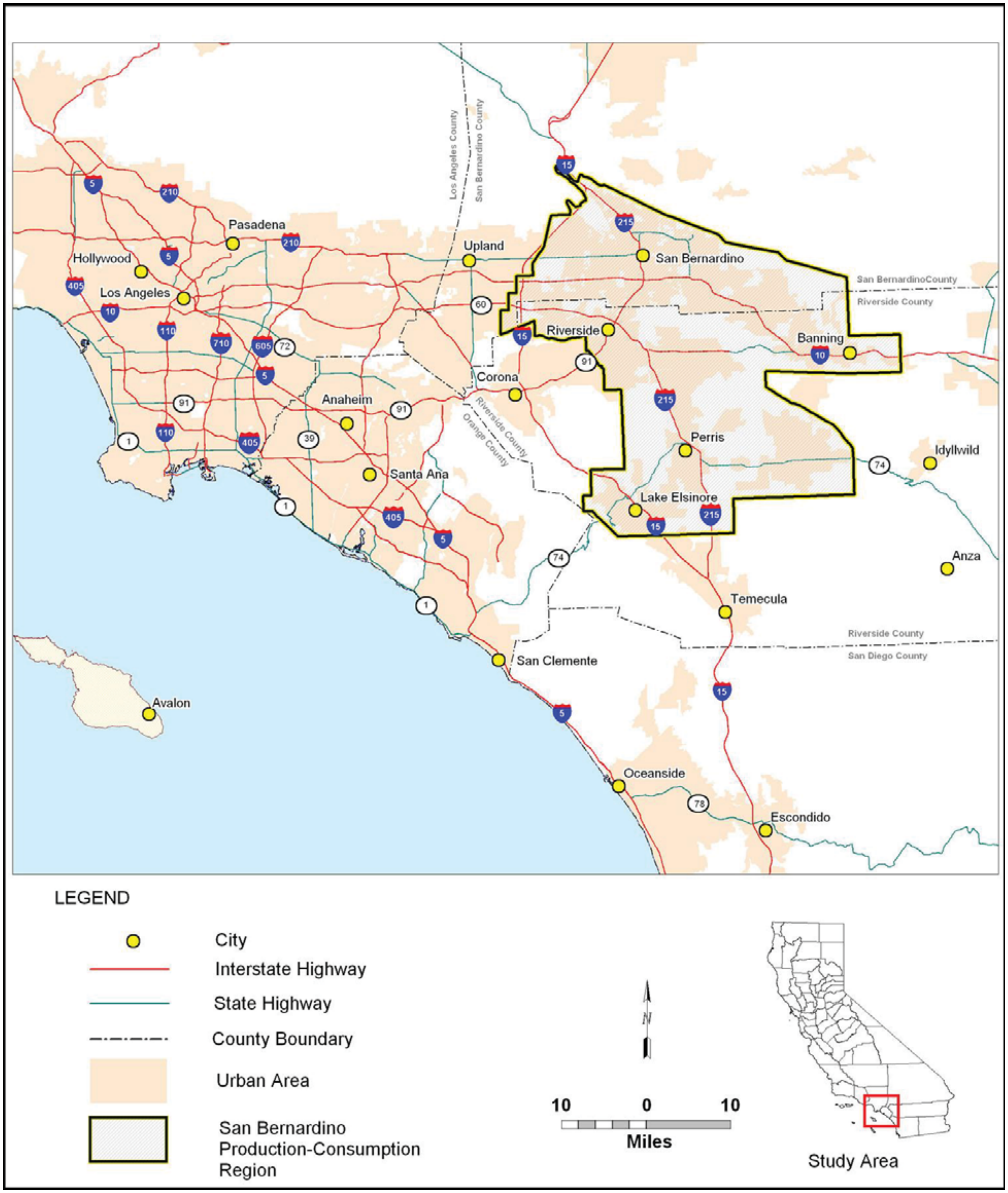


Figure 1. General location map of the San Bernardino P-C Region.

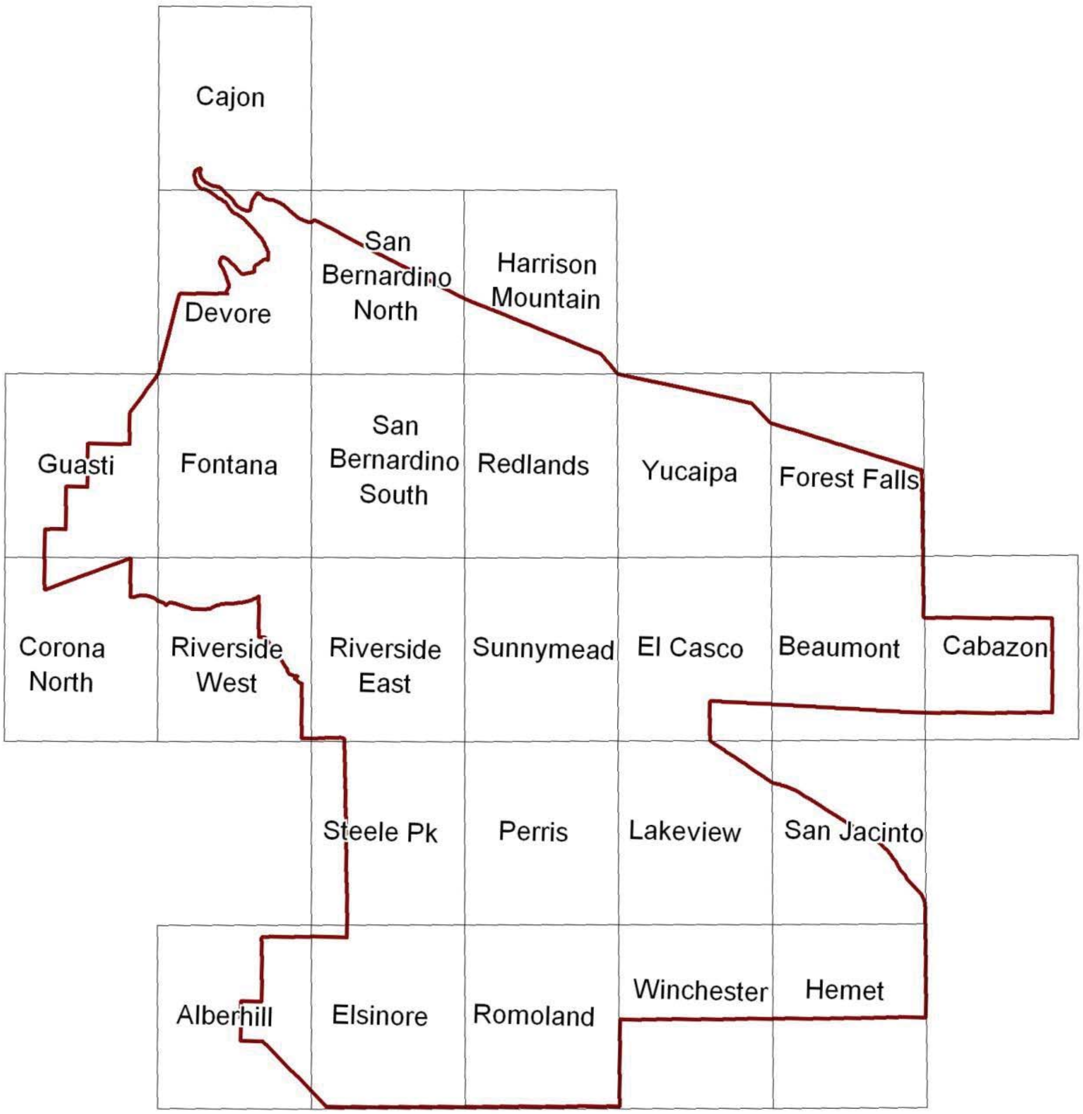


Figure 2. Index map of U.S. Geological Survey 7-1/2 minute quadrangles covering the San Bernardino P-C Region

quantity of construction aggregate in areas with land-uses compatible with potential mining; (2) limits of the market area that these potential resources would supply; and (3) an estimate of the total quantity of aggregate material that will be needed to supply the area for the next 50 years.

Table 1. Lead agencies in the San Bernardino P-C Region (county and incorporated city governments).

LEAD AGENCY	Lead agencies with active aggregate operations within their jurisdiction	Lead agencies with land designated for PCC-grade aggregate within their jurisdiction
County of San Bernardino	*	*
City of Colton		*
City of Fontana		*
City of Grand Terrace		
City of Highland	*	*
City of Loma Linda		
City of Ontario		*
City of Rancho Cucamonga		*
City of Redlands	*	*
City of Rialto	*	*
City of San Bernardino	*	*
City of Yucaipa		
County of Riverside	*	*
City of Banning	*	*
City of Beaumont		
City of Calimesa		
City of Canyon Lake		
City of Hemet		
City of Lake Elsinore		*
City of Moreno Valley		
City of Perris		
City of Riverside		*
City of San Jacinto		

OVERVIEW OF CLASSIFICATION

The classification of construction aggregate resources involves the six distinct but interrelated steps that are listed below.

1. Determination of Study Boundary: Study areas may be a county, a portion of a county, or a P-C region that may contain parts of one or more counties. P-C regions were selected such that the majority (95 percent) of the construction aggregate produced in the region is consumed in the region. (See explanation following this list).

2. Establishment of Mineral Resource Zones (MRZs): Based on geologic appraisals, lands within the study area were classified in SR 143, Part VII as MRZ-1, MRZ-2, or MRZ-3. In this update report, this MRZ classification has been retained and is shown on Plate 1. This classification system is discussed in Part II of this report. The geologic appraisals include a study of pertinent geologic reports and maps, and field investigations of geologic units exposed in outcrops and at active and inactive mines and quarries.

3. Identification of Sectors: Lands known to contain significant aggregate resources (areas classified as MRZ-2 in Step 2 above) are evaluated to determine if current uses of these lands preclude mining. Areas currently permitted for mining and areas found to have land uses compatible with possible mining are identified as *Sectors* (Plates 2 and 3).

4. Calculation of Resource Tonnages within Sectors: Investigation and analysis of on-site conditions, measurement of the areal extent of deposits, drill-hole information, waste-material percentages, and deposit densities are used to calculate total tonnages of aggregate reserves (deposits in land owned or controlled by an aggregate producer and permitted for mining) and resources (all deposits of aggregate, including the permitted reserves) within each Sector.

5. Forecast of 50-Year Needs and the Life Expectancy of Current Reserves: The total tonnage of aggregate needed to satisfy the estimated demand in the study area over the next 50 years is based on multiplying the projected population over that period with the average annual per-capita rate of total aggregate consumption from 1981 to the time of the study. Results of this forecast are used to determine the life expectancy of the study area's current reserves.

6. Identification of Alternative Resources: Alternative sources of aggregate are identified and briefly discussed.

When the determination of the study boundary for the San Bernardino P-C Region originally was made in the early 1980s, the region consumed at least 95 percent of the aggregate produced within the region. Since then, marketing patterns have changed so that this is no longer true. Based on discussions with aggregate operators, it is estimated that approximately 70 percent of the region's aggregate production in 2007 was exported beyond the P-C Region boundary. A small part of this may have been offset by imports from the neighboring Claremont-Upland P-C Region. There are two factors that have led to this increase in inter-regional aggregate commerce. The depletion of aggregate reserves in large areas such as Orange County and northern San Diego County have increased exports to those regions, and consolidation of ownership may have led to longer hauls to company-owned concrete batch plants outside of the P-C region. Also, aggregate is being transported by rail from the San Bernardino P-C Region to the San Gabriel P-C Region.

Classification of the San Bernardino P-C Region was done with regard to the suitability of the material for use in PCC aggregate. Materials suitable only for asphaltic aggregate, base, subbase, and fill were not classified because of their abundance in the region.

OVERVIEW OF DESIGNATION

This update report contains the classification step of the two-phase process provided by SMARA. The designation phase follows the receipt and acceptance of this classification report by the Board. Designation is the formal recognition by the Board, after consultation with lead agencies and other interested parties, of areas containing mineral deposits of regional or statewide economic significance. Procedures for the designation of lands containing significant mineral deposits are specified in Section II.2 of the Board's Guidelines for Classification and Designation of Mineral Lands (http:/www.consrv.ca.gov/SMGB/Guidelines/ClassDesig.pdf).

The Board previously designated lands in the San Bernardino P-C Region in a report titled "Designation of Regionally Significant Construction Aggregate Resource Areas in the Claremont-Upland and San Bernardino Production-Consumption Regions: SMARA Designation Report No. 5" (California Department of Conservation, 1987). This update report reviews the current land uses of the previously designated areas, but does not alter that designation.

LEAD AGENCY RESPONSE TO CLASSIFICATION

The Board, upon receipt of the classification information from the State Geologist, transmits the classification report to the appropriate lead agencies and makes it available to other interested parties. Within 12 months of receipt of the report, each lead agency must develop and adopt mineral resource management policies to be incorporated in its general plan. These policies will:

1. Recognize the mineral land classification information, including the classification maps transmitted to the lead agency by the Board.

2. Emphasize the conservation and development of the identified mineral deposits.

Lead agencies that have jurisdiction within the San Bernardino P-C Region are shown in Table 1. The information in this update and the revised projection of aggregate needs in the region should be used by the lead agencies in evaluating the effectiveness of their current mineral resource management policies and in planning for future construction aggregate demands in their jurisdictions. These plans should be updated if necessary.

PART II - MINERAL LAND CLASSIFICATION OF AGGREGATE IN THE SAN BERNARDINO P-C REGION

This section of the report contains information concerning the location, quality, and quantity of aggregate resources in the San Bernardino P-C region.

MINERAL RESOURCE ZONES

As set forth in Section 2761 (b) of SMARA, the State Geologist shall classify land solely on the basis of geologic factors and without regard to existing land use. Areas subject to mineral land classification studies are divided by the State Geologist into various Mineral Resource Zone (MRZ) categories that reflect varying degrees of mineral resource potential. When SR 143, Part VII was written, the nomenclature for mineral land classification consisted of four categories—MRZ-1, MRZ-2, MRZ-3, and MRZ-4. Since then, the nomenclature has been expanded to include subdivisions of the MRZ-2 and MRZ-3 categories into “a” and “b” subcategories, as explained in the Board’s Guidelines for Classification and Designation of Mineral Lands under Section I, part 3. The original categories for mineral land classification were retained for this update report. Following is a brief description of the three MRZ categories used in this update report (MRZ-4 is not used):

MRZ-1: Areas where available geologic information indicates that little likelihood exists for the presence of significant mineral resources.

MRZ-2: Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists. This zone shall be applied to known mineral deposits or where well-developed lines of reasoning, based upon economic-geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRZ-3: Areas containing known or inferred mineral occurrences of undetermined mineral resource significance.

CLASSIFICATION CRITERIA

To be considered **significant** for the purpose of mineral land classification, a mineral deposit, or a group of mineral deposits that can be mined as a unit, must meet marketability and threshold value criteria adopted by the Board (California State Mining and Geology Board website). Threshold values are intended to indicate in a general way the approximate minimum size of a mineral deposit that will be considered significant for classification and designation. The threshold value criteria vary for different minerals depending on their uniqueness and commodity-type category. The Board determined threshold value of the first marketable product in 1998 dollars to be $1,250,000 for a metallic ore or rare mineral deposit, $2,500,000 for an industrial mineral deposit other than construction aggregate, and $12,500,000 for a construction aggregate deposit. In order to adjust these threshold values to reflect 2008 dollars, each value was multiplied by an inflation factor of 1.34. This factor was determined by dividing the U.S. Department of Labor's (California Department of Finance website, 2008) estimated Consumer Price Index (CPI) for December, 2007 (219.6) by the CPI for 1998 (163.7). Threshold values in 2007 dollars (rounded to the nearest thousand) are as follows:

Metallic or rare mineral deposits	$ 1,675,000
Industrial minerals other than construction aggregate	$ 3,350,000
Construction aggregate	$ 16,750,000

Construction aggregate sells for about $13 per ton in the San Bernardino P-C Region; therefore, $16,750,000 equates to about 1.3 million tons of aggregate material.

REEVALUATION OF MINERAL LAND CLASSIFICATION FOR PCC-GRADE AGGREGATE IN THE SAN BERNARDINO P-C REGION

Analysis of new data obtained since the publication of SR 143, Part VII has resulted in two areas being reclassified from MRZ-3 to MRZ-2 for PCC-grade aggregate.

Areas Reclassified to MRZ-2 from MRZ-3 for PCC-Grade Aggregate

In this update report, 1,657 acres previously classified MRZ-3 for PCC-grade aggregate in SR 143, Part VII are reclassified as MRZ-2 for PCC. These areas are in the City of Fontana (Lytle Creek Fan) and in the north edge of the City of Lake Elsinore (Gavilan Hills) as shown on Plate 1.

<u>Lytle Creek Fan (MRZ-2 PCC-1)</u>

This area contains sand and gravel deposits that are part of the Lytle Creek alluvial fan, southwest of the mouth of Lytle Creek Canyon (Plate 1) and covers an area of 1,567 acres. Excavation for the Mid-Valley Sanitary Landfill has yielded new information on the quality of aggregate material in this area. Robertson's Ready Mix Concrete, Inc., has been selling material from this deposit for use as PCC-grade aggregate since 1999. Other parts of the Lytle Creek Fan were classified MRZ-2 in SR 143, Part VII and subsequently designated by the Board.

<u>Gavilan Hills (MRZ-2 PCC-2)</u>

The second area reclassified to MRZ-2 from MRZ-3 is a 90-acre crushed-stone deposit in the Gavilan Hills north of the City of Lake Elsinore. The rock material here is a granitic rock of the Peninsular Ranges Batholith known as tonalite. Pacific Aggregates, Inc., has been mining and selling this material as PCC-grade aggregate since 2006.

REEVALUATION OF PCC-GRADE AGGREGATE IN THE SAN BERNARDINO P-C REGION

A reevaluation of PCC-grade aggregate resources in the San Bernardino P-C Region is presented in this section of the report. The reevaluation was conducted on the basis of a quantitative evaluation of suitable PCC-grade aggregate resources classified as MRZ-2.

Concepts Used in Identifying Aggregate Resource Sectors

The State Geologist is responsible for identifying and calculating the amount of aggregate resources contained in areas classified as MRZ-2. Recognizing that there are lands within these areas that have already been urbanized, and therefore the mineral resources within them have a limited opportunity for conservation, development, and utilization, the State Geologist further limits the aggregate resource calculations to areas within "Sectors."

Sectors are areas that have been classified as MRZ-2 by the State Geologist, and that have current land uses deemed compatible with potential mining based on criteria provided by the Board. Compatible land uses are defined as those that are non-urbanized or that have very low-density residential developments (one dwelling unit per ten acres or less), land without high-cost improvements, and land used for agriculture, grazing, or open space. Urbanization and/or incompatible land uses are defined as improvements of high cost, such as high-density residential developments, intensive industrial developments, commercial developments, and major public facilities.

Mineral land classification, which is done without regard for current land use, results in a delineation of the resource areas on maps; but this by itself does very little to put into perspective the resource base that is available to meet the future needs of a region. Sectors are used to focus the attention of land-use planners and local governments on the areas that remain accessible for mineral extraction. The State Geologist calculates the available resources of each Sector and identifies the amount of remaining resources that have been permitted for mining. Resources that have been permitted for mining are termed "reserves." The calculated reserves and resources of all the Sectors within a P-C Region are compared with the State Geologist's forecast of the 50-year needs of that P-C Region for the particular mineral resource.

Each Sector, or group of Sectors, meets or exceeds the Board's threshold value, and each Sector may be considered for designation as an area of regional or statewide significance by the Board pursuant to SMARA. The Board only considers areas in Sectors for designation.

For this update, the determination of land use as non-urbanized was based on conditions of the lands as of December 2007. The land use was determined by reference to satellite imagery, field reconnaissance, and consultation with local planners.

The Board's criteria for creating Sectors focuses on the apparent suitability of the land for mining and does not take into consideration land commitments (other than approved tracts or Specific Plans) that may have been made that restrict the accessibility of some of the Sectors for mining. It is possible, therefore, that the available resource base as calculated by the State Geologist may be overestimated.

Calculation of Available Resources

The resource estimates presented in this section are limited to those remaining aggregate resources identified in the Sectors designated by the Board (California Department of Conservation, 1987) and two newly identified resource Sectors. Some Sectors are subdivided into numbered subsectors to recognize the location of existing highways, canals, bridges, power lines, pipelines, etc., to allow for more realistic resource tonnage calculations.

Resource tonnage calculations for this report were made by assuming that the tonnage of resources lost was proportional to the area lost to urban development in each sector. The factors used in this report to determine the areal extent and tonnage of PCC-grade aggregate resources remaining within the designated Sectors are the same as those used in SP 143, Part VII and listed in that report under the descriptions for individual Sectors.

Resource tonnage calculations for this update report used area calculations from Geographic Information System (GIS) software. The calculations are current as of January 2008. Neither SR 143, Part VII or the designation report (California Department of Conservation, 1987) included the area calculations for individual subsectors.

Previously Designated Resource Sectors

In SR 143, Part VII, all lands in the San Bernardino P-C Region classified as containing significant aggregate resources (MRZ-2) and not precluded from mining by incompatible land uses, were divided into nine Sectors—A, B, C, D, E, F, G, H, and I, with Sectors A through G further subdivided into 111 subsectors. In 1987, the Board designated parts of Sectors A through G and all of Sectors H and I (California Department of Conservation, 1987). The areas of the designated Sectors were recalculated for this update using a GIS. The recalculated total is 24,656 acres. Only the Sectors designated in 1987 were retained in this report. Following is a brief summary of the designated Sectors, which are shown on Plates 2 and 3:

> Sector A – Deposits of the Lytle Creek alluvial fan in and around the City of Fontana. Eighteen of the original 30 subsectors are currently designated to be of regional significance. These are Sectors A-4, A-6 through A-9, A-13 through A-19, A-23, A-24, and A-27 through A-30. The area and resources remaining in each Subsector are listed in the Appendix.
>
> Sector B – Deposits of the Lytle Creek alluvial wash, northwest of and partly within the City of San Bernardino. Thirteen of the original 18 subsectors are currently designated to be of regional significance. These are Sectors B-1, B-2, B-5 through B-10, B-12, and B-14 through B17. The area and resources remaining in each Subsector are listed in the Appendix.
>
> Sector C – Deposits of the Cajon Creek alluvial wash, immediately north of the confluence with Lytle Creek alluvial wash. Seven of the original 14 subsectors are currently designated to be of regional significance. These are Sectors C-1, C-3 through C-6, C-8, and C-10. The area and resources remaining in each Subsector are listed in the Appendix.
>
> Sector D – Alluvial fan deposits in the central part of the San Bernardino Valley near the community of Mira Loma. Five of the original seven subsectors are currently designated to be of regional significance. These are Sectors D-2 through D-6. The area and resources remaining in each Subsector are listed in the Appendix.

Sector E – Deposits of alluvium in and near the Santa Ana River channel, downstream of the Interstate Highway 215 crossing to the upstream part of the Santa Ana River Wildlife Area. Fourteen of the original 24 subsectors are currently designated to be of regional significance. These are Sectors E-1, E-2, E-4, E-5, E-9, E-10, E-13, E-14, E-17, E-19, E-20, and E-22 through E-24. The area and resources remaining in each Subsector are listed in the Appendix.

Sector F – Deposits of alluvium of the Santa Ana River and its major tributaries upstream of Interstate Highway 215. Seventeen of the original 33 subsectors are currently designated to be of regional significance. These are Sectors F-1 through F-6, F-9, F-12, F-14 through F-18, F-20, F-23, F-32, and F-33. The area and resources remaining in each Subsector are listed in the Appendix.

Sector G – Deposits of alluvium in the San Gorgonio River channel and floodplain, east of the City of Banning. Both subsectors G-1 and G-2 are currently designated to be of regional significance. The area and resources remaining in these two subsectors are listed in the Appendix.

Sector H – Deposits of alluvium in the channel of Rice Canyon Creek and part of its fan, near the community of Alberhill in Riverside County. This Sector is currently designated to be of regional significance. The resources in this Sector have been depleted.

Sector I – Deposits of alluvium in the channel of McVickers Canyon Creek and part of its fan, northwest of the City of Lake Elsinore. This Sector is currently designated to be of regional significance. The resources in this Sector have been depleted or precluded from mining by urbanization.

Newly Identified Resource Sectors

This report describes two newly identified aggregate resource sectors covering an area of approximately 1,657 acres. The new areas are identified as Sector J (Plate 2), which contains 13 subsectors, and Sector K (Plate 3). These areas are described below and summarized in Table 2. These newly identified sectors are not currently designated, but may be considered for designation by the Board in the future.

<u>Lytle Creek Fan - Sector J (1,567 acres)</u>

Sector J is a newly identified area of significant PCC-grade aggregate resources on the Lytle Creek alluvial fan. Sector J includes the area of the Lytle Creek alluvial fan nearest the mouth of Lytle Creek, north of Highland Avenue and west of Riverside Avenue and is divided into 13 subsectors (J-1 through J13) by roads, a freeway, and power lines. The new information on aggregate quality in this area is derived from the excavation associated with the Mid-Valley Sanitary Landfill. The aggregate resources in Sector J are estimated to be 100 feet thick, have a density of .065 tons per cubic foot, and have a waste factor of 10 percent. It is estimated that Sector J contains approximately 334 million tons of PCC-grade aggregate resources. Robertson's Ready Mix Concrete, Inc. operates in subsectors J-12 and J-13.

Sector J-1 is between Lytle Creek Road and the Ontario Freeway (Interstate 15).

Sector J-2 is northwest of Lytle Creek Road in Section 13, T1N, R6W, SBBM.

Sector J-3 is a triangular area between Citrus Avenue, Duncan Canyon Road, and the Ontario Freeway (Interstate 15).

Sector J-4 is southeast of the Ontario Freeway (Interstate 15), in the west half of Section 18, T1N, R5W, SBBM.

Sector J-5 is southeast of the Ontario Freeway (Interstate 15), in the northeast 1/4 of Section 18, T1N, R5W, SBBM.

Sector J-6 is the largest of the subsectors in Sector J. It is north of Summit Avenue, between Citrus Avenue and Sierra Avenue.

Sector J-7 is east of the Ontario Freeway (Interstate 15), south of Duncan Canyon Road, west of Citrus Avenue, and north of a power line. It is in the northeast ¼ of Section 24, T1N, R6W, SBBM.

Sector J-8 is south of a power line that separates it from Sector J-7, in the northeast ¼ of Section 24, T1N, R6W, SBBM.

Sector J-9 is a rectangular area between Citrus Avenue and Catawba Avenue, north of Curtis Avenue and south of Summit Avenue, in the east ½ of the northeast ¼ of Section 25, T1N, R6W, SBBM.

Sector J-10 is a strip along the eastern side of Sierra Avenue, north of Windflower Avenue, in Sections 17, 20, and 29, T1N, R5W, SBBM.

Sector J-11 is in the northeast ¼ of Section 29, T1N, R5W, SBBM.

Sector J-12 is in the southeast ¼ of Section 19, T1N, R5W, SBBM.

Sector J-13 is south of State Route 210 Freeway, just east of the Rialto Municipal Airport in the east ½ of Section 34, T1N, R5W, SBBM.

Gavilan Hills – Sector K (90 acres)

Sector K is a newly identified 90-acre area within the granitic rocks of the Peninsular Ranges Batholith. It is north of Elsinore Lake, on the northeast corner of the Corona Freeway and Nichols Road. The area is the site of an active crushed-stone quarry operated by the Pacific Aggregates, Inc. The aggregate resources in this Sector are proprietary.

Aggregate Resources in the San Bernardino P-C Region

There are several factors that have changed the amount of PCC-grade aggregate resources in the San Bernardino P-C Region identified in SR 143, Part VII. There also have been changes since the designation in 1987. These factors include the newly identified aggregate resources summarized in Table 2, the designated lands lost to urbanization since 1987 listed in Table 3, and the commercial aggregate production since 1981. There was also significant non-commercial production of PCC-grade aggregate from Sector F-15 in the Santa Ana River Wash for use in the Seven Oaks Dam construction.

Newly identified unpermitted aggregate resources, in the areas reclassified from MRZ-3 to MRZ-2 (Sectors J described above), total 334 million tons. The permitted aggregate reserves in Sector J cannot be included due to confidentiality. The aggregate resource in Sector K is all under permit, and cannot be given.

Urban development has covered 4,427acres within designated Sectors, containing about 959 million tons of PCC-grade aggregate resources (see Table 3 and Plates 2 and 3). This has reduced the designated PCC-grade aggregate resources about 14 percent.

PCC-grade aggregate resources have also been reduced by production from commercial aggregate mines by 252 million tons.

Table 2. Sectors J and K acreages and aggregate resources.

Sector	Acres	Aggregate Resources (million tons)
J-1	65.0	13.9
J-2	32.9	6.7
J-3	37.6	7.9
J-4	91.1	20.4
J-5	29.6	6.1
J-6	755.3	185.5
J-7	48.3	10.3
J-8	44.3	9.5
J-9	63.2	14.9
J-10	196.7	49.4
J-11	76.6	P
J-12	89.5	P
J-13	36.4	9.3
K	89.9	P
Totals	1,656.4	333.9

P - Sector contains reserves that are proprietary and are not added to total.

The construction of the Seven Oaks Dam used 23.6 million tons of aggregate from Sector F-15. This resource figure listed in Table 4 and the Appendix for Sector F-15 has been reduced by this amount.

As shown in Table 4, there are now 5,986 million tons of PCC-grade aggregate resources identified in the San Bernardino P-C Region.

The PCC-grade aggregate reserves (permitted resources) have decreased to 287 million tons from 430 million tons—as given in SR 143, Part VII (see Table 4). The 287 million tons of present reserves includes 109 million tons of reserves permitted since 1987.

Table 3. PCC-grade aggregate resources lost to incompatible land uses, 1987 to 2008. Only those Sectors or subsectors with areas lost to incompatible land uses are listed in this table. A complete listing of subsectors is in the Appendix.

Sector	Acres Designated in Sector in 1987	Acres Lost to Incompatible Uses	Resources Lost (million tons)
A-4	808.5	447.2	92.5
A-6	92.1	92.1	21.5
A-7	813.7	504.1	130.6
A-8	513.2	441.8	126.0
A-9	350.4	251.0	74.9
A-13	291.8	231.7	74.9
A-15	57.9	57.9	14.9
A-16	28.3	12.3	3.0
A-17	24.3	9.5	2.2
A-18	39.5	39.5	9.2
A-19	93.6	7.8	1.4
A-23	74.8	74.8	17.0
A-24	46.3	46.3	4.3
A-27	44.6	44.6	4.0
A-28	214.8	214.8	13.6
B-6	97.0	37.7	2.1
B-7	189.3	40.9	10.2
B-12	12.5	12.5	0.9
B-16	8.2	8.2	0.6
B-17	8.4	8.4	0.3
C-4	58.8	28.4	5.2
C-10	50.0	36.5	3.7
D-2	120.6	120.6	9.0
D-3	269.7	269.7	19.5
D-4	69.5	69.5	7.8
D-5	91.2	91.2	7.0
D-6	72.2	72.2	5.3
E-4	50.9	50.9	8.9
E-10	641.3	45.2	4.7
E-13	281.2	12.3	1.3
E-24	207.5	93.8	13.7

Table 3. (Continued)

Sector	Acres Designated in Sector in 1987	Acres Lost to Incompatible Uses	Resources Lost (million tons)
F-1	48.1	48.1	4.7
F-2	125.4	45.6	2.9
F-3	34.8	16.4	8.3
F-4	134.5	134.5	50.0
F-5	13.4	13.4	1.8
F-6	150.4	19.7	8.3
F-12	54.0	54.0	3.2
F-14	1,140.0	68.9	48.7
F-15	5,493.0	272.2	121.2
F-16	87.2	1.8	0.4
F-17	38.5	2.3	0.4
F-23	151.8	20.4	3.0
I	318.8	255.9	16.1
Totals	**13,512.0**	**4,426.6**	**959.2**

Table 4. Summary of PCC-grade aggregate resources and reserves in the San Bernardino P-C Region in 2008.

Sector	Resources In 2008 (million tons)	Reserves (Permitted Resources) In 2008 (million tons)
A	269.5	0
B	897.6	P
C	615.4	P
D	0	0
E	281.2	0
F	3,476.4	P
G	355.0	P
H	†	0
I	†	0
J††	334	P
K††	P	P
Subtotal*	**6,238**	
Production since 1981	**-252**	
Totals	**5,986**	**287**

P Sector contains reserves that are proprietary.
† Remainder of resources mined out.
†† Newly identified Sector (not designated).
*This subtotal is different than the column total to conceal more than one proprietary figure as provided by PRC 2207(g).

PART III – AGGREGATE PRODUCTION IN THE SAN BERNARDINO P-C REGION

As of January 2008, the following four companies operated nine mines producing PCC-grade aggregate in the San Bernardino P-C Region:

- Cemex (two mines)
- Pacific Aggregates, Inc.
- Robertson's Ready Mix Concrete, Inc. (five mines)
- Vulcan Materials Company

Following are brief descriptions of the above company operations:

Cemex operates the Lytle Creek Quarry in Lytle Creek Wash, south of Interstate Highway 15, and the Redlands Pit in the Santa Ana River Wash, mostly in the City of Redlands and partly in the City of Highland.

Pacific Aggregates, Inc. is quarrying granitic rock from a hillside north of Lake Elsinore. This quarry is known as the Nichols Canyon Mine.

Robertson's Ready Mix Concrete, Inc. owns the 4th Street Rock Crusher operation in the Lytle Creek flood control channel and the Old Webster Quarry in the upper Santa Ana River wash in the City of Highland. The company also has two mines along the San Gorgonio River; one in the City of Banning (Banning Pit) and the other near the community of Cabazon (Cabazon Pit). The company's newest mine involves the removal of material in conjunction with the Mid-Valley Landfill on the Lytle Creek alluvial fan in the City of Rialto.

Vulcan Materials Company, Western Division's Cajon Creek Pit began operation in 1998. The mine is in the Cajon Creek Wash, south of Interstate Highway 15. The project covers 1,392 acres, of which 606 acres will be mined.

AGGREGATE PRODUCTION DATA

PCC-grade aggregate production data for the San Bernardino P-C Region from 1981 to 1990 were collected from records of the U.S. Department of the Interior's Bureau of Mines (now part of the U.S. Geological Survey) and from the aggregate producers. The U.S. Bureau of Mines' records were compiled from responses to voluntary questionnaires sent annually, or biennially, to all known mine operators. Each producer was requested to divulge the production from each of their producing properties for the preceding year. The accuracy of these figures depends on the accuracy of the producers' responses. For the years 1991 through 2006, annual mine production data from the California Department of Conservation's Office of Mine Reclamation were used. As shown in Table 5 and Figure 3, PCC-grade aggregate production in the San Bernardino P-C Region has increased from 3.9 million tons in 1981 to 19.5 million tons in 2006—the last year production figures are available.

Table 5. Population, aggregate production, and per capita consumption in the San Bernardino P-C Region during the years 1981 through 2006.

YEAR	POPULATION	AGGREGATE PRODUCTION (tons*)	PER CAPITA CONSUMPTION (tons)
1981	748,832	3,876,000	5.2
1982	775,693	3,333,000	4.3
1983	801,491	3,154,000	3.9
1984	829,321	5,071,000	6.1
1985	863,843	3,774,000	4.4
1986	907,707	8,361,000	9.2
1987	960,915	5,650,000	5.9
1988	1,023,302	12,172,000	11.9
1989	1,093,438	12,065,000	11.0
1990	1,171,271	12,297,000	10.5
1991	1,260,165	7,403,000	5.9
1992	1,298,262	7,700,000	5.9
1993	1,319,372	7,666,000	5.8
1994	1,333,405	6,933,000	5.2
1995	1,352,146	6,307,000	4.7
1996	1,366,154	7,562,000	5.5
1997	1,389,652	8,152,000	5.9
1998	1,425,498	8,932,000	6.3
1999	1,463,152	9,765,000	6.7
2000	1,497,294	11,784,000	7.9
2001	1,534,859	13,149,000	8.6
2002	1,585,046	14,696,000	9.3
2003	1,640,385	17,240,000	10.5
2004	1,701,269	16,396,000	9.6
2005	1,761,551	18,785,000	10.7
2006	1,819,037	19,656,000	10.8
		Total: 251,879,000	**Average: 7.4**

***Aggregate production figures are rounded to nearest 1000 tons.**

PART IV – UPDATED ESTIMATE OF 50-YEAR CONSUMPTION OF AGGREGATE IN THE SAN BERNARDINO P-C REGION

The Board, as specified in its guidelines for classification and designation of mineral land (California State Mining and Geology Board), requires that mineral land classification reports for regions containing construction materials classified as MRZ-2 include "An estimate of the total quantity of each such construction material that will be needed to supply the requirements of both the county and the marketing region in which it occurs for the next 50 years. The marketing region is defined as the area within which such material is usually mined and marketed. The amount of each construction material mineral resource needed for the next 50 years shall be projected using past consumption rates adjusted for anticipated changes in market conditions and mining technology." This section contains the revised estimate of aggregate needs for the San Bernardino P-C Region, forecasted to the year 2057.

CORRELATION BETWEEN AGGREGATE PRODUCTION AND POPULATION

Past studies of production-consumption regions in California have shown a correlation between the amount of aggregate consumed and the population of the market area (Anderson and others, 1979). An aggregate report for Los Angeles County (Miller, 1994) contains a statistical analysis of aggregate consumption versus population suggesting that roughly two-thirds of the variation in aggregate consumption could be attributed to population variation. The fact that large market regions such as Los Angeles County show a correlation between aggregate production and population indicate that population is a major factor in determining aggregate consumption in many areas. Other factors, such as major public construction projects can randomly add large amounts of aggregate to consumption figures. The economy also has a strong influence on aggregate demand, but the simple factor of population was selected because it most influences aggregate demand over long periods of time.

A comparison of the projected aggregate demand for the San Bernardino P-C Region from SR 143, Part VII and actual production data for the period of 1981 to 2006 is shown in Figure 3. SR 143, Part VII projected that the demand for aggregate in the San Bernardino P-C region for 1981-2006 would be 207 million tons. Actual PCC-grade aggregate production in the San Bernardino P-C Region for 1981-2006 was 252 million tons. The difference between projected demand and actual production, 45 million tons, was about 22 percent more. This difference is because of a greater increase in population than was projected—the projected 2006 population was 1.14 million compared to an actual 2006 population of 1.82 million—and a recent increase in exports to other regions. Information provided by the aggregate producers in the region, indicate that exports reached nearly 70 percent of total production in 2007. If this continues, the demand on the regions aggregate resources may be much higher than is projected.

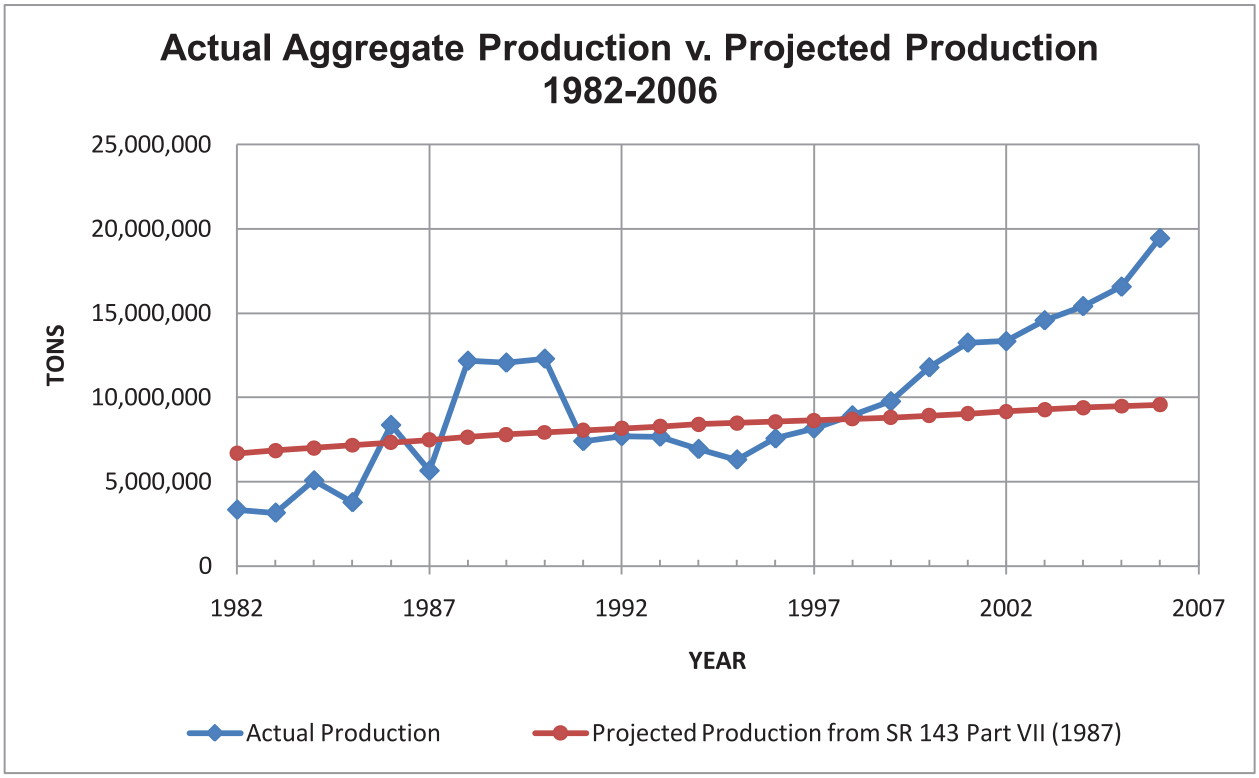


Figure 3. Comparison of projected demand in the San Bernardino P-C Region with actual PCC-grade aggregate production, 1982-2006.

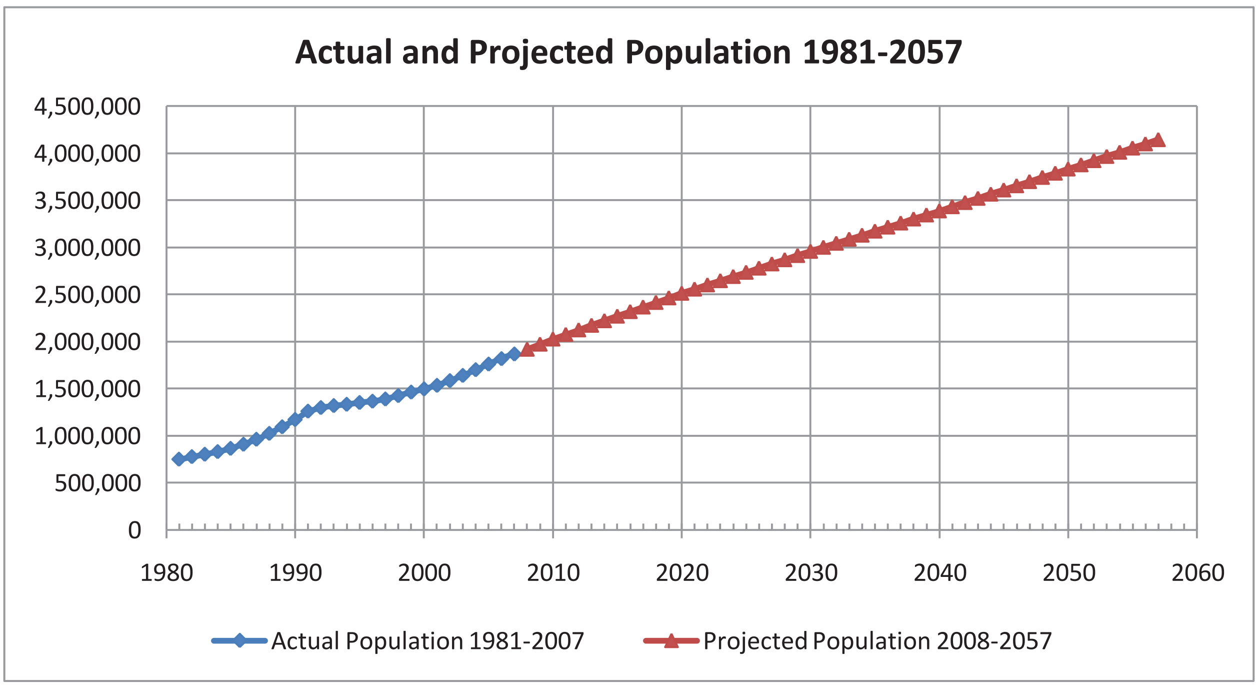
Population data for the San Bernardino P-C Region for the years 1981 to 2007 were obtained from census tract data provided by the San Bernardino County and Riverside County planning departments for the 1980 census and from census tract population data from the U.S. Census Bureau (2007) for the 1990 and 2000 censuses. Complete census tracts within the Region were summed with the population of partial tracts. The population of partial tracts was equated to be the same percentage as the included area. The population statistics between census years are interpolated. The average per capita aggregate consumption rate for the years 1981 through 2006 was 7.4 tons per person per year (Table 5). This rate was used for projecting future aggregate demands.

POPULATION PROJECTION FOR THE SAN BERNARDINO P-C REGION THROUGH THE YEAR 2057

The year-2000 population for the census tracts within San Bernardino and Riverside counties was divided by the total year-2000 population of each county, respectively, resulting in a ratio. This percentage (44.2 percent of Riverside County's total population and 47.6 percent of San Bernardino County's total population) was used to estimate the San Bernardino P-C Region's population for the years 2010, 2020, 2030, 2040 and 2050.

The population projection for the San Bernardino P-C Region (Figure 4) was estimated from official projections published by the California Department of Finance's Demographic Research Unit (California Department of Finance, 2007) and the above percentages for each county. Report 06 P-1(on the California Department of Finance's website) provides population projections for counties in California for the years 2010, 2020, 2030, 2040 and 2050. Yearly population estimates were interpolated from the bracketing 10-year projected population numbers and extrapolated for the years 2051 through 2057. The population of the San Bernardino P-C Region is projected to increase from 1,918,400 in 2007 to 4,147,600 in 2057.

Figure 4. Population of the San Bernardino P-C Region—1981-2007—and population projection to 2057.



PROJECTED AGGREGATE DEMAND FOR THE SAN BERNARDINO P-C REGION THROUGH THE YEAR 2057

A simple analysis using projected population and annual per capita consumption rate, derived by methods described in preceding sections, was used to forecast the aggregate demand of the San Bernardino P-C Region through the year 2057 (Table 6). The calculated annual per capita consumption rate of 7.4 tons (from Table 5) was multiplied by the projected annual population for each year through the year 2057.

The result of this projection shows that an estimated 1,131 million tons of aggregate will be needed to satisfy future demand in the San Bernardino P-C Region through the year 2057. Of this total, it is estimated by producers in the region that approximately 65 percent, or 735 million

Table 6. Projected population and aggregate demand in the San Bernardino P-C Region (2008-2057).

YEAR	PROJECTED POPULATION	PROJECTED AGGREGATE DEMAND (in tons)*	ESTIMATED PCC AGGREGATE DEMAND (in tons)*	YEAR	PROJECTED POPULATION*	PROJECTED AGGREGATE DEMAND (in tons)*	ESTIMATED PCC AGGREGATE DEMAND (in tons)*
2008	1,918,350	14,196,000	9,227,000	2034	3,131,999	23,177,000	15,065,000
2009	1,972,620	14,597,000	9,488,000	2035	3,175,011	23,495,000	15,272,000
2010	2,026,935	14,999,000	9,750,000	2036	3,218,023	23,813,000	15,479,000
2011	2,075,601	15,359,000	9,984,000	2037	3,261,035	24,132,000	15,686,000
2012	2,124,267	15,720,000	10,218,000	2038	3,304,047	24,450,000	15,892,000
2013	2,172,932	16,080,000	10,452,000	2039	3,347,059	24,768,000	16,099,000
2014	2,221,598	16,440,000	10,686,000	2040	3,390,071	25,087,000	16,306,000
2015	2,270,264	16,800,000	10,920,000	2041	3,434,632	25,416,000	16,521,000
2016	2,318,930	17,160,000	11,154,000	2042	3,479,192	25,746,000	16,735,000
2017	2,367,596	17,520,000	11,388,000	2043	3,523,753	26,076,000	16,949,000
2018	2,416,261	17,880,000	11,622,000	2044	3,568,314	26,406,000	17,164,000
2019	2,464,927	18,240,000	11,856,000	2045	3,612,875	26,735,000	17,378,000
2020	2,513,593	18,601,000	12,090,000	2046	3,657,435	27,065,000	17,592,000
2021	2,558,319	18,932,000	12,306,000	2047	3,701,996	27,395,000	17,807,000
2022	2,602,945	19,262,000	12,520,000	2048	3,746,557	27,725,000	18,021,000
2023	2,647,570	19,592,000	12,735,000	2049	3,791,117	28,054,000	18,235,000
2024	2,692,196	19,922,000	12,949,000	2050	3,835,678	28,384,000	18,450,000
2025	2,736,822	20,252,000	13,164,000	2051	3,880,239	28,714,000	18,664,000
2026	2,781,448	20,583,000	13,379,000	2052	3,924,799	29,044,000	18,878,000
2027	2,826,074	20,913,000	13,593,000	2053	3,969,360	29,373,000	19,093,000
2028	2,870,699	21,243,000	13,808,000	2054	4,013,921	29,703,000	19,307,000
2029	2,915,325	21,573,000	14,023,000	2055	4,058,482	30,033,000	19,521,000
2030	2,959,951	21,904,000	14,237,000	2056	4,103,042	30,363,000	19,736,000
2031	3,002,963	22,222,000	14,444,000	2057	4,147,603	30,692,000	19,950,000
2032	3,045,975	22,540,000	14,651,000	**Total 50-Year Demand:**		**1,131,233,000**	**735,302,000**
2033	3,088,987	22,859,000	14,858,000				

* Aggregate figures are rounded to the nearest 1,000 tons

tons, will be used in PCC, with the remainder being used in other construction aggregates. This updated 50-year demand is over two times the previous projected 50-year demand. This is because of the greater increase in population than was predicted by the previous projection.

COMPARISON OF THE 50-YEAR AGGREGATE DEMAND WITH CURRENT PCC-GRADE AGGREGATE RESERVES

The total PCC-grade aggregate reserves of 287 million tons in the San Bernardino P-C Region are projected to last 17 years (to the year 2024). If all of the PCC-grade aggregate reserves were used exclusively for PCC aggregate, the supply would theoretically last 31 years. In reality, 35 percent of the PCC-grade aggregate reserves likely will be used for lower grade aggregate products, and a depletion date of 2024 is more realistic. However, even this date may be optimistic. An important consideration is that not all of the aggregate reserves may be minable under the present permits because of operating restrictions or because of expiration dates that may not allow reserves to be completely mined. This last point is important because of the difficulty in obtaining permit extensions.

Comparing regional needs to available reserves and resources demonstrates the construction aggregate resource issues confronting the region. This includes the need to plan carefully for the use of lands containing these resources and the need to consider the permitting of additional aggregate resources in the region before currently permitted deposits are depleted.

Table 7 is a summary of present aggregate resources and estimated future aggregate demands for the San Bernardino P-C Region. The projected lifespan of the aggregate reserves assumes that mining of these reserves will continue to be permitted until the reserves are depleted. In addition, should unforeseen events occur, such as massive urban renewal, reconstruction in the wake of a disaster, or major economic recession, the demand for construction aggregate in the San Bernardino P-C Region could change considerably, which could alter the lifespan of aggregate reserves in the region.

ALTERNATIVE SOURCES OF AGGREGATE FOR THE SAN BERNARDINO P-C REGION

Potential sources of portland cement concrete aggregate, in addition to the deposits classified MRZ-2, exist within and near the San Bernardino P-C Region. The potential sources within the region are in areas that are classified as MRZ-3 and include areas underlain by Holocene alluvial deposits, Tertiary sedimentary deposits, and crystalline rocks. Too little is known about these alternative sources to allow more than a general description. SR 143, Part VII contains a description of these deposits in the section titled “Alternative Sources of Aggregate.”

Table 7. Summary of PCC-grade aggregate resources, PCC-grade aggregate reserves, projected 50-year demand, and depletion date for the San Bernardino P-C Region.

Estimated PCC-Grade Aggregate Resources	**5,986 Million Tons**
PCC-Grade Aggregate Reserves	**287 Million Tons**
Projected 50-Year Construction Aggregate Demand (all aggregate grades)	**1,131 Million Tons**
Projected 50-Year Demand for PCC Aggregate	**735 Million Tons**
Estimated Years Until Depletion of Current PCC-Grade Aggregate Reserves	**17 Years**
Estimated Depletion Date of PCC-Grade Aggregate Reserves	**2024**

Sources outside of the San Bernardino P-C Region are the production areas in the neighboring Claremont-Upland P-C Region to the west, about three miles away, and the Temescal Valley area, about five miles to the south and east. The additional transportation costs incurred by bringing in aggregate from these other areas could increase the price of construction aggregate in the San Bernardino P-C Region, and, these neighboring regions do not have a 50-year supply of aggregate reserves to meet their own demand (Miller and Busch, 2007; Miller, Shumway, and Hill, 1991).

RECYCLED AGGREGATE

During the past two decades, the use of recycled inert demolition debris such as concrete rubble and slab asphalt rubble has steadily increased in California. The most recycled materials in California, by tonnage, are asphalt and concrete. Recycling programs that recover demolition rubble, such as concrete and asphalt, significantly help reduce the waste-stream going into landfills and also extend the life of existing aggregate mines. However, recycled aggregate generally is not suitable for use as PCC aggregate. The bulk of recycled aggregate is used as base materials.

In the San Bernardino P-C Region, as in all of the greater Los Angeles area, the rate of recycling of demolition waste is high. A roughly estimated 700,000 tons of recycled aggregate is produced from demolished construction materials annually in the P-C Region. This figure is based on producer estimates only. Unless there is a large change in the use of recycled material for aggregate, there will not be a significant effect on the mining of new aggregate deposits and the projection of future demand for raw aggregate materials will not change significantly.

PART V – CONCLUSIONS

Within the San Bernardino P-C Region, two areas previously classified as MRZ-3 have been reclassified as MRZ-2. Newly classified areas contain about 334 million tons of unpermitted PCC-grade aggregate resources. A reevaluation of the previously designated areas within the region indicates that that about 4,427 acres, containing 959 million tons of resources, have been lost to urbanization or depleted between 1987 and 2007. After adjusting for past production, both commercial and non-commercial, the remaining designated resources and the newly identified resources total 5,986 million tons of PCC-grade aggregate resources.

Based on available historic population and production data, and population projections, the San Bernardino P-C Region will need to produce 1,131 million tons of aggregate during the next 50 years. Of this projected demand, it is estimated that 65 percent, or 735 million tons, must be suitable for use in PCC. The presently permitted aggregate reserves of 287 million tons represent approximately 25 percent of the projected construction aggregate demand of the next 50 years. These permitted reserves are projected to last until the year 2024, 17 years from the present. If a major earthquake or similar unforeseen catastrophic event strikes the region and necessitates reconstruction, existing reserves may be depleted sooner. A comparison of the results of the current study with those of the 1987 study is presented in Table 8.

Table 8. Results of this update report compared with Special Report 143, Part VII and the designation report for the San Bernardino P-C Region.

	Previous Reports†	This Update Report
Identified PCC-Grade Aggregate Resources*	6,887 Million Tons	5,986 Million Tons
PCC-Grade Aggregate Reserves*	430 Million Tons	287 Million Tons
Projected 50-year Aggregate Demand	480 Million Tons	1,131 Million Tons
Estimated Number of Years Until Reserves* are Depleted	41 Years	17 Years
Estimated Depletion Date of Reserves*	2022	2024
Calculated Per Capita Aggregate Consumption	8.4 Tons	7.4 Tons

† SR 143, Part VII and the designation report (California Department of Conservation, 1987).
* Reserves are aggregate deposits that have been determined to be acceptable for commercial use, that exist within properties owned or leased by aggregate producing companies, and for which permits have been granted to allow mining and processing of the material. Resources include reserves as well as all potentially usable aggregate materials that may be mined in the future, but for which no permit allowing mining has been granted.

ACKNOWLEDGMENTS

CGS gratefully acknowledges the cooperation of all the local government agencies, organizations, and especially the aggregate producers, all of whom provided information during the course of this study. Special thanks are extended to Doug Sprague of Vulcan Materials Company, Christine Jones and Dave Samaro of Cemex, Christine Goeyvaersts of Robertson's Ready Mix, Chad Warren and Dan Lincoln of Pacific Aggregates, Pete Pouwels of Holliday Rock Products, David Jones of the County of Riverside Planning Department, Chuck Wideen of the County of Riverside Department of Building and Safety, and George Kenline of the County of San Bernardino Land Use Services Department.

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APPENDIX – SECTOR SUMMARIES

Summary of Designated Sector acreages, PCC-grade aggregate resources, and reserves in the San Bernardino P-C Region in 2008. (Note: Newly identified Sectors J and K are not designated)

Sector	**Acres Remaining in Sector**	**Resources in 2008*** (million tons)	**Reserves (Permitted Resources) in 2008** (million tons)
A-4	434.6	74.8	0
A-6	†	0	0
A-7	309.6	80.2	0
A-8	71.4	20.4	0
A-9	99.4	29.7	0
A-13	60.1	19.4	0
A-14	24.4	8.3	0
A-15	†	0	0
A-16	16	3.8	0
A-17	14.8	3.5	0
A-18	†	0	0
A-19	85.8	15.8	0
A-23	†	0	0
A-24	†	0	0
A-27	†	0	0
A-28	†	0	0
A-29	232.0	11.6	0
A-30	19.7	2.0	0
B-1	118.9	45.4	0
B-2	10.9	1.8	0
B-5	3,708.0	709.2	P
B-6	59.3	3.2	0
B-7	148.4	36.8	0
B-8	267.3	59.1	0
B-9	169.6	28.5	P
B-10	85.1	12.0	P
B-12	†	0	0
B-14	18.4	1.3	0
B-15	8.8	0.3	0
B-16	†	0	0
B-17	†	0	0
C-1	510.0	101.5	0
C-3	165.0	39.1	P

Sector	Acres Remaining in Sector	Resources in 2008* (million tons)	Reserves (Permitted Resources) in 2008 (million tons)
C-4	30.4	5.6	0
C-5	413.0	118.2	P
C-6	1,260.9	344.0	P
C-8	26.7	5.6	0
C-10	13.5	1.4	0
D-2	†	0	0
D-3	†	0	0
D-4	†	0	0
D-5	†	0	0
D-6	†	0	0
E-1	49.2	3.0	0
E-2	15.2	0.8	0
E-4	†	0	0
E-5	294.0	62.8	0
E-9	23.0	4.0	0
E-10	596.1	62.1	0
E-13	268.9	29.1	0
E-14	313.8	58.3	0
E-17	19.9	2.9	0
E-19	102.0	18.0	0
E-20	37.6	5.3	0
E-22	41.3	6.1	0
E-23	77.2	12.1	0
E-24	113.7	16.7	0
F-1	†	0	0
F-2	79.8	5.1	0
F-3	18.4	9.3	0
F-4	†	0	0
F-5	†	0	0
F-6	130.7	55.4	0
F-9	51.6	6.3	0
F-12	†	0	0
F-14	1,071.1	756.5	P
F-15	5,220.8	2,301.2	P
F-16	85.4	16.7	0
F-17	36.2	6.5	0
F-18	433.6	117.2	0
F-20	581.6	164.6	0
F-23	131.4	19.6	0
F-32	62.9	7.6	0
F-33	76.5	10.4	0

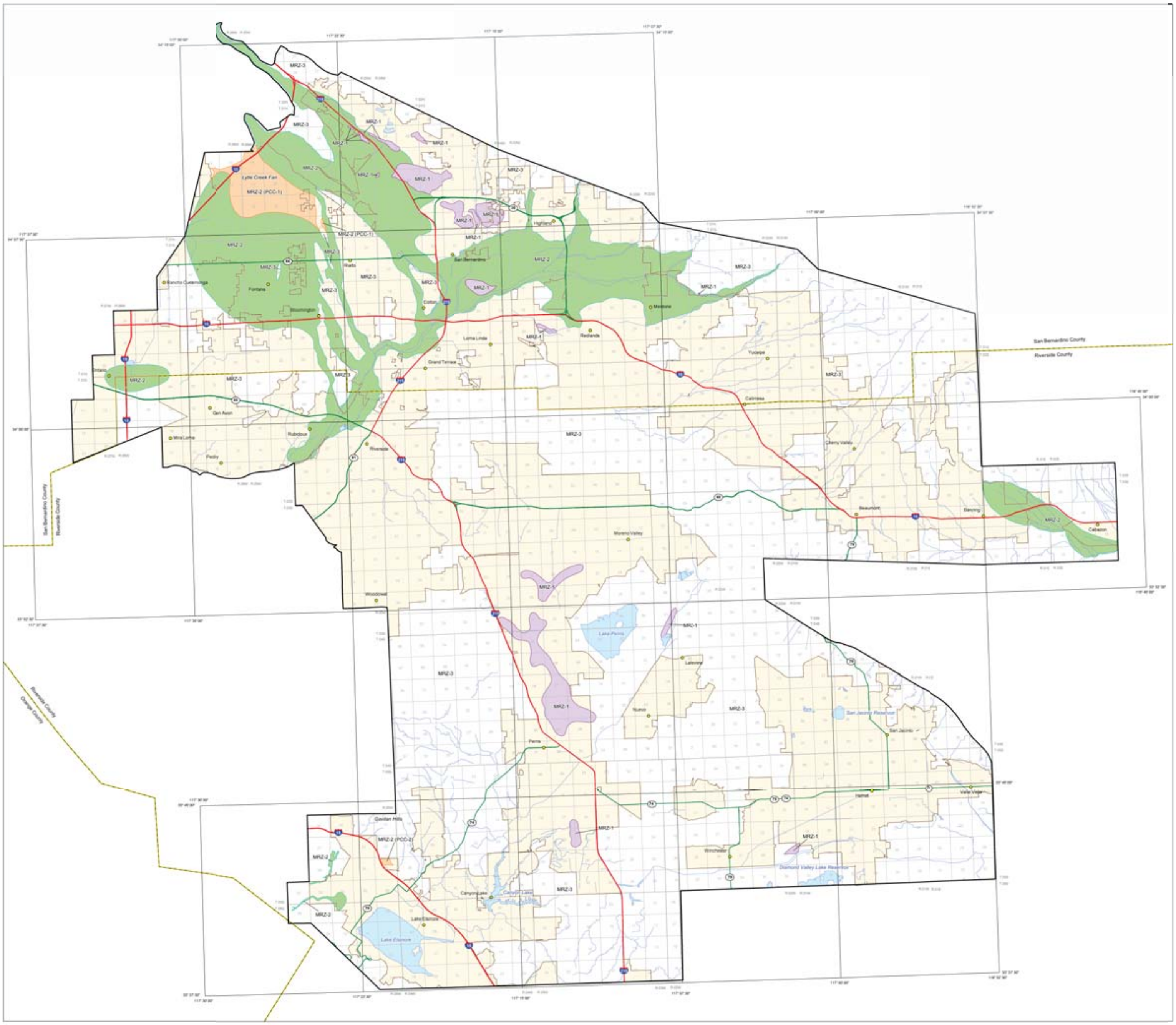
Sector	Acres Remaining in Sector	Resources in 2008* (million tons)	Reserves (Permitted Resources) in 2008 (million tons)
G-1	470.6	75.0	P
G-2	1,677.0	280.0	P
H	0	€	0
I	0	€	0
J-1††	65.0	13.9	0
J-2††	32.9	6.7	0
J-3††	37.6	7.9	0
J-4††	91.1	20.4	0
J-5††	29.6	6.1	0
J-6††	755.3	185.5	0
J-7††	48.3	10.3	0
J-8††	44.3	9.5	0
J-9††	63.2	14.9	0
J-10††	196.7	49.4	0
J-11††	76.6	P	P
J-12††	89.5	P	P
J-13††	36.4	9.3	0
K††	89.9	P	P
Totals	**22,293.4**	**5,986.0****	**287**

* Reserves mined since 1980 are not subtracted due to confidentiality.
P Sector contains reserves that are proprietary
† Completely lost to urbanization
€ Remainder of resources mined out.
†† Newly identified Sector (not designated)
** Due to confidentiality, commercial production since 1981 has not been subtracted from individual Sectors. However, all past production has been subtracted from the resource total (6,238 million tons minus 252 million tons = 5,986 million tons).

Updated Mineral Land Classification Map for Portland Cement Concrete-Grade Aggregate in the San Bernardino Production-Consumption (P-C) Region, San Bernardino and Riverside Counties, California

By
Russell V. Miller (PG #3331) and Lawrence L. Busch (PG #6440)

2008



LEGEND

- San Bernardino P-C Region.
- MRZ-1: Areas where available geologic information indicates that little likelihood exists for the presence of significant mineral resources.
- MRZ-2: Areas where geologic data indicate that significant PCC-Grade aggregate resources are present
- New MRZ-2 areas (this study). MRZ-2 (PCC-1) Notation in parenthesis identifies specific areas - see text for description.
- MRZ- 3: Areas containing known or inferred mineral occurrences of undetermined mineral resource significace.
- Urban Area.

- City, Town or Community
- Public Land Survey System
- County Boundary
- Interstate Highway
- State Highway
- Lake
- River

Location of San Bernardino Production-Consumption Region and Index of USGS 7.5 -Minute Topo quads

N

Miles

Scale: 1:100,000

Map Sources (Digital GIS Layers):

Hydrography ,Roads, and Urban Areas - GDT April 2004.
Public Land Survey System - Department of Conservation, Division of Oil, Gas, and Geothermal Resources.

California Geological Survey Web Site:
http://www.consrv.ca.gov/cgs/

Prepared in Compliance with the Surface Mining and Reclamation Act of 1975, Article 4, Section 2761

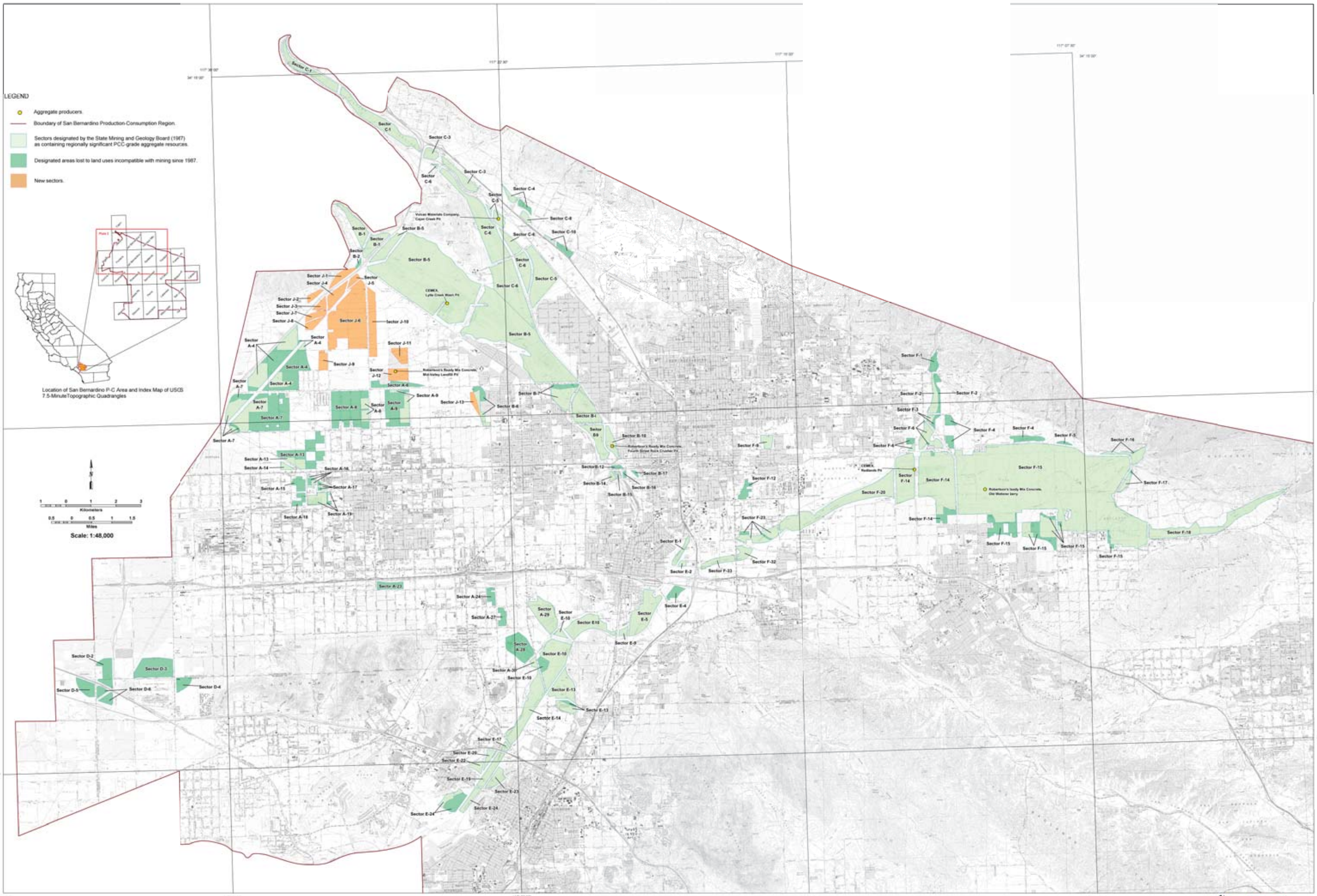
State Geologist

GIS Development and Map Layout by Milton Fonseca

Updated Aggregate Resource Sector Map for Portland Cement Concrete-Grade Aggregate in the Northern San Bernardino Production-Consumption (P-C) Region, San Bernardino and Riverside Counties, California

By
Russell V. Miller (PG #3331) and Lawrence L. Busch (PG #6440)

2008



California Geological Survey Web Site:
http://www.consrv.ca.gov/cgs/

Map Sources (Digital GIS Layers):
7.5-Minute Topographic Quadrangles: U.S. Geological Survey

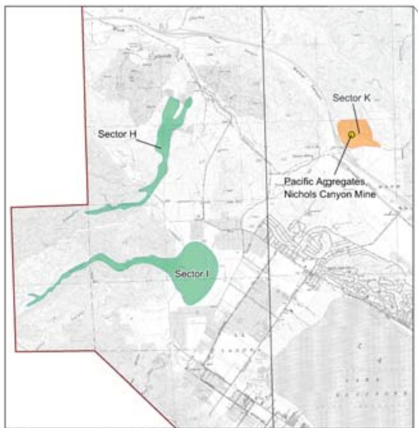
GIS Development and Map Layout by Milton Fonseca

Updated Aggregate Resource Sector Map for Portland Cement Concrete-Grade Aggregate in the Southern San Bernardino Production-Consumption (P-C) Region, San Bernardino and Riverside Counties, California

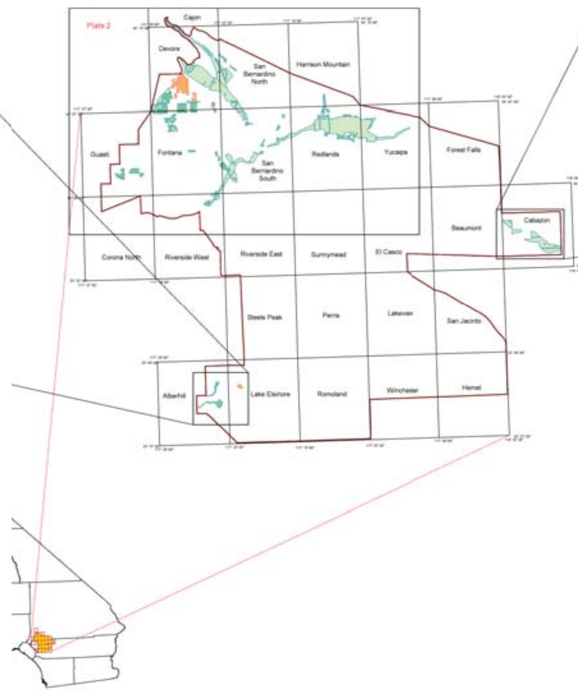
By

Russell V. Miller (PG #3331) and Lawrence L. Busch (PG #6440)

2008



Location of San Bernardino Production-Consumption Region Southwestern Sectors
(Scale 1:48,000)



Location of San Bernardino Production-Consumption Region and Index of USGS 7.5-Minute Topographic Quadrangles

Location of San Bernardino Production-Consumption Region Eastern Sectors
(Scale 1:48,000)

N

Kilometers

Miles

Scale: 1:48,000

LEGEND

- Aggregate producers.
- Boundary of San Bernardino Production-Consumption Region
- Sectors designated by the State Mining and Geology Board (1987) as containing regionally significant PCC-grade aggregate resources
- Designated areas lost to land uses incompatible with mining since 1987
- New sectors.

GIS Development and Map Layout by Milton Fonseca

Memorandum

Flex your power!
Be energy efficient!

To: DISTRICT DIRECTORS

Date: November 18, 2011

From: MALCOLM DOUGHERTY
Acting Director

Subject: **Aggregate Resource Policy Statement and Tools**

This memo is in response to multiple requests from resource developers, planning departments, and California Department of Transportation (Caltrans) staff about our policy toward mining projects. It clarifies the policy and provides tools for districts to encourage an increased supply of aggregate materials statewide.

Our policy is that Caltrans will continue to work with local and State agencies to help gain approval of new aggregate mining sites throughout the state, acknowledging the need for an increased aggregate supply. As a responsible agency under the California Environmental Quality Act, however, we do not endorse specific mining projects. In light of this, Caltrans will provide the technical assessment and information pertaining to availability locally as well as infrastructure needs of aggregate projects in your region, including education of local stakeholders and early public engagement regarding long-term aggregate issues.

The following tools are attached to aid you in this regard:

- A sample letter that can be addressed to our local and regional transportation planning partners. This letter outlines our policy toward mineral resource development in general.
- The 2011 update of the Construction Aggregate Supply Limitations Fact Sheet.
- The 2006 Department of Conservation Map Sheet 52, which shows the permitted aggregate materials supply in relation to projected demand over 50 years.

The above tools were developed in support of an ongoing consortium known as the Aggregate Availability Group. This group, as per its 2009 charter, includes management and staff-level representatives from the Caltrans Divisions of Planning, Design, and Construction, the California Business, Transportation and Housing Agency, the California Department of Conservation, the California Construction and Industrial Materials Association, and the Governor's Office of Planning and Research. One of the main goals of this effort has been to produce maps and other tools to engage the public, legislators, and local jurisdictions. These staff will apprise you of new materials as they become available.

Please take the time to review the attached tools. This issue is as important as ever, and it is my hope that ongoing collaboration will help us secure the resources that we need to provide world-class transportation options for years to come.

Attachments:
(1) Sample Policy Statement Letter
(2) Construction Aggregate Supply Limitations Fact Sheet
(3) Department of Conservation Map Sheet 52, Aggregate Availability in California

Attachment 1

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

DEPARTMENT OF TRANSPORTATION
<DISTRICT>
<ADDRESS>
<CITY, STATE, ZIP>
<PHONE>
<FAX >
<WEB URL>

Flex your power!
Be energy efficient!

<DATE>

<Name>
<Title>
<Organization>
<Street Address>
<City, State, Zip Code>

Dear<RECIPIENT>:

As you are aware, aggregate resources play a vital role in our efforts to build and improve our State's infrastructure. Indeed, our State's mineral resource development is essential to our economic well-being, as well as our intentions to grow more responsibly and provide the safest, fastest, and most efficient transportation options possible. While it is important that we find ways to meet our current needs for construction materials, we must also anticipate future demand and expand our aggregate supply in an environmentally appropriate and culturally circumspect manner. In doing so, we prepare our future generations to navigate the challenges that our State will face as population increases and accessible resources grow scarce.

Throughout the State, attention is being given to what is increasingly seen as an urgent resource issue. The recently enrolled Assembly Bill 566 (Galgiani, 2011) codified several legislative findings, among them that mineral extraction is essential to the needs of society, and that the development of local mineral resources is vital in reducing truck emissions in our State.

The California Department of Transportation (Caltrans) continues to coordinate with public decision-makers, the construction industry, and government officials in exploring opportunities to improve the reclamation and permitting processes and increase California's aggregate supply. While the pressure for resources has eased for the last three years due to a sharp decline in residential construction, the transportation sector continues to build projects and the housing market is showing signs of regaining strength. This is not a time to relax our efforts, but to redouble them in anticipation of full economic recovery.

In the last five years, Caltrans has delivered approximately 1,700 highway projects worth $19 billion that were moved into construction. There are currently 825 construction contracts underway with a contract value that exceeds $10 billion. Highway projects are only one part of the story, however, as local and regional agencies continue to maintain and improve the roads in their jurisdictions.

In addition to the outlay of the traditional transportation agencies, the California High Speed Rail Authority expects to break ground on the first 179 mile stretch of its high-speed railway in fall 2012. This section, from Merced to Bakersfield, will require over five million tons of sand, gravel, and crushed stone, which is about four percent of the total production that the State saw in 2009.

With the passage of SB 391 (Liu, 2009) and SB 375 (Steinberg, 2008), Caltrans and local transportation agencies were challenged to conceive of new ways to reduce greenhouse gas (GHG) emissions while providing world class transportation facilities for our constituents. The statewide modal plans and Regional Transportation Plans, which shape California's transportation future, outline extensive improvements to the current system. Yet, between long truck hauls averaging 50 miles and international importing of materials, the GHG impact of aggregate delivery continues to mount. An increased aggregate reserve that is closer to construction sites is key to addressing our dire air quality and climate change concerns.

While we are continuing to work with local and State agencies to help gain approval of new aggregate mining sites throughout the state, there is still much to be done to ensure that these essential resources will be available for development in the far reaches of our long-range plans. I would like to encourage you to explore new strategies to increase aggregate reserves in your region, including education of local stakeholders, early public engagement, and willingness to collaborate in the mitigation of environmental and transportation system impacts from aggregate production and distribution.

The attached Fact Sheet provides information on the potential economic, social, air quality, and environmental factors that are affected by local aggregate supply. This is a good starting point for collaborative discussions that aim to find solutions to issues regarding aggregate availability. Also attached is a map that shows statewide aggregate supply and demand.

Finally, I would like to invite you to contact <CALTRANS DISTRICT REPRESENTATIVES> (http://www.dot.ca.gov/localoffice.htm), who are available upon request to speak at public meetings in your area regarding the importance of increasing California's aggregate supply in an environmentally sustainable manner. While the permitting of new mining facilities must be done with attention to all of the possible impacts to surrounding areas, Caltrans encourages the development of new sources for construction aggregate. Our economy and our environment depend on it.

Please share this information with your planning commissions, city councils, and county boards of supervisors.

Thank you in advance for helping to improve mobility across California.

Sincerely,

<Signature Block Name>
District Director

Attachments:
(1) 2011 Construction Aggregate Supply Limitations Fact Sheet
(2) Department of Conservation Map Sheet 52, *Aggregate Availability in California*

Construction Aggregate Supply Limitations
Some Estimates of Economic Impact–November 2011

- Aggregates are low-value, heavy-weight building materials used in construction, including sand, gravel, crushed stone, and recycled concrete. Aggregates are mined and either used as raw material (for example, as foundations) or serve as composite materials in the production of concrete and asphalt. The main end markets for aggregates include private residential construction (34 percent), commercial construction (17 percent), and public infrastructure projects (43 percent, including 26 percent for public highways, streets and transit).

- Aggregates are usually shipped from quarries or production sites close to their end market because transportation is a major element in the cost of delivered aggregates and the cost depends on the distance of the delivery. According to the industry, shipping costs for aggregates can outweigh production costs if the material is trucked more than 20 miles.[1] Permitting new aggregate sites would lead to shorter haul distance to minimize transport/shipping cost.

- According to the California Geological Survey (CGS), California has an estimated 74 billion tons of aggregate resources underlying mineral lands classified by the State Geologist. However, only about six to seven percent have actually been permitted by local agencies for mining activities. Permitting of mining sites is difficult and time consuming due to environmental, land development, and zoning laws, and could take between five and ten years. At the current rate of production, available aggregate supply in some areas in the State could be depleted in a decade.

- According to the California Department of Finance, housing construction activity in California more than doubled between 1996-2005, the longest sustained growth period in recent history; but experienced more than 80 percent decline during 2006-2009 (from 209 to 36 thousand units). Despite a 23 percent rebound in housing construction spending in 2010, overall construction industry in California remains depressed. This has contributed to a significant reduction in both production and value of construction aggregate in recent years.

- According to the CGS, California produced 133.5 million tons (valued at $1.4 billion) of construction sand, gravel, and crushed stone in 2009, compared to 237.3 million tons (valued at $1.9 billion) in 2006, an almost 44 percent drop since 2006. The transportation of 133.5 million tons of construction aggregates generates about 5.3 million truckloads (@ 25 tons per truck), or a total of 10.7 million truck trips a year (including empty trucks returning to the aggregate sites) related to the transportation of construction aggregates in the State.

- According to the Teichert Construction and West Coast Aggregates, Inc. the average hauling distance for aggregates in California may be as high as 50 miles. Truck transportation accounts for about 99 percent of shipping aggregates for 40 miles or less.[2] At an average 50-mile distance, the total aggregate-truck VMT would be 535 million miles per year (10.7 million trucks x 50 miles).

- Let us assume that permitting additional mining facilities would reduce the average hauling distance from 50 to 35 miles statewide. Using an average hauling distance of 35 miles, the total annual aggregate-truck miles of travel would be 375 million miles (10.7 million trucks x 35 miles). The 15-mile shorter hauling distance would reduce aggregate-truck miles of travel by 160 million miles per year (535-375), and annual diesel fuel consumption by 20 million gallons [using California Air Resources Board (CARB) diesel fuel consumption rate of 0.13 gallons per vehicle-mile at 55-60 mph speed].

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[1] Therese Dunphy, "Evening the Playing Field," *Aggregates Manager*, August 2006.

[2] Tina Grady Barbaccia, "Off-highway Transportation," *Aggregates Manager*, July 2006.

- A recent University of California, Berkeley study[3] confirms that the most likely, and dominant, effect of the opening of new sites for the production of construction aggregates would be a reduction in truck miles of travel for hauling aggregates (i.e., new quarry will be located closer to the users to minimize transportation costs), thus a reduction in emissions from trucks.

- Based on the CARB emission factors estimates, and assuming an average 55-60 miles per hour speed, a reduction of 160 million miles of truck travel (or 20 million gallons of diesel fuel consumption) would reduce truck emissions (CO, NOx, PM10, SOx, VOC, and CO2) by about 22,436 tons a year.

- The total transportation cost of aggregates (at $0.10 per ton per mile) shipped 35-miles average distance throughout California would be $936 million (10.7 million trucks x 25 tons x 35 miles x $0.1), and over $1.3 billion if shipped an average distance of 50 miles. The statewide transportation cost savings of reduced hauling distance would amount to $376 million a year (or a 30 percent cost savings).

- The California Department of Transportation (Caltrans) estimates that on average, about $2.5 billion is spent on State and local capital outlay projects each year, and on average, aggregates account for 8-10 percent of total project costs, or about $250 million annually. A 30 percent increase/decrease in shipping cost of aggregates would increase/decrease the total annual project costs by $75 million per year.

- The reduction in aggregate-related truck miles of travel would also reduce traffic congestion and traffic accidents on roads, but these impacts would be difficult to estimate. An additional benefit from truck trip reduction would be reduced pavement deterioration. Caltrans expects to spend about $700 million annually on pavement rehabilitation projects. Assuming trucks account for 60 percent of the pavement damage on the State highways, and aggregate-trucks on average account for 5 percent of all heavy truck travel on the State highways, the trucks shipping aggregates would account for about $20 million of cost savings in the pavement rehabilitation each year.

- Project delays due to lack of aggregate supply in the area, would also result in project cost escalation and reduced user benefits (reduced travel time and accidents) that would have otherwise been generated. A delay of 10 percent of the projects (or $250 million in capital outlay expenditures) for one year would increase the cost of the State and local capital outlay program by $13 million a year (at 5 percent average cost escalation factor).

- Generalizing, and pro rating, the user benefits estimated for the 2008 Interregional Transportation Improvement Program projects, a delay of ten percent of the capital outlay program for one year could also cost California about $97 million in increased roadway congestion and traffic accidents.

In conclusion, the overall picture may indicate that the concerns over the limited supply of construction aggregates may have eased for now due to the severe housing decline and economic slowdown. However, over the long run, with the eventual housing and economic rebound, the supply-demand imbalance will continue for many areas. Meanwhile, for some specific localities and construction projects, the challenge of adequate and cost-effective supply of construction aggregates persists.

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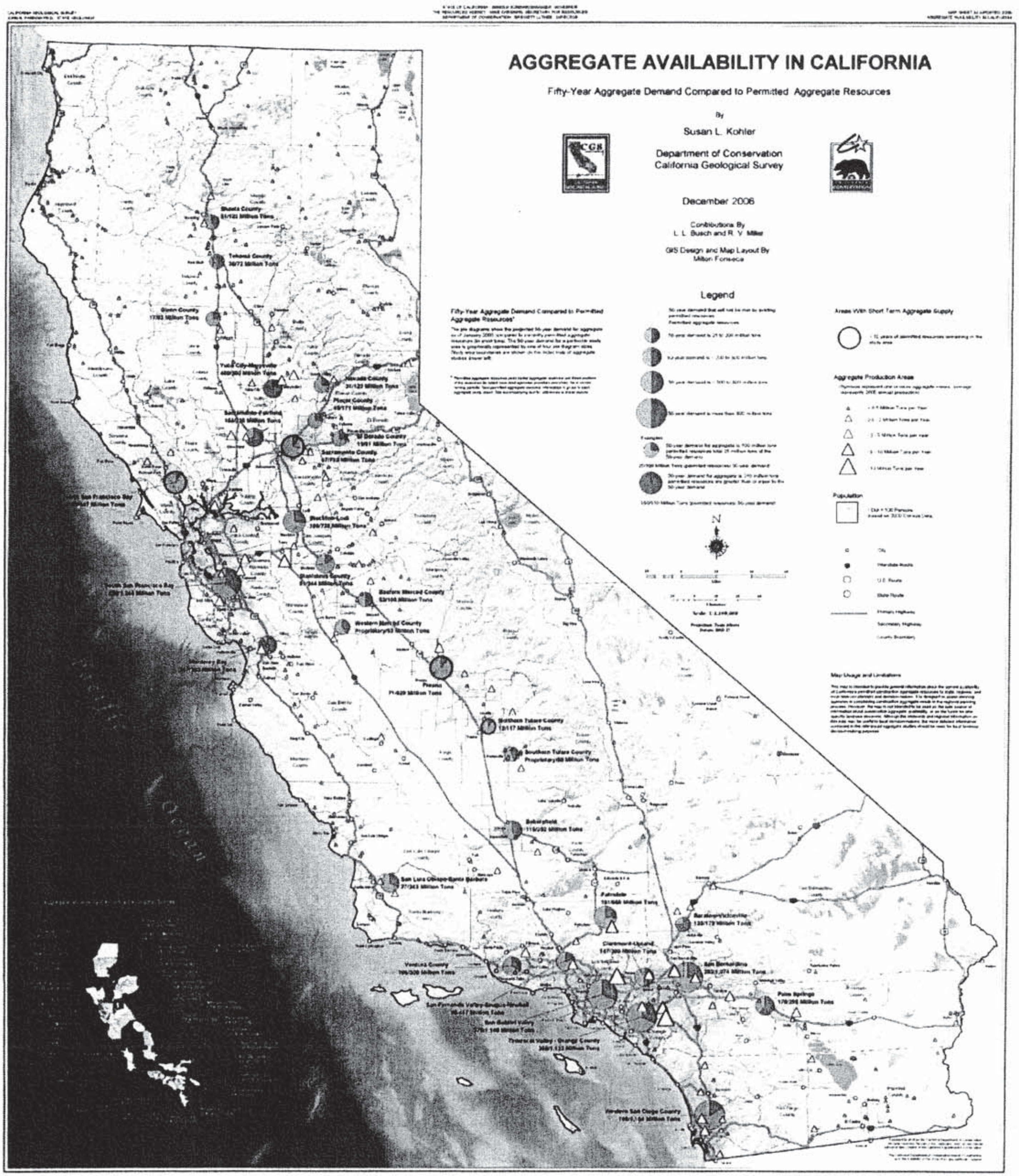
[3] Peter Berck, "A Note on the Environmental Costs of Aggregates," *Working Paper No. 994*, Dept. of Agricultural and Resource Economics and Policy, University of California, Berkeley, January 2005.

Attachment 3



INORGANIC CHEMICALS IN GROUND WATER AND SOIL: BACKGROUND CONCENTRATIONS AT CALIFORNIA AIR FORCE BASES.

Philip M. Hunter[1], Brian K. Davis[2], and Frank Roach[3].

[1]Air Force Center for Environmental Excellence, Brooks City-Base, Texas, [2]Department of Toxic Substances Control, CalEPA, Sacramento, California, and [3]San Antonio, Texas.

Presented at:

44th Annual Meeting of the Society of Toxicology

New Orleans, Louisiana

10 March 2005

Professional affiliations are listed for contact purposes only. Analysis and conclusions contained herein are solely those of the authors, and do not represent official policy of the Department of Toxic Substances Control.

ABSTRACT

Inorganic chemicals have widespread industrial use and are significant contaminants at many hazardous waste sites and industrial locations. Risk assessment and risk management must differentiate between background (naturally occurring) and anthropogenic inorganic chemicals. This distinction is important for site characterization, determining chemicals of concern, establishing cleanup levels, and long-term monitoring programs. This paper is an update of our 2001 report on background at Air Force bases in California.

The Air Force's Environmental Resources Program Information Management System (ERPIMS) database was searched for uncontaminated sample locations for soil and groundwater at 14 Air Force installations in 10 California counties. Background data for 27 inorganic constituents from 1,307 monitoring well locations yielded as many as 5,071 groundwater samples for individual chemicals, while 3,883 boreholes yielded as many as 10,415 soil samples. Medians, 95th, and 99th percentiles are reported for each chemical. Since statistical analysis of soil data indicated that background levels differed significantly with depth, separate background calculations for soil are presented for three depths (less than 3 feet, between 3 and 15 feet, and greater than 15 feet).

For groundwater, background statistics for each constituent are given without regard to sampling depth. Some inorganic constituents were detected frequently and at levels that exceed important environmental thresholds such as Maximum Contaminant Levels (MCLs) or Action Levels for drinking water. Background 95th percentile levels equal or exceed federal and/or California MCLs for aluminum, antimony, cadmium, chromium, nickel, and thallium. The 95th percentile level for lead exceeds the Action Level of 0.015 mg/L for drinking water measured at the tap. This analysis provides background levels that are representative of California Air Force Bases as a group. The background data in this presentation should not be used to replace local background data, but rather provide important benchmarks by which the adequacy of local data can be judged.

INTRODUCTION

Risk assessment of inorganic chemicals for human and ecological receptors requires the parsing of concentrations and associated risk, into portions attributable to anthropogenic activities and portions that are naturally occurring. Background data can be used in the initial site investigation, for identification of chemicals of potential concern, in remedy selection, and for risk communication to the public. (Current USEPA guidance [2002] recommends including all inorganic chemicals in risk assessment and considering the relative contributions of naturally occurring versus anthropogenic chemicals during risk characterization and risk management.)

Computer algorithms were applied to identify background locations at Air Force Bases (AFBs) in California, based on the absence of organic contaminants. This paper presents an update, with substantial increases in data, compared to the summaries of background data in groundwater and soil in Hunter and Davis, 2001. Sample sizes increased by over 40% for soil and by almost 200% for groundwater. These results should not be used in lieu of site-specific background concentrations. They can, however, provide a useful perspective for site-specific results.

METHODS

A computer algorithm was constructed to identify background locations at 14 California Air Force bases, using data from 1984 - 2004. The algorithm, using Structured Query Language, searches out all locations that have been sampled for both inorganic and organic chemicals. Sampling locations with organic contamination (at levels greater than twice the method detection limit) are eliminated. The most common 25 organic contaminants in groundwater were used for groundwater and the most common 25 organic chemicals in soil were similarly applied. Upper-range outliers were eliminated for each inorganic constituent based on concentrations that exceeded "far-outside" values in "box and whisker" plots. Upgradient, downgradient, and sidegradient locations were all potential background sampling locations. Substantially more background locations were identified in soil than in groundwater. On average, 50 background well locations and 100 background borehole locations have been identified per AFB.

This analysis is complicated by different analytical laboratories, various sampling strategies, multiple detection limits, diverse hydrogeologic terrains, variability over 3-dimensional space, a variety of types of hazardous waste sites, multiple Air Force bases, and different waste handling practices. These result in the discrimination of background levels across more than one hydrostratigraphic unit or more than one soil horizon. Given the large sample sizes, percentiles are reported without confidence limits. SAS® and Systat® software generated the statistics shown in the tables. The groundwater data represent dissolved, field-filtered, and total recoverable results.

BACKGROUND ANALYSIS FOR GROUNDWATER

- 1,307 background wells were identified and analyzed from a universe of 6,290 available monitoring wells
- Range of number of Air Force Bases: 5 for boron to 13 for many constituents
- Data are biased, with Vandenberg, Travis and March AFBs representing 75% of the total data
- Range of background wells: 148 for Cr-6 to 1307 for Pb
- Range of sample sizes: 243 for Cr-6 to 5071 for Pb
- Range of detection rates: 2% for Ag to 99.8% for Mg
- Distributions did not fit either a normal or lognormal distribution
- The 95^{th} percentiles for Al, Sb, Cd, Cr, Ni, and Tl exceed the respective MCLs (Maximum Contaminant Levels for drinking water), both California and USEPA; the 95^{th} percentile for Pb exceeds its USEPA Action Level for drinking water

GROUNDWATER DATA FROM AIR FORCE BASES IN CALIFORNIA

Analyte	n	Percentile in ug/L			Detection	Median Method Detection	Number Wells	Number AF Bases
		50th	95th	99th				
Aluminum	3560	100	32,500	118,000	51%	70	968	12
Antimony	4084	*ND*	146	190	6%	26	1084	12
Arsenic	3983	*ND*	35	140	23%	3	1043	13
Barium	3680	90	630	2,100	94%	6	1011	13
Beryllium	4160	*ND*	*ND*	5	5%	2	1104	12
Boron	560	83	1,800	16,000	84%	30	286	5
Cadmium	4396	*ND*	6	42	11%	4	1176	13
Chloride	2184	142,000	1,000,000	3,120,000	99%	500	855	11
Chromium	4335	*ND*	810	5,390	37%	5	1157	13
Chromium-6	243	*ND*	25	60	36%	4	148	9
Cobalt	3686	*ND*	25	95	13%	10	993	12
Copper	4786	*ND*	50	220	19%	12	1094	13
Cyanide	580	*ND*	12	30	6%	10	269	9
Fluoride	1005	400	1,300	1,850	90%	100	557	9
Iron	4508	225	41,000	193,000	74%	20	1054	12
Lead	5071	*ND*	50	220	16%	4	1307	13
Magnesium	4731	23,200	153,000	390,000	100%	36	1075	13
Manganese	4523	46	2,150	5,800	79%	3	1043	12
Mercury	3599	*ND*	0.5	3	7%	0.2	965	13
Molybdenum	3594	*ND*	79	122	23%	6	958	11
Nickel	4200	*ND*	455	1,470	38%	22	1090	13
Selenium	3861	*ND*	31	200	12%	5	1027	13
Silver	4314	*ND*	15	20	2%	3	1163	13
Sodium	4719	85,800	588,000	2,080,000	100%	240	1083	13
Thallium	3965	*ND*	200	300	4%	100	1003	12
Vanadium	3497	16	110	464	62%	7	935	12
Zinc	4835	20	220	990	68%	10	1113	13

BACKGROUND ANALYSIS FOR SOIL

- 4230 background boreholes were identified and analyzed from a universe of 10,030 available boreholes
- Range of number of Air Force Bases: 2 for Cl to 13 for As
- Data are biased, with Vandenberg, March, and Edwards AFBs representing 50% of the total data
- Range of background boreholes: 126 for Fl to 3,883 for Pb
- Range of sample sizes: 354 for Fl to 10,415 for Pb
- Range of detection rates: 2% for Cn to > 99% for Fe, Mn, Ba, and V
- None of the distributions fit either a normal or lognormal distribution
- The 95th percentiles for As, Fe, Tl, and V exceed their respective USEPA Region 9 Preliminary Remediation Goals (residential, health-based concentrations)

SOIL DATA FROM AIR FORCE BASES IN CALIFORNIA								
Analyte	n	Percentile (mg/kg)			Detection	Median Method Detection Limit	Number Boreholes	Number AF Bases
		50th	95th	99th				
Aluminum	7473	7,560.0	23,000.0	31,300.0	97%	10.4	3027	12
Antimony	9065	*ND*	12.5	25.0	7%	6.3	3522	12
Arsenic	8665	2.2	12.7	23.2	61%	0.6	3193	13
Barium	8340	67.3	320.0	584.0	100%	1.0	3218	12
Beryllium	8242	0.3	1.1	5.6	54%	0.2	3211	12
Boron	435	44.9	140.0	201.0	93%	3.2	146	3
Cadmium	9367	*ND*	2.3	7.7	18%	0.5	3691	12
Chloride	572	10.2	629.0	1,730.0	94%	0.2	257	2
Chromium	10051	11.6	49.4	100.0	94%	1.0	3821	12
Chromium-6	2060	*ND*	2.0	5.0	10%	0.2	650	9
Cobalt	7163	5.8	22.0	35.9	85%	1.0	2908	12
Copper	9441	9.9	53.3	157.0	95%	1.3	3671	12
Cyanide	1198	*ND*	0.7	3.0	2%	0.5	525	10
Fluoride	354	1.1	8.9	23.0	82%	0.5	126	3
Iron	8003	12,500.0	36,100.0	49,400.0	100%	5.4	3141	12
Lead	10415	3.1	25.0	148.0	66%	2.0	3883	12
Magnesium	6985	3,280.0	9,520.0	16,200.0	97%	20.0	2814	11
Manganese	7964	208.0	823.0	1,600.0	100%	1.0	3122	12
Mercury	7702	*ND*	0.3	0.6	10%	0.1	2719	12
Molybdenum	6967	*ND*	20.0	44.0	16%	2.0	2752	12
Nickel	9390	7.1	41.5	85.4	72%	2.2	3633	12
Selenium	8656	*ND*	11.0	25.0	7%	0.6	3182	12
Silver	9669	*ND*	2.1	6.1	6%	1.0	3727	12
Sodium	5907	222.0	1,660.0	3,980.0	83%	60.8	3503	11
Thallium	8639	*ND*	25.0	173.5	8%	5.0	3352	12
Vanadium	7971	27.4	88.3	126.0	99%	1.0	3168	12
Zinc	9981	31.2	104.0	307.0	99%	1.1	3870	12

VARIABILITY OF SOIL BACKGROUND LEVELS WITH DEPTH

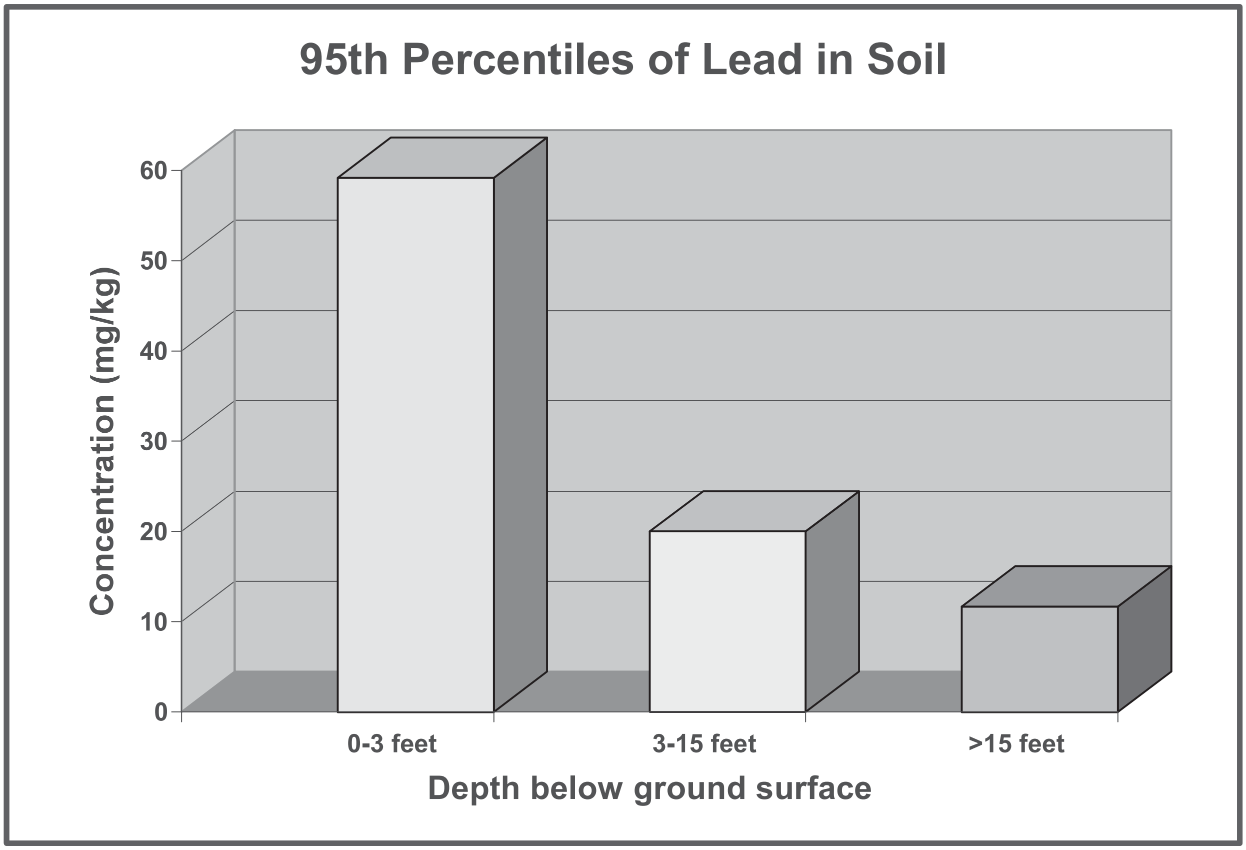
A frequency distribution analysis of sampling depths indicated that the soil sample data could be divided into three horizons of approximately equal sample sizes. These horizons are: 1) surface to 3 feet, 2) 3 feet to 15 feet, and 3) greater than 15 feet. Separate background concentrations by depth were derived for all analytes. No consistent pattern relates concentration and depth. Lead concentrations decrease markedly with depth (95^{th} percentiles are 59.2 mg/kg, 20.0 mg/kg, and 11.7 mg/kg), iron concentrations increase with depth (95^{th} percentiles are 33,000 mg/kg, 36,100 mg/kg, and 40,000 mg/kg), and chromium concentrations are about constant (95^{th} percentiles are 48.9 mg/kg, 49.9 mg/kg, and 49.6 mg/kg).

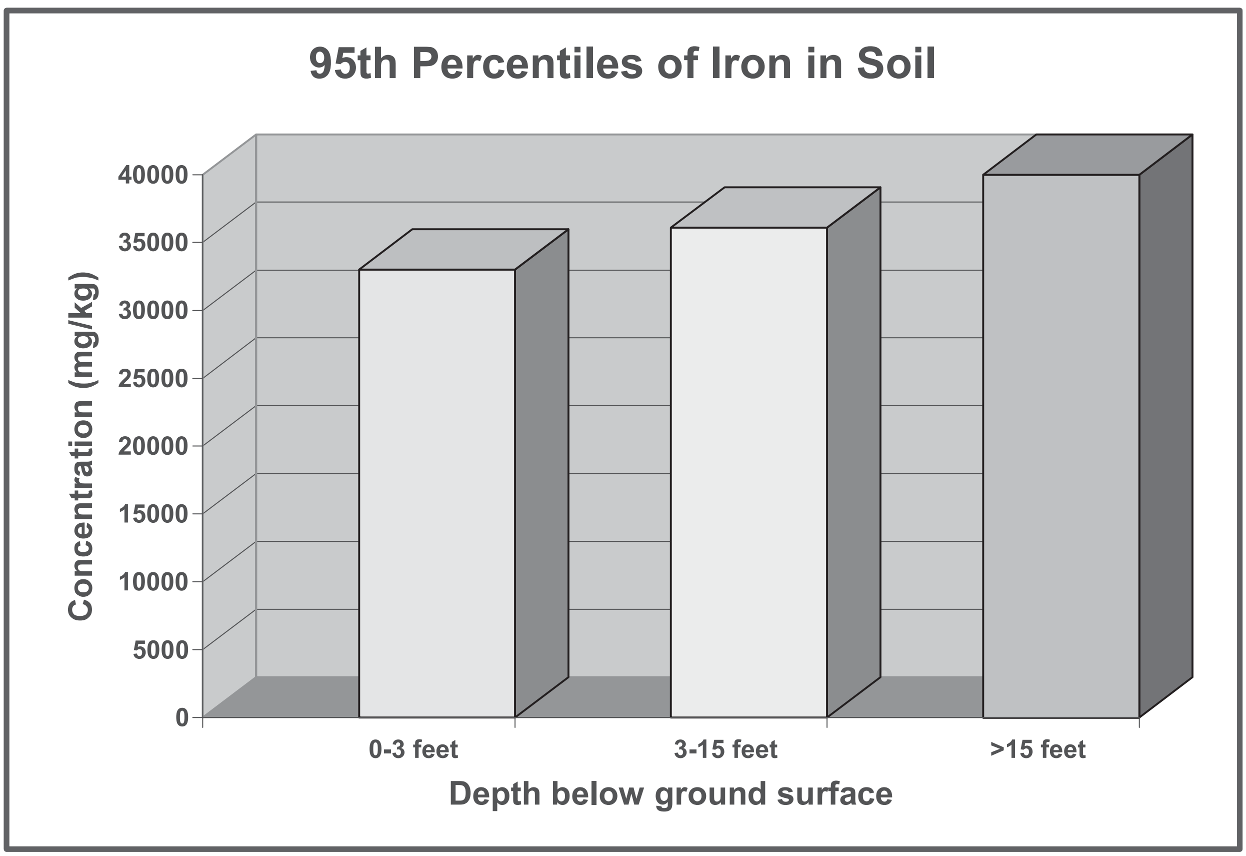
SOIL DATA FROM SURFACE TO 3 FEET								
Analyte	n	Percentile (mg/kg)			Detection	Median Method Detection Limit	Number Boreholes	Number AF Bases
		50th	95th	99th				
Aluminum	2718	7,615.0	22,100.0	28,400.0	98%	10.1	2042	11
Antimony	3003	*ND*	12.0	25.0	9%	6.1	2311	11
Arsenic	2807	2.4	12.6	23.2	69%	0.5	2051	12
Barium	2895	74.0	316.0	596.0	100%	1.0	2141	11
Beryllium	2748	0.3	1.1	2.1	57%	0.2	2112	11
Boron	105	6.1	116.0	136.0	82%	3.2	93	3
Cadmium	3101	*ND*	2.7	10.6	23%	0.5	2362	11
Chloride	224	7.6	419.0	1,100.0	94%	0.2	169	2
Chromium	3297	13.3	48.9	144.0	97%	1.0	2482	11
Chromium-6	560	*ND*	3.3	5.9	13%	0.2	431	9
Cobalt	2444	6.0	21.0	34.1	87%	1.0	1847	11
Copper	3163	11.9	52.7	221.0	97%	1.0	2390	11
Cyanide	422	*ND*	0.6	25.5	3%	0.5	354	9
Fluoride	125	1.0	8.9	18.0	79%	0.5	103	3
Iron	2797	12,600.0	33,000.0	45,600.0	100%	5.2	2094	10
Lead	3312	5.2	59.2	348.0	72%	2.0	2414	11
Magnesium	2436	3,130.0	8,730.0	19,900.0	98%	20.0	1856	10
Manganese	2790	224.0	810.0	1,400.0	100%	1.0	2082	11
Mercury	2471	*ND*	0.2	0.7	13%	0.1	1798	11
Molybdenum	2373	*ND*	20.3	44.0	19%	2.0	1785	11
Nickel	3078	8.3	38.8	127.0	76%	1.5	2345	11
Selenium	2806	*ND*	10.5	25.0	9%	0.6	2056	11
Silver	3251	*ND*	2.0	10.0	7%	0.6	2452	11
Sodium	2053	181.0	1,510.0	4,520.0	82%	51.7	1584	10
Thallium	2886	*ND*	25.0	169.5	8%	5.0	2210	11
Vanadium	2802	28.0	88.0	133.0	99%	1.0	2096	11
Zinc	3341	34.0	125.0	518.0	99%	1.1	2542	11

SOIL DATA FROM 3 FEET TO 15 FEET								
Analyte	n	Percentile (mg/kg)			Detection	Median Method Detection Limit	Number Boreholes	Number AF Bases
		50th	95th	99th				
Aluminum	2961	7,870.0	23,400.0	32,100.0	96%	10.0	1685	11
Antimony	3306	*ND*	13.0	30.0	8%	6.1	1940	11
Arsenic	3145	2.3	15.0	33.9	66%	0.5	1752	11
Barium	3149	70.4	357.0	624.0	100%	0.5	1765	11
Beryllium	2897	0.3	1.1	5.9	54%	0.2	1710	11
Boron	196	50.0	116.0	136.0	99%	3.7	99	3
Cadmium	3360	*ND*	2.5	7.7	15%	0.5	1976	11
Chloride	187	8.9	638.0	2,600.0	96%	0.2	2	2
Chromium	3637	13.8	49.9	94.0	96%	1.0	2078	11
Chromium-6	670	*ND*	2.5	4.4	13%	0.2	397	9
Cobalt	2647	6.4	20.7	35.0	83%	1.0	1537	11
Copper	3395	10.4	56.0	167.0	96%	1.0	1948	11
Cyanide	462	*ND*	0.6	1.3	1%	0.6	235	8
Fluoride	130	1.2	9.3	25.0	82%	0.5	77	1
Iron	3024	13,400.0	36,100.0	47,200.0	100%	5.3	1733	10
Lead	3862	3.2	20.0	89.0	66%	1.8	2081	12
Magnesium	2553	3,550.0	9,770.0	15,400.0	93%	20.0	1477	10
Manganese	3032	207.0	787.0	1,500.0	100%	1.0	1477	11
Mercury	2863	*ND*	0.3	0.6	11%	0.1	1635	11
Molybdenum	2547	*ND*	21.0	42.0	20%	2.0	1485	11
Nickel	3425	8.2	41.8	89.3	75%	1.2	1964	11
Selenium	3228	*ND*	11.0	48.0	10%	0.5	1803	11
Silver	3539	*ND*	2.0	5.0	5%	0.6	2042	11
Sodium	2305	250.0	1,980.0	4,010.0	88%	40.0	1338	10
Thallium	3049	*ND*	25.0	171.5	7%	2.2	1795	11
Vanadium	3027	28.6	86.0	127.0	100%	1.0	1727	11
Zinc	3707	31.6	93.2	250.0	99%	1.0	2109	11

SOIL DATA DEEPER THAN 15 FEET

Analyte	n	Percentile (mg/kg)			Detection	Median Method Detection Limit	Number Boreholes	Number AF Bases
		50th	95th	99th				
Aluminum	1794	7,010.0	23,600.0	34,400.0	96%	11.0	836	12
Antimony	2756	*ND*	12.5	18.0	8%	6.6	1096	12
Arsenic	2713	1.5	10.0	20.0	66%	0.6	1025	12
Barium	2296	56.5	257.0	493.0	100%	1.1	901	12
Beryllium	2597	0.3	1.2	5.8	54%	0.2	1034	11
Boron	134	47.0	147.0	160.0	99%	3.0	62	3
Cadmium	2906	*ND*	1.8	4.7	15%	0.5	1170	12
Chloride	161	17.0	802.0	6,510.0	96%	0.2	95	2
Chromium	3117	8.0	49.6	88.3	96%	1.1	1205	12
Chromium-6	830	*ND*	1.0	4.0	13%	0.1	183	8
Cobalt	2072	5.0	24.3	38.7	83%	1.1	838	12
Copper	2883	6.4	51.5	109.0	96%	2.0	1117	12
Cyanide	314	*ND*	0.7	1.7	1%	0.5	109	7
Fluoride	99	1.4	7.3	29.0	82%	0.5	43	1
Iron	2182	11,100.0	40,000.0	52,800.0	100%	5.6	895	12
Lead	3241	2.7	11.7	22.5	66%	2.0	1274	12
Magnesium	1996	3,040.0	9,690.0	13,600.0	93%	21.7	821	11
Manganese	2142	182.5	930.0	2,010.0	100%	1.1	883	12
Mercury	2368	*ND*	0.3	0.4	11%	0.1	877	11
Molybdenum	2047	*ND*	20.0	44.0	20%	2.2	833	12
Nickel	2887	5.0	43.8	68.5	75%	4.1	1146	12
Selenium	2622	*ND*	11.5	14.0	10%	0.6	1000	12
Silver	2879	*ND*	2.4	5.4	5%	1.0	1127	12
Sodium	1549	216.0	1,180.0	2,700.0	88%	108.0	718	11
Thallium	2704	*ND*	25.0	176.0	7%	5.0	1074	12
Vanadium	2142	24.4	90.7	120.0	100%	1.1	871	12
Zinc	2933	27.1	99.6	180.0	99%	2.1	1181	12


95th Percentiles of Lead in Soil
Concentration (mg/kg)
60
50
40
30
20
10
0
0-3 feet
3-15 feet
>15 feet
Depth below ground surface


95th Percentiles of Iron in Soil
Concentration (mg/kg)
40000
35000
30000
25000
20000
15000
10000
5000
0
0-3 feet
3-15 feet
>15 feet
Depth below ground surface

SUMMARY AND CONCLUSIONS

- Computer algorithms identified background locations, based on the absence of organic contamination, for 27 inorganic chemicals in groundwater and soil at California Air Force Bases.
- The 95th percentile is a good representation of background concentration, given the inherent complexities of these large and diverse samples.
- Concentrations of some inorganic chemicals vary considerably by soil depth.
- For some inorganic chemicals the 95th percentile exceeds health-based criteria of concern.
- Concentrations and statistics for the inorganic chemicals have not changed significantly since our previous report (Hunter and Davis, 2001).
- These data provide insight on background variability across a range of environments, but do not necessarily represent all areas of California.
- These results can provide a useful context, but they cannot substitute for site-specific background concentrations.

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DISCLAIMER

Determination of a Southern California Regional Background Arsenic Concentration in Soil

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Professional affiliations are listed for contact purposes only. Analysis and conclusions contained herein are solely those of the authors, and do not represent official policy of the Department of Toxic Substances Control.

Abstract

Background metals in soil can prove problematic for risk assessment purposes because metals detected at a site may be comprised of naturally occurring metals, regional anthropogenic contributions or a site-specific release. Arsenic is especially problematic since the risk-based soil concentration is 100-times below typical ambient concentrations.

The Department of Toxic Substances Control (DTSC) established a regional background arsenic concentration in soil that can be used as a screening tool for sites throughout southern California. The term "background" collectively refers to both naturally occurring and anthropogenic concentrations in shallow soil. Data were derived from completed Preliminary Environmental Assessment (PEA) reports for proposed school sites. Site data were combined for each county in southern California, including Los Angeles, Orange, Riverside, San Bernardino and San Diego counties. Los Angeles County had the largest number of sites (19 school sites) and arsenic data points (1097 samples) and will serve as the model for the statistical derivation of background arsenic.

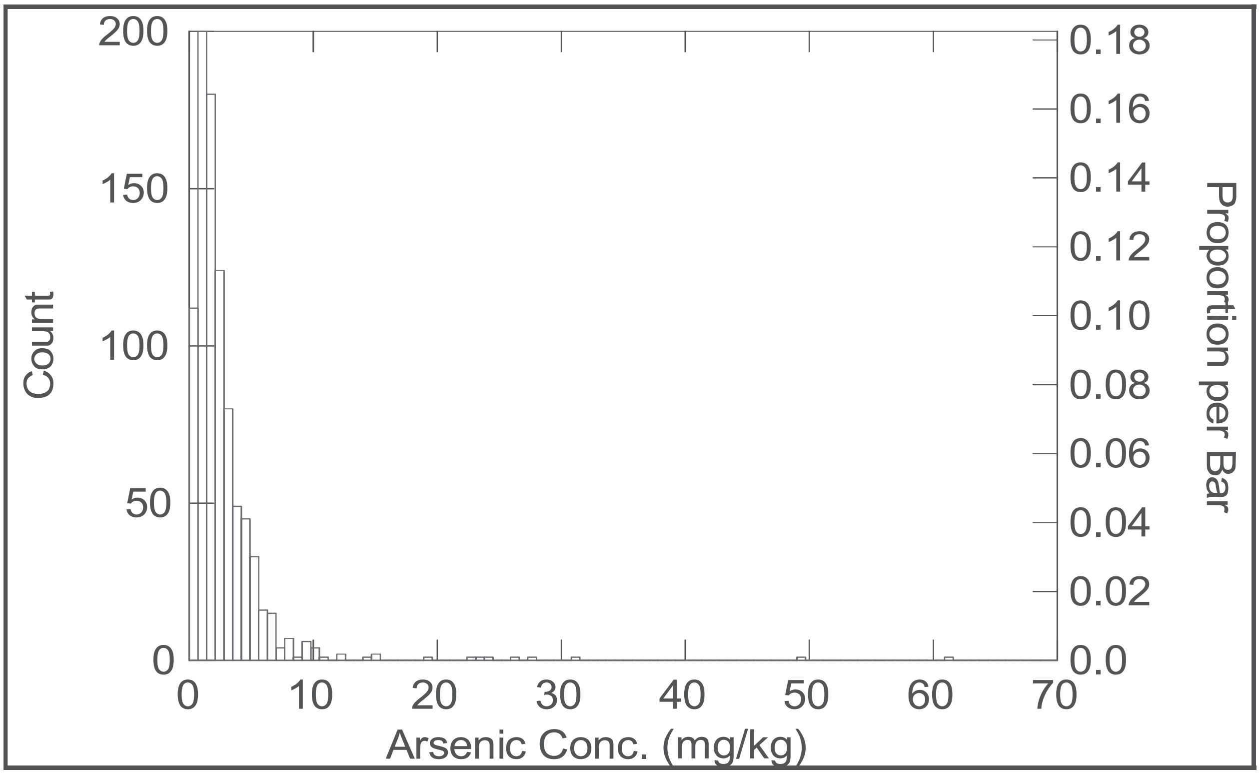
A probability plot of the arsenic data clearly demonstrated a classical, lognormal distribution from which outliers were determined using the box plot. The summary statistics for the arsenic data set, excluding the outliers, were calculated and the upper-bound arsenic concentration estimated using both the 95% confidence limit of the 99th quantile of the arsenic data set and a distribution-free, nonparametric analysis.

Both statistical methods resulted in an upper-bound arsenic concentration of approximately 12 mg/kg for Los Angeles County. Using the same approach, the upper-bound arsenic concentrations were similar for each of the other southern California counties, resulting in an upper-bound estimate of 12 mg/kg for arsenic in southern California. A similar evaluation is being conducted by DTSC for northern California sites in order to derive arsenic screening levels State-wide.

Introduction

The Department of Toxic Substances Control (DTSC) oversees the environmental assessments of proposed and existing school sites. Arsenic has proven problematic at these sites since the risk-based soil concentration of approximately 0.03 mg/kg is nearly always below the concentrations detected on site thereby necessitating the need to establish the arsenic background concentration at each site.

To determine if a regional arsenic background level could be established for the Los Angeles Unified School District (LAUSD), 1097 data points collected from 19 school sites distributed throughout the LAUSD were evaluated using both graphical data plots and statistical calculations.



A histogram of the data demonstrated a classical lognormal distribution with a wide range of arsenic concentrations. A box plot, also known as the fourth spread was used to identify 11 outliers, the two lowest values and the nine largest values, which were eliminated from further analysis. The descriptive statistics for the log-transformed arsenic data set, excluding the outliers previously established are summarized below.

DESCRIPTIVE STATISTIC	**VALUE**
Sample Size (n)	1086
Mean (μ)	0.1788 (1.51 mg/kg)
Median	0.1761 (1.50 mg/kg)
Standard Deviation	0.3646
Standard Error of the Mean[1]	0.0111
Minimum Concentration	-0.8125 (0.15 mg/kg)
Maximum Concentration	1.2930 (19.63 mg/kg)
Lower Quartile (Q_1)	-0.1249
Upper Quartile (Q_3)	0.4472

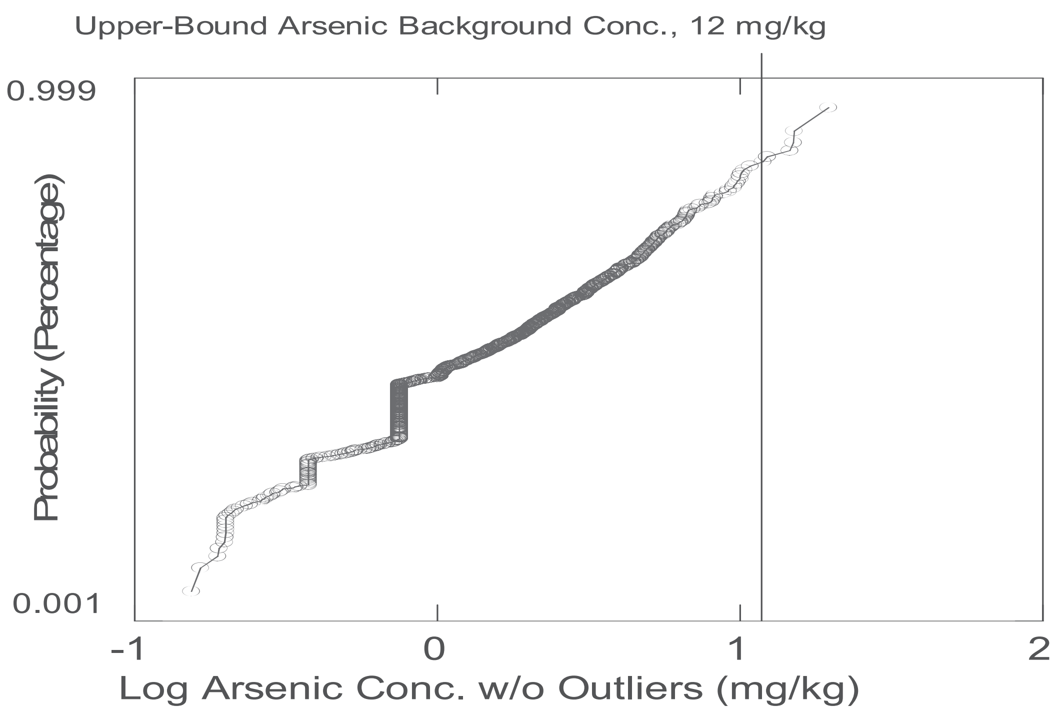
The upper limit of the data set was estimated according to the following equation:

$$UL_{1-\alpha}\left(X_p\right) = \bar{x} + sK_{1-\alpha,p}$$

Calculating the 95% confidence limit of the 99th quantile of the arsenic data set excluding the outliers, the $UL_{0.95}(X_{0.99})$ was found to be 1.054 in log units, or 11.32 mg/kg arsenic. A distribution-free non-parametric analysis to calculate the $UL_{0.95}(X_{0.99})$ as described by Gilbert (1987) used the following equation:

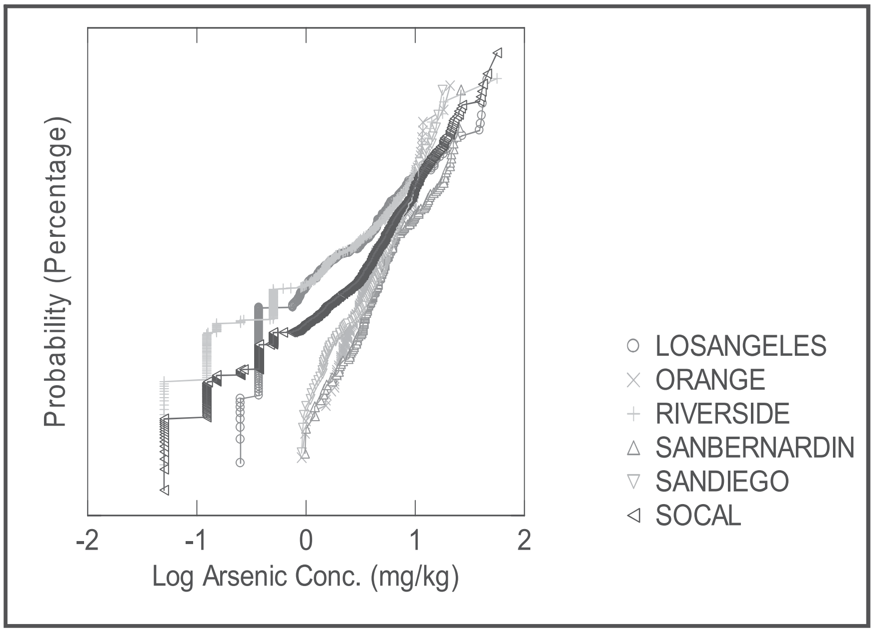
$$Rank\ of\ UL_{0.95}(X_{0.99}) = p(n+1) + Z_{1-\alpha}[np(1-p)]^{1/2}$$

The solution of this equation indicated that the $UL_{0.95}(X_{0.99})$ is 52.4% of the way between the 1081st and 1082nd highest arsenic concentrations which is 12.3 mg/kg. The Probability Plot of the arsenic data set excluding the outliers is shown below:



The plot demonstrates that the log-transformed data is normally distributed with an inflection point at approximately 1.0 which is equivalent to approximately 10 mg/kg. Taken together, the data from the statistical and graphical evaluation of the data from LAUSD has an upper bound between 10 and 12 mg/kg.

The same analysis was conducted on school sites from San Diego County (3 school sites), Orange County (7 school sites), Riverside County (15 school sites), San Bernardino County (6 school sites) and Los Angeles County (21 school sites).



As shown in the Probability Plot of the data from the 5 Southern California Counties, and the combined Southern California data, the individual plots share a common inflection point at approximately 1.1 on the logarithmic scale, or approximately 12 mg/kg.

Conclusion

A Probability Plot and statistical analysis of a large data set from school sites in Los Angeles County gave an upper-bound background arsenic concentration of 12/mg/kg. A Probability Plot for school sites from 5 counties in Southern California also gave an upper-bound background arsenic concentration of 12 mg/kg.

In some of the counties, there was another inflection point at approximately 1.5 mg/kg arsenic. This is interpreted as representing the upper-bound of the naturally occurring arsenic, while the inflection at 12 mg/kg represents the upper-bound of the naturally occurring plus anthropogenic arsenic.

This finding suggests that in Southern California, 12 mg/kg maybe a useful screening number for evaluating arsenic as a chemical of potential concern. A similar evaluation is being conducted by DTSC for school sites in Northern California in order to derive arsenic screening levels State-wide.

APPENDEIX C WHAT CONSTITUTES AN ADVERSE HEALTH EFFECT OF AIR POLLUTION?

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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 ($PM_{2.5}$)			
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 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 witn 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 forma1 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 perspectivc (16). Both perspectives arc 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 arc 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 bioacrosols 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 sociocconomically 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 repre-

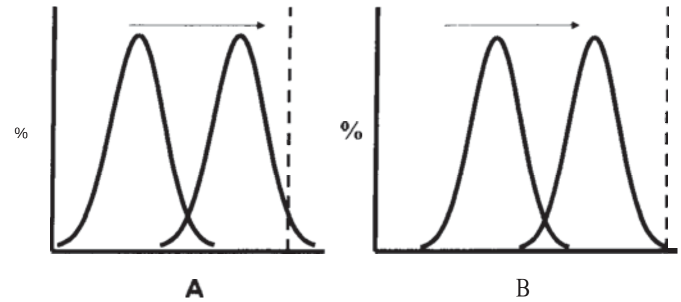

Figure 7. Hypothetical distributions **of exposure for two populations, *A* and *B*. (See text for explanation.)**

senting 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.

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 biomarkcrs 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,

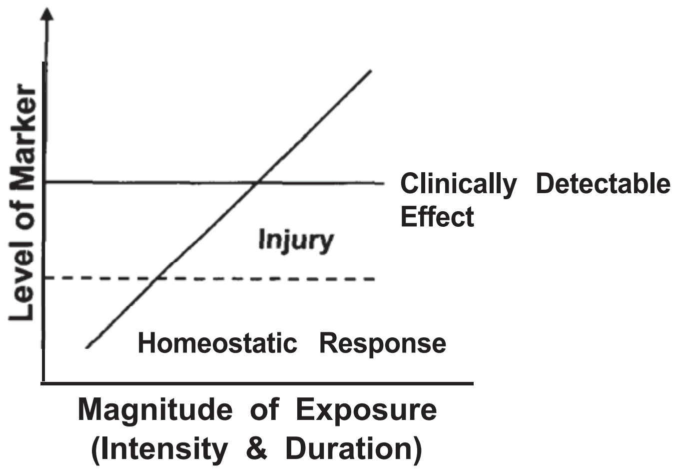

figure 2. Schema for considering biomarkers of response.

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-

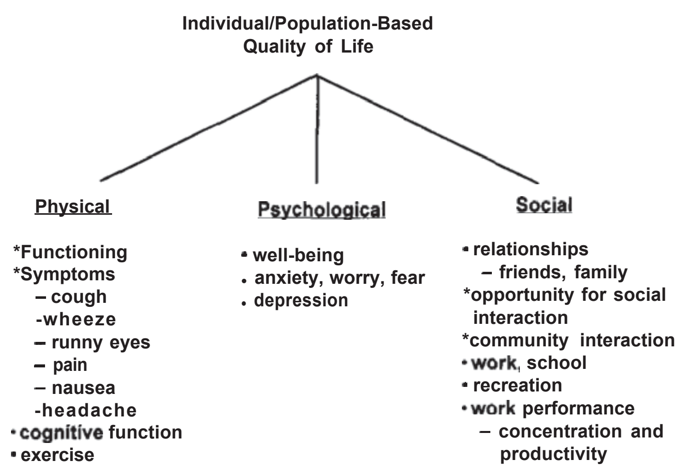

Figure 3. Quality of life domains vulnerable to the adverse health/respiratory effects of air pollution.

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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APPENDEIX D OPERATION PHASE EMISSIONS

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	Project Year 1-2 (lbs/hr)					
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX
Quarrying Fugitive Emissions				5.25	1.533	
Quarrying Engine Emissions	0.174	1.203	2.051	0.075	0.069	0.004
Off-Road Haul - Mine to Processing Area (Fugitive)				8.39	1.78	
Off-Road Haul - Mine to Processing Area (Engine)	0.176	0.990	1.782	0.065	0.059	0.003
Processing Area Drop/Storage	0.165	1.072	1.771	0.461	0.182	
Plant/Aggregate Processing				3.092	0.903	
Loadout Processing Area Drop/Storage				0.386	0.113	
Onroad Onsite Haul Engine Emissions	0.005	0.023	0.137	0.005	0.003	0.0003
Onroad Onsite Haul Fugitive Emissions				15.384	3.261	

	Project Year 3-16 (lbs/hr)					
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX
Quarrying Fugitive Emissions				5.25	1.533	
Quarrying Engine Emissions	0.154	1.127	1.645	0.062	0.057	0.004
Off-Road Haul - Mine to Processing Area (Fugitive)				8.39	1.78	
Off-Road Haul - Mine to Processing Area (Engine)	0.150	0.893	1.304	0.048	0.044	0.003
Processing Area Drop/Storage	0.141	0.984	1.411	0.444	0.166	0.003
Plant/Aggregate Processing				3.092	0.903	
Loadout Processing Area Drop/Storage				0.386	0.113	
Onroad Onsite Haul Engine Emissions	0.003	0.017	0.104	0.004	0.002	0.0003
Onroad Onsite Haul Fugitive Emissions				15.384	3.261	

	Project Year 17-30 (lbs/hr)					
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX
Quarrying Fugitive Emissions				5.25	1.533	
Quarrying Engine Emissions	0.157	0.836	0.359	0.014	0.014	0.004
Off-Road Haul - Mine to Processing Area (Fugitive)				8.39	1.78	
Off-Road Haul - Mine to Processing Area (Engine)	0.139	0.738	0.232	0.009	0.009	0.003
Processing Area Drop/Storage	0.109	0.808	0.315	0.395	0.121	0.003
Plant/Aggregate Processing				3.092	0.903	
Loadout Processing Area Drop/Storage				0.386	0.113	
Onroad Onsite Haul Engine Emissions	0.001	0.010	0.058	0.003	0.001	0.0002
Onroad Onsite Haul Fugitive Emissions				15.384	3.261	

	Project Year 1-2 (tons/yr)						
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX	CO2e
Quarrying Fugitive Emissions	0	0	0	2.457	0.717444	0	0
Quarrying Engine Emissions	0.027371	0.189532	0.323167	0.011828	0.01087	0.000591	57.61856
Off-Road Haul - Mine to Processing Area (Fugitive)	0	0	0	3.925195	0.832141	0	0
Off-Road Haul - Mine to Processing Area (Engine)	0.082175	0.463512	0.833785	0.030308	0.027808	0.001562	152.8626
Plant Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Aggregate Processing	0.075741	0.558725	0.798898	1.485079	0.457471	0.001175	1419.409
Loadout Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Onroad Onsite Haul Engine Emissions	0.002526	0.010618	0.064091	0.002289	0.001531	0.000159	17.60097
Onroad Onsite Haul Fugitive Emissions	0	0	0	7.19949	1.526292	0	0
Onroad Offsite Haul Engine Emissions	0.091838	0.386091	2.330578	0.083242	0.055683	0.005775	640.0354
Total	**0.279652**	**1.608479**	**4.35052**	**15.55608**	**3.734843**	**0.009263**	**2287.526**

	Project Year 3-16 (tons/yr)						
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX	CO2e
Quarrying Fugitive Emissions	0	0	0	2.457	0.717444	0	0
Quarrying Engine Emissions	0.024235	0.177637	0.259198	0.009715	0.008928	0.000591	56.25525
Off-Road Haul - Mine to Processing Area (Fugitive)	0	0	0	3.925195	0.832141	0	0
Off-Road Haul - Mine to Processing Area (Engine)	0.070302	0.418003	0.6104	0.022497	0.020622	0.001562	149.4674
Plant Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Aggregate Processing	0.064098	0.52682	0.641567	1.475709	0.44893	0.001175	1417.096
Loadout Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Onroad Onsite Haul Engine Emissions	0.00163	0.007831	0.048726	0.001894	0.001153	0.000153	16.90301
Onroad Onsite Haul Fugitive Emissions	0	0	0	7.19949	1.526292	0	0
Onroad Offsite Haul Engine Emissions	0.059267	0.284765	1.771866	0.068876	0.041938	0.005546	614.6551
Total	**0.219532**	**1.415057**	**3.331757**	**15.52203**	**3.70305**	**0.009028**	**2254.376**

	Project Year 17-30 (tons/yr)						
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX	CO2e
Quarrying Fugitive Emissions	0	0	0	2.457	0.717444	0	0
Quarrying Engine Emissions	0.024739	0.131744	0.056594	0.002165	0.002165	0.000591	67.27716
Off-Road Haul - Mine to Processing Area (Fugitive)	0	0	0	3.925195	0.832141	0	0
Off-Road Haul - Mine to Processing Area (Engine)	0.06499	0.345261	0.108734	0.004062	0.004062	0.001562	177.7076
Plant Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Aggregate Processing	0.052021	0.47578	0.189702	1.451076	0.42656	0.001257	1439.34
Loadout Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Onroad Onsite Haul Engine Emissions	0.000369	0.004575	0.027163	0.00134	0.000623	0.000112	12.36151
Onroad Onsite Haul Fugitive Emissions	0	0	0	7.19949	1.526292	0	0
Onroad Offsite Haul Engine Emissions	0.013401	0.166381	0.987763	0.048736	0.022669	0.004057	449.5096
Total	**0.15552**	**1.123741**	**1.369956**	**15.45071**	**3.637559**	**0.007579**	**2146.196**

Aggregates Plant - Future

	lb/hr	lb/yr	ton/yr
PM10 Emissions	3.092	2894.112	1.447
PM2.5 Emissions	0.903	845.081	0.423

Device Identifier	Device Type	Max. (ton/hr)	Max. (ton/yr)	Code	Description	PM10 (lb/ton)	PM10 Max. (lb/hr)	PM10 Max. (lb/yr)	Estimated Power (Kw)
A	Grizzly Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
B	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
C	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
D	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
E	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
F	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
G	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
H	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
I	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
J	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
K	Screen	500	468000	1	*Screening*	0.000740	0.3700	346.3200	100.0000
L	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
M	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
N	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
O	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
P	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
Q	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
R	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
S	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
T	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
U	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
V	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
W	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
Z	Belt Scale	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
AA	Surge Bin	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
BB	Jaw Crusher	500	468000	2	*Primary Crushing*	0.002400	1.2000	1123.2000	225.0000
CC	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
DD	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
Portable - Exctec	Vibrating Grizzly	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Screen	500	468000	1	*Screening*	0.000740	0.3700	346.3200	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Powerscreen	Receiving Hopper	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Powerscreen	Vibrating Grizzly	500	468000	0	*Pass Through*	0.000000	*0.0000*	*0.0000*	*0.0000*
Portable - Powerscreen	Screen	500	468000	1	*Screening*	0.000740	0.3700	346.3200	*0.0000*
Portable - Powerscreen	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*

Plant equipment based on VCAPCD Permit Number 00489.

Emission Factors (lb/ton)
AP 42 Table 11.19.2-2, 8/04

Operation Type	Description	PM 10		
		No Control	Control	% Reduction
0	Mis. Ops	0.000000	0	
1	Screening	0.008700	0.000740	0.91
2	Primary Crushing	0.002400	0.000540	0.78
3	Secondary Crushing	0.002400	0.000540	0.78
4	Tertiary Crushing	0.002400	0.000540	0.78
5	Fines Crushing	0.015000	0.001200	0.92
6	Fines Screening	0.072000	0.002200	0.97
7	Conv. Transfer Pt.	0.001100	0.000046	0.96
8	Wet Drilling	0.000080		
9	Truck Unloading Stone	0.000016		

Emission Factors from AP-42 Table 11.19.2-2

PM2.5 emission factor assumed to be 29.2% of PM10 based on SCAQMD's Updated CEIDARS

Electricity Use

Total Kw Draw:	950.0000
Estimated Annual Opp Hours:	2920
Estimated Annual Kw-hr Use:	2774000
Annual CO2e Emissions (grams):	1184498000
Annual CO2e Emissions (lbs):	2611371.086
Annual CO2e Emissions (tons):	1305.685543

CO2e Emissions based on ARB documentation https://bit.ly/2SE6XKF

Material Drop, Storage, and Mining Emissions Factors		
Storage Cycle* Emission Factor from AP42 13.2.4:		
PM10 E.F. (lb/ton) = k(0.0032)(U/5)1.3/(M/2)1.4		
	Value	**Units**
k = particle size multiplier =	0.35	dimensionless
U = mean wind speed =	5.82	mph
M = material moisture content =	3	percent
PM10 EF =	**0.00077**	**lb/ton**
PM2.5 EF =	**0.00023**	**lb/ton**

*****Includes loading into piles, equiptment traffic, windblown dust, and loadout

wind speed taken from CalEEMod Appendix D Table 1.1: Weather Data

Material Drop, Storage, and Mining Emissions Factors		
Aggregate Mining Emission Factor (SDAPCD Documentation)		
	Value	**Units**
Uncontrolled PM10 Ems Factor =	0.021	lbs/ton quarried
PM2.5 Component of PM10 =	0.292	weight fraction
Control Factor (Water Spray) =	0.5	weight fraction
EF PM10 =	**0.0105**	**lbs/ton quarried**
EF PM2.5 =	**0.003066**	**lbs/ton quarried**

*See https://bit.ly/2FuS1pq

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		On-road Trucks	
	PM10	**PM2.5**	**PM10**	**PM2.5**
S = silt content (%) =	4.8		4.8	
W_l = loaded truck wt (tons) =	75		40	
W_u = unloaded truck wt (tons) =	35		15	
W = avg truck weight	55		27.5	
EF (lb/VMT) =	9.55	2.03	6.99	1.48
Baseline C.E. =	80%	80%	80%	80%
Baseline EF (lb/VMT) =	**1.91**	**0.41**	**1.40**	**0.30**

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		On-road Trucks	
	PM10	**PM2.5**	**PM10**	**PM2.5**
S = silt content (%) =	4.8		4.8	
W_l = loaded truck wt (tons) =	75		40	
W_u = unloaded truck wt (tons) =	35		15	
W = avg truck weight	55		27.5	
EF (lb/VMT) =	9.55	2.03	6.99	1.48
Future C.E. =	80%	80%	80%	80%
Future EF (lb/VMT) =	**1.91**	**0.41**	**1.40**	**0.30**

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).*

Basline Paved Road Emission Factors

Paved Road emissions factor from AP42 Section 13.2.1

EF (lb/VMT)= k * $(sL)^{0.91}$ * $(W)^{1.02}$	Mining Haul Trucks		On-road Trucks	
	PM10	**PM2.5**	**PM10**	**PM2.5**
k= particle size multiplier (lb/vmt) =	0.0022	0.00054	0.0022	0.00054
sL = road surface silt loading (g/m^2) =	0.2	0.2	0.2	0.2
W_l = loaded truck wt (tons) =	75	120	40	40
W_u = unloaded truck wt (tons) =	35	50	15	15
W = avge truck weight	55.00	85.00	27.50	27.50
EF (lb/VMT) =	0.03	0.01	0.01	0.00
Baseline C.E. =	80%	80%	80%	80%
Baseline EF (lb/VMT) =	**0.0061**	**0.0023**	**0.0030**	**0.0007**

Particle size multiplier based on AP-42 Table 13.2.1-1
Silt Loading based on ADT of 500 - 5000 from AP-42 Table 13.1-2
Control efficiency for unpaved roads in baseline is 80% for watering.

Future Paved Road Emission Factors

Paved Road emissions factor from AP42 Section 13.2.1

EF (lb/VMT)= k * $(sL)^{0.91}$ * $(W)^{1.02}$	Mining Haul Trucks		On-road Trucks	
	PM10	**PM2.5**	**PM10**	**PM2.5**
k= particle size multiplier (lb/vmt) =	0.0022	0.00054	0.0022	0.00054
sL = road surface silt loading (g/m^2) =	0.2	0.2	0.2	0.2
W_l = loaded truck wt (tons) =	75	120	40	40
W_u = unloaded truck wt (tons) =	35	50	15	15
W = avge truck weight	55.00	85.00	27.50	27.50
EF (lb/VMT) =	0.03	0.01	0.01	0.00
Future C.E. =	80%	80%	80%	80%
Future EF (lb/VMT) =	**0.0061**	**0.0023**	**0.0030**	**0.0007**

Particle size multiplier based on AP-42 Table 13.2.1-1
Silt Loading based on ADT of 500 - 5000 from AP-42 Table 13.1-2
Control efficiency for unpaved roads in baseline is 80% for watering.

Future Years 1 - 2							CalEEMod Emission Factor (2019) g/hp-hr								Max Hour Emissions (lbs)								Max Annual Emissions (lbs)							
Equipment	Make	Model	Estimated HP	Max Annual Op-Hrs	Max Hour Op-Hrs	Load Factor (a)	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
Excavator	John Deere	870 Ex	500	315.15	1	0.38	0.16	1.11	1.78	0.005	0.06	0.05	481.24	0.15	0.07	0.47	0.75	0.0021	0.024	0.022	201.58	0.06	21.39	146.99	234.96	0.66	7.66	7.00	63528.04	20.07
Dozer	John Deere	1050 K	350	315.15	1	0.43	0.32	2.22	3.93	0.005	0.15	0.14	485.86	0.15	0.11	0.74	1.31	0.0017	0.051	0.047	161.21	0.05	33.36	232.07	411.37	0.52	16.00	14.74	50804.87	16.10
Loader	John Deere	844 K	400	630	1	0.4	0.31	1.72	3.29	0.005	0.12	0.11	477.04	0.15	0.11	0.61	1.16	0.0018	0.043	0.040	168.27	0.05	68.03	383.48	730.93	1.11	27.35	25.12	106062.00	33.57
Haul Truck	John Deere	410 E	450	1658	1.8	0.38	0.26	1.48	2.67	0.005	0.10	0.09	485.38	0.15	0.18	0.99	1.78	0.0033	0.065	0.059	324.06	0.10	164.35	927.02	1667.57	3.12	60.62	55.62	303319.35	96.24
Screening Plant Engine	Extect	S5	100	936	1	0.4	0.29	1.62	3.37	0.005	0.13	0.12	480.75	0.15	0.03	0.14	0.30	0.0004	0.011	0.010	42.39	0.01	24.02	133.68	278.23	0.41	10.57	9.74	39681.48	12.55
Screening Plant Engine	PowerScreen	800-PS	100	1872	1	0.4	0.36	3.64	3.57	0.005	0.23	0.21	484.11	0.15	0.03	0.32	0.31	0.0004	0.020	0.019	42.69	0.01	59.43	600.29	588.64	0.83	38.13	35.00	79918.34	25.26

a - Load Factor based on CalEEMod Appendix D OFFROAD Default Horsepower and Load Factors

Screen Plant Egnine Op-Hrs based on maximum throughput listed on Permit 00489

Future Years 3 - 16							CalEEMod Emission Factor (2021) g/hp-hr								Max Hour Emissions (lbs)								Max Annual Emissions (lbs)							
Equipment	Make	Model	Estimated HP	Max Annual Op-Hrs	Max Hour Op-Hrs	Load Factor (a)	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
Excavator	John Deere	870 Ex	500	315.15	1	0.38	0.14	1.09	1.33	0.005	0.05	0.04	469.62	0.15	0.06	0.46	0.56	0.0021	0.019	0.017	196.71	0.06	18.88	143.60	175.80	0.66	5.94	5.41	61994.02	20.07
Dozer	John Deere	1050 K	350	315.15	1	0.43	0.28	2.02	3.28	0.005	0.13	0.12	474.48	0.15	0.09	0.67	1.09	0.0017	0.043	0.039	157.43	0.05	29.59	211.68	342.59	0.52	13.49	12.44	49614.89	16.00
Loader	John Deere	844 K	400	630	1	0.4	0.26	1.53	2.61	0.005	0.10	0.09	467.93	0.15	0.09	0.54	0.92	0.0018	0.034	0.032	165.06	0.05	58.70	340.00	580.37	1.11	21.57	20.01	104035.70	33.57
Haul Truck	John Deere	410 E	450	1658	1.8	0.38	0.23	1.34	1.95	0.005	0.07	0.07	474.54	0.15	0.15	0.89	1.30	0.0033	0.048	0.044	316.82	0.10	140.60	836.01	1220.80	3.12	44.99	41.24	296544.61	95.61
Screening Plant Engine	Extect	S5	100	936	1	0.4	0.25	1.44	2.60	0.005	0.10	0.09	470.30	0.15	0.02	0.13	0.23	0.0004	0.009	0.008	41.47	0.01	20.97	119.01	214.74	0.41	8.34	7.68	38818.83	12.55
Screening Plant Engine	PowerScreen	800-PS	100	1872	1	0.4	0.29	3.60	2.96	0.005	0.17	0.15	473.59	0.15	0.03	0.32	0.26	0.0004	0.015	0.013	41.76	0.01	48.53	594.63	488.02	0.83	27.40	25.09	78180.99	25.26

a - Load Factor based on CalEEMod Appendix D OFFROAD Default Horsepower and Load Factors

Screen Plant Egnine Op-Hrs based on maximum throughput listed on Permit 00489

Future Years 17 - 30							CalEEMod Emission Factor (2035) g/hp-hr								Max Hour Emissions (lbs)								Max Annual Emissions (lbs)							
Equipment	Make	Model	Estimated HP	Max Annual Op-Hrs	Max Hour Op-Hrs	Load Factor (a)	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
Excavator	John Deere	870 Ex	500	315.15	1	0.38	0.20	1.09	0.34	0.005	0.01	0.01	568.30	0.02	0.08	0.46	0.14	0.0021	0.005	0.005	238.05	0.01	25.74	143.76	44.49	0.66	1.72	1.72	75021.23	2.24
Dozer	John Deere	1050 K	350	315.15	1	0.43	0.23	1.15	0.66	0.005	0.03	0.03	568.30	0.02	0.08	0.38	0.22	0.0017	0.008	0.008	188.56	0.01	23.74	119.73	68.70	0.52	2.61	2.61	59424.71	2.09
Loader	John Deere	844 K	400	630	1	0.4	0.19	1.08	0.42	0.005	0.02	0.02	568.30	0.02	0.07	0.38	0.15	0.0018	0.005	0.005	200.46	0.01	42.47	239.23	92.49	1.11	3.33	3.33	126351.54	3.78
Haul Truck	John Deere	410 E	450	1658	1.8	0.38	0.21	1.11	0.35	0.005	0.01	0.01	568.30	0.02	0.14	0.74	0.23	0.0033	0.009	0.009	379.42	0.01	129.98	690.52	217.47	3.12	8.12	8.12	355134.01	11.25
Screening Plant Engine	Extect	S5	100	936	1	0.4	0.19	1.08	0.35	0.005	0.01	0.01	568.30	0.02	0.02	0.10	0.03	0.0004	0.001	0.001	50.12	0.00	15.85	89.31	28.89	0.41	1.07	1.07	46908.01	1.40
Screening Plant Engine	PowerScreen	800-PS	100	1872	1	0.4	0.28	3.77	1.56	0.006	0.02	0.02	568.30	0.03	0.02	0.33	0.14	0.0005	0.002	0.002	50.12	0.00	45.73	623.02	258.02	0.99	3.63	3.63	93816.02	4.13

a - Load Factor based on CalEEMod Appendix D OFFROAD Default Horsepower and Load Factors

Screen Plant Egnine Op-Hrs based on maximum throughput listed on Permit 00489

Loader Cycle Time Analysis

Loader Comparison	John Deere 844K	Caterpillar 980G
Net Horse Power	377	373
Avg. Bucket Size Range (yd^3)	6.3 - 8.1	5 - 8
WheelBase (feet)	12.2	12.5

*On-site loader was assumed to be functionally similar to Caterpillar 980 Model based on manufacturer specifications including but not limited to those demonstrated in this table.

Parameters	Assumption/Calculation
Loader Model	980
Travel Distance (avg) (meters)	25
Bucket Payload[1] (yd^3)	5.5
Bucket Payload in Tons	8.25
Material Type[2]	1/8" to 3/4"
Bucket Fill Factor[2]	90%
Job Efficiency[3] (work 50 min/hr)	83%
Grade Resistance[4]	0%
Rolling Resistance[4]	2%
Total Resistance[4]	2%

Hydraulic Cycle Time (mins) [5]	Assumption/Calculation	
Average Cycle Time [6]		0.55
Material Handler?	Yes	-0.05
Materials:	Mixed	0.02
Pile:	Conveyor piled > 10'	0.00
Truck Ownership:	Independent	0.04
Operation Cycle:	Constant	-0.04
Target Type:	N/A	0.00
Total Hydraulic Cycle Time		**0.52**

Total Cycle Time	Assumption/Calculation
Hydraulic Cycle Time (min/cycle)	0.52
Travel with load[7] (min/cycle)	0.10
Travel empty[7] (min/cycle)	0.10
Total Cycle Time (min/cycle)	**0.72**

Production Rate Calculations	Material Handling	
	Baseline	Future
Cycles per Hour	100.0	100.0
One Machine Production Rate (tph)	743	743
Max Hour Production Rate (tph)	0	500
Max Annual Throughput (tpy)	0	468,000
Opperating Hours Max Hour	0.00	0.67
Operating Hours per Year	0	630

[1] Average of Caterpillar Performance Handbook (CPH) indicated range of 5 to 8 yd^3 for 980G loaders
[2] Material type and bucket fill factor from Caterpillar Performance Handbook Edition 37, February 2007 (CPH) page 27-1
[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 Edition 38 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 12-104,105 in CPH were used to estimate the travel times for 908G loaders.
*See John Deere Manufacterer Specifications https://www.deere.com/en/loaders/wheel-loaders/844k-ii-wheel-loader/ and Caterpillar Manufacturer Specifications https://www.deere.com/en/loaders/wheel-loaders/844k-ii-wheel-loader/ for modern versions of specified Loader Models.

Off-Road Haul Truck (Cat 773C or equivalent) Cycle Time Analysis

Haul Truck Comparison	John Deere 410E	Caterpillar 740
Net Horse Power	443	436
Load Capacity (tons)	41	42

*On-site loader was assumed to be functionally similar to Caterpillar 980 Model based on manufacturer specifications including but not limited to those demonstrated in this table.

Truck Loading Details

	Amount	Units	Source
Max Rate Transferred	743	tons/hour	Project Specification
Truck payload	41	tons	John Deere: https://bit.ly/2YpqIFR
Baseline Haul Distance	0.36	Miles	Google Earth
Future Haul Distance	0.36	Miles	Google Earth
Average Loaded Speed	10	mph	Assumption
Average Unloaded Speed	15	mph	Assumption
Time to load a truck	3.3	minutes	Loader Cycle Time Analysis
Truck maneuver in loading area	0.7	minutes	Page 1-25, CPH ed. 48
Total loading and maneuver time	4.0	minutes	Calculation

	Baseline Time (min.)	Future Time (min.)	Assumptions
Load Total	4.0	4.0	See Loader CT
Travel to Plant Feed	2.2	2.2	Calculation
Dump	1.1	1.1	Estimated
Travel to Quarry	1.4	1.4	Calculation
Total Cycle Time	**8.7**	**8.7**	
Tons/Hour Hauled per Truck	**282**	**282**	
Loads in Max Hour	**0**	**12**	
Loads in Max Year	**0**	**11415**	
VMT in Max hour	**0**	**4**	
VMT in Max Year	**0**	**4109**	
Truck Hrs Required Max Hour	**0.00**	**1.77**	
Truck Hrs Required Max Year	**0**	**1658**	

On-Road Haul Truck Specifications

	Baseline	Future
On-site Loop Distance (Miles):	0.55	0.55
Off-Site Round Trip (Miles):	20	20
Capacity (tons/load):	25	25
On-Site Max Hour VMT:	0	11
On-Site Max Annual VMT:	0	10296
Off-Site Max Annual VMT:	0	374400

Ventura County EMFAC2017 On-Road T7-Tractor Emission Factors

	lbs/VMT								VMT/Gallon
calendar_year	HC_EF	ROG_EF	CO_EF	NOx_EF	PM10_EF	PM2_5_EF	SOx_EF	CO2e_EF	MPG
2000	0.002746	0.003478058	0.014118	0.046897	0.002534	0.002296	0.000320308	4.109612	5.736428792
2001	0.002637	0.003339197	0.01321	0.047484	0.002322	0.002094	0.000318878	4.091065	5.762155581
2002	0.002623	0.003321202	0.013061	0.047473	0.002269	0.002043	0.000317221	4.069658	5.792246831
2003	0.002596	0.003287186	0.012587	0.047533	0.002138	0.001917	0.000317423	4.07253	5.788570025
2004	0.002617	0.003314451	0.012694	0.046522	0.002151	0.00193	0.000316452	4.060075	5.806326008
2005	0.00231	0.002924929	0.011448	0.042522	0.001979	0.001766	0.000311415	3.994949	5.90024847
2006	0.002269	0.002873853	0.01135	0.041036	0.001952	0.00174	0.000311089	3.98911	5.906431075
2007	0.002182	0.002763366	0.010879	0.039312	0.001824	0.001617	3.58559E-05	3.984906	5.912847565
2008	0.002136	0.002705265	0.010616	0.038249	0.001767	0.001563	3.57945E-05	3.978454	5.922981535
2009	0.00196	0.002482708	0.009768	0.035323	0.001638	0.00144	3.59801E-05	3.999212	5.892440108
2010	0.002185	0.002767359	0.010757	0.037704	0.001738	0.001535	3.59459E-05	3.995919	5.898037087
2011	0.002059	0.002606942	0.01012	0.035488	0.001634	0.001435	3.58037E-05	3.978574	5.92145834
2012	0.001868	0.002365583	0.009212	0.033267	0.001508	0.001315	3.56998E-05	3.966496	5.938696438
2013	0.001318	0.001668617	0.006434	0.026527	0.001098	0.000923	3.44634E-05	3.825699	6.15175657
2014	0.00103	0.001304954	0.005075	0.022844	0.000895	0.000728	3.3784E-05	3.749202	6.275464335
2015	0.000874	0.001107111	0.004309	0.019987	0.000773	0.000611	3.31928E-05	3.679249	6.387245291
2016	0.000715	0.000904971	0.00356	0.017348	0.000665	0.000509	3.25522E-05	3.608037	6.512931056
2017	0.000559	0.000707978	0.002821	0.015236	0.000556	0.000404	3.18708E-05	3.532299	6.652188754
2018	0.000459	0.00058094	0.002374	0.013705	0.000491	0.000342	3.13429E-05	3.473659	6.764225728
2019	0.000387	0.000490589	0.002062	0.01245	0.000445	0.000297	3.08505E-05	3.418992	6.87219076
2020	0.000315	0.000399518	0.001769	0.010947	0.000403	0.000258	3.02521E-05	3.35258	7.008126573
2021	0.00025	0.000316598	0.001521	0.009465	0.000368	0.000224	2.96287E-05	3.283414	7.155565696
2022	0.000135	0.000171509	0.00105	0.007556	0.000289	0.000149	2.86036E-05	3.16965	7.412024963
2023	5.33E-05	6.75589E-05	0.000822	0.005431	0.000262	0.000123	2.69133E-05	2.98224	7.877524187
2024	5.48E-05	6.93627E-05	0.000849	0.00553	0.000263	0.000123	2.66104E-05	2.948674	7.967207285
2025	5.59E-05	7.07832E-05	0.000869	0.005574	0.000263	0.000124	2.62207E-05	2.905496	8.085612283
2026	5.68E-05	7.18904E-05	0.000885	0.005593	0.000264	0.000124	2.58044E-05	2.859374	8.216043321
2027	5.73E-05	7.25803E-05	0.000895	0.005582	0.000264	0.000124	2.53206E-05	2.805766	8.37302904
2028	5.77E-05	7.3026E-05	0.000902	0.005555	0.000264	0.000124	2.48229E-05	2.75061	8.540934605
2029	5.78E-05	7.31964E-05	0.000905	0.00551	0.000263	0.000124	2.43291E-05	2.695903	8.714258879
2030	5.79E-05	7.32959E-05	0.000908	0.00547	0.000263	0.000123	2.38416E-05	2.641882	8.892452988
2031	5.79E-05	7.33018E-05	0.000911	0.005471	0.000262	0.000122	2.34012E-05	2.593079	9.059816442
2032	5.77E-05	7.30161E-05	0.000908	0.005424	0.000261	0.000122	2.2929E-05	2.540756	9.246397791
2033	5.73E-05	7.25186E-05	0.000901	0.005375	0.000261	0.000122	2.24855E-05	2.491614	9.428765614
2034	5.69E-05	7.20158E-05	0.000894	0.005323	0.000261	0.000121	2.20596E-05	2.444419	9.610814985
2035	5.65E-05	7.15879E-05	0.000889	0.005277	0.00026	0.000121	2.16698E-05	2.401226	9.783695231
2036	5.62E-05	7.11794E-05	0.000883	0.005236	0.00026	0.000121	2.13305E-05	2.363635	9.939298736
2037	5.59E-05	7.07764E-05	0.000878	0.0052	0.00026	0.000121	2.09954E-05	2.326497	10.09796486
2038	5.56E-05	7.04302E-05	0.000873	0.005169	0.00026	0.00012	2.06931E-05	2.293009	10.24544164
2039	5.54E-05	7.01365E-05	0.000869	0.005145	0.000259	0.00012	2.04241E-05	2.263198	10.38039686
2040	5.52E-05	6.99584E-05	0.000867	0.005128	0.000259	0.00012	2.01954E-05	2.237851	10.49797762
2041	5.52E-05	6.98527E-05	0.000865	0.005115	0.000259	0.00012	1.99995E-05	2.216151	10.60077009
2042	5.51E-05	6.98034E-05	0.000865	0.005107	0.000259	0.00012	1.98328E-05	2.197682	10.68986491
2043	5.51E-05	6.97941E-05	0.000865	0.005101	0.000259	0.00012	1.96914E-05	2.182014	10.7666219
2044	5.51E-05	6.98247E-05	0.000865	0.005099	0.000259	0.00012	1.95745E-05	2.169052	10.83096873
2045	5.52E-05	6.98643E-05	0.000866	0.005097	0.000259	0.00012	1.94738E-05	2.157894	10.88697475
2046	5.52E-05	6.99125E-05	0.000866	0.005097	0.000259	0.00012	1.93884E-05	2.148439	10.93488808
2047	5.52E-05	6.99659E-05	0.000867	0.005096	0.000259	0.00012	1.93161E-05	2.140422	10.97584798
2048	5.53E-05	7.00236E-05	0.000868	0.005096	0.000259	0.00012	1.92549E-05	2.133643	11.01072129
2049	5.53E-05	7.00856E-05	0.000869	0.005097	0.000259	0.00012	1.92046E-05	2.128071	11.03955297

					Yr 1 - 2		Yr 3 - 16		Yr 17 - 30	
	Model Object	TAC	TAC CAS	Speciation	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
Future Mine Max Hour	FMHE	diesel PM10	9901	N/A	0.075059684	0	0.061651169	0	0.01374031	0
		Arsenic	7440382	0.00001	0.0000525	0	0.0000525	0	0.0000525	0
		Beryllium	7440417	0.000001	0.00000525	0	0.00000525	0	0.00000525	0
		Cadmium	7440439	0.000001	0.00000525	0	0.00000525	0	0.00000525	0
		Chromium	7440473	0.00005	0.0002625	0	0.0002625	0	0.0002625	0
		Copper	7440508	0.0001	0.000525	0	0.000525	0	0.000525	0
		Lead	7439921	0.00005	0.0002625	0	0.0002625	0	0.0002625	0
		Manganese	7439965	0.0005	0.002625	0	0.002625	0	0.002625	0
		Nickel	7440020	0.000008	0.000042	0	0.000042	0	0.000042	0
		Selenium	7782492	0.000005	0.00002625	0	0.00002625	0	0.00002625	0
		Silica, Crystalline	1175	0.1	0.525	0	0.525	0	0.525	0
		Zinc	7440666	0.0002	0.00105	0	0.00105	0	0.00105	0
Baseline Mining	BM	diesel PM10	9901	N/A	0	0	0	0	0	0
		Arsenic	7440382	0.00001	0	0	0	0	0	0
		Beryllium	7440417	0.000001	0	0	0	0	0	0
		Cadmium	7440439	0.000001	0	0	0	0	0	0
		Chromium	7440473	0.00005	0	0	0	0	0	0
		Copper	7440508	0.0001	0	0	0	0	0	0
		Lead	7439921	0.00005	0	0	0	0	0	0
		Manganese	7439965	0.0005	0	0	0	0	0	0
		Nickel	7440020	0.000008	0	0	0	0	0	0
		Selenium	7782492	0.000005	0	0	0	0	0	0
		Silica, Crystalline	1175	0.1	0	0	0	0	0	0
		Zinc	7440666	0.0002	0	0	0	0	0	0

					Yr 1 - 2		Yr 3 - 16		Yr 17 - 30	
	Model Object	TAC	TAC CAS	Speciation	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
On-Road Vehicle Emissions	ONRD	diesel PM10	9901	N/A	0	4.578317	0	3.788168	0	2.680456
		Aluminum	7429905	0.015	0	215.9847	0	215.9847	0	215.9847
		Arsenic	7440382	0.00001	0	0.14399	0	0.14399	0	0.14399
		Barium	7440393	0.000145	0	2.087852	0	2.087852	0	2.087852
		Beryllium	7440417	0.000001	0	0.014399	0	0.014399	0	0.014399
		Cadmium	7440439	0.000001	0	0.014399	0	0.014399	0	0.014399
		Chromium	7440473	0.000025	0	0.359975	0	0.359975	0	0.359975
		Copper	7440508	0.00004	0	0.575959	0	0.575959	0	0.575959
		Lead	7439921	0.00003	0	0.431969	0	0.431969	0	0.431969
		Manganese	7439965	0.00049	0	7.055501	0	7.055501	0	7.055501
		Nickel	7440020	0.000008	0	0.115192	0	0.115192	0	0.115192
		Selenium	7782492	0.000001	0	0.014399	0	0.014399	0	0.014399
		Silica, Crystalline	1175	0.1	0	1439.898	0	1439.898	0	1439.898
		Zinc	7440666	0.000112	0	1.612686	0	1.612686	0	1.612686
Off-Road Vehicle Emissions	OFRD	diesel PM10	9901	N/A	0	60.61598	0	44.9933	0	8.123791
		Aluminum	7429905	0.015	0	117.7558	0	117.7558	0	117.7558
		Arsenic	7440382	0.00001	0	0.078504	0	0.078504	0	0.078504
		Barium	7440393	0.000145	0	1.138306	0	1.138306	0	1.138306
		Beryllium	7440417	0.000001	0	0.00785	0	0.00785	0	0.00785
		Cadmium	7440439	0.000001	0	0.00785	0	0.00785	0	0.00785
		Chromium	7440473	0.000025	0	0.19626	0	0.19626	0	0.19626
		Copper	7440508	0.00004	0	0.314016	0	0.314016	0	0.314016
		Lead	7439921	0.00003	0	0.235512	0	0.235512	0	0.235512
		Manganese	7439965	0.00049	0	3.846691	0	3.846691	0	3.846691
		Nickel	7440020	0.000008	0	0.062803	0	0.062803	0	0.062803
		Selenium	7782492	0.000001	0	0.00785	0	0.00785	0	0.00785
		Silica, Crystalline	1175	0.1	0	785.039	0	785.039	0	785.039
		Zinc	7440666	0.000112	0	0.879244	0	0.879244	0	0.879244

					Yr 1 - 2		Yr 3 - 16		Yr 17 - 30	
	Model Object	TAC	TAC CAS	Speciation	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
Rock Plant / Associated Off-Road Equiptment	PLNT	diesel PM10	9901	N/A	0	76.04617	0	57.30657	0	8.039834
		Aluminum	7429905	0.015	0	43.41168	0	43.41168	0	43.41168
		Arsenic	7440382	0.00001	0	0.028941	0	0.028941	0	0.028941
		Barium	7440393	0.000225	0	0.651175	0	0.651175	0	0.651175
		Beryllium	7440417	0.000001	0	0.002894	0	0.002894	0	0.002894
		Cadmium	7440439	0.000001	0	0.002894	0	0.002894	0	0.002894
		Chromium	7440473	0.000028	0	0.081035	0	0.081035	0	0.081035
		Cobalt	7440484	0.000011	0	0.031835	0	0.031835	0	0.031835
		Copper	7440508	0.000037	0	0.107082	0	0.107082	0	0.107082
		Lead	7439921	0.00005	0	0.144706	0	0.144706	0	0.144706
		Manganese	7439965	0.00053	0	1.533879	0	1.533879	0	1.533879
		Nickel	7440020	0.000008	0	0.023153	0	0.023153	0	0.023153
		Selenium	7782492	0.000001	0	0.002894	0	0.002894	0	0.002894
		Silica, Crystalline	1175	0.1	0	289.4112	0	289.4112	0	289.4112
		Zinc	7440666	0.000099	0	0.286517	0	0.286517	0	0.286517
Loadout and Material Handling	LDOT	diesel PM10	9901	N/A	0		0		0	
		Aluminum	7429905	0.015	0	5.424766	0	5.424766	0	5.424766
		Arsenic	7440382	0.00001	0	0.003617	0	0.003617	0	0.003617
		Barium	7440393	0.000225	0	0.081371	0	0.081371	0	0.081371
		Beryllium	7440417	0.000001	0	0.000362	0	0.000362	0	0.000362
		Cadmium	7440439	0.000001	0	0.000362	0	0.000362	0	0.000362
		Chromium	7440473	0.000028	0	0.010126	0	0.010126	0	0.010126
		Cobalt	7440484	0.000011	0	0.003978	0	0.003978	0	0.003978
		Copper	7440508	0.000037	0	0.013381	0	0.013381	0	0.013381
		Lead	7439921	0.00005	0	0.018083	0	0.018083	0	0.018083
		Manganese	7439965	0.00053	0	0.191675	0	0.191675	0	0.191675
		Nickel	7440020	0.000008	0	0.002893	0	0.002893	0	0.002893
		Selenium	7782492	0.000001	0	0.000362	0	0.000362	0	0.000362
		Silica, Crystalline	1175	0.1	0	36.16511	0	36.16511	0	36.16511
		Zinc	7440666	0.000099	0	0.035803	0	0.035803	0	0.035803

	Model Object	TAC	TAC CAS	Speciation	Yr 1 - 2		Yr 3 - 16		Yr 17 - 30	
					lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
Future Mining Max Year	FMY2	diesel PM10	9901	N/A	0	23.65517	0	19.42946	0	4.33028
		Arsenic	7440382	0.00001	0	0.04914	0	0.04914	0	0.04914
		Beryllium	7440417	0.000001	0	0.004914	0	0.004914	0	0.004914
		Cadmium	7440439	0.000001	0	0.004914	0	0.004914	0	0.004914
		Chromium	7440473	0.00005	0	0.2457	0	0.2457	0	0.2457
		Copper	7440508	0.0001	0	0.4914	0	0.4914	0	0.4914
		Lead	7439921	0.00005	0	0.2457	0	0.2457	0	0.2457
		Manganese	7439965	0.0005	0	2.457	0	2.457	0	2.457
		Nickel	7440020	0.000008	0	0.039312	0	0.039312	0	0.039312
		Selenium	7782492	0.000005	0	0.02457	0	0.02457	0	0.02457
		Silica, Crystalline	1175	0.1	0	491.4	0	491.4	0	491.4
		Zinc	7440666	0.0002	0	0.9828	0	0.9828	0	0.9828

APPENDEIX E MODELING RESULTS

Modeling files, alongside a copy of this report, can be found at:

https://bit.ly/2uzLMf6

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REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
1	GRID	309050	3777650	N/A	N/A	0.00072906
2	GRID	310550	3777650	N/A	N/A	0.00094145
3	GRID	312050	3777650	N/A	N/A	0.0004067
4	GRID	313550	3777650	N/A	N/A	0.0010513
5	GRID	315050	3777650	N/A	N/A	0.0013432
6	GRID	316550	3777650	N/A	N/A	0.0011444
7	GRID	318050	3777650	N/A	N/A	0.00045729
8	GRID	319550	3777650	N/A	N/A	0.000061222
9	GRID	321050	3777650	N/A	N/A	0.000040637
10	GRID	322550	3777650	N/A	N/A	0.000038382
11	GRID	309050	3779150	N/A	N/A	0.00094631
12	GRID	310550	3779150	N/A	N/A	0.0010871
13	GRID	312050	3779150	N/A	N/A	0.0012704
14	GRID	313550	3779150	N/A	N/A	0.0019786
15	GRID	315050	3779150	N/A	N/A	0.00039558
16	GRID	316550	3779150	N/A	N/A	0.0018022
17	GRID	318050	3779150	N/A	N/A	0.0017901
18	GRID	319550	3779150	N/A	N/A	0.000082532
19	GRID	321050	3779150	N/A	N/A	0.000071411
20	GRID	322550	3779150	N/A	N/A	0.000069613
21	GRID	309050	3780650	N/A	N/A	0.0010112
22	GRID	310550	3780650	N/A	N/A	0.0013374
23	GRID	312050	3780650	N/A	N/A	0.0018144
24	GRID	313550	3780650	N/A	N/A	0.0022653
25	GRID	315050	3780650	N/A	N/A	0.0029517
26	GRID	316550	3780650	N/A	N/A	0.00043444
27	GRID	318050	3780650	N/A	N/A	0.0005212
28	GRID	319550	3780650	N/A	N/A	0.00060308
29	GRID	321050	3780650	N/A	N/A	0.00017743
30	GRID	322550	3780650	N/A	N/A	0.00015616
31	GRID	309050	3782150	N/A	N/A	0.0011361
32	GRID	310550	3782150	N/A	N/A	0.0016507
33	GRID	312050	3782150	N/A	N/A	0.0023067
34	GRID	313550	3782150	N/A	N/A	0.001299
35	GRID	315050	3782150	N/A	N/A	0.0069448
36	GRID	316550	3782150	N/A	N/A	0.0004835
37	GRID	318050	3782150	N/A	N/A	0.00094924
38	GRID	319550	3782150	N/A	N/A	0.003941
39	GRID	321050	3782150	N/A	N/A	0.0013415
40	GRID	322550	3782150	N/A	N/A	0.00014153
41	GRID	309050	3783650	N/A	N/A	0.0010691
42	GRID	310550	3783650	N/A	N/A	0.0017211
43	GRID	312050	3783650	N/A	N/A	0.0025639
44	GRID	313550	3783650	N/A	N/A	0.0045971

REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
45	GRID	315050	3783650	N/A	N/A	0.011176
46	GRID	316550	3783650	N/A	N/A	0.0048967
47	GRID	318050	3783650	N/A	N/A	0.0026907
48	GRID	319550	3783650	N/A	N/A	0.0043694
49	GRID	321050	3783650	N/A	N/A	0.0023032
50	GRID	322550	3783650	N/A	N/A	0.0017579
51	GRID	309050	3785150	N/A	N/A	0.0010164
52	GRID	310550	3785150	N/A	N/A	0.0012132
53	GRID	312050	3785150	N/A	N/A	0.0020761
54	GRID	313550	3785150	N/A	N/A	0.0028929
55	GRID	315050	3785150	N/A	N/A	0.0064056
56	GRID	316550	3785150	N/A	N/A	0.0010307
57	GRID	318050	3785150	N/A	N/A	0.0023968
58	GRID	319550	3785150	N/A	N/A	0.0034222
59	GRID	321050	3785150	N/A	N/A	0.0023895
60	GRID	322550	3785150	N/A	N/A	0.0011857
61	GRID	309050	3786650	N/A	N/A	0.0007016
62	GRID	310550	3786650	N/A	N/A	0.0011775
63	GRID	312050	3786650	N/A	N/A	0.001514
64	GRID	313550	3786650	N/A	N/A	0.0017403
65	GRID	315050	3786650	N/A	N/A	0.0035428
66	GRID	316550	3786650	N/A	N/A	0.003436
67	GRID	318050	3786650	N/A	N/A	0.0025452
68	GRID	319550	3786650	N/A	N/A	0.0018172
69	GRID	321050	3786650	N/A	N/A	0.0015234
70	GRID	322550	3786650	N/A	N/A	0.0012504
71	GRID	309050	3788150	N/A	N/A	0.00076275
72	GRID	310550	3788150	N/A	N/A	0.00085324
73	GRID	312050	3788150	N/A	N/A	0.0012079
74	GRID	313550	3788150	N/A	N/A	0.0014293
75	GRID	315050	3788150	N/A	N/A	0.001979
76	GRID	316550	3788150	N/A	N/A	0.0017481
77	GRID	318050	3788150	N/A	N/A	0.0015324
78	GRID	319550	3788150	N/A	N/A	0.0010577
79	GRID	321050	3788150	N/A	N/A	0.00022945
80	GRID	322550	3788150	N/A	N/A	0.00062596
81	GRID	309050	3789650	N/A	N/A	0.00057599
82	GRID	310550	3789650	N/A	N/A	0.00070901
83	GRID	312050	3789650	N/A	N/A	0.00088117
84	GRID	313550	3789650	N/A	N/A	0.00093089
85	GRID	315050	3789650	N/A	N/A	0.0012538
86	GRID	316550	3789650	N/A	N/A	0.0011006
87	GRID	318050	3789650	N/A	N/A	0.0010501
88	GRID	319550	3789650	N/A	N/A	0.00092608

REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
89	GRID	321050	3789650	N/A	N/A	0.00084778
90	GRID	322550	3789650	N/A	N/A	0.00059527
91	GRID	309050	3791150	N/A	N/A	0.00049712
92	GRID	310550	3791150	N/A	N/A	0.00056978
93	GRID	312050	3791150	N/A	N/A	0.00068492
94	GRID	313550	3791150	N/A	N/A	0.00073289
95	GRID	315050	3791150	N/A	N/A	0.0007768
96	GRID	316550	3791150	N/A	N/A	0.00075722
97	GRID	318050	3791150	N/A	N/A	0.00074709
98	GRID	319550	3791150	N/A	N/A	0.00070407
99	GRID	321050	3791150	N/A	N/A	0.00051044
100	GRID	322550	3791150	N/A	N/A	0.00049639
101	Worker	315425.4	3784412	5.463E-07	0.22185	0.015385
102	Worker	315309.5	3784203	7.6453E-07	0.19859	0.01577
103	Worker	315524.3	3784201	1.4291E-06	0.25745	0.020604
104	Worker	314819	3784501	1.4385E-07	0.033961	0.0087981
105	Worker	314870.9	3785536	6.3013E-08	0.011589	0.0044142
106	Worker	315545.9	3785545	1.078E-07	0.017025	0.006917
107	Worker	317023.7	3786515	5.0826E-08	0.0079883	0.0036147
108	Worker	317277	3783438	1.0447E-08	0.0013181	0.0040758
109	Residence	316741.8	3783884	3.31097E-07	0.005788	0.0078163
110	Residence	316658	3783803	2.16946E-07	0.0038015	0.0068743
111	Residence	316454.7	3783619	8.45121E-08	0.0015628	0.0037284
112	Residence	316525.3	3783638	1.00887E-07	0.0018792	0.0045408
113	Residence	316723.8	3783843	2.62466E-07	0.0045682	0.0065075
114	Residence	316481.8	3783625	8.71812E-08	0.0016134	0.0033112
115	Residence	316435.2	3783583	8.2968E-08	0.0015298	0.0037141
116	Residence	316934.9	3783882	3.0296E-07	0.0053638	0.0047633
117	Residence	316935.2	3783867	2.87217E-07	0.005089	0.0046156
118	Residence	316942	3783914	3.3197E-07	0.0058725	0.0044587
119	Residence	316968.4	3783923	3.52095E-07	0.0062235	0.0044286
120	Residence	316997.1	3783921	3.48348E-07	0.0061619	0.0041486
121	Residence	316357.6	3783158	3.86869E-08	0.00070622	0.0021653
122	Residence	316401.1	3783150	3.90621E-08	0.00072304	0.0019904
123	Residence	316145.9	3782940	2.73365E-08	0.00050486	0.0016038
124	Residence	316295.7	3782904	2.87551E-08	0.00050576	0.0011189
125	Residence	315901	3782418	1.57457E-08	0.00029161	0.00059094
126	Residence	315792.1	3782244	1.42023E-08	0.00026039	0.00048797
127	Residence	317133.1	3783906	2.93021E-07	0.0052061	0.0028313
128	Residence	317142.4	3783933	3.1477E-07	0.0055782	0.0029673
129	Residence	317147.3	3783979	3.77899E-07	0.0066676	0.0034045
130	Residence	317154.4	3784013	4.42292E-07	0.0077763	0.003174
131	Residence	317170.8	3784043	5.04318E-07	0.0088443	0.003075
132	Residence	316319.2	3786097	8.05584E-07	0.020123	0.0056451

REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
133	Residence	316417.7	3786056	8.46795E-07	0.02069	0.004761
134	Residence	316473.7	3786012	9.07744E-07	0.021801	0.0053121
135	Residence	316507.9	3785967	9.74153E-07	0.023056	0.0052975
136	Residence	316534.3	3785931	1.02992E-06	0.024131	0.0061164
137	Residence	316594.8	3785967	1.00612E-06	0.023006	0.0061065
138	Residence	316647	3785969	1.00463E-06	0.022904	0.0057489
139	Residence	316687.9	3785960	1.00977E-06	0.023061	0.0057726
140	Residence	316764.7	3785995	9.68256E-07	0.021818	0.0054626
141	Residence	316798.7	3785975	9.9047E-07	0.022269	0.005266
142	Residence	316851.5	3785959	1.01265E-06	0.022826	0.0052861
143	Residence	316903.9	3785951	1.02058E-06	0.023028	0.005561
144	Residence	316952.3	3785955	1.00962E-06	0.022797	0.0054377
145	Residence	317008	3785953	9.92743E-07	0.022389	0.0056408
146	Residence	317065.4	3785943	9.80313E-07	0.022028	0.0057993
147	Residence	317116.8	3785927	9.87603E-07	0.022162	0.0044515
148	Residence	317246.8	3785925	9.7837E-07	0.021535	0.0052036
149	Residence	317371.8	3785893	9.52283E-07	0.02104	0.004304
150	Residence	317471.9	3785853	9.34448E-07	0.021077	0.0046649
151	Residence	317579.5	3785808	9.40662E-07	0.021519	0.0043222
152	Residence	317778.8	3785802	8.71483E-07	0.020231	0.0047208
153	Residence	319270	3783854	2.38651E-07	0.0043559	0.0050856
154	Residence	319338.6	3784029	2.01554E-07	0.0037023	0.0053459
155	Residence	319303.1	3784178	1.68104E-07	0.003145	0.0046558
156	Residence	319513.5	3784378	2.04885E-07	0.0038061	0.0040569
157	Residence	319364.6	3784639	1.74736E-07	0.0032422	0.0040775
158	Residence	319336.2	3784837	1.82205E-07	0.0034465	0.0055983
159	Residence	319383.5	3785055	1.7427E-07	0.0033006	0.0038093
160	Residence	319303.1	3785095	1.50725E-07	0.0028778	0.0045188
161	Residence	319128.1	3785440	1.3781E-07	0.0027396	0.00564
162	Residence	319140.9	3785661	1.40517E-07	0.0026345	0.0046921
163	Residence	318366.3	3783901	1.7915E-07	0.0032459	0.0014023
164	Fenceline	315657.4	3784403	N/A	N/A	0.022206
165	Fenceline	315647.7	3784485	N/A	N/A	0.020851
166	Fenceline	315641.3	3784513	N/A	N/A	0.01971
167	Fenceline	315706.7	3784724	N/A	N/A	0.015315
168	Fenceline	315714.2	3784755	N/A	N/A	0.01523
169	Fenceline	315895.5	3784784	N/A	N/A	0.016515
170	Fenceline	316013.1	3784802	N/A	N/A	0.020493
171	Fenceline	316101.5	3784768	N/A	N/A	0.02303
172	Fenceline	316533.8	3784488	N/A	N/A	0.01072
173	Fenceline	316545.7	3784328	N/A	N/A	0.036307
174	Fenceline	316606	3784210	N/A	N/A	0.013183
175	Fenceline	316430.9	3783981	N/A	N/A	0.079244
176	Fenceline	315605	3783689	N/A	N/A	0.019256

REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
177	Fenceline	315548.1	3783937	N/A	N/A	0.020351
178	Fenceline	315617.9	3784014	N/A	N/A	0.021411
179	Fenceline	315631	3784149	N/A	N/A	0.021279
180	Fenceline	315653.7	3784408	N/A	N/A	0.022435
181	Fenceline	315663.1	3784583	N/A	N/A	0.018561
182	Fenceline	315684.9	3784653	N/A	N/A	0.015335
183	Fenceline	315804.8	3784769	N/A	N/A	0.017161
184	Fenceline	315954.3	3784793	N/A	N/A	0.019463
185	Fenceline	316173.5	3784722	N/A	N/A	0.025068
186	Fenceline	316245.6	3784675	N/A	N/A	0.033779
187	Fenceline	316317.7	3784628	N/A	N/A	0.0089638
188	Fenceline	316389.7	3784581	N/A	N/A	0.0039864
189	Fenceline	316461.8	3784535	N/A	N/A	0.0054843
190	Fenceline	316539.8	3784408	N/A	N/A	0.011547
191	Fenceline	316575.9	3784269	N/A	N/A	0.016412
192	Fenceline	316547.7	3784134	N/A	N/A	0.020883
193	Fenceline	316489.3	3784058	N/A	N/A	0.063473
194	Fenceline	316339.2	3783949	N/A	N/A	0.079753
195	Fenceline	316247.4	3783916	N/A	N/A	0.060172
196	Fenceline	316155.6	3783884	N/A	N/A	0.04808
197	Fenceline	316063.8	3783851	N/A	N/A	0.040679
198	Fenceline	315972.1	3783819	N/A	N/A	0.033206
199	Fenceline	315880.3	3783786	N/A	N/A	0.028853
200	Fenceline	315788.5	3783754	N/A	N/A	0.023937
201	Fenceline	315696.8	3783721	N/A	N/A	0.021217
202	Fenceline	315586	3783772	N/A	N/A	0.020248
203	Fenceline	315567.1	3783855	N/A	N/A	0.020617
204	Fenceline	315583	3783976	N/A	N/A	0.021789
205	Fenceline	315624.4	3784081	N/A	N/A	0.023381
206	Fenceline	315638.6	3784236	N/A	N/A	0.022855
207	Fenceline	315646.1	3784322	N/A	N/A	0.021243

APPENDIX B-2

SUPPLEMENTAL AIR QUALITY AND GREENHOUSE GAS EMISSIONS EVALUATION AND HEALTH RISK SCREENING FOR THE PACIFIC ROCK QUARRY CONDITIONAL USE PERMIT MODIFICATION APPLICATION

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technical memorandum

date October 16, 2020

to Bob Delp, Benchmark Resources

from Alan Sako, ESA
Alison Campestre, ESA

subject Supplemental Air Quality and Greenhouse Gas Emissions Evaluation and Health Risk Screening for the Pacific Rock Quarry Conditional Use Permit Modification Application

1.0 Introduction

1.1 Project Background

Pacific Rock, Inc. ("Applicant" or "Operator") has requested a modification to the existing conditional use permit (CUP) and an amendment to the reclamation plan for the Pacific Rock Quarry ("Project"), which is located in unincorporated Ventura County between the cities of Camarillo and Thousand Oaks on portions of the Tax Assessor's Parcel Numbers 234-0-060-220 and 234-0-060-190. The term "Project site" is used herein to reference the proposed CUP area, which includes the existing mining operation and areas proposed for mine expansion and reclamation under the Project. The physical address for the Project site is 1000 South Howard Road, Camarillo, California 93012. The Project site is approximately 1.5 miles east of Lewis Road and approximately two miles south of Highway 101.

The Applicant prepared an "Air Quality, Health Risk, and Climate Change Impact Assessment" (Sespe, 2019a)[1] ("Applicant's air quality study"), which provides estimates of criteria air pollutant and greenhouse gas (GHG) emissions that would result from implementation of the Project. Environmental Science Associates (ESA), as a subconsultant to Benchmark Resources, is assisting with the preparation of the Air Quality and GHG analyses to support the Environmental Impact Report (EIR) for the County's compliance with the California Environmental Quality Act (CEQA). In this role, ESA peer reviewed the Applicant's air quality study and determined that certain Project-related emissions sources were not included in the Applicant's air quality study. To provide a complete evaluation of Project emissions, the County requested that ESA prepare supplemental criteria air pollutant and GHG emissions calculations to support the EIR's air

1 Sespe Consulting, Inc., Air Quality, Health Risk, and Climate Change Impact Assessment, Pacific Rock Quarry Expansion Project, Ventura County, California, March 29, 2019.

quality and GHG impact analyses. The County also requested that this supplemental analysis use emission factors for baseline emissions that reflect emission factors associated with the representative years (2008 to 2017) used for establishing baseline annual production for the existing operation, as discussed further in subsection 2.1, Emission Factors, below. Results from this supplemental analysis are presented here for use by the County in preparing the Draft EIR air quality and GHG impact analysis.

1.2 Purpose of this Technical Memorandum

Based on County direction as discussed above, ESA has prepared this technical memorandum to supplement the criteria air pollutant and GHG emissions calculations in the Applicant's air quality study with emissions calculations for additional Project-related sources that were not included in the Applicant's air quality study. Specifically, this supplemental assessment accounts for the following additional emission sources:

- Respirable and fine particulate matter (PM10 and PM2.5) emissions from fugitive dust resulting from increased drilling for placement of blasting materials;
- Criteria pollutant and GHG emissions resulting from the increased use of drilling equipment for placement of blasting materials;
- Criteria pollutant and GHG emissions resulting from off-site haul truck travel;
- Criteria pollutant and GHG emissions resulting from off-site worker travel;
- PM10 and PM2.5 emissions from fugitive dust for the crushing of recycle asphalt and concrete at the proposed recycle plant;
- Criteria pollutant and GHG emissions resulting from the increased use of diesel-fueled equipment for the handling of recycle asphalt and concrete at the proposed recycle plant; and
- PM10 and PM2.5 emissions from proposed fill import and placement for reclamation.

The result of ESA's analysis for the above activities shows an increase to both baseline and Project emission estimates as compared to the emissions reported in the Applicant's air quality study. A description of the calculation methodologies is provided in the next section, and a summary of the annual and daily emissions results from ESA's analysis are provided in **Tables 1** through **4**, provided following the Emissions Calculation Methodology section of this technical memorandum.

2.0 Emissions Calculation Methodology

The calculation methodologies for criteria pollutants and GHG emissions are described below for each aforementioned activity where supplementary data collection and studies were conducted by ESA. Additionally, the methodology used for establishing emission factors for calculating the baseline and Project criteria pollutants and GHG emissions from the quarrying engine, off-road haul engine and the on-road onsite haul trucks are also described below.

Methodologies and emission factors for emissions estimates are drawn from the United States Environmental Protection Agency (USEPA) Compilation of Air Pollutant Emission Factors (AP-42), the California Air Resources Board's (CARB) EMissions FACtor 2017 (EMFAC2017) model and the CARB California Emissions Estimator Model (CalEEMod) software (version 2016.3.2), and appropriate scaling of emissions estimated in the Applicant's air quality study. AP-42 was used for fugitive dust-related emissions calculations, scaled emissions based on updated vehicle miles traveled were used for off-site haul truck and worker vehicle travel-related emissions calculations, and CalEEMod was used for on-site heavy-duty diesel equipment emissions calculations. CalEEMod and EMFAC2017 were also relied upon for obtaining emission factors used in calculating emissions from the quarrying engine, off-road haul engine, and the on-road onsite haul trucks.

The supplemental emissions estimates for both the baseline conditions (i.e., emissions associated with existing operations at the site) and Project conditions were calculated for each source. The results of the supplemental emissions estimates are then combined with the emissions estimates from the Applicant's air quality study. The resulting emissions are considered appropriate for use by the County in the Draft EIR for evaluation of the Project's air quality and GHG impacts.

2.1 Emission Factors

For this analysis and based on the County's request, a weighted average emission factor was developed for the baseline sources listed below utilizing the annual tonnage mined from data reported from 2008 to 2017.[2] The CalEEMod emission factors from the year 2008 to 2017 for each equipment type were weighted by dividing a given year's reported tonnage mined by the total tonnage mined during the years 2008 and 2017. This methodology was implemented to calculate baseline emissions for the following equipment:

- Drill rig,
- Quarrying engines,
- Off-road haul from mine to processing,
- On-road onsite haul engine, and
- On-road offsite haul trucks and worker vehicles.

The emission factors used to calculate Project emissions from the above-named equipment are based on the Project operational year 2021. This approach for Project emissions is considered conservative since equipment emission factors will continue to decrease over time after 2021. Consistent with the Applicant's air quality study, the emissions from aggregate plant processing

2 The tonnage for the 2014 reporting year represents an outlier year and may be underreported. Thus, was adjusted based on the average annual tonnage of the other years, 2008 to 2013 and 2015 to 2017.

equipment are based on 2019 operational year emission factors. The emission factors used for calculating criteria pollutant and GHG emissions from the aggregate plant processing equipment are the same for both the baseline and Project years. As discussed above, emissions from the proposed recycling plant are conservatively assumed to be the same as the quarrying engines, off-road haul from mine to processing, and the aggregate plant processing. Thus, the calculated emissions for the proposed recycling plant utilize 2021 emissions factors for the quarrying engines and off-road haul from mine to processing and 2019 emission factors for calculating emissions from the aggregate plant processing equipment.

2.2 Emissions Sources

Drilling Fugitive Dust

Mining at the Project site utilizes blasting to loosen rock, which requires drilling to create borings where blasting agents are placed. Drilling into bedrock results in fugitive dust emissions, of which PM10 and PM2.5 emissions are a component. The Applicant's air quality study does not account for drilling fugitive dust emissions; therefore, an estimate of both baseline and Project fugitive dust emissions associated with drilling is provided here.

For drilling emissions estimates under baseline conditions, approximately 415 tons per day and 20,900 tons per year of material is assumed to be mined.[3] For drilling emissions estimates with the Project, an average 1,500 tons per day and 468,000 tons per year of material is assumed to be mined. The average 1,500 tons per day for the Project is based on 312 working days per year, i.e. 468,000 tons per year ÷ 312 working days per year.

The PM10 emissions are estimated for this analysis by multiplying the amount of mined material (measured in tons) by the drilling fugitive dust emission factor from USEPA AP-42, Table 11.19.2-2[4].

The emissions calculation methodology is detailed below.

$$\text{Emissions}_{\text{drilling,fugitivedust}}[\text{lbs/day or lbs/year}] = EF_{PM10} \times TQ$$

Where:

$\text{Emissions}_{\text{drilling,fugitivedust}}$	=	Fugitive dust emissions caused by drilling [lbs/day or lbs/year]
EF_{PM10}	=	Emission factor for PM10 [lbs/TQ]
TQ	=	Tons quarried [tons]

Drilling Equipment Exhaust

As discussed in the previous section, **Drilling Fugitive Dust**, drilling is required to place the blast material used in extracting the raw resource for processing. It is assumed under baseline and

3 Annual production under baseline conditions is based on the 10-year annual average reported by the Operator between 2008 and 2017.

4 USEPA AP-42, Chapter 11.9, Table 11.19.2-2, wet drilling – unfragmented stone. https://www3.epa.gov/ttn/chief/ap42/ch11/final/c11s09.pdf.

Project conditions that a diesel-powered drill rig is used, generating criteria pollutant, toxic air contaminants (TAC) (i.e., diesel particulate matter), and GHG emissions.[5] The Applicant's air quality study does not account for drilling equipment criteria pollutant and GHG emissions; therefore, an estimate of both baseline and Project emissions associated with drilling equipment is provided here.

Emissions from the drill rig are calculated based on emission factors in CalEEMod based on a weighted average of the historical annual tons quarried per year between the years of 2008 and 2017 (refer to section 2.1, Emission Factors, above for additional explanation). Under the Project, maximum daily emissions are based on equipment operating for an 8-hour workday. Baseline emissions are estimated using a scaling coefficient based on the baseline and Project tons quarried. The coefficient is a ratio of the estimated tons quarried per day in the baseline or Project divided by the tons quarried per day in the Project (i.e., 415 tons divided by 1,500 tons; refer to detailed calculations provided in Exhibit A). The coefficient is 1 for the Project and 0.277 for the baseline. Annual emissions are also based on the number of drilling days in a year, which is estimated at two days per year for primary blasts and two days per week for smaller blasts, for a total of 106 days per year. The emissions calculation methodology is detailed below.

$\text{Emissions}_{\text{pollutant,drillrig}}$[lbs/day or lbs/year] = $\text{EF}_{\text{pollutant}} \times \text{BD} \times \text{C}_{\text{TQ}}$

Where:

$\text{Emissions}_{\text{pollutant,drillrig}}$ = Emissions caused by drill rig [lbs/year]
$\text{EF}_{\text{pollutant}}$ = Emission factor for pollutant [lbs/day]
BD = Drilling days [days/year]C_{TQ}
= Tons quarried coefficient [dimensionless, %]

GHG emissions associated with diesel-powered drill rig operation consist of CO_2 and lesser amounts of CH_4. Like the criteria pollutant analysis, the GHG emissions were calculated based on the estimated number of blast days, the CalEEMod generated emission factors, the scaling factor as described above, and the applicable GWP factors as shown below.

Emissions [MTCO_2e] = $\sum_i (\text{EF}_{\text{pollutant,drilling}} \times \text{BD} \times \text{C}_{\text{TQ}} \times \text{GWP}_i)$

Where:

MTCO_2e = Metric tons of carbon dioxide equivalents from drill rig
$\text{EF}_{\text{pollutant,drillrig}}$ = Emissions factor for pollutant [lbs/year]
BD = Drilling days [days/year]
C_{TQ} = Tons quarried coefficient [dimensionless, %]
GWP_i = Global warming potential [where i is $\text{GWP}_{\text{CO2}} = 1$ and $\text{GWP}_{\text{CH4}} = 25$]

5 Diesel emissions also include toxic air contaminants that relate to health risk, as discussed in the Adjusted Health Risk Assessment section of this memorandum.

On-site and Off-site Haul Truck Travel

Although the emissions analysis from off-site, on-road haul trucks was included in the Applicant's air quality study, the technical peer review of that study conducted by ESA determined that estimated travel distances on paved roads, expected number of truckloads per day and, therefore, total vehicle miles traveled (VMT) were underestimated. Furthermore, the County requested that ESA use weighted average baseline emission factors to calculate emissions from the on-site, on-road haul truck travel to more appropriately reflect the baseline operational years from 2008 through 2017 (refer to section 2.1, Emission Factors, above for additional explanation).

Haul Distance

The Applicant's air quality study assumed an average roundtrip distance of 20 miles on paved roads (10 miles inbound, 10 miles outbound) for off-site haul truck travel. ESA's review of the Applicant's air quality study recommended a longer average trip distance using the CalEEMod default 40-mile roundtrip (20 miles inbound, 20 miles outbound) as more conservative and appropriate for the County's EIR analysis of off-site haul truck trip emissions. County staff concurred with this recommendation. ESA's technical review of the Applicant's air quality study concurred with that study's use of an on-site roundtrip travel distance on unpaved roads of 0.55 miles per roundtrip. Thus, the total roundtrip travel distance used in this analysis is 40.55 miles, including 40 miles of travel on off-site paved roads and 0.55 miles of travel on on-site unpaved roads. Although the haul truck emissions from the 0.55 miles of travel on on-site unpaved roads were accounted for in the Applicant's air quality study, they have been recalculated for this supplemental analysis using a weighted emission factor (refer to section 2.1, Emission Factors, above for additional explanation). Therefore, this supplemental analysis estimates haul truck emissions associated with the 40 miles of travel on off-site paved roads and recalculates the estimated haul truck emissions associated with the 0.55 miles of travel on on-site unpaved roads.

Haul Truck Trips

The number of haul truck trips associated with baseline conditions and Project operation were considered in determining the methodology for the air quality and GHG analysis. The following sections discuss estimated daily and annual haul truck trips under baseline conditions and with Project operation.

Baseline Daily Haul Truck Trips

The existing operation is permitted to generate up to 60 loads (120 one-way truck trips) per day. Information regarding existing operations is not available to provide a detailed accounting of baseline daily trips and vehicle miles traveled for the existing operation. However, estimates of daily and annual VMT under baseline conditions can be made using information from operational records that are available.

According to Operator reporting submitted to the VCAPCD, during the period August 1, 2015 through July 31, 2016, total annual production during the period was 37,345 tons. Records indicate that the aggregate was produced over a total of 90 days during this period. Although on-site production does not necessarily directly equate to off-site transport, an assumed correlation between on-site production and off-site transport is considered sufficient for the purposes of this analysis. Based on an assumed typical average haul truck load capacity of 25 tons, the transport of 37,345 tons of aggregate requires 1,494 haul truck loads, resulting in an average of 16.6 daily haul truck loads from the site. To determine the number of trips, the number of haul truck loads is multiplied by two to account for the trip associated with the unloaded truck traveling to the site. Thus, approximately 33 daily one-way haul truck trips are assumed under baseline conditions for a typical day of operations.

Baseline Annual Haul Truck Trips

The Operator submits "Mining Operation Annual Reports" to the County and the California Department of Conservation, Division of Mine Reclamation (DMR). Based on these records, average annual production for the 10-year period between 2008 and 2017 is approximately 20,900 tons. The County has directed that the 10-year average of 20,900 tons be used as the annual production baseline for the purposes of environmental review. Applying the 25-ton haul load capacity factor, the 20,900 tons of material requires approximately 836 haul truck loads per year.

Project Daily and Annual Trips

Operations under the Project would be limited to 60 loads per day, regardless of the load type. These loads could consist of a combination of aggregate exports from the site, incoming concrete and asphalt for recycle processing, outgoing concrete and asphalt after recycle processing, and imported material for reclamation fill. The Project would allow for hauling to and from the site seven days a week, and this analysis conservatively assumes that hauling could occur at the maximum daily rate of 365 days per year, resulting in a maximum potential of 21,900 haul truck loads per year (60 truck loads per day × 365 days per year = 21,900 truck loads per year). The Applicant's air quality study estimated Project annual truckloads at 18,720, based on a maximum aggregate production of 468,000 tons per year divided by 25 tons per truck load. However, in consultation with the County, it was determined that ESA should use the higher annual truck load factor of 21,900 loads per year to sufficiently account for the Project's potential 60 loads per day 365 day per year. .

Vehicle Miles Traveled and Emission Factors

VMT is calculated both daily and annually as follows:

$VMT_{haultrucks}$ [miles/day or miles/year] = Truckloads × Distance

Where:

$VMT_{haultrucks}$	=	Heavy-duty truck miles traveled [miles/day or miles/year]
Truckloads	=	Number of roundtrip truckloads [truckloads/day or truckloads/year]
Distance	=	Roundtrip distance per truckload [miles/truckload]

Haul trucks associated with baseline conditions and Project operations generate off-site, on-road heavy-duty truck exhaust emissions of VOCs, NO_X, CO, SO_X, PM10 and PM2.5, evaporative emissions of VOCs, and fugitive dust emissions of PM10 and PM2.5 from haul trucks transporting product to and from the Project site. Heavy-duty truck emissions, with the exception of fugitive dust, were calculated by taking the total miles traveled per vehicle per day and per year and multiplying that mileage by emission factors for heavy-heavy-duty trucks (HHDT category) taken from the EMFAC2017 model. Baseline emissions were calculated using a weighted average emission factor developed based on the tonnage mined per year during the years of 2008 to 2017 ((refer to section 2.1, Emission Factors, above for additional explanation)).[6] Project emissions were calculated assuming a project operational year 2021. Total emissions per truck per trip were then summed to reach the total daily and annual criteria pollutant emissions for heavy-duty vehicles under baseline conditions and Project operations.

$Emissions_{pollutant}$ [lbs/day or lbs/year] = $VMT_{haultrucks} \times EF_{running,pollutant}$

Where:

$Emissions_{pollutant}$	=	Emissions from truck running for each pollutant [lbs/day or lbs/year]
$VMT_{haultrucks}$	=	Truck miles traveled [miles/day or miles/year]
$EF_{running,pollutant}$	=	Emission factor for running emissions [lb/mile]

The fugitive dust emissions calculations utilize emission factors derived from the information contained in USEPA AP-42, Chapter 13.2.1 for paved roads and Chapter 13.2.2 for unpaved roads. Additional details and associated assumptions of these emission factor calculations can be found in Exhibit A.

Furthermore, on-site and off-site, on-road heavy-duty trucks would generate GHG emissions of CO_2 and lesser amounts of CH_4 and N_2O from haul trucks transporting product to and from the Project site. Like the criteria pollutant analysis, the emissions from mobile sources were calculated based on the trip rates, trip lengths, the running emission factors generated from the EMFAC2017 model, and the applicable GWP factors as shown below.

Emissions [$MTCO_2e$] = $\sum_i (VMT_{haultrucks} \times EF_{running,pollutant} \times GWP_i)$

Where:

$MTCO_2e$	=	Metric tons of carbon dioxide equivalents
$VMT_{haultrucks}$	=	Truck miles traveled [miles/day or miles/year]
$EF_{running,pollutant}$	=	Emission factor for running emissions [MT/mile]
GWP_i	=	Global warming potential [where i is $GWP_{CO2} = 1$, $GWP_{CH4} = 25$, and $GWP_{N2O} = 298$]

Off-site Worker Travel

Off-site worker travel emissions were not accounted for in the Applicant's air quality study. Thus, this supplemental analysis includes emissions from off-site worker travel. The number of workers at the site under existing operations varies depending on activities occurring on any given day.

6 Since the average speed on the on-site unpaved road is unknown, ESA assumed an average speed of 15 miles per hour for an unloaded haul truck and 10 miles per hour for a loaded haul truck. Emission factors from EMFAC2017 are based on these speeds. An aggregate speed was assumed for the emission factors from EMFAC2017 for the off-site on-road haul trucks.

The Operator advised the County that on November 27, 2018 (the day traffic counts were taken associated with other studies prepared for the EIR) there were three worker trips to the site and three worker trips from the site, for a total of six one-way worker trips or three worker roundtrips on that day (the same day involved nine aggregate truck loads from the site, indicating that site operations and shipments were occurring on that day). Based on this data and coordination with the County, three workers and three worker roundtrips is considered a reasonable estimate of worker trips on a typical day of operations under baseline conditions. Assuming 90 days per year of operations under baseline conditions as discussed previously, baseline annual worker roundtrips are estimated to be 270 per year.

The Applicant advises that the Project would require up to 12 workers per day, each resulting in an assumed two one-way worker trips or one roundtrip, resulting in a total of 12 worker roundtrips per day and 4,380 worker roundtrips per year. Additional trips would periodically be required for equipment, fuel, and other supply deliveries, and maintenance. These trips are considered to represent a very small portion of the total Project-related trips. Due to the conservative approach in estimating haul truck and worker trips and trip distances in this memorandum, supply delivery trips are not separately estimated and emissions are considered to be reasonably accounted for in the Project haul truck trip emissions presented here.

For this analysis, it is assumed that the average work trip distance would be 20 miles, resulting in an average worker roundtrip distance of 40 miles.

$VMT_{workers}$ [miles/day or miles/year] = $RoundTrips_{workers} \times Distance_{roundtrip}$

Where:

VMT_{worker}	=	Light-duty worker miles traveled [miles/day or miles/year]
$RoundTrips_{workers}$	=	Number of worker round trips [trips/day or trips/year]
$Distance_{roundtrip}$	=	Roundtrip distance per worker [miles/trip]

Work trips associated with baseline conditions and Project operations generate off-site, on-road light-duty vehicle exhaust emissions of VOCs, NO_X, CO, SO_X, PM10 and PM2.5, evaporative emissions of VOCs, and fugitive dust emissions of PM10 and PM2.5 from workers traveling to and from the site. All miles are assumed to be traveled on paved roads. Light-duty worker vehicle emissions were calculated by taking the total miles traveled per vehicle per day and per year and multiplying that mileage by emission factors for light-duty vehicles (LDA, LDT1, and LDT2 categories) taken from CARB EMFAC2017 model. Baseline emissions were calculated using a weighted average emission factor developed based on the tonnage mined per year during the years of 2008 to 2017 ((refer to section 2.1, Emission Factors, above for additional explanation)). Project emissions were calculated assuming a project operational year 2021. Total emissions per vehicle per trip were then summed to reach the total daily and annual criteria pollutant emissions for light-duty vehicles.

$Emissions_{pollutant}$ [lb/day or lbs/year] = $VMT_{workers} \times EF_{running,pollutant}$

Where:

$Emissions_{pollutant}$	=	Emissions from worker vehicle running for each pollutant [lbs/day or lbs/year]
$VMT_{workers}$	=	Light-duty worker miles traveled [miles/day or miles/year]
$EF_{running,pollutant}$	=	Emission factor for running emissions [lb/mile]

Furthermore, off-site, on-road light-duty vehicles generate GHG emissions of CO_2 and lesser amounts of CH_4 and N_2O from workers traveling to and from the location. Like the criteria pollutant analysis, the emissions from mobile sources were calculated based on the trip rates, trip lengths, the running emission factors generated from the EMFAC2017 model, and the applicable GWP factors as follows.

$$\text{Emissions } [MTCO_2e] = \sum_i (VMT_{workers} \times EF_{running,pollutant} \times GWP_i)$$

Where:

$MTCO_2e$	=	Metric tons of carbon dioxide equivalents
$VMT_{workers}$	=	Light-duty worker miles traveled [miles/day or miles/year]
$EF_{running,pollutant}$	=	Emission factor for running emissions [MT/mile]
GWP_i	=	Global warming potential [where *i* is $GWP_{CO2} = 1$, $GWP_{CH4} = 25$, and $GWP_{N2O} = 298$]

Proposed Recycle Plant Fugitive Dust

Operation of the proposed recycle plant would generate fugitive dust emissions, including PM10 and PM2.5, from aggregate crushing. The Applicant's air quality study did not include emissions associated with the proposed recycle plant; therefore, emissions for this Project component are included in this supplemental analysis. As noted previously, all other emissions from equipment at the proposed recycle plant would be permitted by VCAPCD, and thus, pursuant to VCAPCD direction, these factors do not need to be accounted for in the daily emissions towards the significance thresholds. The PM10 and PM2.5 emissions were based on the tons of aggregate processed and the USEPA AP-42, Table 11.19.2-4[7] emission factors for pulverized mineral processing operations.

$$Emissions_{pollutant}[\text{lbs/day or lbs/year}] = EF_{pollutant} \times TP$$

Where:

$Emissions_{pollutant}$	=	Fugitive dust emissions from processing aggregate [lbs/day or lbs/year]
$EF_{pollutant}$	=	Emission factor pulverized mineral processing operations [lb/ton]
TP	=	Tons of aggregate processed [tons/day or tons/year]

7 USEPA AP-42, Chapter 11.19.2, Table 11.19.2-4, Product Storage with Fabric Filter Control. https://www3.epa.gov/ttnchie1/ap42/ch11/final/c11s1902.pdf.

Proposed Recycle Plant Equipment Exhaust

Detailed information regarding the engine size of the proposed Recycle Plant Aggregate Crushing Equipment is not known. According to the technical memorandum, "Response to Comments – Air Quality, Health Risk and Climate Change Impact Assessment" (Sespe 2019b),[8] which was prepared to address County comments on the Applicant's air quality study, recycle plants are generally smaller and process at a slower rate than aggregates plants. Under the proposed Project, up to 30,000 cubic yards per year of concrete and asphalt debris would be received, crushed, and sold as base material, which would be substantially less volume than the Project's permitted annual production of 468,000 tons per year. Therefore, the assumption of a generally smaller recycling plant with a reduced processing rate as compared to the aggregates plant is reasonable. For the purposes of this supplement assessment, and as a conservative assumption, the proposed Recycle Plant Aggregate Crushing Equipment is assumed to be the same as those of the aggregate plant, quarrying engines, loading equipment, and off-road haul from mine to processing area, as documented in the Applicant's air quality study.

Reclamation Fill Import and Placement Fugitive Dust

The proposed Project would allow approximately 150,000 tons per year of fill to be imported for reclamation purposes. PM10 and PM2.5 emissions from fill import and placement were not estimated or included in the Applicant's air quality study; therefore, emissions for this Project component are included in this supplemental analysis.

For the purposes of this analysis, imported fill material is assumed to be handled twice once brought on site (allowing for initial placement to stockpile material when brought on site with subsequent relocation for final placement), which results in a total of 300,000 tons of material managed annually. Tons of fill material managed daily was based on the 60 truckload per day limit in the existing CUP and an assumed 25 tons per truckload, thus up to 1,500 tons of imported fill is assumed as a daily maximum. Emissions from fill import and placement were calculated based on tons of material managed and calculated emission factors utilizing methodology from USEPA AP-42, Chapter 13.2.4[9].

$\text{Emissions}_{\text{pollutant}}$[lbs/day or lbs/year] = $\text{EF}_{\text{pollutant}} \times \text{FM} \times \text{H}$

Where:

$\text{Emissions}_{\text{pollutant}}$	=	Fugitive dust emissions from placing fill [lbs/day or lbs/year]
$\text{EF}_{\text{pollutant}}$	=	Soil handling emission factor [lbs/ton soil]
FM	=	Fill material managed [tons/day or tons/year]
H	=	Number of times material handled [dimensionless]

And, $\text{EF}_{\text{pollutant}} = [\ k_{\text{pollutant}}\ (0.0032)\ [\ (U/5)^{1.3} / (M/2)^{1.4}]]$

Where:

8 Sespe Consulting, Inc., Response to Comments – Air Quality, Health Risk and Climate Change Impact Assessment CUP Modification Application for the Pacific Rock Quarry in Ventura County, CA, August 15, 2019.

9 USEPA AP-42, Chapter 13.2.4, Section 3 (2006). https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf.

$k_{pollutant}$	=	Particle size multiplier [dimensionless factor]
U	=	mean wind speed [mph][10]
M	=	Moisture content [%][11]

3.0 Supplemental Emissions Results

Annual and daily criteria pollutant emissions associated with the supplemental analysis for the operational components discussed above are shown in **Table 1**, *Supplemental Annual Criteria Pollutant and Greenhouse Gas Emissions by Source*, and **Table 2**, *Supplemental Daily Criteria Pollutant Emissions by Source*, below. Detailed emissions calculations are provided in **Exhibit A** of this technical memorandum.

10 Based on atmospheric dispersion modeling system, AERMOD, meteorological data, converted from 5.06 knots.

11 Based on USEPA AP-42, Table 13.2.4-1, cover moisture content. https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf.

TABLE 1
SUPPLEMENTAL ANNUAL CRITERIA POLLUTANT AND GREENHOUSE GAS EMISSIONS BY SOURCE

Pollutant	ROG (tons/year)	NO_X (tons/year)	CO (tons/year)	SO_2 (tons/year)	PM10 (tons/year)	PM2.5 (tons/year)	$MTCO_2e$ (MT/year)
Baseline							
Drilling Fugitive Dust	--	--	--	--	0.001	<0.001	--
Drill Rig	0.007	0.034	0.108	<0.001	0.003	0.003	13.44
Off-site Haul Truck Travel	0.025	0.419	0.115	0.001	0.037	0.019	63.60
Off-site Worker Travel	0.003	0.004	0.032	<0.001	0.007	0.002	4.18
Recycle Plant Fugitive Dust	--	--	--	--	--	--	--
Recycle Plant Equipment	--	--	--	--	--	--	--
Reclamation Fill Handling	--	--	--	--	--	--	--
Project							
Drilling Fugitive Dust	--	--	--	--	0.019	0.002	--
Drill Rig	0.014	0.161	0.110	0.001	0.005	0.004	44.43
Off-site Haul Truck Travel	0.140	4.423	1.146	0.014	0.691	0.220	1,445.41
Off-site Worker Travel	0.026	0.020	0.233	0.001	0.118	0.030	55.39
Recycle Plant Fugitive Dust	--	--	--	--	0.040	0.005	--
Recycle Plant Equipment	0.220	2.209	1.446	0.005	0.086	0.079	394.26
Reclamation Fill Handling	--	--	--	--	0.017	0.003	--

Source: ESA, 2020.

TABLE 2
SUPPLEMENTAL DAILY CRITERIA POLLUTANT EMISSIONS BY SOURCE

Pollutant	ROG (lbs/day)	NO_X (lbs/day)	CO (lbs/day)	SO_2 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Baseline						
Drilling Fugitive Dust	--	--	--	--	0.03	<0.01
Drill Rig	0.45	2.31	7.38	0.01	0.22	0.20
Off-site Haul Truck Travel	0.99	16.65	4.55	0.02	1.48	0.75
Off-site Worker Travel	0.08	0.08	0.71	<0.01	0.16	0.04
Recycle Plant Fugitive Dust	--	--	--	--	--	--
Recycle Plant Equipment	--	--	--	--	--	--
Reclamation Fill Handling	--	--	--	--	--	--
Project						
Drilling Fugitive Dust	--	--	--	--	0.12	0.02
Drill Rig	0.26	3.04	2.08	0.01	0.09	0.08
Off-site Haul Truck Travel	0.77	24.24	6.28	0.08	3.79	1.20
Off-site Worker Travel	0.14	0.11	1.27	<0.01	0.65	0.17
Recycle Plant Fugitive Dust	--	--	--	--	2.38	0.31
Recycle Plant Equipment	1.41	14.16	9.27	0.03	0.55	0.51
Reclamation Fill Handling	--	--	--	--	0.33	0.05

Source: ESA, 2020.

4.0 Total Baseline and Project Emissions

The total baseline and Project emissions include the annual and daily criteria pollutant emissions from ESA's supplemental analysis discussed above, as well as baseline and Project emissions from all other sources estimated in the Applicant's air quality study, which include criteria pollutant, toxic air contaminants, and GHG emissions from: Quarrying Fugitive Dust; On-Site Off-Road Haul – Mine to Processing Area (Fugitive Dust); Processing Area Drop/Storage;

Plant/Aggregate Processing; Loadout Processing Area Drop/Storage; and On-Site On-road Haul (Fugitive Dust).

Baseline annual emissions for those sources listed above are derived by multiplying the baseline maximum hour emissions, which are based on a production of 500 tons, by a factor of 41.8 to reflect baseline annual production of 20,900 tons (500 tons per hour x 41.8 hours per year = 20,900 tons per year) and converting from pounds to tons (pounds / 2,000 = tons).

Baseline daily emissions for those sources listed above are derived by multiplying the baseline maximum hour emissions, which are based on a production of 500 tons, by a factor of 0.83 to reflect baseline daily production of 415 tons (500 tons per hour x 0.83 hours per day = 415 tons per day). Daily emissions are reported in units of pounds per day; therefore, no unit conversion is necessary.

Project annual emissions for the aggregate plant processing equipment and fugitive dust emissions from quarrying, off-road hauling from mine to processing, processing area drop and storage, load out processing area drop and storage are derived by multiplying the baseline maximum hour production of 500 tons by a factor of 936 to reflect Project annual production of 468,000 tons (500 tons per hour x 936 hours per year = 468,000 tons per year) and converting from pounds to tons (pounds / 2,000 = tons).

Project daily emissions for the aggregate plant processing equipment and fugitive dust emissions from quarrying, off-road hauling from mine to processing, processing area drop and storage, load out processing area drop and storage are derived by multiplying the baseline maximum hour production of 500 tons by a factor of 3 to reflect Project daily production of 1,500 tons (500 tons per hour x 3 hours per day = 1,500 tons per day). Daily emissions are reported in units of pounds per day; therefore, no unit conversion is necessary.

Total annual and daily criteria pollutant emissions associated with baseline operations and the Project are shown in **Table 3**, *Total Annual Criteria Pollutant and Greenhouse Gas Emissions by Source*, and **Table 4**, *Total Daily Criteria Pollutant and Greenhouse Gas Emissions by Source*, below. These tables utilize the emissions estimates from the Applicant's air quality study, as adjusted to match the appropriate baseline and Project production levels, and incorporate the supplemental emissions estimates provided in this memorandum (as summarized in Tables 1 and 2, above).

TABLE 3
TOTAL ANNUAL CRITERIA POLLUTANT AND GREENHOUSE GAS EMISSIONS BY SOURCE

Pollutant	ROG (tons/year)	NO_X (tons/year)	CO (tons/year)	SO_2 (tons/year)	PM10 (tons/year)	PM2.5 (tons/year)	$MTCO_2e$ (MT/year)
Baseline							
Quarrying Fugitive Emissions	--	--	--	--	0.110	0.032	--
Quarrying Engine Emissions	0.005	0.071	0.032	<0.001	0.003	0.002	7.42
Off-Road Haul - Mine to Processing Area (Fugitive)	--	--	--	--	0.175	0.037	--
Off-Road Haul - Mine to Processing Area (Engine)	0.006	0.068	0.030	<0.001	0.003	0.002	6.64
Plant/Aggregate Processing	0.003	0.037	0.022	<0.001	0.002	0.001	4.84
Processing Area Drop/Storage	--	--	--	--	0.065	0.019	--
Loadout Processing Area Drop/Storage	--	--	--	--	0.008	0.002	--
On-road On-site Haul Engine Emissions	0.001	0.012	0.003	<0.001	<0.001	<0.001	2.27
On-road On-site Haul Fugitive Emissions	--	--	--	--	0.322	0.068	--
Drilling Fugitive Dust	--	--	--	--	0.001	<0.001	--
Drill Rig	0.007	0.034	0.108	<0.001	0.003	0.003	13.44
Off-site Haul Truck Travel	0.025	0.419	0.115	0.001	0.037	0.019	63.60
Off-site Worker Travel	0.003	0.004	0.032	<0.001	0.007	0.002	4.18
Recycle Plant Fugitive Dust	--	--	--	--	--	--	--
Recycle Plant Equipment	--	--	--	--	--	--	--
Reclamation Fill Handling	--	--	--	--	--	--	--
Baseline Total Emissions	***0.050***	***0.645***	***0.342***	***0.001***	***0.736***	***0.187***	***102.39***
Project							
Quarrying Fugitive Emissions	--	--	--	--	2.457	0.716	--
Quarrying Engine Emissions	0.072	0.770	0.528	0.002	0.029	0.027	51.03
Off-Road Haul - Mine to Processing Area (Fugitive)	--	--	--	--	3.927	0.833	--
Off-Road Haul - Mine to Processing Area (Engine)	0.124	1.081	0.740	0.003	0.040	0.037	135.63
Plant/Aggregate Processing	0.078	0.830	0.501	0.001	0.035	0.032	108.41
Processing Area Drop/Storage	--	--	--	--	1.446	0.421	‘--
Loadout Processing Area Drop/Storage	--	--	--	--	0.183	0.051	‘--
On-road On-site Haul Engine Emissions	0.007	0.157	0.097	<0.001	0.001	0.001	47.57
On-road On-site Haul Fugitive Emissions	--	--	--	--	8.422	1.786	‘--
Drilling Fugitive Dust	--	--	--	--	0.019	0.002	--
Drill Rig	0.014	0.161	0.110	0.001	0.005	0.004	44.43
Off-site Haul Truck Travel	0.140	4.423	1.146	0.014	0.691	0.220	1,445.41
Off-site Worker Travel	0.026	0.020	0.233	0.001	0.118	0.030	55.39
Recycle Plant Fugitive Dust	--	--	--	--	0.040	0.005	--
Recycle Plant Equipment	0.220	2.209	1.446	0.005	0.086	0.079	394.26
Reclamation Fill Handling	--	--	--	--	0.017	0.003	--
Project Total Emissions	***0.681***	***9.651***	***4.801***	***0.027***	***17.516***	***4.247***	***2,282.13***
Net Emissions Increase	**0.631**	**9.006**	**4.459**	**0.026**	**16.780**	**4.060**	**2,179.74**

Source: Sespe, 2019a; ESA, 2020.

TABLE 4
TOTAL DAILY CRITERIA POLLUTANT EMISSIONS BY SOURCE

Pollutant	ROG (lbs/day)	NO_X (lbs/day)	CO (lbs/day)	SO_2 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Baseline						
Quarrying Fugitive Emissions	--	--	--	--	4.36	1.27
Quarrying Engine Emissions	0.20	2.84	1.29	<0.01	0.10	0.09
Off-Road Haul - Mine to Processing Area (Fugitive)	-	--	--	--	6.96	1.48
Off-Road Haul - Mine to Processing Area (Engine)	0.23	2.70	1.17	<0.01	0.10	0.10
Plant/Aggregate Processing	0.14	1.47	0.89	<0.01	0.06	0.06
Processing Area Drop/Storage	--	--	--	--	2.56	0.75
Loadout Processing Area Drop/Storage	--	--	--	--	0.32	0.09
On-road On-site Haul Engine Emissions	0.05	0.47	0.13	<0.01	0.01	0.01
On-road On-site Haul Fugitive Emissions	--	--	--	--	12.77	2.71
Drilling Fugitive Dust	--	--	--	--	0.03	<0.01
Drill Rig	0.45	2.31	7.38	0.01	0.22	0.20
Off-site Haul Truck Travel	0.99	16.65	4.55	0.02	1.48	0.75
Off-site Worker Travel	0.08	0.08	0.71	<0.01	0.16	0.04
Recycle Plant Fugitive Dust	--	--	--	--	--	--
Recycle Plant Equipment	--	--	--	--	--	--
Reclamation Fill Handling	--	--	--	--	--	--
Total Emissions	***2.14***	***26.52***	***16.12***	***0.03***	***29.13***	***7.55***
Project						
Quarrying Fugitive Emissions	--	--	--	--	15.75	4.59
Quarrying Engine Emissions	0.46	4.93	3.38	0.01	0.18	0.17
Off-Road Haul - Mine to Processing Area (Fugitive)	-	-	-	-	25.17	5.34
Off-Road Haul - Mine to Processing Area (Engine)	0.45	3.91	2.68	0.01	0.14	0.13
Plant/Aggregate Processing	0.50	5.32	3.21	0.01	0.22	0.20
Processing Area Drop/Storage	--	--	--	--	9.27	2.70
Loadout Processing Area Drop/Storage	--	--	--	--	1.17	0.33
On-road On-site Haul Engine Emissions	0.04	0.86	0.53	<0.01	<0.01	<0.01
On-road On-site Haul Fugitive Emissions	--	--	--	--	46.15	9.78
Drilling Fugitive Dust	--	--	--	--	0.32	0.04
Drill Rig	0.26	3.04	2.08	0.01	0.09	0.08
Off-site Haul Truck Travel	0.77	24.24	6.28	0.08	3.79	1.20
Off-site Worker Travel	0.14	0.11	1.27	<0.01	0.65	0.17
Recycle Plant Fugitive Dust	--	--	--	--	2.38	0.31
Recycle Plant Equipment	1.41	14.16	9.27	0.03	0.55	0.51
Reclamation Fill Handling	--	--	--	--	0.33	0.05
Total Emissions	***4.03***	***56.57***	***28.70***	***0.15***	***106.16***	***25.60***
Net Emissions Increase	**1.89**	**30.05**	**12.58**	**0.12**	**77.03**	**18.05**

Source: Sespe, 2019a; ESA, 2020.

5.0 Adjusted Health Risk Assessment

The Applicant's air quality study includes a health risk assessment (HRA) that evaluates the anticipated health risk associated with air pollutant emissions as estimated in that study. As discussed above, this memorandum provides supplemental emissions estimates which concludes that the Project would result in a greater difference between baseline emissions and Project emissions than that reported in the Applicant's air quality study. Therefore, it is necessary to consider whether the adjusted emissions would be expected to substantially change the health risk conclusions in the Applicant's air quality study and its HRA.

The Applicant's HRA was performed in accordance with the revised OEHHA "Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" (OEHHA, 2015). The analysis incorporated the Project's estimated TAC emissions and dispersion modeling using the USEPA AERMOD model with meteorological data from the Camarillo Airport (Meteorological Station ID 23136). The Applicant's HRA assumed all Project toxic air contaminant emissions would be net new emissions and did not subtract the baseline toxic air contaminant emissions in the HRA. Therefore, the Applicant's HRA is conservative and overestimates the incremental increase in health risks from the Project. **Table 5**, *Applicant's Air Quality Study HRA Results* presents that study's conclusions that the Project would not exceed the significance thresholds at the nearest sensitive uses.

TABLE 5
APPLICANT'S AIR QUALITY STUDY HRA RESULTS

Model Receptor No. – Type – Location	Excess Cancer Cases per One Million People Exposed	Maximum Chronic Hazard Index	Maximum Acute Hazard Index
136 – MEIR (Cancer, Chronic) – North of Project	1.0	0.024	< 0.010
109 – MEIR (Acute) – East of Project	0.33	0.006	< 0.010
103 – MEIW (Cancer, Chronic, Acute) – Funeral Home	1.4	0.260	0.021
194 – PMI – Project Boundary (UTM 316339, 3783949)	N/A	N/A	0.079
Significance Threshold	**10**	**1.0**	**1.0**
Exceeds Significance Threshold?	**No**	**No**	**No**

Source: Sespe, 2019a

Diesel particulate matter (DPM) emissions are a primary influence on health risk and DPM emissions highly correlate with exhaust PM2.5 emissions.[12] Therefore, for the purposes of this supplemental analysis, an initial screening assessment was performed to consider whether emission estimates as updated by this supplemental analysis would have the potential to substantially affect the conclusions of the Applicant's HRA. This screening assessment considers the difference between the annual PM2.5 emissions of the Applicant's air quality study and the updated annual PM2.5 emissions and correlates that change to a similar change in health risk.

The Applicant's air quality study estimated the Project's maximum annual emissions of PM2.5 at 3.73 tons per year (Sespe, 2019a: Table 7). Based on the supplemental calculations provided herein, the Project's adjusted maximum annual emissions of PM2.5 is 4.247 tons per year, as shown in Table 3 above. However, a portion of the Project's adjusted maximum annual emissions of PM2.5 are attributable to off-site haul truck and off-site worker vehicle travel, which contributes approximately 0.250 tons per year to the Project's adjusted maximum annual emissions of PM2.5. The overwhelming majority of the off-site haul truck and worker vehicle travel emissions would occur on regional roadways away from the Project site. As discussed above, off-site haul trucks and worker vehicles are assumed to travel an average of 40 miles per roundtrip (20 miles inbound, 20 miles outbound). Emissions beyond approximately 0.25 mile

[12] South Coast Air Quality Management District, Updated CEIDARS Table with PM2.5 Fractions.

from the Project site would not substantially influence concentrations of toxic air contaminants in the area near the Project site or at sensitive receptor locations in the vicinity of the Project site. As a conservative assumption, it is assumed 5% (equivalent to 2 miles of travel, or 1 mile for an inbound trip and 1 mile for an outbound trip) of the off-site haul truck and worker vehicle emissions are considered in the adjusted health risk assessment. Therefore, the Project's adjusted maximum annual emissions of PM2.5 considered for the adjusted health risk assessment screening is 4.010 tons per year, which represents an increase of 0.280 tons per year, or an increase of approximately 7.5%, as compared to PM2.5 emissions estimates in the Applicant's air quality study.

Table 6, *Adjusted Health Risk Assessment*, presents the results of applying a 7.5% increase to the health risk assessment results from the Applicant's HRA. As shown in the table, the 7.5% increase continues to result in increased health risk levels well below the significance thresholds. It is noted that HRA modeling based on the updated emissions would be expected to result in projected risk levels that vary slightly from those estimated through the screening approach used here. However, it is reasonably expected that updated modeling would result in the same impact determination as shown in Table 6 and would not indicate an increased health risk that would exceed the significance thresholds. Thus, the conclusions presented here are considered sufficient for the County's CEQA review of the Project.

TABLE 6
ADJUSTED HEALTH RISK ASSESSMENT

Model Receptor No. – Type – Location	Excess Cancer Cases per One Million People Exposed	Maximum Chronic Hazard Index	Maximum Acute Hazard Index
136 – MEIR (Cancer, Chronic) – North of Project	1.08	0.026	0.011
109 – MEIR (Acute) – East of Project	0.35	0.006	0.011
103 – MEIW (Cancer, Chronic, Acute) – Funeral Home	1.51	0.280	0.023
194 – PMI – Project Boundary (UTM 316339, 3783949)	N/A	N/A	0.085
Significance Threshold	**10**	**1.0**	**1.0**
Exceeds Significance Threshold?	**No**	**No**	**No**

Source: Derived by multiplying the health risk assessment results provided in the "Air Quality, Health Risk, and Climate Change Impact Assessment" (Sespe, 2019a) and scaled to account for the Project's adjusted total annual emissions estimates as presented in Table 3. Scaling is based on PM2.5 emissions, which are highly correlated to diesel particulate matter emissions, the primary driver of health risk impacts.

APPENDIX C-1

INITIAL STUDY BIOLOGICAL ASSESSMENT REPORT FOR PACIFIC ROCK—LU10-0003 (CUP 3817-3), MODIFICATION

BENCHMARK RESOURCES

Initial Study Biological Assessment

Cover Page

Original ISBA report date: January 15, 2010

Revision report date(s): February 16, 2017

Case number (to be entered by Planning Div.)**:** LU10-0003

Permit type: Conditional Use Permit

Applicant: Pacific Rock, Inc.

Case Planner (to be entered by Planning Div.)**:** Ebony McGee-Andersen

Total parcel(s) size: 718.11 acres

Assessor Parcel Number(s): 234-0-060-22 and 234-0-060-19

Development proposal description: Modification of existing Conditional Use Permit and the approval of an amended Reclamation Plan to authorize mining expansion area. Mining would occur over an approximate 172.8-acre area with a maximum depth of 180 feet.

Prepared for Ventura County Planning Division by:

As a Qualified Biologist, approved by the Ventura County Planning Division, I hereby certify that this Initial Study Biological Assessment was prepared according to the Planning Division's requirements and that the statements furnished in the report and associated maps are true and correct to the best of my knowledge.

Qualified Biologist (signature):		Date: 2/16/17
Name (printed): Matt Schaap	Title: Biologist	Company: BioResource Consultants Inc.
Phone: 831.710.7687	email: matt@biorc.com	
Other Biologist (signature):		Date: 2/16/17
Name (printed): Sarah Termondt	Title: Biologist	Company: BioResource Consultants Inc.
Phone: 805.794.7324	email: sarah@biorc.com	
Role: Biologist conducted field work, mapped data, assisted in the report writing.		

Initial Study Checklist

This Biological Assessment DID NOT provide adequate information to make CEQA findings regarding potentially significant impacts or to develop mitigation measures necessary to mitigate potentially significant project and cumulative impacts.

Additional biology-related information, studies, or outside agency permits needed to make CEQA findings, develop mitigation measures, or to satisfy other regulatory agencies will be required.

Per consultation with Ventura County (W. Wilkinson, personal communication, Feb. 9, 2017), focused studies to be conducted in order to provide information for CEQA will include:

- Focused Botanical Surveys for all species with High Potential (see Observed and Potentially Occurring Special-Status Species Table) during appropriate bloom periods in the spring of 2017.
- Update/Amendment to the Jurisdictional Wetland Delineation in the spring of 2017.

Contents

Maps

Summary

The Project site is located within the westernmost Santa Monica Mountains and contains native and non-native vegetation types. Non-native vegetation is of a ruderal character and is directly associated with the existing mining operation. Native plant communities are primarily undisturbed except for portions of the chaparral and coastal sage scrub which have undergone past grading disturbances and through which a small number of unpaved access roads are routed.

On-site vegetation communities support habitat for five special-status species that were observed within the Survey Area (SA1) conducted by BioResource Consultants, Inc. (BRC) in 2016: southern California black walnut (*Juglans californica*), coastal whiptail (*Aspidoscelis tigris stejnegeri*), loggerhead shrike (*Lanius ludovicianus*), sharp-shinned hawk (*Accipiter striatus*), and San Diego desert woodrat *(Neotoma lepida intermedia*). Previous studies conducted within the SA1 in 2010 identified populations of Blochman's dudleya (*Dudleya blochmaniae* ssp. *blochmaniae*), Conejo dudleya (*Dudleya parva*), Verity's dudleya (*Dudleya verity*), Conejo buckwheat (*Eriogonum crocatum*), and an individual yellow warbler (*Setophaga petechia*).

Although not observed on-site during BRC's survey, suitable habitat is available for an additional 17 special-status species: Catalina mariposa-lily (*Calochortus catalinae*), Plummer's mariposa-lily (*Calochortus plummerae*), Blochman's dudleya, Conejo dudleya, Verity's dudleya, Conejo buckwheat, Ojai navarretia (*Navarretia ojaiensis*), Lyon's pentachaeta (*Pentachaeta lyonii*), woven-spored lichen (*Texosporium sancti-jacobi*), Crotch bumble bee (*Bombus crotchii*), Santa Monica grasshopper (*Trimerotropis occidentiloides*), western pond turtle (*Emys marmorata*), golden eagle (*Aquila chrysaetos*), burrowing owl (*Athene cunicularia*), coastal California gnatcatcher (*Polioptila californica californica*), yellow warbler, and least Bell's vireo (*Vireo bellii pusillus*).

SA1 also provides suitable habitat for nesting birds protected by the California Department of Fish and Wildlife (CDFW) and the Migratory Bird Treaty Act (MBTA). Project implementation may impact nesting birds due to crushing, trampling, or removal of vegetation, which could result in the mortality of nesting birds or their eggs and/or young. In addition, indirect impacts to nesting birds could occur due to elevated noise levels and vibrations associated with construction equipment, which could result in nesting birds abandoning their nests, eggs, or young. Potential impacts to protected nesting birds are considered less than significant.

Fifteen southern California black walnut trees (two adults and 13 saplings) fall within the Project Construction Footprint and will likely need to be removed. Due to their size and maturity, these trees are not seen as significant to the local habitat community, and therefore merit implementing a 1:1 mitigation measure to remove the trees and plant replacements in an unaffected area of the parcel. Thirteen coast live oak trees (*Quercus agrifolia*) are located within SA1, with three 'heritage' individuals falling within the Construction Footprint. Consultation with the county Planning Division and an arborist report will likely be required to address the removal of these protected trees.

Twenty-four water features (W1-W24) were identified within SA1 during the 2016 survey. All drainages encountered within SA1 deliver ephemeral or intermittent surface flows (W1-W23); have a defined bed and bank, and at some points are culverted; and generally flow westward and southwestward until they are ultimately impounded in a man-made detention basin (W24) forming a perennial lacustrine system (a limnetic and littoral-emergent wetland). All features except W6, W11, W18, W19, and W24 are expected to be impacted as a result of the Project.

The Project is located within the Santa Monica–Sierra Madre Connection (Connection), one of the few coastal-to-inland connections remaining in the South Coast Ecoregion. The Connection stretches from the rugged Santa Monica Mountains at the coast inward to the jagged peaks of the Santa Susana Mountains and the Sierra Madre Ranges of the Los Padres National Forest. Within SA1, the Connection is characterized as a corridor connecting the Santa Monica Mountains to Conejo Mountain. The expansion of the quarry will narrow the corridor connecting the Santa Monica Mountains to Conejo Mountain, but may not be determined to be significant being that the wildlife movement through the area will not be impeded.

Eight vegetation communities within the SA1 were recognized as locally important communities. These communities include Laurel Sumac Scrub, California Sagebrush Scrub, Deerweed Scrub, Giant Wild Rye Grasslands, Red Willow Thicket, Mountain Mahogany Scrub, and Disturbed Chamise/Ceanothus Chaparral and Coast Live Oak Woodland. These communities were determined to be locally important due to a combination of habitat suitability, limited range, and proximity of known occurrences to several listed species of which include: Verity's dudleya, Conejo buckwheat, Plummer's mariposa lily, Catalina mariposa lily, Least Bell's Vireo, coastal California Gnatcatcher, and Yellow Warbler. Red Willow Thicket and Coast Live Oak Woodland are the only two locally important communities that would not be impacted by Project activities. Additionally, SA1 supports moderate to high quality habitat for four recognized locally important species determined to have high potential to occur on the Project site including: Plummer's mariposa lily, Conjeo dudleya, Verity's dudleya, and Conejo buckwheat.

Section 1: Construction Footprint Description

Construction Footprint Definition (per the Ventura County Planning Division): The construction footprint includes the proposed maximum limits of temporary or permanent direct land or vegetation disturbance for a project including such things as the building pad(s), roads/road improvements, grading, septic systems, wells, drainage improvements, fire hazard brush clearance area(s), tennis courts, pools/spas, landscaping, storage/stockpile areas, construction staging areas, fire department turnarounds, utility trenching and other grading areas. The construction footprint on some types of projects, such as mining, oil and gas exploration or agricultural operations, may be quite different than the above.

Development Proposal Description:

Mining Operations

The Applicant requests a modification to the existing Conditional Use Permit (CUP) and the approval of an amended Reclamation Plan to authorize the extraction (mining) of approximately 13.2 million tons of construction aggregate and the reclamation of the mined lands (i.e. the areas disturbed by mining activities).

The requested CUP modification would authorize a maximum production limit of 468,000 tons per year. Total material production from the site is estimated to be 13.2 million tons (19.8 million cubic yards). Operations would occur Monday through Saturday between the hours of 7:00 am to 4:00 pm. Mining would occur over an approximate 172.8-acre area with a maximum depth of 180 feet.

Mining operations will continue in generally the same manner as they have since the early 1900s. The mining area is being expanded to the east to correct the existing "over steepened" slope conditions at the northerly and northeasterly sided of the quarry and for expansion onto recently acquired adjacent land. The mining methods will include blasting to loosen the hard rock material and various processing methods.

At the proposed maximum mining rate of 468,000 tons per year, mining the 13.2 million tons of material would require approximately 28 years (i.e. to the year 2045). The maximum production limit is not expected to achieved for each of the 28 years; hence the Applicant is proposing a 30-year mining permit and is proposing the end of mine life to be December 31, 2050, which includes an additional five years for reclamation and monitoring.

End Use

The mine site would be reclaimed to Agricultural Open Space, including an agricultural grazing area. The final reclaimed surface would be characterized by a near-level quarry floor with an adjacent excavated slope. The slope would be a maximum of 1:1 (h:v) overall gradient with intervening 50-foot wide benches placed every 50 feet of elevation. The bench surfaces would be re-vegetated with native species compatible with the surrounding area and the floor would be vegetated with an agricultural barley crop to support grazing cattle. Site drainage would be directed to sedimentation basins to minimize the offsite transport of eroded material while the vegetation is established.

Construction Footprint Size

172.8 acres (Entirely within APN 234006022 and 234006019)

Project Design for Impact Avoidance or Minimization

None

Coastal Zone/Overlay Zones

The Construction Footprint is located outside of the Coastal Zone. No overlay zones were depicted in the Ventura County zoning website for APN 234006022 or 234006019.

Zoning

APN 234006022 – Agricultural Exclusive Zone – 40 acres.

APN 234006019 – Open Space – 160 acres.

Elevation

180 – 1,248 feet above mean sea level (amsl).

Other

An SCE power line easement runs adjacent to the eastern edge of the site.

Section 2: Survey Area Description and Methodology

2.1 Survey Purpose

Discretionary actions undertaken by public agencies are required to demonstrate compliance with the California Environmental Quality Act (CEQA). The purpose of this Initial Study Biological Assessment (ISBA) is to gather enough information about the biological resources associated with the proposed project, and their potential to be impacted by the project, to make a CEQA Initial Study significance finding for biological resources. In general, ISBA's are intended to:

- Provide an inventory of the biological resources on a project site and the values of those resources.
- Determine if a proposed project has the potential to impact any significant biological resources.
- Recommend project redesign to avoid, minimize or reduce impacts to significant biological resources.
- Recommend additional studies necessary to adequately assess potential impacts and/or to develop adequate mitigation measures.
- Develop mitigation measures, when necessary, in cases where adequate information is available.

2.2 Survey Area Description

Survey Area Definition (per the Ventura County Planning Division): The physical area a biologist evaluates as part of a biological assessment. This includes all areas that could potentially be subject to direct or indirect impacts from the project, including, but not limited to: the construction footprint; areas that would be subject to noise, light, dust or runoff generated by the project; any required buffer areas (e.g., buffers surrounding wetland habitat). The construction *footprint plus a 100 to 300-foot buffer—beyond the required fire hazard brush clearance boundary—(or 20-foot from the cut/fill boundary or road fire hazard brush clearance boundary – whichever is greater) is generally the size of a survey area. Required off-site improvements—such as roads or fire hazard brush clearance—are included in the survey area. Survey areas can extend off the project's parcel(s) because indirect impacts may cross property lines. The extent of the survey area shall be determined by the biologist in consultation with the lead agency.*

SA1 is associated with the existing Pacific Rock Quarry and adjacent areas at 1000 Howard Road, Camarillo, CA 93012 (APN 234006022, 234006019, 234008079, 234008038, and 234006012), within unincorporated Ventura County on the *Piru* USGS 7.5-minute quadrangle.

Survey Area 1 (SA1)

Location

SA1 is located to the southwest of the city of Camarillo, approximately 1.5 miles southwest of Highway 101, and is bordered by Conejo Mountain Memorial Park to the west. SA1 extends approximately 1,200 feet northward and eastward from the existing boundary of the quarry and approximately 700 feet southward from the southern boundary of the quarry.

Survey Area Environmental Setting

SA1 ranges in elevation from approximately 180 to 1,248 feet above mean sea level (amsl). In general, the topography of the quarry is generally flat within the existing mining area. Within the remainder of SA1, steep slopes are found just outside the existing quarry, notably to the north, inhibiting safe foot access. These areas are referred to as Inaccessible Areas (See Site and Survey Area Map). Habitat within this area was assessed with binoculars and aerial photographs. A large portion of SA1 is considered disturbed due to previous and current mining activities as well as the 2013 Springs Fire that burned much of the surrounding area. The majority of the surrounding habitat is dominated by chaparral, and coastal sage scrub vegetation communities. Multiple ephemeral drainages exist within SA1; these drainages flow into a detention basin located on the western side of the property.

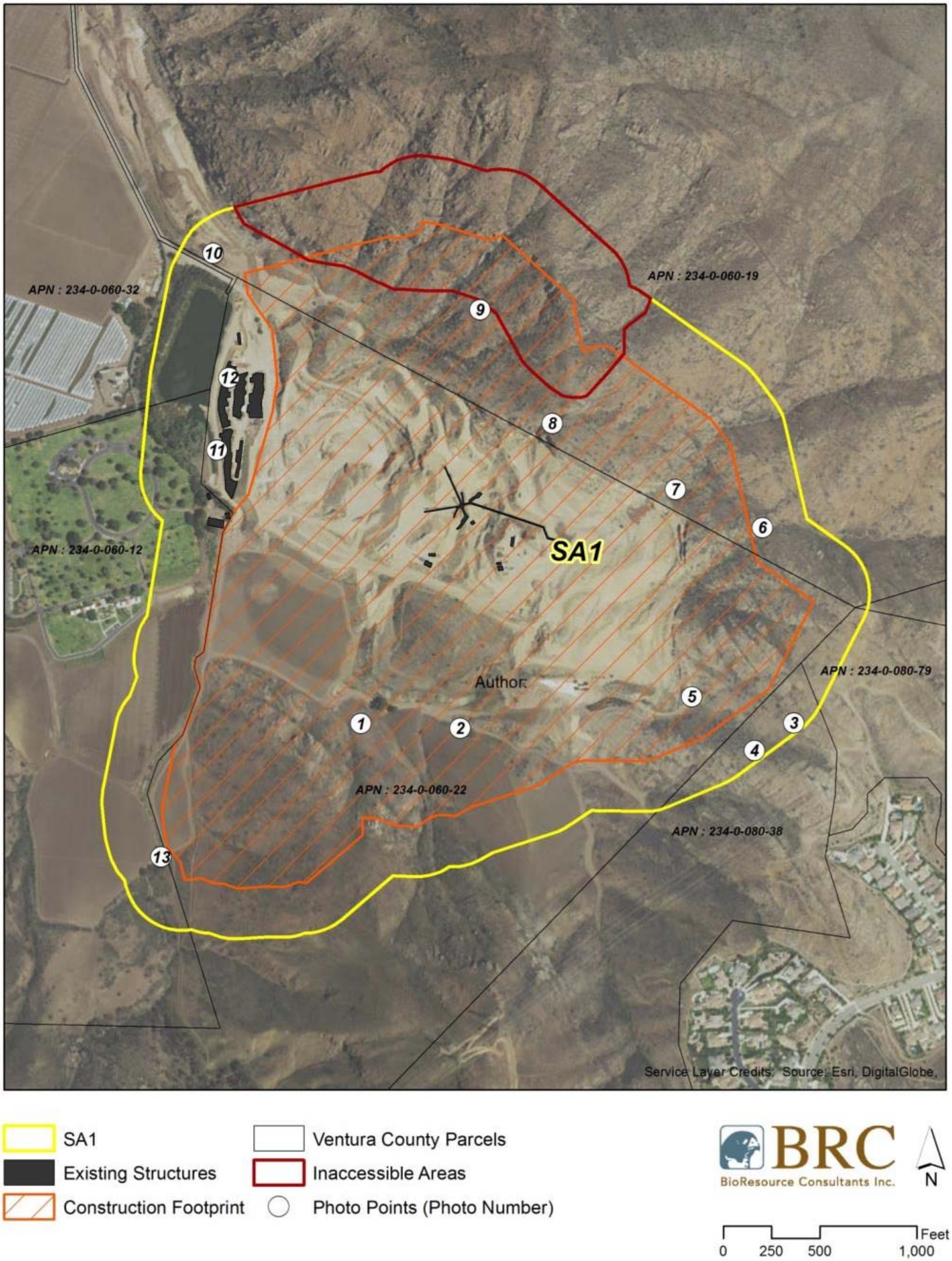
Surrounding Area Environmental Setting

Land uses within and surrounding the SA1 include the existing Pacific Rock Mine quarry, located at the center of the Project site; agricultural lands and the Conejo Mountain Cemetery to the west; residential lands to the southeast; and open space to the north, south, and northeast. Undeveloped lands are composed of natural habitats like those found on site in these open space areas.

Cover

50.3%	Native vegetation
9.2%	Non-native vegetation
50.3%	Recently burned
7.4%	Agricultural/grazing
31%	Bare ground/cleared/graded
0.6%	Buildings, paved roads, and other impervious cover
1.5%	Open water

Project Vicinity Map



Site and Survey Area Map

2.3 Methodology

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BRC performed a site visit to map the vegetation; assess the habitat suitability for potential special-status species and wildlife movement; map any sensitive biological resources encountered on-site; and, record observations of plant and wildlife species.

Survey Details Table

Survey Date & Details							
Survey Key	**Survey Date**	**Survey Area Map Key(s)***	**Survey Type**	**Time Period**	**Methods/Constraints**	**GPS**	**Surveyors**
SD1	12/5/1994	Unknown	ISBA	7:00am - 5:00pm	Surveys consisted of walking the disturbed an undisturbed areas within the initial lease boundary as well as areas adjacent to the east and south of the initial site. Animal and plant species observed were recorded.	Unknown	Aquatic Consulting Services
SD2	5/19/1995	Unknown	ISBA	7:00am - 5:00pm	Surveys consisted of walking the disturbed an undisturbed areas within the initial lease boundary as well as areas adjacent to the east and south of the initial site. Animal and plant species observed were recorded.	Unknown	Aquatic Consulting Services
SD3	12/30/09	SA1	ISBA	Unknown	Surveys conducted to evaluate the existing on-site habitat, flora, fauna, and hydrologic features within the proposed expansion	Unknown	Aquatic Consulting Services; Louis A. Courtois
SD4	1/5/2010	SA1	ISBA	Unknown	Surveys conducted evaluate the existing on-site habitat, flora, fauna, and hydrologic features within the proposed expansion	Unknown	Aquatic Consulting Services; Louis A. Courtois
SD5	5/3/2010	SA1	ISBA	8:00 am - 1:00 pm	A walking reconnaissance survey of the site to review habitat types and determine placement of trap lines for mammals and habitat areas in which special-status plant species focused surveys would be appropriate.	N/A	Joe Decruyenaere
SD6	5/3/2010	SA1	Wetlands	8:00 am - 12:30 pm	Walking site. Approximately 90 percent of the drainages and wetland features were accessible; approximately 10 percent of the drainages areas were mapped using aerial imagery and custom topography.	N/A	R.C. Brody
SD7	5/11/2010	SA1	Botanical	9:00 am - 10:30 am	All accessible habitats were investigated for general plant species, and accessible rocky habitats were investigated in depth for quantitative mapping of special-status Blochman's dudleya and Conejo buckwheat.	Trimble Geo XH sub-meter	Joe Decruyenaere

Survey Date & Details							
Survey Key	**Survey Date**	**Survey Area Map Key(s)***	**Survey Type**	**Time Period**	**Methods/Constraints**	**GPS**	**Surveyors**
SD8	5/19/2010	SA1	Botanical	9:00 am - 10:30 am	All accessible habitats were investigated for general plant species, and accessible rocky habitats were investigated in depth for quantitative mapping of special-status Blochman's dudleya and Conejo buckwheat.	Trimble Geo XH sub-meter	Joe Decruyenaere
SD9	05/03/2010	SA1	LBV/CAGN Surveys	8:30 am - 11:05 pm	Conducted protocol surveys for least Bell's vireo and coastal California gnatcatcher	Unknown	Thomas Ryan
SD10	5/4/2010	SA1	Mammal trapping	7:00 pm - 8:00 pm	Initial trapping set-up and baiting. 30 traps were used, placed to sample coastal sage scrub, chaparral, and disturbed areas, both upland and near riparian vegetation south of the agricultural field. Traps were placed in SA1 (3 traps in ruderal vegetation), SA2 (13 traps in ruderal and coastal sage scrub vegetation), SA3 (4 traps in disturbed coastal sage scrub vegetation), and SA4 (10 traps in coastal sage scrub and chaparral vegetation).	Unknown	Joe Decruyenaere; R.C. Brody
SD11	5/5/2010	SA1	Mammal trapping	6:00 am - 8:00 am	Recordation and release of captured animals	Unknown	Joe Decruyenaere; R.C. Brody
SD12	5/5/2010	SA1	Mammal trapping	7:00 pm - 8:00 pm	Trap set-up and baiting	Unknown	Joe Decruyenaere
SD13	5/6/2010	SA1	Mammal trapping	6:00 am - 8:00 am	Recordation and release of captured animals	Unknown	Joe Decruyenaere; R.C. Brody
SD14	5/6/2010	SA1	Mammal trapping	7:00 pm - 8:00 pm	Trap set-up and baiting	Unknown	Joe Decruyenaere
SD15	5/7/2010	SA1	Mammal trapping	6:00 am - 8:00 am	Recordation and release of captured animals	Unknown	Joe Decruyenaere; R.C. Brody
SD16	05/13/2010	SA1	LBV/CAGN Surveys	8:42 am - 10:15 pm	Conducted protocol surveys for least Bell's vireo and coastal California gnatcatcher	Unknown	Thomas Ryan
SD17	05/24/2010	SA1	LBV/CAGN Surveys	8:15 am - 9:48 pm	Conducted protocol surveys for least Bell's vireo and coastal California gnatcatcher	Unknown	Thomas Ryan
SD18	5/25/2010	SA1	Mammal trapping	6:30 pm - 8:00 pm	Trap set-up and baiting	Unknown	Joe Decruyenaere
SD19	5/26/2010	SA1	Mammal trapping	6:00 am - 8:00 am	Recordation and release of captured animals	Unknown	Joe Decruyenaere; R.C. Brody

Survey Date & Details							
Survey Key	**Survey Date**	**Survey Area Map Key(s)***	**Survey Type**	**Time Period**	**Methods/Constraints**	**GPS**	**Surveyors**
SD20	5/26/2010	SA1	Mammal trapping	6:30 pm - 8:00 pm	Trap set-up and baiting	Unknown	Joe Decruyenaere
SD21	5/27/2010	SA1	Mammal trapping	6:00 am - 8:00 am	Recordation and release of captured animals	Unknown	Joe Decruyenaere; R.C. Brody
SD22	5/27/2010	SA1	Mammal trapping	6:30 pm - 8:00 pm	Trap set-up and baiting	Unknown	Joe Decruyenaere
SD23	5/28/2010	SA1	Mammal trapping	6:00 am - 8:00 am	Recordation and release of captured animals	Unknown	Joe Decruyenaere; R.C. Brody
SD24	06/05/2010	SA1	LBV/CAGN Surveys	7:03 am - 9:10 am	Conducted protocol surveys for least Bell's vireo and coastal California gnatcatcher	Unknown	Thomas Ryan
SD25	06/16/2010	SA1	LBV/CAGN Surveys	8:36 am - 10:00 am	Conducted protocol surveys for least Bell's vireo and coastal California gnatcatcher	Unknown	Thomas Ryan
SD26	06/26/2010	SA1	LBV/CAGN Surveys	9:18 am - 10:25 am	Conducted protocol surveys for least Bell's vireo and coastal California gnatcatcher	Unknown	Thomas Ryan
SD27	6/29/2010	SA1	Mammal trapping	6:00 pm - 8:00 pm	Trap set-up and baiting	Unknown	Joe Decruyenaere
SD28	6/30/2010	SA1	Mammal trapping	6:00 am - 8:00 am	Recordation and release of captured animals	Unknown	Joe Decruyenaere; Ty Garrison
SD29	6/30/2010	SA1	Mammal trapping	6:00 pm - 8:00 pm	Trap set-up and baiting	Unknown	Joe Decruyenaere
SD30	7/1/2010	SA1	Mammal trapping	6:00 am - 8:00 am	Recordation and release of captured animals	Unknown	Joe Decruyenaere; Ty Garrison
SD31	07/07/2010	SA1,	LBV/CAGN Surveys	9:00 am - 9:40 am	Conducted protocol surveys for least Bell's vireo and coastal California gnatcatcher	Unknown	Thomas Ryan
SD32	07/21/2010	SA1	LBV/CAGN Surveys	5:50 am - 6:28 pm	Conducted protocol surveys for least Bell's vireo and coastal California gnatcatcher	Unknown	Thomas Ryan
SD33	11/04/2016	SA1*	ISBA	8:30 am - 4:30 pm	Surveys consisted of walking undisturbed areas within the revised Construction Footprint and 300-ft. buffer (SA1). Animal and plant species observed were recorded.	Digiland DL721-RB	Matt Schaap, Sarah Termondt

* SA1 adjusted in 2016 to reflect proposed change in Construction Footprint. From this point on in the document, SA1 refers to revised Survey Area for 2016.

ISBA ....……………Initial Study Biological Assessment
Botanical ....………… Botanical Survey
LBV/CAGN……………....Least Bell's Vireo and California Gnatcatcher Protocol Survey
Mammal Trapping……...Mammal Trapping Surveys
Wetlands………………..Jurisdictional Delineation of drainages and wetlands

Section 3: The Biological Inventory

See Appendix 1 for an overview of the types of biological resources that are protected in Ventura County.

3.1 Habitats: Plant Communities, Physical Features and Wetlands

Plant Communities

One CDFW sensitive plant communities and eight locally-important plant communities were found within SA1.

Major Plant Communities Summary

PC1 - Laurel Sumac Scrub (*Malosma laurina* Alliance; S4, G4; Locally Important Community)
In this community within SA1, laurel sumac (*Malosma laurina*) is the dominant species in the shrub canopy. Associated species include chaparral yucca (*Hesperoyucca whipplei*), sugar bush (*Rhus ovata*), and red-topped buckwheat (*Eriogonum fasciculatum* var. *foliolosum*). A sparse-to-grassy herbaceous understory of intermittent non-native grasses is present. Within SA1, this community ranges from open/intermittent to moderately-dense cover because of the 2013 Springs Fire. This community was found to be the predominant vegetation type within SA1 with shrubs located on moderate to steep slopes of variable aspect. It occurs at elevations ranging from 5 to 400 meters amsl (Sawyer et al. 2009). This shrubland alliance is not considered to be unique habitat within Ventura County; however, this community was determined to be considered locally important because special-status species with limited range including state rare Conejo buckwheat (*Eriogonum crocatum*) and federally threatened Verity's dudleya (*Dudleya verityi*), have been previously recorded to occupy this community within SA1 (See Special-Status Plant Species Map). Additionally, this alliance does support wildlife connectivity outside of the SA1.

PC2 - California Sagebrush Scrub (*Artemisia californica* Alliance; S5, G5; Locally Important Community)
In this community within SA1, California sagebrush (*Artemisia californica*) is the dominant species in the shrub canopy, with occurrences of black sage (*Salvia mellifera*) and deerweed (*Acmispon glaber*). A sparse herbaceous understory of intermittent non-native grasses is present. Within SA1, this community was found to be intact with principally dried/dormant vegetation and is located on gentle slopes of variable aspect. It occurs at elevations ranging from 50 to 925 meters amsl (Sawyer et al. 2009). This shrubland alliance is not considered to be unique habitat within Ventura County; however, this community was determined to be considered locally important because special-status species with limited range including Conejo buckwheat and Verity's dudleya, have been previously recorded within similar habitat in the SA1. Additionally, this alliance does support habitat for the federally threatened coastal California Gnatcatcher (*Polioptila californica californica*) within SA1.

PC3 - Deerweed Scrub (*Acmispon glaber* [form. *Lotus scoparius*] Alliance; S5, G5; Locally Important Community)
In this community within SA1, deerweed is the dominant species in the shrub canopy with red-topped buckwheat and sparse occurrences of laurel sumac. A sparse herbaceous understory of intermittent non-native grasses is present. Within SA1, this community was found to be intermittent with principally dried/dormant vegetation and is located on gentle slopes of variable aspect with rocky outcroppings. It occurs at elevations ranging from 50 to 925 meters amsl (Sawyer et al. 2009). This shrubland alliance is not considered to be unique habitat within Ventura County; however this community was determined to be locally important due to its potential to support Catalina mariposa-lily (*Calochortus catalinae*) and Plummer's mariposa-lily (*Calochortus plummerae*), both CNPS 4.2 listed species. Additionally, this alliance does support foraging habitat for the coastal California Gnatcatcher and does support wildlife connectivity outside of the SA1.

PC4 - Giant Wild Rye Grasslands (*Elymus condensatus* [form. *Leymus condensatus*] Alliance; S3, G3; Locally Important Community)

In this community within SA1, giant wild rye (*Elymus condensatus*) is the dominant species in the herbaceous layer, with a sparse herbaceous understory of intermittent non-native grasses. This community was found on north facing slopes and in association with ephemeral drainages on the eastern portion of SA1. It occurs at elevations ranging from 0 to 1500 meters amsl (Sawyer et al. 2009). This shrubland alliance is not considered to be unique habitat within Ventura County; however this community was determined to be locally important due to its potential to support special-status plant species including Catalina mariposa-lily and Plummer's mariposa-lily. It should be noted that listed plant species including Conejo buckwheat and Verity's dudleya, were documented within this general area in 2010, but it is assumed these specific population locations were limited to rock outcroppings found within or adjacent to this community.

PC5 - Cattail Marsh (*Typha latifolia* Alliance; S5, G5)

In this community within SA1, broadleaf cattail (*Typha latifolia*) is the dominant species in the herbaceous layer, with occurrences of poison hemlock (*Conium maculatum*) and tule (*Schoenoplectus acutus* var. *occidentalis*). This community occurs adjacent to an annual spring and within the bed and bank of an intermittent drainage found in the south-central portion of SA1 as well as near the southwestern portion of the retention pond. It occurs at elevations ranging from 0 to 350 meters amsl (Sawyer et al. 2009).

PC6 - Red Willow Thicket (*Salix laevigata* Alliance; S3, G3; CDFW Sensitive Community; Locally Important Community)

In this community within SA1, red willow (*Salix laevigata*) is the dominant species in the tree canopy, with occurrences of broadleaf cattail and tule. The trees form a continuous canopy adjacent to a culverted drainage feeding into the retention pond. This community occurs at elevations ranging from 0 to 1700 meters amsl (Sawyer et al. 2009). CDFW considers this a sensitive community type synonymous with Southern Willow Scrub (CNDDB, Holland 1986). This woodland alliance is considered a unique habitat within Ventura County and is considered a locally-important community yellow warbler (*Setophaga petechial*), a CDFW Species of Special Concern, was observed previously nesting within it. Additionally, federally and state endangered least Bell's vireo (*Vireo bellii pusillus*), which has been recorded within one mile of the Project site and has the potential to occur within SA1 (CNDDB, eBird 2016), may utilize this community for nesting. This alliance supports wildlife connectivity outside of the parcel boundary.

PC7 – Mountain Mahogany Scrub (*Cercocarpus betuloides* [form. *Cercocarpus montanus*] Alliance; S4, G5; Locally Important Community)

In this community within SA1, birchleaf mountain mahogany (*Cercocarpus betuloides*) is the dominant species in the shrub layer with sparse occurrences of laurel sumac and an understory of intermittent non-native grasses. This community was found in the eastern portion of SA1 in association with an ephemeral drainage. It occurs at elevations ranging from 100 to 2400 meters amsl (Sawyer et al. 2009). This shrubland alliance is not considered to be unique habitat within Ventura County; however this community was determined to be locally important due to its potential to support special-status plant species including Catalina mariposa-lily and Plummer's mariposa-lily. Additionally, this alliance does support foraging habitat for the coastal California Gnatcatcher. It should be noted that special-status plant species including Conejo buckwheat and Verity's dudleya, were documented within this general area in 2010, but it is assumed these specific population locations were limited to rock outcroppings found within or adjacent to the area.

PC8 – Disturbed Chamise/Ceanothus Chaparral (*Adenostoma fascicultatum* Alliance; S5, G5; Locally Important Community)

In this community within SA1, an open to sparse tree/shrub canopy of chamise (*Adenostoma fasciculatum*) and ceanothus (*Ceanothu*s sp.) exists. Within SA1, this vegetation community was recently burned by the 2013 Springs Fire and was starting to show signs of regrowth at the time of BRC's 2016 survey. This community is found adjacent to rock outcroppings in the northeastern portion of SA1. It occurs at elevations ranging from 10 to 1800 meters amsl (Sawyer et al. 2009). This shrubland alliance is not considered to be unique habitat within Ventura County; however, this community was determined to be considered locally important because special-status species with limited range including Conejo buckwheat and Verity's dudleya, have been previously recorded within similar habitat in the SA1.

PC9- Coast Live Oak Woodland – (*Quercus agrifolia* Woodland Alliance; S4, G5, County Locally Important Community)

In this community within SA1, coast live oak trees form a continuous canopy with California sagebrush, saw-toothed goldenbush (*Hazardia squarrosa*), and features a mixed grassy understory with black sage. This community occurs at elevations ranging from 0 to 1200 meters amsl. The Ventura County Board of Supervisors has deemed oak woodlands to be a locally important community.

PC 10 – Russian Thistle Fields

This community is characterized by a dense cover of Russian thistle (*Salsola tragus*), a non-native invasive weed species. This community occurs in the southwestern corner of SA1 within a previously-cleared parcel that is adjacent to several agricultural fields.

PC11- Non-Native Annual Grassland

This community is characterized by a dense-to-sparse cover of annual grasses with germination at the onset of the late fall rains, and growth, flowering, and seed-set occurring from winter through spring. The plants are dead through the summer-to-fall dry season, persisting instead as seeds during that time. Species present include short-pod mustard (*Hirschfeldia incana*), mustard (*Brassica* sp.), ripgut brome (*Bromus diandrus*), yellow star thistle (*Centaurea* melitensis), and foxtail brome (*Bromus madritensis*). Populations of special-status plant species previously recorded in 2010 in these areas no longer exist and conditions are currently considered too disturbed to provide suitable habitat (See Special-Status Plant Species Map).

PC12 – Agriculture

Agriculture includes areas currently utilized for agricultural purposes. Within SA1, this predominantly includes strawberry and palm fields.

PC13 – Undifferentiated Ornamental

Undifferentiated Ornamental includes areas landscaped with non-native ornamental trees and shrubs. Within SA1, this community includes predominantly non-native tree species located within and on the border of the Conejo Mountain Cemetery, which is located directly east of the existing quarry. One coast live oak tree and several oak saplings were located within the community, immediately adjacent to a hedge of ornamental trees and shrubs on the quarry property.

PC14 - Developed

Developed includes areas currently developed with structures or roads. This includes existing paved areas and offices.

PC15 – Previously Cleared Land

Previously Cleared Land includes areas that were previously graded lands that are not vegetated. Within SA1, this area includes the current rock quarry and associated vehicle storage yards. Aerial views show these areas were cleared prior to 1989. Utilizing existing plant communities located adjacent to SA1 as a guide, it is likely these cleared areas were initially composed of intact coastal sage scrub and chaparral communities including Laurel Sumac Scrub and California Sagebrush Scrub.

Plant Communities								
Map Key	**SVC Alliance**	**SVC Association**	**Misc.**	**Status**	**Condition**	**Acres Total**	**Acres Impacted**	**Comments**
PC1	Laurel Sumac Scrub			LIC (S4,G4)	Overall Intact with portions recovering from 2013 burn	120.52	71.02	Impacted acreage falls within Construction Footprint.
PC2	California Sagebrush Scrub			LIC (S5,G5)	Intact	0.14	0.14	Impacted acreage falls within Construction Footprint.
PC3	Deerweed Scrub			LIC (S5,G5)	Intact	1.30	0	Vegetation community falls outside of Construction Footprint to the east.
PC4	Giant Wild Rye Grasslands			LIC (S3, G3)	Intact	2.04	1.50	Impacted acreage falls within Construction Footprint.
PC5	Cattail Marsh			(S5, G5)	Intact	0.32	0.19	Impacted acreage falls within Construction Footprint.
PC6	Red Willow Thicket			SC LIC (S3, G3)	Intact	2.01	0	Impacted acreage falls within Construction Footprint.
PC7	Mountain Mahogany Scrub			LIC (S4, G5)	Intact	0.23	0.23	Impacted acreage falls within Construction Footprint.
PC8	Disturbed Chamise/ Ceanothus Chaparral			LIC (S5, G5)	Burn	1.43	1.34	Impacted acreage falls within Construction Footprint.

Plant Communities								
PC9	Coast Live Oak Woodland			LIC (S4, G5)	Intact	1.52	0	No anticipated impacts, outside of Construction Footprint.
PC10			Russian Thistle Fields			2.93	1.52	Non-native, falls within Construction Footprint
PC11			Non-Native Annual Grassland			16.38	11.50	Non-native, falls within Construction Footprint
PC12			Agriculture			19	10.21	Within proposed Construction footprint
PC13			Ornamental			4.25	0.01	Within proposed Construction footprint
PC14			Developed			1.70	0.29	Existing structures and paved areas
PC15			Previously Cleared Land			79.90	69.03	Within Construction Footprint. Likely previously intact Laurel Sumac Scrub and California Sagebrush Scrub.
-			Detention Pond			3.75	0	-
					Totals	257.40	166.98	

LIC..............Locally Important Plant Community
SC…………CDFW Recognized Sensitive Community
G1 or S1 .....Critically Imperiled Globally or Sub-nationally (state)
G2 or S2 .....Imperiled Globally or Sub-nationally (state)
G3 or S3 .....Vulnerable to extirpation or extinction Globally or Sub-nationally (state)
G4 or S4…..Apparently Secure, uncommon but not rare (state)
G5 or S5…..Secure, common, widespread and abundant (state)

Physical Features

Physical Features		
Map Key	Physical Feature	Comments
PF1 (a,b,c,d)	Volcanic rock outcrop	The north, east, and south central portions of SA1 comprise large sections of volcanic rock outcrops. These areas provide habitat for special status species, including *Dudleya blochmaniae* ssp. *blochmaniae* (Blochman's dudleya, CNPS List 1B.1), *Eriogonum crocatum* (Conejo buckwheat, California Rare; CNPS List 1B.2).
PF2	Cliff face	Large cliff face that provides habitat for roosting bats and nesting birds.
PF3	Cliff face	Large cliff face that provides habitat for roosting bats and nesting birds.
PF4	Cliff face	Large cliff face that provides habitat for roosting bats and nesting birds.

Waters and Wetlands

See Appendix 1 for an overview of the local, state and federal regulations protecting waters, wetlands and riparian habitats. Wetlands are complex systems; delineating their specific boundaries, functions and values generally takes a level of effort beyond the scope of an Initial Study Biological Assessment (ISBA). The goal of the ISBA with regard to waters and wetlands is simply to identify whether they may exist or not and to determine the potential for impacts to them from the proposed project. This much information can be adequate for designing projects to avoid impacts to waters and wetlands. Additional studies are generally warranted to delineate specific wetland boundaries and to develop recommendations for impact minimization or impact mitigation measures.

Waters and/or wetlands were found within SA1.

Waters and Wetlands Summary

Twenty-four water features (W1-W24) were identified within SA1 during the 2016 survey. All drainages encountered with SA1 deliver ephemeral or intermittent surface flows (W1-W23); have a defined bed and bank and at some points are culverted; and generally flow westward and southwestward until they are ultimately impounded in a man-made detention basin (W24) to form a perennial lacustrine system (a limnetic and littoral-emergent wetland). These ephemeral and intermittent flows can serve as an indirect tributary to Conejo Creek (a WPD redline and regionally-important stream drainage for a substantial portion of southern Ventura County); however, surface flows generated from this site join Conejo Creek (via an off-site laurel sumac chaparral swale) only during noteworthy flood events when floodwaters are able to significantly breach the detention pond. As such, on-site drainages do not hold regional significance as they primarily drain onto the immediate property and their flows are contained on-site. A wetland delineation was conducted as part of original ISBA submission by Impact Sciences, Inc., in 2010; however, this delineation did not include the additional impact areas that were added to the revised Construction Footprint. Therefore, an updated formal wetland delineation should be conducted for the revised Project.

Eight natural ephemeral drainages (W1-W8) exist in the northwestern and north-central portions of SA1. W1 through W7 are tributaries to W8, which the existing mining operation has disconnected. W8 is culverted at C3, which feeds into the detention pond (W24). Seven natural ephemeral drainages (W9-W15) exist in the east-central portion of SA1. These features were also disconnected by the existing mining operation. The accumulation of sheet flow produced by these features is collected at the lowest point of the quarry and culverted at C2, which also feeds into the detention pond (W24).

In the southern central portion of SA1, an intermittent drainage with water present, potentially sourced from an annual spring was encountered (W17). This feature supports a small area of a persistent stand of emergent vegetation (PC-5 Cattail Marsh) within its bed and bank. Four ephemeral drainages (W18-W21) located in the southern portion of SA1 serve as tributaries to W17, which is disconnected by an agricultural field and culverted at C1. C1 connects these features to W23, a natural ephemeral drainage that borders agricultural fields to the south and eventually feeds into the detention pond (W24). An additional natural ephemeral drainage (W22) was identified in the southwestern portion of SA1 and appears to have been disconnected by the existing mining/agricultural operation. Currently, flows from W22 appear to either dissipate or to connect to W23 via sheet flow across the disturbed Russian Thistle Fields.

The man-made detention basin (W24) is located outside and along the western boundary of the property between the headquarters of the mining operation and Conejo Creek. This lacustrine feature is bounded by willow woodlands, supports a persistent stand of emergent vegetation (bulrush and cattail) throughout much of the entire littoral zone, and has no regular connection to any other downstream waters or wetlands. The detention basin is shared by neighbors as a water source for commercial operations.

Waters and Wetlands Table

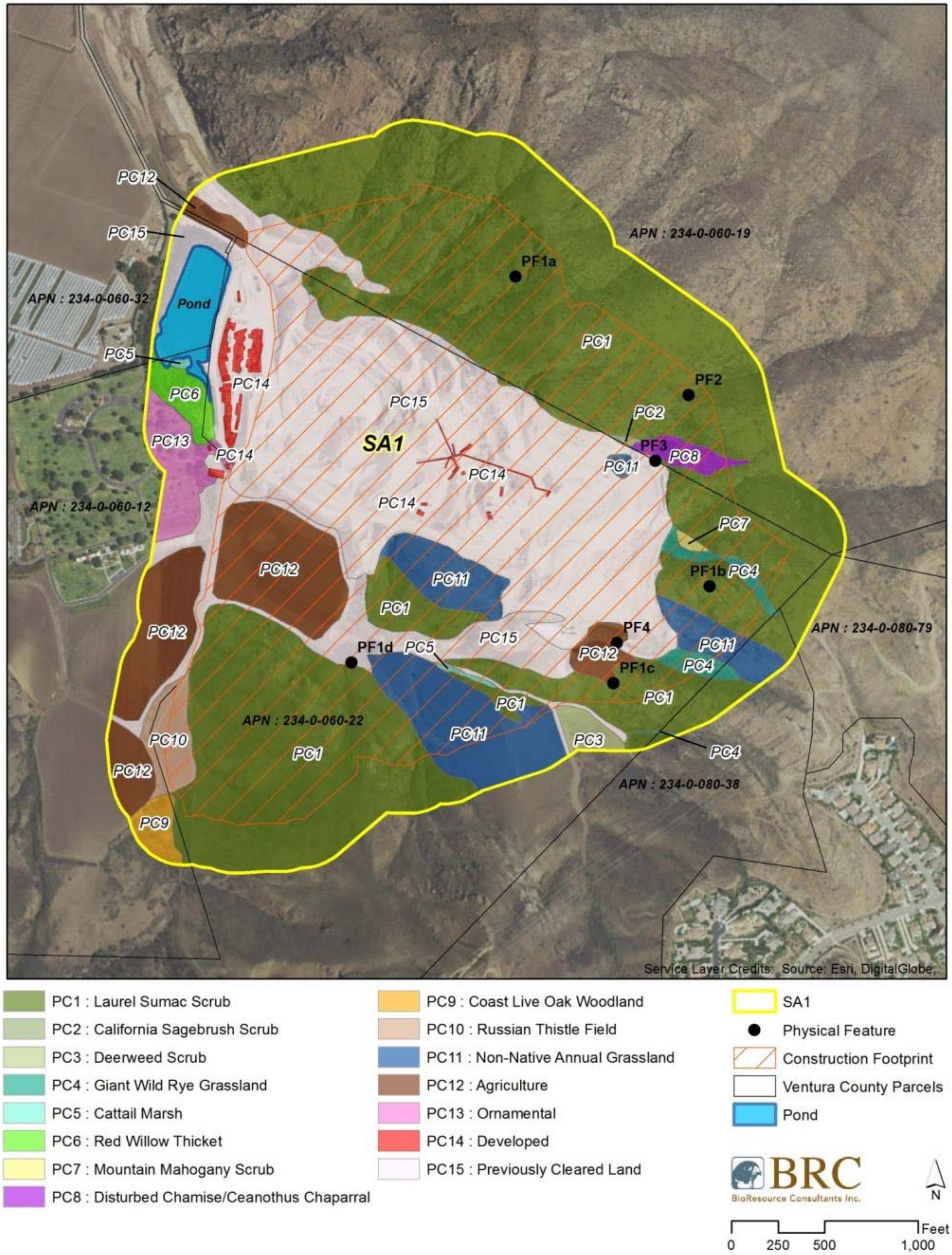
Waters and Wetlands						
Map Key	**Wetland Type**	**Wetland Name (if any)**	**Wetland Status (if known)**	**Wetland Size**	**Hydrologic Status**	**Primary Water Source**
W1	Ephemeral drainage	Unnamed	CDFW	842 linear feet	Dry	Precipitation, natural runoff
W2	Ephemeral drainage	Unnamed	CDFW	1,228 linear feet	Dry	Precipitation, natural runoff
W3	Ephemeral drainage	Unnamed	CDFW	1,062 linear feet	Dry	Precipitation, natural runoff
W4	Ephemeral drainage	Unnamed	CDFW	552 linear feet	Dry	Precipitation, natural runoff
W5	Ephemeral drainage	Unnamed	CDFW	829 linear feet	Dry	Precipitation, natural runoff
W6	Ephemeral drainage	Unnamed	CDFW	308 linear feet	Dry	Precipitation, natural runoff
W7	Ephemeral drainage	Unnamed	CDFW	980 linear feet	Dry	Precipitation, natural runoff
W8	Ephemeral drainage	Unnamed	CDFW	988 linear feet	Dry	Precipitation, natural runoff. Features W1-W7 serve as tributaries to W8.
W9	Ephemeral drainage	Unnamed	CDFW	714 linear feet	Dry	Precipitation, natural runoff
W10	Ephemeral drainage	Unnamed	CDFW	910 linear feet	Dry	Precipitation, natural runoff
W11	Ephemeral drainage	Unnamed	CDFW	322 linear feet	Dry	Precipitation, natural runoff
W12	Ephemeral drainage	Unnamed	CDFW	681 linear feet	Dry	Precipitation, natural runoff
W13	Ephemeral drainage	Unnamed	CDFW	894 linear feet	Dry	Precipitation, natural runoff
W14	Ephemeral drainage	Unnamed	CDFW	212 linear feet	Dry	Precipitation, natural runoff
W15	Ephemeral drainage	Unnamed	CDFW	946 linear feet	Dry	Precipitation, natural runoff
W16	Ephemeral drainage	Unnamed	CDFW	555 linear feet	Dry	Precipitation, natural runoff
W17	Intermittent drainage	Unnamed	CDFW County	2046 linear feet	Ponded	Annual spring, precipitation, groundwater, natural and agricultural runoff. Features W18-W21 serve as tributaries to W17.
W18	Ephemeral drainage	Unnamed	CDFW	154 linear feet	Dry	Precipitation, natural runoff
W19	Ephemeral drainage	Unnamed	CDFW	292 linear feet	Dry	Precipitation, natural runoff
W20	Ephemeral drainage	Unnamed	CDFW	1,070 linear feet	Dry	Precipitation, natural runoff
W21	Ephemeral drainage	Unnamed	CDFW	796 linear feet	Dry	Precipitation, natural runoff
W22	Ephemeral drainage	Unnamed	CDFW	678 linear feet	Dry	Precipitation, natural runoff
W23	Ephemeral drainage	Unnamed	CDFW	2,405 linear feet	Dry	Precipitation, natural runoff

Waters and Wetlands						
W24	Detention Basin	Unnamed	CDFW, County	3.75 acres	Ponded	Precipitation, groundwater, natural and agricultural runoff. Artificially impounded
CDFW .... California Department of Fish & Game regulated County .... County General Plan protected wetland						

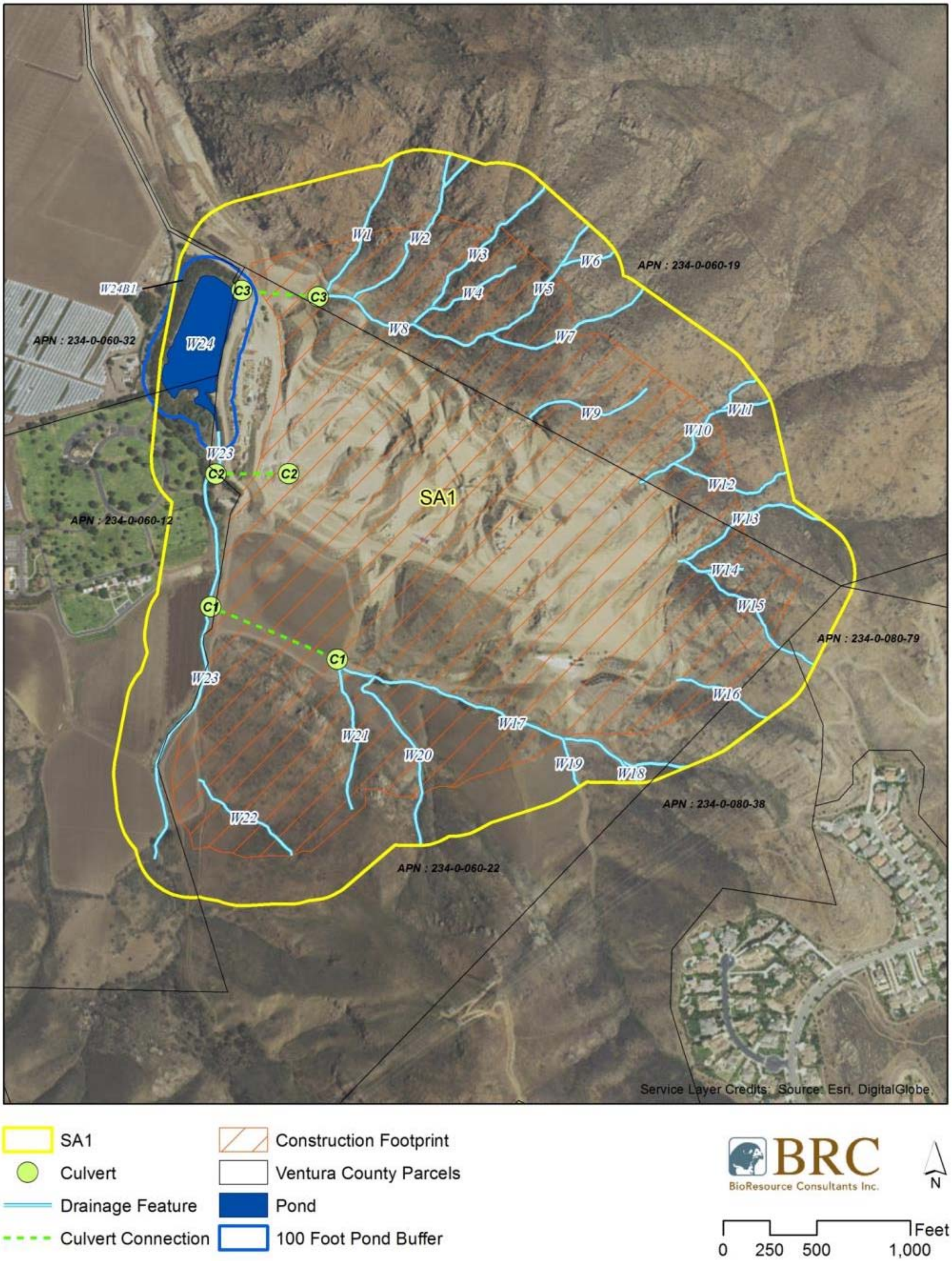
Waters and Wetlands (continued)			
Map Key	**County Wetland Significance**	**Wetland Distance from Project**	**Comments**
W1	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W2	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W3	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W4	Unknown	Within Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W5	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W6	Unknown	Adjacent to Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W7	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W8	Unknown	Within Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W9	Unknown	Within Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W10	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W11	Unknown	Adjacent to Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W12	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W13	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W14	Unknown	Within Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W15	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W16	Unknown	Within Construction Footprint and immediately adjacent	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W17	Unknown	Within Construction Footprint and immediately adjacent	Intermittent drainage within moderately disturbed sumac scrub and contains a small section of cattail marsh habitat within bed and bank. Moderately disturbed with few invasive species.
W18	Unknown	Adjacent to Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W19	Unknown	Adjacent to Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W20	Unknown	Within Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed

Waters and Wetlands (continued)			
		and immediately adjacent	chaparral and few invasive species.
W21	Unknown	Within Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W22	Unknown	Within Construction Footprint	Ephemeral drainage contains healthy, moderately disturbed chaparral and few invasive species.
W23	Unknown	Immediately adjacent to Construction Footprint	Ephemeral drainage that runs through small section of oak woodland and then borders agricultural fields running in a northerly direction. Relatively disturbed in sections adjacent to agricultural fields. Contains numerous invasive species.
W24	Significant	Adjacent to Construction Footprint	The detention pond contains habitat for multiple federal, state, and CDFW listed species including least bell's vireo, yellow warbler, and western pond turtle. The feature is situated immediately adjacent to existing mining operations and captures all runoff from the facility. Consequently, this feature receives moderately high levels of continual disturbance.

Water/Wetland Buffers		
Map Key (1)	Recommended Buffer (2)	Comments
W24B1	100'	The feature provides suitable habitat for special-status wildlife species.



Plant Communities Map



Waters and Wetlands Map

3.2 Species

Observed Species

Plants: The vegetation on the slopes within SA1 consists primarily of chaparral vegetation and portions of coastal sage scrub with openings dominated by a combination of native and non-native grasses, as is expected following a fire. Characteristic species found within SA1 include laurel sumac, California sagebrush, giant wild rye, deerweed, black sage, coast prickly-pear (*Opuntia littoralis*), California buckwheat, ashy-leaf buckwheat (*Eriogonum cinereum*), and yucca. Understory vegetation within chaparral and coastal sage scrub communities on-site supports a variety of herbaceous annuals, perennials, and woody species, including poison-oak (*Toxicodendron diversilobum*), Pacific sanicle (*Sanicula crassicaulis*), California aster (*Corethrogyne filaginifolia*), golden yarrow (*Eriophyllum confertiflorum* var. *confertiflorum*), chalk liveforever (*Dudleya pulverulenta*), big-fruited man-root (*Marah macrocarpus* var. *macrocarpus*), California wishbone bush (*Mirabilis laevis* var. *crassifolia)*, and bluedicks (*Dichelostemma capitatum*).

Invasive species such as short-pod mustard, Russian thistle, yellow star thistle, slender oat (*Avena barbata*), ripgut brome, soft chess (*Bromus hordeaceus*), and red brome were observed to dominate previously disturbed areas at the margins of the active quarry and along the fire road that extends eastward along the southern and western edges of the mining expansion area.

A total of 205 plant species were observed within SA1 during surveys in 2010 by Impact Sciences, Inc., and in 2016 by BRC. Of the 205 plant species observed, 166 are native species (75%) and 39 non-native species (25%). Refer to Appendix 2 for a full list of observed plant species during surveys.

Wildlife: The site provides habitat for upland and riparian/wetland adapted wildlife species, including amphibians, reptiles, birds, and mammals. Reptile species were observed throughout the site. Reptile observations included Great Basin fence lizard (*Sceloporus occidentalis longipes*), California side-blotched lizard (*Uta stansburiana elegans*), coastal whiptail, and San Diego gopher snake (*Pituophis catenifer annectens*) within relatively drier upland vegetation types.

Several bird species were observed utilizing aquatic and riparian habitats located in the western portion of SA1, including pied-billed grebe (*Podilymbus podiceps*), American coot (*Fulica americana*), black phoebe (*Sayornis nigricans*), American pipit (*Anthus rubescens*), ring-necked duck (*Aythya collaris*), and ruddy duck (*Oxyura jamaicensis*). Upland bird species observed include American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), Allen's hummingbird (*Selasphorus sasin*), Nuttall's woodpecker (*Picoides nuttallii*), downy woodpecker (*Picoides pubescens*), California scrub-jay (*Aphelocoma californica*), common raven (*Corvus corax*), bushtit (*Psaltriparus minimus*), rock wren (*Salpinctes obsoletus*), canyon wren (*Catherpes mexicanus*), Bewick's wren (*Thryomanes bewickii*), northern mockingbird (*Mimus polyglottos*), California towhee (*Pipilo crissalis*), house finch (*Carpodacus mexicanus*), and lesser goldfinch (*Carduelis psaltria*).

Two special-status bird species, loggerhead shrike and sharp-shinned hawk, were observed during the 2016 survey. A single loggerhead shrike was observed perched on a small snag on the north side of the quarry. It then flew to east side of SA1 where it was observed a second time. A single sharp-shinned hawk was observed foraging over the quarry throughout the day.

Scat and tracks of coyote (*Canis latrans*) were observed throughout SA1 and a coyote carcass was observed in a northeastern drainage. In addition, burrows and middens of Botta's pocket gopher (*Thomomys bottae*), dusky-footed woodrat (*Neotoma fuscipes*), San Diego desert woodrat, and California ground squirrel (*Spermophilusbeecheyi*) are all common throughout undisturbed portions of the Project site.

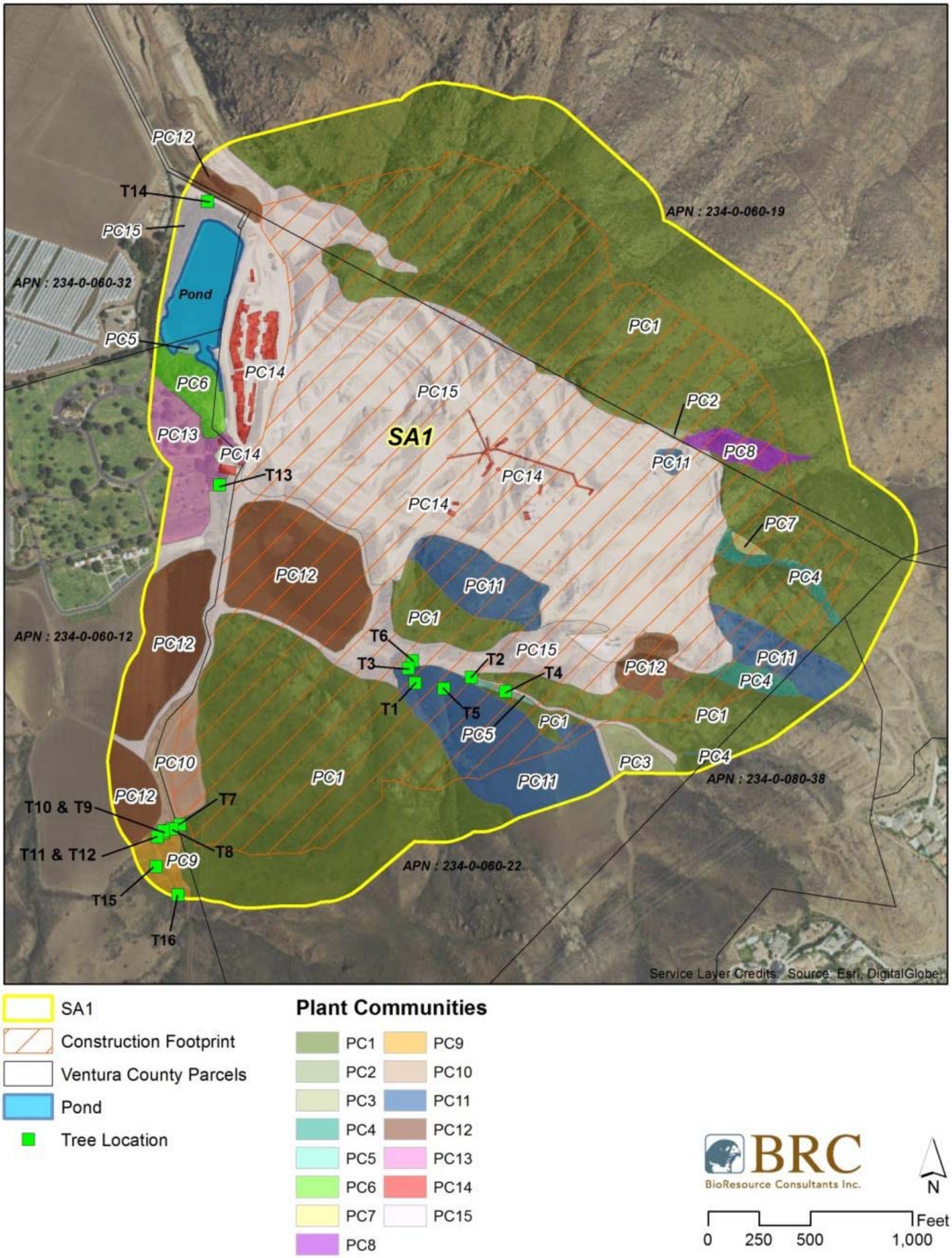
BRC observed 43 wildlife species during the 2016 survey. In total, 99 species were observed during the surveys conducted in 2016 by BRC and in 2010 by Impact Sciences. All 99 species are considered native with the exception of the rock pigeon (*Columba livia*). Refer to Appendix 2 for a full list of observed wildlife species during surveys.

Protected Trees

Protected trees do occur within SA1 and within the Construction Footprint. Below is an inventory of protected trees based on the Ventura County Tree Protection Ordinance and the California National Plant Society (CNPS) special-status plant ranking system. The following oak trees are protected based on the Ventura County standards, as outlined in Appendix 1. The southern California black walnut trees are protected because they are ranked CNPS 4.2, defined as a plant or tree that is being watched due to its limited distribution, and the species is facing a moderate degree and immediacy of threat. Trees of any species measuring 90 inches in girth for single-trunk or 72 inches for multiple-trunk are considered to have "heritage" status and are protected.

Three heritage coast live oak trees and 15 (two adults, 13 saplings) southern California black walnut trees are located within the Construction Footprint and may need to be removed. Ten coast live oak trees are located within SA1 but outside of the Construction Footprint and are not anticipated to be impacted. Consultation with the County Planning Division and an arborist report will likely be required to address the removal of protected trees.

Protected Trees				
Map Key	Species	Common Name	Girth (circumference)	Impact
T1	*Juglans californica*	Southern California black walnut (Multi-stem)	10 stems each 1.5 inches	Removal – Tree located within proposed Project footprint.
T2	*Juglans californica*	Southern California black walnut (Sapling)	13 saplings <1 inch	Removal – Trees located within proposed Project footprint.
T3	*Quercus agrifolia*	Coast live oak (Multi-trunk)	39 inches, 44 inches, 20 inches (Heritage)	Removal – Tree located within proposed Project footprint.
T4	*Quercus agrifolia*	Coast live oak	115.5 inches (Heritage)	Removal – Tree located within proposed Project footprint.
T5	*Quercus agrifolia*	Coast live oak (Multi-trunk)	14 inches, 15.5 inches,8.5 inches,9.5 inches,8.5 inches, 7.5 inches,8.5 inches, 14.5 inches (Heritage)	Removal – Tree located within proposed Project footprint.
T6	*Juglans californica*	Southern California black walnut (Multi-stem)	7 stems each 1.5 inches	Removal – Tree located within proposed Project footprint.
T7	*Quercus agrifolia*	Coast live oak (Multi-trunk)	6 inches, 5 inches, 3.5 inches	Tree located within SA1 and outside of Construction Footprint. Tree falls >50 ft. away from Construction Footprint, no encroachment.
T8	*Quercus agrifolia*	Coast live oak	87.5 inches	Not Impacted
T9	*Quercus agrifolia*	Coast live oak	82 inches	Not Impacted
T10	*Quercus agrifolia*	Coast live oak	80 inches	Not Impacted
T11	*Quercus agrifolia*	Coast live oak	27 inches and 51 inches	Not Impacted
T12	*Quercus agrifolia*	Coast live oak	32 inches, 47 inches, and 37 inches	Not Impacted
T13	*Quercus agrifolia*	Coast live oak	10 inches, 7 inches, and inches	Not Impacted
T14	*Quercus agrifolia*	Coast live oak	8 inches, 9 inches, 13 inches, 4 inches.	Not Impacted
T15	*Quercus agrifolia*	Coast live oak	Estimated 60"	Not Impacted
T16	*Quercus agrifolia*	Coast live oak	Estimated 60"	Not Impacted



Protected Trees Map

Endangered, Threatened, Rare, and Locally Important Species and Nests
(Initial Study Checklist A & E)

> *See Appendix 1 for definitions of the types of special status species that have federal, state or local protection and for more information on the regulations that protect birds' nests.*

Endangered, threatened, rare, or locally important species were observed or have a moderate to high potential to occur within the SA1.

Suitable habitat for nesting birds protected under the MBTA exists within SA1.

Special Status Species Summary

Information on special-status species and habitats within a 10-mile radius of SA1 was obtained from the California Natural Diversity Database (CNDDB), U.S. Fish and Wildlife Service (USFWS) Critical Habitat maps, the Calflora database, and Ventura County Planning Division's GIS layer of past biological reports for reference materials. The special-status species that were observed are listed below in the Special Status Species table.

During the 2016 general biological assessment survey, BRC observed multiple individuals of southern California black walnut (see Protected Trees), as well as a sharp-shinned hawk, a CDFW Watch List Species, and a single loggerhead shrike and coastal whiptail, both CDFW species of special concern. Additionally, a CDFW-listed sensitive community, Red Willow Thicket, was encountered within SA1 (see Plant Communities). The Project site contains vegetation that could support nesting birds.

Potential Species

The table below includes all special-status species potentially at the Project site that are recorded in the CNDDB within five miles of the Project site.

Definitions of Low, Moderate and High Potential to Occur

High potential for occurrence: (1) The habitat on the Project site is the species' preferred habitat and is in good condition (has not been degraded by human disturbance); and/or (2) there is record of the species occurring on or adjacent to the Project site.

Moderate potential for occurrence: (1) The habitat on the Project site is the species' preferred habitat, but it has been disturbed or disturbance encompasses the Project site, reducing the quality of the habitat to below a high likelihood that the species would inhabit it; or (2) the habitat on the Project site is not the species' preferred habitat, but it contains a similar structure to the preferred habitat and the species has been observed in this habitat type; or (3) the habitat on the Project site is not the species' preferred habitat, but there is record of the species occurring in the immediate vicinity of the Project site, and there is potential for the species to forage within the habitat on-site.

Low potential for occurrence: The habitat on the Project site is not the species' preferred habitat, the habitat is highly disturbed, and/or there are no records of the species occurring on or near the Project site.

None potential for occurrence: the habitat does not exist on the Project site and the species requires this habitat for survival.

Observed and Potentially Occurring Special-Status Species						
Map Key	**Survey/ Source**	**Scientific Name**	**Common Name**	**Species Status**	**Potential to Occur**	**Habitat Requirements**
PLANTS						
SSP1	CNDDB	*Astragalus brauntonii*	Braunton's milk-vetch	FE, CRPR 1B.1, G2, S2	None	Requires recent burns or disturbed areas; usually on sandstone with carbonate layers. Chaparral, coastal scrub, valley and foothill grassland on hilltops, saddles or bowls between hills at elevations of 3-640 meters amsl. Required limestone outcrops are not present on site. Flowering Time: Mar--Jul
SSP2	Impact Sciences, Inc. 2010	*Calochortus catalinae*	Catalina mariposa-lily	CRPR 4.2	High	Observed in 2010 by Impact Sciences, not observed in 2016 by BRC likely as a result of survey being conducted outside of blooming period. Occurs in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland communities between 15 and 700 meters amsl. Flowering Time: Mar--May
SSP3	CNDDB	*Calochortus plummerae*	Plummer's mariposa-lily	LIS, CRPR 4.2	High	Occurs on rocky and sandy sites, usually of granitic or alluvial material. Common after fire at elevations of 60-2500 meters amsl. Found in coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest. Flowering Time: May--Jul
SSP4	CNDDB	*Centromadia parryi* ssp. *australis*	southern tarplant	CRPR 1B.1, G3, S2	None	Often in disturbed sites near the coast at marsh edges; also in alkaline soils sometimes with saltgrass. Sometimes on vernal pool margins. 0-975 meters amsl. No vernally mesic, alkaline habitat is not present on site. Flowering Time: Jun--Oct
SSP5	CNDDB	*Delphinium parryi* ssp. *blochmaniae*	dune larkspur	CRPR 1B.1, S2	None	Requires maritime chaparral and coastal dunes between 0 and 200 meters amsl. No suitable habitat present. Flowering Time: Apr--May
SSP6	CNDDB, Impact Sciences, Inc. 2010	*Dudleya blochmaniae* ssp. *blochmaniae*	Blochman's dudleya	CRPR 1B.1, G3, S2	High	Not observed on site in 2016, but previously reported as present by Impact Sciences, Inc. 2010. This species has potential to occur in cliffs and rock outcroppings of SA1. Rocky, clay or serpentine soils in coastal bluff scrub, chaparral, coastal scrub, and valley and foothill grassland communities between 5 and 450 meters amsl. Flowering Time: Apr--Jun
SSP7	CNDDB	*Dudleya cymosa* ssp. *marcescens*	marcescent dudleya	FT, SR, LIS, CRPR 1B.2, S2	Low	Occurs on sheer rock surfaces and rocky volcanic cliffs at elevations of 145-670 meters amsl in chaparral habitats. Suitable habitat but no known occurrences within 3 miles of Project site. Project area on edge of species' known range. Flowering Time: May--Jun

Observed and Potentially Occurring Special-Status Species						
SSP8	CNDDB, Aquatic Consulting Services, 2010.	*Dudleya parva*	Conejo dudleya	FT, LIS CRPR 1B.2, G1, S1	High	Not observed on site in 2016, but previously reported as present by Hunt (in Aquatic Consulting Services, 2010). This species has potential to occur in inaccessible portions of SA1. Grows on clay or volcanic substrates in coastal scrub and valley and foothill grassland communities between 60 and 450 meters amsl. Flowering Time: May--Jul
SSP9	CNDDB	*Dudleya verityi*	Verity's dudleya	FT, LIS CRPR 1B.1, G1, S1	High	Not observed on site in 2016, but previously reported as present by Hunt (in Aquatic Consulting Services, 2010). This species has potential to occur in inaccessible portions of SA1. Occurs on volcanic outcrops in chaparral, cismontane woodland, and coastal scrub communities between 60 and 120 meters amsl. Flowering Time: May--Jun
SSP10	CNDDB	*Eriogonum crocatum*	Conejo buckwheat	SR, LIS CRPR 1B.2, G1, S1	High	Not observed within SA1 in 2016, but previously reported as present by Impact Sciences, Inc. 2010. Occurs on Conejo volcanic outcrops in chaparral, coastal scrub, valley and foothill grassland communities between 50 and 580 meters amsl. Flowering Time: Apr--Jul
SSO1	Impact Sciences, Inc. 2010, BRC 2016	*Juglans californica*	southern California black walnut	CRPR 4.2, G3, S3	Observed	Observed in 2010 by Impact Sciences as well in 2016 by BRC. Occurs in chaparral, cismontane woodland and coastal scrub communities between 50 and 900 meters amsl. Flowering Time: Mar--May
SSP11	CNDDB	*Monardella hypoleuca* ssp. *hypoleuca*	white-veined monardella	LIS, CRPR 1B.3, S2	Low	Found on dry slopes in chaparral, cismontane woodland communities from 50-1525 meters amsl. CNDDB occurrence #4 located 4 miles to southeast but site but needs additional information/fieldwork. Flowering Time: May--Oct
SSP12	CNDDB	*Navarretia ojaiensis*	Ojai navarretia	CRPR 1B.1, G2, S2	Moderate	Openings in chaparral, coastal scrub, and valley and foothill grassland communities between 275 and 620 meters amsl. Flowering Time: May--Jul
SSP13	CNDDB	*Pentachaeta lyonii*	Lyon's pentachaeta	FE, SE, CRPR 1B.1, G1, S1	Moderate	Rocky clay soils of volcanic origin in openings within chaparral, coastal scrub, and valley and foothill grassland communities between 30 and 630 m. It does not compete well with dense annual grasses or shrubs, but occurs where there is a majority of bare ground. Flowering Time: Mar--Aug
SSP14	CNDDB	*Pseudognaphalium leucocephalum*	white rabbit-tobacco	CRPR 2B.2, G4, S2	None	Requires open washes, Sandy or gravelly alluvium in chaparral, cismontane woodland, coastal scrub, and riparian woodland habitats between 0 and 2100 meter amsl No suitable habitat within SA1 due to the absence of appropriate alluvial soils. Flowering Time: Jul--Oct

Observed and Potentially Occurring Special-Status Species						
SSP15	CNDDB	*Senecio aphanactis*	chaparral ragwort	LIS, CRPR 2B,2 G3, S2	None	Occurs on drying alkaline flats within chaparral, cismontane woodland, and coastal scrub habitats at elevations from 20 and 855 meters amsl. No suitable habitat. Flowering Time: Feb--May
SSP16	CNDDB	*Texosporium sancti-jacobi*	woven-spored lichen	CRPR 3, G3, S1	Moderate	Occurs in open sites; in California with chamise, *Eriogonum* ssp., and *Selaginella* spp. at elevations of 290-660 meters amsl.
INSECTS						
SSP17	CNDDB	*Bombus crotchii*	Crotch bumble bee	G3, S1	Moderate	Found in areas within food plant genera include *Antirrhinum*, *Phacelia, Clarkia, Dendromecon, Eschscholzia*, and *Eriogonum*.
SSP18	CNDDB	*Trimerotropis occidentiloides*	Santa Monica grasshopper	G1, S1	High	Found on bare hillsides and along dirt trails in chaparral. Suitable habitat is found in the chaparral vegetation communities found throughout the project site.
FISH						
SSP19	CNDDB	*Gila orcuttii*	arroyo chub	SSC, G2, S2	None	Requires slow water stream sections with mud or sand bottoms. Feeds heavily on aquatic vegetation and associated invertebrates. There is no direct connection between the quarry's irrigation pond and Conejo Creek. No surveys for chubs were conducted during the current survey, and no chubs are believed to have been previously reported for this site. Conversation with client mentioned poor water quality within pond and possible anoxic conditions due to runoff.
SSP20	CNDDB	*Oncorhynchus mykiss irideus*	steelhead - southern California DPS	FE, S1	None	Requires aquatic habitat with flowing waters. No permanent water on site. There is no direct connection between the quarry's irrigation pond and Conejo Creek. No surveys for chubs were conducted during the current survey, and no chubs are believed to have been previously reported for this site. Conversation with client mentioned poor water quality within pond and possible anoxic conditions due to runoff.
REPTILES						
SSO2	CNDDB	*Aspidoscelis tigris stejnegeri*	coastal whiptail	SSC, S3	Observed	Found in deserts & semiarid areas with sparse vegetation and open areas. Also found in woodland & riparian areas. Potential habitat is found within the Project site, but heavy disturbance encompasses portions of the Project site reducing the quality of the habitat.

Observed and Potentially Occurring Special-Status Species						
SSP21	CNDDB	*Thamnophis hammondii*	two-striped garter snake	SSC, S3	None	Coastal California from vicinity of Salinas to northwest Baja California. From sea to about 7,000 feet elevation. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.
SSP22	CNDDB	*Emys marmorata*	western pond turtle	SSC, G3, S3	High	A thoroughly aquatic turtle of ponds, marshes, rivers, streams & irrigation ditches, usually with aquatic vegetation, below 6000 feet elevation. Habitat exists in the retention pond.
BIRDS						
SSO3	BRC 2016	*Accipiter striatus*	sharp-shinned hawk	WL	Observed	Observed in 2016 by BRC. Prefers riparian areas. North-facing slopes, with plucking perches are critical requirements. Nests usually within 275 feet of water.
SSP23	CNDDB	*Aquila chrysaetos*	golden eagle	FP, WL, S3	Moderate	Requires cliffs for nesting in grassland, chaparral, shrubland, forest, and other vegetated areas They avoid developed areas and uninterrupted stretches of forest. They are found primarily in mountains up to 12,000 feet. Suitable nesting habitat is present within SA1; however high levels of disturbance occur at the site as a result of the quarry.
SSP24	Aquatic Consulting Services	*Athene cunicularia*	burrowing owl	SSC,	High	Not observed on site in 2016, but previously reported as present by Hunt (in Aquatic Consulting Services, 2010). This species has potential to occur in open areas of grassland, chaparral and coastal scrub communities within SA1.
SSP25	CNDDB	*Elanus leucurus*	white-tailed kite	FP, S3	None	Requires open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching. No suitable habitat within the Project area.
SSO4	BRC 2016	*Lanius ludovicianus*	loggerhead shrike	SSC	Observed	Observed in 2016 by BRC. Inhabits open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. The species was observed on the slopes west of the existing quarry.
SSP26	CNDDB	*Polioptila californica californica*	coastal California gnatcatcher	FT, SSC, G4, S2	High	Inhabits dry coastal slopes, washes, and mesas, they are restricted to areas of coastal sage scrub below 2,000 feet in elevation. Suitable habitat exists for this species on the lower slopes of SA1.

Observed and Potentially Occurring Special-Status Species						
SSP27	Impact Sciences, Inc. 2010	*Setophaga petechia*	yellow warbler	SSC	High	Not observed on site in 2016, but previously reported as present by Impact Sciences, Inc. in 2010. Believed to be nesting in red willow thicket. This species is frequently found nesting and foraging in willow thickets and in other riparian plants including cottonwoods, sycamores, ash, and alders.
SSP28	CNDDB	*Vireo bellii pusillus*	least Bell's vireo	FE, SE, G5T2, S2	High	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2,000 feet Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, mulefat, and mesquite. Suitable habitat is located west of the Project Construction Footprint within red willow thickets.
MAMMALS						
SSO5	Impact Sciences, Inc. 2010	*Neotoma lepida intermedia*	San Diego desert woodrat	SSC, S3	Observed	Observed in 2010 by Impact Sciences as well as in 2016 by BRC (middens). Occurs in Moderate to dense canopies preferred. They are particularly abundant in rock outcrops & rocky cliffs & slopes within coastal scrub

Special-Status Species (continued)				
Map Key	Adequate Habitat Onsite	Adequate Habitat Size	Acreage Impacted	Comments
SSP2	Yes	Yes	72.50	Observed in 2010 by Impact Sciences, not observed in 2016 by BRC likely as a result of survey being conducted outside of blooming period. The location of the species was not recorded by Impact Sciences, Inc. Suitable habitat is present throughout SA1 in chaparral, cismontane woodland, coastal scrub, and grassland communities. There are no CNDDB records within 10 miles of the site. Several records of the species are present along Highway 101 within the Consortium of California Herbaria database.
SSP3	Yes	Yes	72.50	Species was not observed during surveys likely since BRC conducted survey outside of the known blooming period for the species. The species tend to be common after fire and would be expected to occur within suitable habitat found on the slopes throughout SA1. A review of CalFlora records identified a recent (2012) record on Conejo Mountain.
SSP6	Yes	Yes	72.36	Not observed within SA1 in 2016, but previously reported as present by Impact Sciences, Inc. 2010.This species has potential to occur in cliffs and rock outcroppings of SA1. Impact Sciences, Inc. identified an area of approximately 0.5 acres of occupied habitat on the rock outcroppings located on the eastern portion of the quarry expansion area. An incidental population of approximately 15 individuals was discovered 200 ft. east of SA1 in 2016. The recent fire of the area may have resulted in the loss of individuals from the previously documented 2010 population. Previously documented observations are mapped.

Special-Status Species (continued)				
SSP8	Yes	Yes	71.02	Not observed on site in 2016, but previously reported as present by Hunt (in Aquatic Consulting Services, 2010). The location of the species was not provided in previous reporting rock outcroppings located on the eastern portion of the mining expansion area.. This species has potential to occur in portions of SA1 on cliffs and rock outcroppings. The species is documented within one mile of the proposed northern expansion area. Surveys conducted by Hunt in 1998 identified the species on the rock outcroppings located in the eastern portion of the mine expansion. Surveys were conducted outside of the blooming period for the species. CNDDB records for the species are located within one mile of the mine expansion area.
SSP9	Yes	Yes	71.02	Not observed on site in 2016, but previously reported as present by Hunt (in Aquatic Consulting Services, 2010). The location of the species was not provided in previous reporting in the rock outcroppings located on the eastern portion of the mining expansion area. This This species has potential to occur in inaccessible portions of SA1. Surveys conducted by Hunt in 1998 identified the species on the rock outcroppings located in the eastern portion of the mine expansion. Surveys were conducted BRC outside of the blooming period for the species. The recent fire of the area may have resulted in the loss of individuals from the documented population. A search of CNDDB has identified several occurrences of the species located within one mile of the site.
SSP10	Yes	Yes	83.86	Not observed within SA1 in 2016, but previously reported as present by Impact Sciences, Inc. 2010. The 25 individuals that were observed by Impact Sciences were not observed by BRC in 2016. These plants were located on the south edge of the quarry and on the eastern edge and are mapped. These individuals may not been observed because of the fire and drought. An incidental population of 9 individuals was discovered by BRC approximately 200 ft. east of SA1 in 2016.
SSO1	Yes	Yes	11.69	Species was observed in 2010 by Impact Sciences as well in 2016 by BRC. Several large trees were observed by Impact Sciences, Inc., along the drainage in the southern portion of SA1. BRC identified 15 trees, 13 of which are saplings. All of which are located within the drainage located within the southern portion of the site. The large trees observed by Impact Sciences were likely burned during the fire.
SSP12	Yes	Yes	72.36	Suitable habitat is present within the chaparral habitat within SA1; however, the species has not been identified during surveys. BRC surveys were conducted outside of known blooming period for the species. The nearest document population (CNDDB occurrence #20) of the species is located 3 miles northeast of SA1.
SSP13	Yes	Yes	72.52	Suitable habitat is present within openings of chaparral, coastal scrub communities observed within SA1. The species was not observed during surveys; however BRC conducted surveys outside of the known blooming period for the species. The nearest documented population (CNDDB occurrence #22) is located 3 miles northeast of the project location.
SSP16	Yes	Yes	1.34	Not detected on site during surveys. Considered to have potential to be present on site because of the presence of chamise, *Eriogonum* spp. within SA1. Species may have been impacted by recent fire. The nearest documented CNDDB occurrence (occurrence #20) is located 2.8 miles south of SA1 along Potrero Road.
SSP17	Yes	Yes	85.26	Not observed during surveys; however suitable food plants genera including *Phacelia* and *Eriogonum* were observed within the survey. The nearest known occurrence (CNDDB occurrence # 124) is located 1.9 miles west of the project site in the city of Camarillo.

Special-Status Species (continued)				
SSP18	Yes	Yes	85.50	Suitable habitat present on the bare hillsides in coastal sage scrub and chaparral communities on site, but species was not observed during surveys. The species is documented (CNDDB occurrence #3) is located 2.8 miles south of SA1 along Potrero Road.
SSO2	Yes	Yes	85.50	Observed in 2010 by Impact Sciences, Inc. as well as in 2016 by BRC. The locations of observations made by Impact Sciences, Inc. were not recorded. A single individual was observed by BRC on the western portion of SA1 located along the western drainage in an area dominated by non-native vegetation. Suitable habitat for the species is found throughout the mining expansion area within the chaparral and coastal scrub vegetation communities.
SSP22	Yes	Yes	0	Not detected on site but considered potentially present due to the presence of permanent surface water (retention pond) and basking and aestivation habitat. Nearby CNDDB records include the North Fork of Conejo Creek; Arroyo Conejo and Conejo Creek, in the eastern region of Pleasant Valley; and 1.6 miles northwest of the intersection of Potrero Road and North Potrero Road.
SSO3	Yes	Yes	71.02	Observed in 2016 by BRC, however the project is located outside of the nesting range of the species. The species is only considered a CDFW WL species for nesting, not wintering.
SSP23	Yes	Yes	71.02	Not observed during surveys. SA1 provides suitable nesting and wintering habitat is present in rocky escarpments in the northern and eastern portion of the project site. The nearest CNDDB occurrence (occurrence # 77) is located 4.2 miles south of SA1. Disturbance as result of quarry activities has potential to impacts nesting and foraging activities.
SSP24	Yes	Yes	72.53	Not observed on site in 2016, but previously reported as present by Hunt (in Aquatic Consulting Services, 2010). Suitable habitat and burrow locations are present within SA1. The nearest eBird record of the species is for a single wintering individual located 1.5 miles of SA1 near Potrero Road.
SSO4	Yes	Yes	72.25	Observed in 2016 by BRC. The species was observed on the slopes west of the existing quarry. Suitable habitat is present within the chaparral and coastal scrub communities present within SA1. The vegetation present on site provides suitable nesting and foraging habitat for the species.
SSP26	Yes	Yes	72.25	Not observed on site during protocol surveys conducted in 2010. Suitable nesting habitat is present within the coastal scrub vegetation communities. The nearest CNDDB occurrence (occurrence # 918) is located 2.8 miles south of the survey along Potrero Road. The recent fire has impacted vegetation communities within SA1 and likely has decreased the suitability of the site for the species.
SSP27	Yes	Yes	0	Observed within red willow thickets located on the southern end of pond during focused least Bell's vireo surveys conducted by Impact Sciences in 2010. BRC did not observe species since survey was conducted outside of the breeding season for the species. Suitable habitat is restricted to red willow thickets.

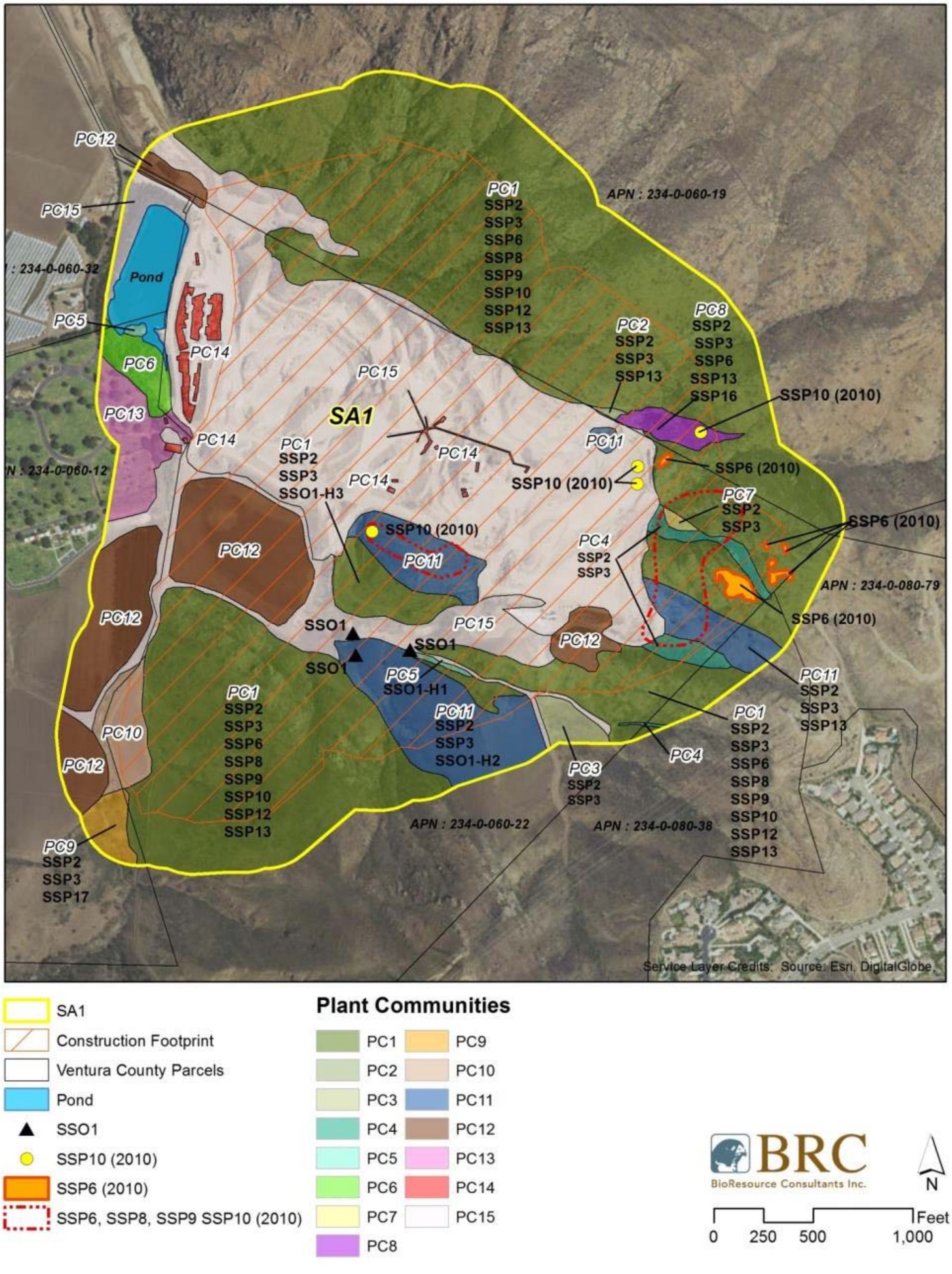
Special-Status Species (continued)				
SSP28	Yes	Yes	0	Not observed on site during protocol surveys conducted in 2010. Suitable nesting habitat is present within the red willow thickets located on the western end of pond. BRC did not observe species since survey was conducted outside of the breeding season for the species. Suitable habitat is restricted to red willow thickets.
SSO5	Yes	Yes	84	Small mammal trapping was conducted Impact Sciences, Inc. in 2010. The species is documented to occur throughout the chaparral and coastal scrub vegetation communities present on site prior to the fire. The species was caught throughout SA1. During BRC's survey in 2016 desert woodrat middens were observed in the northeastern portion of the mining expansion area.

FE ....Federal Endangered
FT ....Federal Threatened
SFP................California Fully Protected Species
SE..................California Endangered
SR..................California Rare
SSC ....California Species of Special Concern
FP ....California Fully Protected Species
WL ....California Watch List Species

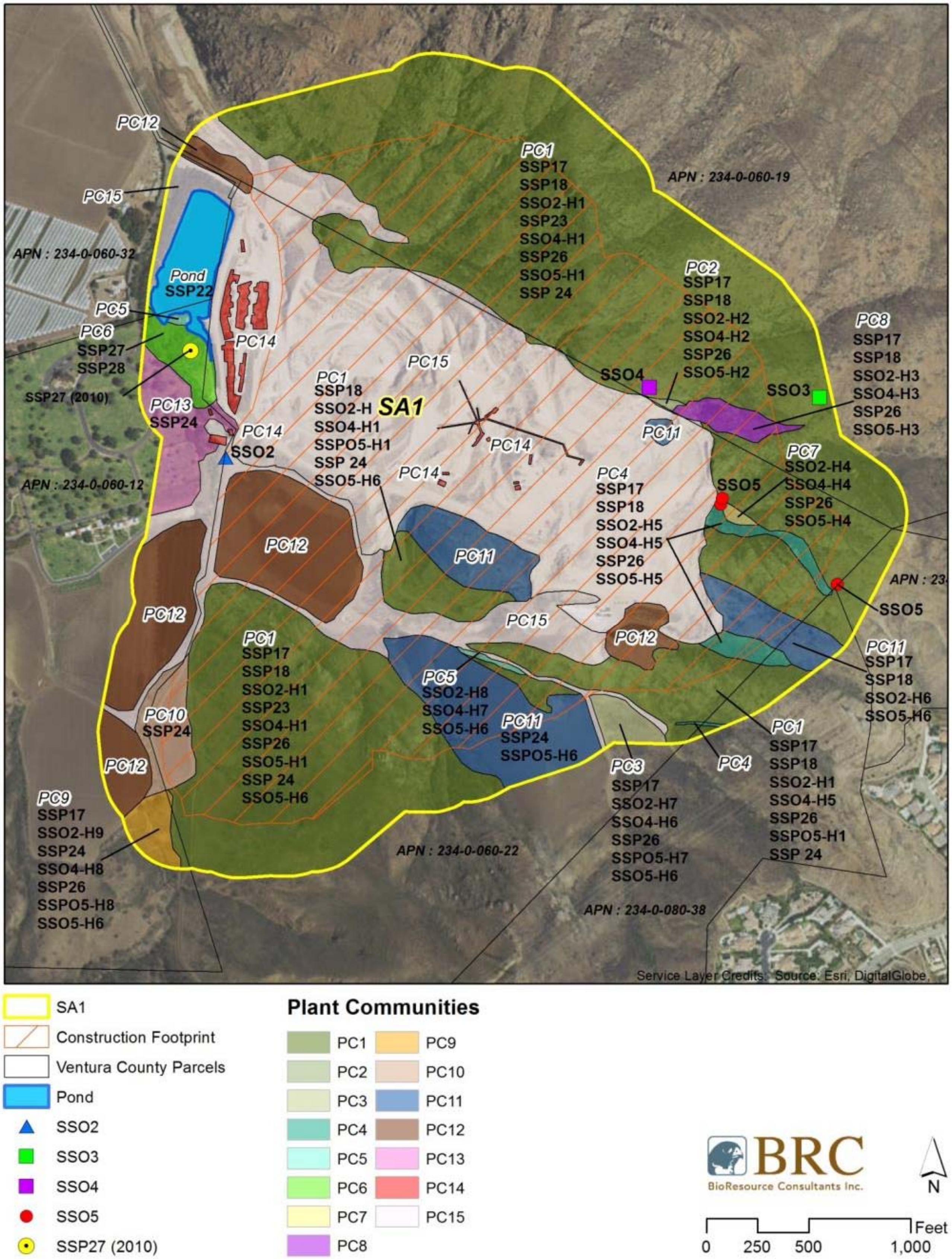
CDFG/NatureServe Rank
G1 or S1 - Critically Imperiled Globally or Subnationally (state)
G2 or S2 - Imperiled Globally or Subnationally (state)
G3 or S3 - Vulnerable to extirpation or extinction Globally or Subnationally (state)
California Rare Plant Rank (CRPR)
CRPR 1A- California Native Plant Society/CDFG listed as presumed to be extinct
CRPR 1B- California Native Plant Society/CDFG listed as rare or endangered in California and elsewhere
CRPR 2 - California Native Plant Society/CDFG listed as rare or endangered in California but more common elsewhere
CRPR 3 - California Native Plant Society/CDFG listed as in need of more information.
CRPR 4 - California Native Plant Society/CDFG listed as of limited distribution or infrequent throughout a broader area in California.
LIS ....Locally Important Species

Nesting Bird Summary

Most of the bird species that were observed during the survey (Appendix 2) likely nest within SA1, predominantly within the vegetated areas and with preference show towards undisturbed native habitats such as the riparian and chaparral scrub communities. Several species, however, were also observed within the quarry and likely nest there, including the white-throated swift (*Aeronautes saxatalis*), which nests in crevices on rock faces, and the canyon wren and rock wren, which both nest on ledges on rock faces. These species are protected under the MBTA and the California Department of Fish and Game Code (Section 3503).



Special-Status Plant Species Map



Special-Status Wildlife Species Map

3.3 Wildlife Movement and Connectivity

(Initial Study Checklist D)

Wildlife movement or connectivity features, or evidence thereof, were found within SA1.

Mapped Corridors or Linkage

Connectivity Feature 1 (C1)

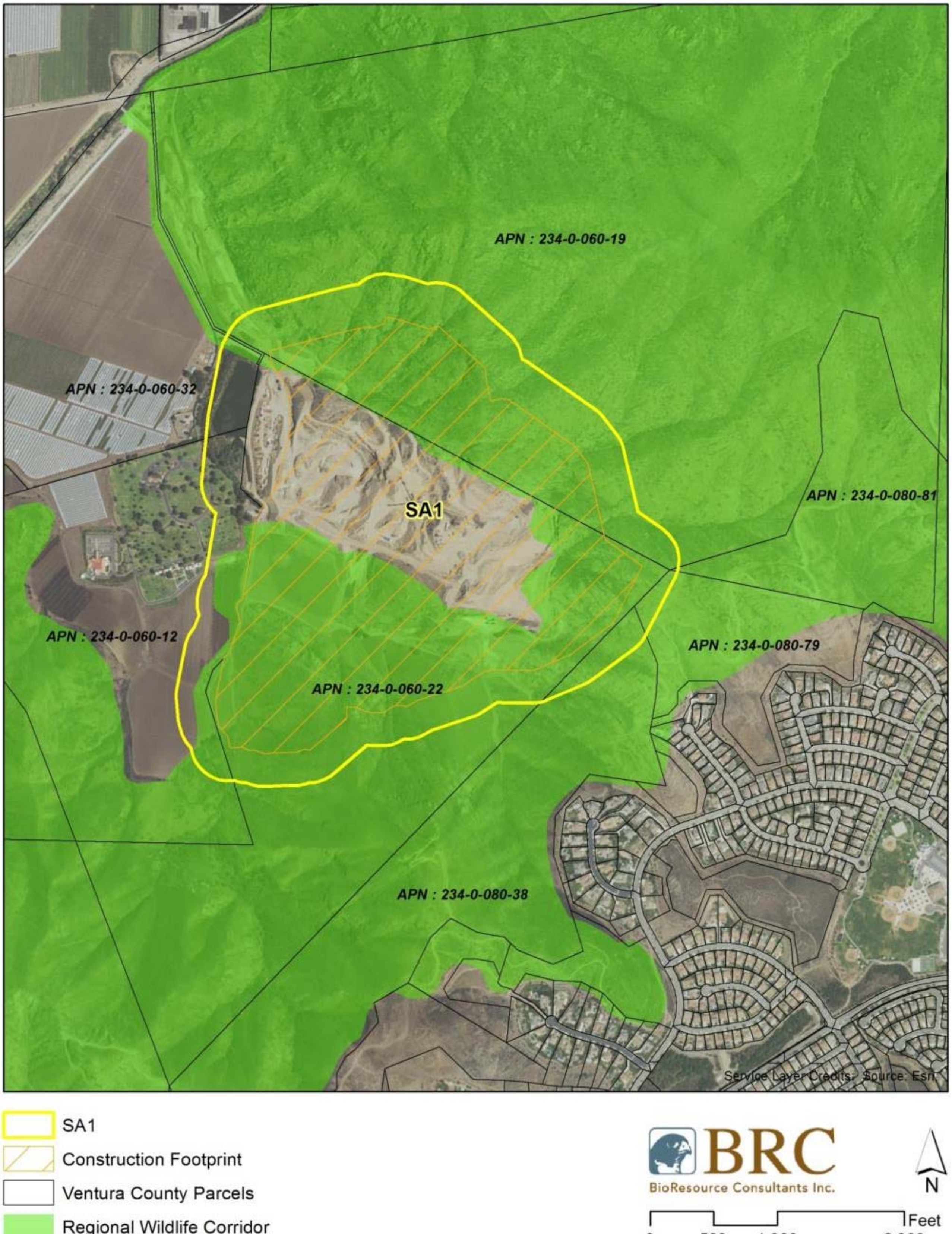
Santa Monica-Sierra Madre Connection

Description

The Santa Monica–Sierra Madre Connection is one of the few coastal to inland connections remaining in the South Coast Ecoregion. The Connection stretches from the rugged Santa Monica Mountains at the coast inland to the jagged peaks of the Santa Susana Mountains and the Sierra Madre Ranges of Los Padres National Forest. The Linkage Design includes substantial public ownership that protects natural habitats from development, with 34% (43,249 of 125,613 acres) of the connection currently receiving some level of conservation protection. The connection comprises a rich mosaic of oak woodland, savanna, chaparral, coastal sage scrub, grasslands, and riparian forests and woodlands, and has several major strands to accommodate diverse species and ecosystem functions.

Within SA1, the connection is characterized as a corridor linking the Santa Monica Mountains to Conejo Mountain. The portion of the corridor that falls within the SA1 consists of scattered rock outcroppings within Deerweed Scrub and Laurel Sumac Scrub. The SA1 corridor/linkage provides essential habitat for foraging, cover, and local and regional movement in a generally west-to-east direction.

Connectivity Features							
Map Key	Type of Connectivity Feature	Description	Species Observed	Evidence	Functional Group/Species Expected	Habitats Connected	Comments
C1	chokepoint	Saddle between Mountains	Coyote, mule deer (*Odocoileus hemionus*)	Carcass, tracks, scat	Mammals, birds, reptiles	Santa Monica Mountains – Conejo Mountain	Connection abuts the north, south and east edges of the expansion areas. Development of the area will narrow the connection, but will not impede movement.



Habitat Connectivity Map

Section 4: Recommended Impact Assessment & Mitigation

4.1 Sufficiency of Biological Data

Additional information needed to make CEQA findings and develop mitigation measures:

Additional information IS needed to make CEQA findings.

Additional biology-related surveys or permits needed prior to issuance of land use permit:

Focused studies that need to be conducted in order to provide information for CEQA include:

- Focused Botanical Surveys for all species with High Potential (see Observed and Potentially Occurring Special-Status Species Table) during appropriate bloom periods in the spring of 2017.
- Update/Amendment to the Jurisdictional Wetland Delineation in the spring of 2017.

BRC has also determined that a discretionary Tree Ordinance Permit will be required for this project and a certified arborist will need to prepare an Arborist Tree Report and Protection Plan. In addition, a Streambed Alteration Agreement will need to be prepared and submitted to the CDFG for issuance. The Project will not impact waters of the U.S., and therefore, permit requirements under Section 404 of the Clean Water Act and water certification under Section 401 are not required.

4.2 Impacts and Mitigation

A. Species	Project: PS-M; Cumulative: PS-M

No federally- or state-listed endangered, threatened, or rare animal species were observed within SA1 by BRC during the 2016 survey. Special-status species observed within SA1 include southern California black walnut trees, as well as sharp-shinned hawk, CDFW Watch list species, and loggerhead shrike, coastal whiptail, loggerhead shrike, sharp-shinned hawk, and San Diego desert woodrat, all CDFW Species of Special Concern (see Special-Status Wildlife Map, mapped as SS01 through SS05).

Additionally, SA1 supports moderate to high quality habitat for an additional 17 special-status species—Catalina mariposa-lily, Plummer’s mariposa-lily, Blochman's dudleya, Conejo dudleya, Verity's dudleya, Ojai navarretia, Conejo buckwheat, Lyon's pentachaeta, woven-spored lichen, Crotch bumble bee, Santa Monica grasshopper, western pond turtle, golden eagle, burrowing owl, coastal California gnatcatcher, yellow warbler, and least Bell’s vireo. SA1 also supports suitable roosting and nesting sites for birds protected by the CDFW and the MBTA.

Significance Finding – Project Impacts: 15 southern California black walnuts and three coast live oak trees were observed within the Construction Footprint. Project implementation may result in impact/ removal of these trees as they are located within the mining expansion area.

Though they were not observed within SA1 during the 2016 surveys, Blochman's dudleya, Conejo dudleya, Verity's dudleya, and Conejo buckwheat have been documented to occur in previous surveys within the rocky outcroppings located in the central and eastern portions of the Construction Footprint. In total, 17 special-status species are documented to occur within the mining expansion area or were determined to have potential to occur on site and may therefore be impacted by the Project.

The Project will result in the loss of 87.44 acres of suitable habitat for special-status species. It is anticipated that, as a result of Project implementation, Project-related activities including vegetation removal, grading, compaction, and construction, may result in the loss of individual coastal whiptails, San

Diego desert woodrats, Crotch bumble bees, Santa Monica grasshoppers, western pond turtles, burrowing owls, loggerhead shrikes, and/or coastal California gnatcatchers and/or their nests. These losses are considered potentially significant but mitigable.

Project implementation may also indirectly impact nesting birds due to elevated noise levels and vibration associated with construction equipment, which may result in birds abandoning their nests, eggs, or young. Potential impacts to protected nesting birds are considered potentially significant but mitigable.

Significance Finding – Cumulative Impacts: Project activities have the potential to indirectly impact several wildlife species. Noise and increased construction activities have the potential to disrupt breeding or foraging special-status wildlife outside of the mine expansion area, including golden eagles, loggerhead shrikes, burrowing owls, coastal California gnatcatchers, and nesting habitat for birds protected under MBTA, which would be considered potentially cumulatively significant but mitigable.

Avoidance and Minimization Measures

MM1: Nesting Birds

Purpose: In order to minimize impacts to nesting birds protected by the MBTA. Active nests of native bird species are protected by the MBTA (16 U.S.C. 704) and the California Fish and Game Code (Section 3503) within the Construction Footprint.

Requirement: If activities associated with construction or grading are planned to occur during the bird nesting/breeding season, generally January through March for early nesting birds (e.g., Cooper's hawks or hummingbirds) and from mid-March through September for most bird species, the applicant should have a qualified biologist conduct surveys for active nests to determine the presence/absence of active nests. Pre-construction nesting bird surveys should be conducted weekly beginning 30 days prior to the initiation of ground-disturbance and vegetation removal activities, with the last survey conducted no more than three days prior to the start of clearance/construction work. If ground-disturbing activities are delayed, additional pre-construction surveys should be conducted so that no more than three days have elapsed between the survey and ground-disturbing activities. Surveys should include examination of trees, shrubs, and the ground for nesting birds. Several bird species such as killdeer and night hawks are known to nest on bare ground.

Protected bird nests that are found within or adjacent to the construction zone should be protected by a buffer deemed suitable by a qualified biologist and verified by the CDFW. Typically, a 300-foot buffer is required for most species and a 500-foot buffer is required for raptor species. Buffer areas should be delineated with orange construction fencing or other exclusionary material that would inhibit access within the buffer zone. Installation of the exclusionary material delineating the buffer zone should be verified by a qualified biologist prior to initiation of construction activities. The buffer zone should remain intact and maintained while the nest is active (i.e.: occupied or being constructed by the adults bird[s]) and until young birds have fledged and no continued use of the nest is observed, as determined by a qualified biologist.

Documentation: The Permittee will provide to the Planning Division and the CDFW a Survey Report documenting the results of the pre-construction survey and noting the location species and anticipated fledge date of all active nests within undisturbed areas of SA1.

Timing: January through March for early nesting birds (e.g., Cooper's hawks or hummingbirds) and from mid-March through September for most other bird species, 30 days prior to ground disturbance.

MM2: Rare Plant surveys

Purpose: To minimize impacts to rare plants that have been documented, or have potential to occur within the Construction Footprint.

Requirement: Conduct rare plant surveys within the undisturbed areas of SA1 during the known blooming period for species with potential to document the occurrence and population size of each species occurring within the Construction Footprint.

Documentation: The Permittee will provide to the Planning Division and CDFW a Survey Report documenting the results of the pre-construction survey.

Timing: Prior to land clearing in undisturbed areas of the mine site, rare plant surveys should be conducted during known blooming period for species with potential to occur within the Construction Footprint. Two surveys, occurring between April and June should be conducted in all habitats that have potential to support special-status plants.

MM3: Rare Plant Mitigation Plan

Purpose: To minimize impacts to rare plants that have been documented, or have potential to occur within the Construction Footprint.

Requirement: If rare plants are observed during surveys, a Draft Rare Plant Mitigation and Monitoring Plan shall be submitted to Ventura County and CDFW for review and approval prior to ground disturbance to occupied habitat. Upon approval, the plan will be implemented by the applicant or its designee. The plan will demonstrate the feasibility of enhancing or restoring habitat of documented rare plants, hereby known as target rare plant species, in selected areas to be managed as natural open space without conflicting with other resource management objectives. The plan shall provide for replacement target rare plant species to be removed at a minimum 1:1 ratio, within suitable habitat at a site where no future mining-related disturbance will occur. The plan shall specify the following:

1. The location of the mitigation site in protected/preserved areas within the Pacific Rock site.
2. Methods for harvesting seeds or salvaging and transplantation of individual plants to be impacted.
3. Measures for propagating target rare plants (from seed or cuttings) or transferring living specimens from the salvage site to the introduction site.
4. Site preparation procedures for the mitigation site.
5. A schedule and action plan to maintain and monitor the mitigation area.
6. The list of criteria and performance standards by which to measure the success of the mitigation site.
7. Measures to exclude unauthorized entry into the mitigation areas.
8. Contingency measures such as erosion control, replanting, or weeding to implement in the event that mitigation efforts are not successful.

The plan will specify methods to collect target plant propagules and to introduce them into these mitigation sites. Introductions will use source material from the Pacific Rock site unless otherwise approved by CDFW. Alternatively, seed may be collected from protected occurrences, following CDFW-approved seed collection guidelines. The applicant or its designee will monitor the reintroduction sites for no fewer than five additional years to estimate survivorship or seedling establishment. Annual monitoring reports will be prepared and submitted to CDFW to guide future mitigation planning for target species. Monitoring reports will describe all restoration/enhancement measures taken in the preceding year; describe success and completion of those efforts and other pertinent site conditions (erosion, trespass, animal damage) in qualitative terms; and describe target plant species survival or establishment in quantitative terms.

The performance standards for the Rare Plant Mitigation and Monitoring Plan shall be the following:

1. Within five years after reintroducing target rare plant individuals to the mitigation site, the extent of occupied acreage and the number of established reproductive plants will be no smaller than at the site lost to the project.
2. Non-native species cover will be no more than 5% absolute cover through the term of the restoration period.

Documentation: A Draft Rare Plant Mitigation and Monitoring Plan shall be submitted to Ventura County and CDFW six months prior to vegetation removal.

Timing: Implementation of the mitigation plan and the introduction of plantings would ideally be timed prior to winter rain events. Weeding activities would ideally be timed prior to seed set.

MM4: Oak Trees

Purpose: To mitigate the loss of coast live oaks impacted within the Construction Footprint.

Requirement: Mitigation for impacts to protected oaks will be set forth as conditions of a Tree Permit, issued by Ventura County. If approved, the Tree Permit will include conditions relating to the following general issues:

1. Replacement of removed or relocated oaks at a minimum 2:1 ratio, or 10:1 for heritage oaks.
2. Provisions to ensure that replacement oaks are of the correct type and provenance, and that they are planted in appropriate locations on or off-site.
3. Provisions to ensure the maintenance of replaced and encroached oaks through a monitoring period of at least 2 years, and the reportage of mitigation success through the monitoring period.
4. Provisions to ensure proper supervision by a licensed arborist of protective measures during the construction phase of the project, including provisions that encroaching activities are minimally invasive (e.g. that they be carried out with hand tools).
5. Provisions to ensure proper supervision by a licensed arborist of replacement plantings.

Documentation: The Permittee will provide the Planning Division and CDFW a Survey Report documenting the results of the initial pre-construction survey efforts upon completion of the pre-construction surveys.

Timing: Conduct surveys at least 30 days prior to the tree removal.

Monitoring and Reporting: Provisions to ensure the maintenance of replaced and encroached oaks through a monitoring period of at least 2 years, and the annual reportage of mitigation success through the monitoring period. The Permittee will provide the Planning Division and CDFW a Survey Report documenting the results of the initial pre-construction survey and passive relocation prior to tree removal.

MM5: Burrowing owl surveys

Purpose: To minimize impacts to nesting/wintering burrowing owls within the Construction Footprint.

Requirement: Conduct protocol-level surveys following CDFW guidelines. Breeding season and non-breeding surveys should be conducted if feasible to determine the presence of burrowing owls within the mine expansion area. Surveys should be conducted in all areas that have been determined to provide suitable habitat for the species. If burrowing owls are determined to be present, consultation with CDFW should occur and an appropriate method for passively relocating the burrowing owl should be developed.

Documentation: The Permittee will provide to the Planning Division and CDFW a Survey Report documenting the results of the pre-construction survey and passive relocation efforts.

Timing: Surveys should be conducted no more than 30 days prior to vegetation removal. Surveys should be conducted weekly. If occupied burrows are identified within SA1, passive relocation efforts will occur no more than two weeks prior to the vegetation removal.

Monitoring and Reporting: Upon Project completion, the Permittee will provide the Planning Division and CDFW a Survey Report documenting the results of the initial pre-construction survey and passive relocation efforts.

MM6: Least Bell's vireo and Coastal California gnatcatcher surveys

Purpose: To minimize impacts to nesting least Bell's vireo and coastal California gnatcatcher within the Construction Footprint.

Requirement: Conduct pre-construction protocol-level surveys for least Bell's vireo and coastal California gnatcatcher (per USFWS protocol) within areas with suitable habitat for each species.

Documentation: The Permittee will provide the Planning Division and CDFW/USFWS a Survey Report documenting the results of the protocol-level surveys for the coastal California gnatcatcher and least Bell's vireo upon completion of the pre-construction surveys at Project completion.

Timing: Surveys will occur within the recommended survey period described within the USFWS survey protocols.

- Protocol Least Bell's Vireo Surveys between April 10th- July 31st
- Protocol California Gnatcatcher Surveys between February 15th – August 30th

Monitoring and Reporting: No additional monitoring or reporting is necessary.

MM5: Coastal Whiptail, Western Pond Turtle Surveys

Purpose: To prevent impacts to coastal whiptails and western pond turtles occurring within the Construction Footprint.

Requirement: A qualified biologist will conduct a pre-construction survey within 72 hours of any ground disturbance, and provide periodic site surveys during construction to determine presence of coastal whiptails, western pond turtles, and other reptiles. All reptiles found within the work area shall be relocated by the qualified biologist. If any of these reptiles are detected, they should be relocated to undeveloped areas prior to the commencement of construction, and provisions should be made to prevent their reentry to the site, such as by the placement of silt fencing or other means which would provide a physical barrier to movement. A survey for aestivating southwestern pond turtle is recommended to determine if burrows are available for use by southwestern pond turtle and, if present, whether they are being used by aestivating individuals. If aestivating southwestern pond turtles are found on-site, the formulation of a habitat replacement program is recommended which would incorporate details of replacement aestivation burrows, relocation of aestivating individuals to new burrows and monitoring of habitat replacement success.

Documentation: Upon Project completion, the Permittee will provide the Planning Division and the CDFW a Survey Report documenting the results of the pre-construction survey for coastal whiptails and western pond turtles.

Timing: A pre-construction survey will be conducted within 72 hours of ground disturbance within the Construction Footprint and vegetation removal to determine presence of coastal whiptail and western pond turtle.

Monitoring and Reporting: No additional monitoring or reporting is necessary.

MM7: San Diego Desert Woodrat Trapping

Purpose: To prevent impacts to San Diego desert woodrats and other small mammals occurring within the Construction Footprint.

Requirement: Prior to vegetation removal, trapping and relocation of small mammals should be conducted by a qualified biologist. Trapping should occur outside of the breeding season of the San Diego desert woodrat. Within seven days prior to vegetation removal, a qualified biologist will conduct surveys for small mammals. All small mammals captured during trapping will be relocated to suitable habitat on site outside of the proposed mine expansion area. During trapping efforts all woodrat middens will be dismantled and the material shall be relocated to a suitable receiver location identified on site.

Documentation: The Permittee will provide to the Planning Division and CDFW a Survey Report documenting the results of the trapping and relocation efforts.

Monitoring and Reporting: No additional monitoring or reporting is necessary.

B. Ecological Communities	Project: PS-M; Cumulative: LS

Sensitive Plant Communities

One CDFW sensitive plant community was found within SA1: Red Willow Thickets. This sensitive community provides high quality suitable habitat for one federally-endangered species: least Bell's vireo (see Special-Status Wildlife Species Map, mapped as SSP28).

Red Willow Thicket makes up 1.52 acres of SA1 and is located outside of the Construction Footprint. No trees, shrubs, or understory of these communities are anticipated to be impacted by Project activities. Individual oak trees lost as a result of Project activities are addressed in MM4.

Significance Finding – Project Impacts: The Project will not impact or alter any CDFW sensitive plant communities. No impact mitigation measures are necessary.

Significance Findings – Cumulative Impacts: The Project will not have cumulative impacts to this community.

No mitigation measures are necessary.

Waters and Wetlands

Mitigation for impacts to drainages may be accomplished through habitat creation, restoration, or conservation. The required mitigation ratio for each of these approaches varies with the type of habitats affected, the type of mitigation chosen, and the distance of the mitigation site from the Project site.

If impacts to CDFW-jurisdictional areas are foreseen as a result of proposed Project implementation, a Streambed Alteration Agreement (SAA) should be processed with CDFW in parallel with any other permit processing done through local, state or federal agencies. Any conditions or mitigation measures of the SAA should be included as conditions of the lead-agency issued permit granting development entitlements for the Project site.

MM8: Wetland and Waters Delineation

Purpose: To identify wetlands within the project and determine the extent of impact that may occur to each of the drainages as a result of project.

Requirement: Conduct a formal wetland delineation

Documentation: The Permittee will provide the Ventura County Planning Division and CDFW a Jurisdictional Delineation Report documenting the results of the formal wetland delineation.

Timing: The wetland delineation should occur at minimum 90 days prior to ground disturbance.

Monitoring and Reporting: No additional monitoring or reporting is necessary.

C. Coastal Habitat Project: None; Cumulative: None

SA1 is not located within or adjacent to the coastal zone. No mitigation measures are necessary.

Environmentally Sensitive Habitat Areas

N/A

D. Habitat Connectivity (migration corridors) Project: PS; Cumulative: LS

The Santa Monica–Sierra Madre Connection is one of the few coastal to inland connections remaining in the South Coast Ecoregion. It stretches from the rugged Santa Monica Mountains at the coast inland to the jagged peaks of the Santa Susana Mountains and the Sierra Madre Ranges of the Los Padres National Forest. Within SA1, the Connection is characterized as a corridor linking the Santa Monica Mountains to Conejo Mountain. Vegetation within the area consists of scattered rock outcroppings within Deerweed Scrub and Laurel Sumac Scrub. The SA1 corridor/linkage provides essential habitat for foraging, cover, and local and regional movement in a generally west-to-east direction (South Coast Wildlands 2008). The Project site contains an undeveloped area that provides habitat for migrating species and may facilitate movement between developed areas, but there is no evidence that the Construction Footprint contains a significant linkage or corridor necessary for migrating species.

Significance Finding – Project Impacts: Project implementation will reduce the area of the Santa Monica-Sierra Madre Connection around the Conejo Mountain and narrow the corridor between the quarry and residential development to the east. Although the implementation of the Project may reduce available habitat for wildlife Santa Monica-Sierra Madre Connection, the project is not expected to be significant being that the wildlife movement through the area will not be impeded.

Significance Findings – Cumulative Impacts: The Project will not have cumulative impacts.

No mitigation measures are necessary.

E. Locally Important Species/Communities Project: PS; Cumulative: LS

SA1 contains eight recognized locally important communities including Laurel Sumac Scrub, California Sagebrush Scrub, Deerweed Scrub, Giant Wild Rye Grasslands, Red Willow Thicket, Mountain Mahogany Scrub, and Disturbed Chamise/Ceanothus Chaparral, and Coast Live Oak Woodland. The majority of these communities were determined to be locally important due to a combination of habitat suitability, limited range, and proximity of known occurrences to several listed species of which include: Verity's dudleya, Conejo buckwheat, Plummer's mariposa lily, Catalina mariposa lily, Least Bell's Vireo, coastal California Gnatcatcher, and Yellow Warbler.

SA1 supports SA1 supports moderate to high quality habitat for six recognized locally important species including Plummer's mariposa-lily, marcescent dudleya, Conejo dudleya, Verity's dudleya, Conejo buckwheat, white-veined monardella, and chaparral ragwort. Of these species, Plummer's mariposa lily, Conjeo dudleya, Verity's dudleya, and Conejo buckwheat were determined to have a high potential to occur.

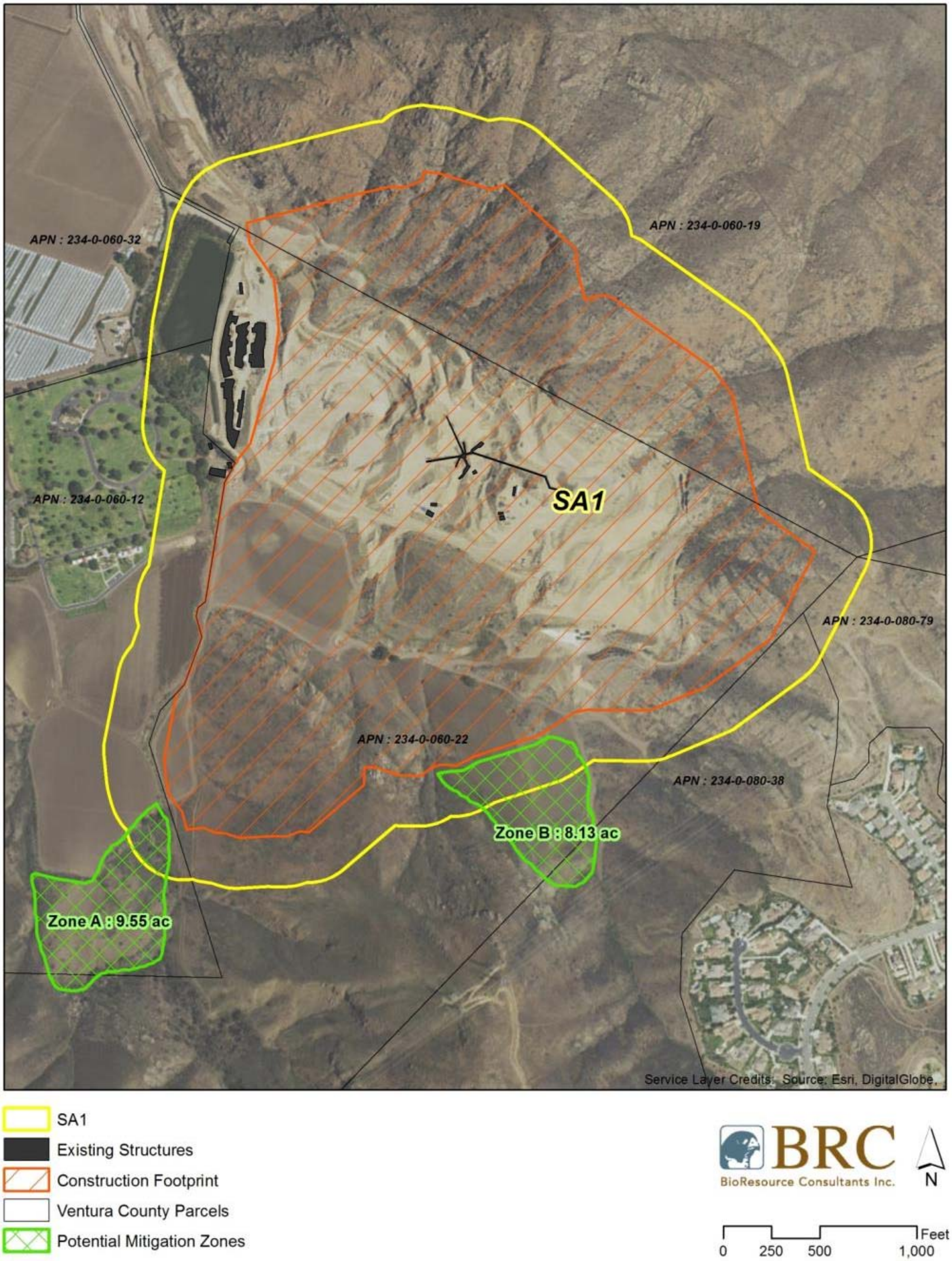
Significance Finding – Project Impacts: Project implementation will result in the removal of 74.23 acres of habitat determined to be Locally Important (See Plant Community Table for individual community acreage loss). Of the eight recognized locally important communities, only Red Willow Thicket and Coast Live Oak Woodlands will avoid Project related impacts.

Locally important species that are documented to occur within or in the immediate vicinity of the mining expansion area and were determined to have potential to occur on site may be impacted by the Project. These include Plummer's mariposa lily, Conjeo dudleya, Verity's dudleya, and Conejo buckwheat. Though they were not observed within SA1 during the 2016 survey, Conejo dudleya, Verity's dudleya and Conejo buckwheat have been documented to occur in previous surveys within the rocky outcroppings located in the eastern portion of the Construction Footprint.

Significance Finding – Cumulative Impacts: The Project will not have cumulative impacts on any recognized Locally Important Species or Communities.

Avoidance and Minimization Measures

Please see above:
MM2: Rare Plant surveys
MM3: Rare Plant Mitigation Plan

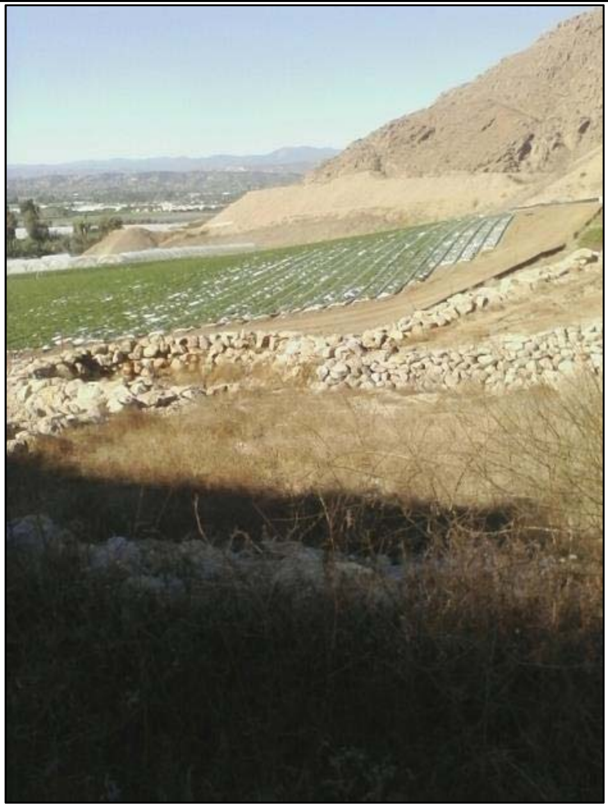


Potential Mitigation Areas Map

Section 5: Photos

Photos	
Location SA1 **Map Key** PS1 **View Direction** Southeast **Description** Transition between Laurel Sumac Scrub and non-native grassland	
Location SA1 **Map Key** PS1 **View Direction** Northeast **Description** Oak tree (left edge of photo) within the Construction Footprint, intermittent Laurel Sumac Scrub shown in the background.	

Photos

Location	
SA1	
Map Key	
PS1	
View Direction	
Southeast	
Description	
Transition between Laurel Sumac Scrub and non-native grassland	

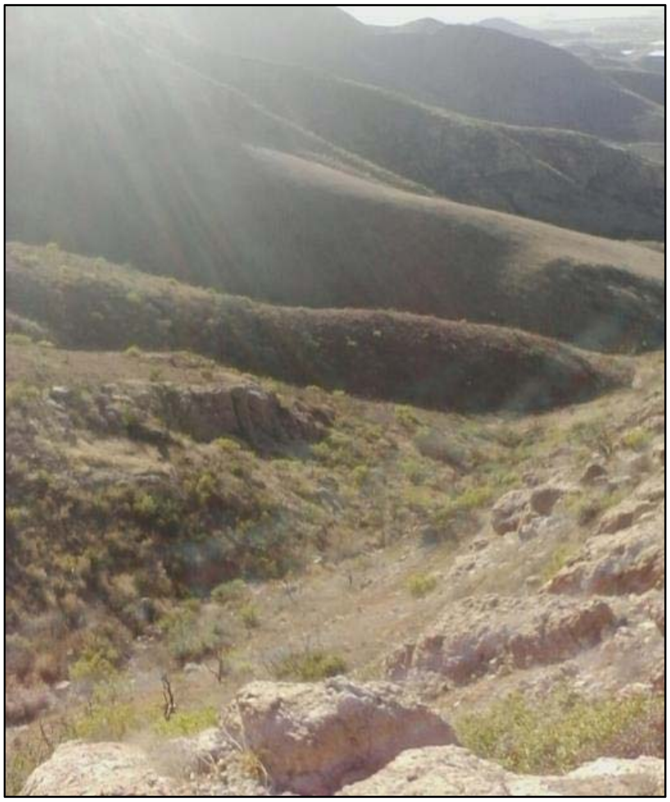
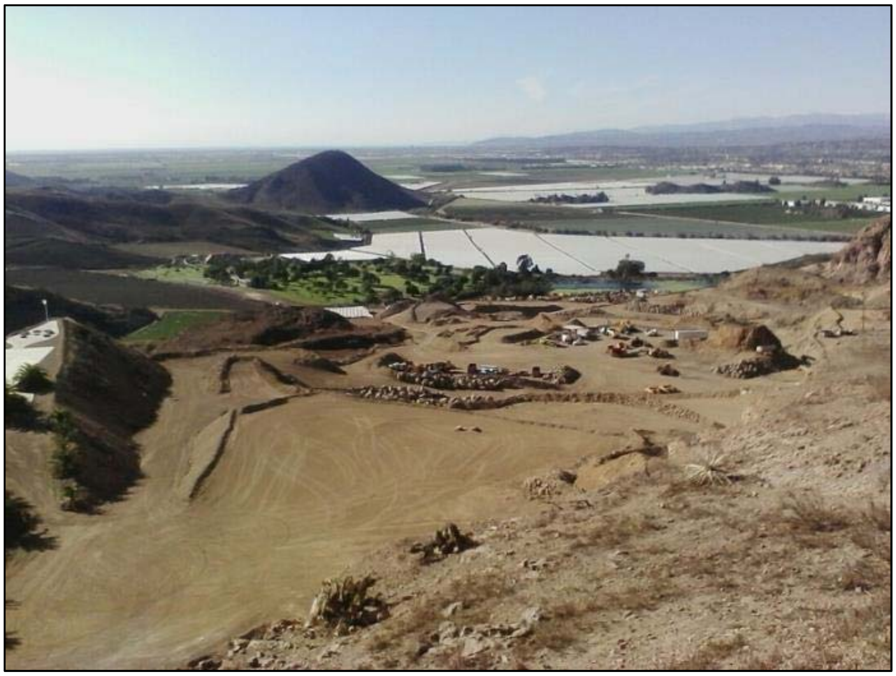
Location	
SA1	
Map Key	
PS2	
View Direction	
East	
Description	
Intermittent drainage with oak individual in background.	

Photos

Location	
SA1	
Map Key	
PS2	
View Direction	
West	
Description	
Looking downstream in intermittent drainage at cattail marsh and annual spring area in foreground. Agriculture (strawberry) field and oaks in background.	

Location	
SA1	
Map Key	
PS3	
View Direction	
Southwest	
Description	
Non-native grassland in foreground with Laurel Sumac Scrub (sub dominant of giant rye) in background on hillside.	

Photos

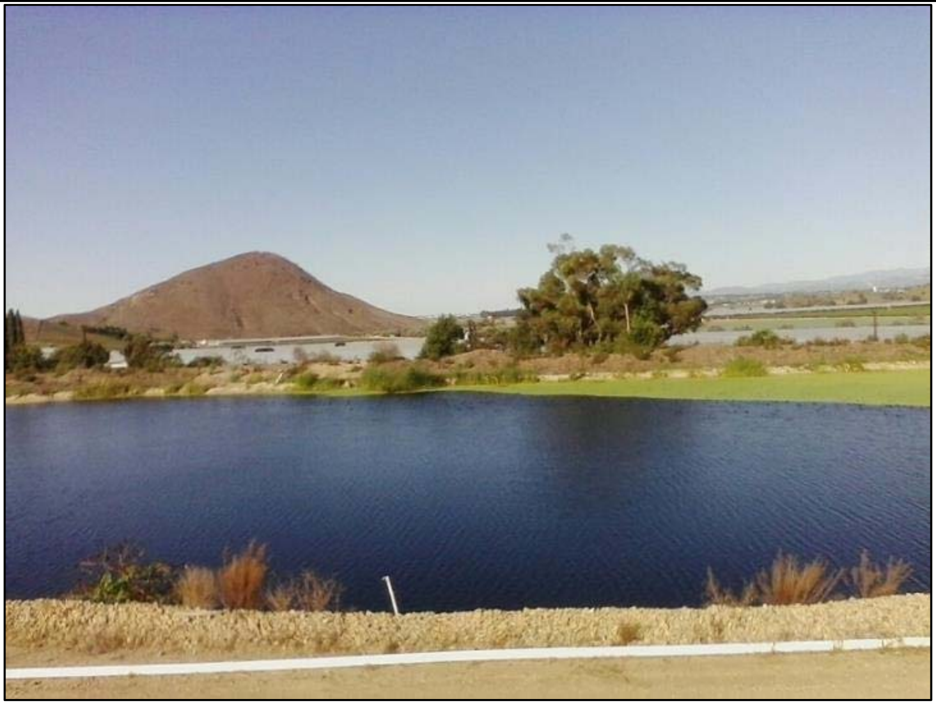
Location	
SA1	
Map Key	
PS4	
View Direction	
Southeast	
Description	
At edge of rock outcrop facing down into drainage with adjacent hillsides of Laurel Sumac Scrub with understory of deerweed and intermittent *Ceanothus* sp. individuals. Background shows non-native grassland.	
Location	
SA1	
Map Key	
PS5	
View Direction	
Northwest	
Description	
View of quarry operation (previous cleared land) and surrounding area.	

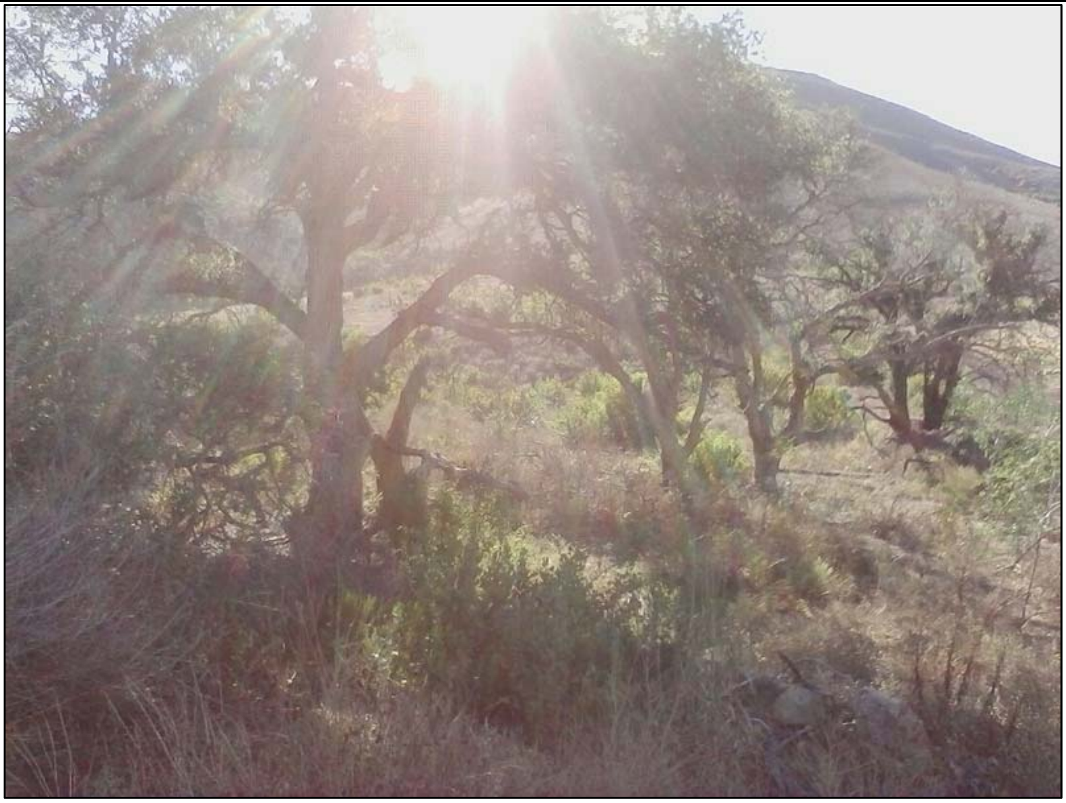
Photos	
Location SA1 **Map Key** PS6 **View Direction** Southeast **Description** Looking down at ephemeral drainage with giant rye grass vegetation community.	
Location SA1 **Map Key** PS7 **View Direction** Northwest **Description** Example of cliff-face physical feature.	

Photos	
Location SA1 **Map Key** PS8 **View Direction** West **Description** Disturbed intermittent sumac scrub, evidence of fire.	
Location SA1 **Map Key** PS9 **View Direction** North **Description** Scattered Laurel Sumac Scrub among portions of inaccessible steep rocky cliffside.	

<table>
<tr><th colspan="2">Photos</th></tr>
<tr><td>Location
SA1
Map Key
PS9
View Direction
West
Description
Scattered Laurel Sumac Scrub among steep rocky hillsides.</td><td></td></tr>
<tr><td>Location
SA1
Map Key
PS10
View Direction
South
Description
Culvert – Overflow from detention pond. Only during significant flooding events can water breach into this area from the detention pond.</td><td></td></tr>
</table>

<table>
<tr><th colspan="2">Photos</th></tr>
<tr><td>Location
SA1
Map Key
PS10
View Direction
West
Description
Overflow directed into this drain – Directed back into detention pond and used for irrigation.</td><td></td></tr>
<tr><td>Location
SA1
Map Key
PS11
View Direction
West
Description
Red Willow Thicket adjacent to pond with cattail marsh visible in background.</td><td>(
</td></tr>
</table>

<table>
<tr><th colspan="2">Photos</th></tr>
<tr><td>Location
SA1
Map Key
PS12
View Direction
West
Description
Detention Pond (W23). All drainages on site are diverted into this pond.</td><td></td></tr>
<tr><td>Location
SA1
Map Key
PS13
View Direction
Northeast
Description
Russian Thistle Field in foreground with scattered Laurel Sumac Scrub in background.</td><td></td></tr>
</table>

<table>
<tr><th colspan="2">Photos</th></tr>
<tr><td>Location
SA1
Map Key
PS13
View Direction
Southwest
Description
Oak woodland at the southwestern tip of SA1, outside of Construction Footprint.</td><td></td></tr>
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Appendix 1

Summary of Biological Resource Regulations

The Ventura County Planning Division, as "lead agency" under CEQA for issuing discretionary land use permits, uses the relationship of a potential environmental effect from a proposed project to an established regulatory standard to determine the significance of the potential environmental effect. This Appendix summarizes important biological resource regulations which are used by the Division's biologists (consultants and staff) in making CEQA findings of significance:

Sensitive Status Species Regulations
Nesting Bird Regulations
Plant Community Regulations
Tree Regulations
Waters and Wetlands Regulations
Coastal Habitat Regulations
Wildlife Migration Regulations
Locally Important Species/Communities Regulations

Sensitive Status Species Regulations

Federally Protected Species

Ventura County is home to 29 federally listed endangered and threatened plant and wildlife species. The U.S. Fish and Wildlife Service (USFWS) regulates the protection of federally listed endangered and threatened plant and wildlife species.

FE (Federally Endangered): A species that is in danger of extinction throughout all or a significant portion of its range.

FT (Federally Threatened): A species that is likely to become endangered in the foreseeable future.

FC (Federal Candidate): A species for which USFWS has sufficient information on its biological status and threats to propose it as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

FSC (Federal Species of Concern): A species under consideration for listing, for which there is insufficient information to support listing at this time. These species may or may not be listed in the future, and many of these species were formerly recognized as "Category-2 Candidate" species.

The USFWS requires permits for the "take" of any federally listed endangered or threatened species. "Take" is defined by the USFWS as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering."

The Endangered Species Act (ESA) does not provide statutory protection for candidate species or species of concern, but USFWS encourages conservation efforts to protect these species. USFWS can set up voluntary Candidate Conservation Agreements and Assurances, which provide non-Federal landowners (public and private) with the assurance that if they implement various conservation activities to protect a given candidate species, they will not be subject to additional restrictions if the species becomes listed under the ESA.

State Protected Species

The California Department of Fish and Game (CDFG) regulates the protection of endangered, threatened, and fully protected species listed under the California Endangered Species Act. Some species may be jointly listed under the State and Federal Endangered Species Acts.

SE (California Endangered): A native species or subspecies which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.

ST (California Threatened): A native species or subspecies that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Any animal determined by the commission as "rare" on or before January 1, 1985, is a "threatened species."

SFP (California Fully Protected Species): This designation originated from the State's initial effort in the 1960's to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, mammals, amphibians, reptiles, and birds. Most fully protected species have also been listed as threatened or endangered species under the more recent endangered species laws and regulations.

SR (California Rare): A species, subspecies, or variety of plant is rare under the Native Plant Protection Act when, although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens. Animals are no longer listed as rare; all animals listed as rare before 1985 have been listed as threatened.

SSC (California Species of Special Concern): Animals that are not listed under the California Endangered Species Act, but which nonetheless 1) are declining at a rate that could result in listing, or 2) historically occurred in low numbers and known threats to their persistence currently exist.

The CDFG requires permits for the “take” of any State-listed endangered or threatened species. Section 2080 of the Fish and Game Code prohibits "take" of any species that the California Fish and Game Commission determines to be endangered or threatened. “Take” is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

The California Native Plant Protection Act protects endangered and rare plants of California. Section 1908, which regulates plants listed under this act, states: “no person shall import into this state, or take, possess, or sell within this state, except as incident to the possession or sale of the real property on which the plant is growing, any native plant, or any part or product thereof, that the commission determines to be an endangered native plant or rare native plant, except as otherwise provided in this chapter.”

Unlike endangered, threatened, and rare species, for which a take permit may be issued, California Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

The California Endangered Species Act does not provide statutory protection for California species of special concern, but they should be considered during the environmental review process.

California Rare Plant Ranks (RPR)

Plants with 1A, 1B, 2 or 4 should always be addressed in CEQA documents. Plants with a RPR 3 do not need to be addressed in CEQA documents unless there is sufficient information to demonstrate that a RPR 3 plant meets the criteria to be listed as a RPR 1, 2, or 4.

RPR 1A: Plants presumed to be extinct because they have not been seen or collected in the wild in California for many years. This list includes plants that are both presumed extinct in California, as well as those plants which are presumed extirpated in California. A plant is extinct in California if it no longer occurs in or outside of California. A plant that is extirpated from California has been eliminated from California, but may still occur elsewhere in its range.

RPR 1B: Plants that are rare throughout their range with the majority of them endemic to California. Most of the plants of List 1B have declined significantly over the last century.

RPR 2: Plants that are rare throughout their range in California, but are more common beyond the boundaries of California. List 2 recognizes the importance of protecting the geographic range of widespread species.

Plants identified as RPR 1A, 1B, and 2 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing.

RPR 3: A review list for plants for which there is inadequate information to assign them to one of the other lists or to reject them.

RPR 4: A watch list for plants that are of limited distribution in California.

Global and Subnational Rankings

Though not associated directly with legal protections, species have been given a conservation status rank by NatureServe, an international non-profit conservation organization that is the leading source for information about rare and endangered species and threatened ecosystems. The Ventura County Planning Division considers the following ranks as sensitive for the purposes of CEQA impact assessment (G = Global, S = Subnational or State):

G1 or S1 - Critically Imperiled
G2 or S2 – Imperiled
G3 or S3 - Vulnerable to extirpation or extinction

Locally Important Species

Locally important species' protections are addressed below under "Locally Important Species/Communities Regulations."

For lists of some of the species in Ventura County that are protected by the above regulations, go to http://www.ventura.org/rma/planning/ceqa/bio_resource_review.html.

Migratory Bird Regulations

The Federal Migratory Bird Treaty Act (MBTA) and the California Department of Fish and Game (CDFG) Code (3503, 3503.5, 3511, 3513 and 3800) protect most native birds. In addition, the federal and state endangered species acts protect some bird species listed as threatened or endangered. Project-related impacts to birds protected by these regulations would normally occur during the breeding season, because unlike adult birds, eggs and chicks are unable to escape impacts.

The MBTA implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and Russia for the protection of migratory birds, which occur in two of these countries over the course of one year. The Act maintains that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Bird species protected under the provisions of the MBTA are identified by the List of Migratory Birds (Title 50 of the Code of Federal Regulations, Section 10.13 as updated by the 1983 American Ornithologists' Union (AOU) Checklist and published supplements through 1995 by the USFWS).

CDFG Code 3513 upholds the MBTA by prohibiting any take or possession of birds that are designated by the MBTA as migratory nongame birds except as allowed by federal rules and regulations promulgated pursuant to the MBTA. In addition, there are CDFG Codes (3503, 3503.5, 3511, and 3800) which further protect nesting birds and their parts, including passerine birds, raptors, and state "fully protected" birds.

NOTE: These regulations protect almost all *native nesting birds*, not just sensitive status birds.

Plant Community Regulations

Plant communities are provided legal protection when they provide habitat for protected species or when the community is in the coastal zone and qualifies as environmentally sensitive habitat area (ESHA).

Global and Subnational Rankings

Though not associated directly with legal protections, plant communities have been given a conservation status rank by NatureServe, an international non-profit conservation organization that is the leading source for information about rare and endangered species and threatened ecosystems. The Ventura County Planning Division considers the following ranks as sensitive for the purposes of CEQA impact assessment (G = Global, S = Subnational or State):

G1 or S1 - Critically Imperiled
G2 or S2 - Imperiled
G3 or S3 - Vulnerable to extirpation or extinction

CDFG Rare

Rare natural communities are those communities that are of highly limited distribution. These communities may or may not contain rare, threatened, or endangered species. Though the Native Plant Protection Act and the California Endangered Species Act provide no legal protection to plant communities, CDFG considers plant communities that are ranked G1-G3 or S1-S3 (as defined above) to be rare or sensitive, and therefore these plant communities should be addressed during CEQA review.

Environmentally Sensitive Habitat Areas

The Coastal Act specifically calls for protection of “environmentally sensitive habitat areas” or ESHA, which it defines as: “Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments” (Section 30107.5).

ESHA has been specifically defined in the Santa Monica Mountains. For ESHA identification in this location, the Coastal Commission, the agency charged with administering the Coastal Act, has described the habitats that are considered ESHA. A memo from a Coastal Commission biologist that describes ESHA in the Santa Monica Mountains can be found at: http://www.ventura.org/rma/planning/ceqa/bio_resource_review.html.

Locally Important Communities

The Ventura County Initial Study Assessment Guidelines defines a locally important community as one that is considered by qualified biologists to be a quality example characteristic of or unique to the County or region, with this determination being made on a case-by-case basis. The County has not developed a list of locally important communities, but has deemed oak woodlands to be a locally important community through the County’s *Oak Woodland Management Plan*.

Tree Regulations

Selected trees are protected by the Ventura County Tree Protection Ordinance, found in Section 8107-25 of the Ventura County Non-Coastal Zoning Ordinance. This ordinance, which applies in the unincorporated areas of the County outside the coastal zone, regulates—through a tree permit program—the removal, trimming of branches or roots, or grading or excavating within the root zone of a "protected tree." Individual trees are the focus of the ordinance, while oak woodlands are additionally protected as “locally important communities.”

The ordinance allows removal of five protected trees (only three of which can be oaks or sycamores; none of which can be heritage or historical trees) through a ministerial permit process. Removal of more/other than this may trigger a discretionary tree permit.

If a proposed project cannot avoid impacts to protected trees, mitigation of these impacts (such as replacement of lost trees) is addressed through the tree permit process—**unless the impacts may affect biological resources beyond the tree itself**, such as to sensitive status species that may be using the tree, nesting birds, the tree’s role as part of a larger habitat, etc. These secondary impacts have not been addressed through the tree permit program and must be addressed by the biologist in the biological assessment in accordance with the California Environmental Quality Act (CEQA).

A tree permit does not, however, substitute as mitigation for impacts to oak woodlands. The Public Resources Code requires that when a county is determining the applicability of CEQA to a project, it must determine whether that project “may result in a conversion of oak woodlands that will have a significant effect on the environment.” If such effects (either individual impacts or cumulative) are identified, the law requires that they be mitigated. Acceptable mitigation measures include, but are not limited to, conservation of other oak woodlands through the use of conservation easements and planting replacement trees, which must be maintained for seven years. In addition, only 50% of the mitigation required for significant impacts to oak woodlands may be fulfilled by replanting oak trees.

The following trees are protected in the specified zones. Girth is measured at 4.5 feet from the midpoint between the uphill and downhill side of the root crown.

PROTECTED TREES			
Common Name/Botanical Name (Genus species)	Girth Standard (Circumference)	Applicable Zones	
		All Base Zones	SRP[1]
Alder (*Alnus* all species)	9.5 in.		X
Ash (*Fraxinus* all species)	9.5 in.		X

Bay (*Umbellularia californica)*	9.5 in.		X
Cottonwood (*Populus* all species)	9.5 in.		X
Elderberry (*Sambucus* all species)	9.5 in.		X
Big Cone Douglas Fir (*Pseudotsuga macrocarpa)*	9.5 in.		X
White Fir (*Abies concolor)*	9.5 in.		X
Juniper (*Juniperus californica)*	9.5 in.		X
Maple (*Acer macrophyllum)*	9.5 in.		X
Oak (Single) (*Quercus* all species)	9.5 in.	X	X
Oak (Multi) (*Quercus* all species)	6.25 in.	X	X
Pine (*Pinus* all species)	9.5 in.		X
Sycamore (*Platanus* all species)	9.5 in.	X	X
Walnut (*Juglans* all species)	9.5 in.		X
Historical Tree[3] (any species)	(any size)	X	X
Heritage Tree[4] (any species)	90.0 in.	X	X

X Indicates the zones in which the subject trees are considered protected trees.

1. SRP - Scenic Resource Protection Overlay Zone

2. SHP - Scenic Highway Protection Overlay Zone

3. Any tree or group of trees identified by the County or a city as a landmark, or identified on the Federal or California Historic Resources Inventory to be of historical or cultural significance, or identified as contributing to a site or structure of historical or cultural significance.

4. Any species of tree with a single trunk of 90 or more inches in girth or with multiple trunks, two of which collectively measure 72 inches in girth or more. Species with naturally thin trunks when full grown or naturally large trunks at an early age, or trees with unnaturally enlarged trunks due to injury or disease must be at least 60 feet tall or 75 years old.

Waters and Wetlands Regulations

Numerous agencies control what can and cannot be done in or around streams and wetlands. If a project affects an area where water flows, ponds or is present even part of the year, it is likely to be regulated by one or more agencies. Many wetland or stream projects will require three main permits or approvals (in addition to CEQA compliance). These are:

- 404 Permit (U.S. Army Corps of Engineers)
- 401 Certification (California Regional Water Quality Control Board)
- Streambed Alteration Agreement (California Department of Fish and Game)

For a more thorough explanation of wetland permitting, see the Ventura County’s “Wetland Project Permitting Guide” at http://www.ventura.org/rma/planning/ceqa/bio_resource_review.html.

404 Permit (U.S. Army Corps of Engineers)

Most projects that involve streams or wetlands will require a 404 Permit from the U.S. Army Corps of Engineers (USACE). Section 404 of the federal Clean Water Act is the primary federal program regulating activities in wetlands. The Act regulates areas defined as “waters of the United States.” This includes streams, wetlands in or next to streams, areas influenced by tides, navigable waters, lakes, reservoirs and other impoundments. For nontidal waters, USACE jurisdiction extends up to what is referred to as the “ordinary high water mark” as well as to the landward limits of adjacent Corps-defined wetlands, if present. The ordinary high water mark is an identifiable natural line visible on the bank of a stream or water body that shows the upper limit of typical stream flow or water level. The mark is made from the action of water on the streambank over the course of years.

Permit Triggers: A USACE 404 Permit is triggered by moving (discharging) or placing materials—such as dirt, rock, geotextiles, concrete or culverts—into or within USACE jurisdictional areas. This type of activity is also referred to as a “discharge of dredged or fill material.”

401 Certification (Regional Water Quality Control Board)

If your project requires a USACE 404 Permit, then you will also need a Regional Water Quality Control Board (RWQCB) 401 Certification. The federal Clean Water Act, in Section 401, specifies that states must certify that any activity subject to a permit issued by a federal agency, such as the USACE, meets all state water quality standards. In California, the state and regional water boards are responsible for certification of activities subject to USACE Section 404 Permits.

Permit Trigger: A RWQCB 401 Certification is triggered whenever a USACE 404 Permit is required, or whenever an activity could cause a discharge of dredged or fill material into waters of the U.S. or wetlands.

Streambed Alteration Agreement (California Department of Fish and Game)

If your project includes alteration of the bed, banks or channel of a stream, or the adjacent riparian vegetation, then you may need a Streambed Alteration Agreement from the California Department of Fish and Game (CDFG). The California Fish and Game Code, Sections 1600-1616, regulates activities that would alter the flow, bed, banks, channel or associated riparian areas of a river, stream or lake. The law requires any person, state or local governmental agency or public utility to notify CDFG before beginning an activity that will substantially modify a river, stream or lake.

Permit Triggers: A Streambed Alteration Agreement (SAA) is triggered when a project involves altering a stream or disturbing riparian vegetation, including any of the following activities:

- Substantially obstructing or diverting the natural flow of a river, stream or lake
- Using any material from these areas
- Disposing of waste where it can move into these areas

Some projects that involve routine maintenance may qualify for long-term maintenance agreements from CDFG. Discuss this option with CDFG staff.

Ventura County General Plan

The Ventura County General Plan contains policies which also strongly protect wetland habitats.

Biological Resources Policy 1.5.2-3 states:

> Discretionary development that is proposed to be located within 300 feet of a marsh, small wash, intermittent lake, intermittent stream, spring, or perennial stream (as identified on the latest USGS 7½ minute quad map), shall be evaluated by a County approved biologist for potential impacts on wetland habitats. Discretionary development that would have a significant impact on significant wetland habitats shall be prohibited, unless mitigation measures are adopted that would reduce the impact to a less than significant level; or for lands designated "Urban" or "Existing Community", a statement of overriding considerations is adopted by the decision-making body.

Biological Resources Policy 1.5.2-4 states:

> Discretionary development shall be sited a minimum of 100 feet from significant wetland habitats to mitigate the potential impacts on said habitats. Buffer areas may be increased or decreased upon evaluation and recommendation by a qualified biologist and approval by the decision-making body. Factors to be used in determining adjustment of the 100 foot buffer include soil type, slope stability, drainage patterns, presence or absence of endangered, threatened or rare plants or animals, and compatibility of the proposed development with the wildlife use of the wetland habitat area. The requirement of a buffer (setback) shall not preclude the use of replacement as a mitigation when there is no other feasible alternative to allowing a permitted use, and if the replacement results in no net loss of wetland habitat. Such replacement shall be "in kind" (i.e. same type and acreage), and provide wetland habitat of comparable biological value. On-site replacement shall be preferred wherever possible. The replacement plan shall be developed in consultation with California Department of Fish and Game.

Coastal Habitat Regulations

Ventura County's Coastal Area Plan and the Coastal Zoning Ordinance, which constitute the "Local Coastal Program" (LCP) for the unincorporated portions of Ventura County's coastal zone, ensure that the County's land use plans, zoning ordinances, zoning maps, and implemented actions meet the requirements of, and implement the provisions and polices of California's 1976 Coastal Act at the local level.

Environmentally Sensitive Habitats

The Coastal Act specifically calls for protection of "environmentally sensitive habitat areas" or ESHA, which it defines as: "Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments" (Section 30107.5).

Section 30240 of the Coastal Act states:

(a) "Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas."

(b) "Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas."

There are three important elements to the definition of ESHA. First, a geographic area can be designated ESHA either because of the presence of individual species of plants or animals or because of the presence of a particular habitat. Second, in order for an area to be designated as ESHA, the species or habitat must be either rare or it must be especially valuable. Finally, the area must be easily disturbed or degraded by human activities.

Protection of ESHA is of particular concern in the southeastern part of Ventura County, where the coastal zone extends inland (~5 miles) to include an extensive area of the Santa Monica Mountains. For ESHA identification in this location, the Coastal Commission, the agency charged with administering the Coastal Act, has described the habitats that are considered ESHA. A memo from a Coastal Commission biologist that describes ESHA in the Santa Monica Mountains can be found at: http://www.ventura.org/rma/planning/ceqa/bio_resource_review.html.

The County's Local Coastal Program outlines other specific protections to environmentally sensitive habitats in the Coastal Zone, such as to wetlands, riparian habitats, dunes, and upland habitats within the Santa Monica Mountains (M Overlay Zone). Protections in some cases are different for different segments of the coastal zone.

Copies of the Coastal Area Plan and the Coastal Zoning Ordinance can be found at: http://www.ventura.org/rma/planning/Programs/local.html.

Wildlife Migration Regulations

The Ventura County General Plan specifically includes wildlife migration corridors as an element of the region's significant biological resources. In addition, protecting habitat connectivity is critical to the success of special status species and other biological resource protections. Potential project impacts to wildlife migration are analyzed by biologists on a case-by-case basis. The issue involves both a macro-scale analysis—where routes used by large carnivores connecting very large core habitat areas may be impacted—as well as a micro-scale analysis—where a road or stream crossing may impact localized movement by many different animals.

Locally Important Species/Communities Regulations

Locally important species/communities are considered to be significant biological resources in the Ventura County General Plan.

Locally Important Species

The Ventura County General Plan defines a Locally Important Species as a plant or animal species that is not an endangered, threatened, or rare species, but is considered by qualified biologists to be a quality example or unique species within the County and region. The following criteria further define what local qualified biologists have determined to be Locally Important Species:

Locally Important Animal Species Criteria

Taxa for which habitat in Ventura County is crucial for their existence either globally or in Ventura County. This includes:

- Taxa for which the population(s) in Ventura County represents 10 percent or more of the known extant global distribution; or
- Taxa for which there are five or fewer *element occurrences*, or less than 1,000 individuals, or less than 2,000 acres of habitat that sustains populations in Ventura County; or,
- Native taxa that are generally declining throughout their range or are in danger of extirpation in Ventura County.

Locally Important Plant Species Criteria

- Taxa that are declining throughout the extent of their range AND have five (5) or fewer element occurrences in Ventura County.

The County maintains a list of locally important species, which can be found on the Planning Division website at: http://www.ventura.org/rma/planning/ceqa/bio_resource_review.html. *This list should not be considered comprehensive.* Any species that meets the criteria qualifies as locally important, whether or not it is included on this list.

Locally Important Communities

The Ventura County Initial Study Assessment Guidelines defines a locally important community as one that is considered by qualified biologists to be a quality example characteristic of or unique to the County or region, with this determination being made on a case-by-case basis. The County has not developed a list of locally important communities. Oak woodlands have however been deemed by the Ventura County Board of Supervisors to be a locally important community.

The state passed legislation in 2001, the Oak Woodland Conservation Act, to emphasize that oak woodlands are a vital and threatened statewide resource. In response, the County of Ventura prepared and adopted an Oak Woodland Management Plan that recommended, among other things, amending the County's Initial Study Assessment Guidelines to include an explicit reference to oak woodlands as part of its definition of locally important communities. The Board of Supervisors approved this management plan and its recommendations.

Appendix 2
Observed Species Tables

Species Observed					
Scientific name	**Common Name**	**Native**	**Observed in 2010**	**Observed in 2016**	**Notes**
PLANTS					
Ferns and Allies					
Pellaea andromedifolia	coffee fern	Y	X		
Pentagramma triangularis	goldenback fern	Y	X	X	
Selaginella bigelovii	Bigelow's spike-moss	Y	X	X	
Monocots					
Agrostis microphylla	small-leaf bentgrass	Y	X		
Allium peninsulare var. *peninsulare*	purple wild onion	Y	X		
Avena barbata	slender oat	N	X	X	
Bloomeria crocea	common goldenstar	Y	X		
Bromus catharticus	rescue brome	N	X		
Bromus diandrus	ripgut brome	N	X	X	
Bromus hordeaceus	soft chess	N	X		
Bromus madritensis ssp. *rubens*	red brome	N	X	X	
Calochortus catalinae	**Catalina mariposa-lily**	**Y**	**X**		**CNPS listed 4.2, not observed in 2016 potentially as a result of recent fire.**
Chlorogalum pomeridianum var. *pomeridianum*	wavy-leaf soap plant	Y	X		
Cynodon dactylon	Bermuda grass	N	X	X	
Cyperus eragrostis	nutsedge	Y	X	X	

Dichelostemma capitatum	bluedicks	Y	X	X	
Hordeum murinum ssp. *leporinum*	hare barley	N	X		
Lamarckia aurea	goldentop grass	N	X		
Leymus condensatus	giant wildrye	Y	X	X	
Melica imperfecta	Coast Range melic	Y	X	X	
Nassella pulchra	purple needlegrass	Y	X		
Pennisetum setaceum	African fountaingrass	N	X		
Piptatherum miliaceum	smilo grass	N	X	X	
Poa secunda ssp. *secunda*	one-sided bluegrass	Y	X		
Schismus barbatus	Mediterranean splitgrass	N	X		
Vulpia microstachys var. *ciliata*	Eastwood's fescue	Y	X		
Yucca whipplei	Whipple's yucca	Y	X	X	
Dicots					
Achillea millefolium	common yarrow	Y	X		
Acourtia microcephala	scapellote	Y	X	X	
Adenostoma fasciculatum	chamise	Y	X	X	
Anagallis arvensis	scarlet pimpernel	N	X		
Anthemis arvensis	dog-fennel	N	X		
Apiastrum angustifolium	wild celery	Y	X	X	
Artemisia californica	California sagebrush	Y	X	X	
Artemisia douglasiana	mugwort	Y	X	X	
Asclepias fascicularis	narrow-leaf milkweed	Y	X		
Atriplex lentiformis	quailbush	Y	X	X	
Baccharis pilularis	coyote bush	Y	X	X	
Baccharis salicifolia	mulefat	Y	X	X	
Brassica nigra	black mustard	N	X	X	
Brickellia californica	California brickellbush	Y	X	X	

Calystegia macrostegia sp.	coast/island morning-glory	Y	X	X	
Carduus pycnocephalus	Italian thistle	N	X	X	
Ceanothus crassifolius	hoaryleaf ceanothus	Y	X	X	Ceanothus sp. observed in 2016, indistinguishable due to fire.
Ceanothus megacarpus	big pod ceanothus	Y	X		
Centaurea melitensis	tocolote	N	X	X	
Cercocarpus betuloides var. betuloides	mountain mahogony	Y	X	X	
Chamaesyce albomarginata	rattlesnake weed	Y	X	X	
Chenopodium album	lamb's quarters	N	X		
Clarkia bottae	punch-bowl clarkia	Y	X		
Collinsia parryi	Parry's blue-eyed Mary	Y	X		
Conium maculatum	poison hemlock	N	X	X	
Convolvulus arvensis	field bindweed	N	X		
Corethrogyne filaginifolia	California aster	Y	X		
Crassula connata	pigmy weed	Y	X		
Cryptantha intermedia	common cryptantha	Y	X		
Cryptantha muricata	muricate cryptantha	Y	X		
Deinandra fasciculata	clustered tarplant	Y	X	X	
Descurainia pinnata ssp. *glabra*	smooth western tansy mustard	Y	X		
Dodecatheon clevelandii ssp. sanctarum	coastal shooting-star	Y	X		
***Dudleya blochmaniae* ssp. blochmaniae**	**Blochman's dudleya**	**Y**	**X**		**CNPS Listed, not observed in 2016 potentially as a result of recent fire.**

Dudleya lanceolata	lance-leaved dudleya	Y	X	X	
Dudleya pulverulenta	chalk live-forever	Y	X	X	
Encelia californica	California bush sunflower	Y	X		
Epilobium canum ssp. *canum*	gray California fuschia	Y	X		
Eriastrum sapphirinum	sapphire woolystar	Y	X		
Eriogonum cinereum	ashy-leaf buckwheat	Y	X	X	
Eriogonum crocatum	**Conejo buckwheat**	**Y**	**X**	**X**	**California Rare; CNPS List 1B.2**
Eriogonum fasciculatum var. *foliolosum*	red-topped buckwheat	Y	X	X	
Eriophyllum confertiflorum var. *confertiflorum*	golden yarrow	Y	X		
Erodium cicutarium	red-stem filaree	N	X	X	
Eucrypta chrysanthemifolia var. *chrysanthemifolia*	spotted hideseed	Y	X		
Foeniculum vulgare	fennel	N	X	X	
Galium angustifolium ssp. *angustifolium*	narrow-leaf bedstraw	Y	X		
Galium aparine	goose-grass	Y	X		
Gilia angelensis	chaparral gily-flower	Y	X		
Gnaphalium californicum	California everlasting	Y	X		
Hazardia squarrosa var. *grindelioides*	saw-toothed goldenbush	Y	X	X	
Helminthotheca echioides	bristly ox-tongue	N	X		
Heteromeles arbutifolia	toyon	Y	X	X	
Hirschfeldia incana	short-pod mustard	N	X	X	
Isocoma menziesii	coastal goldenbush	Y	X		
Juglans californica	**southern California black walnut**	**Y**	**X**	**X**	**CNPS List 4.2**
Lactuca saligna	willow-lettuce	N	X		

Lactuca serriola	prickly lettuce	N	X		
Lasthenia californica ssp. *californica*	California goldfields	Y	X		
Leptosyne gigantea	giant coreopsis	Y	X		
Logfia filaginoides	California cottonrose	Y	X		
Lotus scoparius var. *scoparius*	deerweed	Y	X	X	
Lotus strigosus	bishop's lotus	Y	X		
Malacothamnus fasciculatus var. *fasciculatus*	chaparral bush mallow	Y	X	X	
Malacothrix saxatilis var. *tenuifolia*	short leaved cliff aster	Y	X	X	
Malosma laurina	laurel sumac	Y	X	X	
Malva parviflora	cheese weed	N	X	X	
Marah macrocarpus var. *macrocarpus*	big-fruited man-root	Y	X	X	
Medicago polymorpha	burclover	N	X	X	
Melilotus albus	white melilot	N	X		
Melilotus indicus	yellow sweet-clover	N	X		
Mimulus aurantiacus var. pubescens	southern bush monkeyflower	Y	X		
Mimulus cardinalis	scarlet monkey flower	Y		X	
Minuartia douglasii	Douglass's stichwort	Y	X		
Mirabilis laevis var. *crassifolia*	California wishbone bush	Y	X	X	
Nicotiana glauca	tree tobacco	N	X	X	
Opuntia littoralis	coast prickly-pear	Y	X	X	
Oxalis pes-caprae	Cape sorrel	N	X	X	
Phacelia cicutaria	caterpillar phacelia	Y	X	X	Phacelia sp. observed in 2016

Phacelia ramosissima	branching phacelia	Y	X		
Phacelia viscida	sticky phacelia	Y	X		
Polygonum aviculare	prostrate knotweed	N	X	X	
Populus fremontii ssp. *fremontii*	Fremont cottonwood	Y	X		
Pterostegia drymarioides	fairy mist	Y	X		
Quercus agrifolia var. *agrifolia*	coast live oak	Y	X	X	
Rafinesquia californica	California chicory	Y	X		
Rhamnus ilicifolia	holly-leaf redberry	Y	X	X	
Rhus integrifolia	lemonade berry	Y	X		
Rhus ovata	sugar bush	Y	X	X	
Ricinus communis	castor-bean	N	X	X	
Rumex crispus	curly dock	N	X		
Salix laevigata	red willow	Y	X	X	
Salix lasiolepis	arroyo willow	Y	X	X	
Salsola tragus	Russian-thistle	N	X	X	
Salvia apiana	white sage	Y	X	X	
Salvia leucophylla	purple sage	Y	X	X	
Salvia mellifera	black sage	Y	X	X	
Sambucus nigra ssp. *caerulea*	blue elderberry	Y	X		
Sanicula crassicaulis	Pacific sanicle	Y	X		
Schoenoplectus acutus var. *occidentalis*	tule	Y		X	
Senecio vulgaris	common groundsel	N	X		
Silene gallica	windmill pink	N	X		
Silene laciniata ssp. *laciniata*	fringed Indian-pink	Y	X		
Sisymbrium orientale	eastern rocket	N	X		

Solanum xanti	chaparral nightshade	Y			
Sonchus oleraceus	common sow thistle	N			
Stachys ajugoides var. *rigida*	rigid woodmint	Y			
Stylocline gnaphaloides	everlasting nest-straw	Y			
Thysanocarpus laciniatus	narrow-leaf fringepod	Y	X	X	
Toxicodendron diversilobum	poison oak	Y	X	X	
Trifolium willdenovii	tomcat clover	Y	X		
Typha latifolia -	broadleaf cattail	Y		X	
Uropappus lindleyi	silver puffs	Y	X		
Venegasia carpesioides	canyon sunflower	Y	X		
Verbena lasiostachys var. *lasiostachys*	western vervain	Y	X		
Xanthium spinosum	spiny cocklebur	Y	X		
Xanthium strumarium	cocklebur	Y	X	X	
ANIMALS					
Amphibians					
Lithobates catesbeianus	American bullfrog	N	X		
Reptiles					
Aspidoscelis tigris stejnegeri	**coastal whiptail**	**Y**	**X**	**X**	**CDFW SSC**
Crotalus helleri	southern pacific rattlesnake	Y	X		
Elgaria multicarinata webbii	San Diego alligator lizard	Y	X		
Pituophis catenifer annectens	San Diego gopher snake	Y	X	X	
Sceloporus occidentalis	western fence lizard	Y		X	
Trachemys scripta elegans	red-eared slider	N	X		
Uta stansburiana elegans	California side-blotched	Y	X	X	

	lizard				
Birds					
Accipiter striatus	**sharp-shinned hawk**	**Y**		**X**	**CDFW WL, observed in 2016 by BRC**
Aeronautes saxatalis	white-throated swift	Y	X	X	
Agelaius phoeniceus	red-winged blackbird	Y	X		
Anas platyrhynchos	mallard	Y	X		
Anas strepera	gadwall	Y	X		
Anthus rubescens	American pipit			X	
Aphelocoma californica	California scrub-Jay		X	X	
Ardea alba	great egret	Y	X		
Ardea herodias	great blue heron	Y	X		
Aythya collaris	ring-necked duck			X	
Baeolophus inornatus	oak titmouse	Y	X		
Buteo jamaicensis	red-tailed hawk	Y	X	X	
Butorides virescens	green heron	Y	X		
Callipepla californica	California quail	Y	X		
Calypte anna	Anna's Hummingbird		X	X	
Carduelis psaltria	lesser goldfinch	Y	X		
Carduelis tristis	American goldfinch	Y	X		
Cathartes aura	turkey vulture	Y	X		
Catharus guttatus	hermit thrush	Y	X		
Catherpes mexicanus	canyon wren	Y	X	X	
Chamaea fasciata	wrentit	Y	X		
Charadrius vociferus	killdeer	Y	X		
Chondestes grammacus	lark sparrow			X	
Chordeiles acutipennis	lesser nighthawk	Y	X		
Colaptes auratus	northern flicker			X	

Columba livia	rock pigeon	Y	X		
Columbina passerina	common ground-dove	Y	X		
Contopus sordidulus	western wood-pewee	Y	X		
Corvus brachyrhynchos	American crow	Y	X	X	
Corvus corax	common raven	Y	X		
Dendroica occidentalis	hermit warbler	Y	X		
Dendroica petechia	**yellow warbler**	**Y**	**X**		**SSC, not observed in 2016.**
Empidonax difficilis	Pacific-slope flycatcher	Y	X		
Euphagus cyanocephalus	Brewer's blackbird	Y	X		
Falco sparverius	American kestrel	Y	X	X	
Fulica americana	American coot	Y	X	X	
Geococcyx californianus	greater roadrunner	Y	X		
Geothlypis trichas	common yellowthroat	Y	X		
Haemorhous mexicanus	house Finch	Y	X	X	
Hirundo rustica	barn swallow	Y	X		
Icterus bullockii	Bullock's oriole	Y	X		
Icterus cucullatus	hooded oriole	Y	X		
Junco hyemalis	Dark-eyed Junco	Y		X	
Lanius ludovicianus	**loggerhead Shrike**	**Y**		**X**	**CDFW SSC, observed in 2016 by BRC**
Megaceryle alcyon	belted kingfisher	Y	X		
Melospiza melodia	song sparrow	Y	X		
Melozone crissalis	California towhee	Y	X	X	
Mimus polyglottos	northern mockingbird	Y	X		
Molothrus ater	brown-headed cowbird	N	X		
Myiarchus cinerascens	ash-throated flycatcher	Y	X		
Nycticorax nycticorax	black-crowned night-heron	Y	X		

Oxyura jamaicensis	ruddy duck	Y		X	
Passerina amoena	lazuli bunting	Y	X		
Passerina caerulea	blue grosbeak	Y	X		
Petrochelidon pyrrhonota	cliff swallow	Y	X		
Phainopepla nitens	phainopepla	Y	X		
Phalacrocorax auritus	double-crested cormorant	Y	X		
Pheucticus melanocephalus	black-headed grosbeak	Y	X		
Picoides nuttallii	Nuttall's woodpecker	Y	X		
Picoides pubescens	downy woodpecker	Y	X		
Pipilo maculatus	spotted towhee	Y	X		
Podilymbus podiceps	pied-billed grebe	Y	X	X	
Polioptila caerulea	blue-gray Gnatcatcher	Y		X	
Porzana carolina	sora	Y		X	
Psaltriparus minimus	bushtit	Y	X		
Quiscalus mexicanus	great-tailed grackle	Y	X		
Salpinctes obsoletus	rock wren	Y	X	X	
Sayornis nigricans	Black phoebe	Y	X	X	
Sayornis saya	Say's phoebe	Y		X	
Selasphorus sasin	Allen's hummingbird	Y	X		
Sialia mexicana	western bluebird	Y		X	
Spinus psaltria	lesser goldfinch	Y		X	
Stelgidopteryx serripennis	northern rough-winged swallow	Y	X		
Turdus migratorius	American robin	Y		X	
Tyrannus verticalis	western kingbird	Y		X	
Tyto alba	barn owl	Y		X	
Yellow-rumped warbler	yellow-rumped warbler	Y		X	
Zenaida macroura	mourning dove	Y		X	

Zonotrichia leucophrys	white-crowned sparrow	Y		X	
Mammals					
Canis latrans	coyote	Y	X	X	
Chaetodipus californicus	California pocket mouse	Y	X		
Lynx rufus	bobcat	Y	X		
Neotoma fuscipes	dusky-footed woodrat	Y	X	X	
Neotoma lepida intermedia	**San Diego desert woodrat**	**Y**	**X**	**X**	**CDFW SSC, trapped in 2010; middens observed in 2016 by BRC**
Odocoileus hemionus	mule deer	Y	X		
Peromyscus californicus	California mouse	Y	X		
Peromyscus eremicus	cactus mouse	Y	X		
Peromyscus maniculatus	deer mouse	Y	X		
Spermophilus beecheyi	California ground squirrel	Y	X	X	
Sylvilagus audubonii	desert cottontail	Y	X	X	
Thomomys bottae	Botta's pocket gopher	Y	X	X	

APPENDIX C-2

PACIFIC ROCK QUARRY EXPANSION PROJECT:
JUNE 2018 RARE PLANT SURVEY AND BURROWING OWL HABITAT
ASSESSMENT RESULTS MEMORANDUM

BENCHMARK
RESOURCES

ESA

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Memorandum

date October 23, 2018

to Bob Delp, Benchmark Resources

from Dale Hameister, Senior Biologist, ESA
Greg Ainsworth, Director of Biological Resources, ESA

subject Pacific Rock Quarry Expansion Project: June 18 Rare Plant Survey and Burrowing Owl Habitat Assessment Results

Introduction

This technical memorandum describes the methods and results of a rare plant survey and burrowing owl habitat assessment conducted by Environmental Science Associates, Inc. (ESA) in June of 2018 to provide information in support of the environmental impact report (EIR) being prepared for the proposed Pacific Rock Quarry Expansion Project (project).

Approval of the project is subject to discretionary review by the County of Ventura (County), requiring environmental review in compliance with the California Environmental Quality Act (CEQA). ESA is subcontracted to Benchmark Resources which is contracted with the County to prepare the an EIR for the project. Because the project would expand mining operations to areas with the potential to contain habitat and species with special status under federal, state, and or local regulations, an assessment of these habitats and potential special-status species occurrence is required. The application materials include a 2017 Initial Study Biological Assessment (ISBA) prepared by BioResources Consultants, Inc., on behalf of the applicant. Upon review of that report, the County determined that supplemental information including rare plant surveys and burrowing owl habitat surveys are necessary to provide information for the EIR. The survey results documented herein are intended for use by ESA and Benchmark Resources in preparing the biological resources impact assessment for the EIR.

Project Overview

The proposed project includes a modification to the existing Conditional Use Permit (CUP) and the approval of an amended Reclamation Plan to authorize the expansion of ongoing mining operations at the Pacific Rock Quarry. The project site is located on Howard Road in unincorporated Ventura County, California, south of the city of Camarillo, south of State Highway 101, and north of Portero Road (**Attachment A, Figure 1**), immediately to the east of active agricultural fields and the Conejo Mountain Funeral Home, Memorial Park & Crematory (**Attachment A, Figure 2)**.

As proposed, mining would occur over an approximately 172.8-acre area (entirely within APNs 234006022 and 234006019). Mining operations would continue in the same manner as under current operations, involving blasting to loosen the hard rock material and various processing methods.

Methodology

Literature Review

ESA conducted a literature review to gather information on the natural resources and special status species known or likely to occur in the area. This included a review of the following:

- Initial Study Biological Assessment (ISBA), BioResource Consultants, Inc. Report Revised February 16, 2017.
- California Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB). Accessed May, 2018.
- CDFW. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities, March 20, 2018
- United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPac) Environmental Conservation Online System (ECOS). Accessed May, 2018.

Rare Plant Survey

ESA biologists/botanists Robert Sweet and Dale Hameister led a plant survey on the project site on June 4, 5 and 6, 2018. The survey included the entire mine area boundary, including areas within the existing CUP and existing mining areas, as well as an approximately 200 ft. “buffer” beyond the proposed project’s expansion limits (the combined expansion area and buffer are referred to herein as the “study area”). The survey focused primarily on rare plants; however, all species were inventoried (See **Attachment B**, **Species Compendium**).

The plant survey was conducted during the blooming periods of potentially-occurring special-status plant species (See **Table 1, Targeted Species for Rare Plant Survey**) and in accordance with the *CDFW Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW, March 20, 2018)*. A known reference site located approximately one-half mile from the project site that contains blooming populations of Blochman’s dudleya (*Dudleya blochmaniae ssp. blochmaniae*), Conejo buckwheat (*Eriogonum crocatum*), and Verity's dudleya (*Dudleya parva*), was surveyed and all three species were in full bloom at the time of the surveys. The study area includes steep slopes and vertical rock faces. Pedestrian transects spaced approximately 30 feet apart were walked in all accessible areas within the study area in search of any rare plants. Steep terrain that was not accessible is located at the northern portion of the expansion area, which was assessed from the nearest vantage point using binoculars. Biologists identified each plant to the species- or subspecies-level using a dichotomous key. Plant species observed are listed in Attachment A.

All wildlife species observed, including any sign such as scat, tracks, feathers, bones, etc. were documented and are listed in Attachment B, Observed Wildlife Species.

Burrowing Owl Habitat Assessment

The ISBA (BioResource Consultants, February 2017) concluded that western burrowing owl (*Athene cunicularia hypugaea*) are known to occur in the region, and therefore, have potential to occur within the low-lying grass-dominated areas located within the lower elevation of the study area. Therefore, during the plant survey, ESA biologists searched for any sign of burrowing owl presence, including any ground squirrel burrows capable of supporting burrowing owls, as well as feathers, scat, pellets, bone fragments, etc. Burrowing owls are also known to use man-made structures for wintering and breeding, such as irrigation pipes, culverts, and debris stockpiles, each of which are present within the site and were visually inspected during the survey.

Results

Rare Plant Survey

Ten special-status species were determined to have a high potential to occur in the study area based on the results of the CNDDB search and the presence of suitable habitat in the study area (e.g., coastal sage scrub, native soils, elevation, slope). Five of the special-status species were observed during the surveys: Catalina mariposa lily (*Calochortus catalinae*), club haired mariposa lily (*Calochortus clavatus* var. *clavatus*), Blochman’s dudleya (*Blochman's dudleya*), Conejo buckwheat (*Eriogonum crocatum*), and southern California black walnut (*Juglans californica*). As depicted in **Attachment A, Figure 3, Rare Plant Locations**, all of the rare plants were observed within the study area. Representative photographs of the habitat within the study area is provided in **Attachment C, Photographs**.

Table 1, Targeted Species for Rare Plant Survey, lists the ten special-status plant species and status, and identifies whether they were observed as present within the survey area and, if so, the general locations/terrain in which they were observed. **Table 2, Rare Plant Survey Results**, identifies the number of individual plants of each species observed within the study area.

Specifically, the two mariposa lily species were observed in clustered populations within the grassland areas in the southwest and southern portions of the study area that are dominated by short-pod mustard and non-native grasses including non-native compact brome (*Bromus madritensis*), wild oats (*Avena fatua*), and Harding grass (*Phalaris aquatica*). The Blochman’s dudleya were observed in large numbers on rock outcrops located in the eastern portion of the study area with smaller populations also observed within the rock outcrops located at the southwest portion of the study area. The areas where Blochman’s dudleya were observed were commonly associated with Bigelow’s spikemoss (*Selaginella bigelovii*) and compact brome. Conejo buckwheat was observed northern, eastern, and southern portions of the study area, generally on south-facing steep to vertical surfaces. The majority of the Conejo buckwheat was observed using binoculars from the nearest vantage point due to its presence on steep slopes that are not accessible.

TABLE 1:
TARGETED SPECIES FOR RARE PLANT SURVEY

Scientific Name	Common Names	Status Federal/State/CNPS	Present or Absent	Location Observed
Calochortus catalinae	Catalina mariposa-lily	None/None/4.2	Present	Observed within grassland slopes in the southern portion of the survey area.
Calochortus clavatus var. clavatus	Club haired mariposa-ily	None/None/4.3	Present	Observed within grassland slopes in the southern portion of the survey area.
Calochortus plummerae	Plummer's mariposa-lily	None/None/4.2	Absent	
Dudleya blochmaniae ssp. blochmaniae	Blochman's dudleya	None/None/1B.1	Present	Observed on flat tops of large boulders and steep to vertical surfaces in the east, and southwestern portions of the survey area. Commonly associated with Bigelow's spikemoss and compact brome in patches of soil on the flat tops of large rocks.
Dudleya parva	Verity's dudleya	FT/None/1B.1	Absent	
Eriogonum crocatum	Conejo buckwheat	None/Rare/1B.1	Present	Observed on generally south and east facing steep to vertical surfaces in the north, eastern and southern parts of the survey area.
Juglans californica	Southern California black walnut	None/None/4.2	Present	Observed within the drainage on the south side of the survey area.
Navarretia ojaiensis	Ojai navarretia	None/None/1B.1	Absent	
Pentachaeta lyonii	Lyon's pentachaeta	FE/ SE/1B.1	Absent	
Texosporium sancti-jacobi	woven-spored lichen	None/None/3	Absent	

Federal
FE = Endangered
FT = Threatened
State
SE = Endangered
ST = Threatened
CNPS - California Rare Plant Rank
1B. Rare or Endangered in California and elsewhere
3. Plants for which we need more information - Review list
4. Plants of limited distribution - Watch list

TABLE 2:
RARE PLANT SURVEY RESULTS

Scientific Name	Common Names	Number of Plants within Proposed CUP Boundary	Number of Plants within 200-foot Buffer Area
Calochortus catalinae	Catalina mariposa-lily	180	4
Calochortus clavatus var. clavatus	Club haired mariposa lily	13	
Dudleya blochmaniae ssp. blochmaniae	Blochman's dudleya	857	21
Eriogonum crocatum	Conejo buckwheat	54	35
Juglans californica	Southern California black walnut	6	

Burrowing Owl Habitat Assessment

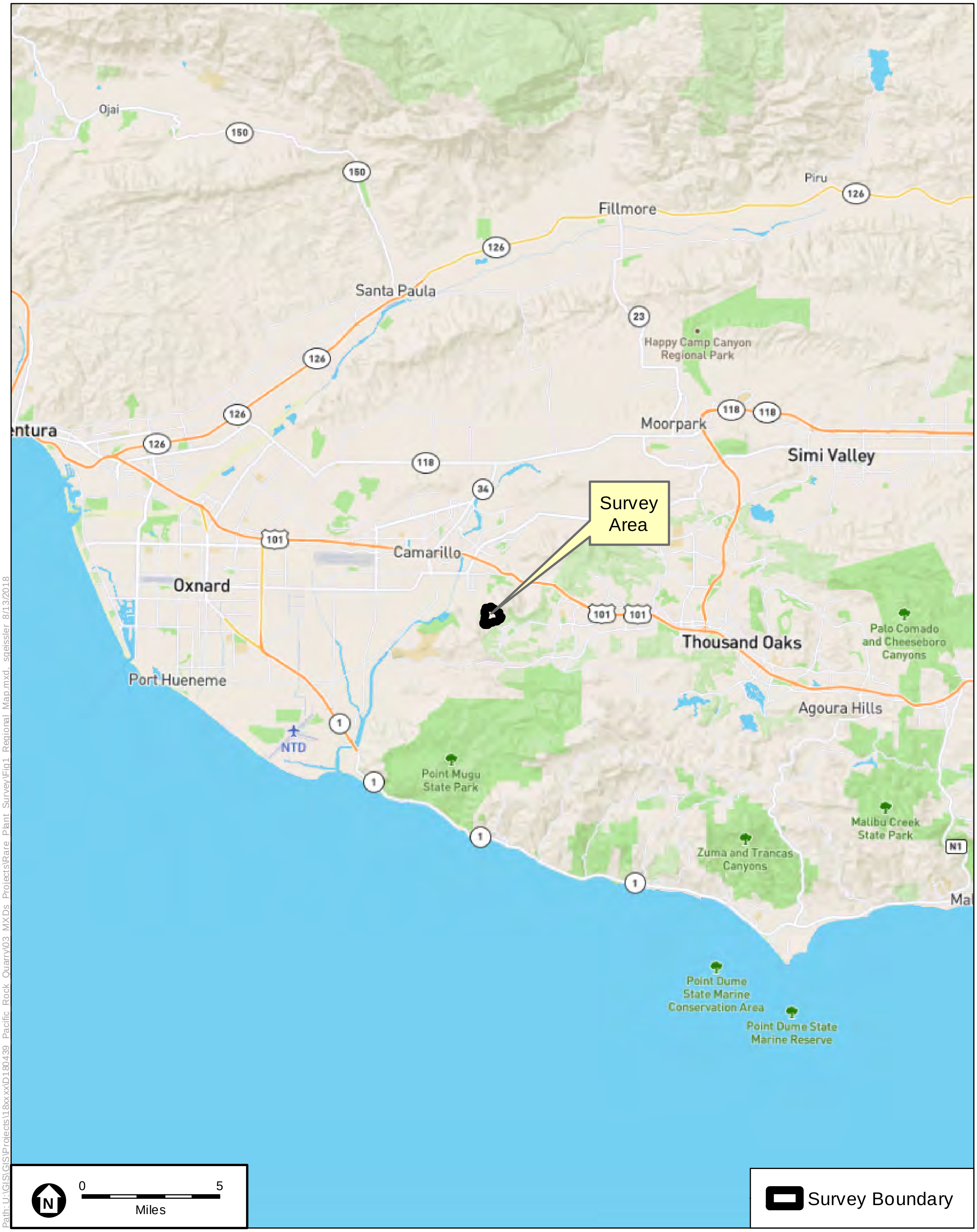
Burrowing owls generally occur on flat terrain; therefore, the study area provides marginal habitat for burrowing owls due to the presence of steep slopes in much of the site. No suitable burrows were observed within the study area and no burrowing owl individuals or sign of presence was observed; therefore, burrowing owls are not expected to occur within the study area.

The following common wildlife species were observed: reptiles - western fence lizard (*Sceloporus occidentalis*), southern Pacific rattlesnake (*Crotalus oreganus helleri*), and granite spiny lizard (*Sceloporus orcutti*); birds - red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), Anna's hummingbird (*Calypte anna*), Allen's hummingbird (*Selasphorus sasin*), mourning dove (*Zenaida macroura*), Nuttall's woodpecker (Picoides nuttallii), Western scrub-jay (*Aphelocoma californica*), common raven (*Corvus corax*), bushtit (*Psaltriparus minimus*), northern mockingbird (Mimus polyglottos), California towhee (*Pipilo crissalis*), house finch (*Carpodacus mexicanus*), Bewick's wren (*Thryomanes bewickii*), and lesser goldfinch (*Carduelis psaltria*); mammals - desert cottontail (*Sylvilagus audubonii*), and sign of coyote (*Canis latrans*) and southern mule deer (*Odocoileus hemionus*).

Several species of common waterfowl and wading birds were observed at the basin/pond in the western portion of the study area, including American coot (*Fulica americana*), mallard (*Anas platyrhynchos*), ruddy duck (*Oxyura jamaicensis*), and black-crowned night heron (*Nycticorax nycticorax*). A complete list of wildlife species observed during the field surveys is provided in Attachment B, Species Compendium.

‘

Attachment A
Figures

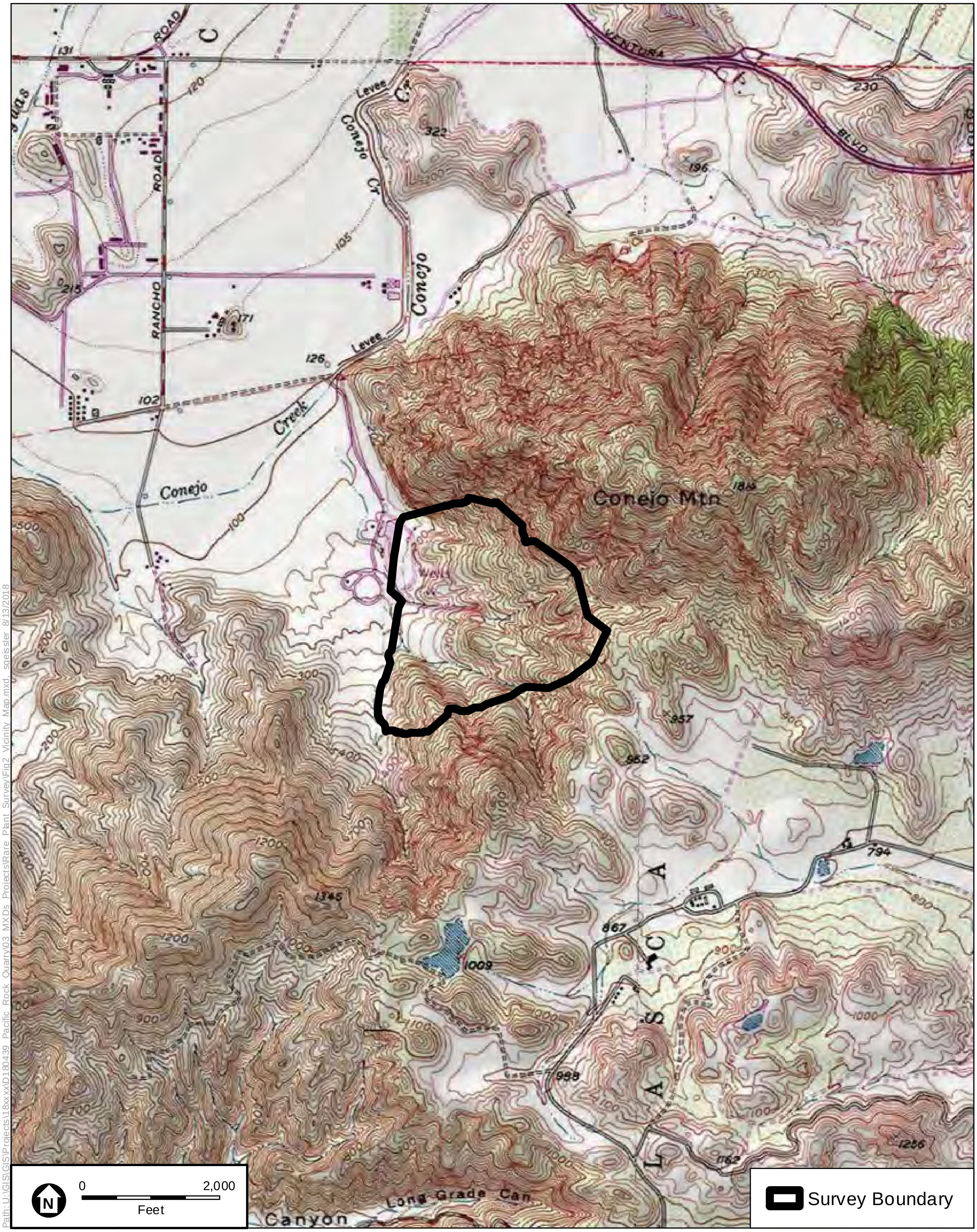


SOURCE: Open Street Map, 2018.

Pacific Rock Quarry Mine Expansion

Figure 1
Regional Map

ESA

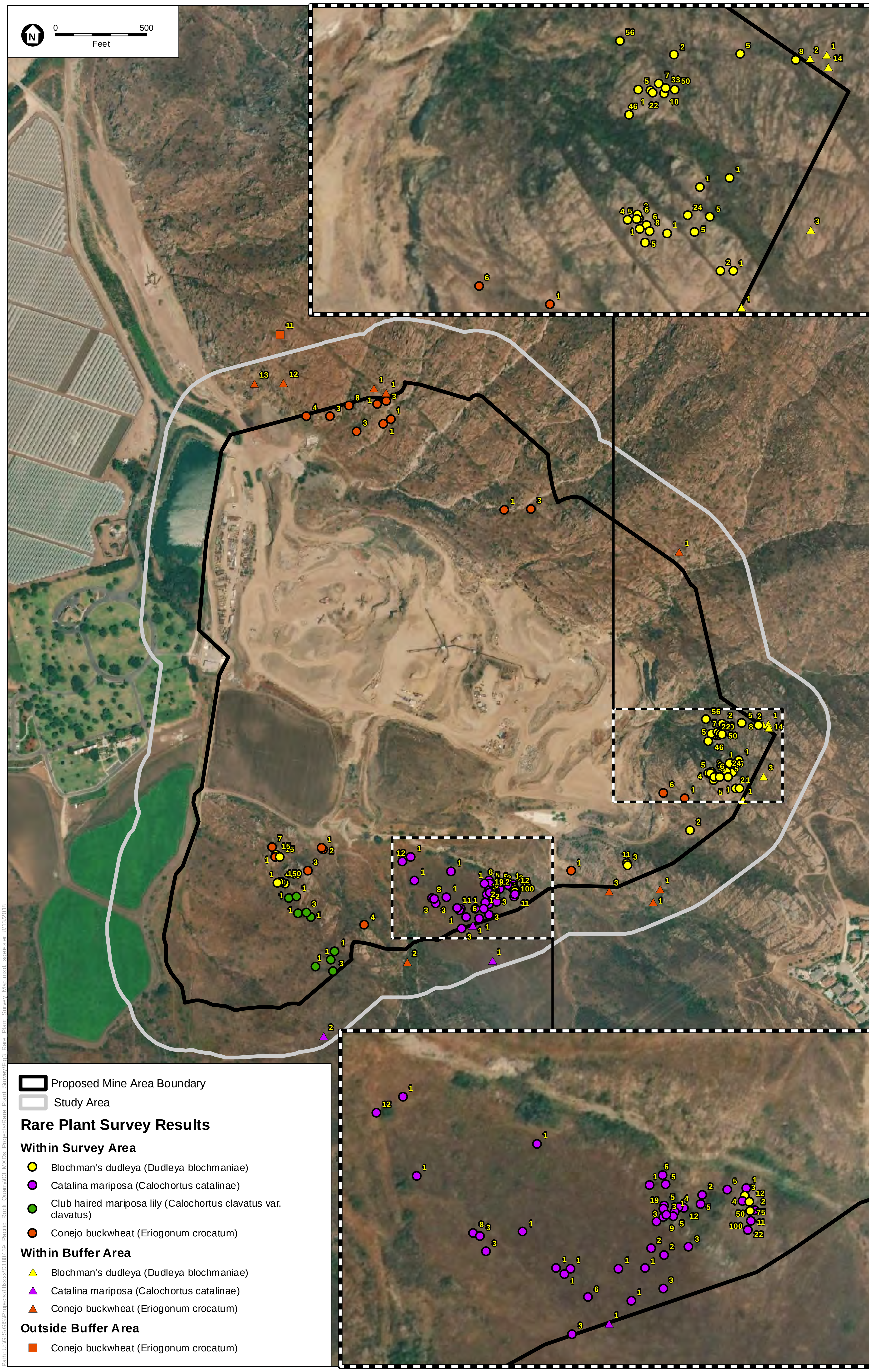


SOURCE: USGS Topographic Series (Camarillo, Newbury Park, CA).

Pacific Rock Quarry Mine Expansion

Figure 2
Vicinity Map

ESA



SOURCE: ESRI, 2018.

Pacific Rock Quarry Mine Expansion

Figure 3
Rare Plant Survey Map

ESA

Attachment B
Species Compendium

Pacific Rock Plant Species Compendia

Scientific Name	Common Name	Special Status
LYCOPHYTES		
Selaginellaceae - Spike-moss family		
Selaginella bigelovii	Bushy spike-moss	
FERNS		
Pteridaceae - Brake family		
Cheilanthes newberryi	Newberry's lip fern	
EUDICOTS		
Aizoaceae - Fig-marigold family		
* *Carpobrotus edulis*	Freeway iceplant	
Anacardiaceae - Sumac Or Cashew family		
Malosma laurina	Laurel sumac	
Rhus aromatica	Skunk bush	
Rhus integrifolia	Lemonade berry	
Rhus ovata	Sugar bush	
Toxicodendron diversilobum	Western poison oak	
Apiaceae - Carrot family		
* *Conium maculatum*	Poison hemlock	
Sanicula crassicaulis	Pacific blacksnakeroot	
Apocynaceae - Dogbane family		
Asclepias fascicularis	Narrow-leaf milkweed	
Asteraceae - Sunflower family		
Ambrosia dumosa	White bur-sage	
Anaphalis margaritacea	Western pearly everlasting	
Artemisia californica	California sagebrush	
Artemisia douglasiana	Mugwort	
Baccharis salicifolia ssp. salicifolia	Mule fat	
* *Centaurea melitensis*	Tocalote	
Deinandra fasciculata	Clustered tarweed	
Encelia californica	California brittlebush	
* *Erigeron bonariensis*	Flax-leaved horseweed	
Erigeron canadensis	Horseweed	
Eriophyllum confertiflorum	Golden-yarrow, yellow-yarrow	
Hazardia squarrosa	Saw-toothed goldenbush	
Helianthus annuus	Common sunflower	
Isocoma menziesii	Coastal goldenbush	
* *Lactuca serriola*	Prickly lettuce	

Scientific Name	Common Name	Special Status
Lasthenia californica	California goldfields	
* *Logfia gallica*	Daggerleaf cottonrose	
Microseris douglasii	Douglas' silverpuffs	
Pseudognaphalium beneolens		
* *Pseudognaphalium luteoalbum*	Jersey cudweed	
* *Sonchus asper ssp. asper*	Prickly sow thistle	
* *Sonchus oleraceus*	Common sow thistle	
Venegasia carpesioides	Canyon sunflower	
Boraginaceae - Borage family		
Cryptantha sp.	Cryptantha	
Phacelia cicutaria var. hispida	Caterpillar phacelia	
Phacelia parryi	Parry's phacelia	
Brassicaceae - Mustard family		
* *Brassica rapa*	Turnip, field mustard	
* *Hirschfeldia incana*	Shortpod mustard	
Lepidium densiflorum	Common pepperweed	
* *Sisymbrium irio*	London rocket	
Cactaceae - Cactus family		
Opuntia littoralis	Coastal prickly-pear	
Chenopodiaceae - Goosefoot family		
* *Chenopodium album*	Lamb's quarters	
* *Salsola tragus*	Russian thistle, tumbleweed	
Convolvulaceae - Morning-glory family		
Calystegia macrostegia	Island false bindweed	
Cuscuta californica	Chaparral dodder	
Crassulaceae - Stonecrop family		
Dudleya blochmaniae ssp. blochmaniae	Blochman's dudleya	CRPR 1B.1
Dudleya cymosa	Canyon liveforever	
Dudleya pulverulenta	Chalk dudleya	
Cucurbitaceae - Gourd family		
Marah macrocarpa	Chilicothe	
Euphorbiaceae - Spurge family		
Croton setigerus	Turkey-Mullein	
* *Ricinus communis*	Castorbean	
Fabaceae - Legume family		
Acmispon argophyllus	Silver bird's-foot trefoil	
Acmispon glaber	Deerweed, California broom	
Lupinus succulentus	Arroyo lupine	

Scientific Name	Common Name	Special Status
* *Melilotus indicus*	Sourclover	
* *Trifolium hirtum*	Rose clover	
Fagaceae - Oak family		
Quercus agrifolia	Coast live oak, encina	
Geraniaceae - Geranium family		
* *Erodium cicutarium*	Redstem filaree	
Grossulariaceae - Gooseberry family		
Ribes malvaceum	Chaparral currant	
Juglandaceae - Walnut family		
Juglans californica	Southern California black walnut	CRPR 4.2
Lamiaceae - Mint family		
Salvia columbariae	Chia	
Salvia leucophylla	Purple sage	
Salvia mellifera	Black sage	
Malvaceae - Mallow family		
Malacothamnus fasciculatus	Chaparral mallow	
* *Malva parviflora*	Cheeseweed, little mallow	
Nyctaginaceae - Four O'clock family		
Mirabilis laevis var. crassifolia	Wishbone bush	
Onagraceae - Evening Primrose family		
Clarkia bottae	Punchbowl godetia	
Epilobium ciliatum	Fringed willowherb	
Orobanchaceae - Broom-rape family		
Castilleja affinis	Coast indian paintbrush	
Castilleja exserta	Purple owl's-clover	
Oxalidaceae - Oxalis family		
* *Oxalis pes-caprae*	Bermuda buttercup	
Phrymaceae - Lopseed family		
Diplacus aurantiacus	Stickly monkeyflower	
Erythanthe cardinalis	Scarlet monkeyflower	
Plantaginaceae - Plantain family		
Antirrhinum nuttallianum		
Collinsia concolor	Chinese houses	
Polygonaceae - Buckwheat family		
Eriogonum cinereum	Coastal wild buckwheat	
Eriogonum crocatum	Conejo buckwheat	SR, CRPR 1B.2
Eriogonum fasciculatum	California buckwheat	
* *Rumex crispus*	Curly dock	

Scientific Name	Common Name	Special Status
Primulaceae - Primrose family		
Dodecatheon clevelandii	Padre's shooting star	
Ranunculaceae - Buttercup family		
Delphinium parryi ssp. parryi	Parry's larkspur	
Rhamnaceae - Buckthorn family		
Ceanothus megacarpus	Bigpod ceanothus	
Frangula californica	California coffee berry	
Rhamnus ilicifolia	Hollyleaf redberry	
Rosaceae - Rose family		
Adenostoma fasciculatum	Chamise, greasewood	
Cercocarpus betuloides		
Rubiaceae - Madder family		
Galium angustifolium	Narrowly leaved bedstraw	
Salicaceae - Willow family		
Salix exigua	Narrowleaf willow	
Salix gooddingii	Goodding's black willow	
Salix laevigata	Red willow	
Salix lasiolepis	Arroyo willow	
Solanaceae - Nightshade family		
Datura wrightii	Sacred thorn-apple	
* *Nicotiana glauca*	Tree tobacco	
Solanum americanum	American black nightshade	
Solanum umbelliferum	Bluewitch nightshade	
Tamaricaceae - Tamarisk family		
* *Tamarix ramosissima*	Saltcedar	
Valerianaceae - Valerian family		
Valeriana occidentalis	Western valerian	
MONOCOTS		
Agavaceae - Century Plant family		
Hesperoyucca whipplei	Chaparral yucca	
Arecaceae - Palm family		
Washingtonia filifera	California fan palm	
* *Washingtonia robusta*	Mexican fan palm	
Cyperaceae - Sedge family		
Cyperus eragrostis	Tall flatsedge	
Schoenoplectus californicus	Southern bulrush	
Iridaceae - Iris family		
Sisyrinchium bellum	Western blue-eyed-grass	

Scientific Name	Common Name	Special Status
Liliaceae - Lily family		
Calochortus catalinae	Catalina mariposa lily	CRPR 4.2
Calochortus clavatus var. clavatus	Club-haired mariposa lily	CRPR 4.3
Poaceae - Grass family		
* *Avena barbata*	Slender wild oat	
* *Avena fatua*	Wild oat	
* *Bromus diandrus*	Ripgut grass	
* *Bromus madritensis*	Compact brome	
Elymus condensatus	Giant wild-rye	
Festuca microstachys	Pacific fescue	
* *Festuca myuros*	Rattail sixweeks grass	
* *Lamarckia aurea*	Goldentop grass	
Melica imperfecta	Little California melica	
* *Pennisetum setaceum*	Crimson fountain grass	
* *Phalaris aquatica*	Harding grass	
* *Polypogon monspeliensis*	Annual beard grass, rabbitfoot grass	
Stipa lepida	Foothill needle grass	
Stipa pulchra	Purple needle grass	
Themidaceae - Brodiaea family		
Bloomeria crocea	Common goldenstar	
Dichelostemma capitatum	Blue dicks	
Typhaceae - Cattail family		
Typha domingensis	Southern cattail	

Scientific Name	Common Name	Special Status

Legend

*= Non-native or invasive species

Special Status:

Federal:
FE = Endangered
FT = Threatened

State:
SE = Endangered
ST =Threatened

CRPR – California Rare Plant Rank
1A. Presumed extinct in California
1B. Rare or Endangered in California and elsewhere
2. Rare or Endangered in California, more common elsewhere
3. Plants for which we need more information - Review list
4. Plants of limited distribution - Watch list

Threat Ranks
.1 - Seriously endangered in California
.2 – Fairly endangered in California

Scientific Name	Common Name	Special Status
VERTEBRATES		
Reptiles		
Sceloporus occidentalis	Western Fence Lizard	
Sceloporus orcutti	Granite Spiny Lizard	
Uta stansburiana	Side-blotched Lizard	
Aspidoscelis tigris multiscutatus	Coastal Western Whiptail	
Crotalus oreganus helleri	Southern Pacific Rattlesnake	
Birds		
Anas platyrhynchos	Mallard	
Oxyura jamaicensis	Ruddy Duck	
Ardea herodias	Great Blue Heron	
Ardea alba	Great Egret	
Egretta thula	Snowy Egret	
Nycticorax nycticorax	Black-crowned Night-Heron	
Cathartes aura	Turkey Vulture	
Buteo lineatus	Red-shouldered Hawk	
Buteo jamaicensis	Red-tailed Hawk	
Falco sparverius	American Kestrel	
Fulica americana	American Coot	
**Columba livia*	Rock Pigeon	
**Streptopelia decaocto*	Eurasian Collared-Dove	
Zenaida macroura	Mourning Dove	
Bubo virginianus	Great Horned Owl	
Calypte anna	Anna's Hummingbird	
Selasphorus sasin	Allen's Hummingbird	
Picoides nuttallii	Nuttall's Woodpecker	
Sayornis nigricans	Black Phoebe	
Sayornis saya	Say's Phoebe	
Tyrannus vociferans	Cassin's Kingbird	
Aphelocoma californica	Western Scrub-Jay	
Corvus brachyrhynchos	American Crow	
Corvus corax	Common Raven	

Scientific Name	Common Name	Special Status
Stelgidopteryx serripennis	Northern Rough-winged Swallow	
Petrochelidon pyrrhonota	Cliff Swallow	
Hirundo rustica	Barn Swallow	
Psaltriparus minimus	Bushtit	
Thryomanes bewickii	Bewick's Wren	
Mimus polyglottos	Northern Mockingbird	
**Sturnus vulgaris*	European Starling	
Pipilo maculatus	Spotted Towhee	
Aimophila ruficeps canescens	Southern California Rufous-crowned Sparrow	
Melozone crissalis	California Towhee	
Melospiza melodia	Song Sparrow	
Icterus cucullatus	Hooded Oriole	
Carpodacus mexicanus	House Finch	
Carduelis psaltria	Lesser Goldfinch	
Mammals		
Sylvilagus audubonii	Desert Cottontail	
Canis latrans	Coyote	
Procyon lotor	Northern Raccoon	
Odocoileus hemionus	Southern Mule Deer	

Legend

*= Non-native or invasive species

Special Status:

Federal:
FE = Endangered
FT = Threatened

State:
SE = Endangered
ST =Threatened
CSC = California Species of Special Concern
CFP = California Fully Protected Species

Attachment C
Site Photographs

Photograph 1: Blochman's dudleya observed in rocky area in the eastern portion of the expansion area.

Photograph 2: Catalina mariposa-lily observed in the grassland areas in the southern portion of the expansion area.

Photograph 3: Club haired mariposa in the grassland areas in the southern portion of the expansion area.

Photograph 4: Conejo buckwheat observed on steep cliff in the southeastern portion of the expansion area.

Photograph 5: Agricultural area in the western portion of the expansion area. The area was surveyed for potential habitat and suitable burrow for burrowing owl. No suitable burrows were observed.

Photograph 6: Showing habitat for Conejo buckwheat and Blochman's dudleya in the northern section of the expansion area.

APPENDIX D-1

UPDATED GEOLOGIC AND GEOTECHNICAL REVIEW REPORT, MODIFICATION TO CONDITIONAL USE PERMIT (CUP) FOR PACIFIC ROCK QUARRY, AS RELATED TO CALIFORNIA MINE ID NO. 91-56-0011, 100 SOUTH HOWARD ROAD, CAMARILLO AREA, COUNTY OF VENTURA

BENCHMARK RESOURCES

File No.: JCR13-01132
December 3, 2016

PACIFIC ROCK, INC.
P.O. Box 255
Somis, CA 93066
Attn.: Mr. Tom Staben

SUBJECT: Updated Geologic and Geotechnical Review Report, Modification to Conditional Use Permit (CUP) for Pacific Rock Quarry, as Related to California Mine ID No. 91-56-0011, 100 South Howard Road, Camarillo Area, County of Ventura.

Dear Mr. Staben:

In accordance with your request, this updated report has been prepared to summarize the results of our review and supplemental geologic and geotechnical of the planned revisions to your current Conditional Use Permit (CUP) which include the expansion of Pacific Rock Quarry. It is our understanding, based upon our review of the revised mining plan, that it is proposed to extend the previous limits of the quarry area. The planned final cut slope gradient within the CUP boundaries has been modified to a uniform 1:1 slope ratio. The changes were proposed to correct the existing "oversteepened" slope conditions at the northerly and northeasterly sides of the quarry and for expansion onto recently acquired adjacent land parcels.

SCOPE OF WORK

The scope of work for this updated report included the completion of the following tasks:

1. Review of general geologic maps and geologic information pertaining to the site and its vicinity, including:
    a. Surface Mining and Reclamation Act of 1975, California Department of Conservation, Office of Mine Reclamation, updated January 2007.
    b. Geologic Map of the Camarillo and Newbury Park Quadrangles, T.W. Dibblee, Jr., 1990.
    c. Seismic Hazard Map of the Newbury Park Quadrangle, California Division of Mines and Geology, dated February 7, 2002.
    d. Earthquake Fault Zone Map of the Newbury Park Quadrangle, California Division of Mines and Geology, May 1, 1999.

   e. Seismic Hazards Study of Ventura County, California, California Division of Mines and Geology, Open File Report 76-5-LA.
   f. Geology and Mineral Resources Study of Southern Ventura County, California, California Division of Mines and Geology, Preliminary Report 14, 1973.

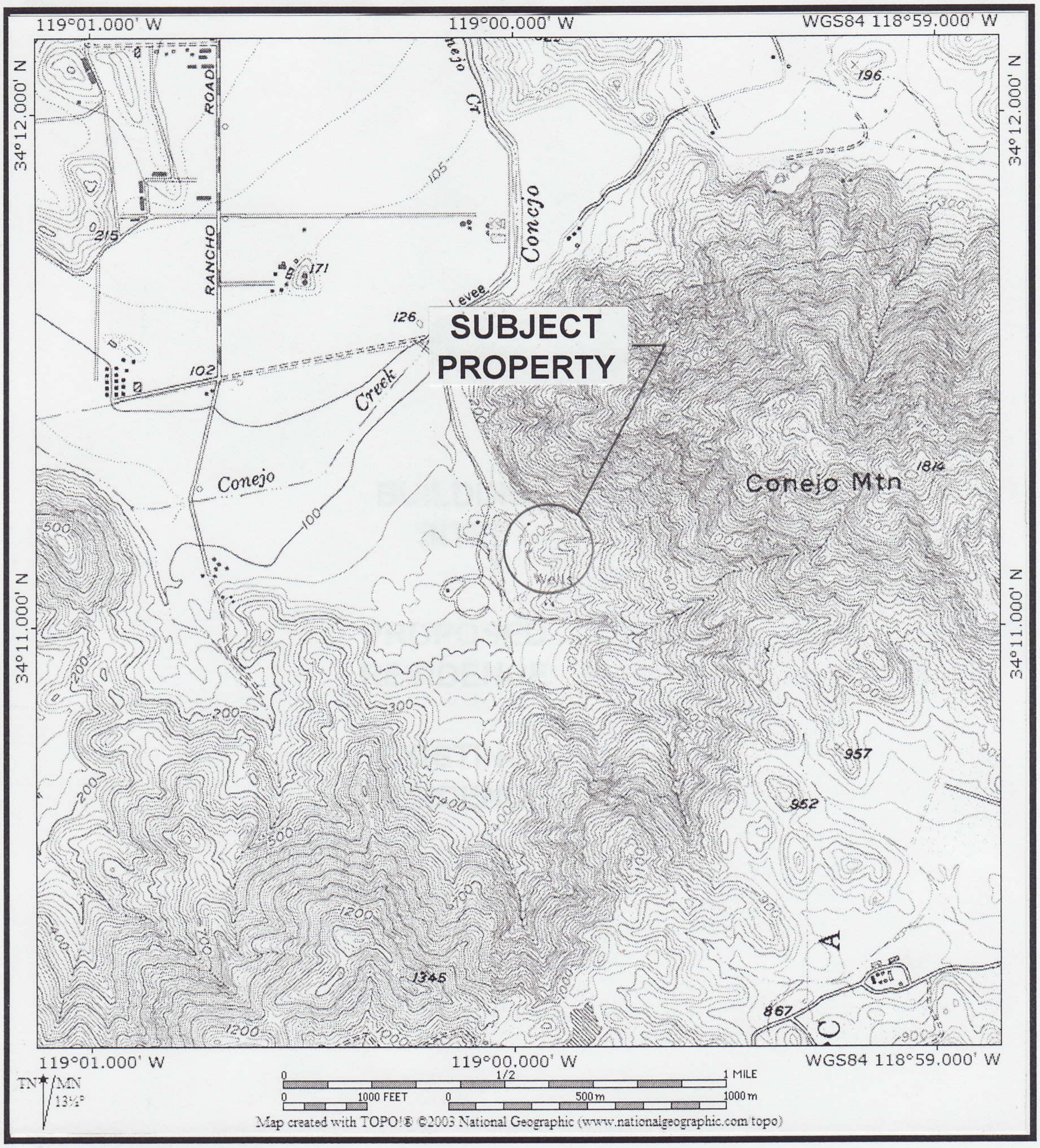
2. Review of previously prepared geologic and geotechnical reports prepared for the subject property. A complete list of references is included in Appendix III.
3. Review of the revised Reclamation Plan Set, prepared by Sespe Consulting, Inc., not dated.
4. Update of the Geologic Map using the current Topographic Map as a base, included as Plate 1.
5. Preparation of four Geologic Cross-Sections to evaluate the existing geologic conditions with respect to the proposed mining excavations, included as Plate 2.
6. Slope stability analysis of the planned slope excavations/final slope configuration.
7. Preparation of this updated report to present the results of our analysis and our geologic and geotechnical recommendations.

The geologic information obtained from our review of the previous reports by Gold Coast GeoServices, Inc., as well as supplemental geologic information mapped by this office, have been plotted on the Geologic Map included as Plate 1 with this report. The Geologic Map uses the current Mining and Reclamation Plan by Sespe Consulting, Inc. as a base. Graphic depiction of the subsurface geology, with respect to the proposed Mining and Reclamation Plan, is shown on Geologic Cross-Sections A-A' to D-D', included as Plate 2.

SITE DESCTIPTION & BACKGROUND

The quarry is situated within a roughly east-west trending canyon located along the southwest side of Conejo Mountain at the northwestern side of the Santa Monica Mountain Range (see Site Map, Figure 1). It is our understanding that the quarry has been in existence at the current location since the 1950's. The quarry supplies rock products ranging from gravel to rip-rap. Near vertical excavations, up to approximately 100 feet in height, were established along the original northerly and easterly property lines by a previous owner. The current owner has acquired the adjacent property and now plans to extend the limits of the quarry and correct the over-steepened cut slopes.

Under the current ownership and management, the Pacific Rock quarry activities have consisted of excavation, processing and sorting of rock material. Stockpiles of product are contained in the central and western portion of the quarry.



BASE MAP:

TOPO! Los Angeles and Surrounding Areas

NORTH
SCALE = AS SHOWN

JCR CONSULTING	**SITE LOCATION MAP** 1000 Howard Road, Camarillo	**FILE NO.:** JCR10-0413 **FIGURE 1**

PROPOSED MODIFICATIONS TO CUP 3817

The Reclamation Plan, prepared by Sespe Consulting, Inc., calls for the continued mining and processing of rock material for commercial sale. As shown on the Sespe plan, the ultimate configuration of the quarry will establish three large pad areas identified herein as the northwestern pad, southwestern pad and the eastern or main pad. Finish grades of approximately 190 feet, 250 feet, and 300 feet, respectively, have been proposed for the three pads. Planned mining related excavations have now been expanded to the north and south onto the recently acquired adjacent property. Excavations are proposed at 1 (horizontal) to 1 (vertical) slope ratio. The maximum slope height is approximately 600 feet along the northerly side of the quarry.

REGIONAL GEOLOGY

The Pacific Rock Quarry is located within the Transverse Ranges geologic province of California. The geologic configurations of the Transverse Ranges geologic province are a direct result of lateral and compressional tectonics. The unique tectonic forces of the region are a direct result of the “big bend” in the San Andreas Fault (located in the near the Gorman area of southern California). The “bend” is a result of contact between the North American Plate and the Pacific Plate. As a result, the Transverse Ranges geologic province is experiencing compressional stresses in addition to right-lateral strike-slip motion. This stress has produced a region characterized by east/west-trending mountain ranges, valleys, geologic structures and numerous active faults which is in contrast to the typical north/northwest structural trend typically observed elsewhere in the state. Typical faulting observed within the Transverse Ranges Geomorphic Province is thrust or reverse-dip-slip faulting usually with lateral components which is attributed to the relatively high compressional forces.

SITE GEOLOGY

The geologic conditions, earth materials and structure beneath the subject property have been interpreted and characterized based upon our review of published and unpublished geologic references, review of the referenced geologic and geotechnical engineering reports, and our surface observations made during the course of our investigation. It is important to note that our conclusions regarding the overall site geologic conditions involve projections of data observed in exposures that require that geologic conditions remain generally consistent between points of observation.

The Pacific Rock Quarry is located at the southwest base of Conejo Mountain, which is comprised primarily of an intrusive dacitic dome. The intrusive dacite bedrock is assigned to the middle Miocene age Conejo Volcanics geologic formation which includes extrusive and intrusive, submarine and subaerial volcanic material.

The Conejo Volcanics bedrock exposed at the quarry consist of three distinct volcanic units: dark gray extrusive basalt (Tcvb), light gray to pinkish gray dacitic breccias (Tcvdb), and dark intrusive basaltic rocks (bi).

The dacitic breccias (Tcvdb) are comprised of unsorted angular fragments of dacite to andesite in a hard volcanic detrital matrix comprised of dacite and andesite. The breccias are hard to very hard and resistant to erosion. The dark gray to dark olive-brown extrusive basalt (Tcvb) is mapped near the central portion of the quarry and is hard to very hard and resistant to erosion. Near vertical basaltic (bi) dikes traverse the northerly portions of the quarry in a northwesterly direction. The dikes are comprised of hard to very hard and erosion resistant dark gray basalt.

Geologic Structure

Based upon our review of published geologic maps, previous geologic mapping performed by Gold Coast GeoServices, and on supplemental mapping performed by this office, the dacitic breccias and extrusive basalt are typically massive or unstratified. Flow banding previously mapped in the vicinity by others has been observed in outcrops to dip at 20-25 degrees west-northwest within the dacitic breccias.

As previously described by Gold Coast, the bedrock in the quarry is moderately jointed with two primary jointing orientations. The first typically strikes N20-45E with dip angles of 55-85 degrees northwest or southeast and the second oriented with a strike of N35-70W with dip angles of 80-90 degrees southwest. The vertical dikes strike approximately N45-60W.

Geologic/geotechnical engineering analysis, performed by Gold Coast GeoServices, for the last CUP submittal (2010) was ultimately approved. During our review of the referenced reports, this office has determined that the geologic data, analysis, and conclusions previously submitted by Gold Coast GeoServices, Inc. may be, in general, applied to the currently requested modifications to the CUP. Additional slope stability analysis have been performed to verify the stability of the planned future excavations.

Landslides

The Conejo Volcanics are typically highly resistant to erosion and/or slope failure due to rock hardness and lack of potential sliding surfaces. No landslides or debris flows have occurred within or adjacent to the quarry site, and no landslides are shown to occur at or adjacent to the site on regional geologic maps by others. The landslide hazard potential from excavations at the quarry is very low based upon the findings from the previous geotechnical analysis and on the geotechnical analysis of the plans as now proposed.

Faulting and Seismicity

The property is not known to be underlain by any seismically active or potentially active faults, and the property is not situated within a Fault Rupture Special Studies Zone of the State of California. The closest active fault is the Simi-Santa Rosa fault located approximately four miles north of the quarry. Several other significant onshore and offshore faults, which are capable of producing earthquakes, are located within 50 miles of the site. Earthquakes along any of the fault systems within approximately 50 miles of the site could cause moderate to strong ground shaking at the site.

Based upon our review of the California Department of Mines and Geology Seismic Hazard Zone Report for the Newbury Park Quadrangle (2002), the quarry is not located within a State designated “seismically-induced liquefaction hazard” zone due to the presence of volcanic bedrock beneath the site. The northerly side of the site of the quarry is located within or adjacent to a State designated “seismically-induced landslide hazard” zone. In the event of a significant earthquake, rockfall or rock topple are potential seismically-induced hazards at the site.

SLOPE STABILITY ANALYSIS

Based on our review of the proposed CUP and Reclamation Plan prepared by Sespe Consulting, Inc., it is now proposed to expand the southern and northern limits of the quarry and lay back the over steepened slopes located near the northern and eastern edges of the original property limits. This office is in general agreement with the conclusions pertaining to site slope stability as presented by Gold Coast GeoServices, Inc. in the referenced reports. The purpose of our slope stability analysis was to evaluate the currently proposed mining excavations with respect to the site surficial and subsurface conditions. Four geologic cross-sections were evaluated.

Stability analysis was performed using the Visual Slope computer program (Version 6). The program performs a two-dimensional limit equilibrium analysis that searches for the most critical surface. Bishop’s Simplified Method was utilized to search for the most critical circular potential failure surface. A minimum of 500 surfaces were analyzed. Both static and pseudo-static conditions were analyzed for global stability. A seismic coefficient of 0.15g was used to simulate an average horizontal force under seismic shaking.

Shear Strength Parameters

Shear strength parameters used in our analysis were obtained from the referenced Gold Coast GeoServices, Inc., reports and response letters of 2010 that were previously approved. As recommended by the Office of Mines and Reclamation (OMR) in the review letter dated October 21, 2010, the presence of weaker basaltic dike bedrock was recommended to be accounted for by reducing the determined shear strength of the breccia by 10% since the basaltic dike materials were found to represent approximately 10% of the rock mass. However, GCGS decided to use a 50% reduction in shear strength in order to provide an “ultraconservative” analysis. We do not concur that the 50% reduction is justified and agree with the OMR that a 10% reduction is prudent from a geotechnical engineering standpoint. We performed our slope stability analysis using both the 50% reduction and 10% reduction in shear strength for the critical cross sections (A-A and B-B). The results are tabulated below.

Cross-Section	Analysis	Shear Parameters		Location	F.S.
		Cohesion (psf)	Friction Angle (deg)		
A-A’	Static	4900.0*	36.0	Global	1.470
A-A’	Pseudo-Static	4900.0*	36.0	Global	1.120
A-A’	Static	8200.0**	36.0	Global	1.670
A-A’	Static	4900.0*	36.0	Lower	1.390
A-A’	Pseudo-Static	4900.0*	36.0	Lower	1.090
A-A’	Static	8200.0**	36.0	Lower	1.650
A-A’	Pseudo-Static	8200.0**	36.0	Lower	1.310
B-B’	Static	4900.0*	36.0	Global	1.480
B-B’	Pseudo-Static	4900.0*	36.0	Global	1.150
B-B’	Static	8200.0**	36.0	Global	1.840
B-B’	Pseudo-Static	8200.0**	36.0	Global	1.590
C-C’	Static	4900.0*	36.0	Global	2.290
C-C’	Pseudo-Static	4900.0*	36.0	Global	1.590
C-C’	Static	4900.0*	36.0	Lower	1.630
C-C’	Pseudo-Static	4900.0*	36.0	Lower	1.310
D-D’	Static	4900.0*	36.0	Global	1.810
D-D’	Pseudo-Static	4900.0*	36.0	Global	1.350
D-D’	Static	4900.0*	36.0	Lower	1.690
D-D’	Pseudo-Static	4900.0*	36.0	Lower	1.280

*50% Shear Strength Reduction

**10% Shear Strength Reduction

Based on *Cross-Section A-A'* and *B-B'*, our analyses indicated factor of safety values is less than 1.5 in static conditions using a 50% reduction in shear strength. However, all sections have factors of safety exceeding 1.5 for static conditions and 1.1 in seismic conditions for all modes of failure using the recommended 10% reduction of shear strength.

Based on our analyses, it is our finding that the currently proposed mining plan will result in finished slopes that have adequate factors of safety exceeding 1.25 for the intended use as open space using a 50% reduction in shear strengths and exceeding 1.5 using a 10% reduction in shear strengths. It is our opinion that the proposed mining plan configuration is adequate for its intended final use from a geotechnical engineering standpoint. The results of the slope stability analyses are presented with this report in Appendix II. The most critical failure surfaces determined by the slope stability analysis are shown on the corresponding computer generated print outs.

CONCLUSIONS AND RECOMMENDATIONS

Based on our review of the referenced reports, as well as our updated analysis of the currently proposed modifications to the CUP 3817-3, as shown on the Reclamation Plan prepared by Sespe Consulting, Inc., it our finding that the proposed modifications are feasible from a geologic and geotechnical standpoint. The following recommendations are provided for consideration by the site owner and the design professionals:

The currently planned mining excavations of the quarry slopes are considered to be feasible from an engineering geologic and geotechnical engineering standpoint and have been determined to possess adequate calculated factors of safety against slope failure. The mining activity and slope excavations shall be periodically monitored by the engineering geologist to evaluate slope performance, stability and to address any hazardous conditions. Quarterly site inspections, depending on mining activity, are recommended. Annual reports will be prepared by the engineering geologist to provide a summary of the site conditions and observations.

The planned excavations within the mining area will be made at an overall 1:1 slope ratio. In order to facilitate the mining operations, approximately 50-foot wide benches will be excavated every 50 vertical feet as shown in the Geologic Cross Sections included on Sheet 2.

Site Inspections

Based upon our analysis, the slopes in the areas where mining activities are planned have been determined to have adequate factors of safety against slope failure. It is recommended that the quarry be observed on a quarterly basis by the engineering geologist. Additionally, in the event of a sudden and/or significant change in site conditions are observed, the quarry owner/manager shall immediately notify this office to arrange for a site inspection.

Limitations

This report has been prepared solely for the benefit of the Pacific Rock Quarry. The observations summarized herein are generalized and are based upon verbal information provided by the property owner and representatives of Ventura County as well as visual observations made over the course of this investigation. The scope of services did not include subsurface exploration and/or additional geotechnical analysis of bedrock strengths. The slope stability of the site was previously evaluated by other consultants and updated stability analysis presented herein has utilized previously accepted rock strength parameters.

Remarks

Please call this office at (805) 300-4564 if you have any questions regarding this letter/report.

Respectfully submitted,

JCR CONSULTING

John C. Rubenacker, CEG 2200

R. Mark Workman Jr., RCE 68557

PROFESSIONAL GEOLOGIST
JOHN C. RUBENACKER
No. CEG2200
CERTIFIED
ENGINEERING
GEOLOGIST
Exp. 04-30-18
STATE OF CALIFORNIA

REGISTERED CIVIL ENGINEER
R. MARK WORKMAN JR.
No. 68557
EXP. 09/30/17
CIVIL
STATE OF CALIFORNIA

APPENDIX 1

GEOLOGIC MAP AND GEOTECHNICAL/GEOLOGIC CROSS-SECTION

GEOLOGIC LEGEND

Spill Fill	SURFICIAL FILL (SAND, GRAVEL, COBBLES) FROM MINING OPERATIONS
Qf	ALLUVIAL FAN DEPOSITS (SILT, SAND, GRAVEL
Qal	ALLUVIUM (SAND AND GRAVEL)
Tcvdb	CONEJO VOLCANICS (DACITIC BRECCIA)
Tcvb	CONEJO VOLCANICS (BASALTIC ROCKS)
bi	BASALT DIKE
20	STRIKE AND DIP OF FLOW BANDING
88	STRIKE AND DIP OF JOINT
73	STRIKE AND DIP OF SHEAR/FAULT
A A'	LINE OF GEOLOGIC CROSS SECTION
	LINE OF GEOLOGIC CONTACT DASHED WHERE INFERRED

LEGEND

PROPERTY BOUNDARY
CUP
MINING BOUNDARY

N

PLATE 1

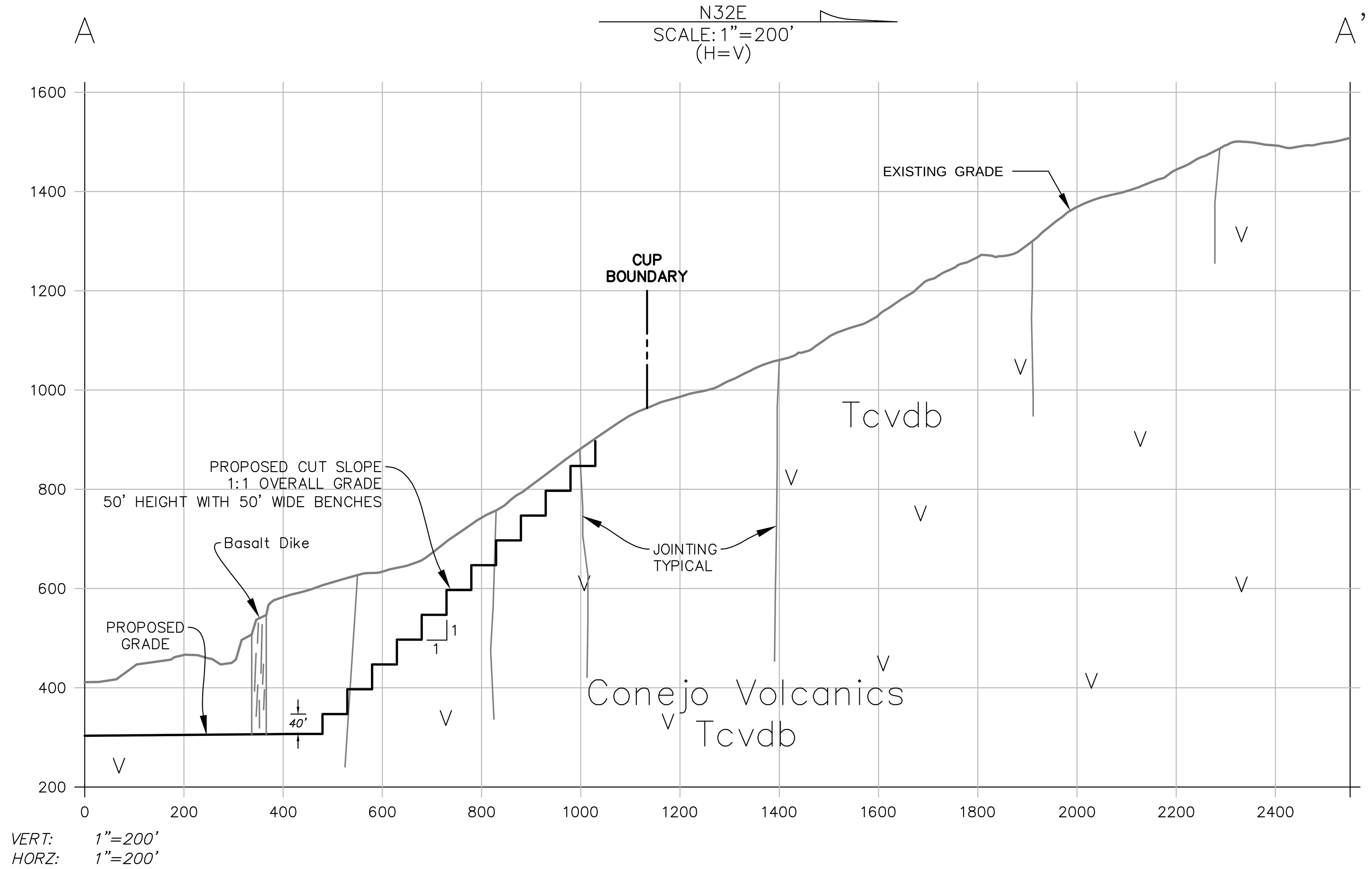
PLOT PLAN 100 South Howard Road, Camarillo		
1" = 200'	FILE NO.:	
DATE: 11-14-16	JCR010-04123	REV.
JCR CONSULTING		
444 MOONDANCE STREET, THOUSAND OAKS, CA 91360*(805) 300-4564*Fax (805) 241-2502		

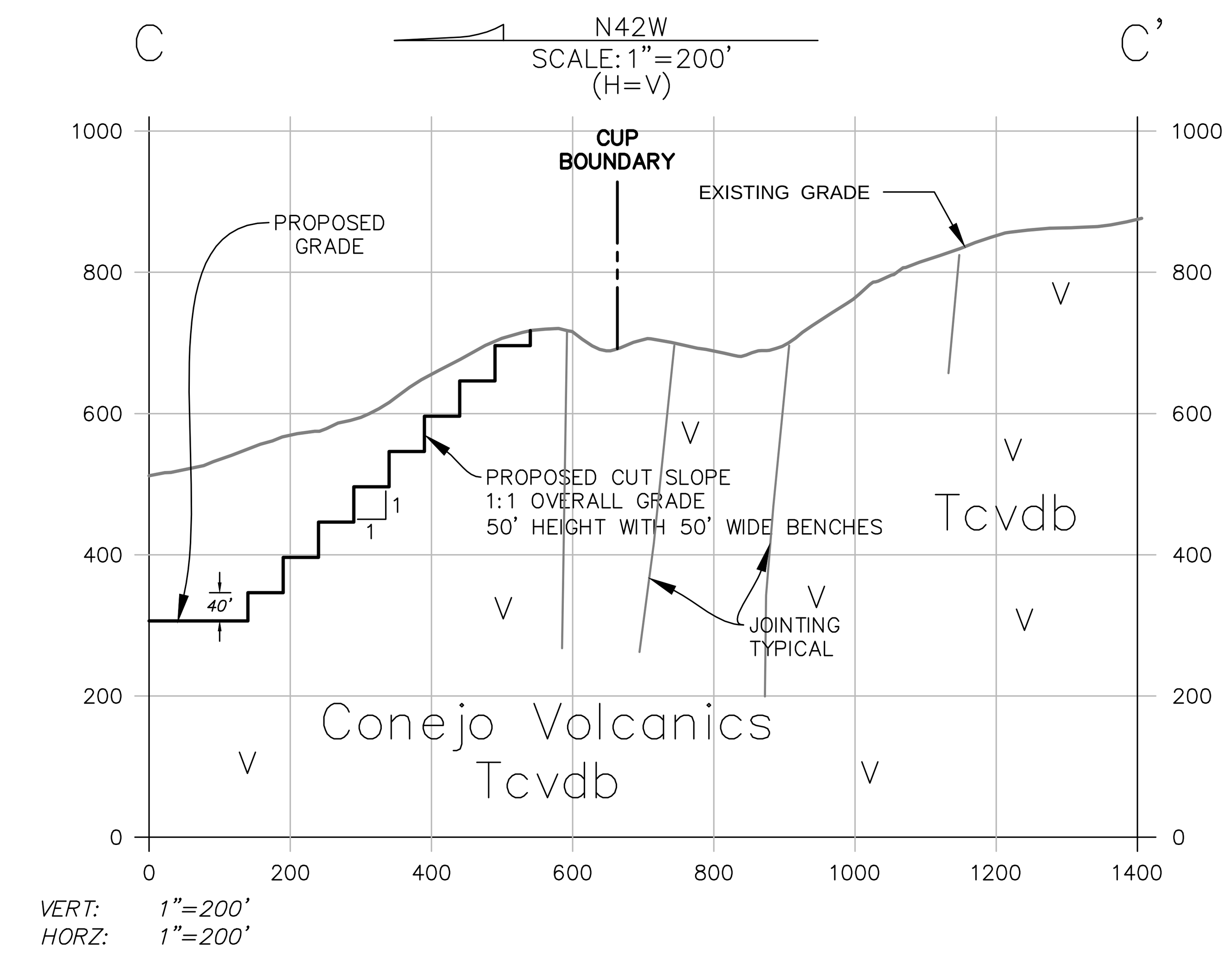
200 0 200 400
SCALE OF FEET

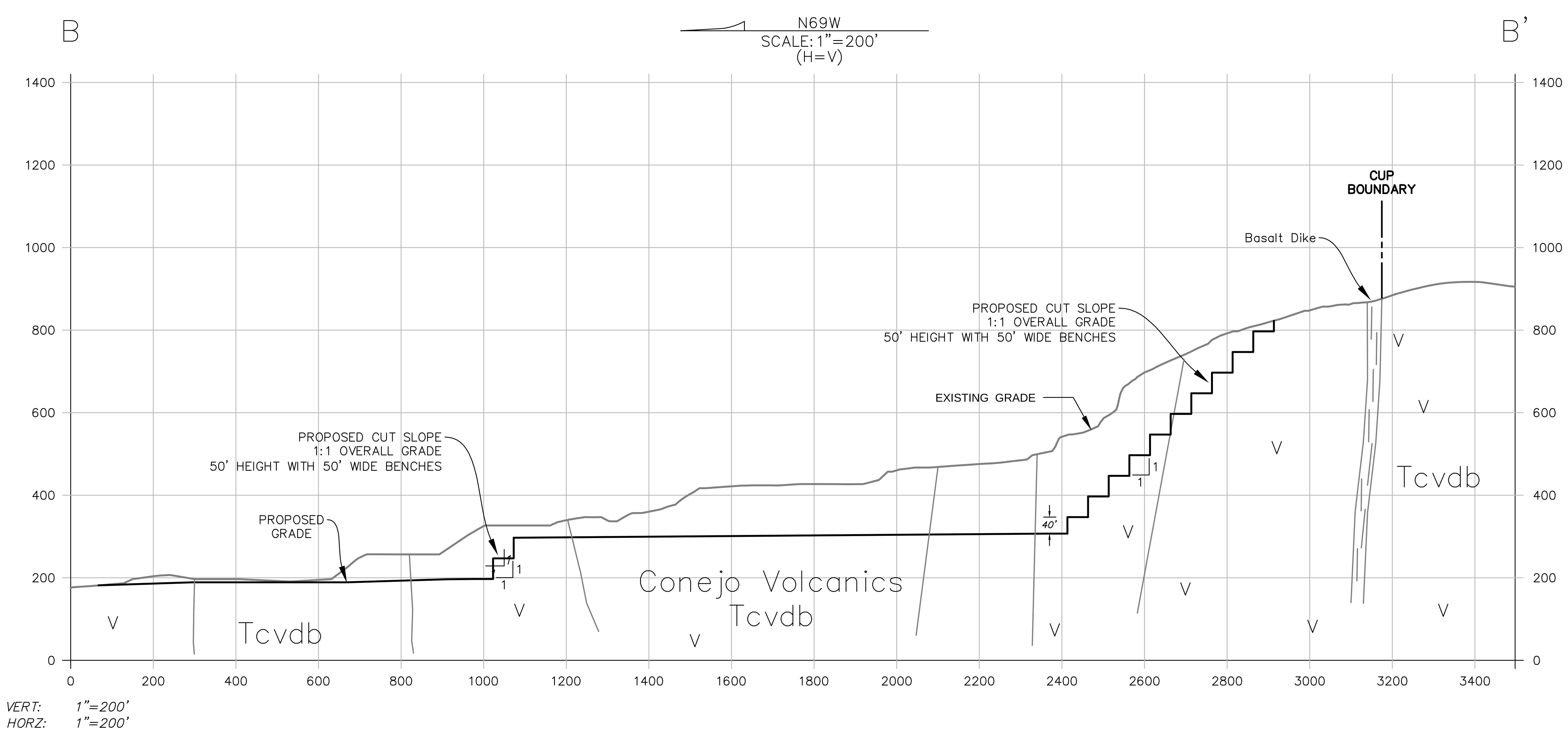
SESPE CONSULTING, INC.
374 Poli Street, Ste.200 • Ventura, CA 93001
(805) 275-1515 www.sespeconsulting.com

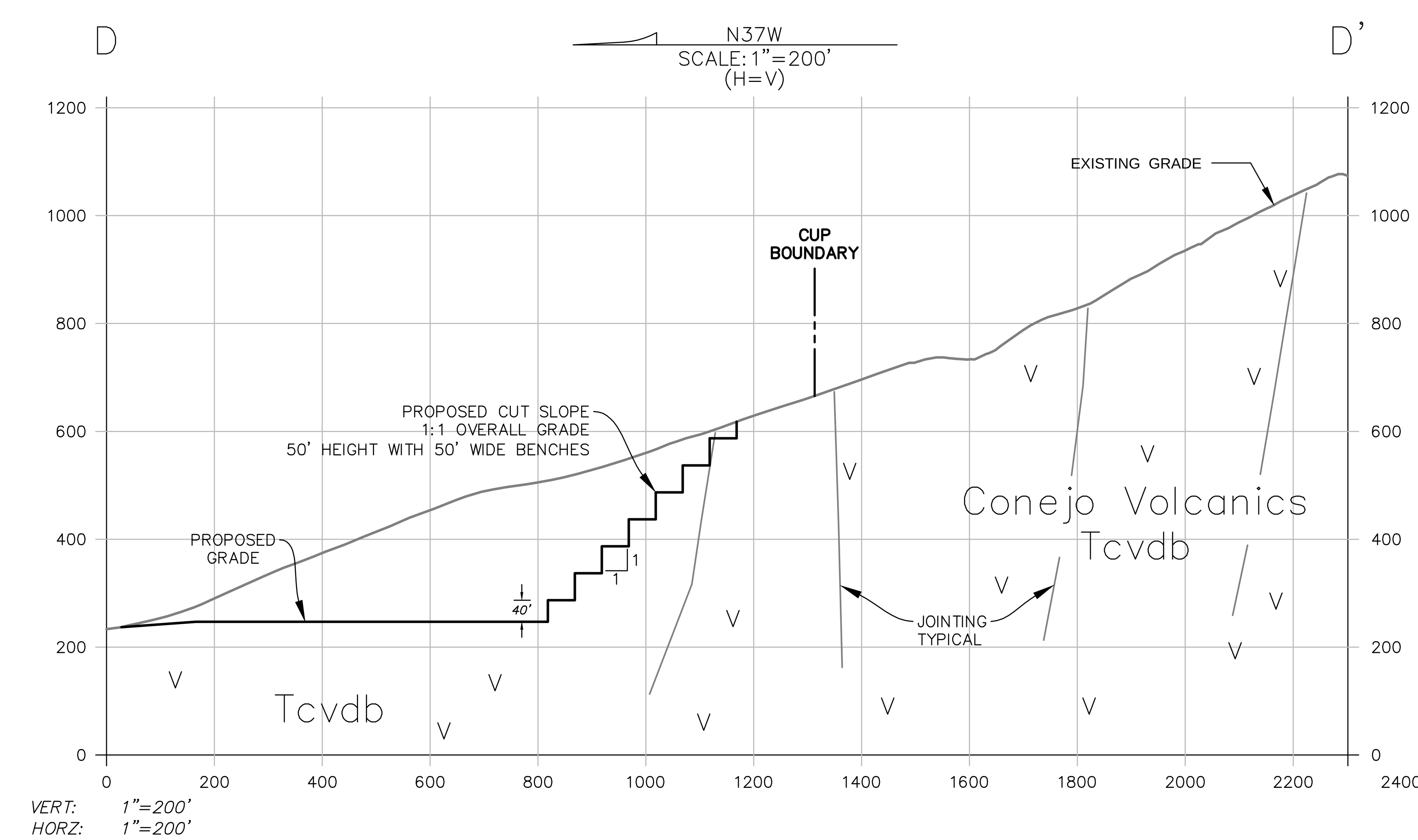
PACIFIC ROCK QUARRY
VENTURA COUNTY, CALIFORNIA
APN: 234-0-060-220
100 SOUTH HOWARD ROAD
CAMARILLO, CALIFORNIA 93012

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN	FIGURE NUMBER
DRAWN BY: G.CAMUS	1 OF 3
CHECKED BY: ??	









GEOLOGIC CROSS-SECTIONS A, B, C, and D		
100 South Howard Road, Camarillo		
1" = 200'	FILE NO.:	
DATE: 11-14-16	JCR010-04123	REV.
JCR CONSULTING		
444 MOONDANCE STREET, THOUSAND OAKS, CA 91360*(805) 300-4564*Fax (805) 241-2502		

SESPE CONSULTING, INC.
374 Poli Street, Ste.200 • Ventura, CA 93001
(805) 275-1515 www.sespeconsulting.com

PACIFIC ROCK QUARRY
VENTURA COUNTY, CALIFORNIA
APN: 234-0-060-220
100 SOUTH HOWARD ROAD
CAMARILLO, CALIFORNIA 93012

SCALE: HORIZ: AS SHOWN
VERT: AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: ??

FIGURE NUMBER
2 OF 3

APPENDIX 2

SLOPE STABILITY ANALYSIS

Cross-Section	Analysis	Shear Parameters		Location	F.S.
		Cohesion (psf)	Friction Angle (deg)		
A-A′	Static	4900.0*	36.0	Global	1.470
A-A′	Pseudo-Static	4900.0*	36.0	Global	1.120
A-A′	Static	8200.0**	36.0	Global	1.670
A-A′	Static	4900.0*	36.0	Lower	1.390
A-A′	Pseudo-Static	4900.0*	36.0	Lower	1.090
A-A′	Static	8200.0**	36.0	Lower	1.650
A-A′	Pseudo-Static	8200.0**	36.0	Lower	1.310
B-B′	Static	4900.0*	36.0	Global	1.480
B-B′	Pseudo-Static	4900.0*	36.0	Global	1.150
B-B′	Static	8200.0**	36.0	Global	1.840
B-B′	Pseudo-Static	8200.0**	36.0	Global	1.590
C-C′	Static	4900.0*	36.0	Global	2.290
C-C′	Pseudo-Static	4900.0*	36.0	Global	1.590
C-C′	Static	4900.0*	36.0	Lower	1.630
C-C′	Pseudo-Static	4900.0*	36.0	Lower	1.310
D-D′	Static	4900.0*	36.0	Global	1.810
D-D′	Pseudo-Static	4900.0*	36.0	Global	1.350
D-D′	Static	4900.0*	36.0	Lower	1.690
D-D′	Pseudo-Static	4900.0*	36.0	Lower	1.280

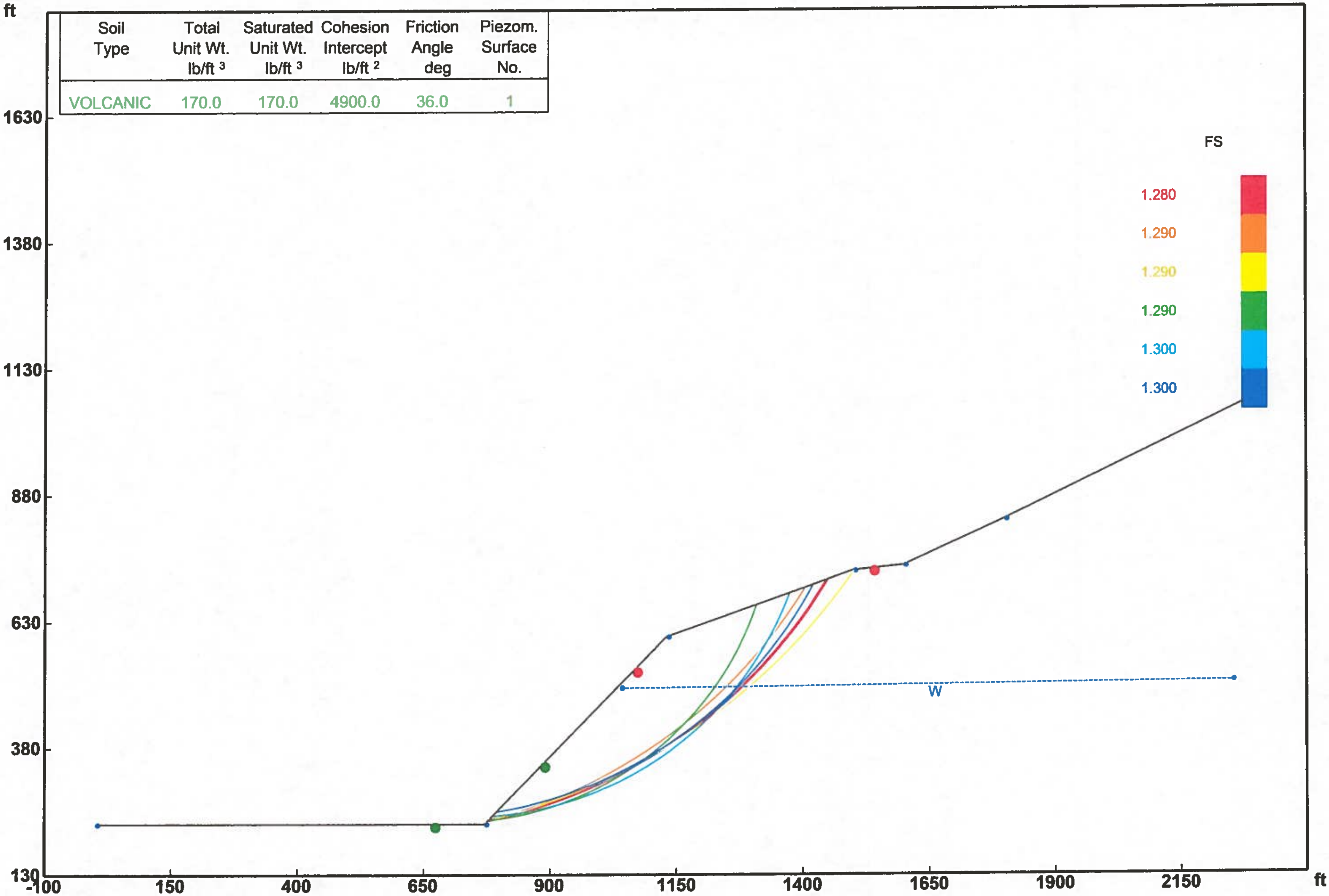
*50% Shear Strength Reduction

**10% Shear Strength Reduction

Pacific Rock

Cross-Section D-D' Lower Slope Pseudo-Static

Soil Type	Total Unit Wt. lb/ft 3	Saturated Unit Wt. lb/ft 3	Cohesion Intercept lb/ft 2	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	4900.0	36.0	1



FSmin = 1.280Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0
(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.DD.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section D-D' Lower Slope Pseudo-Static

User Name： Travis Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength Fi Reduc. 1 C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	230.00	770.00	230.00	VOLCANIC
2	770.00	230.00	1130.00	600.00	VOLCANIC
3	1130.00	600.00	1500.00	730.00	VOLCANIC
4	1500.00	730.00	1600.00	740.00	VOLCANIC
5	1600.00	740.00	1800.00	830.00	VOLCANIC
6	1800.00	830.00	2300.00	1070.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

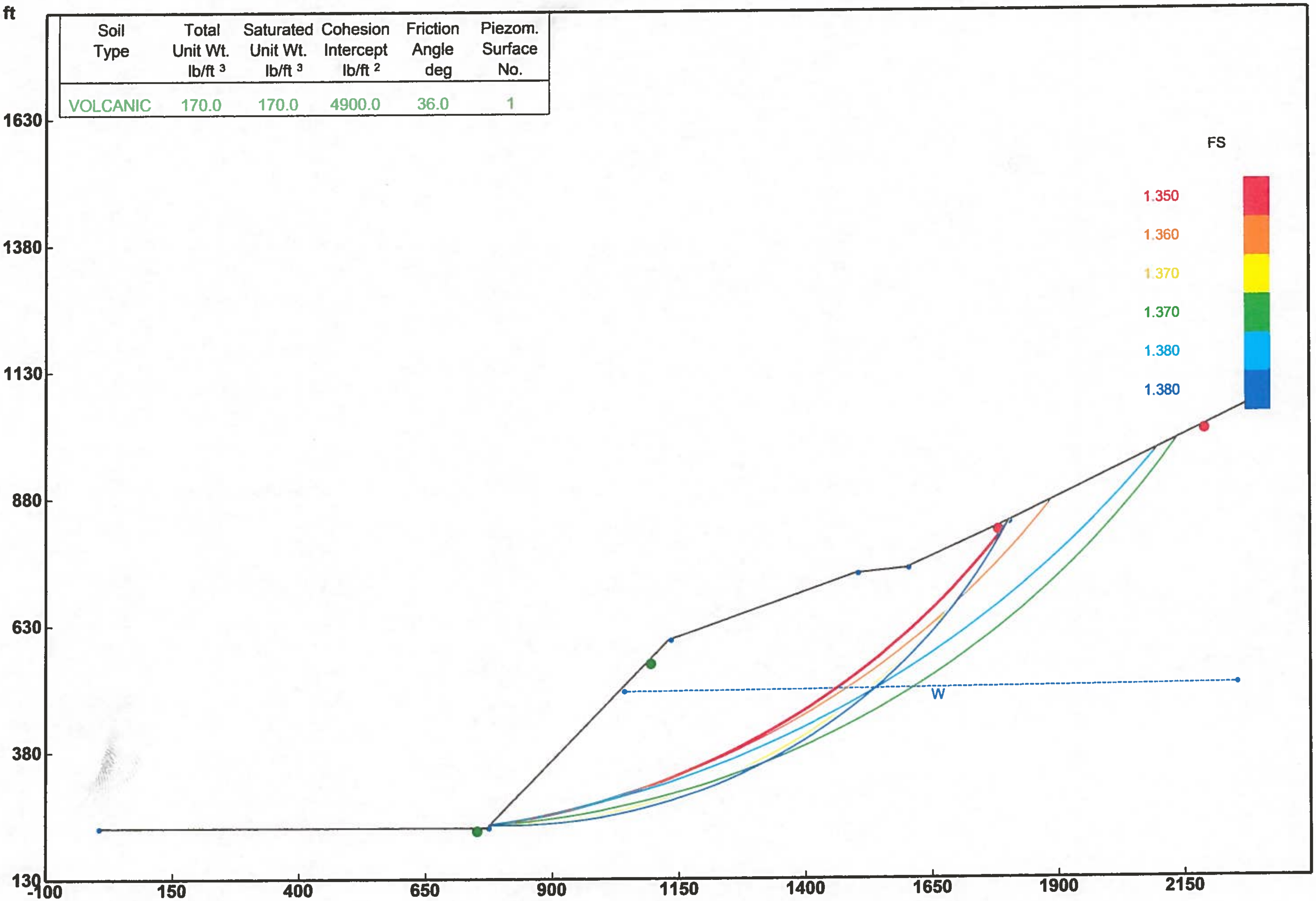
Piezometric Surface No. 1 Consists Of 2 Points

X	Y
1038.00	499.23
0.00	0.00

	Seismic	Loads					
			Horizontal		Vertical		
			Acceleration		Acceleration		
			g		g		
			0.15		0.0		
	Results						
	Circular	Failure					
	Analysis	Method:	ASD-Bishop Method				
Searched	From	667.69	ft	To	884.62	ft	
Total :	500	Surfaces	Following 6	Most Critical	Surfaces		
Defined By :	48	Points FS=	1.28	Drvg F	8148168	lb/ft	
Center	X =	568.458	Y =	1246.37	Radius=	1029.549	
	Point		X-Coord		Y-Coord		
			ft		ft		
	1		778.19		238.41		
	2		794.7		242.69		
	3		811.14		247.23		
	4		827.51		252.05		
	5		843.79		257.14		
	6		859.98		262.5		
	7		876.09		268.13		
	8		892.1		274.02		
	9		908.01		280.18		
	10		923.81		286.6		
	11		939.51		293.28		
	12		955.09		300.22		
	13		970.55		307.42		

Pacific Rock

Cross-Section D-D' Global Pseduo-Static



FSmin = 1.350Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0
(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific DD.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section D-D' Global Pseduo-Static

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength Fi Reduc. 1 C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	230.00	770.00	230.00	VOLCANIC
2	770.00	230.00	1130.00	600.00	VOLCANIC
3	1130.00	600.00	1500.00	730.00	VOLCANIC
4	1500.00	730.00	1600.00	740.00	VOLCANIC
5	1600.00	740.00	1800.00	830.00	VOLCANIC
6	1800.00	830.00	2300.00	1070.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

Piezometric Surface No. 1 Consists Of 2 Points

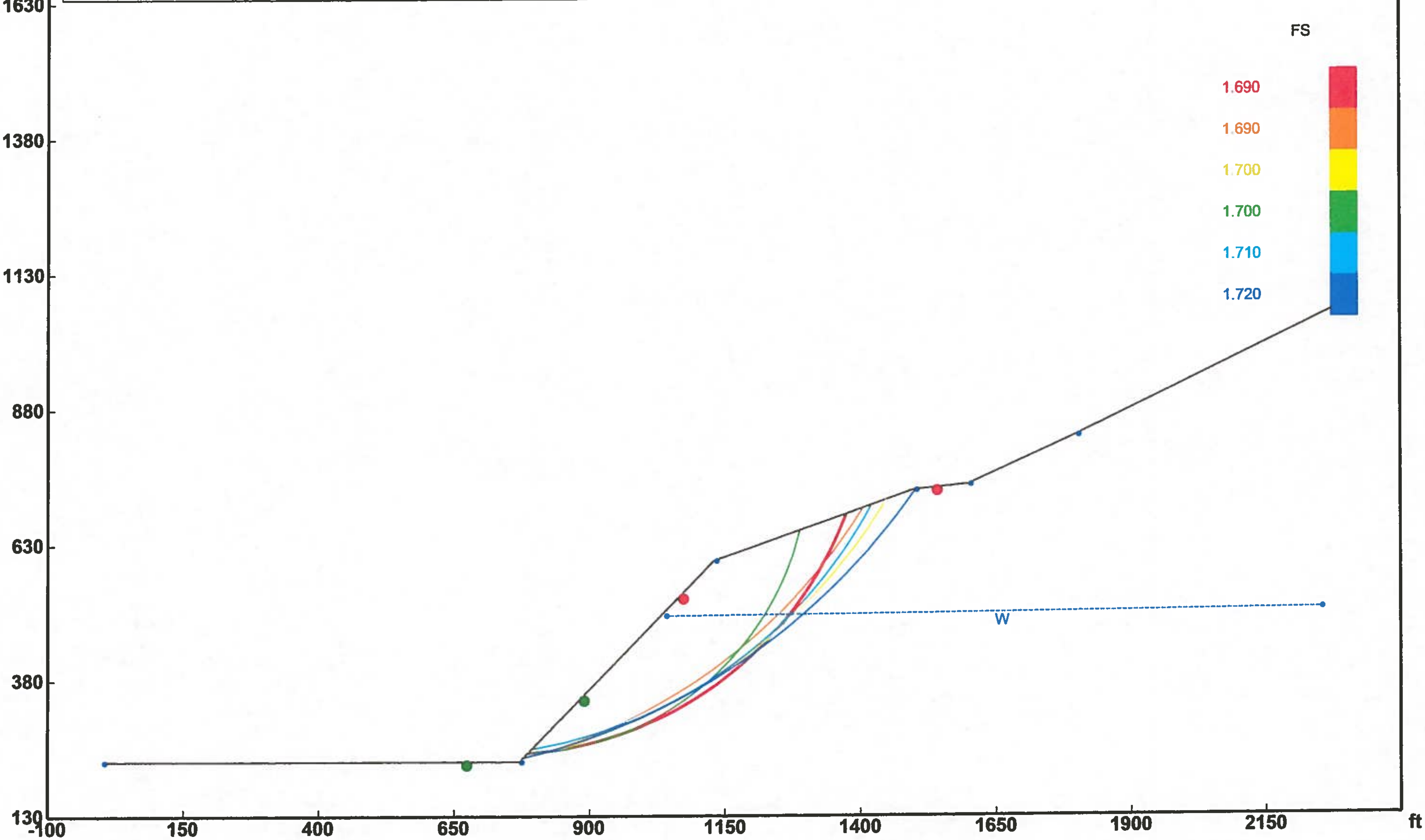
X	Y
1038.00	499.23
0.00	0.00

	Seismic	Loads				
			Horizontal Acceleration g		Vertical Acceleration g	
			0.15		0.0	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	746.15	ft	To	1089.23	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	48	Points FS=	1.35	Drvg F	15278350	lb/ft
Center	X =	570.791	Y =	1780.061	Radius=	1556.978
	Point		X-Coord ft		Y-Coord ft	
	1		776.56		236.74	
	2		804.49		241.02	
	3		832.35		245.75	
	4		860.13		250.93	
	5		887.83		256.56	
	6		915.42		262.64	
	7		942.92		269.17	
	8		970.31		276.14	
	9		997.58		283.55	
	10		1024.73		291.4	
	11		1051.74		299.69	
	12		1078.62		308.41	
	13		1105.36		317.57	

Pacific Rock

Cross-Section D-D' Lower Slope Static

Soil Type	Total Unit Wt. lb/ft ^{3}	Saturated Unit Wt. lb/ft ^{3}	Cohesion Intercept lb/ft ^{2}	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	4900.0	36.0	1



FSmin = 1.690Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.DD.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section D-D' Lower Slope Static

User Name：	Travis	Calculation	Method：	ASD-Bishop Method

Input Data

Failure	Surface	Strength	Fi Reduc.	1	C Reduc.	1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	230.00	770.00	230.00	VOLCANIC
2	770.00	230.00	1130.00	600.00	VOLCANIC
3	1130.00	600.00	1500.00	730.00	VOLCANIC
4	1500.00	730.00	1600.00	740.00	VOLCANIC
5	1600.00	740.00	1800.00	830.00	VOLCANIC
6	1800.00	830.00	2300.00	1070.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree）	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight	Of Water =	62.4	lb/ft^3		
Piezometric	Surface No.	1	Consists Of	2	Points
		X		Y	
		1038.00		499.23	
		0.00		0.00	

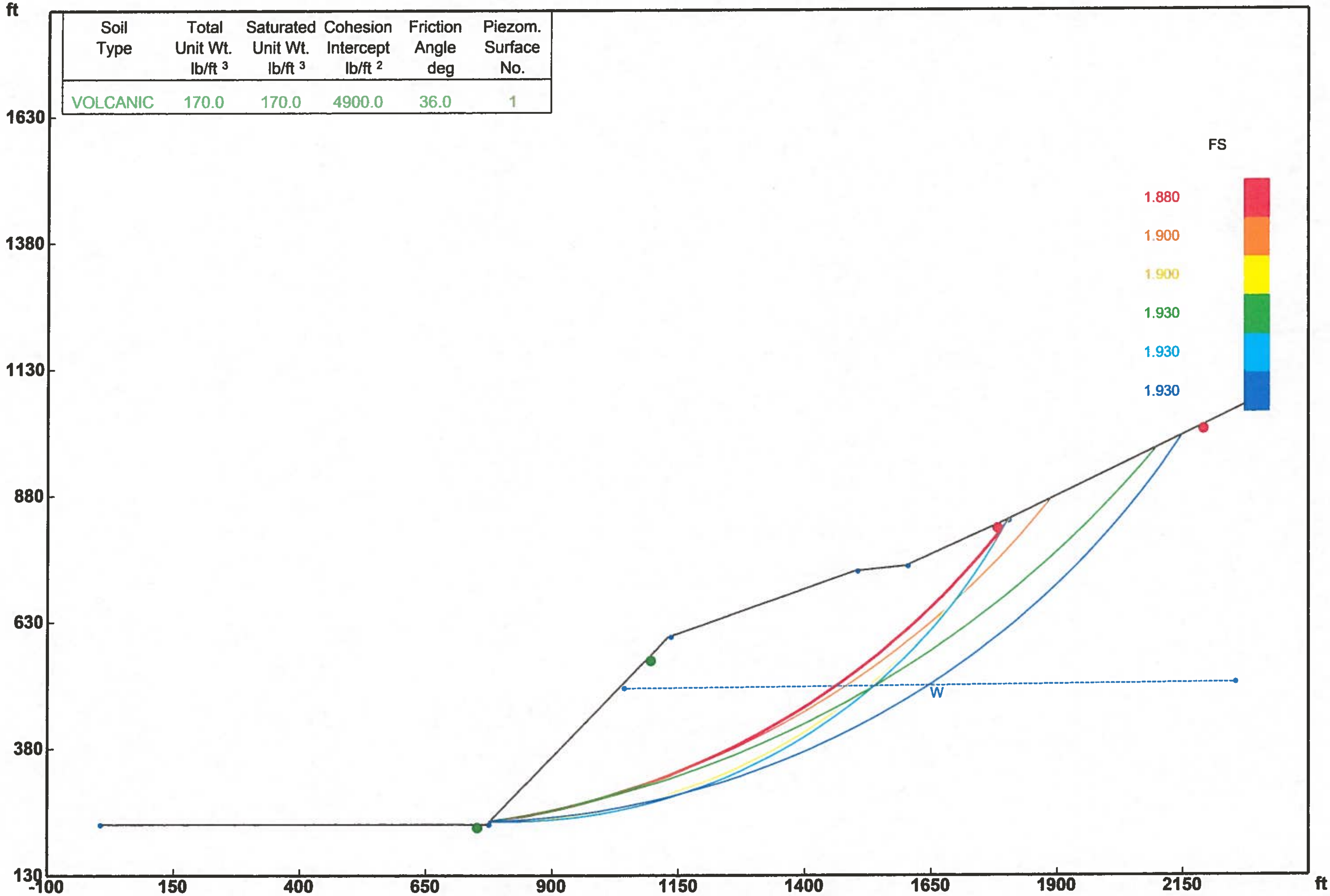
Results

	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	667.69	ft	To	884.62	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	48	Points FS=	1.69	Drvg F	6112508	lb/ft
Center	X =	738.71	Y =	922.868	Radius=	677.716

Point	X-Coord	Y-Coord
	ft	ft
1	778.19	238.41
2	794.7	242.69
3	811.14	247.23
4	827.51	252.05
5	843.79	257.14
6	859.98	262.5
7	876.09	268.13
8	892.1	274.02
9	908.01	280.18
10	923.81	286.6
11	939.51	293.28
12	955.09	300.22
13	970.55	307.42
14	985.9	314.87
15	1001.12	322.58
16	1016.2	330.54
17	1031.16	338.75
18	1045.97	347.2
19	1060.65	355.9

Pacific Rock

Cross-Section D-D' Global Static



FSmin = 1.880Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.DD.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section D-D' Global Static

User Name：	Travis	Calculation	Method：	ASD-Bishop Method

Input Data

Failure	Surface	Strength	Fi Reduc.	1	C Reduc.	1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	230.00	770.00	230.00	VOLCANIC
2	770.00	230.00	1130.00	600.00	VOLCANIC
3	1130.00	600.00	1500.00	730.00	VOLCANIC
4	1500.00	730.00	1600.00	740.00	VOLCANIC
5	1600.00	740.00	1800.00	830.00	VOLCANIC
6	1800.00	830.00	2300.00	1070.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight	Of Water =	62.4	lb/ft^3		
Piezometric	Surface No.	1	Consists Of	2	Points
		X		Y	
		1038.00		499.23	
		0.00		0.00	

Results

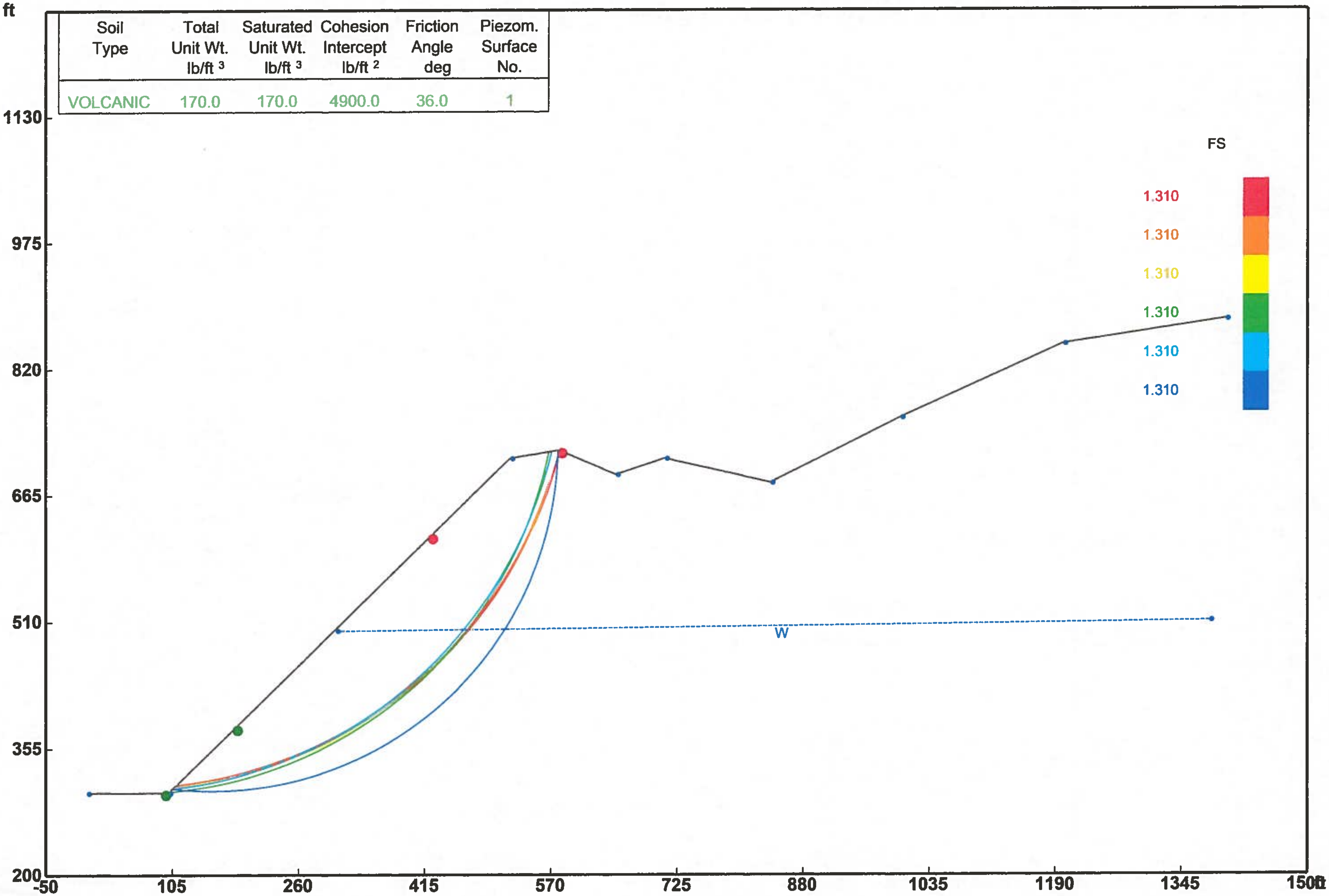
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	746.15	ft	To	1089.23	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	48	Points FS=	1.88	Drvg F	11694960	lb/ft
Center	X =	570.791	Y =	1780.061	Radius=	1556.978

Point	X-Coord	Y-Coord
	ft	ft
1	776.56	236.74
2	804.49	241.02
3	832.35	245.75
4	860.13	250.93
5	887.83	256.56
6	915.42	262.64
7	942.92	269.17
8	970.31	276.14
9	997.58	283.55
10	1024.73	291.4
11	1051.74	299.69
12	1078.62	308.41
13	1105.36	317.57
14	1131.94	327.17
15	1158.36	337.19
16	1184.62	347.63
17	1210.71	358.5
18	1236.61	369.8
19	1262.33	381.51

Pacific Rock

Cross-Section C-C' Lower Slope Pseudo-Static

Soil Type	Total Unit Wt. lb/ft ^{3}	Saturated Unit Wt. lb/ft ^{3}	Cohesion Intercept lb/ft ^{2}	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	4900.0	36.0	1



FSmin = 1.310Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0
(ASD)

User Name: Travis C:\Users\Travis\Documents\Pacific.CC.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section C-C' Lower Slope Pseudo-Static

User Name： Travis　　Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength　Fi Reduc. 1　C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	100.00	300.00	VOLCANIC
2	100.00	300.00	520.00	710.00	VOLCANIC
3	520.00	710.00	580.00	720.00	VOLCANIC
4	580.00	720.00	650.00	690.00	VOLCANIC
5	650.00	690.00	710.00	710.00	VOLCANIC
6	710.00	710.00	840.00	680.00	VOLCANIC
7	840.00	680.00	1000.00	760.00	VOLCANIC
8	1000.00	760.00	1200.00	850.00	VOLCANIC
9	1200.00	850.00	1400.00	880.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

Piezometric Surface No. 1 Consists Of 2 Points

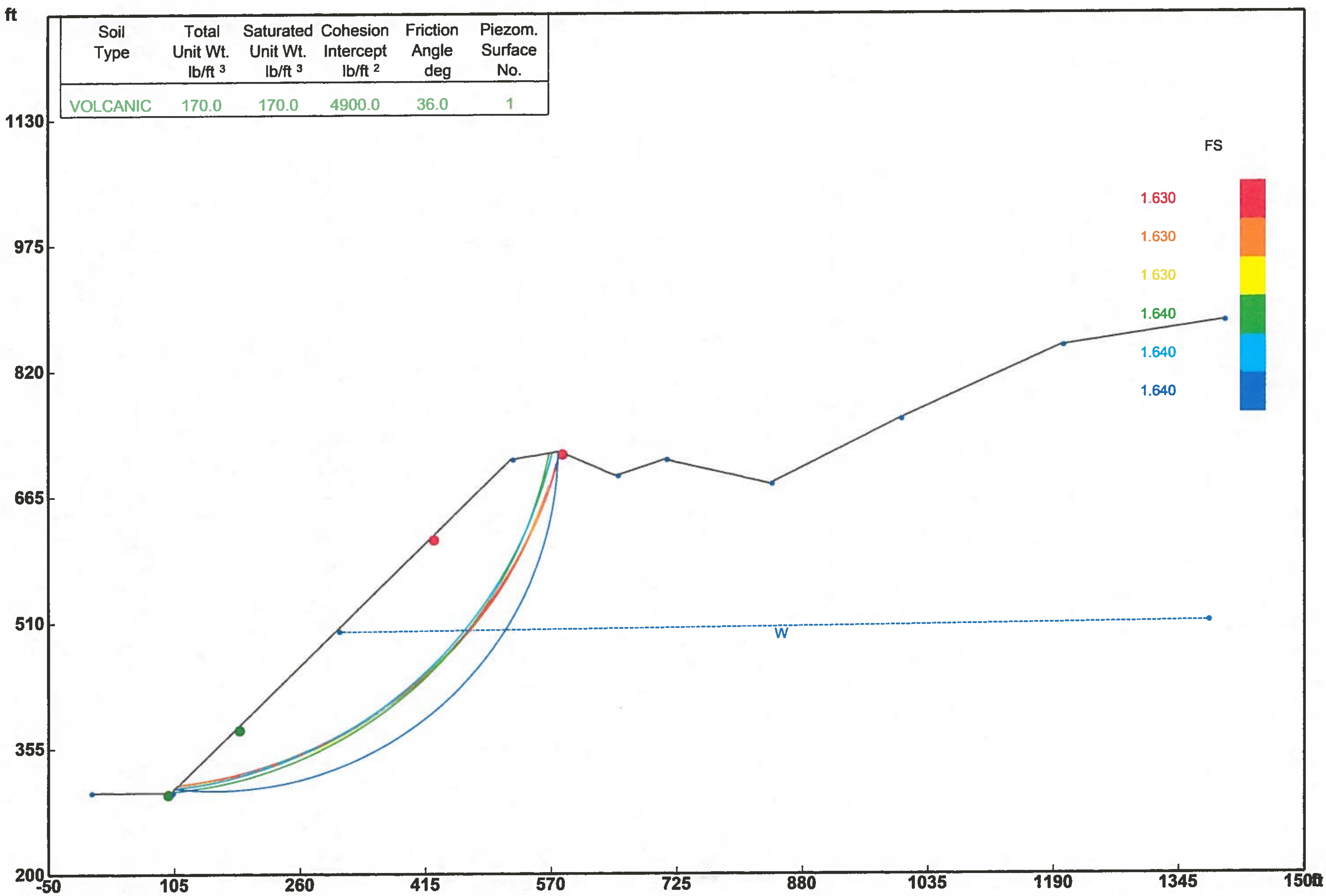
X　Y

			306.00		499.00	
			0.00		0.00	
	Seismic	Loads				
			Horizontal		Vertical	
			Acceleration		Acceleration	
			g		g	
			0.15		0.0	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	94.0	ft	To	182.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	71	Points FS=	1.31	Drvg F	5391877	lb/ft
Center	X =	50.685	Y =	852.391	Radius=	546.19
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		109.62		309.39	
	2		119.11		310.49	
	3		128.59		311.76	
	4		138.03		313.2	
	5		147.46		314.8	
	6		156.85		316.57	
	7		166.21		318.5	
	8		175.53		320.6	
	9		184.82		322.86	
	10		194.06		325.29	

Pacific Rock

Cross-Section C-C' Lower Slope Static

Soil Type	Total Unit Wt. lb/ft ^{3}	Saturated Unit Wt. lb/ft ^{3}	Cohesion Intercept lb/ft ^{2}	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	4900.0	36.0	1



FSmin = 1.630Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0
(ASD)

User Name: Travis C:\Users\Travis\Documents\Pacific CC.slp

Visual Slope

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称：　Pacific Rock

Cross-Section C-C' Lower Slope Static

User Name： Travis　　Calculation Method： ASD-Bishop Method

Input Data

Failure	Surface	Strength	Fi Reduc.	1	C Reduc.	1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	100.00	300.00	VOLCANIC
2	100.00	300.00	520.00	710.00	VOLCANIC
3	520.00	710.00	580.00	720.00	VOLCANIC
4	580.00	720.00	650.00	690.00	VOLCANIC
5	650.00	690.00	710.00	710.00	VOLCANIC
6	710.00	710.00	840.00	680.00	VOLCANIC
7	840.00	680.00	1000.00	760.00	VOLCANIC
8	1000.00	760.00	1200.00	850.00	VOLCANIC
9	1200.00	850.00	1400.00	880.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

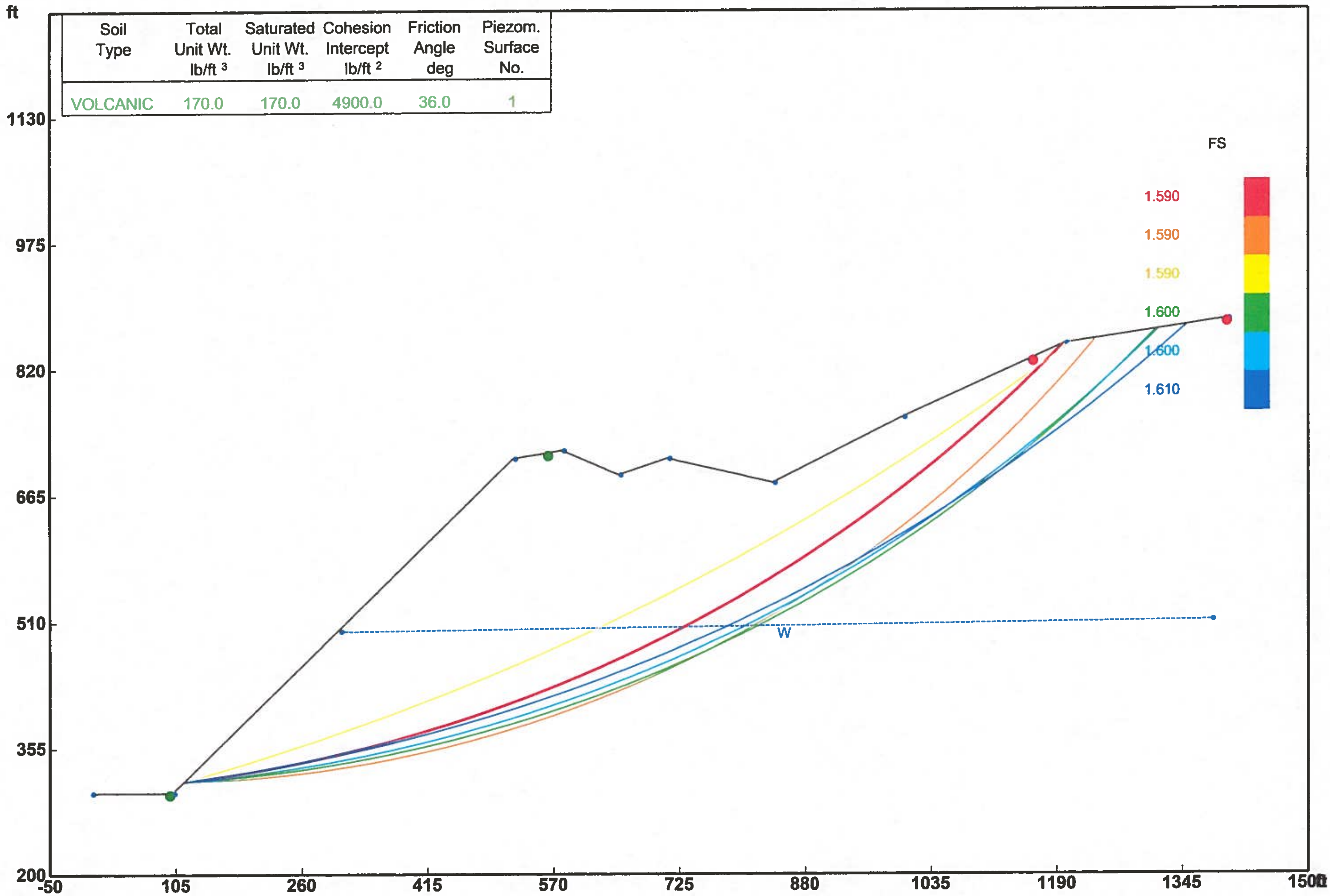
Piezometric Surface No. 1 Consists Of 2 Points

X	Y

			306.00		499.00	
			0.00		0.00	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	94.0	ft	To	182.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	71	Points FS=	1.63	Drvg F	4548203	lb/ft
Center	X =	50.685	Y =	852.391	Radius=	546.19
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		109.62		309.39	
	2		119.11		310.49	
	3		128.59		311.76	
	4		138.03		313.2	
	5		147.46		314.8	
	6		156.85		316.57	
	7		166.21		318.5	
	8		175.53		320.6	
	9		184.82		322.86	
	10		194.06		325.29	
	11		203.26		327.87	
	12		212.42		330.62	
	13		221.52		333.53	
	14		230.57		336.6	
	15		239.57		339.83	
	16		248.51		343.21	

Pacific Rock

Cross-Section C-C' Global Pseduo-Static



FSmin = 1.590Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.CC.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section C-C' Global Pseduo-Static

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength   Fi Reduc. 1   C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	100.00	300.00	VOLCANIC
2	100.00	300.00	520.00	710.00	VOLCANIC
3	520.00	710.00	580.00	720.00	VOLCANIC
4	580.00	720.00	650.00	690.00	VOLCANIC
5	650.00	690.00	710.00	710.00	VOLCANIC
6	710.00	710.00	840.00	680.00	VOLCANIC
7	840.00	680.00	1000.00	760.00	VOLCANIC
8	1000.00	760.00	1200.00	850.00	VOLCANIC
9	1200.00	850.00	1400.00	880.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

Piezometric Surface No. 1 Consists Of 2 Points

X	Y

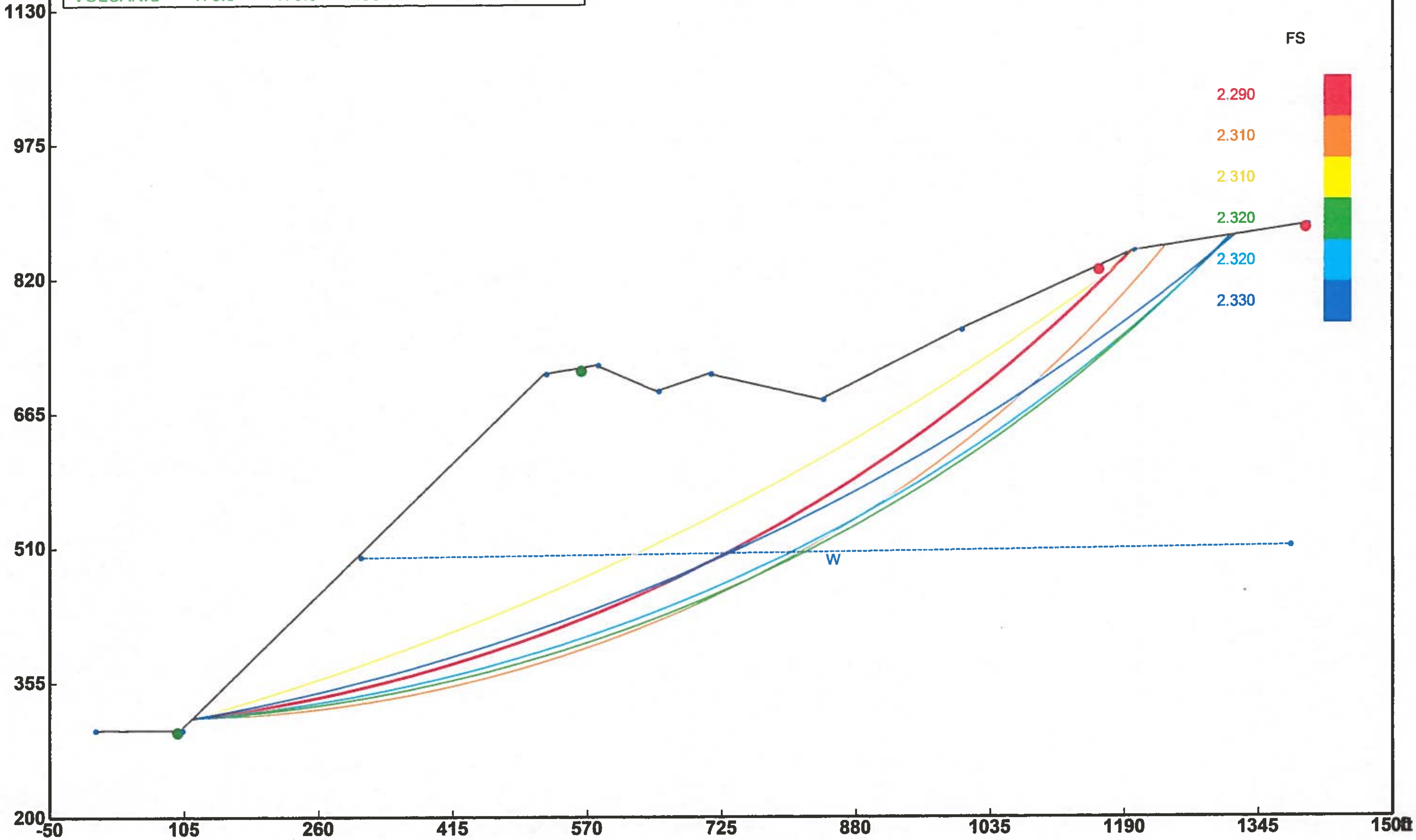
			306.00		499.00	
			0.00		0.00	
	Seismic	Loads				
			Horizontal		Vertical	
			Acceleration		Acceleration	
			g		g	
			0.15		0.0	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	94.0	ft	To	560.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	52	Points FS=	1.59	Drvg F	13143380	lb/ft
Center	X =	-101.635	Y =	2117.667	Radius=	1815.995

Point	X-Coord	Y-Coord
	ft	ft
1	115.0	314.64
2	140.56	315.37
3	166.11	316.53
4	191.63	318.13
5	217.12	320.17
6	242.57	322.64
7	267.98	325.54
8	293.33	328.88
9	318.62	332.65
10	343.84	336.85

Pacific Rock

Cross-Section C-C' Global Static

Soil Type	Total Unit Wt. lb/ft ^{3}	Saturated Unit Wt. lb/ft ^{3}	Cohesion Intercept lb/ft ^{2}	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	4900.0	36.0	1



FSmin = 2.290Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0
(ASD)

User Name: Travis C:\Users\Travis\Documents\Pacific.CC.slp

Visual Slope

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section C-C' Global Static

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength Fi Reduc. 1 C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	100.00	300.00	VOLCANIC
2	100.00	300.00	520.00	710.00	VOLCANIC
3	520.00	710.00	580.00	720.00	VOLCANIC
4	580.00	720.00	650.00	690.00	VOLCANIC
5	650.00	690.00	710.00	710.00	VOLCANIC
6	710.00	710.00	840.00	680.00	VOLCANIC
7	840.00	680.00	1000.00	760.00	VOLCANIC
8	1000.00	760.00	1200.00	850.00	VOLCANIC
9	1200.00	850.00	1400.00	880.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

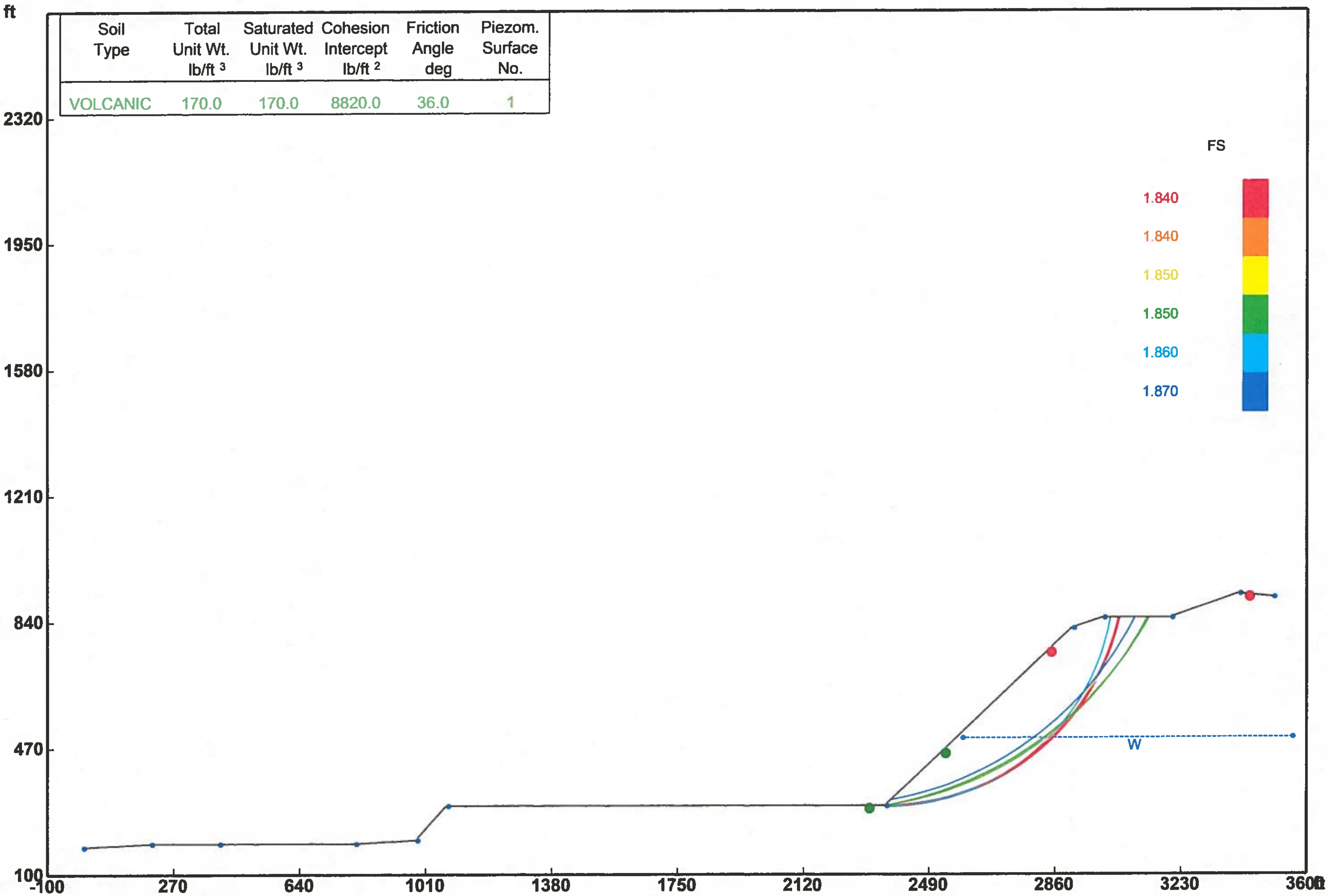
Piezometric Surface No. 1 Consists Of 2 Points

X Y

			306.00		499.00	
			0.00		0.00	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	94.0	ft	To	560.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	52	Points FS=	2.29	Drvg F	9643404	lb/ft
Center	X =	-101.635	Y =	2117.667	Radius=	1815.995
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		115.0		314.64	
	2		140.56		315.37	
	3		166.11		316.53	
	4		191.63		318.13	
	5		217.12		320.17	
	6		242.57		322.64	
	7		267.98		325.54	
	8		293.33		328.88	
	9		318.62		332.65	
	10		343.84		336.85	
	11		368.99		341.48	
	12		394.06		346.54	
	13		419.03		352.03	
	14		443.91		357.94	
	15		468.69		364.27	
	16		493.35		371.03	

Pacific Rock

Cross-Section B-B' Static 10% Reduction



Soil Type	Total Unit Wt. lb/ft ^{3}	Saturated Unit Wt. lb/ft ^{3}	Cohesion Intercept lb/ft ^{2}	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	8820.0	36.0	1

FSmin = 1.840Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

User Name: Travis C:\Users\Travis\Documents\Pacific.BB.slp

Visual Slope

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section B-B' Static 10% Reduction

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength Fi Reduc. 1 C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	180.00	200.00	190.00	VOLCANIC
2	200.00	190.00	400.00	190.00	VOLCANIC
3	400.00	190.00	800.00	190.00	VOLCANIC
4	800.00	190.00	980.00	200.00	VOLCANIC
5	980.00	200.00	1070.00	300.00	VOLCANIC
6	1070.00	300.00	2360.00	300.00	VOLCANIC
7	2360.00	300.00	2910.00	820.00	VOLCANIC
8	2910.00	820.00	3000.00	850.00	VOLCANIC
9	3000.00	850.00	3200.00	850.00	VOLCANIC
10	3200.00	850.00	3400.00	920.00	VOLCANIC
11	3400.00	920.00	3500.00	910.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	8820	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

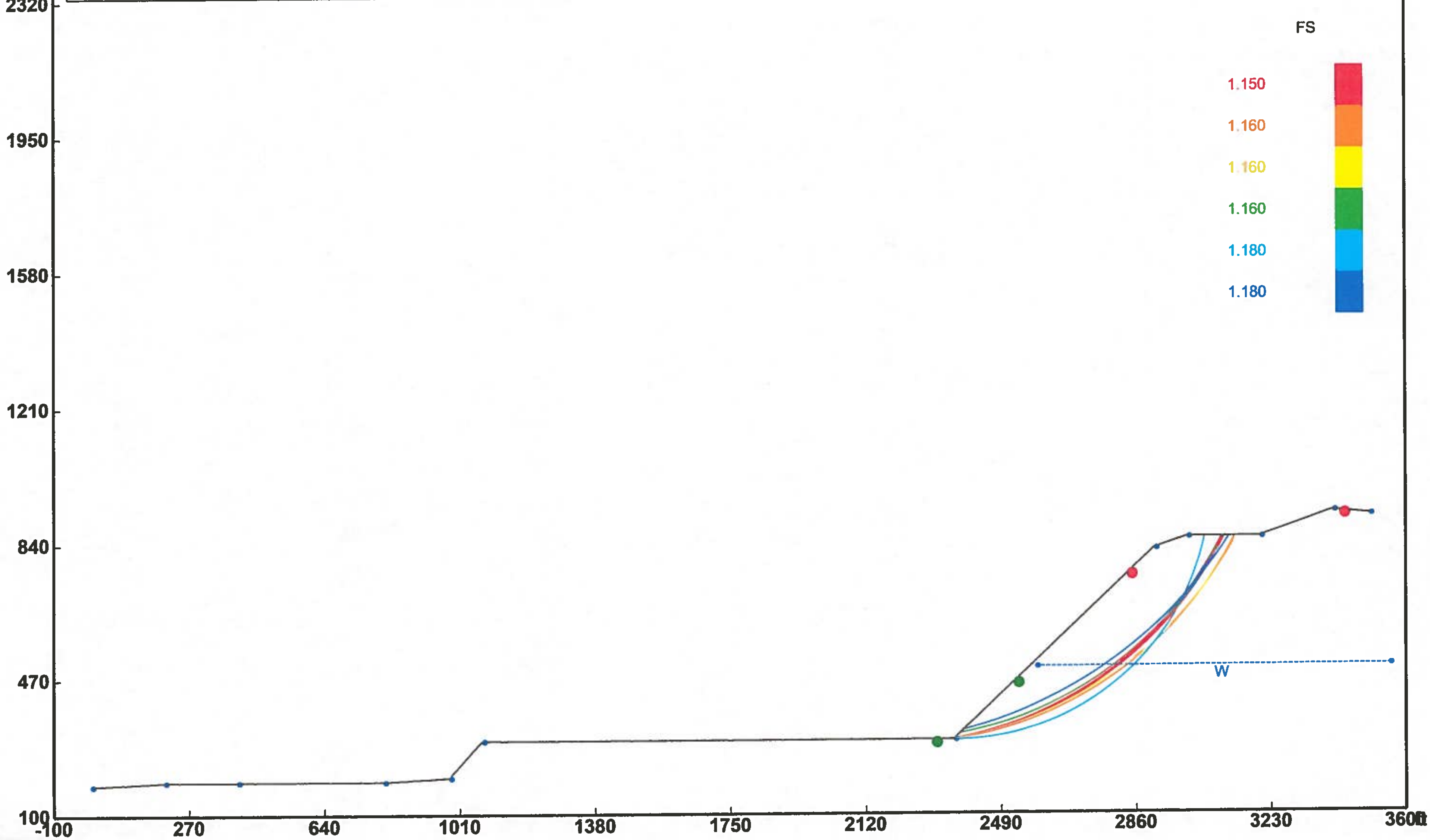
	Piezometric	Surface No.	1	Consists Of	2	Points
			X		Y	
			2583.85		499.23	
			0.00		0.00	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	2306.92	ft	To	2530.77	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	46	Points FS=	1.84	Drvg F	10513020	lb/ft
Center	X =	2365.472	Y =	999.001	Radius=	699.023

Point	X-Coord ft	Y-Coord ft
1	2360.0	300.0
2	2381.71	303.35
3	2403.34	307.16
4	2424.89	311.43
5	2446.33	316.17
6	2467.68	321.35
7	2488.91	326.99
8	2510.01	333.09
9	2530.98	339.63
10	2551.8	346.62
11	2572.47	354.05
12	2592.98	361.91
13	2613.31	370.22
14	2633.47	378.95

Pacific Rock

Cross-Section B-B' Pseduo-Static

Soil Type	Total Unit Wt. lb/ft 3	Saturated Unit Wt. lb/ft 3	Cohesion Intercept lb/ft 2	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	4900.0	36.0	1



FSmin = 1.150Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0 (ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.BB.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section B-B' Pseduo-Static

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength   Fi Reduc. 1   C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	180.00	200.00	190.00	VOLCANIC
2	200.00	190.00	400.00	190.00	VOLCANIC
3	400.00	190.00	800.00	190.00	VOLCANIC
4	800.00	190.00	980.00	200.00	VOLCANIC
5	980.00	200.00	1070.00	300.00	VOLCANIC
6	1070.00	300.00	2360.00	300.00	VOLCANIC
7	2360.00	300.00	2910.00	820.00	VOLCANIC
8	2910.00	820.00	3000.00	850.00	VOLCANIC
9	3000.00	850.00	3200.00	850.00	VOLCANIC
10	3200.00	850.00	3400.00	920.00	VOLCANIC
11	3400.00	920.00	3500.00	910.00	VOLCANIC

Soil Data

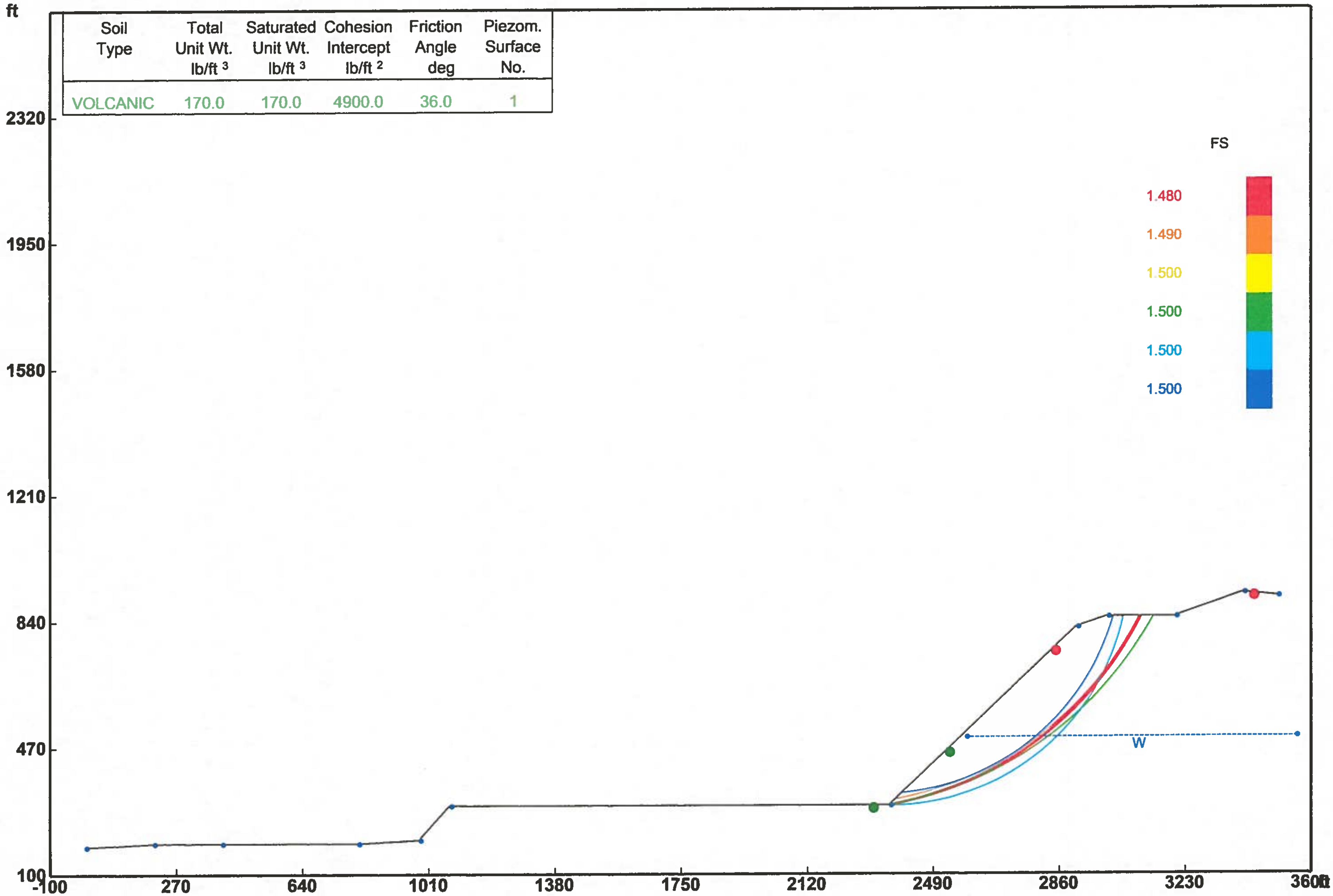
Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

	Piezometric	Surface No.	1	Consists Of	2	Points
			X		Y	
			2583.85		499.23	
			0.00		0.00	
	Seismic	Loads				
			Horizontal		Vertical	
			Acceleration		Acceleration	
			g		g	
			0.15		0.0	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	2306.92	ft	To	2530.77	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	46	Points FS=	1.15	Drvg F	11947140	lb/ft
Center	X =	2182.804	Y =	1310.66	Radius=	1026.076
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		2360.0		300.0	
	2		2381.71		303.35	
	3		2403.34		307.16	
	4		2424.89		311.43	
	5		2446.33		316.17	
	6		2467.68		321.35	
	7		2488.91		326.99	
	8		2510.01		333.09	

Pacific Rock
Cross-Section B-B' Static



FSmin = 1.480Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.BB.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section B-B' Static

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength Fi Reduc. 1 C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	180.00	200.00	190.00	VOLCANIC
2	200.00	190.00	400.00	190.00	VOLCANIC
3	400.00	190.00	800.00	190.00	VOLCANIC
4	800.00	190.00	980.00	200.00	VOLCANIC
5	980.00	200.00	1070.00	300.00	VOLCANIC
6	1070.00	300.00	2360.00	300.00	VOLCANIC
7	2360.00	300.00	2910.00	820.00	VOLCANIC
8	2910.00	820.00	3000.00	850.00	VOLCANIC
9	3000.00	850.00	3200.00	850.00	VOLCANIC
10	3200.00	850.00	3400.00	920.00	VOLCANIC
11	3400.00	920.00	3500.00	910.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

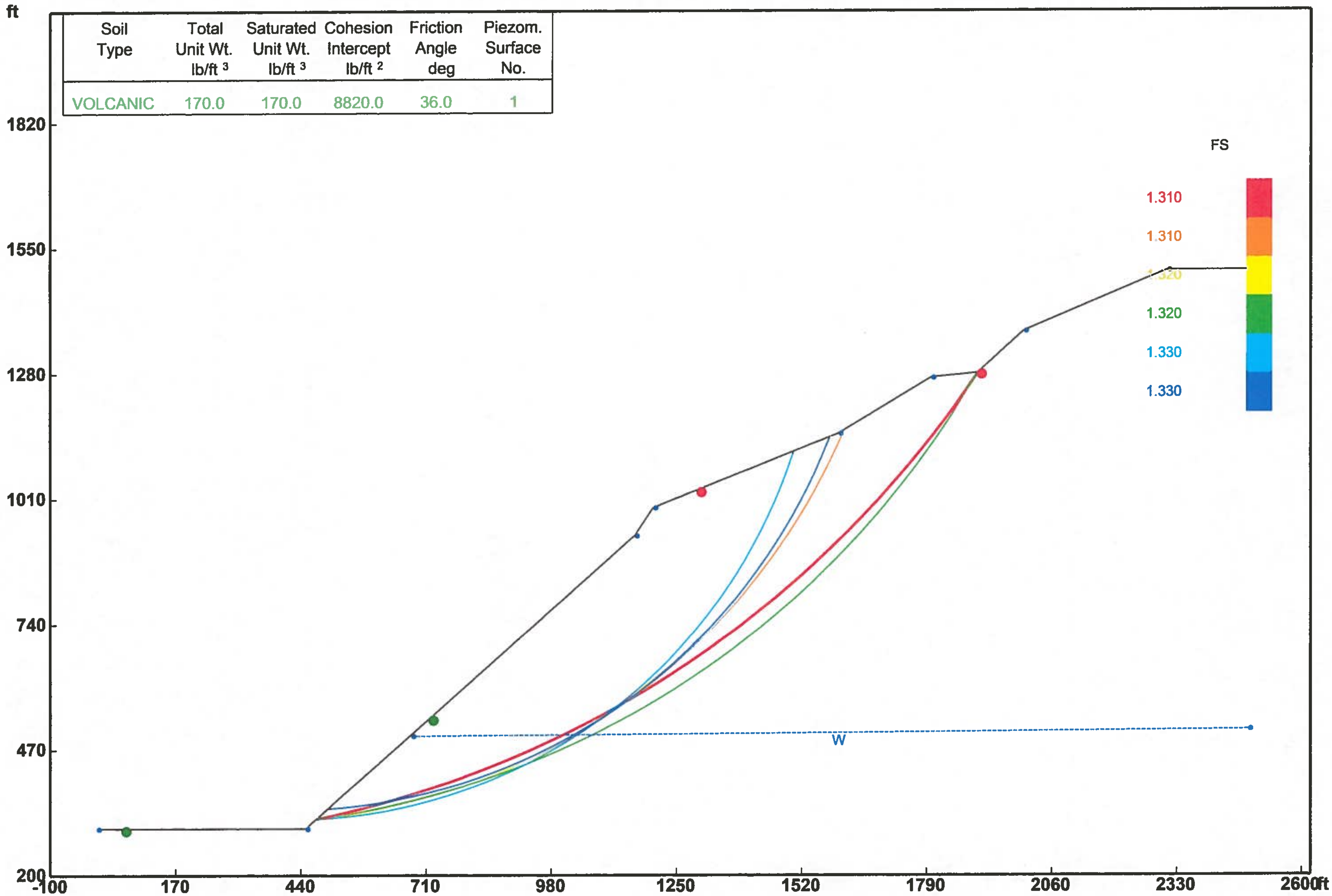
1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

	Piezometric	Surface No.	1	Consists Of	2	Points
			X		Y	
			2583.85		499.23	
			0.00		0.00	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	2306.92	ft	To	2530.77	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	44	Points FS=	1.48	Drvg F	9961054	lb/ft
Center	X =	2182.804	Y =	1310.66	Radius=	1026.076
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		2378.97		317.94	
	2		2400.55		322.07	
	3		2422.02		326.67	
	4		2443.4		331.75	
	5		2464.65		337.29	
	6		2485.78		343.29	
	7		2506.77		349.76	
	8		2527.61		356.68	
	9		2548.3		364.06	
	10		2568.82		371.89	
	11		2589.17		380.17	
	12		2609.33		388.9	
	13		2629.29		398.06	
	14		2649.04		407.66	

Pacific Rock

Cross-Section A-A' Pseudo-Static Lower Slope 10% Reduction



FSmin = 1.310Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.AA.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称：   Pacific Rock

Cross-Section A-A' Pseudo-Static Lower Slope 10% Reduction

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength Fi Reduc. 1 C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	450.00	300.00	VOLCANIC
2	450.00	300.00	1160.00	930.00	VOLCANIC
3	1160.00	930.00	1200.00	990.00	VOLCANIC
4	1200.00	990.00	1600.00	1150.00	VOLCANIC
5	1600.00	1150.00	1800.00	1270.00	VOLCANIC
6	1800.00	1270.00	1900.00	1280.00	VOLCANIC
7	1900.00	1280.00	2000.00	1370.00	VOLCANIC
8	2000.00	1370.00	2310.00	1500.00	VOLCANIC
9	2310.00	1500.00	2520.00	1500.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	8820	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

Piezometric Surface No. 1 Consists Of 2 Points

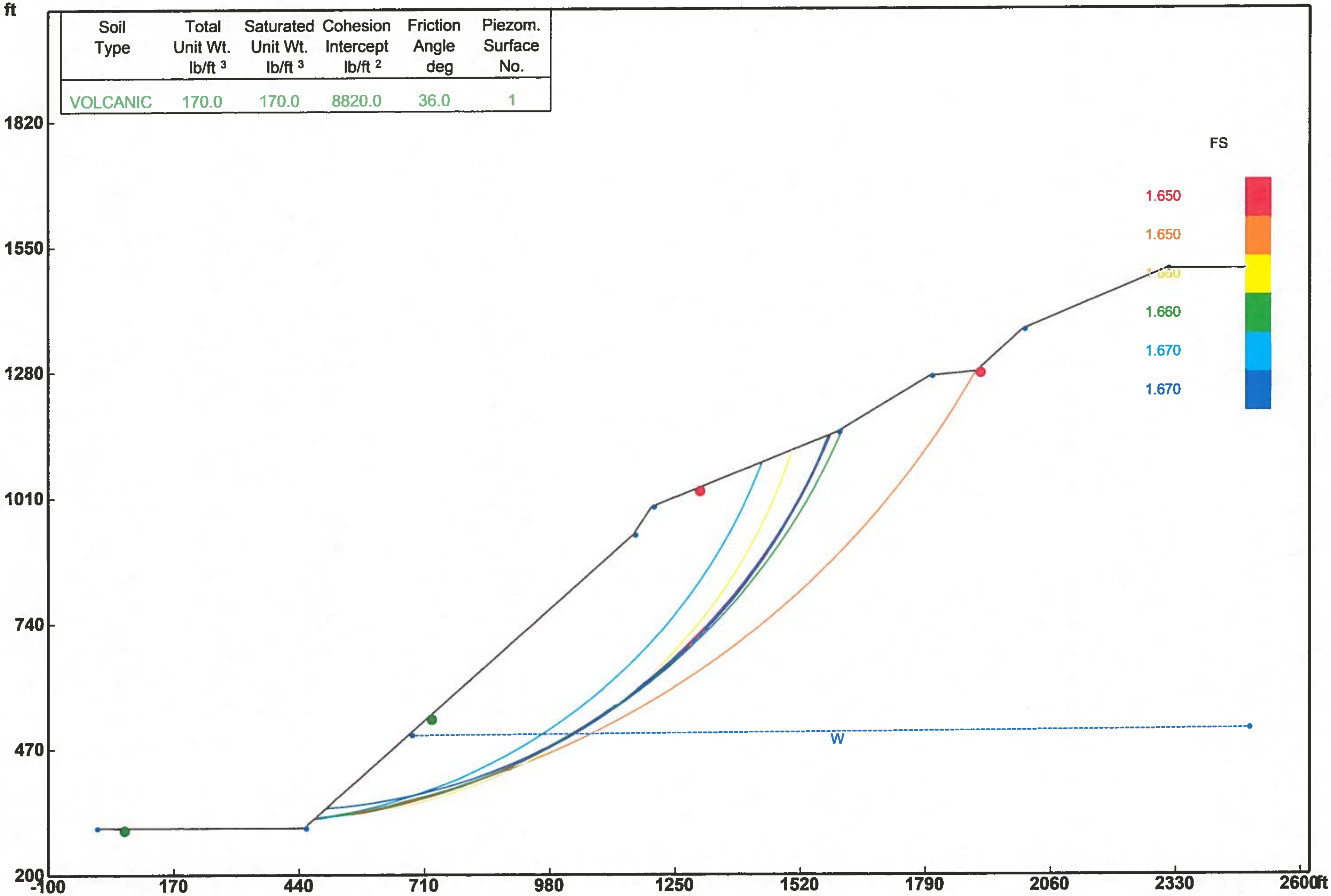
X Y

			678.33		500.00	
			0.00		0.00	
	Seismic	Loads				
			Horizontal		Vertical	
			Acceleration		Acceleration	
			g		g	
			0.15		0.0	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	58.33	ft	To	720.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	42	Points FS=	1.31	Drvg F	34402720	lb/ft
Center	X =	14.661	Y =	2546.54	Radius=	2271.795
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		474.55		321.78	
	2		510.53		325.84	
	3		546.39		330.83	
	4		582.11		336.76	
	5		617.66		343.62	
	6		653.02		351.41	
	7		688.17		360.12	
	8		723.07		369.74	
	9		757.71		380.27	
	10		792.07		391.71	

Pacific Rock

Cross-Section A-A' Static Lower Slope 10% Reduction

Soil Type	Total Unit Wt. lb/ft ³	Saturated Unit Wt. lb/ft ³	Cohesion Intercept lb/ft ²	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	8820.0	36.0	1



FSmin = 1.650Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0 (ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.AA.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section A-A' Static Lower Slope 10% Reduction

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure	Surface	Strength	Fi Reduc.	1	C Reduc.	1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	450.00	300.00	VOLCANIC
2	450.00	300.00	1160.00	930.00	VOLCANIC
3	1160.00	930.00	1200.00	990.00	VOLCANIC
4	1200.00	990.00	1600.00	1150.00	VOLCANIC
5	1600.00	1150.00	1800.00	1270.00	VOLCANIC
6	1800.00	1270.00	1900.00	1280.00	VOLCANIC
7	1900.00	1280.00	2000.00	1370.00	VOLCANIC
8	2000.00	1370.00	2310.00	1500.00	VOLCANIC
9	2310.00	1500.00	2520.00	1500.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	8820	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

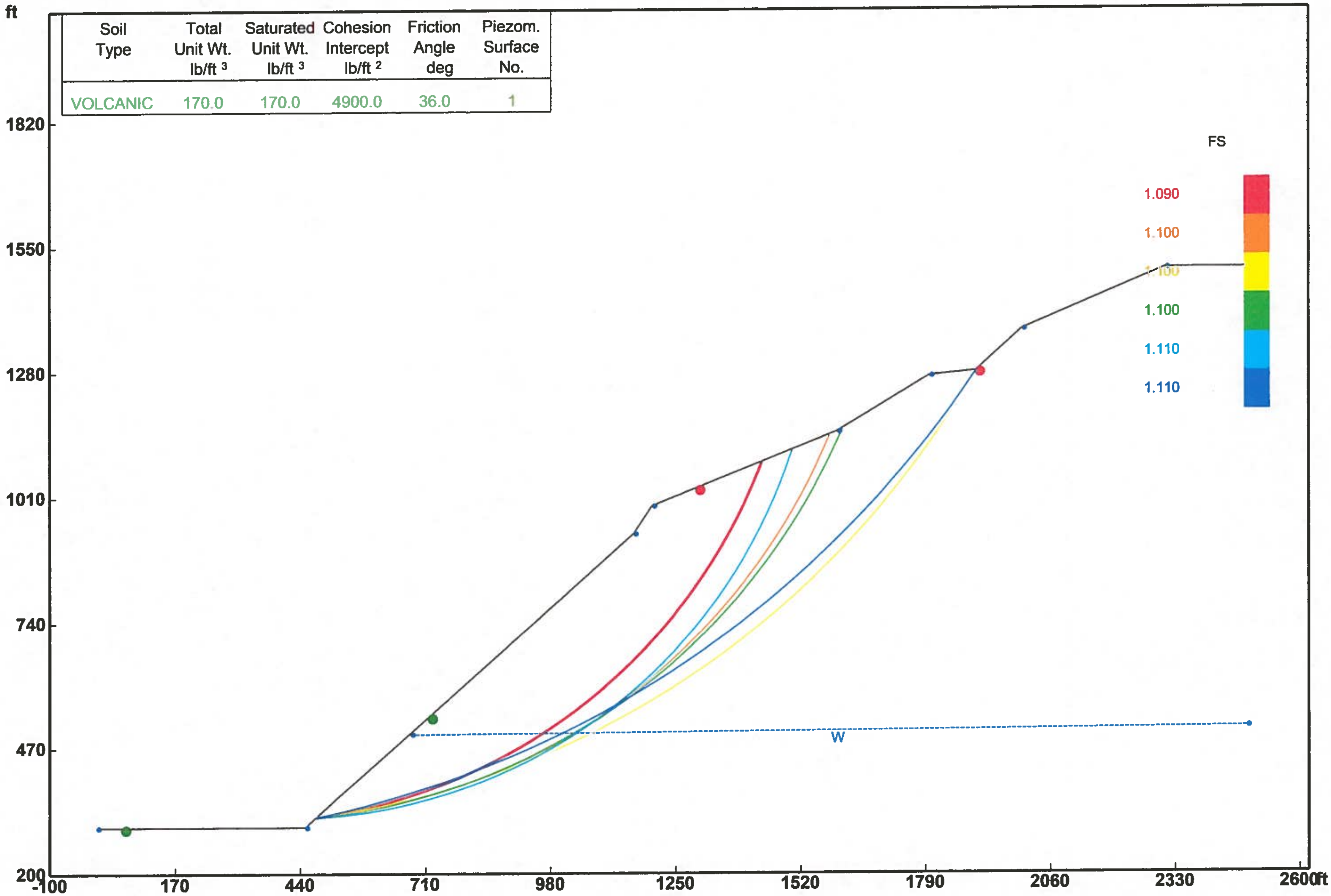
Piezometric Surface No. 1 Consists Of 2 Points

X	Y

			678.33		500.00	
			0.00		0.00	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	58.33	ft	To	720.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	51	Points FS=	1.65	Drvg F	21987320	lb/ft
Center	X =	346.956	Y =	1654.066	Radius=	1338.382
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		474.55		321.78	
	2		510.38		326.98	
	3		546.11		332.84	
	4		581.72		339.37	
	5		617.21		346.57	
	6		652.56		354.42	
	7		687.75		362.93	
	8		722.78		372.09	
	9		757.63		381.91	
	10		792.3		392.37	
	11		826.76		403.47	
	12		861.01		415.22	
	13		895.03		427.6	
	14		928.82		440.62	
	15		962.36		454.26	
	16		995.64		468.52	

Pacific Rock

Cross-Section A-A' Pseudo-Static Lower Slope



FSmin = 1.090Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.AA.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section A-A' Pseudo-Static Lower Slope

User Name：	Travis	Calculation	Method：	ASD-Bishop Method

Input Data

Failure	Surface	Strength	Fi Reduc.	1	C Reduc.	1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	450.00	300.00	VOLCANIC
2	450.00	300.00	1160.00	930.00	VOLCANIC
3	1160.00	930.00	1200.00	990.00	VOLCANIC
4	1200.00	990.00	1600.00	1150.00	VOLCANIC
5	1600.00	1150.00	1800.00	1270.00	VOLCANIC
6	1800.00	1270.00	1900.00	1280.00	VOLCANIC
7	1900.00	1280.00	2000.00	1370.00	VOLCANIC
8	2000.00	1370.00	2310.00	1500.00	VOLCANIC
9	2310.00	1500.00	2520.00	1500.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree）	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

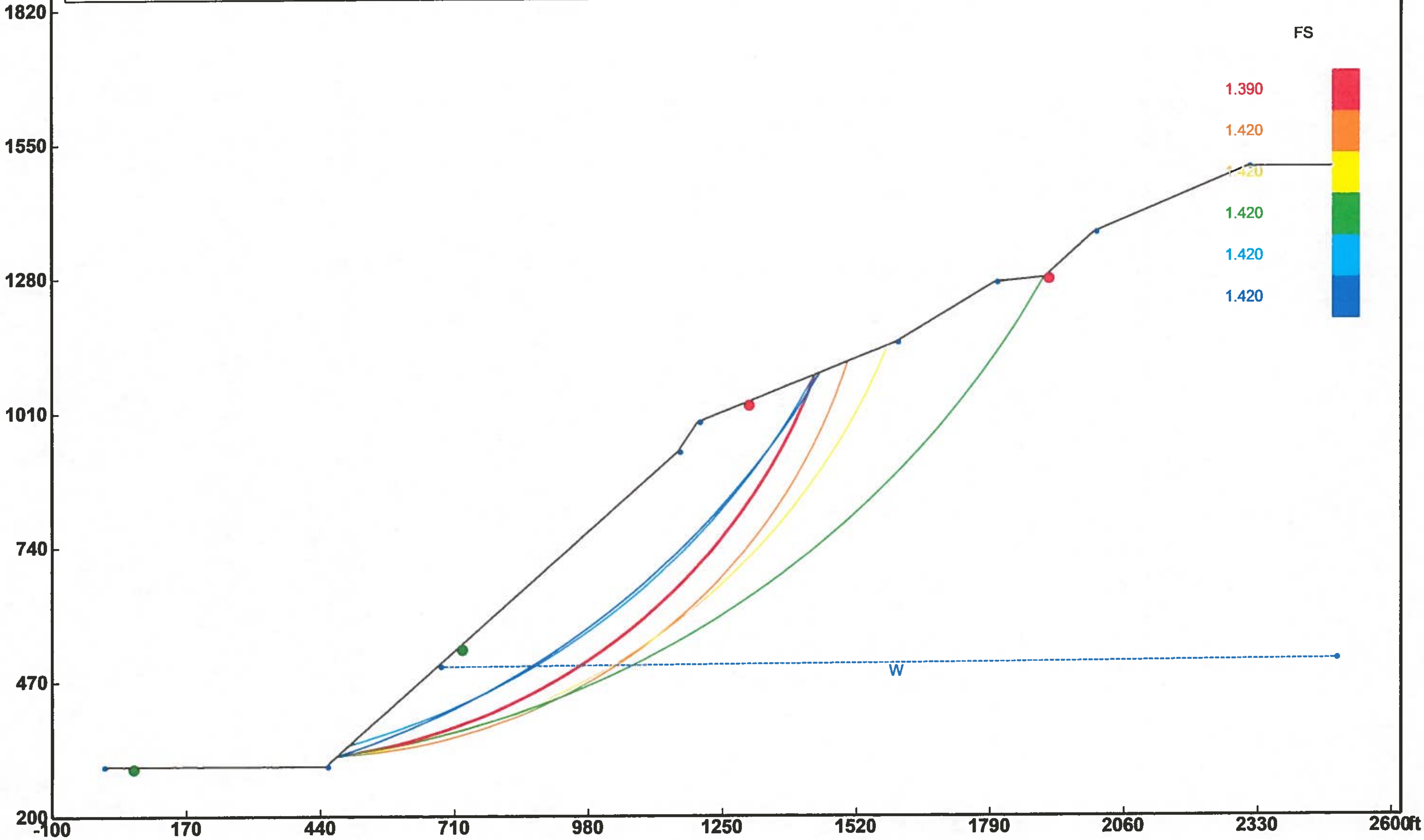
Unit Weight	Of Water =	62.4	lb/ft^3		
Piezometric	Surface No.	1	Consists Of	2	Points
		X		Y	

			678.33		500.00	
			0.00		0.00	
	Seismic	Loads				
			Horizontal		Vertical	
			Acceleration		Acceleration	
			g		g	
			0.15		0.0	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	58.33	ft	To	720.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	42	Points FS=	1.09	Drvg F	19788730	lb/ft
Center	X =	312.632	Y =	1515.304	Radius=	1204.457
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		474.55		321.78	
	2		510.54		325.72	
	3		546.41		330.63	
	4		582.14		336.51	
	5		617.69		343.36	
	6		653.05		351.16	
	7		688.18		359.92	
	8		723.07		369.62	
	9		757.68		380.27	
	10		791.98		391.84	

Pacific Rock

Cross-Section A-A' Static Lower Slope

Soil Type	Total Unit Wt. lb/ft³	Saturated Unit Wt. lb/ft³	Cohesion Intercept lb/ft²	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	4900.0	36.0	1



FSmin = 1.390Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.AA.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section A-A' Static Lower Slope

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength Fi Reduc. 1 C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	450.00	300.00	VOLCANIC
2	450.00	300.00	1160.00	930.00	VOLCANIC
3	1160.00	930.00	1200.00	990.00	VOLCANIC
4	1200.00	990.00	1600.00	1150.00	VOLCANIC
5	1600.00	1150.00	1800.00	1270.00	VOLCANIC
6	1800.00	1270.00	1900.00	1280.00	VOLCANIC
7	1900.00	1280.00	2000.00	1370.00	VOLCANIC
8	2000.00	1370.00	2310.00	1500.00	VOLCANIC
9	2310.00	1500.00	2520.00	1500.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

Piezometric Surface No. 1 Consists Of 2 Points

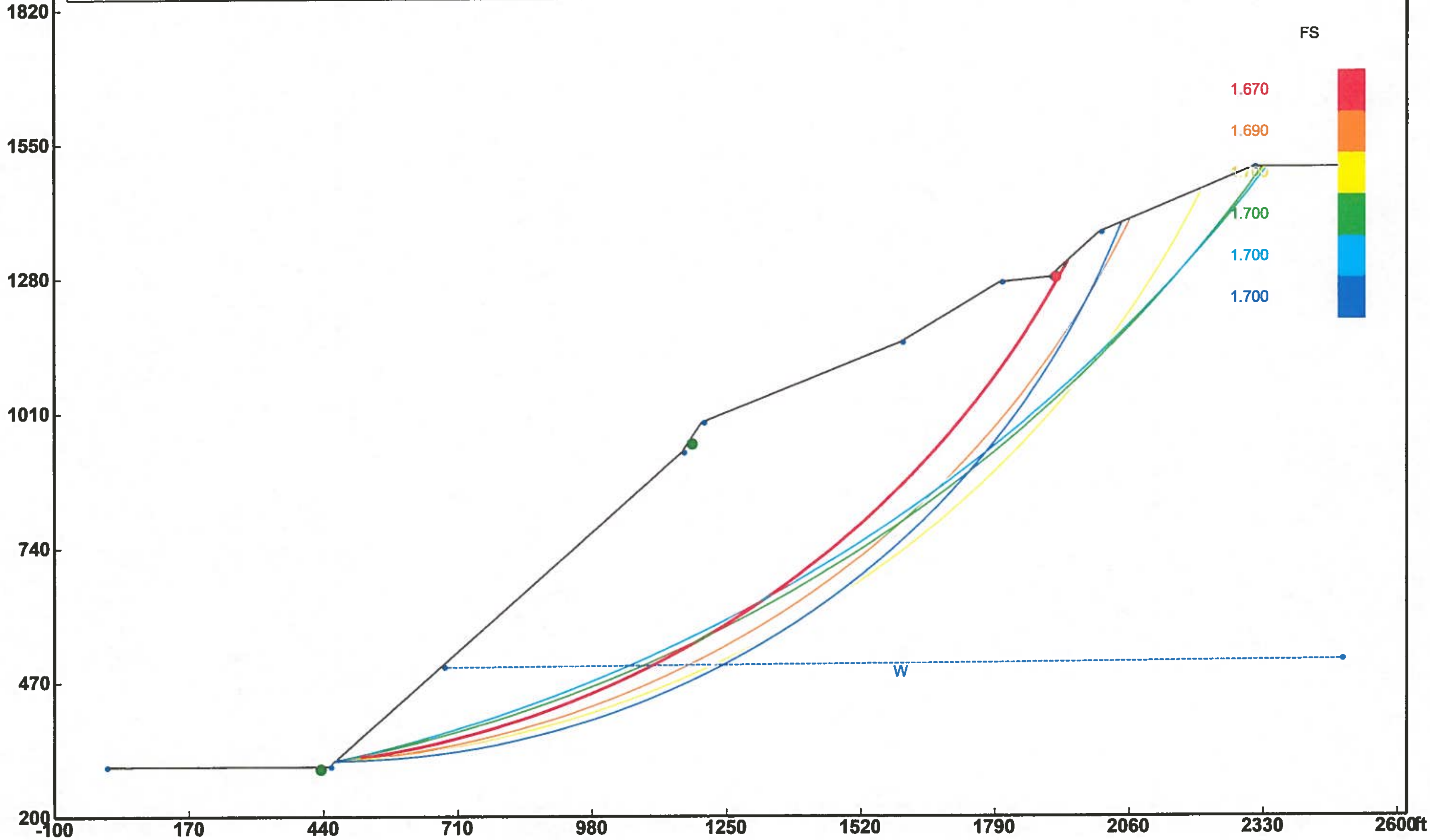
X Y

			678.33		500.00	
			0.00		0.00	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	58.33	ft	To	720.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	40	Points FS=	1.39	Drvg F	16679180	lb/ft
Center	X =	312.632	Y =	1515.304	Radius=	1204.457
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		474.55		321.78	
	2		510.68		324.11	
	3		546.72		327.59	
	4		582.63		332.22	
	5		618.38		337.99	
	6		653.92		344.89	
	7		689.23		352.92	
	8		724.26		362.07	
	9		758.98		372.33	
	10		793.36		383.69	
	11		827.36		396.14	
	12		860.95		409.66	
	13		894.09		424.25	
	14		926.75		439.88	
	15		958.9		456.55	
	16		990.49		474.23	

Pacific Rock

Cross-Section A-A' Static 10% Reduction

Soil Type	Total Unit Wt. lb/ft³	Saturated Unit Wt. lb/ft³	Cohesion Intercept lb/ft²	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	8820.0	36.0	1



FSmin = 1.670Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0
(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.AA.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section A-A' Static 10% Reduction

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure	Surface	Strength	Fi Reduc.	1	C Reduc.	1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	450.00	300.00	VOLCANIC
2	450.00	300.00	1160.00	930.00	VOLCANIC
3	1160.00	930.00	1200.00	990.00	VOLCANIC
4	1200.00	990.00	1600.00	1150.00	VOLCANIC
5	1600.00	1150.00	1800.00	1270.00	VOLCANIC
6	1800.00	1270.00	1900.00	1280.00	VOLCANIC
7	1900.00	1280.00	2000.00	1370.00	VOLCANIC
8	2000.00	1370.00	2310.00	1500.00	VOLCANIC
9	2310.00	1500.00	2520.00	1500.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree）	psf	ft	
VOLCANIC	170	170	8820	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

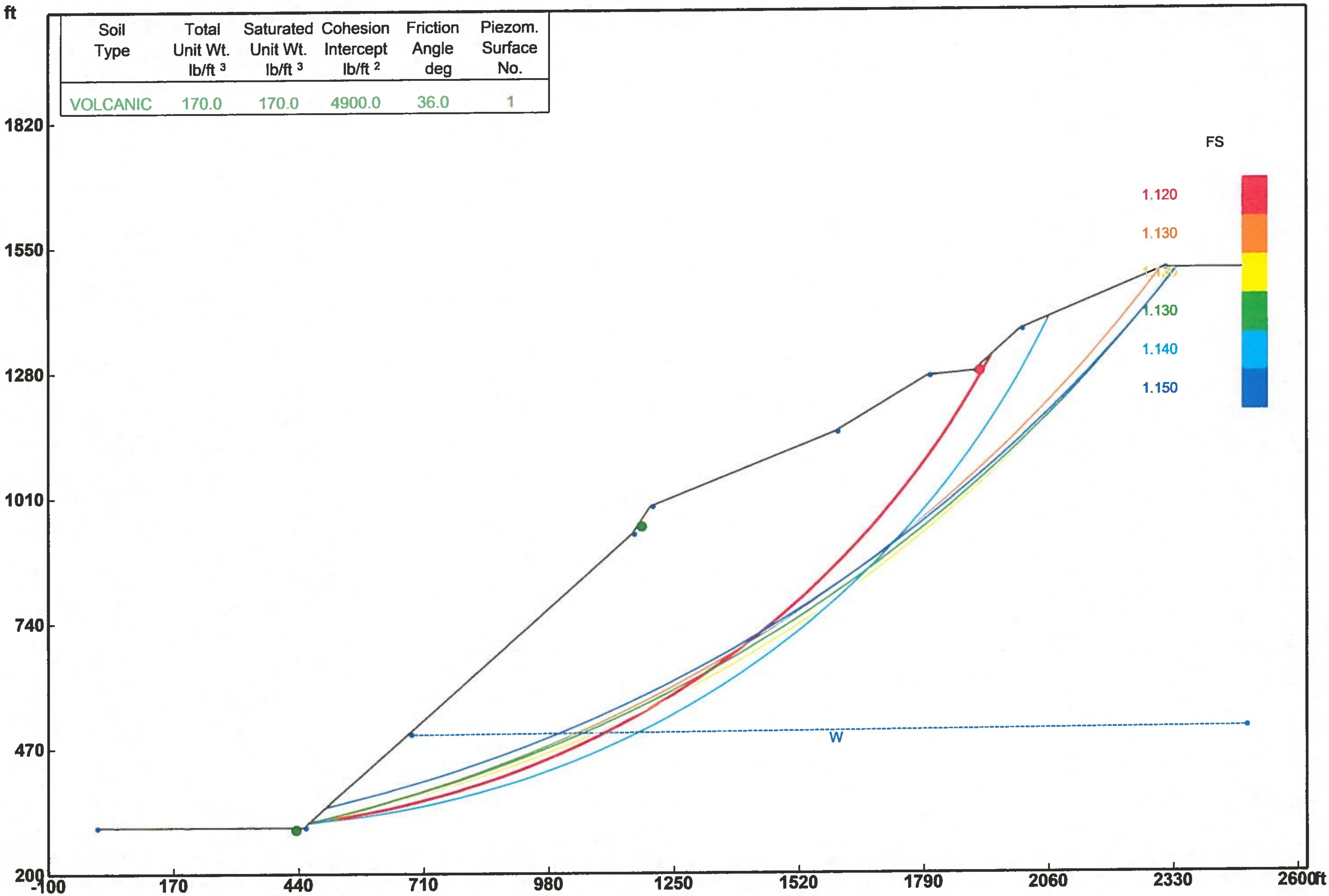
Piezometric Surface No. 1 Consists Of 2 Points

X	Y

			678.33		500.00	
			0.00		0.00	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	428.33	ft	To	1175.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	51	Points FS=	1.67	Drvg F	32606330	lb/ft
Center	X =	236.08	Y =	2232.127	Radius=	1933.319
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		463.83		312.27	
	2		504.65		315.65	
	3		545.38		319.88	
	4		586.01		324.98	
	5		626.52		330.95	
	6		666.9		337.77	
	7		707.13		345.44	
	8		747.18		353.97	
	9		787.04		363.34	
	10		826.7		373.56	
	11		866.13		384.62	
	12		905.32		396.51	
	13		944.24		409.23	
	14		982.89		422.77	
	15		1021.24		437.13	
	16		1059.27		452.3	

Pacific Rock
Cross-Section A-A' Pseudo-Static

Soil Type	Total Unit Wt. lb/ft 3	Saturated Unit Wt. lb/ft 3	Cohesion Intercept lb/ft 2	Friction Angle deg	Piezom. Surface No.
VOLCANIC	170.0	170.0	4900.0	36.0	1



FSmin = 1.120Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0
(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.AA.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section A-A' Pseudo-Static

User Name：	Travis	Calculation	Method：	ASD-Bishop Method

Input Data

Failure	Surface	Strength	Fi Reduc.	1	C Reduc.	1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	450.00	300.00	VOLCANIC
2	450.00	300.00	1160.00	930.00	VOLCANIC
3	1160.00	930.00	1200.00	990.00	VOLCANIC
4	1200.00	990.00	1600.00	1150.00	VOLCANIC
5	1600.00	1150.00	1800.00	1270.00	VOLCANIC
6	1800.00	1270.00	1900.00	1280.00	VOLCANIC
7	1900.00	1280.00	2000.00	1370.00	VOLCANIC
8	2000.00	1370.00	2310.00	1500.00	VOLCANIC
9	2310.00	1500.00	2520.00	1500.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

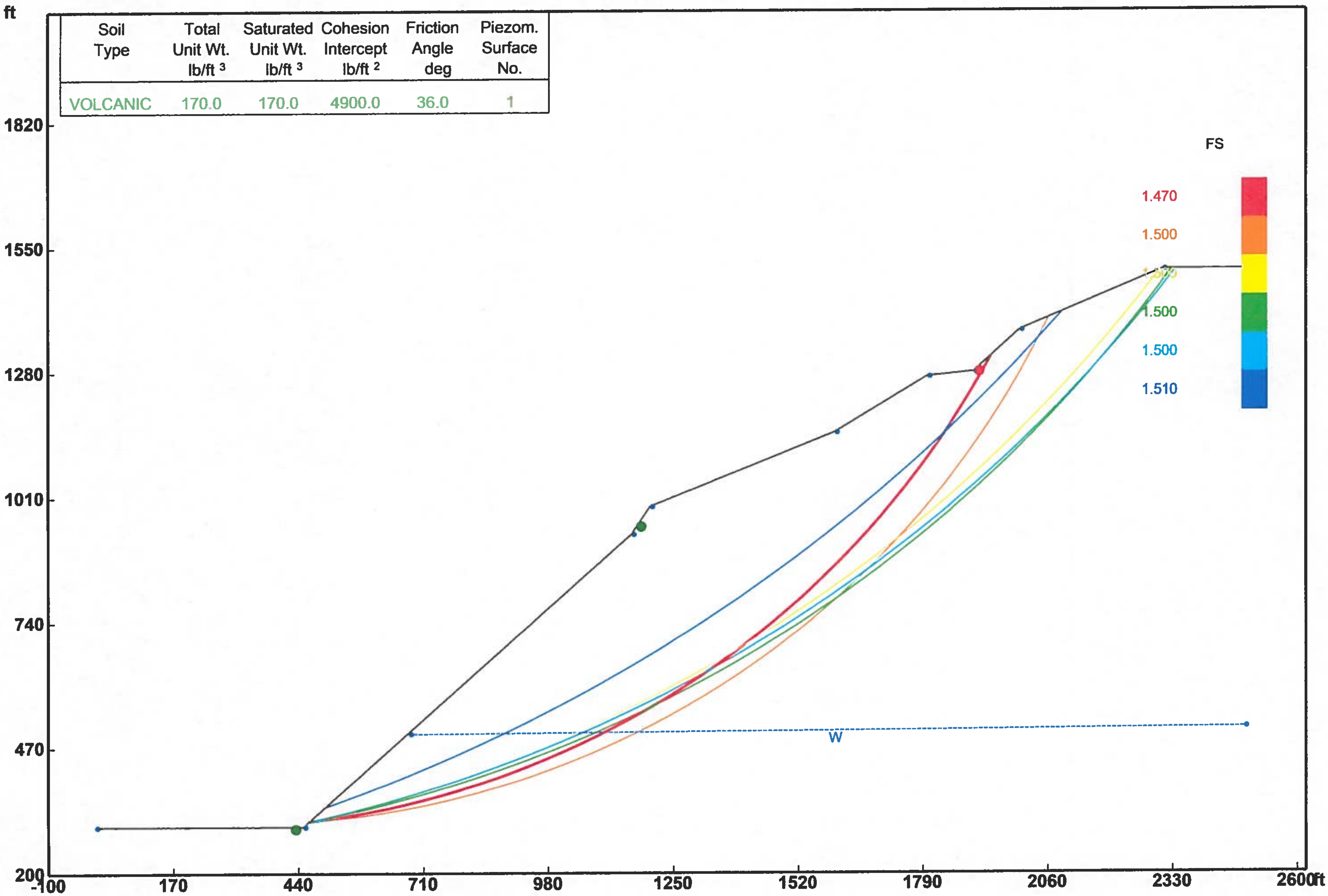
1 Piezometric Surface(s)

Unit Weight	Of Water =	62.4	lb/ft^3		
Piezometric	Surface No.	1	Consists Of	2	Points
		X		Y	

			678.33		500.00	
			0.00		0.00	
	Seismic	Loads				
			Horizontal		Vertical	
			Acceleration		Acceleration	
			g		g	
			0.15		0.0	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	428.33	ft	To	1175.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	56	Points FS=	1.12	Drvg F	39872490	lb/ft
Center	X =	236.08	Y =	2232.127	Radius=	1933.319
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		463.83		312.27	
	2		503.71		321.61	
	3		543.46		331.46	
	4		583.08		341.81	
	5		622.56		352.67	
	6		661.9		364.03	
	7		701.1		375.9	
	8		740.14		388.27	
	9		779.01		401.13	
	10		817.72		414.5	

Pacific Rock

Cross-Section A-A' Static



FSmin = 1.470Bishop Method Failure Surface Fi/C Reduction= 1.0/1.0

(ASD)

Visual Slope

User Name: Travis C:\Users\Travis\Documents\Pacific.AA.slp

Visual Slope

边坡稳定分析，土钉及加筋边坡设计

项目名称： Pacific Rock

Cross-Section A-A' Static

User Name： Travis   Calculation Method： ASD-Bishop Method

Input Data

Failure Surface Strength   Fi Reduc. 1   C Reduc. 1

Line #	X-Left	Y-Left	X-Right	Y-Right	Soil Name
	ft	ft	ft	ft	
1	0.00	300.00	450.00	300.00	VOLCANIC
2	450.00	300.00	1160.00	930.00	VOLCANIC
3	1160.00	930.00	1200.00	990.00	VOLCANIC
4	1200.00	990.00	1600.00	1150.00	VOLCANIC
5	1600.00	1150.00	1800.00	1270.00	VOLCANIC
6	1800.00	1270.00	1900.00	1280.00	VOLCANIC
7	1900.00	1280.00	2000.00	1370.00	VOLCANIC
8	2000.00	1370.00	2310.00	1500.00	VOLCANIC
9	2310.00	1500.00	2520.00	1500.00	VOLCANIC

Soil Data

Soil Name	Unsat Unit WT.	Saturated Unit WT.	Cohesion Intercept	Friction Angle	Pore Pressure	Pressure Constant	Piez. Surface
	lb/ft^3	lb/ft^3	psf	(degree)	psf	ft	
VOLCANIC	170	170	4900	36	0	0	1

1 Piezometric Surface(s)

Unit Weight Of Water = 62.4 lb/ft^3

Piezometric Surface No. 1 Consists Of 2 Points

X   Y

			678.33		500.00	
			0.00		0.00	
	Results					
	Circular	Failure				
	Analysis	Method:	ASD-Bishop Method			
Searched	From	428.33	ft	To	1175.0	ft
Total :	500	Surfaces	Following 6	Most Critical	Surfaces	
Defined By :	51	Points FS=	1.47	Drvg F	32606330	lb/ft
Center	X =	236.08	Y =	2232.127	Radius=	1933.319
	Point		X-Coord		Y-Coord	
			ft		ft	
	1		463.83		312.27	
	2		504.65		315.65	
	3		545.38		319.88	
	4		586.01		324.98	
	5		626.52		330.95	
	6		666.9		337.77	
	7		707.13		345.44	
	8		747.18		353.97	
	9		787.04		363.34	
	10		826.7		373.56	
	11		866.13		384.62	
	12		905.32		396.51	
	13		944.24		409.23	
	14		982.89		422.77	
	15		1021.24		437.13	
	16		1059.27		452.3	

APPENDIX 3

REFERENCES

1) Gold Coast GeoServices, Inc., Engineering Geologic Report, Modification to Conditional Use Permit (CUP No. 3817-3) Pacific Rock Quarry, 100 South Howard Road, Camarillo, Ventura County, California, File No. GC93-3350, January 12, 2010.

2) Gold Coast GeoServices, Inc., Engineering Geologic Report Analysis of Revised Reclamation Plan for Modification to Conditional Use Permit CUP 3817-3, Pacific Rock, Inc., Camarillo of Ventura, California, File No. GC93-3350, August 2, 2010.

3) Gold Coast GeoServices, Inc., Review to “Review of Engineering Geologic Report for Pacific Rock Quarry CA Mine ID #91-56-0011”, by Department of Conservation, Office of Mine Reclamation, for Pacific Rock, Inc., Camarillo, County of Ventura, File No. GC93-3350, dated September 28, 2010.

4) Department of Conservation, Office of Mine Reclamation, Compliance Amended Reclamation Plan for Pacific Rock Quarry, CA Mine ID# 91-56-0011, dated October 21, 2010.

5) Gold Coast GeoServices, Inc., Discussion of OMR “Geotechnical Requirements” for Pacific Rock Quarry, by Department of Conservation, Office of Mine Reclamation, File No. GC93-3350, dated October 27, 2010.

6) County of Ventura Public Works Agency Engineering Services Department Memorandum, Review of Compliance Reclamation Plan Amendment, CUP 3817/Pacific Rock, Inc., dated November 19, 2010.

7) Sespe Consulting, Inc., Site Plan, Pacific Rock Quarry, Ventura County California, not dated.

APPENDIX D-2

CUSTOM SOIL RESOURCE REPORT FOR VENTURA AREA, CALIFORNIA-
PACIFIC ROCK QUARRY PROPOSED CUP 2019

BENCHMARK
RESOURCES

United States Department of Agriculture

NRCS

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

Ventura Area, California

Pacific Rock Quarry Proposed CUP 2019

August 12, 2019

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.

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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.

Custom Soil Resource Report
Soil Map

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.

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: Ventura Area, California
Survey Area Data: Version 13, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 29, 2017

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
1159	Topdeck loam, 10 to 35 percent slopes	4.3	2.0%
CyC	Cropley clay, 2 to 9 percent slopes, warm MAAT, MLRA 19	4.8	2.3%
GtD	Gilroy-Cibo complex, 5 to 15 percent slopes	6.1	2.9%
GvF	Gilroy loam, 15 to 50 percent slopes, very rocky	21.8	10.4%
GxG	Gullied land	1.4	0.7%
HaG	Hambright very rocky loam, 15 to 75 percent slopes	26.3	12.5%
IrG	Igneous rock land	115.0	54.8%
PxG	Pits and dumps	28.9	13.8%
W	Water	1.1	0.5%
Totals for Area of Interest		**209.6**	**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.

Ventura Area, California

1159—Topdeck loam, 10 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2y8sv
Elevation: 110 to 1,070 feet
Mean annual precipitation: 15 to 17 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of local importance

Map Unit Composition

Topdeck and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Topdeck

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from andesite or basalt

Typical profile

A - 0 to 4 inches: loam
Bt - 4 to 14 inches: gravelly loam
R - 14 to 24 inches: bedrock

Properties and qualities

Slope: 10 to 35 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Gilroy

Percent of map unit: 8 percent

Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Hambright

Percent of map unit: 3 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Cotharin

Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Cibo

Percent of map unit: 3 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

CyC—Cropley clay, 2 to 9 percent slopes, warm MAAT, MLRA 19

Map Unit Setting

National map unit symbol: 2tb9k
Elevation: 20 to 3,360 feet
Mean annual precipitation: 15 to 27 inches
Mean annual air temperature: 60 to 65 degrees F
Frost-free period: 270 to 365 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cropley and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cropley

Setting

Landform: Terraces, alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from calcareous shale

Typical profile

Ap - 0 to 3 inches: clay
A - 3 to 15 inches: clay
Bss1 - 15 to 29 inches: clay
Bss2 - 29 to 38 inches: clay
BCk1 - 38 to 49 inches: clay
BCk2 - 49 to 79 inches: clay

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Coastal Terrace 14-16" p.z. (R020XD047CA), CLAYEY (1975) (R019XD001CA)
Hydric soil rating: No

Minor Components

Salinas

Percent of map unit: 4 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rincon

Percent of map unit: 4 percent
Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Botella

Percent of map unit: 2 percent
Landform: Low hills
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

GtD—Gilroy-Cibo complex, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2y8st
Elevation: 180 to 1,200 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of local importance

Map Unit Composition

Gilroy and similar soils: 55 percent
Cibo and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilroy

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Toeslope, backslope
Landform position (three-dimensional): Mountainbase, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from igneous rock

Typical profile

A - 0 to 12 inches: loam
Bt - 12 to 36 inches: clay loam
R - 36 to 46 inches: bedrock

Properties and qualities

Slope: 5 to 20 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock

Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Cibo

Setting
Landform: Mountains, hills
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Mountainbase, base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from igneous rock

Typical profile
A - 0 to 4 inches: clay
Bss - 4 to 26 inches: clay
Bkss - 26 to 39 inches: clay
Bk - 39 to 47 inches: clay loam
R - 47 to 57 inches: bedrock

Properties and qualities
Slope: 5 to 20 percent
Depth to restrictive feature: 28 to 59 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 4 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Topdeck

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Hambright

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

GvF—Gilroy loam, 15 to 50 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 2xgty
Elevation: 490 to 1,200 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilroy and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilroy

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from igneous rock

Typical profile

A - 0 to 5 inches: loam
Bt1 - 5 to 9 inches: clay loam
Bt2 - 9 to 13 inches: gravelly clay loam

Bt3 - 13 to 20 inches: gravelly clay loam
R - 20 to 30 inches: bedrock

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 8 percent
Landform: Mountains, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop, crest
Down-slope shape: Convex
Across-slope shape: Convex

Cotharin

Percent of map unit: 3 percent
Landform: Hills, mountains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Cibo, deep

Percent of map unit: 3 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Concave
Across-slope shape: Convex
Hydric soil rating: No

Topdeck

Percent of map unit: 3 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex

Across-slope shape: Convex
Hydric soil rating: No

Hambright

Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

GxG—Gullied land

Map Unit Composition

Gullied land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gullied Land

Setting

Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from igneous and sedimentary rock

Typical profile

H1 - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Badland

Percent of map unit: 4 percent
Hydric soil rating: No

Balcom

Percent of map unit: 4 percent
Hydric soil rating: No

Gaviota

Percent of map unit: 4 percent
Hydric soil rating: No

Saugus

Percent of map unit: 3 percent
Hydric soil rating: No

HaG—Hambright very rocky loam, 15 to 75 percent slopes

Map Unit Setting

National map unit symbol: hc8r
Elevation: 200 to 4,000 feet
Mean annual precipitation: 8 to 25 inches
Mean annual air temperature: 45 to 64 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Hambright and similar soils: 70 percent
Rock outcrop: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hambright

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 2 inches: loam
H2 - 2 to 14 inches: very stony clay loam
H3 - 14 to 32 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Rock Outcrop

Typical profile

H1 - 0 to 4 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 75 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Natural drainage class: Excessively drained

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Gilroy

Percent of map unit: 3 percent
Hydric soil rating: No

Igneous rockland

Percent of map unit: 3 percent
Hydric soil rating: No

Cibo

Percent of map unit: 2 percent
Hydric soil rating: No

Hambright, rocky clay loam

Percent of map unit: 2 percent
Hydric soil rating: No

IrG—Igneous rock land

Map Unit Setting

National map unit symbol: hc90
Elevation: 650 to 9,000 feet
Mean annual precipitation: 8 to 15 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Igneous rock land: 50 percent
Lithic xerorthents and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Igneous Rock Land

Setting

Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Natural drainage class: Excessively drained
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Lithic Xerorthents

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Parent material: Residuum weathered from igneous rock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Natural drainage class: Excessively drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydric soil rating: No

Minor Components

Hambright

Percent of map unit: 5 percent
Hydric soil rating: No

Gullied land

Percent of map unit: 5 percent
Hydric soil rating: No

PxG—Pits and dumps

Map Unit Composition

Pits and dumps: 40 percent
Dumps: 40 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits And Dumps

Typical profile

H1 - 0 to 6 inches: extremely gravelly coarse sand
H2 - 6 to 60 inches: extremely gravelly sand, extremely gravelly coarse sand, very gravelly coarse sand
H2 - 6 to 60 inches:
H2 - 6 to 60 inches:

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Dumps

Setting

Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Sandy alluvial land

Percent of map unit: 5 percent
Hydric soil rating: No

Igneous rockland

Percent of map unit: 5 percent
Hydric soil rating: No

Sedimentary rock land

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 5 percent
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the following National Soil Survey Handbook link: "National Soil Survey Handbook."

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low: 0 to 3
Low: 3 to 6
Moderate: 6 to 9
High: 9 to 12
Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology) from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth’s surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Very low: Less than 0.2
Low: 0.2 to 0.4
Moderately low: 0.4 to 0.75
Moderate: 0.75 to 1.25
Moderately high: 1.25 to 1.75
High: 1.75 to 2.5
Very high: More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth’s crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low: Less than 0.5 percent
Low: 0.5 to 1.0 percent
Moderately low: 1.0 to 2.0 percent
Moderate: 2.0 to 4.0 percent
High: 4.0 to 8.0 percent
Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5
Extremely acid: 3.5 to 4.4
Very strongly acid: 4.5 to 5.0
Strongly acid: 5.1 to 5.5
Moderately acid: 5.6 to 6.0
Slightly acid: 6.1 to 6.5
Neutral: 6.6 to 7.3
Slightly alkaline: 7.4 to 7.8
Moderately alkaline: 7.9 to 8.4
Strongly alkaline: 8.5 to 9.0
Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where “Rock outcrop” is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)

High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)

Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)

Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)

Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)

Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which “severely eroded,” “very severely eroded,” or “gullied” is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1

Moderate: 13-30:1

Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand: 2.0 to 1.0

Coarse sand: 1.0 to 0.5

Medium sand: 0.5 to 0.25

Fine sand: 0.25 to 0.10

Very fine sand: 0.10 to 0.05

Silt: 0.05 to 0.002

Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated
Prismatic: Vertically elongated and having flat tops
Columnar: Vertically elongated and having rounded tops
Angular blocky: Having faces that intersect at sharp angles (planes)
Subangular blocky: Having subrounded and planar faces (no sharp angles)
Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand
Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

The uprooting and tipping over of trees by the wind.

APPENDIX E

NOISE AND GROUNDBORNE VIBRATION IMPACT ASSESSMENT

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NOISE AND GROUNDBORNE VIBRATION IMPACT ASSESSMENT

Pacific Rock Quarry
Conditional Use Permit Modification Application
LU10-0003

November 2020

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NOISE AND GROUNDBORNE VIBRATION IMPACT ASSESSMENT

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EXECUTIVE SUMMARY

This Noise and Groundborne Vibration Impact Assessment (NVIA) presents regulatory review, ambient noise measurements, noise impact predictions, and vibration impact predictions for the Pacific Rock Quarry located in unincorporated Ventura County near the City of Camarillo, California (Figure 1). This NVIA is intended for use as a technical document in support of the California Environmental Quality Act (CEQA) assessment for the Project.

The Project site consists of an existing aggregate mine and processing plant. Pacific Rock has prepared and submitted to the County a Conditional Use Permit (CUP) Major Modification application (LU10-0003) to entitle the following proposed modifications to the existing Project:

- Extend the life of the existing permitted operations.
- Expand the mining area boundary to the east, north, and south (Figure 2).
- Extend the operating schedule from six (6) to seven (7) days per week (to include material load out on Sundays).
- Allow additional material load out hours and a limited number of extended 24-hour operation days (60 days maximum per year).
- Operate a portable crushing and screening plant onsite to recycle concrete debris (Recycle Plant).
- Install a structure for a 24-hour onsite security guard.

The following existing Project features would remain unchanged:

- Daily maximum aggregate production rate.
- Number of daily truck trips and truck haul routes.
- Number of employees.
- Aggregate excavation and processing equipment and methods.
- Basting event hours, frequency, and methods.

This NVIA makes the following determinations regarding significance of noise and groundborne vibration impacts resulting from the Project:

- Noise impacts from onsite sources (“Non-Transportation”) are less than significant after mitigation.
- Noise impacts from traffic sources (“Transportation”) are less than significant.
- Groundborne vibration impacts are less than significant.
- The Project would result in a Class II impact, significant but mitigable to less than significant levels.

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NOISE AND GROUNDBORNE VIBRATION IMPACT ASSESSMENT

Pacific Rock Quarry
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TABLES

APPENDICES

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NOISE AND GROUNDBORNE VIBRATION IMPACT ASSESSMENT

Pacific Rock Quarry
Conditional Use Permit Modification Application
LU10-0003

November 2020

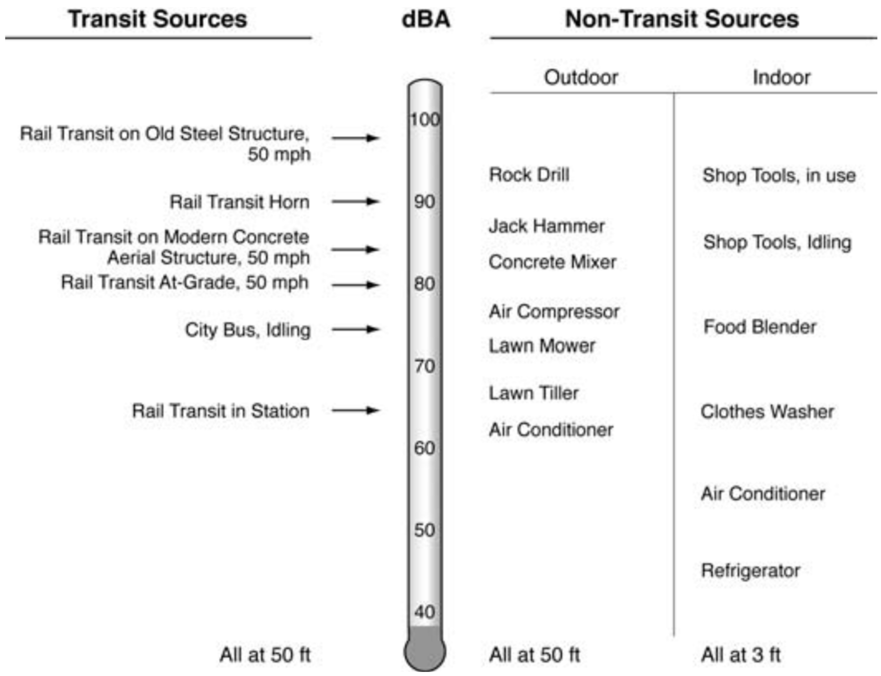
1.0 INTRODUCTION

This Noise and Groundborne Vibration Impact Assessment (NVIA) presents regulatory review, ambient noise measurements, noise impact predictions, and groundborne vibration impact predictions for the Pacific Rock Quarry located in unincorporated Ventura County near the City of Camarillo, California (Figure 1). Pacific Rock is proposing to extend the life of the Condition Use Permit (CUP), expand the mining area boundary, extend the operating schedule to seven (7) days per week, allow for additional material load out hours, operate a portable crushing and screening plant onsite to recycle concrete debris (Recycle Plant), and install a structure for a 24-hour onsite security guard (Project).

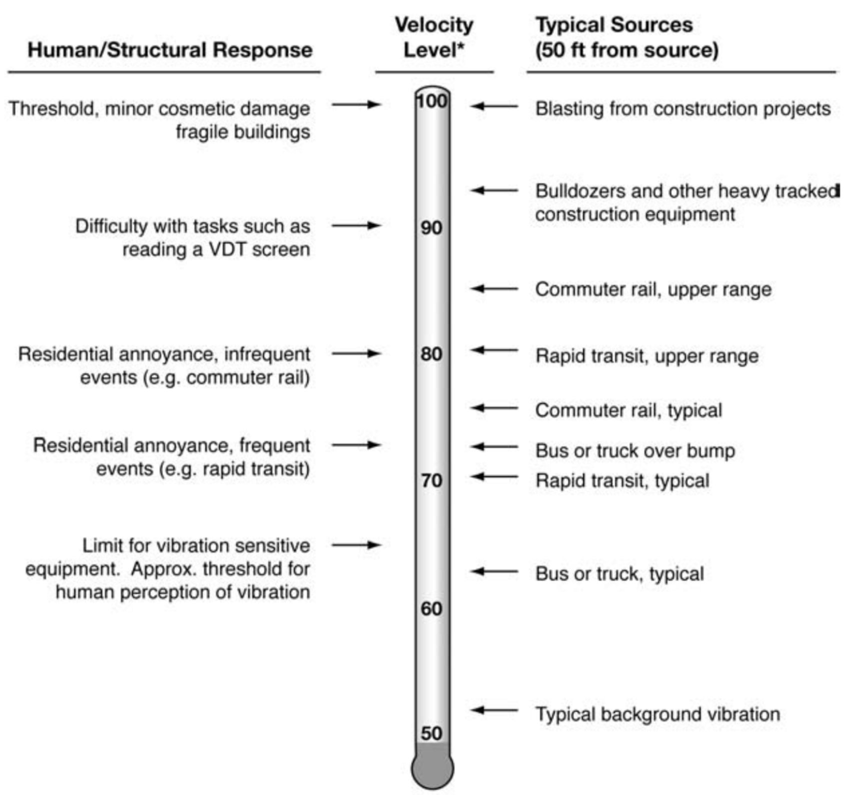
This NVIA is intended for use in the environmental review for the Project under the California Environmental Quality Act (CEQA). Methodologies and criteria outlined in the Ventura County *2040 General Plan Hazards and Safety Element* (Ventura County, 2020), the Ventura County *Initial Study Assessment Guidelines* (Ventura County, 2011), the Ventura County *Construction Noise Threshold Criteria and Control Plan* (Ventura County, 2010), and applicable state and federal transportation agency (e.g., Caltrans, Federal Transit Administration, etc.) noise and vibration guidelines are utilized to determine the significance of Project impacts. The Project's onsite non-transportation industrial noise and vibration sources (e.g., equipment operating onsite, blasting, etc.) and transportation noise sources (i.e., haul trucks on public roads) have been quantified and compared to applicable significance thresholds in this NVIA.

Illustrations on the next page, which are from the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment Manual* (Federal Transit Administration, 2018), present the intensity level of common noise and vibration generating activities.

Common Noise Levels



Common Vibration Levels



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: (Federal Transit Administration, 2018)

2.0 EXISTING SETTING

The Project site is located approximately 1.5 miles east of Lewis Road and approximately 2.0 miles south of U.S. Highway 101 off a private road (Howard Road), in unincorporated Ventura County near the City of Camarillo and the City of Thousand Oaks (Figure 1). The site is located on the west facing side of the Santa Monica Mountain Range. The Camarillo Airport is located approximately 4.5 miles away to the northwest and the Point Mugu Naval Air Station is located approximately 7.2 miles away to the southwest.

This section discusses the Project's existing environmental and regulatory settings.

2.1 Noise & Groundborne Vibration Fundamentals

2.1.1 Definitions

The following terms are employed in this NVIA:

- **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.
- **Ambient Noise Level:** The noise that results from the combination of all sources, near and far.
- **Community Noise Equivalent Level [CNEL - dB(a)]:** The long-term time average sound level, weighted as follows:
    - Frequency response is filtered using the A-weighting network.
    - Sounds occurring between 7:00 p.m. and 10:00 p.m. are weighted by +5 dB.
    - Sounds occurring between 10:00 p.m. and 7:00 a.m. are weighted by +10 dB.
- **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, 60 dB represents one million units, etc.
- **Equivalent Continuous Noise Level (L_{eq}):** The level, in decibels, of the mean sound pressure averaged over time period, generally one hour. This is often referred to as "equivalent sound level" and hence the "eq" subscript. The "equivalence" is to a sound of constant level that has the same total acoustic energy content.
- **Peak Particle Velocity (PPV)**: The peak signal value of an oscillating vibration velocity waveform. PPV is usually expressed in inches per second (in/sec) in the United States.
- **Root Mean Square (rms):** The square root of the mean-square value of an oscillating waveform, where the mean-square value is obtained by squaring the value of amplitudes at each instant of time and then averaging these values over the sample time.
- **Sound Pressure Level (SPL):** The logarithmic measure of the power of a sound relative to a reference value, measured in decibels (dB). The sound pressure level is always associated with a specific location or distance from a sound source.
- **Sound Power Level (SWL):** The acoustical energy emitted by the sound source. The SWL is an absolute value that is not affected by the environment, unlike SPL.

2.1.2 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 NVIA are A-weighted. Table 1 provides sound pressure levels of typical noise sources in units of dBA and micropascals (µPa) of pressure.

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 5-10 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: (US EPA, 1971) and (Federal Interagency Committee on Noise, 1992).

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 Community Noise Equivalent Level (CNEL) noise descriptor described below, 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.

Community Noise Equivalent Level (CNEL) is based upon the average noise level over a 24-hour day, with a +5 decibel weighing applied to noise occurring during evening (7:00 p.m. to 10:00 p.m.) hours and a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. These additions are made to account for the noise sensitive time periods during the evening and nighttime hours, when people are generally at home and more sensitive to sound. Because CNEL represents a 24-hour average, it tends to smooth out short-term variations in the noise environment. CNEL 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 time period (usually one hour or less). This value is useful as it can reveal short-term, intermittent noise sources (e.g., industrial equipment, etc.) within a noise environment, which would be lost with CNEL noise descriptor.

2.1.3 Characteristics of Groundborne Vibration

Vibration is like 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 a 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.

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. 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.

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. Table 2 displays the results of a 1974 study which relates human response to transient vibration sources (i.e., mining equipment) in terms of particle velocity (PPV) vibration levels.

Table 2 General Human Responses to Vibration Levels

Human Response to Vibration	Peak Vibration Threshold (in./sec. PPV)
Severe	2.0
Strongly perceptible	0.9
Distinctly perceptible	0.24
Barely perceptible	0.035

Source: *Transportation and Construction Vibration Guidance Manual* (California Department of Transportation, 2013).

2.2 Physical Setting

This section describes noise sources in the areas around the Project site, the receptors of concern near the Project site and haul routes, and the existing ambient noise levels. Existing plant and excavation operations as well as haul truck activity are included in the baseline noise sources. The incremental increase in noise levels due to the Project is analyzed in this NVIA.

2.2.1 Project Site

The Project site is located in a rural area of unincorporated Ventura County. It is surrounded mainly by agricultural and open space land uses. The Conejo Mountain Memorial Cemetery and Funeral Home is located to the west of the Project site. The General Plan does not identify any other significant noise generating land uses in the immediate vicinity. The site is located on the southern flank of Conejo Mountain overlooking the Oxnard Plain, and separated from the Conejo Valley by the mountain crest. While the Camarillo Airport is a large source of noise in the south Camarillo area, it is approximately 4.5 miles to the northwest and has no appreciable influence on noise levels near the Project site.

As discussed above, the Pacific Rock Quarry is an existing aggregate mine and processing plant. The following operations are currently permitted under existing CUP 3817-3, and would not change as a result of the proposed Project:

- Daily maximum aggregate production rate.
- Number of daily truck trips and truck routes.
- Number of employees.
- Aggregate excavation and processing equipment (i.e., Aggregate Plant) and methods.
- Basting event operation hours, frequency, and methods.

These existing operations (e.g., aggregate excavation and processing, daytime haul truck activity, etc.) are considered baseline for this NVIA. Under CUP 3817-3, existing aggregate processing plant, excavation, and haul truck activities occur from 7:00 a.m. to 4:00 p.m., Monday through Sunday. Additionally, Condition #38 limits haul truck activity to sixty (60) truck loads per day (120 one-way trips) during normal operating hours. Both the existing truck trip limit and haul routes would not change as a result of the Project. Currently trucks leave the Project site and travel down Howard Road/Pancho Road to Pleasant Valley Road, where they then either head north to U.S. State Highway 101 or south to State Route 1 (Pacific Coast Highway) for delivery to various locations (Figure 3).

The Ventura County 2040 General Plan identifies noise-sensitive land uses as including “residences; schools; historic sites; cemeteries; parks, recreation, and open space areas; hospitals and care facilities; sensitive wildlife habitats, including the habitat of rare, threatened, or endangered species; hotels and other short-term lodging (e.g., bed and breakfasts, and motels); places of worship; and libraries”. As they would have the potential to experience different types of noise from the Project operations, noise-sensitive “receptors” considered in this NVIA have been separated into two categories based on whether they would have the potential to be impacted by 1) Project-related onsite industrial noise sources (i.e., “Non-Transportation” sources) or 2) Project-related off-site haul truck operations (i.e., “Transportation” sources). The receptors considered in this NVIA are described below. Note that, when possible, receptors are grouped and the noise impact at the worst-case portion of the group is determined. Figure 2 and Figure 3 (Appendix A) display the location of the receptors.

2.2.2 Vicinity Setting & Non-Transportation Receptors

As described above, the Project site is located in a semi-rural area of unincorporated Ventura County. Existing noise sources near the Project site receptors include equipment noise from Pacific Rock operations, noise from nearby agricultural operations, traffic noise from nearby roadways, and natural sounds (wind, plants rustling, birds/insects, etc.). Receptor 1 (R1), Receptor 2 (R2) and Receptor 3 (R3) within the vicinity of the Project site are described below.

- **Receptor 1 (R1)** is the Conejo Mountain Funeral Home to the west of the Project site. On the west side of the funeral home property, away from the Project site, is the funeral home building and on the east side, between the building and the Project site, is a grave yard. Noise sources near R1 include grounds keeping activities at the funeral home, cars on Howard Road, and nearby agricultural activities. Noise from the existing aggregate plant operations are faintly audible at R1 as background white noise.

  Per the 2040 General Plan, the funeral home is considered a noise sensitive receptor.

- **Receptor 2 (R2)** collectively represents the group of residences to the east-southeast of the Project site, on the other side of the crest of the Santa Monica Mountain Range within the City of Thousand Oaks. Existing noise sources near R2 include cars on roads to the east, hikers passing by, and plants rustling in the wind.

  Existing Project noise sources (i.e., excavation equipment, aggregate processing plant) were generally not audible in the area of R2. The ridge of the mountain blocks line-of-site between the Project site and residential receptors in this area. The mountain’s large mass and height, in addition to the large distance between source and receptor, was noted to attenuate industrial noise to the point that it was not audible during visits to the site on December 20th and 21st, 2018. Though R2 does not have line-of-sight to existing operations, there is a potential for this receptor to have line-of-sight to new excavation areas, specifically mining activities expanding to the north. Please see Section 5.1 and Figures 4A, 4B, and 4C for more details regarding line-of-sight between the Project site and R2.

  The R2 residences nearest to the expanded mining boundary were assessed, respectively located at the ends of Via Sandra and Via Pisa in the Dos Vientos Ranch community (Figure 2). Noise and vibration impacts are analyzed at the three (3) closest residences in this area, shown as R2-A, R2-B, and R2-C, and are meant to represent worst-case impacts for the entire receptor area. Due to the intervening mountains, noise impacts at R2 are less of a concern than vibration impacts, which travel more readily through solids.

Receptor 3 (R3) collectively represents the various hiking trails located in open space areas to the southeast, east and northeast of the Project site. As compared to the other receptors considered in this evaluation (e.g., residences and funeral home), the open space area and trails are less frequently occupied and typically by fewer individuals. Nonetheless, R3 is analyzed as a representative "recreation/open space" sensitive receptor per the County's 2040 General Plan. Existing noise sources near R3 primarily include residential noise sources, periodic and variable buzzing of overhead transmission lines, and natural sounds (e.g., birds/insects, plants rustling in the wind, etc.). As with R2, existing Project noise sources were generally not audible during visits to the site on December 20th and 21st, 2018, as the ridge of the mountain blocks line-of-site between the existing operations and trails in this area. Please see Section 5.1 and Figure 4C, for more details regarding line-of-sight between the Project site and R3.

To determine worst-case noise and vibration impacts experienced by trail users, the portion of trails located closest to the Project site, specifically a location on the Powerline Trail, was analyzed (see Figure 2). As with R2, vibration impacts are evaluated at R3 as vibration from blasting could travel more readily through solids.

Ambient noise measurements were collected on December 20th and 21st, 2018 at Monitoring Locations 1 and 2 shown on Figure 2. Monitoring Location 1 is considered representative of noise levels at Receptors R2 and R3, and Monitoring Location 2 is considered representative of noise levels at Receptor R1. Noise generated by Pacific Rock's existing permitted activities (i.e., processing operations, mining operations, daytime haul truck activity, etc.) was captured within the ambient noise measurements as the site was operational during these days. The ambient noise measurements were collected by two (2) Quest DL SoundPro, Type 2 sound level meters equipped with random-incidence type microphones, windscreens and placed on tripods approximately 5-feet above ground level. Microphones were calibrated using Quest QC-10 calibrators before and after each measurement. Both long-duration (24-hour) and short-duration (15-minute) measurements were collected using A-weighted energy equivalent sound levels on a slow response time at 1-minute intervals for the long-duration measurements and 10-second intervals for the short-duration measurements.

To estimate evening and nighttime noise levels for certain receptors, measurements collected at the long-duration (24-hour) reference locations were compared to measurements at the short-duration (15-minute) monitoring locations during the same time of day to determine the dBA difference between the two points. For example, Monitoring Location 2 measurements (15-minute) collected between 3:37 p.m. and 3:52 p.m. when compared to noise levels collected at the Monitoring Location 1 24-hour reference point during the same time period show a noise level difference of -3.2 L_{eq} dBA. This difference between the measured values can be used as a correction factor, which is utilized to estimate the evening and nighttime L_{eq}1H noise levels at short-duration monitoring locations. This same concept was also utilized to estimate daytime and nighttime noise levels at haul route Receptor 4 (R4). Please see Appendix C for additional details regarding these calculations.

The monitoring locations for R1 and R2/R3 are illustrated on Figure 2 (Appendix A). The results of ambient measurements collected at Monitoring Locations 1 and 2 as representative of the non-transportation receptors during the daytime, evening, and nighttime periods are summarized in Table 3. Complete noise measurement logs are included in Appendix C.

Table 3 Ambient Monitoring Results @ Non-Transportation Receptors

Receptor	Receptor Type	Date(s) Measured	Time Period(s)	Daytime L_{eq}1H [A, B]	Evening L_{eq}1H [A, B]	Nighttime L_{eq}1H [A, B]
R1	Conejo Mountain Funeral Home	12/20/2018	Daytime	41.6 dBA	32.9 dBA	32.7 dBA
R2 & R3	Residence(s) & Open Space/Trails	12/20/2018 12/21/2018	24-Hours	44.8 dBA	36.2 dBA	36.0 dBA

Notes:

A – Daytime = 6:00 a.m. – 7:00 p.m., Evening = 7:00 p.m. – 10:00 p.m., Nighttime = 10:00 p.m. – 6:00 a.m. (Ventura County, 2020).

B – Noise levels shown above were measured on 12/20/2018 and 12/21/2018. See Figure 2 (Appendix A) which shows the monitoring locations.

2.2.3 Regional Setting & Transportation Noise Receptors

The existing ambient noise environment near Project haul route (i.e., transportation) receptors is consistent with that of typical semi-urban/commercial areas. Existing noise sources include traffic on nearby roadways, agricultural operations, and commercial/industrial noise from facilities located on Pancho Road. Receptor 4 (R4) and Receptor 5 (R5) located within the vicinity of the Project haul routes are described below.

When considering a straight road segment, the noise levels are symmetrical on each side of the road and the same at any specified distance along the road (except near the ends of the road segment). For this reason, the nearest receptor to the road can be selected to conservatively represent noise impacts for a group of receptors (e.g. housing tract). In this NVIA, receptors were selected for each group of residences located near unique portions of the haul road geometry. These receptors (i.e., Receptors 4, 5A, 5B, and 5C) represent the worst-case impact for all receptors in that grouping. Figure 3 (Appendix A) shows the locations of the haul route receptors analyzed.

- **Receptor 4 (R4)** is the residence located in unincorporated Ventura County, just south of the intersection of Howard Road and Pancho Road. Noise sources near R4 primarily include nearby agricultural activities, as it is surrounded by active agricultural operations on all sides.

  Traffic noise generate by roadways to the north (e.g., Pleasant Valley Road, U.S. Highway 101, etc.) are faintly audible. Haul truck activity associated with the Project and surrounding agricultural operations are an infrequent but significant existing source of noise. This receptor generally has an unobstructed view of the Project haul route and passing trucks on Howard Road/Pancho Road. Due to the large distance between R4 and the Project site, existing aggregate plant and mining operations during the daytime are generally not audible from this location.

- **Receptor 5 (R5)** collectively represents the group of residences near the intersection of Pleasant Valley Road and Pancho Road within the City of Camarillo. Noise sources near R5 include cars on roads to the south and east (Pleasant Valley Road, U.S. Highway 101), as well as nearby agricultural and commercial operations. Pleasant Valley Road is a heavily trafficked roadway adjacent to R5, as it connects the U.S. Highway 101 to the north and the Pacific Coast Highway (State Route 1) to the south. Due to the large distance and intervening structures between R5 and the Project site, existing aggregate plant and mining operations are not audible from this location.

  The residences nearest to the intersection, as well as one to the north and west, were assessed. Noise impacts are analyzed at the three (3) representative residences in this area, shown as R5-A, R5-B, and R5-C, and are meant to represent worst-case impacts for the entire receptor area. There is an existing 6-foot sound wall that runs adjacent to these receptors along the entire length of Pleasant Valley Road (see Figures 6 and 7).

Ambient noise measurements were collected at Receptors R4 and R5 on January 23rd and 24th 2019. Both long-duration (24-hour) and short-duration (15-minute) measurements were collected using A-weighted energy equivalent sound levels on a slow response time at 1-minute intervals for the long-duration measurements and 10-second intervals for the short-duration measurements. Additional detail regarding the monitoring results and calculations are included in Appendix C. Table 4 presents the existing ambient noise levels at representative receptors along the Project's haul routes.

Table 4 Ambient Monitoring Results @ Transportation Receptors

Receptor	Receptor Type	Date(s) Measured	Average Hour (L_{eq}1H) A, C			CNEL
			Daytime	Evening	Nighttime	Outdoor
R4	Residence	1/23/2019 1/24/2019	59.8 dBA	50.7 dBA	47.9 dBA	58.9 dBA
R5	Residence(s)	1/23/2019 1/24/2019	77.4 dBA	66.3 dBA	65.4 dBA	62.2 dBA

Notes:

A – Daytime = 6:00 a.m. – 7:00 p.m., Evening = 7:00 p.m. – 10:00 p.m., Nighttime = 10:00 p.m. – 6:00 a.m. (Ventura County, 2020). These values are shown for informational purposes only.

B – CNEL = Sound levels measured during the evening hours (7:00 p.m. – 10:00 p.m.) are weighted by +5 dBA and sound levels measured during the nighttime hours (10:00 p.m. – 7:00 a.m.) are weighted by +10 dBA.

C – Noise levels shown above were measured on 1/23/2019 and 1/214/2019. See Figure 3 (Appendix A) which shows the monitoring locations.

Background noise levels at haul route receptors (R4 and R5) were also quantified using a computer model. Specifically, ambient noise levels were determined at R4 and R5 using a computer noise propagation model called SoundPLAN Essential 4.0. SoundPLAN Essential utilizes the same methods and algorithms as the Federal Highway Administration's *Traffic Noise Model* (TNM) to calculate noise impacts from traffic. In the TNM, a transportation noise source (e.g., Howard Road, Pleasant Valley Road, etc.) is input along with receptor locations to predict the noise levels associated with a specific vehicle trip count. Baseline traffic data collected by VRPA Technologies, Inc. (VRPA) on November 27th, 2018 and existing haul truck activity provided by Pacific Rock were input into the SoundPLAN Essential model to estimate background noise levels at haul route receptors. Table 5 presents the modeled background noise levels at haul route receptors. See Appendix E for additional information regarding this approach. Figure 6 in Appendix A displays the results of the baseline traffic noise model.

Table 5 Baseline Noise Modeling Results @ Transportation Receptors

Receptor	Receptor Type	Average Hour (L_{eq}1H) A, C			CNEL B, C
		Daytime	Evening	Nighttime	Outdoor
R4	Residence	53.2 dBA	34.6 dBA	25.6 dBA	50.3 dBA
R5-A	Residence(s)	59.9 dBA	53.8 dBA	49.8 dBA	59.7 dBA
R5-B	Residence(s)	60.2 dBA	54.7 dBA	50.6 dBA	60.3 dBA

Receptor	Receptor Type	Average Hour (L_{eq}1H) A, C			CNEL B, C
		Daytime	Evening	Nighttime	Outdoor
R5-C	Residence(s)	60.8 dBA	55.4 dBA	52.1 dBA	61.3 dBA

Notes: See Figure 6 (Appendix A) which shows the baseline noise levels modeled in SoundPLAN Essential.

A – Average L_{eq}1H: Daytime = 7:00 a.m. – 7:00 p.m., Evening = 7:00 p.m. – 10:00 p.m., Nighttime = 10:00 p.m. – 7:00 a.m.

B – CNEL = Sound levels measured during the evening hours (7:00 p.m. – 10:00 p.m.) are weighted by +5 dBA and sound levels measured during the nighttime hours (10:00 p.m. – 7:00 a.m.) are weighted by +10 dBA.

C – Baseline noise levels shown were modeled in SoundPLAN Essential 4.0, using actual traffic data collected by VRPA on 11/27/2018 and haul truck activity provided by Pacific Rock.

When comparing the measured ambient noise levels in Table 4 to the modeled ambient noise levels in Table 5, the baseline noise levels modeled in SoundPLAN are lower than the ambient noise levels measured on January 23rd and 24th 2019. This is primarily because the SoundPLAN model only considers noise generated by vehicles on affected roadways, and excludes any other ambient noise sources (e.g., agricultural activities, nearby commercial centers, etc.) that exist in the areas around R4 and R5. Because the focus of this traffic noise analysis is to determine the impacts of new haul truck activity during the evening and nighttime hours, using the modeled baseline values is more appropriate. This is also a more conservative approach, as the lower numbers determined within the model present a lower baseline by which Project impacts are compared to (i.e., lower baseline means a greater chance for Project impacts).

2.3 Regulatory Setting

The regulatory setting consist of the Ventura County *2040 General Plan – Hazards and Safety Element, Noise* (Ventura County, 2020), Ventura County *Initial Study Assessment Guidelines* (Ventura County, 2011), Ventura County *Construction Noise Threshold Criteria and Control Plan* (Ventura County, 2010), as well as applicable California Department of Transportation (Caltrans) and Federal Transit Administrations (FTA) guidance documents.

2.3.1 Ventura County General Plan Noise Element

The Ventura County 2040 General Plan – Hazards and Safety Element, Noise (Chapter 7.9) (Ventura County, 2020) presents standards for development of new noise-generating uses based on the noise sensitivity of a project's surroundings. The General Plan includes hourly (L_{eq}1H) significance thresholds for the daytime (6:00 a.m. to 7:00 p.m.), evening (7:00 p.m. to 10:00 p.m.), and nighttime (10:00 p.m. to 6:00 a.m.) hours. These hourly thresholds apply to "noise generators proposed to be located near any noise sensitive use". Noise sensitive uses include "residences; schools; historic sites; cemeteries; parks, recreation, and open space areas; hospitals and care facilities; sensitive wildlife habitats, including the habitat of rare, threatened, or endangered species; hotels and other short-term lodging (e.g., bed and breakfasts, and motels); places of worship; and libraries" as defined within the 2040 General Plan. A copy of the relevant 2040 General Plan text is included in Appendix B.

The 2040 General Plan also includes significance thresholds for sensitive receptors located near relatively continuous noise sources, such as roads, that use the Community Noise Equivalent Level (CNEL) noise metric. As defined in Section 2.1.1, CNEL describes noise impacts over a 24-hour period with penalties for noise generated during the evening (7:00 p.m. – 10:00 p.m.) and nighttime (10:00 p.m. – 7:00 a.m.) hours. The CNEL nighttime and daytime timeframes differ from the timeframes considered in the General Plan/CEQA Guidelines standards by one hour (CNEL daytime begins at 7:00 a.m. vs. 6:00 a.m. under the General Plan L_{eq}1H standard). The CNEL standard applies to transportation sources that vary over time and, per the General Plan Hazards and Safety Element, is the metric applied to Projects that cause traffic impacts to existing receptors.

In addition to the Ventura County 2040 General Plan criteria described above, the General Plan also presents a comprehensive land-use compatibility guideline graphic chart developed by the former California Office of Noise Control (CONC). This chart presents planning noise standards based on a sliding scale of impacts, ranging from “normally acceptable” to “clearly unacceptable” depending on the specific type of land use (e.g., residential, commercial, industrial, etc.) potentially impacted. While the land-use compatibility is not utilized to determine the significance of Project noise impacts, it is presented in this NVIA for information purposes. Please see Appendix B which presents the state land use compatibility chart taken from the Ventura County 2040 General Plan – Hazards and Safety Background Report (Chapter 11 – Hazards and Safety, Section 11.6 – Noise and Vibration, Table 11-10 – State Land Use Compatibility Standards for Community Noise Environment).

2.3.2 Ventura County Initial Study Assessment Guidelines

The Ventura County CEQA Guidelines (Ventura County, 2011) present methodologies for measuring noise levels and determining if their associated impacts are significant. Significance thresholds depend on ambient noise levels in the area of the project during each applicable time periods. If ambient levels are less than the thresholds, then the “fixed” thresholds are used. If ambient levels are greater than the fixed thresholds, then the “ambient noise +3 decibels (dB)” is used as the significance threshold. The CEQA Guidelines standards were used in the County General Plan described above (Appendix B).

The vibration thresholds referenced in the CEQA Guidelines are from the *Transit Noise and Vibration Impact Assessment Manual* (Federal Transit Administration, 2018), and apply to frequent vibration events from transportation sources (i.e., highways, rail lines, etc.), not blasting events. Therefore, the Caltrans vibration thresholds described below are utilized to determine the significance of infrequent vibration impacts resulting from blasting events.

2.3.3 Californian Department of Transportation

The *Transportation and Construction Vibration Guidance Manual* (California Department of Transportation, 2013) includes a chapter (Chapter 11) about blasting impacts assessment. In the absence of an established, local blasting vibration significance threshold guidance, criteria in the Caltrans manual are used to determine the significance of groundborne vibration in this NVIA.

2.3.4 Neighboring City Requirements

The Project site is located in unincorporated Ventura County, but has the potential to generate impacts at receptors located within the nearby cities of Camarillo and Thousand Oaks. Specifically, residential receptors (i.e., R1 and R2) and recreation/open space area receptor(s) to the east (i.e., R3) are located within the City of Thousand Oaks, and those located to the west (i.e., R5) are within the City of Camarillo.

The Thousand Oaks General Plan Noise Element (City of Thousand Oaks, 2000) includes land use planning standards for noise which are based on a sliding scale of impacts, where for low-density residential, 55 dBA CNEL is “clearly acceptable”, 60 dBA CNEL is “normally acceptable”, 65 dBA CNEL is “conditionally acceptable”, and 75 dBA CNEL is “normally unacceptable”. The Camarillo General Plan Noise Element (City of Camarillo, 2015) also includes similar sliding scale noise criteria. Specifically, for low-density residential, 60 dBA CNEL is “normally acceptable”, 70 dBA CNEL is “conditionally acceptable”, and 75 dBA CNEL is “normally unacceptable”.

The Camarillo Municipal Code also contains specific noise regulations (Chapter 10.34). The Municipal Code includes significance thresholds for daytime (7:00 a.m. to 9:00 p.m.) and nighttime (9:00 p.m. to 7:00 a.m.) that are identical to the Ventura County General Plan thresholds for these same time periods. The only differences are the Municipal Code lacks a separate evening (7:00 p.m. – 10:00 p.m.) standard, and the daytime period begins one hour later (7:00 a.m.) while the nighttime period begins one hour earlier (9:00 p.m.) compared to the County's General Plan standards.

3.0 PROJECT DESCRIPTION

Pacific Rock has prepared a CUP Modification (LU10-003) application to modify their existing permitted operations under CUP 3817-3. Features of the Project that may affect the noise and vibration environment are as follows.

- Extend the life of the existing permitted operations.
- Expand the mining area boundary to the east, north, and south (Figure 2).
- Extend the operating schedule from six (6) to seven (7) days per week (to include material load out on Sundays).
- Allow additional material load out hours and a limited number of extended 24-hour operation days (60 days maximum per year).
- Operate a portable crushing and screening plant to recycle concrete debris (Recycle Plant).
- Install a structure for a 24-hour onsite security guard.

Table 6 summarizes and compares the existing and proposed operational parameters for the Project. Section 3.1 describes the onsite non-transportation noise and vibration sources (e.g., mobile excavation and stationary processing equipment, blasting, etc.) associated with the Project. Section 3.2 describes the offsite transportation sources of noise (i.e., haul truck activity on roadways) associated with the Project.

Table 6 Project Operational Parameters (Existing vs. Proposed)

Activity	Operational Parameters		Change?
	Current Operations	Proposed Operations	
Excavation & Processing (e.g., aggregate excavation and processing, and use of explosives)	CUP Boundary = 115.5 acres	CUP Boundary = 204.5 acres	+89 acres (approx.)
	7:00 a.m. – 4:00 p.m. Monday – Saturday	7:00 a.m. – 4:00 p.m. Monday – Saturday	No Change
	Daily Production = 2,400 tons/day (mining/processing)	Daily Production = 2,400 tons/day (mining/processing)	No Change
Recycling Operations (crushing and screening of concrete debris)	None	7:00 a.m. – 4:00 p.m. Monday – Saturday	New Operation
Equipment Fueling and Maintenance	5:30 a.m. – 10:00 p.m. Sunday – Saturday	5:30 a.m. – 10:00 p.m. Sunday – Saturday	No Change
Truck Activity (use of water truck, material loading, entrance and exit)	Daily Limit = 120 trips/day	Daily Limit = 120 trips/day	No Change
	Haul Route = Howard Road, Pancho Road, Pleasant Valley Road	Haul Route = Howard Road, Pancho Road, Pleasant Valley Road	No Change
	7:00 a.m. – 4:00 p.m. Monday – Saturday	5:30 a.m. – 10:00 p.m. Sunday – Saturday	Additional Hours & Days
Limited 24-hour operations* (60 Days Maximum Per Year)	None	24 Hours Sunday – Saturday	New Operation
* Extended processing and trucking is permitted for 60 days per year to satisfy Public Works, Caltrans, and other special/emergency projects that require nighttime deliveries. Daily truck trip limit (i.e., 120 trips/day) would remain unchanged during 24-hour emergency haul truck operations.			

3.1 Non-Transportation Noise Sources

From a noise and vibration perspective, the primary onsite (i.e., non-transportation) modification proposed by this Project is the extension of the existing excavation operations to the east, north, and south (approximately 89 additional acres). This expansion would correct the existing slope conditions at the northerly and northeasterly side of the quarry, as well as expand onto recently acquired adjacent land. Aggregate excavation in these areas would be conducted in the same manner as currently occurs onsite, specifically by blasting and then pushing the loosened material over a steep slope. The following noise generating mobile equipment would continue to be used during aggregate excavation in the expanded mining areas. See Appendix D for additional information regarding the Project's onsite (i.e., non-transportation) mobile equipment noise sources:

- Front-End Loader
- Excavator
- Rock Drill
- Dozer
- Water Truck

In addition to the expanded excavation boundary, Pacific Rock is proposing to operate a portable crushing and screening plant (Recycle Plant). The Recycle Plant would be used to recycle concrete debris into reusable materials. The portable Recycle Plant would operate in various locations within the center of the Project site, near the existing aggregate processing plant (see Figure 2). The Recycle Plant would operate during the same daytime time periods as the aggregate excavation and processing operations (Monday – Saturday, 7:00 a.m. – 4:00 p.m.). Please see Appendix D for additional information related to the Recycle Plant.

The Project also involves installation of a small structure to house a 24-hour onsite security guard. However, this Project component does not involve significance noise generating activities and would occur away from nearby receptors (Figure 2). Therefore, impacts from this proposed activity are not analyzed within this NVIA.

Although operations associated with the existing aggregate processing plant are considered part of the permitted baseline, and noise generated by this existing operation was captured in the ambient measurements (see Section 2.2), this source has also been included as a new Project source in the onsite noise analysis. Using this method is conservative, as generally existing sources operating while ambient measurements are collected are not also included within the Project impact calculations as this produces artificially high results. However, due to community concerns related to cumulative noise impacts, conservatively noise generated by the existing Aggregate Plant is also analyzed along with the other proposed onsite sources (i.e., mobile equipment in expanded mining areas, Recycle Plant). Please see Section 5.1 for more detail.

Since blasting activities are occasional and very short in duration (about 1-second), they do not have any substantial effect on the noise environment in the area. Blasting would continue to occur during daytime operating hours only (7:00 a.m. – 4:00 p.m.), and in the same manner as currently occurs onsite. Therefore, noise impacts from blasting operations are not assessed within this NVIA. Although noise impacts from blasting events are not analyzed, noise impacts from the rock drill, which is a noisy component of the blasting operations, is included in the onsite excavation noise assessment described above (Appendix D).

While blasting is not a concern from a noise perspective, it may have vibration impacts on the surrounding areas. This is especially true for Receptor 2 (R2) and Receptor 3 (R3) (see Section 2.2.2) since the Project proposes to extend excavation farther east towards this group of receptors. While the intervening mountains may help to reduce noise impacts at R2 and R3, vibration travels more readily through solids. Blasting activities would continue in the same manner as previously permitted. The following details describe the blasting process:

- 3-inch diameter holes to a depth of approximately 40-feet (rock drill utilized).
- 110 pounds of ammonium nitrate fuel oil (ANFO) explosives per hole.

- Larger blasts occur approximately twice a year and include 40 holes per blast.
- Smaller blasts occur a couple of times per week and include 10 holes per blast.
- There is a 5-millisecond delay between blasting in each hole.

3.2 Transportation Noise Sources

As part of the Project, Pacific Rock is requesting that Condition #38 be approved with this permit modification to continue allowing a maximum of 60 trucks (120 one-way trips) per day, and allow the Planning Director to authorize an increase in the maximum number of vehicles during emergencies. While the number of daily truck trips would not change, as shown in Table 6 the proposed haul truck operational hours have been expanded. Currently, haul truck activity occurs during daytime hours only (7:00 a.m. – 4:00 p.m.). Under the proposed Project, haul truck activity could occur during the additional nighttime hours of 5:30 a.m. to 7:00 a.m., daytime hours of 4:00 p.m. to 7:00 p.m., and the evening hours of 7:00 p.m. to 10:00 p.m. Additionally, the proposed 24-hour material load out and haul truck activities during emergency Public Works, Caltrans, or special projects also has the potential to produce noise impacts. Due to these extended haul truck hours, residential receptors along the Project haul route(s) may experience new noise impacts. Therefore, offsite haul truck noise impacts during the evening and nighttime hours are analyzed within this NVIA.

4.0 SIGNIFICANCE THRESHOLDS

According to the Appendix G Checklist in the CEQA Guidelines, a Project would have a significant environmental noise effect if it would result in the following:

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?

4.1 Ventura County Noise Regulations & Significance Thresholds

As discussed in Section 2.3, Ventura County has adopted various guidelines, requirements and policies related to noise. Applicable Ventura County noise criteria are utilized to address CEQA Checklist item *a)*. Specifically, the Ventura County 2040 General Plan – Hazards and Safety Element and CEQA Guidelines include significance thresholds for noise impacts at sensitive receptors, which state the following:

(1) Noise sensitive uses proposed to be located near highways, truck routes, heavy industrial activities and other relatively continuous noise sources shall incorporate noise control measures so that:

a. Indoor noise levels in habitable rooms do not exceed CNEL 45; and

b. Outdoor noise levels do not exceed CNEL 60 or L_{eq}1H of 65 dB(A) during any hour.

(4) New noise generators, proposed to be located near any noise sensitive use, shall incorporate noise control measures so that ongoing outdoor noise levels received by the noise sensitive receptor, measured at the exterior wall of the building, does not exceed any of the following standards:

a. L_{eq}1H of 55dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 6:00 a.m. to 7:00 p.m.

b. L_{eq}1H of 50dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 7:00 p.m. to 10:00 p.m.

c. L_{eq}1H of 45dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 10:00 p.m. to 6:00 a.m.

Part (1) of this standard is primarily intended to be applied to new sensitive receptors (e.g., schools, residences, etc.) located next to existing noise sources (i.e., roads, railroads, highways). However, as discussed in Section 2.3.1, this standard may also appropriately be applied to projects that cause new traffic noise impacts to existing sensitive receptors. When assessing haul truck noise impacts over the course of a full operating day (e.g., 10.5-hours, 24-hours, etc.), the CNEL standard in Part (1) is more appropriate than the L_{eq}(1H) standard, which only assesses noise impacts within a 1-hour timeframe. The CNEL standard also applies penalties to noise generated during the evening and nighttime hours, when receptors would be most sensitive to noise generated by new haul truck operations. Therefore, the standard presented in Part (1) from the County General Plan is utilized to determine the significance of noise impacts resulting from Project haul truck activity (i.e., transportation sources). Conversely, the L_{eq}(1H) standards in Part (4) are more appropriate for the inconsistent noises generated by industrial equipment sources (i.e., mining equipment, Aggregate and Recycle Plant). For these reasons, the CNEL criteria presented in Part (1) is applied to transportation receptors located near the Project haul route (R4 and

R5), and the daytime, evening, and nighttime L_{eq}(1H) criteria presented in Part (4) are applied to non-transportation receptors located near the Project site (R1, R2 and R3).

As discussed in Section 2.3.1, the Noise Element criteria are meant to apply "sensitive receptors", which are defined as "residences; schools; historic sites; cemeteries; parks, recreation, and open space areas; hospitals and care facilities; sensitive wildlife habitats, including the habitat of rare, threatened, or endangered species; hotels and short-term lodging (e.g., bed and breakfast, and motels); places of worship; and libraries". All of the receptors analyzed within this NVIA are considered "noise sensitive uses" per the 2040 General Plan, specifically "residences" (R2, R4 and R5), "parks, recreation, and open space" (R3) and "cemeteries" (R1). Therefore, the standards presented in Part (1) and Part (4) specific to these "noise sensitive uses" are applied to determine Project noise impacts.

In general, noise level changes of less than 3 dBA are not perceptible, and therefore 3+ dBA increase is commonly considered a "substantial increase" for the purposes of environmental noise assessment. This concept is used in Part (4) of the County standard to account for receptors where the existing background noise already exceeds the specified "fixed" criteria. Similarly, ambient plus 3+ dBA is also considered the significance criteria for Part (1) when the background CNEL noise levels exceed the specified standard. The applicable General Plan significance criteria are summarized in Table 7.

Table 7 Ventura County Noise Criteria

Industrial Source (Non-Transportation) Criteria			Traffic Source (Transportation) Criteria	
Time Period	**Hours**	**Threshold L_{eq}(1H)**	**Outdoor**	**Indoor**
Daytime	6:00 a.m. – 7:00 p.m.	55 dBA or ambient +3 dBA	CNEL = 60 dBA or ambient +3 dBA L_{eq}(1H) = 65 dBA or ambient +3 dBA	CNEL = 45 dBA or ambient +3 dBA
Evening	7:00 p.m. – 10:00 p.m.	50 dBA or ambient +3 dBA		
Nighttime	10:00 p.m. – 6:00 a.m.	45 dBA or ambient +3 dBA		

Source: Ventura County 2040 General Plan, Hazards and Safety Element, Noise (Chapter 7.9), September 2020.

Referring to monitoring results presented in Table 3, the ambient noise levels measured at the non-transportation receptors (R1 and R2/R3) are less than the applicable 1-hour (L_{eq}1H) "fixed thresholds" for the daytime, evening, and nighttime periods. Therefore, the "fixed thresholds" are utilized to determine the significance of Project noise impacts at Receptors R1, R2 and R3.

Table 8 Non-Transportation Significance Criteria

Receptor	Receptor Type	Daytime (L_{eq}1H)	Evening (L_{eq}1H)	Nighttime (L_{eq}1H)
Receptor 1	Cemetery	55.0 dBA	50.0 dBA	45.0 dBA
Receptor 2	Residence(s)	55.0 dBA	50.0 dBA	45.0 dBA
Receptor 3	Recreation/Open Space	55.0 dBA	50.0 dBA	45.0 dBA

See Appendix C for more detail.

For the Project haul route receptors (R4 and R5), modeled ambient noise levels shown in Table 5 exceed the outdoor "fixed threshold" of 60 dBA CNEL at Receptor 5 (R5). Therefore, per Ventura County guidance, the ambient noise levels "+3 dBA" would be utilized to determine the significance of the Project's outdoor noise impacts at haul route Receptor(s) R5. These adjusted significance criteria for R5 (i.e., R5-A, R5-B, R5-C) are summarized in Table 9 below. Please note, the modeled ambient outdoor noise level at Receptor 4 (R4) was below the applicable "fixed" CNEL thresholds. Therefore, the "fixed thresholds" of 60 dBA CNEL is utilized to determine the significance of traffic impacts at R4.

Table 9 Transportation Significance Criteria

Receptor	Receptor Type	Outdoor (CNEL)
Receptor 4	Residence	60.0 dBA
Receptor 5-A	Residence(s)	62.7 dBA
Receptor 5-B	Residence(s)	63.3 dBA
Receptor 5-C	Residence(s)	64.3 dBA

Note: Per Standard (1) within the Ventura County Hazards and Safety Element, Noise Chapter, the "fixed" CNEL significance criteria is 60 dBA for outdoor noise levels experienced at sensitive receptors. See Appendix E for more detail.

4.1.1 Neighboring City Criteria Discussion

As discussed in Section 2.3.4, although the Project site is located in unincorporated Ventura County, some of the affected receptors are located within the nearby Cities of Camarillo and Thousand Oaks. Specifically, residential receptors (i.e., R1 and R2) and recreation/open space receptors (i.e., R3) to the east are located within Thousand Oaks, and those located to the west (i.e., R5) are within Camarillo.

The Thousand Oaks General Plan Noise Element (City of Thousand Oaks, 2000) and Camarillo General Plan Noise Element (City of Camarillo, 2015) include land use planning standards for noise based on a sliding scale of impacts. These standards are identical to the sliding scale found in the Ventura County General Plan land-use compatibility chart (Appendix B). Since the Ventura County Noise Element noise criteria are identical to Thousand Oaks and Camarillo General Plan criteria, the Ventura County standards are used to determine significance of noise impacts at Receptors R1, R2, R3 and R4 in this NVIA. Additionally, the County 1-hour (L_{eq}1H) criteria during the daytime, evening, and nighttime periods is more stringent than the 24-hour CNEL standards, and is therefore conservative in comparison (i.e., impacts that do not exceed the Ventura County L_{eq}1H thresholds would not exceed the Thousand Oaks/Camarillo Noise Element CNEL thresholds).

The Camarillo Municipal Code also contains specific noise regulations (Chapter 10.34). As some of the Project haul route receptors (i.e., R5) are located within the City limits, these standards may apply. The Municipal Code includes noise level limits for daytime (7:00 a.m. to 9:00 p.m.) and nighttime (9:00 p.m. to 7:00 a.m.) that are identical to the Ventura County General Plan thresholds for these same time periods (55 dBA and 45 dBA respectively). The only differences are the Municipal Code lacks a separate evening (7:00 p.m. – 10:00 p.m.) standard, and the daytime period begins one hour later (7:00 a.m.) while the nighttime period begins one hour earlier (9:00 p.m.) compared to the periods in the Ventura County General Plan standards. Due to the inclusion of a separate evening standard/penalty, on balance the Ventura County thresholds are more stringent than the Camarillo Municipal Code. Furthermore, because the residential receptor(s) located within the City of Camarillo are haul route receptors (i.e., R5), and exposed to relatively continuous noise sources, the 24-hour CNEL Noise

Element significance threshold is more appropriately applied. For this reason, the Ventura County 2040 General Plan – Hazards and Safety Element (Chapter 7.9 – Noise) CNEL thresholds shown in Table 9 are utilized to determine Project impacts at haul route receptors.

4.2 Vibration Significance Thresholds

While the CEQA Guidelines refer to thresholds in the FTA's *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration, 2018), they are not appropriate to apply to blasting vibration. The *Transit Noise and Vibration Impact Assessment* thresholds are meant to be applied to transit sources that occur frequently throughout the day, which have a higher likelihood of causing damage and annoyance than infrequent, short duration (about 1-second) blasting events. For this reason, as discussed in Section 2.3.3, blasting specific thresholds from the Caltrans *Transportation and Construction Vibration Guidance Manual* (California Department of Transportation, 2013) are used to determine the significance of Project blasting vibration in this NVIA. This threshold criterion is utilized to address CEQA Checklist item *b)*.

There are two (2) types of vibration significance thresholds, damage and annoyance. The damage thresholds are intended to prevent damage to structures while annoyance thresholds are intended to prevent annoyance to nearby residents. Table 22 in the Caltrans *Transportation and Construction Vibration Guidance Manual* includes a list of vibration levels and their effects on structures from a variety of sources. Table 10 below includes a number of these vibration levels. Note that a peak particle velocity (PVV) of 2.0 inches per second (in/sec) is utilized as the damage threshold in this NVIA.

Table 10 Vibration Structure Damage

Category	PPV (in/sec)
Equivalent to jumping on the floor	0.3
Equivalent to door slam	0.5
Equivalent to nail driving	0.9
No damage to a residential structure	**<2.0**
Probable damage to a residential structure	>4.0

Source: Table 22 within the Caltrans *Transportation and Construction Vibration Guidance Manual* (California Department of Transportation, 2013).

Table 11 presents the human response to blasting as described in the *Transportation and Construction Vibration Guidance Manual*. As there is a difference between perceptibility and annoyance, it is not appropriate to adopt a threshold of perceptibly to determine the significance of infrequent blasting events. The *Transportation and Construction Vibration Guidance Manual* indicates that "while a blaster can quite easily design his blasts to stay well below any vibration or air overpressure levels that could cause damage, it is virtually impossible to design blasts that are not perceptible by people in the vicinity." This NVIA conservatively uses the strongly perceptible PPV level of 0.50 in/sec to determine significance of blasting events from an annoyance standpoint.

Table 11 Human Response to Blasting Vibration

Average Human Response	PPV (in/sec)
Barely to distinctly perceptible	0.02 – 0.10
Distinctly to strongly perceptible	0.10 – **0.50**
Strongly perceptible to mildly unpleasant	0.50 – 1.00
Mildly to distinctly unpleasant	1.00 – 2.00
Distinctly unpleasant to intolerable	2.00 – 10.00

Source: Table 21 within the Caltrans *Transportation and Construction Vibration Guidance Manual* (California Department of Transportation, 2013).

5.0 METHODOLOGIES

5.1 Assessment Methodologies – Non-Transportation Sources

As discussed in Section 3.1, the primary modification proposed by the Project from an onsite (i.e., "non-transportation") noise perspective is the expansion of the excavation operations. To determine impacts at nearby receptors, excavation equipment noise levels are quantified in this NVIA based on the expanded mining boundary. Figure 2 (Appendix A) shows the location of the expanded mine boundary and the nearest receptors of concern (R1, R2 and R3). To quantify the noise generated by the Project non-transportation noise sources (i.e., mobile mining and processing equipment), reference data from the *Construction Noise Threshold Criteria and Control Plan* (Ventura County, 2010) and the FHWA's *Roadway Construction Noise Model User Guide* (Federal Highway Administration, 2006) was utilized. Appendix D contains more detail related to the mobile equipment reference noise levels.

In addition to the expanded mining boundary, the Project would allow the operation of a portable Recycle Plant in various locations near the center of the Project site (Figure 2). The Recycle Plant would operate during the same daytime time periods as aggregate excavation and processing operations. As discussed in Section 3.1, although the aggregate processing plant (Aggregate Plant) is an existing permitted operation, conservatively noise generated by the plant has also been included in the non-transportation noise analysis. Figure 2 (Appendix A) displays the general area where the proposed portable Recycle Plant would operate onsite, as well as the existing location of the aggregate processing plant. As shown on Figure 2, the area closest to each receptor where the Recycle Plant could potentially operate was assessed to determine worst-case daytime noise impacts.

As discussed in Section 2.2.2, existing onsite operations are generally not audible at R2 and R3, and only faintly audible at R1. The ridge of the mountain and existing pit walls generally block line-of-site between the equipment noise sources and nearby receptors (R1, R2 and R3). A detailed analysis of the topography in and around the Project site was conducted for the three (3) residences that comprise Receptor 2 (i.e., R2-A, R2-B, and R2-C) and for the portion of the nearby hiking trail(s) represented by Receptor 3 (R3). Line-of-sight assessments were conservatively modeled from a second story vantage point (i.e., 15-feet above the ground surface) using current topographic data. As shown in Figure 4A and Figure 4C (Appendix A), Receptors R2-A, R2-C and R3 do not have line-of-sight to new Project excavation areas due to intervening mountains and topography. However, as shown on Figure 4B, Receptor 2-B (R2-B) is expected to have line-of-sight to three (3) new excavation areas located to the north. Figure 5 depicts these three (3) potential line-of-site (LoS) areas, shown as LoS-A, LoS-B, and LoS-C, in relation to Receptor 2-B. Receptor 2-B will potentially have direct line-of-sight to mobile equipment operating in these areas, and therefore no noise attenuation would result in this location due to the lack of intervening topography. Therefore, noise levels generated by mobile equipment operating within area LoS-A (Figures 4B and 5) were utilized to represent worst-case daytime noise impacts at Receptor 2-B (R2-B). Appendix D contains additional detail regarding the line-of-sight analysis.

Figure 2 (Appendix A) displays where the portable Recycle Plant would operate, specifically within the bottom of the existing excavation pit near the center of the Project site. The existing Aggregate Plant is also located in this area. Due to the intervening mountain range (Figures 4A, 4B, and 4C), residences at Receptor 2 and hikers at Receptor 3 are not expected to have line-of-sight to the existing Aggregate Plant or proposed Recycle Plant locations. Therefore, noise attenuation is assumed for these receptor-source combinations. Although it is anticipated that the existing excavation pit walls may shield views of the existing Aggregate Plant and proposed Recycle Plant from Receptor 1 (R1), this receptor may have line-of-sight to the top portions of the plant structures. Therefore, conservatively it is assumed that Aggregate Plant and Recycle Plant noise would not be attenuated at Receptor R1.

The non-transportation (i.e., onsite industrial noise sources) impact calculations (Appendix D) are based on the following conservative assumptions:

- As shown in Table 6, excavation and aggregate processing operations would continue to occur during the daytime hours only (7:00 a.m. – 4:00 p.m.). The proposed Recycle Plant would also operate during daytime hours only. As such, only daytime noise impacts from onsite sources would occur at Receptors 1 (R1), 2 (R2) and 3 (R3).
- The excavation equipment identified in Section 3.1 is conservatively assumed to operate simultaneously in the mining area or applicable line-of-sight (i.e., LoS) area closest to each receptor during the peak hour. This includes a loader, a dozer, an excavator, a rock drill, and a water truck. This is conservative because in reality not all mobile equipment would operate simultaneously in a single physical location closest to each receptor. For example, the rock drill is only used prior to blasting events, and would therefore operate separately from the other mobile equipment.
- Noise levels associated with the existing Aggregate Plant and proposed portable Recycle Plant are based on field measurements collected by Sespe Consulting, Inc. in 2020 from comparable rock crushing/recycling operation in Otay Mesa, California. This data was utilized in a previous Sespe study with a similar crushing/recycle plant (Sespe Consulting, Inc., 2020). In addition to the plants, when these measurements were collected at the Otay Mesa facility other ancillary equipment, specifically haul trucks and two (2) loaders, were also operating nearby simultaneously. Therefore, the noise levels measured at this facility represent a conservative overestimation of the noise generated by Pacific Rock's existing Aggregate Plant and proposed Recycle Plant. Appendix B contains relevant source noise references for the existing Aggregate Plant and proposed Recycle Plant.
- Noise impacts at receptors are calculated using standard logarithmic propagation equations from the guidance documents. These equations are also found in the applicable guidance documents published by the Federal Transit Administration (FTA) and Caltrans. This equation uses a logarithmic scale, with an approximate noise propagation factor of 6 decibels (dB) per doubling of distance.

  Six (6) decibels per doubling of distance is accepted as the appropriate propagation factor for environmental noise impact assessments. As explained in the Caltrans *Technical Noise Supplement* (California Department of Transportation, 2013), sound from a small localized source radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates or drops off at a rate of 6 dBA for each doubling of the distance. This decrease, resulting from the geometric spreading of the energy over an ever-increasing area, is referred to as the inverse square law. Appendix B presents an excerpt from the Caltrans guidance document.
- Peak 1-hour (L_{eq}1H) excavation noise levels are conservatively calculated when excavation equipment is operating as close to the affected receptors as possible (Figure 2) or within closest area with direct line-of-sight to the affected receptor (Figure 5).
- When looking at onsite noise impacts from mobile equipment (i.e., excavation operations), the crest of intervening mountain ranges between the equipment sources and R2 (i.e. R2-A, R2-B, R2-C) and R3 is estimated to provide -10 dBA of attenuation. Please see the barrier insertion loss calculations in Appendix D, which quantify the amount on noise attenuation expected due to the mountain ridge blocking line-of-sight between source and receptor. This is true of Receptors R2-A (Figure 4A) and R2-C and R3 (Figure 4C) as the intervening topography blocks their line-of-sight to the mine expansion areas. However, there is a potential for line-of-sight to exist between portions of the extended excavation areas and R2-B in three (3) locations to the north (Figure 4B). The closest excavation area with line-of-sight to R2-B is approximately 1,652 feet away (Figure 5). Mining in this area (i.e., LoS-A) would result in worst-case noise

impacts to receptor R2-B and is therefore utilized to determine significance (see calculations in Appendix D). As the excavation proceeds, the mass and height of intervening mountains would increase between the source and receptor resulting in increased noise attenuation and lower impacts at R2-B.

- For the existing Aggregate Plant and proposed Recycle Plant, the crest of intervening terrain between the plant locations and R2 and R3 also completely blocks line-of-sight between the noise sources and these receptors. Figures 4A, 4B, and 4C (Appendix A) show the line-of-sight geometry, and Appendix D which contains barrier insertion loss calculations. Therefore, an attenuation of -10 dBA is assumed at Receptor 2 (R2) and 3 (R3) when analyzing noise impacts from the Aggregate Plant and Recycle Plant operations. However, as described above, there is a potential for line-of-sight to exist between the Recycle Plant and R1. Therefore, no attenuation is assumed for the plant noise levels at R1.
- Total vibration impacts from blasting activities are determined in this NVIA based on the International Society of Explosives Engineers *Blasters' Handbook*, 17th Edition (International Society of Explosives Engineers, 1998), the blasting parameters described in Section 3.1, and the closest distance between the blasts and the receptors. The vibration equation presented in the *Blasters' Handbook* is identical to the equation outlined in applicable Caltrans guidance documents (California Department of Transportation, 2013).

Limited evening and nighttime activities are proposed as part of the Project to satisfy potential Public Works, Caltrans, and other special or emergency projects. However, only load out to haul trucks would be conducted during any extended evening and nighttime operations. Excavation and aggregate processing activities would continue to occur during daytime hours only (see Section 3.0). Nighttime load out activities would potentially impact R1 but, because the funeral home is only occupied during the daytime hours, noise during limited evening and nighttime operations would not adversely affect this land use. Additionally, these limited evening and nighttime operations would also not impact R2 and R3 due to the large distance between the truck loading area and receptors (minimum 2,295 feet), as well as the minimum -10 dBA attenuation provided by the intervening terrain. As discussed in Section 2.2.2, the existing aggregate processing plant and truck loading noise was not audible at R2 and R3 during previous site visits.

5.2 Assessment Methodologies – Transportation Sources

Project traffic/transportation noise impacts at receptors located along haul routes would result from aggregate delivery haul trucks on public roads. Project transportation noise was assessed using the SoundPLAN Essential 4.0 model software. As discussed in Section 2.2.3, SoundPLAN Essential uses the FHWA's *Traffic Noise Model* (TNM) algorithm to predict traffic noise impacts. Baseline traffic data on affected roadways was collected by VRPA Technologies, Inc. (VRPA) by measuring actual vehicle counts measured over a 24-hour period on November 27th, 2018. As discussed in Section 3.2, the daily haul truck trips associated with the Project would not change from existing levels (i.e., 60 loads/day, 120 one-way trips/day).

Total traffic count was modeled with SoundPLAN by combining the actual traffic counted by VRPA with estimated average hourly haul truck activity from the Pacific Rock Quarry. Specifically, SoundPLAN estimates that the existing daily truck trips (120 truck trips/day) would be spread evenly throughout the current operating day hours (i.e., average of 13 truck trips/daytime hour). Per the existing CUP, haul truck activity is limited to occur between 7:00 a.m. and 4:00 p.m. only. Using the methodology described above and average hourly baseline traffic data during the daytime, evening, and nighttime time periods, the SoundPLAN Essential model was used to calculate the baseline CNEL noise levels at Receptors R4 and R5 located along the haul route. Figure 6 (Appendix A) displays the results of the baseline noise model.

While the daily number of haul truck trips would not change from existing permitted levels (i.e., 60 loads/day, 120 one-way trips/day), the time period truck trips may occur would change. Specifically, allowing proposed 24-hour haul truck activity to satisfy Public Works, Caltrans, and other special/emergency projects would result in redistribution of daytime haul truck trips to periods during the evening and nighttime hours. The Project was modeled in SoundPLAN Essential assuming that all truck trips occur evenly throughout the evening (7:00 p.m. – 10:00 p.m.) and nighttime (10:00 p.m. – 7:00 a.m.) hours (i.e., average of 5 truck trips per evening/nighttime hour). This is conservative, as the CNEL noise metric adds the greatest penalty/weight to noise generated during these time periods (+5 dBA for evening noise, +10 dBA for nighttime noise).

Project noise impacts at haul route receptors (R4 and R5) were modeled over a 24-hour period (CNEL) for both the existing and proposed Project trip scenarios. The cumulative incremental noise impacts at each receptor are then compared to the appropriate criteria to determine significance.

6.0 PROJECT-LEVEL IMPACTS & MITIGATION MEASURES

6.1 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))**

6.1.1 Non-Transportation Impact Analysis

To address the CEQA Criteria *a)* for non-transportation source noise impacts, the applicable Ventura County 1-hour (L_{eq}1H) noise criteria presented in Table 8 are utilized. Non-transportation (i.e., onsite) Project noise impacts are presented and compared to the applicable significance thresholds in Table 12 below. For the reasons discussed in Section 5.1, these impacts are conservative as the vast majority of Project operation days would result in lesser impacts. Where line-of-site between receptor and noise source is blocked, a -10 dBA attenuation factor was applied. Specifically, a -10 dBA attenuation is applied at R2-A, R2-C and R3 due to the intervening topography blocking line-of-sight between the expanded excavation operations and receptors. Please see Appendix D for applicable barrier insertion loss calculations. This attenuation factor was also applied to proposed Recycle Plant and existing Aggregate Plant noise impacts at Receptors R2 (i.e., R2-A, R2-B, and R2-C) and R3 due to the mountain ridge blocking line-of-sight. Figure 4A, 4B and 4C (Appendix A) show the line-of-sight assessments for R2 and R3 receptors respectively. See Appendix D for assumptions and noise impact calculation.

Table 12 Non-Transportation Noise Impacts & Significance Determination (Prior to Mitigation)

Parameter	1-Hour (L_{eq}1H) – Noise Level (dBA)				
	R1	R2-A	R2-B	R2-C	R3
Baseline Noise Level (dBA):	41.6	44.8	44.8	44.8	44.8
Mobile Excavation Equipment Noise Impacts					
Distance to Equipment Source (feet)^{D}:	1,160	1,161	1,652	943	390
Noise Reduction due to Shielding (dBA)^{A}:	---	-10	---	-10	-10
Equipment Noise Level (L_{eq}1H) @ Receptor (dBA):	59.8	49.8	56.7	51.6	59.2
Aggregate Plant Noise Impacts					
Distance to Equipment Source (feet):	2,474	2,728	2,781	2,703	2,201
Noise Reduction due to Shielding (dBA)^{A}:	---	-10	-10	-10	-10
Equipment Noise Level (L_{eq}1H) @ Receptor (dBA):	55.2	39.4	39.2	39.4	41.2
Recycle Plant Noise Impacts					
Distance to Equipment Source (feet):	1,833	2,547	2,688	2,580	1,955
Noise Reduction due to Shielding (dBA)^{A}:	---	-10	-10	-10	-10
Equipment Noise Level (L_{eq}1H) @ Receptor (dBA):	52.8	40.0	39.5	39.8	42.3
Total Non-Transportation Equipment Noise Impacts & Significance Determination					
Cumulative Noise Level (L_{eq}1H) @ Receptor (dBA)^{C}:	**61.0**	**51.6**	**57.1**	**52.8**	**59.6**
Applicable Significance Threshold (dBA)^{B}:	**55.0**	**55.0**	**55.0**	**55.0**	**55.0**
Significant?	**Yes**	**No**	**Yes**	**No**	**Yes**

Footnotes (see Table 12 on previous page):

A – See Figure 4A (Receptor 2-A) and Figure 4C (Receptor 2-C and 3) which show the line-of-sight assessment for these receptors.

B – Significance threshold shown are the Ventura County General Plan/CEQA Guidelines "fixed" noise standards for daytime hours (6:00 a.m. – 7:00 p.m.). Onsite non-transportation operations would occur during daytime hours only (i.e., 7:00 a.m. – 4:00 p.m.), and therefore only the daytime L_{eq}1H criteria applies.

C – The total Project noise level represents the cumulative worst-case noise level experienced at Receptors R1, R2 and R3 due to operation of onsite equipment sources (i.e., mobile excavation equipment, proposed Recycle Plant, existing Aggregate Plant) operating simultaneously within a given hour.

D – As shown on Figure 5, the mining area with direct line-of-sight to Receptor 2-B is approximately 1,652-feet away. Mobile excavation equipment operating within this area (i.e., LoS-A) will produce worst-case noise impacts at R2-B and is therefore utilized to determine the significance of impacts.

As shown in Table 12 above, the predicted peak hour Project noise levels (L_{eq}1H) exceed the Ventura County General Plan/CEQA Guidelines daytime L_{eq}1H noise threshold at Receptor 1 (R1), Receptor 2-B (R2-B), and Receptor 3 (R3) due to expanded excavation activities as well as the existing Aggregate Plant and proposed Recycle Plant operations. Therefore, unmitigated noise impacts at R1, R2-B, and R3 due to onsite non-transportation sources are considered potentially significant. Please refer to the following section for the recommended mitigation measures.

Level of Significance Before Mitigation

Potential for a significant noise impact is predicted at Receptor 1 (R1), Receptor 2-B (R2), and Receptor 3 (R3).

Mitigation Measures

As shown in Table 12, peak one hour (L_{eq}1H) Project noise levels from onsite non-transportation sources (i.e., expanded excavation operations, existing Aggregate Plant, proposed Recycle Plant) exceed the applicable Ventura County daytime significance criteria at Receptors 1 (R1), 2-B (R2-B) and 3 (R3). Therefore, to ensure noise generated by onsite non-transportation equipment sources does not exceed applicable significance thresholds at Receptors R1, R2-B and R3, the following mitigation measures are recommended. Please see Appendix D for more details regarding the proposed mitigation measures.

NO-1. Blasting, excavation, and materials processing and recycling activities shall continue to occur during daytime operation hours (7:00 a.m. to 4:00 p.m.) only.

NO-2. Excavation equipment (loader, dozer, excavator, rock drill, water truck) shall be fitted with a manufacturer's approved exhaust muffler.

NO-3. Excavation equipment, including the drill rig, shall not idle for more than 30 minutes at any one time.

NO-4. The existing Aggregate Plant and proposed Recycle Plant shall not operate simultaneously for any time period.

NO-5. Neither the proposed Recycle Plant and nor the existing Aggregate Plant shall operate when excavation is occurring within 1,600-feet of the Conejo Mountain Funeral Home (Receptor 1).

NO-6. The predicted noise impacts associated with onsite excavation equipment shall be verified with noise level measurements upon commencement of mining activities within line-of-sight of Receptor 1 (R1) and Receptor 2-B (R2-B). In the event that actual noise levels exceed the assumptions contained within this analysis, additional noise control measures shall be implemented.

Based on information in the Ventura County Construction Guidelines (Ventura County, 2010) and EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (U.S. Environmental Protection Agency, 1971) presented in Appendix B, the above mitigations have been determined to be sufficient to reduce the noise impacts to less than significant at nearby receptors. Furthermore, Pacific Rock has advised Sespe during preparation of this report that the above mitigations are feasible.

At Receptor 1 (R1), in some instances combined noise levels resulting from operations of mobile equipment and one of the processing plants (i.e., Aggregate or Recycle Plants) still exceed applicable Ventura County standards, even with the implementation of Mitigation Measures NO-1 through NO-4. Additional noise propagation calculations show that Project noise impacts at this receptor will fall below the applicable Ventura County General Plan daytime significance threshold if neither the proposed Recycle Plant nor the existing Aggregate Plant are operational when mining equipment is operating within 1,600-feet of the receptor (see Appendix D). Figure 8 depicts the potential excavation areas located less than 1,600-feet away from R1. Therefore, if excavation is occurring within 1,600 feet of R1, neither the Recycle Plant nor the Aggregate Plant shall be operated (as required by Mitigation Measure NO-5) to ensure Project noise impacts at R1 are less than significant.

Table 13 below presents the mitigated noise levels expected while onsite operations are occurring in the Project site areas closest to or within line-of-sight of the affected receptors. The mitigated noise levels for excavation equipment are based on the EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (Appendix B), which notes that installation of a manufacturer's "improved muffler" on each equipment's "exhaust" would result in a "probable noise reduction" of -10 dBA. The EPA document also notes these quieter equipment noise levels are obtainable by "implementing noise control features requiring no major redesign or extreme cost" (Appendix B). Since the exhaust stack is considered the dominant noise component on the front-end loader, dozer, and excavator (Appendix D), a -10 dBA reduction is assumed for these pieces of equipment due to the installation of an improved muffler. For the rock drill and water truck, conservatively it is assumed this control measure would achieve a -5 dBA noise reduction, as the exhaust stack is the secondary noisy component for these equipment pieces (Appendix D). Use of an improved muffler is also presented in the Ventura County Construction Guidelines as a feasible mitigation option, which states using "quieter methods or equipment and implementing feasible noise controls" can reduce equipment noise impacts. The Ventura County Construction Guidelines includes the EPA's mitigated equipment noise levels by reference. See Appendix B for applicable Ventura County/EPA mitigation references, and Appendix D for mitigated equipment noise levels and mitigated noise impact calculations.

Table 13 Non-Transportation Noise Impacts & Significance Determination with Mitigation

Receptor	Unmitigated Noise Level (L_{eq}1H) @ Receptor (dBA) [A]	Mitigated Noise Level (L_{eq}1H) @ Receptor (dBA) [D]	Ventura County Significance Criteria (dBA) [B]	Significant?
Receptor 1 (R1) [C]	61.0	54.9	55	No
Receptor 2-A (R2-A)	51.6	47.8	55	No
Receptor 2-B (R2-B)	57.1	51.4	55	No
Receptor 2-C (R2-C)	52.8	48.5	55	No
Receptor 3 (R3)	59.5	53.5	55	No

Notes (also see following page):

A – Prior to mitigation, noise impacts at R2-A and R2-C were shown to be below the applicable significance thresholds due to intervening topography (see Table 12). However, since the proposed mitigation measures would apply to all excavation equipment, the mitigated noise levels at these receptors are also shown here for informational purposes.

B – Significance threshold shown is Ventura County General Plan noise criteria for daytime hours (6:00 a.m. – 7:00 p.m.).

C – While mitigated noise levels at R1 appear very close to the 55 dBA significance threshold, this is due to the design of the proposed mitigation measures. With mitigations NO-4 and NO-5 implemented, worst case noise impacts at R1 would occur when only mobile mining equipment (no Recycle and Aggregate Plant operations per Mitigation Measure NO-5) is operating and excavation is occurring within 1,600 feet of the receptor (this scenario produces an estimated 54.9 dBA level at R1). The majority of excavation operations would occur further than 1,600-feet from R1, and therefore noise impacts would usually be below those shown in Table 13. Please see the calculations in Appendix D for more detail.

D – Mitigated noise levels at receptors R1, R2 and R3 take into account predicted noise reductions resulting through the implementation of Mitigation Measures NO-1 through NO-4, while mitigated noise levels shown for R1 also take into account reductions resulting from the implementation of Mitigation Measure NO-5. Please see Appendix D for additional detail.

As shown in Table 13, non-transportation noise sources are expected to have a less than significant impact at Receptors R1, R2 and R3 with mitigation incorporated. It is also important to note this study was designed to produce conservative worst-case Project noise impacts to nearby receptors. For example, inclusion of the existing Aggregate Plant as a new noise source represents a conservative assumption. In reality, when taking into account the shielding or absorption effects from intervening topography/vegetation between source and receptor, as well as the fact that most excavation and processing operations will not occur simultaneously, near the outermost Project site boundary or 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 NVIA. Furthermore, as mining progresses to a final depth and the pit walls deepen, additional noise attenuation can be assumed.

Per Mitigation Measure NO-6, to ensure noise impacts to nearby noise-sensitive receptors to the west (R1) and east (R2-B) are not significant, reference sound levels associated with onsite excavation and processing equipment would be verified through noise level measurements upon commencement of mining and processing activities in areas within line-of-sight of Receptor 1 and Receptor 2-B (Figure 5).

Level of Significance After Mitigation

Upon implementation of Mitigation Measures NO-1 through NO-6 described above, Project non-transportation impacts to nearby Receptors R1, R2 and R3 would be less than significant as shown in Table 13.

6.1.2 Transportation Impact Analysis

To address the CEQA Criteria *a)* for transportation Project impacts, prediction of noise impacts from Project transportation sources (i.e., haul trucks) is addressed in this section. Project traffic noise would result from aggregate delivery haul trucks on public roadways. Project traffic noise impacts on affected road segments of Howard Road, Pancho Road, and Pleasant Valley Road (Figure 3) were modeled using SoundPLAN Essential compute software. Please see Section 5.2 which summarizes the assumptions and methodologies utilized in the traffic noise model.

Figure 6 and Figure 7 (Appendix A) display the results of both the baseline and Project road noise model respectively. Table 14 summarizes the predicted cumulative CNEL noise levels experienced by the Project haul route Receptors R4 and R5 under the baseline and Project conditions. Haul truck noise impacts are below the applicable Ventura County Noise Element significance criteria. Please see Appendix E for more details regarding the transportation noise model and resulting impact assessment.

Table 14 Transportation Noise Level & Significance Determination

Parameter	R4 (CNEL – dBA)	R5-A (CNEL – dBA)	R5-B (CNEL – dBA)	R5-C (CNEL – dBA)
Baseline Outdoor Noise Level	50.3	59.7	60.3	61.3
Total Project Outdoor Noise Level	55.2	61.1	61.4	61.6
Significance Threshold	**60.0**	**62.7**	**63.3**	**64.3**
Significant?	No	No	No	No

See Figure 6 and Figure 7 (Appendix A) and the model output files in Appendix E for more detail.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not Applicable.

6.2 Generation of Excessive Groundborne Vibration

Impact Statement

Impact NO-2: *Generation of excessive groundborne vibration or groundborne noise levels?* **(Appendix G Threshold Criteria (b))**

As discussed in Section 5.1, total vibration impacts from blasting activities are determined in this NVIA based on the International Society of Explosives Engineers *Blasters' Handbook*, 17th Edition (International Society of Explosives Engineers, 1998), assuming the closest distance between the blasts and the receptors. See Appendix F for the calculations and additional information.

Blasting vibration impacts at Receptors R1, R2 and R3 are presented and compared to the applicable Caltrans significance criteria in Table 15. These estimates are conservative, as it assumes the blasts occur within the Project site area closest to each receptor. Blasting would continue to be conducted during the daytime hours only (see Section 3.1). Table 15 presents the results of the blasting vibration analysis in terms of peak particle velocity (PPV). Note that the peak blasting vibration impact would only slightly increase at R1 and R2 (R2-A, R2-B, R2-C) above the threshold of perception (i.e., 0.02 in/sec) due to the Project. While predicted vibration levels are slightly higher at R3, this may be considered acceptable due to the transitory use of the open space area and trails and the fact that no permanent structures are found in this location. Please see Appendix F for the vibration impact calculations.

Table 15 Peak Project Vibration Impacts and Significance Determination

Receptor	Project Vibration Impact – PPV (in/sec)	Structure Damage Threshold – PPV (in/sec)	Significant?	Annoyance Threshold – PPV (in/sec)	Significant?
Receptor 1	0.086	2.0	**No**	0.50	**No**
Receptor 2-A	0.086	2.0	**No**	0.50	**No**
Receptor 2-B	0.050	2.0	**No**	0.50	**No**
Receptor 2-C	0.120	2.0	**No**	0.50	**No**
Receptor 3	0.492	2.0	**No**	0.50	**No**

See Appendix F for more detail.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not Applicable.

6.3 Airport & Airstrip 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 the vicinity of a private airstrip or within 2.0 miles of any public airports or public airstrips. As discussed in Section 2.2, the closest airport/airstrip is Camarillo Airport, located approximately 4.5 miles northwest of the Project site. Additionally, per Figure 11-15 within the Ventura County 2040 General Plan – Health and Safety Background Report (Ventura County, 2020), neither the Project site nor the affected receptors are located within the CNEL contour areas for the Camarillo Airport, or the Point Mugu Naval Air Station located approximately 7.2 miles away to the southwest (see Figure 11-15 – Camarillo Airport Noise Contours and Figure 11-17 – NAWS at Point Mugu Noise Contours; Ventura County 2014 General Plan – Health and Safety Background Report, Section 11.6 – Noise and Vibration). Therefore, the Project would have no impact related to public or private 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 NVIA finds that:

- Noise impacts from onsite sources ("Non-Transportation") are less than significant after mitigation.
- Noise impacts from traffic sources ("Transportation") are less than significant.
- Groundborne vibration impacts are less than significant.
- The Project would result in a Class II impact, significant but mitigable to less than significant levels.

8.0 REFERENCES

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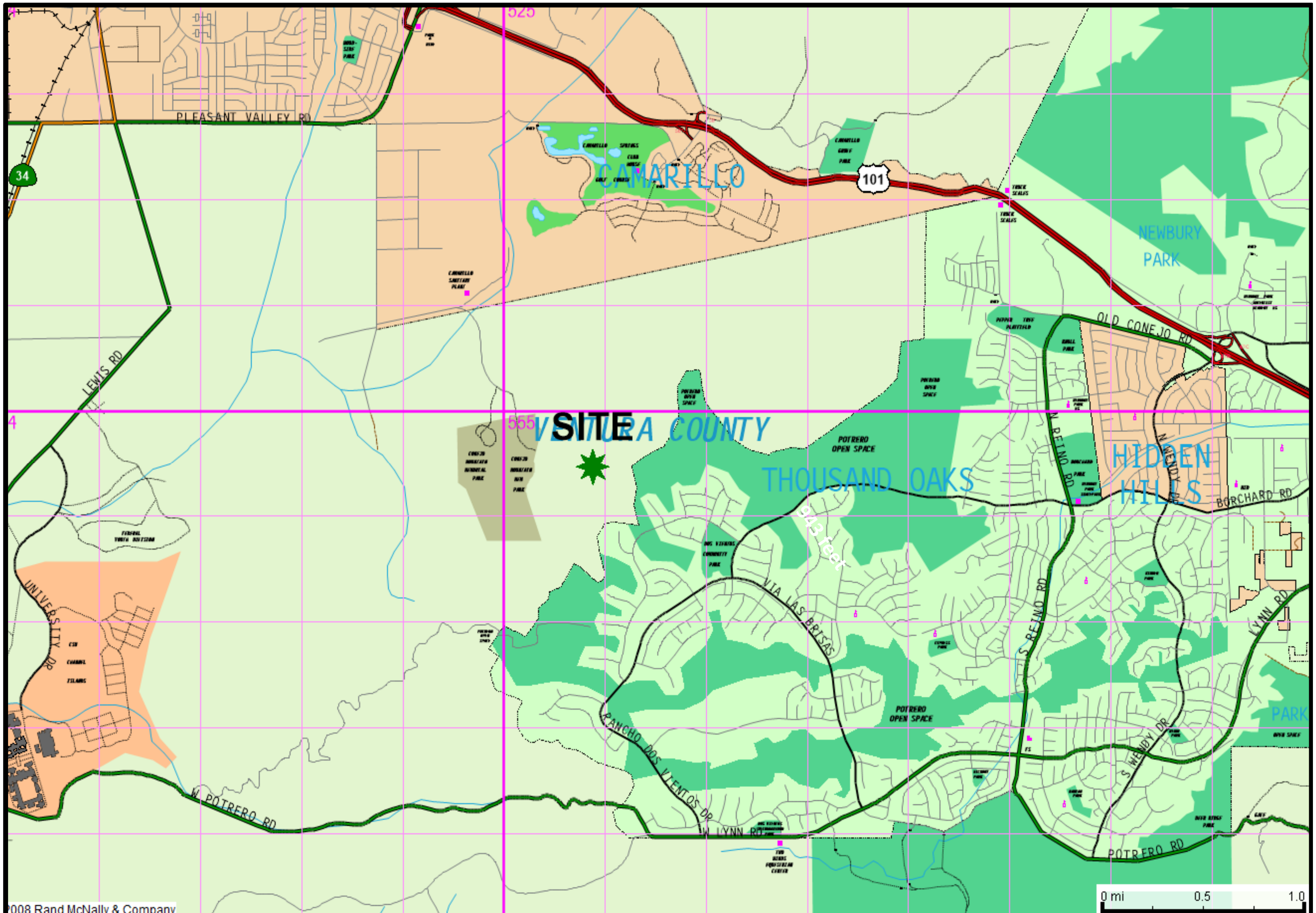
APPENDIX A

FIGURES



Source: Rand McNally & Company (2008)

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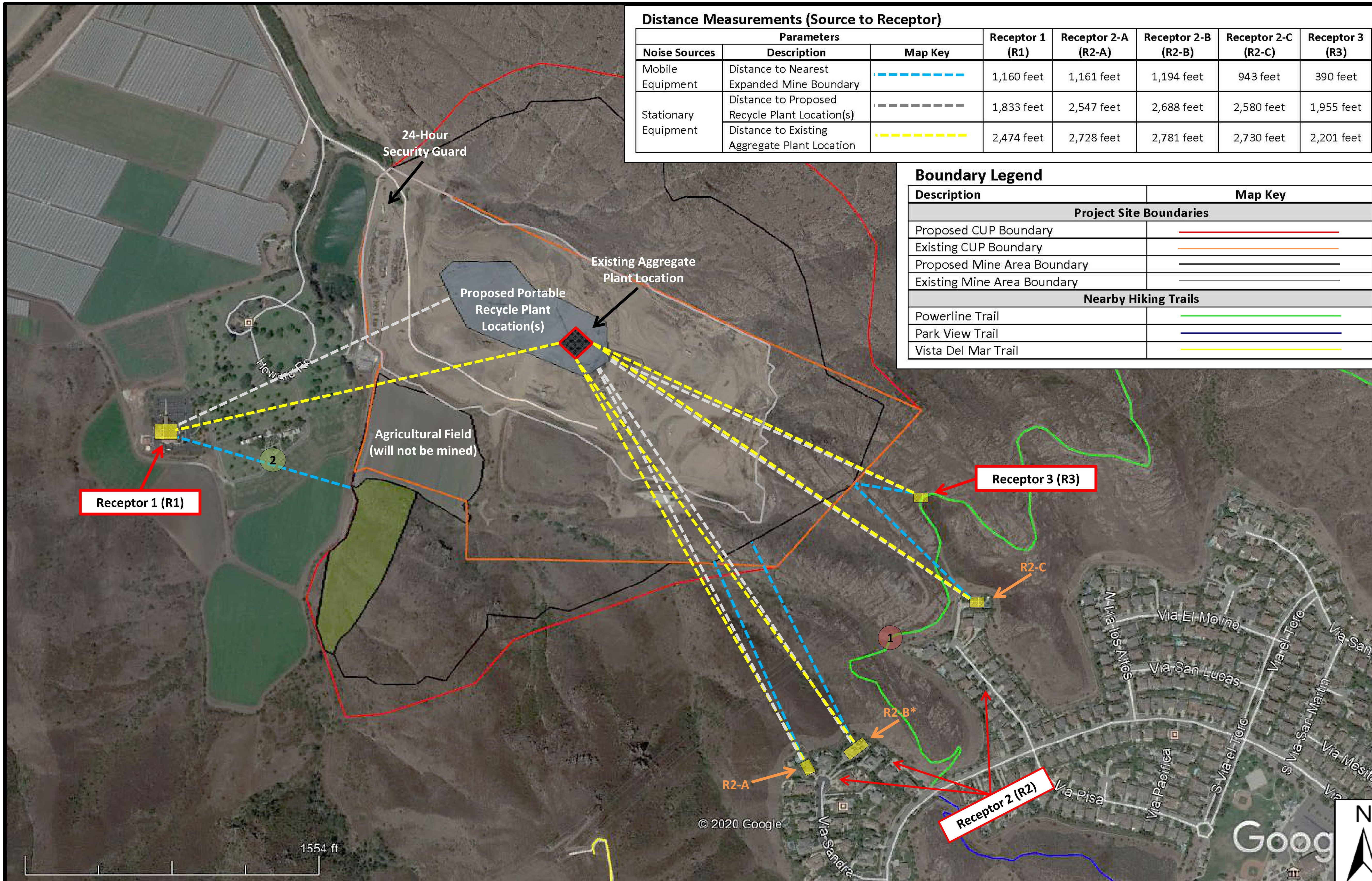
FIGURE 1	SITE LOCATION MAP Pacific Rock Quarry 1000 S. Howard Road Camarillo, CA 93012		
PROJECT #:	PA01.09.01	DATE:	2/3/17
SCALE:	As Shown	DRAWN BY:	GPS

Distance Measurements (Source to Receptor)

Noise Sources	Description	Map Key	Receptor 1 (R1)	Receptor 2-A (R2-A)	Receptor 2-B (R2-B)	Receptor 2-C (R2-C)	Receptor 3 (R3)
Mobile Equipment	Distance to Nearest Expanded Mine Boundary		1,160 feet	1,161 feet	1,194 feet	943 feet	390 feet
Stationary Equipment	Distance to Proposed Recycle Plant Location(s)		1,833 feet	2,547 feet	2,688 feet	2,580 feet	1,955 feet
	Distance to Existing Aggregate Plant Location		2,474 feet	2,728 feet	2,781 feet	2,730 feet	2,201 feet

Boundary Legend

Description	Map Key
Project Site Boundaries	
Proposed CUP Boundary	
Existing CUP Boundary	
Proposed Mine Area Boundary	
Existing Mine Area Boundary	
Nearby Hiking Trails	
Powerline Trail	
Park View Trail	
Vista Del Mar Trail	



Source: Google Earth (2020)

- Receptor Locations
- 24-Hour Monitoring Location
- 15-Minute Monitoring Location(s)
- Proposed Recycle Plant Location(s)
- Existing Aggregate Plant Location

* Figure 5 shows the expanded mining areas that Receptor 2-B (R2-B) will have a direct line-of-sight (LoS) with no attenuation due to intervening topography. Therefore, worst case noise impacts @ R2-B were determined by assessing mobile equipment operating within LoS of R2-B, and not at the nearest mining boundary (as shown here).

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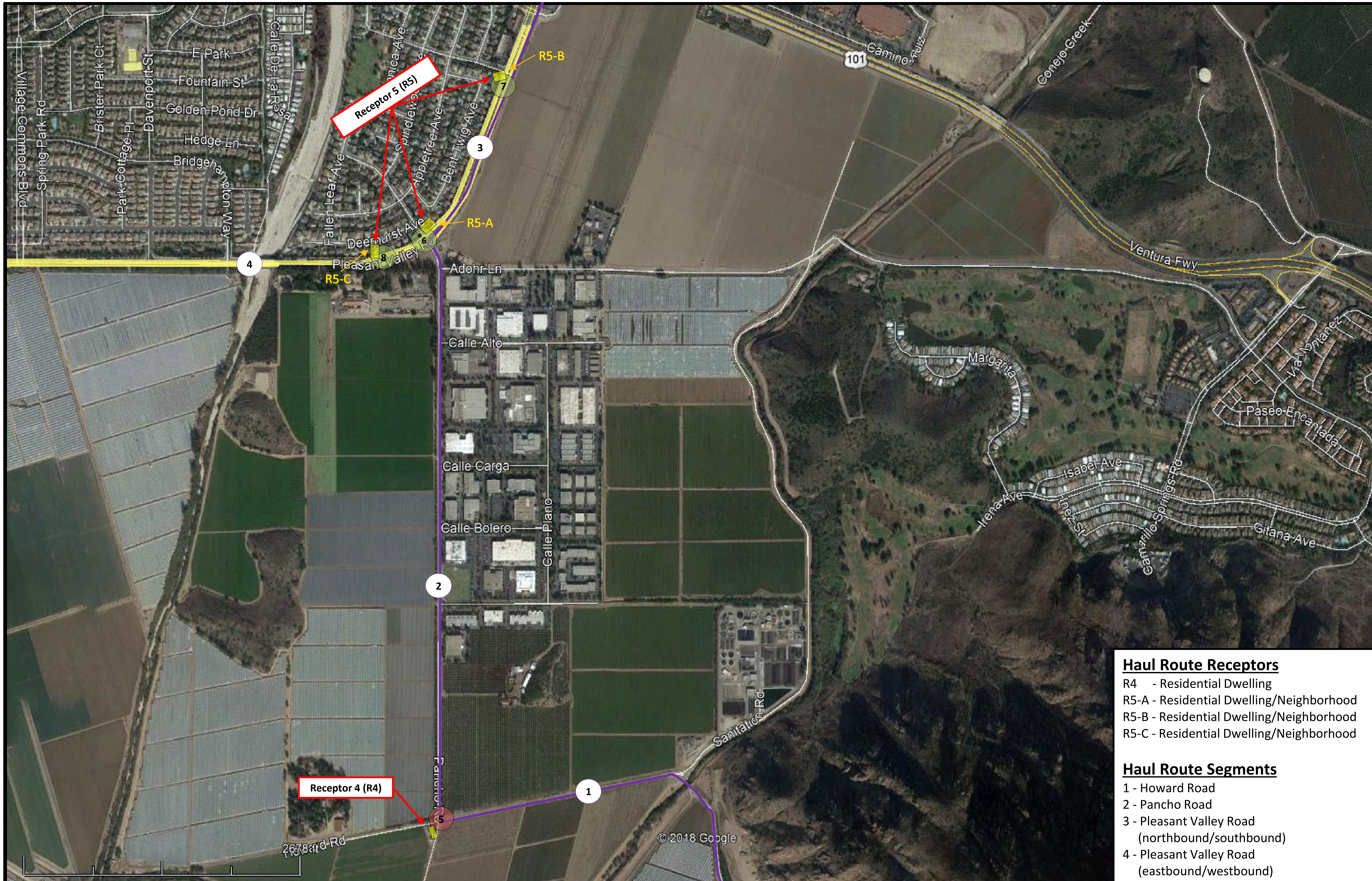
FIGURE	SITE AERIAL & FACILITY RECEPTORS		
2	Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012		
PROJECT #:	PA01.09.01	DATE:	11/3/20
SCALE:	As Shown	DRAWN BY:	GPS



Haul Route Receptors

R4 - Residential Dwelling
R5-A - Residential Dwelling/Neighborhood
R5-B - Residential Dwelling/Neighborhood
R5-C - Residential Dwelling/Neighborhood

Haul Route Segments

1 - Howard Road
2 - Pancho Road
3 - Pleasant Valley Road (northbound/southbound)
4 - Pleasant Valley Road (eastbound/westbound)

Source: Google Earth (2018)

Proposed Haul Route Segment (approximate)
Receptor Location
24-Hour Monitoring Location
15-Minute Monitoring Locations
* Three (3) separate 15-minute measurements were collected at Monitoring Location #6

N

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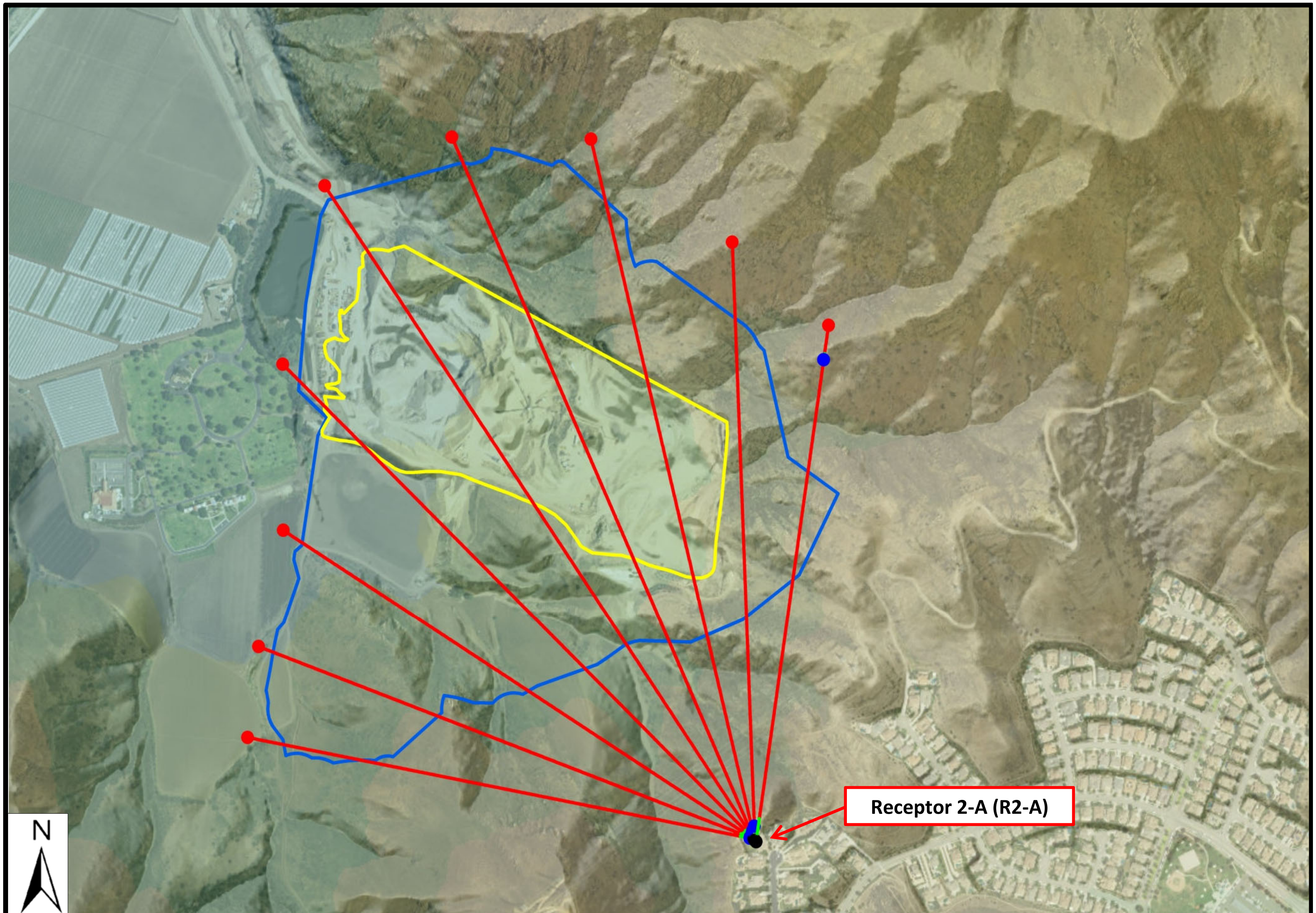
FIGURE	AERIAL & HAUL ROUTE RECEPTORS		
3	Pacific Rock Quarry 1000 S. Howard Road Camarillo, CA 93012		
PROJECT #: PA01.09.01		DATE:	12/27/18
SCALE: As Shown		DRAWN BY:	GPS



Source: ArcMap (2017)

Existing Mining Boundary (approximate)

Proposed Mining Boundary (approximate)

Notes: Second floor vantage points (i.e., 15-feet above ground surface) were modeled. Line segments/areas shown in green have line-of-sight (LoS), while line segments/areas shown in red do not have line-of-sight (LoS).

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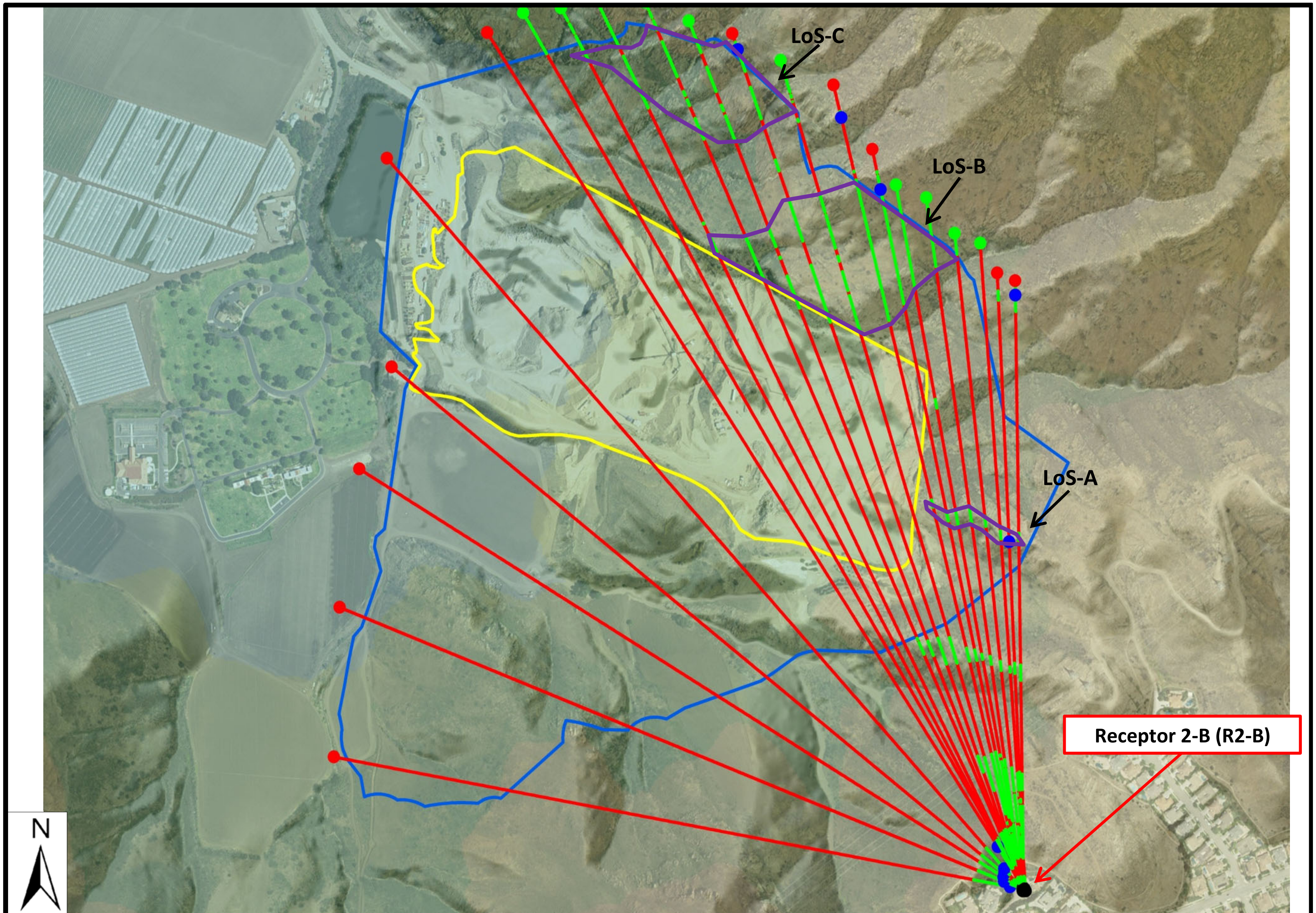
FIGURE 4A	RECEPTOR 2-A: LINE-OF-SIGHT Pacific Rock Quarry 1000 S. Howard Road Camarillo, CA 93012		
PROJECT #:	PA01.09.01	DATE:	2/13/19
SCALE:	N/A	DRAWN BY:	GPS



Source: ArcMap (2017)

Existing Mining Boundary (approximate)

Proposed Mining Boundary (approximate)

Notes: Second floor vantage points (i.e., 15-feet above ground surface) were modeled. Line segments/areas shown in green have line-of-sight (LoS), while line segments/areas shown in red do not have line-of-sight (LoS).

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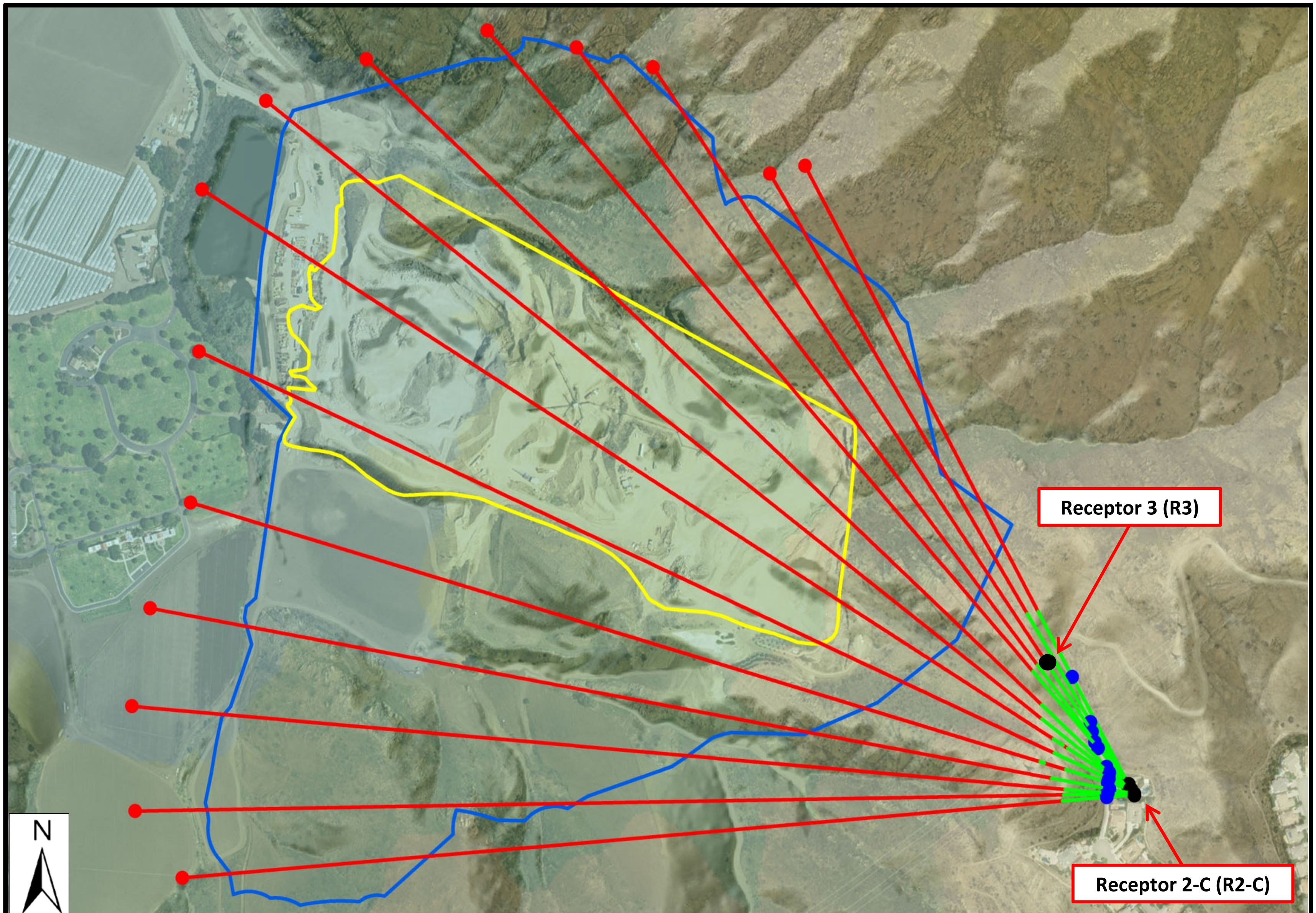
FIGURE 4B	RECEPTOR 2-B: LINE-OF-SIGHT Pacific Rock Quarry 1000 S. Howard Road Camarillo, CA 93012		
PROJECT #:	PA01.09.01	DATE:	2/13/19
SCALE:	N/A	DRAWN BY:	GPS



Source: ArcMap (2017)

Existing Mining Boundary (approximate)

Proposed Mining Boundary (approximate)

Notes: Second floor vantage points (i.e., 15-feet above ground surface) were modeled. Line segments/areas shown in green have line-of-sight (LoS), while line segments/areas shown in red do not have line-of-sight (LoS).

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FIGURE 4C

RECEPTORS 2-C & 3: LINE-OF-SIGHT

Pacific Rock Quarry
1000 S. Howard Road
Camarillo, CA 93012

PROJECT #:	PA01.09.01	DATE:	2/3/19
SCALE:	N/A	DRAWN BY:	GPS

Source: Google Earth (2018)

Existing Mining Boundary (approximate)

Proposed Mining Boundary (approximate)

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FIGURE 5	R2-B LINE-OF-SIGHT DISTANCES Pacific Rock Quarry 1000 S. Howard Road Camarillo, CA 93012		
PROJECT #:	PA01.09.01	DATE:	2/3/18
SCALE:	As Shown	DRAWN BY:	GPS

FIGURE 6
Traffic Noise Model - Baseline CNEL (24-Hour)

Average Baseline - CNEL
Operating Hours = 7:00 a.m. - 4:00 p.m.
13 truck trips/hour

Receptors:
#1 = Receptor 4 (R4)
#2 = Receptor 5-A (R5-A)
#3 = Receptor 5-B (R5-B)
#4 = Receptor 5-C (R5-C)

Vehicle Types Modeled:
-Heavy-Duty Trucks
-Medium-Duty Trucks
-Automobiles
-Motorcycles
-Buses

Signs and Symbols

Ground Absorption
Wall
Receptor
Haul Route(s)
Surface

1 : 1183

0 0.15 0.3 0.6 0.9 1.2 feet

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FIGURE 7
Traffic Noise Model - Project CNEL (24-Hour)

Average Project - CNEL
Operating Hours = 24 hours/day
5 truck trips/hour

Receptors:
#1 = Receptor 4 (R4)
#2 = Receptor 5-A (R5-A)
#3 = Receptor 5-B (R5-B)
#4 = Receptor 5-C (R5-C)

Vehicle Types Modeled:
-Heavy-Duty Trucks
-Medium-Duty Trucks
-Automobiles
-Motorcycles
-Buses

Signs and Symbols

Ground Absorption
Wall
Receptor
Haul Route(s)
Surface

1 : 1183

0 0.15 0.3 0.6 0.9 1.2 feet

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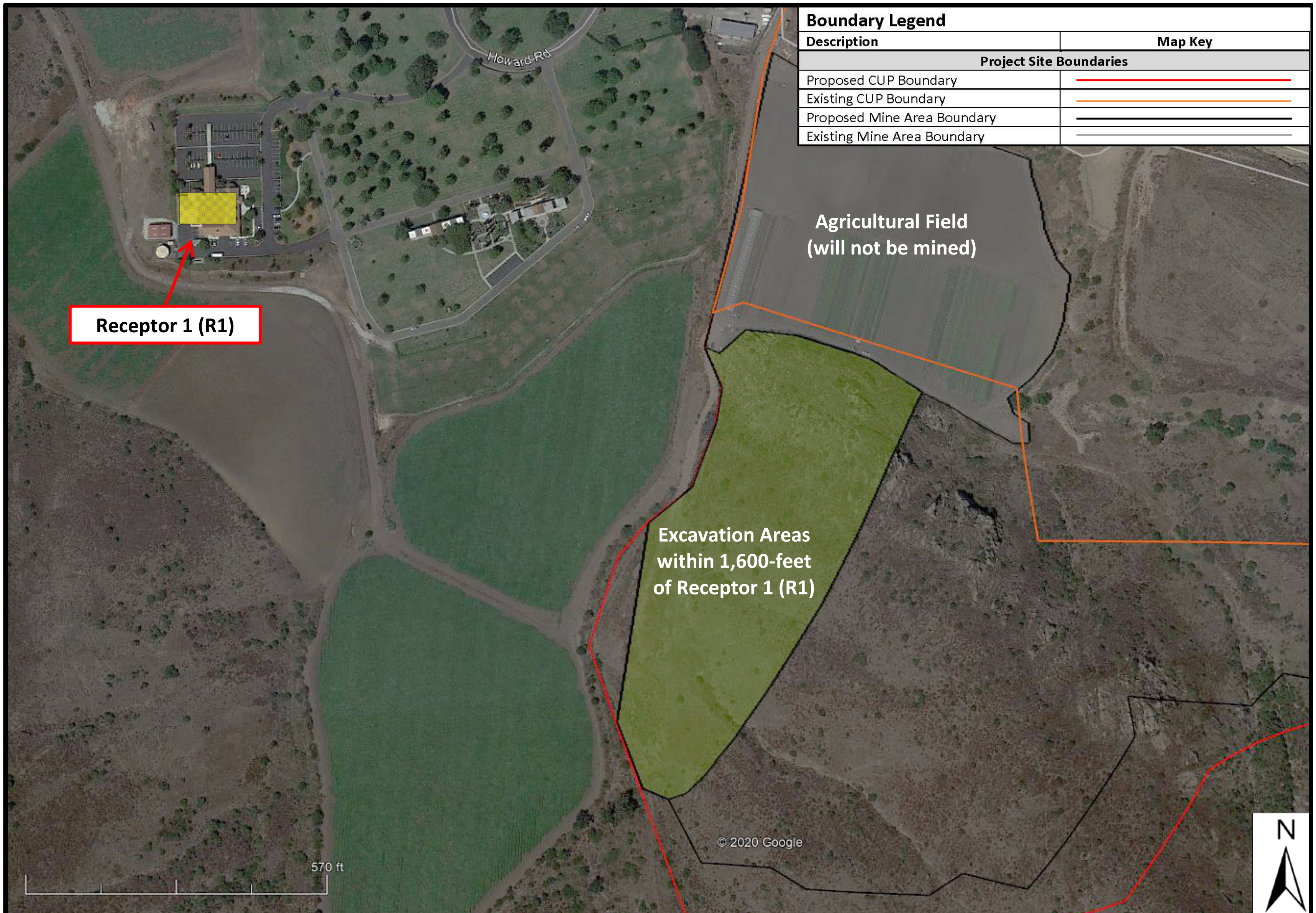

Source: Google Earth (2020)

Note: To ensure Project noise levels at Receptor 1 (R1) comply with the applicable General Plan noise criteria, neither the existing Aggregate Plant or the proposed Recycle Plant shall operate at any time when excavation is occurring within 1,600-feet of Receptor R1. Please see Mitigation Measure NO-5 and the propagation calculations presented in Appendix D.

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FIGURE 8	MITIGATION MEASURE NO-5 Pacific Rock Quarry 1000 S. Howard Road Camarillo, CA 93012		
PROJECT #:	PA01.09.01	DATE:	11/3/20
SCALE:	As Shown	DRAWN BY:	GPS

APPENDIX B

REGULATORY REFERENCES

7.9 Noise

The predominant sources of noise in the county include traffic noise on major roadways, transit and freight trains, and aircraft. In addition to the information provided in Section 11.6, “Noise and Vibration,” of the Background Report on existing conditions, Table 7-1 includes the calculated future noise levels at 50 feet from County roadways, as well as distances to the 60, 65, and 70 dBA CNEL noise contours for all modeled roadways.

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. These uses include: residences; schools; historic sites; cemeteries; parks, recreation, and open space areas; hospitals and care facilities; sensitive wildlife habitats, including the habitat of rare, threatened, or endangered species; hotels and other short-term lodging (e.g., bed and breakfasts, and motels); places of worship; and libraries.

HAZ-9	To protect the health, safety, and general welfare of county residents by striving to eliminate or avoid the adverse noise impacts on existing and future noise sensitive uses.

HAZ-9.1 **Limiting Unwanted Noise**

The County shall prohibit discretionary development which would be impacted by noise or generate project-related noise which cannot be reduced to meet the standards prescribed in Policy Haz-9.2. This policy does not apply to noise generated during the construction phase of a project. (SO)

HAZ-9.2 **Noise Compatibility Standards**

EIR HC

The County shall review discretionary development for noise compatibility with surrounding uses. The County shall determine noise based on the following standards:

1. New noise sensitive uses proposed to be located near highways, truck routes, heavy industrial activities and other relatively continuous noise sources shall incorporate noise control measures so that indoor noise levels in habitable rooms do not exceed Community Noise Equivalent Level (CNEL) 45 and outdoor noise levels do not exceed CNEL 60 or Leq1H of 65 dB(A) during any hour.

2. New noise sensitive uses proposed to be located near railroads shall incorporate noise control measures so that indoor noise levels in habitable rooms do not exceed Community Noise Equivalent Level (CNEL) 45 and outdoor noise levels do not exceed L10 of 60 dB(A)

3. New noise sensitive uses proposed to be located near airports:

   a. Shall be prohibited if they are in a Community Noise Equivalent Level (CNEL) 65 dB or greater, noise contour; or

   b. Shall be permitted in the Community Noise Equivalent Level (CNEL) 60 dB to CNEL 65 dB noise contour area only if means will be taken to ensure interior noise levels of CNEL 45 dB or less.

4. New noise generators, proposed to be located near any noise sensitive use, shall incorporate noise control measures so that ongoing outdoor noise levels received by the noise sensitive receptor, measured at the exterior wall of the building, does not exceed any of the following standards:

    a. Leq1H of 55dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 6:00 a.m. to 7:00 p.m.;

    b. Leq1H of 50dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 7:00 p.m. to 10:00 p.m.; and

    c. Leq1H of 45dB(A) or ambient noise level plus 3dB(A), whichever is greater, during any hour from 10:00 p.m. to 6:00 a.m.

5. Construction noise and vibration shall be evaluated and, if necessary, mitigated in accordance with the Construction Noise Threshold Criteria and Control Plan (Advanced Engineering Acoustics, November 2005). (RDR)

Table 7-1 Projected 2040 Noise Levels and Contours

Corridor and Segment		Noise (dBA CNEL) at 50 feet from Roadway	Noise Contour Distance in Feet		
			60 dBA	65 dBA	70 dBA
Roadways					
1	Aggen Road north of Los Angeles Avenue (SR 118)	55.0	32	10	3
2	Balcom Canyon Road south of South Mountain Road	58.2	65	21	7
3	Balcom Canyon Road north of Los Angeles Avenue (SR 118)	57.1	51	16	5
4	Bardsdale Avenue east of Sespe Street	56.7	47	15	5
5	Beardsley Road north of Central Avenue	62.8	190	60	19
6	Box Canyon Road south of Santa Susana Pass Road	59.3	86	27	9
7	Bradley Road north of Los Angeles Avenue (SR 118)	62.2	166	52	17
8	Briggs Road south of Telegraph Road	62.9	197	62	20
9	Briggs Road north of Telegraph Road	58.8	75	24	8
10	Bristol Road west of Montgomery Avenue	65.9	387	123	39
11	Broadway Road west of Grimes Canyon Road (SR 23)	61.0	125	40	13
12	Burnham Road south of Baldwin Road (SR 150)	57.7	59	19	6
13	Burnham Road east of Santa Ana Road	57.3	54	17	5
14	Calle Yucca north of Camino Manzanas	54.2	26	8	3
15	Camino Dos Rios west of Lynn Road	57.2	52	17	5
16	Canada Larga Road east of Ventura Avenue	54.4	28	9	3
17	Casitas Vista Road west of Ojai Freeway (SR 33)	58.6	72	23	7
18	Center School Road south of Los Angeles Avenue (SR 118)	56.2	42	13	4
19	Center Street (Piru) west of Telegraph Road (SR 126)	54.7	29	9	3
20	Central Avenue west of Ventura Freeway (US 101)	67.9	619	196	62
21	Central Avenue west of Santa Clara Avenue	67.9	620	196	62
22	Central Avenue east of Vineyard Avenue (SR 232)	64.5	284	90	28
23	Channel Islands Boulevard west of Rice Avenue	68.4	693	219	69
24	Creek Road east of Country Club Drive	55.8	38	12	4
25	Creek Road east of Ventura Avenue (SR 33)	62.6	181	57	18
26	Donlon Road north of La Cumbre Road	52.0	16	5	2
27	Doris Avenue east of Victoria Avenue	64.9	311	98	31

	Corridor and Segment	Noise (dBA CNEL) at 50 feet from Roadway	Noise Contour Distance in Feet		
			60 dBA	65 dBA	70 dBA
28	El Roblar Drive west of Maricopa Highway (SR 33)	57.7	58	18	6
29	Etting Road east of Dodge Road	62.0	159	50	16
30	Fairview Road east of Maricopa Highway (SR 33)	51.4	14	4	1
31	Fairway Drive north of Valley Vista Drive	57.3	53	17	5
32	West Fifth Street east of North Harbor Boulevard	59.6	92	29	9
33	Foothill Road west of Peck Road	61.1	128	40	13
34	Foothill Road west of Briggs Road	56.2	42	13	4
35	Foothill Road east of North Wells Road	62.1	161	51	16
36	Foothill Road east of Saticoy Avenue	63.3	211	67	21
37	Gonzales Road east of North Harbor Boulevard	63.3	213	67	21
38	Grimes Canyon Road north of Los Angeles Avenue (SR 118)	61.5	142	45	14
39	Guiberson Road east of Chambersburg Road (SR 23)	57.7	58	18	6
40	Harbor Boulevard north of Gonzales Road	70.6	1,153	365	115
41	Harbor Boulevard south of Gonzales Road	70.3	1,074	340	107
42	Howe Road east of Torrey Road	51.6	14	5	1
43	Hueneme Road east of Las Posas Road	67.1	512	162	51
44	Hueneme Road east of Nauman Road	66.9	495	156	49
45	Hueneme Road east of Wood Road	66.2	417	132	42
46	Hueneme Road east of Olds Road	68.7	746	236	75
47	Kanan Road east of Lindero Canyon Road	66.6	460	145	46
48	Kanan Road east of Hollytree Drive/Oak Hills Drive	66.6	454	143	45
49	Kanan Road south of Tamarind Street	68.2	667	211	67
50	La Luna Avenue south of Lomita Avenue	56.4	44	14	4
51	Laguna Road east of Pleasant Valley Road	60.4	109	34	11
52	Las Posas Road north of East Fifth Street (SR 34)	67.7	587	186	59
53	Las Posas Road south of East Fifth Street (SR 34)	67.8	601	190	60
54	Las Posas Road south of Hueneme Road	65.6	361	114	36
55	Lewis Road south of Pleasant Valley Road	69.0	788	249	79
56	Lewis Road north of Potrero Road	67.9	617	195	62
57	Lockwood Valley Road west of Kern County Line	56.8	48	15	5
58	Lockwood Valley Road east of Maricopa Highway (SR 33)	49.0	8	3	1
59	Lomita Avenue east of Tico Road	59.1	82	26	8
60	Main Street (Piru) north of Telegraph Road (SR 126)	56.7	46	15	5
61	Moorpark Road north of Santa Rosa Road	70.7	1,168	369	117
62	Old Telegraph Road west of Grand Avenue	59.2	82	26	8
63	Olds Road north of Hueneme Road	61.4	137	43	14
64	Olivas Park Drive west of Victoria Avenue	68.9	769	243	77
65	Pasadena Avenue east of Sespe Street	50.7	12	4	1
66	Patterson Road south of Doris Avenue	52.5	18	6	2
67	Pleasant Valley Road south of East Fifth Street (SR 34)	69.4	861	272	86
68	Pleasant Valley Road west of Las Posas Road	68.2	663	210	66
69	Portero Road east of Lake Sherwood Drive East	62.8	193	61	19
70	Portero Road west of Stafford Road	59.9	97	31	10
71	Portero Road west of Hidden Valley Road	52.4	17	6	2
72	Portero Road at Milepost 2.75	58.6	73	23	7
73	Portero Road east of Lewis Road	62.7	188	59	19
74	Rice Avenue south of East Fifth Street (SR 34)	72.9	1,936	612	194
75	Rice Avenue north of Channel Islands Boulevard	71.9	1,559	493	156

	Corridor and Segment	Noise (dBA CNEL) at 50 feet from Roadway	Noise Contour Distance in Feet		
			60 dBA	65 dBA	70 dBA
76	Rice Avenue north of Hueneme Road	59.8	96	30	10
77	Rice Road south of Lomita Avenue	59.8	96	30	10
78	Rose Avenue south of Los Angeles Avenue (SR 118)	64.2	265	84	26
79	Rose Avenue south of Central Avenue	64.5	279	88	28
80	Rose Avenue north of Collins Street	67.3	540	171	54
81	Santa Ana Boulevard east of Ventura River	58.8	76	24	8
82	Santa Ana Road south of Baldwin Road (SR 150)	54.6	29	9	3
83	Santa Ana Road south of Santa Ana Boulevard	60.7	119	37	12
84	Santa Clara Avenue north of Friedrich Road	69.0	803	254	80
85	Santa Clara Avenue south of Los Angeles Avenue (SR 118)	69.9	983	311	98
86	Santa Rosa Road west of Moorpark Road	70.8	1,203	380	120
87	Santa Rosa Road west of East Las Posas Road	69.0	801	253	80
88	Santa Susana Pass Road east of Katherine Road	58.2	66	21	7
89	Sespe Street north of South Mountain Road	61.6	144	45	14
90	Sespe Street south of Pasadena Avenue	55.7	37	12	4
91	South Mountain Road east of Balcom Canyon Road	55.1	32	10	3
92	South Mountain Road south of Santa Clara River	58.4	69	22	7
93	Stockton Road east of Balcom Canyon Road	56.4	43	14	4
94	Sturgis Road west of Pleasant Valley Road	65.4	350	111	35
95	Tapo Canyon Road south of Bennett Road	52.8	19	6	2
96	Telegraph Road west of Briggs Road	65.2	331	105	33
97	Telegraph Road west of Olive Road	64.7	292	92	29
98	Tico Road north of Ventura Avenue (SR 150)	56.6	46	14	5
99	Tierra Rejada Road east of Moorpark Freeway (SR 23)	71.8	1,526	483	153
100	Torrey Road south of Telegraph Road (SR 126)	56.9	49	16	5
101	Valley Vista Drive south of Calley Aurora	59.5	88	28	9
102	Ventura Avenue north of Canada Larga Road	57.5	57	18	6
103	Ventura Avenue north of Shell Road	60.2	105	33	10
104	Victoria Avenue south of Olivas Park Drive	73.8	2,386	755	239
105	Walnut Avenue north of Los Angeles Avenue (SR 118)	53.3	21	7	2
106	Wendy Drive north of Gerald Drive	63.6	229	72	23
107	Wood Road south of Hueneme Road	58.8	75	24	7
108	Wood Road south of East Fifth Street (SR 34)	67.8	601	190	60
109	Wooley Road west of Rice Avenue	68.4	694	219	69
110	Yerba Buena Road north of Pacific Coast Highway (SR 1)	49.4	9	3	1
	Freeways / Highways				
111	SR 1 at Calleguas Creek	73.7	2,368	749	237
112	SR 1 at Seacliff Colony, Junction SR 101	66.9	488	154	49
113	SR 1 at Las Cruces, SR 101, Mobil Oil Pier	59.1	81	26	8
114	SR 23 at Grimes Canyon Road	69.9	987	312	99
115	SR 23 at Junction SR 126, Ventura Road	67.7	585	185	59
116	SR 33 at West Junction SR 150, Baldwin Road	66.7	465	147	47
117	SR 33 at Los Padres National Forest Boundary	55.5	35	11	4
118	SR 33 at Sespe Gorge Maintenance Station	51.0	13	4	1
119	SR 33 at Ventura/Santa Barbara County Line	53.9	25	8	2
120	SR 34 at Junction SR 118, Los Angeles Avenue	68.4	692	219	69
121	U.S. Highway 101 at Victoria Avenue	80.9	12,207	3,860	1221
122	U.S. Highway 101 at Ventura/Santa Barbara County Line	79.5	8,815	2,787	881

Corridor and Segment		Noise (dBA CNEL) at 50 feet from Roadway	Noise Contour Distance in Feet		
			60 dBA	65 dBA	70 dBA
123	SR 118 at Junction SR 232 (Westbound)	75.8	3,761	1,189	376
124	SR 118 at SR 34, Somis Road (Westbound)	72.5	1,787	565	179
125	SR 118 at Grimes Canyon Road	72.8	1,919	607	192
126	SR 118 at West Junction SR 23, Moorpark Avenue	71.7	1,475	466	147
127	SR 118 at East Junction SR 23, Spring Road	72.5	1,780	563	178
128	SR 150 at Santa Barbara/Ventura County Line	49.1	8	3	1
129	SR 150 at Junction SR 33 South (South)	63.0	197	62	20
130	SR 150 at Santa Paula North City Limit	59.0	80	25	8
131	SR 232 and Junction SR 118	65.8	381	120	38

Notes: SR = State Route; dBA = a-weighted decibels;
Gray shaded cells reflect roadway segments exceeding 60 dBA CNEL at 50 feet from the roadway centerline.
All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow, and does not account for shielding of any type or finite roadway adjustments. All noise levels are reported as A-weighted noise levels.
Source: Modeled by Ascent Environmental in 2019; based on traffic data provided by GHD (2019).

HAZ-9.3 **Development Along Travel Routes**

The County shall evaluate discretionary development for noise generated by project-related traffic along the travel route to the nearest intersection which allows for movement of traffic in multiple directions. In all cases, the evaluation of project-related roadway noise shall be evaluated along the travel route(s) within 1,600 feet of the project site. (RDR)

HAZ-9.4 **Acoustical Analysis Required**

The County shall require an acoustical analysis by a qualified acoustical engineer for discretionary development involving noise exposure or noise generation in excess of the established standards. The analysis shall provide documentation of existing and projected noise levels at on-site and off-site receptors and shall recommend noise control measures for mitigating adverse impacts. (RDR)

HAZ-9.5 **Site and Building Design**

EJ HC

The County shall require discretionary development and County-initiated projects to comply with adopted noise standards through proper site and building design features, such as building location and orientation, setbacks, natural barriers and vegetation, and building construction. The County shall only consider sound walls if noise mitigation measures have been evaluated or integrated into the project and found infeasible. (RDR)

HAZ-9.6 **Airport Noise Compatibility**

EJ

The County shall use the aircraft noise analysis prepared for local airports or the noise contours from the current NBVC-Point Mugu Air Installations Compatible Use Zones (AICUZ) study, as most appropriate for a project location, as an accurate mapping of the long-term noise impact of the airport's aviation activity. The County shall restrict new discretionary residential land uses to areas outside of the 60 decibel Community Noise Equivalence Level (dB CNEL) aircraft noise contour unless interior noise levels can be mitigated to meet a maximum 45 dB CNEL. (RDR)

HAZ-9.7 **Noise Control Priorities**

The priorities for noise control for discretionary development shall be as follows:

1. Reduction of noise emissions at the source.
2. Attenuation of sound transmission along its path, using barriers, landform modification, dense plantings, building orientation and placement, and the like.
3. Rejection of noise at the reception point using noise control building construction, hearing protection or other means.

(RDR)

HAZ-9.8 **Implement Noise Control Measures for Traffic Noise**

The County shall require noise control measures to be implemented along roadways for new discretionary development generating traffic noise if either of the following circumstances would exist:

- The discretionary development would result in traffic noise levels above a County noise compatibility standard stated in Policy HAZ 9.2 in an area where traffic noise levels, under existing conditions, do not exceed the County noise compatibility standard; or,
- The discretionary development would result in an increase in traffic noise levels of 3 dBA or greater in an area where traffic noise levels under existing conditions exceed a County noise compatibility standard stated in Policy HAZ 9.2.

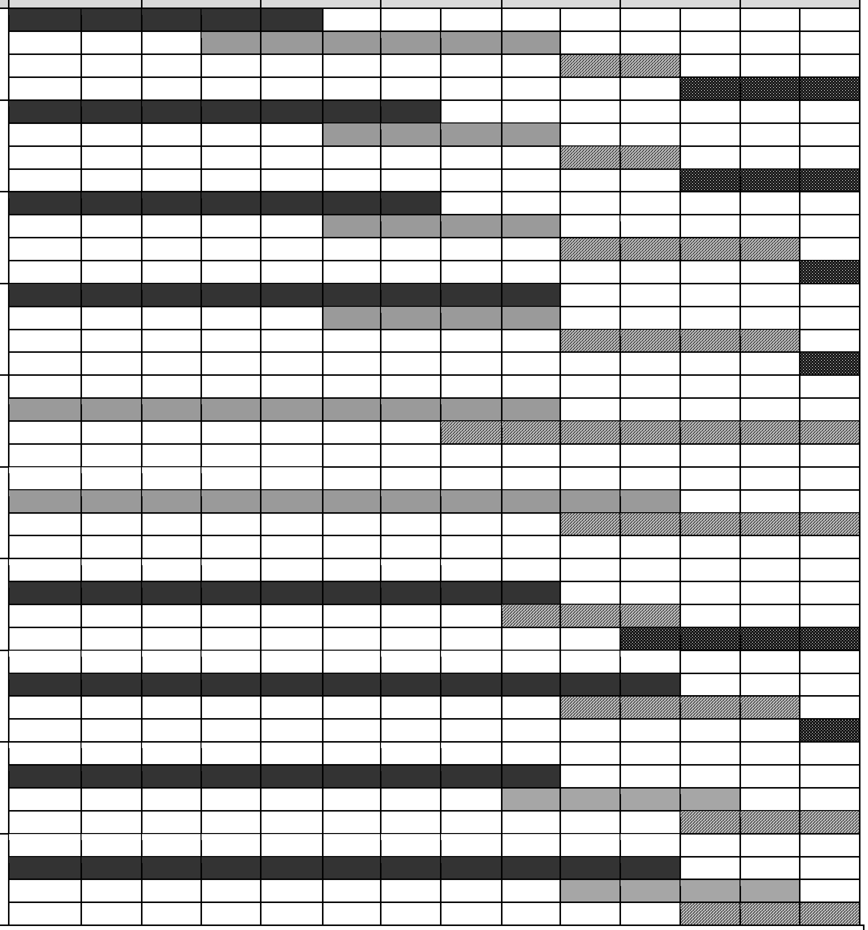
Noise control measures may include increased vegetation, roadway pavement improvements and maintenance, and site and building design features. If such measures are not sufficient to reduce a new discretionary development's fair-share of traffic-generated noise at sensitive receptors, a sound wall barrier may be constructed. All feasible[1] noise reduction measures shall be implemented to ensure the development's fair-share of traffic-generated noise is reduced, consistent with Policy HAZ 9.2. (RDR)

EIR

[1] "Feasible" means that this mitigation measure shall be applied to future discretionary projects under the 2040 General Plan when and to the extent it is "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" as determined by the County in the context of such future projects based on substantial evidence. This definition is consistent with the definition of "feasible" set forth in CEQA (Pub. Res. Code, § 21066.1) and the CEQA Guidelines (§ 15164). The County shall be solely responsible for making this feasibility determination in accordance with CEQA.

TABLE 11-10
STATE LAND USE COMPATIBILITY STANDARDS FOR COMMUNITY NOISE ENVIRONMENT

Land Use Category	Community Noise Exposure - L_{dn} or CNEL (db)
	50 · 55 · 60 · 65 · 70 · 75 · 80
Residential – Low-Density Single Family, Duplex, Mobile	
Residential - Multi-Family	
Transient Lodging – Motels, Hotels	
Schools, Libraries, Churches, Hospitals, Nursing Homes	
Auditoriums, Concert Halls, Amphitheaters	
Sports Arenas, Outdoor Spectator Sports	
Playgrounds, Neighborhood Parks	
Golf Courses, Riding Stables, Water Recreation, Cemeteries	
Office Buildings, Business Commercial and Professional	
Industrial, Manufacturing, Utilities, Agriculture	



Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: California Governor's Office of Planning and Research 2003

21. Noise and Vibration

A. Definition of Issue

Noise is defined as any unwanted sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. Noise impacts can occur during the construction and/or operational phases of a project.

With the exception of a few large-scale construction projects that last a period of years, most projects involve only short term construction noise impacts. The severity of construction noise impacts varies based on the location of sensitive receptors; type or phase of construction; combination of equipment used; site layout; and, construction methods that are employed.

Operational noise typically includes long-term impacts—that is, impacts that persist throughout the life of a project. Impacts from operational noise vary based on the: location of sensitive receptors; type of equipment or machinery that is used; site layout; and, duration and times during which noise-generating uses occur.

Vibration is defined as a motion that repeatedly reverses itself. The most common type of environmental impact involving vibration consists of ground vibration, which is the periodic displacement of earth, which creates vibration waves that move through soil and rock strata, foundations of nearby buildings, and then throughout the parts of the building structure. Ground-borne vibration can result in sensible movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. The rumbling sound caused by the vibration of room surfaces is called ground-borne noise.

The operation of construction equipment and construction techniques (e.g., pile driving, blasting, or excavation) can generate temporary ground vibration impacts. Moreover, heavy duty vehicles traveling along roadways with potholes and bumps, steel-wheeled/steel-rail vehicles (e.g., trains), and equipment used in industrial operations which are related to a proposed project can generate recurring ground vibration impacts throughout the life of a project. If the amplitudes are high enough, ground vibration can: cause damage to buildings, ranging from more severe (yet uncommon) structural damage to less severe cosmetic damage (e.g., cracked plaster); and, generate ground-borne noise that is discomforting or a nuisance to individuals who live or work close to vibration-generating activities.

B. Definition of Terms

The following is a partial glossary of acoustic and vibration terminology. For a more comprehensive glossary of noise-related terms, see the Ventura County General Plan Hazards Appendix (§2.16.2). For a more comprehensive glossary of vibration-related terms, see the Transit Noise and Vibration Impact Assessment.[1]

Ambient Noise **-** The noise that results from the combination of all sources, near and far, which constitutes the existing environmental setting for the purposes of evaluating noise impacts. The ambient noise levels are expressed as L_{eqT} or CNEL as judged appropriate to the situation.

A-weighted Sound Level [L_A - dB(A)] **-** 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 (ANSI S1.4).

Community Noise Equivalent Level [CNEL - dB(A)] **-** The long-term time average sound level, weighted as follows:

- Frequency response is filtered using the A-weighting network.
- Sounds occurring between 7 p.m. and 10 p.m. are weighted by 5 dB (in effect, the number of noise events is multiplied by 3.15).

[1] Hanson, Carl E., David A. Towers, and Lance D. Meister. (May 2006). *Transit Noise and Vibration Impact Assessment.* Federal Transit Administration, Office of Planning and Environment. FTA-VA-90-1003-06. Available on-line at: http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf.

- Sounds occurring between 10 p.m. and 7 a.m. are weighted by 10 dB (in effect, the number of noise events is multiplied by 10).

Decibel (dB) **-** A unit of sound measurement equal to 10 times the base-10 logarithmic ratio squared of the magnitude of acoustic pressure divided by and relative to a specified reference level. The airborne acoustic pressure reference level is the threshold of hearing of an average human, which is equal to 20 micropascals (μPa or 2×10^{-5} Pa) and is equivalent to 0 dB, the quietest sound a human can hear. A 3 dB increase is barely detectable. A 10 dB increase represents a doubling of loudness.

Noise Contour **-** A line on a map that indicates locations of constant ambient sound level near or around known sources of noise. In practice, noise contours are often shown as calculated for the dominant source of noise only.

Noise Sensitive Uses **-** Dwellings, schools, hospitals, nursing homes, churches and libraries.

Time Average Sound Level (L_{eqT} - dB) **-** The level, in decibels, of the mean sound pressure averaged over time period T. This is often referred to as "equivalent sound level" and hence the "eq" subscript. The "equivalence" is to a sound of constant level that has the same total acoustic energy content.

Vibration Category 1 (High Sensitivity Use) **-** Buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance. Examples include: concert halls; vibration-sensitive research and manufacturing; hospitals with vibration-sensitive equipment; and, university research operations.

Vibration Category 2 (Residential) - All residential land uses and any buildings where people sleep, such as hotels and hospitals.

Vibration Category 3 (Institutional) - Schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.

C. Applicable General Plan Goals and Policies

The following goals and policies of the Ventura County General Plan are applicable to this issue:

Countywide Goals, Policies and Programs:

Goal 2.16.1

Policies 2.16.2-1 through -3

Lake Sherwood/Hidden Valley Area Plan:

Goals 3.3.1-1 & -2

Policies 3.3.2-1 through 5

Oak Park Area Plan:

Goals 2.4.1-1 & -2

Policies 2.4.2-1 through -5

Ojai Valley Area Plan:

Goals 2.4.1-1 & -2

Policies 2.4.2-1 through -3

Piru Area Plan:

Goals 2.4.1-1 & -2

Policies 2.4.2-1 through -3

Thousand Oaks Area Plan:

Goals 2.3.1-1 & -2

Policy 2.3.2

D. Threshold of Significance Criteria

Noise Thresholds:

Any project that produces noise in excess of the standards for noise in the Ventura County General Plan Goals, Policies and Programs (Section 2.16) or the applicable Area Plan , has the potential to cause a significant noise impact. Noise-generating uses that either individually or when combined with other recently approved, pending, and probable future projects, exceeds the noise thresholds of General Plan Noise Policy 2.16.2-1(4) are considered to have a potentially significant impact.

Vibration Thresholds:

1. Construction Threshold - Any project that either individually or when combined with other recently approved, pending, and probable future projects, includes construction activities involving blasting, pile-driving, vibratory compaction, demolition, and drilling or excavation which exceed the threshold

criteria provided in the Transit Noise and Vibration Impact Assessment (Section 12.2),[2] is considered to have a potentially significant impact.

Table 1 - Screening Distances for Vibration Assessment

Vibration-Generating Transit Use	Critical Distance for Land Use Categories* Distance from Right-of-Way or Property Line (feet)		
	Category 1	Category 2	Category 3
Steel-Wheeled/Steel-Rail Vehicle Transit Uses			
Conventional Commuter Railroad	600	200	120
Rail Rapid Transit	600	200	120
Light Rail Transit	450	150	100
Intermediate Capacity Transit	200	100	50
Rubber-Tire Heavy Vehicle Uses			
Rubber-Tire Heavy Vehicles (if not previously screened out)**	100	50	--

*See the "Definition of Technical Terms" (above) for the land uses that fall within each of the Categories, as well as the Transit Noise and Vibration Impact Assessment, Appendix A, for the definitions of vibration-generating transit uses listed in this table. For the purposes of screening procedures, concert halls and television studios should be evaluated as Category 1, and theaters and auditoriums should be evaluated as Category 2.

**See the discussion below.

Source: Transit Noise and Vibration Impact Assessment, Table 9.2.

2. Transit Use Thresholds - Table 1 lists the thresholds for vibration-generating transit uses, based on the type of transit use and the location of the transit use in relation to sensitive use categories. If a project would result in a transit use located within any of the critical distances of the vibration-sensitive uses listed in Table 1, the project has the potential to result in a significant impact and must be evaluated using the Transit Noise and Vibration Impact Assessment (Chapters 8 through 11).[3]

3. Commercial/Industrial Use Vibration Thresholds:

   a. Any project that would generate new heavy vehicle (e.g., semi truck or bus) trips on uneven roadways located within proximity to sensitive uses has the potential to either individually or when combined with other recently approved, pending, and probable future projects, exceed the threshold criteria of the Transit Use Thresholds for rubber-tire heavy vehicle uses (Item No. 3 and Table 1, above), thereby resulting in a potentially significant impact.

[2] Ibid

[3] Ibid.

b. Any project that involves blasting, pile-driving, vibratory compaction, demolition, drilling, excavation, or other similar types of vibration-generating activities has the potential to either individually or when combined with other recently approved, pending, and probable future projects, exceed the threshold criteria[4] provided in the *Transit Noise and Vibration Impact Assessment* (Section 12.2),[5] thereby resulting in a potentially significant impact.

E. Methodology

Noise

Construction noise impacts shall be evaluated using the assessment methodology, criteria, and reporting procedures provided in the Construction Noise Threshold Criteria and Control Measures.[6] All other types of noise impacts shall be evaluated pursuant to the following procedures.

Step 1 - Preliminary Noise Assessment

A preliminary noise assessment shall be conducted by the County Agency responsible for administering the proposed development project. The purpose of the preliminary noise assessment is to determine if a consultant prepared acoustical analysis is required. (See Step 2, below) The preliminary noise assessment shall consist of the following:

a. **Determine if the Proposed Use is Noise Sensitive or a Noise Generator -** If the proposed use is *noise sensitive*, see Steps 1.b, 1c and 1.d below. If the proposed use is a potential noise generator, see Step 1.e below.

b. **Consult) GIS Noise Exposure/Contour Maps -** Using Planning GIS, view the project site with the noise layers turned on, in order to determine whether or not the noise-sensitive use site is within the 60 dB(A) CNEL contour of a highway or airport . If the project is located within this contour, the noise impact is potentially significant and a consultant prepared acoustical analysis must be completed.

c. **Consult Land Use Maps -** Locate the project area on the General Land Use, Existing Community and Area Plan Maps (as appropriate) of the General Plan, which are available from the Resource Management Agency, GIS Development and Mapping Services Division. If the project is noise-sensitive and is within 500 feet of an industrially designated area, the noise impact is potentially significant and a consultant prepared acoustical analysis must be completed.

d. **Consult GIS Aerial Imagery –** Using Planning GIS, view the project site with the most current aerial imagery layer turned on to determine if a railroad exists within the vicinity of the project site. If a railroad exists, use the measuring tool to determine the distance between the noise-sensitive use site and the railroad. If the noise-sensitive project site is located within 3,400[7] feet of a railroad, the noise impact is potentially significant and a consultant prepared acoustical analysis must be completed.

e. **Estimate Potential Noise Impact -** If the project is a noise-generator, it will be necessary to determine:

- The noise-generating equipment's and activities' estimated noise levels and the times at which the noise levels would occur; and,

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[4] The severity of vibration-related impacts to buildings and humans are the same regardless of the source of the vibration, be it from construction or operational activities, provided that the equipment is equivalent in terms of their vibration-generating potential. Therefore, the construction-related threshold criteria are to be used for commercial/industrial operations.

[5] Hanson, Carl E., David A. Towers, and Lance D. Meister. (May 2006).

[6] Advanced Engineering Acoustics. (November 2005). *County of Ventura Construction Noise Threshold and Criteria Plan*. Available on-line at: http://www.ventura.org/rma/planning/pdf/ceqa/Construction_Noise_Thresholds.pdf..

[7] This distance was determined based on: (1) the maximum indoor noise level for habitable rooms (45 CNEL) stated in the Ventura County General Plan *Goals, Policies and Programs*, Noise Policy 2.16.2-1(1)a; and, (2) the calculated distance in feet between main line railroad tracks and the 45 CNEL contours, for railroads within Ventura County (Ventura County General Plan *Hazards Appendix*, 2005, 94).

- The proximity of the noise-generating equipment to the noise-sensitive uses using the project plans, information gathered during a site visit, aerial imagery, and land use maps that are available from the Resource Management Agency, GIS Development and Mapping Services Division.

In general, noise decreases by 5 dB for each doubling of the distance from the noise source. If the noise from the proposed project is estimated to exceed any of the following standards at the nearest *noise sensitive use*, the noise impact is deemed to have a potentially significant noise impact and a consultant prepared acoustical analysis must be completed:

55 dB(A) between 6:00 a.m. and 7:00 p.m.,

50 dB(A) between 7:00 p.m. and 10:00 p.m., or

45 dB(A) between 10:00 p.m. and 6:00 a.m.

If the preliminary noise assessment reveals that the project does not have the potential to create a significant noise impact and an acoustical analysis is not required, the agency that is responsible for administering the project shall complete the Initial Study Checklist and discussion of responses to the checklist pursuant to the "Instructions for Preparing an Initial Study" provided in the Ventura County Initial Study Assessment Guidelines. However, if the preliminary noise assessment reveals that the project has the potential to create a significant noise impact, a consultant prepared acoustical analysis must be prepared pursuant to the criteria provided in Step 2 (below).

Step 2 - Consultant Prepared Acoustical Analysis

If it is determined that a quantitative assessment is required, a qualified noise consultant shall prepare the analysis (see attached Noise Consultant Qualifications). The agency that is responsible for administering the project will ensure that the consultant meets the minimum qualifications.

Acoustical Analysis Requirements

The purpose of the consultant prepared acoustical analysis is to: determine if the project would result in any potentially significant noise impacts; identify any feasible mitigation measures that might exist to reduce the severity of the noise impacts; and, determine if the noise impacts, after mitigation, are still potentially significant. As such, the acoustical analysis must include a(n):

- Discussion of the existing environmental setting (e.g., a description of the noise sources and *ambient noise* levels of the project site and surrounding area);
- Discussion of recently approved, pending, and probable future noise-generating projects[8] that have the potential to contribute to cumulative impacts to the noise environment and, as such, are included in the acoustical analysis;
- Discussion of the methodology used in collecting noise data (e.g., noise equipment and metrics used). Noise measurements should be taken using standard industry practices, after taking into consideration site-specific characteristics (e.g., buildings, walls, topography, and the location of existing and potential future noise-sensitive receptors in relation to noise generators) which might have an influence on the noise measurements;
- Discussion of the methodology used in calculating project-specific and cumulative noise impacts (e.g., noise models used);
- Presentation of the data on the existing noise environment, as well as data on projected noise levels; and,
- Initial Study checklist and discussion pursuant to the requirements of the "Instructions for Preparing an Initial Study" in the Ventura County Initial Study Assessment Guidelines.

[8] The list of recently approved, pending, and probable future projects is available on-line at: http://www.ventura.org/rma/planning/Permits/projects.html.

Step 3 - Environmental Document Determination

If the acoustical analysis shows that there would be no significant impact, the Initial Study Checklist should be checked LS. If the study shows that there would be potentially significant noise impacts, but feasible mitigation measures could be incorporated into the project which could reduce the impact to a less than significant level, then the Initial Study Checklist should be checked PS-M. If the study shows that there would be significant, immitigable noise impacts (except construction related noise), the project could not be approved because of the General Plan noise policies. .

Step 4 - Update Data Base

In a continuing effort to update County noise data, a copy of all consultants' acoustical analysis shall be sent to the Planning Director.

Vibration:

Construction-Related Vibration

The agency that is responsible for administering the project shall request from the applicant information regarding the: types of construction activities that will be required; duration of each construction phase; and, types and number of construction equipment that will be used during each phase of construction. Using the list of recently approved, pending, and probable future projects,[9] the agency also shall identify other vibration-generating projects located within the vicinity of the project site that have the potential to contribute to cumulative impacts relating to vibration. Once this information is obtained, the agency that is responsible for administering the project shall evaluate potential construction-related vibration impacts using the assessment methodology provided in the Transit Noise and Vibration Impact Assessment (Section 12.2 et seq).[10]

As discussed in the Transit Noise and Vibration Impact Assessment, many projects will not have the potential to create prolonged annoyance or damage from construction vibrations and, therefore, will only require a qualitative assessment of potential construction-related vibration impacts. In these cases, the agency that is responsible for administering the project shall prepare the Initial Study checklist and discussion pursuant to the requirements of the "Instructions for Preparing an Initial Study" in the Ventura County Initial Study Assessment Guidelines.

Steel-Wheeled/Steel-Rail Vehicle Transit Uses

In order to determine if a project has the potential to generate a significant impact using the threshold criteria provided above (Threshold Criterion No. 3 and Table 1), the agency that is responsible for administering the project will need to determine if any vibration-sensitive uses are located within proximity to the project site. This information can be gathered by observation during a site visit and using the aerial imagery in Planning GIS. During the site visit, the agency that is responsible for administering the project shall identify any vibration-sensitive uses located within proximity to the project site. Using Planning GIS, the agency that is responsible for administering the project should view the project site with the most current aerial imagery data layer, identify the location of the vibration sensitive use that was identified during the site visit vis-à-vis the project site, and use the measuring tool to determine the distance between the vibration-sensitive use and the project site.

If the project site is located outside of the critical distance for the vibration-sensitive use specified in Table 1 (above), the project would have a less-than-significant impact, and the agency that is responsible for administering the project shall complete the Initial Study checklist and discussion pursuant to the requirements of the "Instructions for Preparing an Initial Study" in the Ventura County Initial Study Assessment Guidelines.

If the project site is located within the critical distance specified in Table 1 (above), the project shall be evaluated for potential vibration impacts using the assessment methodology, criteria, and reporting procedures provided in the Transit Noise and Vibration Impact Assessment (Chapters 9 through 11, and

[9] See Footnote 13 (above).

[10] Hanson, Carl E., David A. Towers, and Lance D. Meister. (May 2006).

13).[11] Both project-specific and the project's contribution to cumulative impacts shall be evaluated. Cumulative impacts shall be evaluated by incorporating into the assessment all recently approved, pending, and probable future projects located within the vicinity of the project site that have the potential to contribute to cumulative impacts relating to vibration.[12] A qualified engineer must prepare the analysis. The agency that is responsible for administering the project will be responsible for selecting the consultant, and shall develop its own contract procedures with which to hire consultants. The consultants must meet the qualifications discussed in the Construction-Related Vibration Section (above). The analysis must include an Initial Study checklist and discussion that meets the requirements of the "Instructions for Preparing an Initial Study" in the Ventura County Initial Study Assessment Guidelines.

Rubber-Tire Heavy Vehicle Transit Uses

Rubber-tire heavy vehicles traveling on roadways typically will not produce a significant vibration impact, except in situations where a large number of heavy vehicles (e.g., semi trucks or buses) are traveling along uneven roadways within proximity to sensitive uses. Therefore, if a project would build, place or expand vibration-sensitive uses in close proximity to roadways on which a large number of rubber-tire heavy vehicles travel, the following initial screening questions must be asked to determine if the project would result in a potentially significant vibration impact:

1. Will the project result in the location of vibration-sensitive uses in close proximity to roadways with expansion joints, speed bumps, or other design features that result in unevenness in the road? Such roadway irregularities can result in perceptible ground-borne vibration at distances up to 75 feet away.
2. Will the project result in buses, trucks or other heavy vehicles operating near a vibration-sensitive use? Research using electron microscopes and manufacturing of computer chips are examples of vibration-sensitive uses.
3. Will the project result in the operation of vehicles inside or directly underneath buildings that are vibration-sensitive? Special considerations are often required for shared-use facilities such as a bus station located inside an office building complex.

If the answer is "no" to all three of the initial screening questions, the project would have a less-than-significant impact, and the agency that is responsible for administering the project shall complete the Initial Study checklist and discussion that meets the requirements of the "Instructions for Preparing an Initial Study" in the Ventura County Initial Study Assessment Guidelines.

If the answer is "yes" to any one of the initial screening questions, the project must be evaluated using the screening criteria in Table 1 (above). If the project would result in the location of rubber-tire heavy vehicle uses within any of the critical distances of the sensitive use categories listed in Table 1, the project has the potential to generate a significant impact, and must be evaluated using the Transit Noise and Vibration Impact Assessment.[13] Both project-specific and the project's contribution to cumulative noise impacts shall be evaluated. Cumulative impacts shall be evaluated by incorporating into the assessment all recently approved, pending, and probable future projects located within the vicinity of the project site that have the potential to contribute to cumulative impacts relating to vibration.[14] A qualified engineer must prepare the analysis. The agency that is responsible for administering the project will be responsible for selecting the consultant, and shall develop its own contract procedures with which to hire consultants. The consultants must meet the qualifications discussed in the Construction-Related Vibration Section (above). The analysis must include an Initial Study checklist and discussion that meets the requirements of the "Instructions for Preparing an Initial Study" in the Ventura County Initial Study Assessment Guidelines.

[11] Hanson, Carl E., David A. Towers, and Lance D. Meister. (May 2006).

[12] See Footnote 13 (above).

[13] Hanson, Carl E., David A. Towers, and Lance D. Meister. (May 2006).

[14] See Footnote 13 (above).

Commercial- or Industrial-Generated Vibration

Any project that would generate new heavy vehicle (e.g., semi truck or bus) trips on uneven roadways located within proximity to sensitive uses shall be evaluated using the methodology prescribed for rubber-tire heavy vehicle transit uses (above).

Any project that involves blasting, pile-driving, vibratory compaction, demolition, drilling, excavation, or other similar types of vibration-generating activities shall be evaluated using the methodology prescribed for construction-related vibration (above).

Adopted by the Board of Supervisors on July 27, 2010

Attachment
Noise Consultant Qualifications

The Environmental Quality Advisory Committee has established the following minimum qualifications for noise consultants for the purpose of conducting acoustical analysis. Noise consultants must demonstrate that they meet the minimum qualifications as defined below:

Education - Consultants should hold an advanced degree from an accredited institution (e.g., M.A., M.S., or Ph.D.) in Physics, Mathematics, Engineering or related discipline. Consultants without an advanced degree in these fields must provide documentation of at least five years of relevant research or field work in acoustical engineering.

Experience - All consultants must possess a working knowledge of physics, acoustical principles, utilization of sound level meters, and applicable state codes. Experience with CEQA is highly desirable. Consultants also must have experience in the following:

- Acquiring and evaluating data;
- Creating mitigation monitoring and reporting programs; and,
- Evaluating designs for compliance with standards relative to land use.

Local and State Expertise - Consultants must provide evidence of expertise in community/industrial noise (e.g., the preparation of Noise Elements of General Plans, technical reports, studies, mitigation measures, or noise ordinances).

Professional Certification - Evidence of professional certification is highly desirable though not required.

Vibration Consultant Qualifications

Environmental Quality Advisory Committee has established the following minimum qualifications for vibration consultants for the purpose of conducting vibration analyses. Vibration consultants must demonstrate that they meet the minimum qualifications for vibration consultants as defined below:

Education - Consultants should hold an advanced degree from an accredited institution (e.g., M.A., M.S., or Ph.D.) in Physics, Mathematics, Engineering or related discipline. Consultants without an advanced degree in these fields must provide documentation of at least five years of relevant research or field work in engineering activities involving vibration impact assessment.

Experience: All consultants must possess a working knowledge of physics, vibration principles, and applicable state codes. Experience with CEQA is highly desirable. Consultants also must have at least five years experience in the following:

- Acquiring and evaluating data;
- Creating mitigation monitoring and reporting programs; and,
- Evaluating designs for compliance with standards relative to land use.

Local and State Expertise - Consultants must provide evidence of expertise in transportation, construction, and/or industrial vibration (e.g., the preparation of environmental assessments, technical reports, studies, or mitigation measures).

Professional Certification - Evidence of professional certification is highly desirable though not required.

TABLE IV. IMMEDIATE ABATEMENT POTENTIAL OF CONSTRUCTION EQUIPMENT

Equipment	Noise Level in dB(A) at 50 ft		Important Noise Sources[2]	Usage[3]
	Present	With Feasible Noise Control[1]		
Earthmoving				
front loader	79	75	E C F I H	.4
backhoes	85	75	E C F I H	.16
dozers	80	75	E C F I H	.4
tractors	80	75	E C F I W	.4
scrapers	88	80	E C F I W	.4
graders	85	75	E C F I W	.08
truck	91	75	E C F I T	.4
paver	89	80	E D F I	.1
Materials Handling				
concrete mixer	85	75	E C F W T	.4
concrete pump	82	75	E C H	.4
crane	83	75	E C F I T	.16
derrick	88	75	E C F I T	.16
Stationary				
pumps	76	75	E C	1.0
generators	78	75	E C	1.0
compressors	81	75	E C H I	1.0
Impact				
pile drivers	101	95	W P E	.04
jack ha mers	88	75	P W E C	.1
rock drills	98	80	W E P	.04
pneumatic tools	86	80	P W E C	.16
Other				
saws	78	75	W	.04
vibrator	76	75	W E C	.4

Notes:

1. Estimated levels obtainable by selecting quieter procedures or machines and implementing noise control features requiring no major redesign or extreme cost.
2. In order of importance:

T	Power Transmission System, Gearing	F	Cooling Fan
C	Engine Casing	W	Tool-Work Interaction
E	Engine Exhaust	H	Hydraulics
P	Pneumatic Exhaust	I	Engine Intake

3. Percentage of time equipment is operating at noisiest mode in most used phase on site.

this table, one may determine that control of engine noise, and particularly of engine exhaust noise, will affect many items of equipment with high usage factors and thus should be given high priority.

Table V presents a brief listing of the noise control techniques applicable to the sources indicated in Table IV, together with an estimate of the noise reductions that may readily be achieved by means of these techniques.

2.2 Home Appliances

The use of convenient and sometimes necessary appliances constitutes a growing noise problem within the home. Almost without exception, appliances could be significantly quieter. However, manufacturers offer three primary arguments for opposing quieter redesign; they believe

- that the public associates the noise generated by a device with its power;
- that quieter appliances would be marketed at a price disadvantage and since the public has not objected to noise, that the public, in general, is satisfied;
- that since appliances are generally controlled by the operator, the option, as with air conditioners, "to have quiet or to be cool" is "option enough".

Yet, in keeping with the public's growing awareness of noise, many appliances are advertised as being "noiseless", "quiet", "vibration-free".

Although many manufacturers have made detailed acoustic measurements of the noise output of their appliances, very little data has been reported in the open literature. Some of the

TABLE V. NOISE CONTROL FOR CONSTRUCTION EQUIPMENT

Source	Control Techniques	Probable Noise Reduction in dB(A)*
Engine		
exhaust	improved muffler	10
casing	improved design of block	2
	enclosure	10
fan (cooling)	redesign	5
	silencers, ducts and mufflers	5
intake	silencers	5
Transmission	redesign, new materials	7
	enclosure	7
Hydraulics	redesign, new materials	7
	enclosure	10
Exhaust (pneumatic)	muffler	5-10
Tool-Work interaction	enclosure	7-20
	change in principle	10-30

*Note that noise reductions are not additive. Incremental reductions can be realized only by simultaneous quieting of all sources of equal strength.

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).

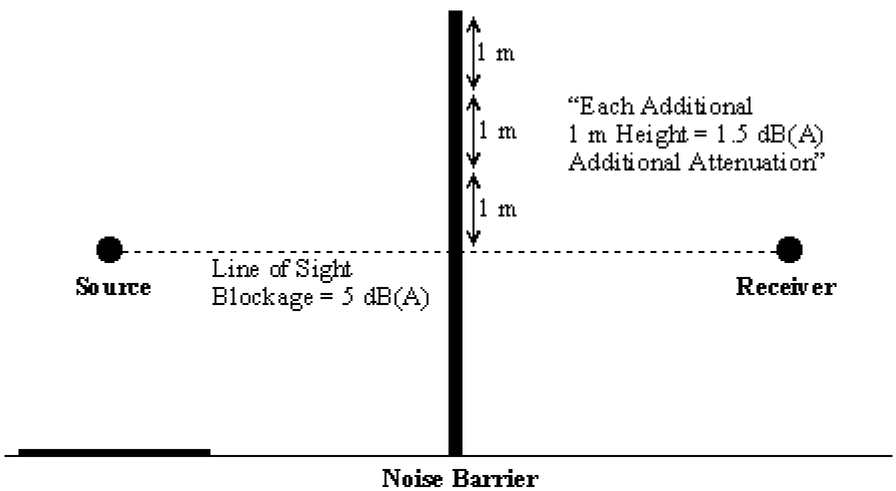


Figure 13. Line-of-sight

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)

Aggregate & Recycle Plant/Rock Crushing Source Noise

Noise Measurement Data - Rock Crushing/Processing Activities (dBA)							
		Measured Noise Levels			Reference Noise Levels		
Location #	Measurement #	Measured L_{eq}	Measured L_{eq} (Combined)	Distance from Source (ft.)	Reference Distance (ft.) [A]	L_{eq} @ 50-feet [B]	L_{eq} @ 50-feet (Combined)
Location #1	#1	76.0	81.2	205	50	88.3	93.4
	#2	80.6				92.9	
	#3	83.8				96.1	
Location #2	#1	79.4	76.4	145	50	88.6	85.7
	#2	76.3				85.5	
	#3	61.9				71.1	
Location #3	#1	77.7	80.7	42	50	76.2	79.2
	#2	83.7				82.2	
	#3	77.9				76.4	
Location #4	#1	83.4	81.5	51	50	83.6	81.6
	#2	74.3				74.5	
	#3	82.4				82.6	
Location #5	#1	83.0	81.0	54	50	83.7	81.7
	#2	82.2				82.9	
	#3	72.1				72.8	
Location #6	#1	85.1	82.7	78	50	89.0	86.5
	#2	76.7				80.6	
Location #7	#1	79.0	78.2	96	50	84.7	83.8
	#2	77.1				82.8	
Location #8	#1	83.4	83.4	140	50	92.3	92.3
Location #9	#1	73.3	73.3	120	50	80.9	80.9
Location #10	#1	72.8	72.8	70	50	75.7	75.7
					Plant Noise Level (L_{eq}) - Statistical Average @ 50-feet [C]:		**84.1** dBA

Note: The noise levels shown above were measured while a rock crushing plant was operating "at maximum capacity". In addition to the plant, mobile equipment (haul trucks, loaders) were also operating in the vicinity during the measurements. Despite the addition of mobile sources, these measured sound levels are conservatively utilized to represent Pacific Rock's existing Aggregate Plant and the proposed Recycle Plant.

A - Distances (feet) estimated using Google Earth ™.

B - L_{eq}Calc = Selected_L_{eq} - 20*log(D/50). "Selected_L_{eq}" = reference noise level @ 50-feet. D = distance to location/receptor (feet).
Source: Ventura County's *Construction Noise Threshold and Control Plan* and FHWA's *Roadway Construction Noise Model*.

C - A total of 22 noise measurements (3-minutes each) were collected at 10 locations surrounding the crushing/processing equipment at an Otay Mesa aggregate facility.
Measurements were collected while the crushing equipment was operating at approximately full capacity and within line-of-sight of the noise source(s).
Noise measurements were then statistically combined/averaged to determine an average source noise level (L_{eq} = 84.1 dBA) at a reference distance of 50-feet.

2.1.3.8 White and Pink Noise

White noise is noise with a special frequency spectrum that has the same amplitude (level) for each frequency interval over the entire audible frequency spectrum. It is often generated in laboratories for calibrating sound level measuring equipment, specifically its frequency response. One might expect that the octave or one-third-octave band spectrum of white noise would be a straight line, but this is not true. Beginning with the lowest audible octave, each subsequent octave spans twice as many frequencies than the previous ones, and therefore contains twice the energy. This corresponds with a 3-dB step increase for each octave band, and 1 dB for each one-third-octave band.

Pink noise, in contrast, is defined as having the same amplitude for each octave band (or one-third-octave band), rather than for each frequency interval. Its octave or one-third-octave band spectrum is truly a straight “level” line over the entire audible spectrum. Therefore, pink noise generators are conveniently used to calibrate octave or one-third-octave band analyzers.

Both white and pink noise sound somewhat like the static heard from a radio that is not tuned to a particular station.

2.1.4 Sound Propagation

From the source to receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on the following important factors.

- Geometric spreading from point and line sources.
- Ground absorption.
- Atmospheric effects and refraction.
- Shielding by natural and manmade features, noise barriers, diffraction, and reflection.

2.1.4.1 Geometric Spreading from Point and Line Sources

Sound from a small localized source (approximating a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates or drops off at a rate of

6 dBA for each doubling of the distance (6 dBA/DD). This decrease, resulting from the geometric spreading of the energy over an ever-increasing area, is referred to as the inverse square law. Doubling the distance increases each unit area, represented by squares with sides “a” in Figure 2-7, from a^2 to $4a^2$.

Because the same amount of energy passes through both squares, the energy per unit area at 2D is reduced four times from that at distance D. Therefore, for a point source the energy per unit area is inversely proportional to the square of the distance. Taking $10\log_{10}(1/4)$ results in a 6-dBA/DD reduction. This is the point source attenuation rate for geometric spreading.

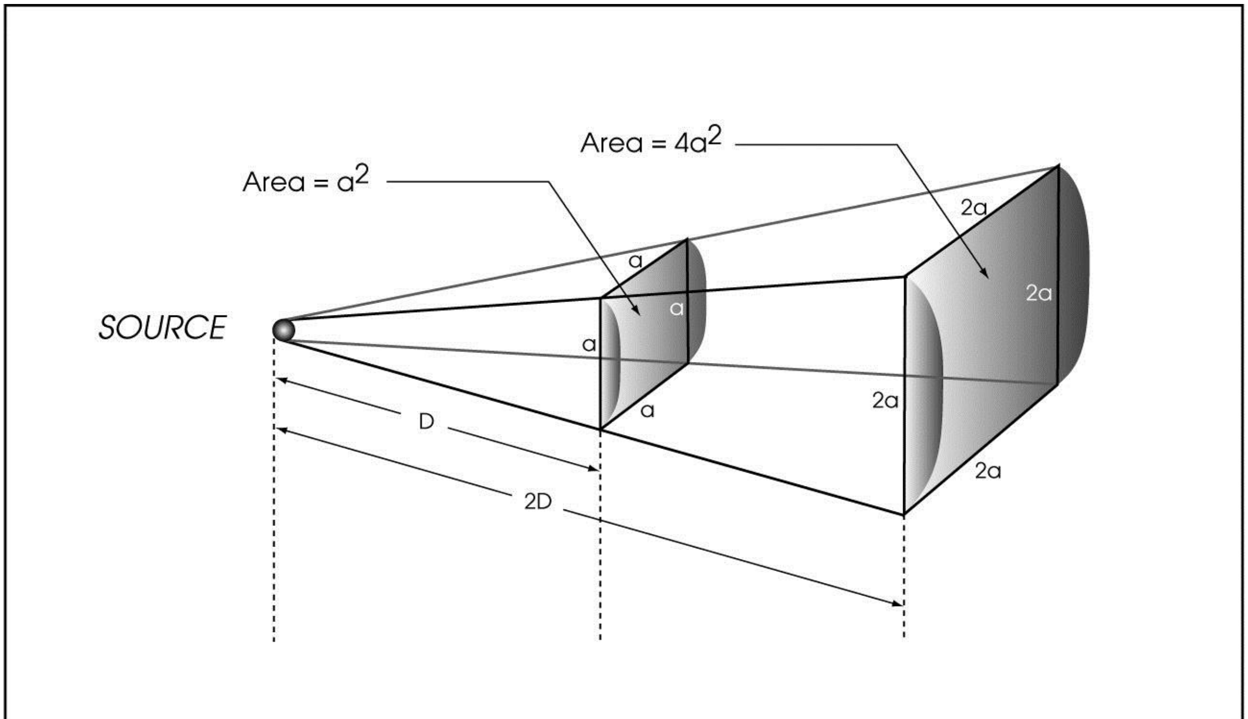


Figure 2-7. Point Source Propagation (Spherical Spreading)

As seen in Figure 2-8, based on the inverse square law the change in noise level between any two distances because of spherical spreading can be found using the following equation:

$$dBA_2 = dBA_1 + 10\log_{10}[(D_1/D_2)]^2 = dBA_1 + 20\log_{10}(D_1/D_2) \qquad \textbf{(2-13)}$$

Where:

dBA_1 = noise level at distance D_1

dBA_2 = noise level at distance D_2

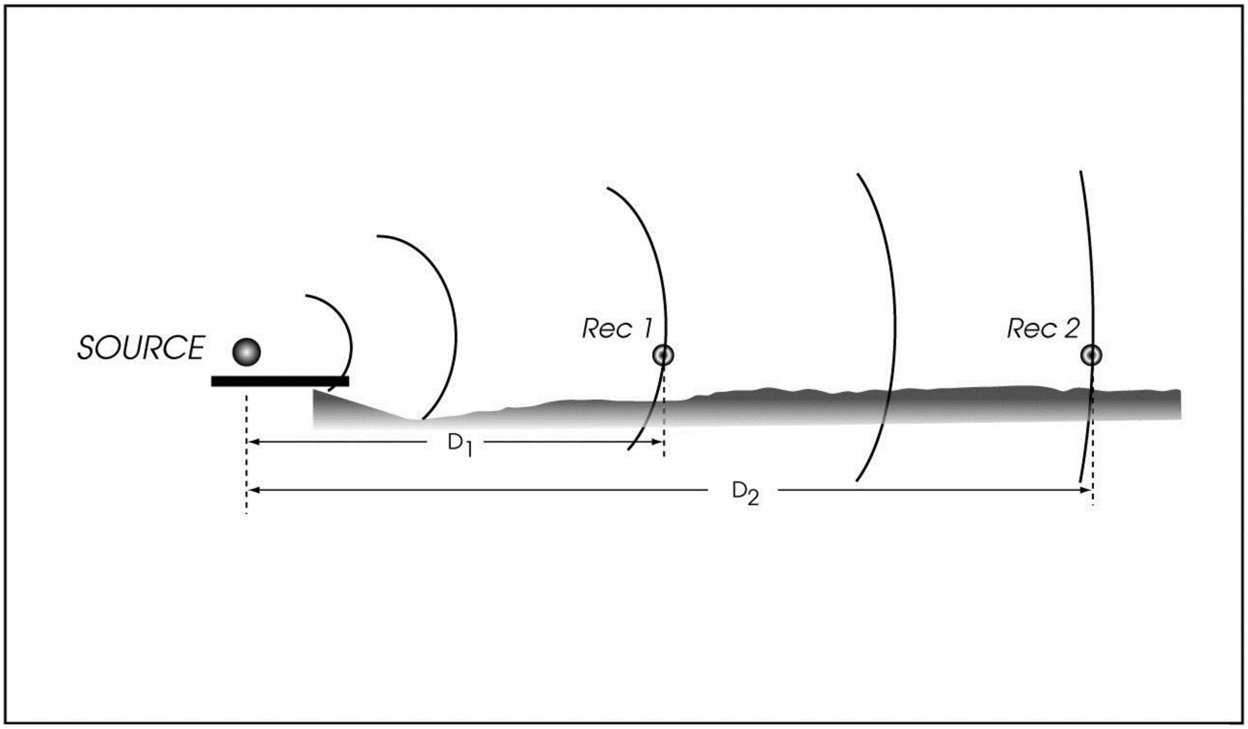


Figure 2-8. Change in Noise Level with Distance from Spherical Spreading

However, highway traffic noise is not a single, stationary point source. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over a time interval (Figure 2-9). This results in cylindrical spreading rather than spherical spreading. Because the change in surface area of a cylinder only increases by two times for each doubling of the radius instead of the four times associated with spheres, the change in sound level is 3 dBA/DD. The change in noise levels for a line source at any two different distances from cylindrical spreading is determined using the following equation:

$$dBA_2 = dBA_1 + 10\log_{10}(D_1/D_2) \qquad \textbf{(2-14)}$$

Where:

dBA_1 = noise level at distance D_1 and conventionally the known noise level

dBA_2 = noise level at distance D_2 and conventionally the unknown noise level

Note

The expression $10\log_{10}(D_1/D_2)$ is negative when D_2 is more than D_1 and positive when D_1 is more than D_2. Therefore, the equation automatically accounts for the receiver being farther or closer with respect to the source—$\log_{10}$ of a number less than 1 gives a negative result, $\log_{10}$ of a number more than 1 is positive, and $\log_{10}(1) = 0$.

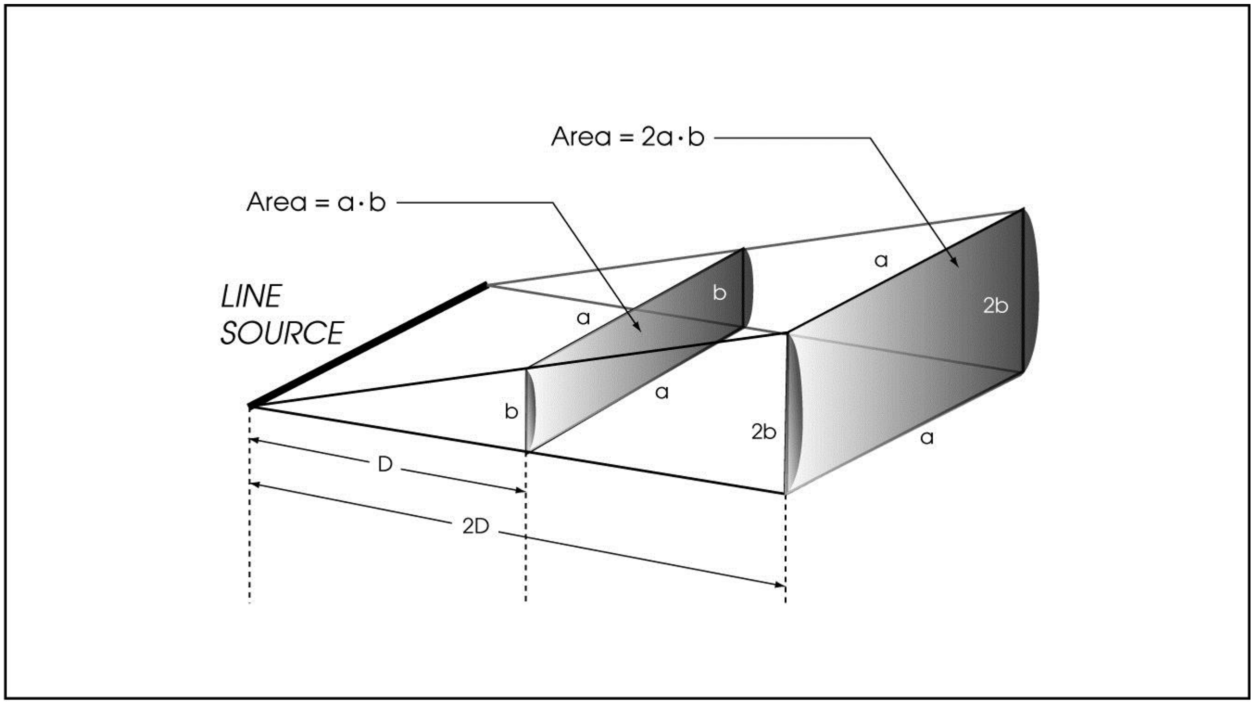


Figure 2-9. Line Source Propagation (Cylindrical Spreading)

2.1.4.2 Ground Absorption

Most often, the noise path between the highway and observer is very close to the ground. Noise attenuation from ground absorption and reflective wave cancellation adds to the attenuation from geometric spreading. Traditionally, this excess attenuation has been expressed in terms of decibels of attenuation per doubling of distance. This approximation is done for simplification only; for distances of less than 200 feet, the prediction results based on this scheme are sufficiently accurate. The sum of the geometric spreading attenuation and excess ground attenuation (if any) is referred to as the attenuation or dropoff rate. For distances of 200 feet or more, the approximation causes excessive inaccuracies in predictions. The amount of excess ground attenuation depends on the height of the noise path and characteristics of the intervening ground or site. In practice, excess ground attenuation may vary from 0 to 8–10 dBA/DD or more. In fact, it varies as the noise path height changes from the source to receiver and with vehicle type because the source heights are different. The complexity of terrain also influences the propagation of sound by potentially increasing the number of ground reflections.

The FHWA TNM is the model that is currently approved by FHWA for use in noise impact studies. The TNM has complex algorithms that directly calculate excess ground attenuation based on ground type and site geometry.

APPENDIX C

SIGNIFICANCE THRESHOLDS & AMBIENT NOISE MEASUREMENT LOGS

Ambient Measurements + Significance Thresholds

Measure Ambient Noise Levels + Ventura County Significance Thresholds

Ventura County Noise Significance Thresholds					
Facility Thresholds			Haul Route Thresholds		
			Outdoor		Indoor
Standard	Hours	Noise Threshold (L_{eq}1H)	CNEL	L_{eq}1H	CNEL
Daytime	6:00 a.m. - 7:00 p.m.	55 dBA or ambient +3 dBA	60 dBA	65 dBA	45 dBA
Evening	7:00 p.m. - 10:00 p.m.	50 dBA or ambient +3 dBA			
Nighttime	10:00 p.m. - 6:00 a.m.	45 dBA or ambient +3 dBA			

Source: Ventura County *2040 General Plan Noise Element* (September 2020) / Ventura County *Initial Study Assessment Guidelines* (April 2011)

CNEL = Community Noise Equivalent Level, is a long-term average sound level with a +5 dBA penalty added to evening (7:00 p.m. - 10:00 p.m.) noise and a +10 dBA penalty added to nighttime (10:00 p.m. - 7:00 a.m.) noise.

Facility Receptors - Ambient/Baseline Measurements & Ventura County Significance Thresholds									
				Ambient Noise Levels (L_{eq}1H)			County Thresholds (L_{eq}1H) [C, D]		
Receptor	Measurement / Study	Receptor Type	Date(s) Measured	Daytime	Evening	Nighttime	Daytime	Evening	Nighttime
R1 [B]	Study #2	Cemetery	12/20/2018	41.6	32.9	32.7	55	50	45
R2 [A]	Study #1	Residence(s)	12/20/2018 12/21/2018	44.8	36.2	36.0	55	50	45
R3 [A]	Study #1	Recreation/Open Space	12/20/2018 12/21/2018	44.8	36.2	36.0	55	50	45

Haul Route Receptors - Ambient/Baseline Measurements & Ventura County Significance Thresholds													
				Ambient Noise Levels (L_{eq}1H & CNEL) [E]					County Thresholds (L_{eq}1H & CNEL) [C, E]				
							CNEL					CNEL	
Receptor	Measurement / Study	Receptor Type	Date(s) Measured	Daytime	Evening	Nighttime	Outdoor	Indoor [F]	Daytime	Evening	Nighttime	Outdoor	Indoor
R4 [A]	Study #3	Residence	1/23/2019 1/24/2019	59.8	50.7	47.9	58.9	38.9	62.8	53.7	50.9	61.9	45.0
R5 [B]	Study #4 Study #5 Study #6	Residence(s)	1/23/2019 1/24/2019	77.4	66.3	65.4	62.2	42.2	80.4	69.3	68.4	65.2	45.2

A - Ambient noise levels at Receptors 2 (R2), 3 (R3) and 4 (R4) represent actual L_{eq}1H noise levels measured during the daytime, evening, and nighttime timeframes over a 24-hours period.

B - For Receptors 1 (R1) and 5 (R5) where 24-hour measurements were not collected, a dBA ±change was calculated by comparing measured short-duration (15-minute) L_{eq} values at these locations to the measured L_{eq} noise level at the appropriate 24-hour reference location during the identical time period. The difference between these values (i.e., correction factor) is is then applied to the applicable daytime, evening, nighttime, and CNEL 24-hour L_{eq}1H measurements to estimate the noise levels at Receptors R1 and R5.

C - Ambient noise levels at Facility receptors (R1, R2 and R3) are below the Ventura County "fixed" thresholds, and therefore the "fixed" thresholds are utilized to determine the significance of Facility noise impacts on these receptors. However, because the ambient noise levels at haul route receptors (R4 and R5) already exceeds the "fixed" thresholds, per Ventura County guidance the measured "ambient noise level +3 decibels (dBA)" is utilized to determine the significance of haul route noise impacts at Receptors R4 and R5.

D - Because the Facility (i.e., mining and processing operations) will operate during daytime hours (i.e., 7:00 a.m. - 4:00 p.m.) only, the daytime threshold is utilized to determine the significance of Facility noise impacts. The evening and nighttime ambient noise levels and significance thresholds are shown for information purposes only.

E - As discussed in Appendix E, the applicable CNEL thresholds are utilized to determine the significance of Project haul truck impacts. The measured L_{eq}1H noise levels, and adjusted thresholds, for the daytime, evening, and nighttime timeframes are shown for informational purposes only.

F - Based on the EPA's *Protective Noise Levels* document (March, 1974), an outdoor to indoor attenuation of -20 dBA is assumed. This takes into account the average noise reduction provided while windows are closed (-25 dBA) and while windows are open (-15 dBA). This is a conservatively low estimate of noise attenuation as residences are expected to generally keep windows closed, especially those facing sources of noise. The -20 dBA attenuation is applied to the CNEL values. See Appendix B for the applicable excerpt from the EPA guidance document.

Study #1 - Facility
Long-Duration (24-Hours)

	Time	Date
Start:	1:00:53 PM	12/20/2018
End:	1:00:53 PM	12/21/2018

Baseline Noise Level (24-Hour)

24-Hour L_{eq}:	42.6

Baseline Noise Level (L_{eq}1H) @ R2

Daytime:	44.8
Evening:	36.2
Nighttime:	36.0

	15-Min L_{eq}	24-Hour L_{eq}	Difference
Study #2 (R1)	46.9	50.1	-3.2

	Daytime	Evening	Nighttime
Study #2 (R1)	41.6	32.9	32.7

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1	Time	Baseline SPL ($10^{(Leq/10)}$)
Study #1	0:01:00	0:01:00		46	55.7	32.8	1:01:53 PM	39810.71706
Receptors 2 & 3	0:02:00	0:02:00		38.9	50.9	30.9	1:02:53 PM	7762.471166
	0:03:00	0:03:00		36.1	45.7	30.2	1:03:53 PM	4073.802778
	0:04:00	0:04:00		33.1	35.5	31.4	1:04:53 PM	2041.737945
	0:05:00	0:05:00		33.3	36.5	31.6	1:05:53 PM	2137.96209
	0:06:00	0:06:00		33	36.7	30	1:06:53 PM	1995.262315
	0:07:00	0:07:00		35.7	38.4	32	1:07:53 PM	3715.352291
	0:08:00	0:08:00		33	36.6	30.8	1:08:53 PM	1995.262315
	0:09:00	0:09:00		35	38.7	31.9	1:09:53 PM	3162.27766
	0:10:00	0:10:00		35.9	39	33.3	1:10:53 PM	3890.45145
	0:11:00	0:11:00		33.9	38.2	31.9	1:11:53 PM	2454.708916
	0:12:00	0:12:00		33.9	35.7	32.2	1:12:53 PM	2454.708916
	0:13:00	0:13:00		33.6	35.7	31.7	1:13:53 PM	2290.867653
	0:14:00	0:14:00		34.1	37.6	30.7	1:14:53 PM	2570.395783
	0:15:00	0:15:00		39.1	41.6	35.1	1:15:53 PM	8128.305162
	0:16:00	0:16:00		35	38.3	32.7	1:16:53 PM	3162.27766
	0:17:00	0:17:00		34.1	38	32.7	1:17:53 PM	2570.395783
	0:18:00	0:18:00		33.7	35.4	32.8	1:18:53 PM	2344.228815
	0:19:00	0:19:00		33.9	41.3	31.6	1:19:53 PM	2454.708916
	0:20:00	0:20:00		32.4	34.3	31	1:20:53 PM	1737.800829
	0:21:00	0:21:00		32.9	36.6	31.4	1:21:53 PM	1949.8446
	0:22:00	0:22:00		32.7	34.2	31.7	1:22:53 PM	1862.087137
	0:23:00	0:23:00		33	35	31.7	1:23:53 PM	1995.262315
	0:24:00	0:24:00		35	38.5	32.3	1:24:53 PM	3162.27766
	0:25:00	0:25:00		41.8	46.3	34.9	1:25:53 PM	15135.61248
	0:26:00	0:26:00		37.2	40.7	34.8	1:26:53 PM	5248.074602
	0:27:00	0:27:00		38.3	46.1	34.2	1:27:53 PM	6760.829754
	0:28:00	0:28:00		48.6	54	37.8	1:28:53 PM	72443.59601
	0:29:00	0:29:00		39	43.8	37	1:29:53 PM	7943.282347
	0:30:00	0:30:00		37	37.9	36.1	1:30:53 PM	5011.872336
	0:31:00	0:31:00		44.8	50.4	36.3	1:31:53 PM	30199.5172
	0:32:00	0:32:00		53.8	62.8	37.9	1:32:53 PM	239883.2919
	0:33:00	0:33:00		37.7	39.1	37.1	1:33:53 PM	5888.436554
	0:34:00	0:34:00		37.7	39.3	36.9	1:34:53 PM	5888.436554
	0:35:00	0:35:00		37.7	38.9	37.2	1:35:53 PM	5888.436554
	0:36:00	0:36:00		37.7	39.3	36.8	1:36:53 PM	5888.436554
	0:37:00	0:37:00		38.1	42.2	36.7	1:37:53 PM	6456.54229
	0:38:00	0:38:00		37.7	40.9	36.5	1:38:53 PM	5888.436554
	0:39:00	0:39:00		37.5	41.3	36.4	1:39:53 PM	5623.413252
	0:40:00	0:40:00		39	50	36.9	1:40:53 PM	7943.282347
	0:41:00	0:41:00		37.7	42	36.5	1:41:53 PM	5888.436554
	0:42:00	0:42:00		37.5	40.5	36.6	1:42:53 PM	5623.413252
	0:43:00	0:43:00		40.9	45.5	36.9	1:43:53 PM	12302.68771
	0:44:00	0:44:00		37.4	40.2	36.1	1:44:53 PM	5495.408739
	0:45:00	0:45:00		37.4	39.3	36.3	1:45:53 PM	5495.408739
	0:46:00	0:46:00		36.5	37.4	35.9	1:46:53 PM	4466.835922
	0:47:00	0:47:00		36.4	37.5	35.9	1:47:53 PM	4365.158322
	0:48:00	0:48:00		36.9	37.9	36.1	1:48:53 PM	4897.788194
	0:49:00	0:49:00		37.1	38.4	36.2	1:49:53 PM	5128.61384
	0:50:00	0:50:00		39.1	49.2	36.3	1:50:53 PM	8128.305162
	0:51:00	0:51:00		37.8	40.2	35.9	1:51:53 PM	6025.595861
	0:52:00	0:52:00		38.9	40.9	37.2	1:52:53 PM	7762.471166
	0:53:00	0:53:00		41.2	47.1	37	1:53:53 PM	13182.56739
	0:54:00	0:54:00		39.5	43.2	37.2	1:54:53 PM	8912.509381
	0:55:00	0:55:00		38.1	41.4	36.6	1:55:53 PM	6456.54229
	0:56:00	0:56:00		38.3	41.5	36.6	1:56:53 PM	6760.829754
	0:57:00	0:57:00		39.5	41.8	37.6	1:57:53 PM	8912.509381
	0:58:00	0:58:00		38.9	42.7	37.3	1:58:53 PM	7762.471166
	0:59:00	0:59:00		38.5	42.8	36.7	1:59:53 PM	7079.457844
	1:00:00	1:00:00		41.8	46.2	36.8	2:00:53 PM	15135.61248
	1:01:00	1:01:00		45	51.3	38.1	2:01:53 PM	31622.7766
	1:02:00	1:02:00		47.7	53.5	37.7	2:02:53 PM	58884.36554
	1:03:00	1:03:00		39.5	42.7	37.3	2:03:53 PM	8912.509381
	1:04:00	1:04:00		39.6	42.1	37.6	2:04:53 PM	9120.108394
	1:05:00	1:05:00		38.9	41.7	37.4	2:05:53 PM	7762.471166
	1:06:00	1:06:00		40.1	42.2	38.2	2:06:53 PM	10232.92992
	1:07:00	1:07:00		39.5	42.4	37.4	2:07:53 PM	8912.509381
	1:08:00	1:08:00		39.7	41.8	38	2:08:53 PM	9332.543008
	1:09:00	1:09:00		43.4	48.1	38.6	2:09:53 PM	21877.61624
	1:10:00	1:10:00		50.5	59.7	38.1	2:10:53 PM	112201.8454
	1:11:00	1:11:00		38.8	41.4	37.6	2:11:53 PM	7585.77575
	1:12:00	1:12:00		39.9	44	37.7	2:12:53 PM	9772.37221
	1:13:00	1:13:00		49.4	55.7	43.3	2:13:53 PM	87096.359
	1:14:00	1:14:00		45.7	53.4	38.8	2:14:53 PM	37153.52291
	1:15:00	1:15:00		38.9	41.8	37.3	2:15:53 PM	7762.471166
	1:16:00	1:16:00		38.4	41.6	37.3	2:16:53 PM	6918.309709
	1:17:00	1:17:00		37.5	39.7	36.6	2:17:53 PM	5623.413252
	1:18:00	1:18:00		38.2	41.6	36.6	2:18:53 PM	6606.93448
	1:19:00	1:19:00		39.4	41.2	38	2:19:53 PM	8709.6359
	1:20:00	1:20:00		38.9	43.3	37	2:20:53 PM	7762.471166
	1:21:00	1:21:00		37.6	39.1	36.8	2:21:53 PM	5754.399373
	1:22:00	1:22:00		37.5	39	36.8	2:22:53 PM	5623.413252
	1:23:00	1:23:00		39.1	41.3	37.5	2:23:53 PM	8128.305162

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1				Baseline SPL
	1:24:00	1:24:00		37.8	39.2	36.9			2:24:53 PM	6025.595861
	1:25:00	1:25:00		39.8	44.7	37			2:25:53 PM	9549.92586
	1:26:00	1:26:00		37.7	38.7	36.8			2:26:53 PM	5888.436554
	1:27:00	1:27:00		37.6	41	36.6			2:27:53 PM	5754.399373
	1:28:00	1:28:00		35	37.7	31.7			2:28:53 PM	3162.27766
	1:29:00	1:29:00		35.3	38.2	32.2			2:29:53 PM	3388.441561
	1:30:00	1:30:00		36.4	39.4	33.6			2:30:53 PM	4365.158322
	1:31:00	1:31:00		33.8	36.3	31.3			2:31:53 PM	2398.832919
	1:32:00	1:32:00		33.7	37.3	30.7			2:32:53 PM	2344.228815
	1:33:00	1:33:00		33.7	37.5	30.8			2:33:53 PM	2344.228815
	1:34:00	1:34:00		33.9	36.9	32.1			2:34:53 PM	2454.708916
	1:35:00	1:35:00		33	35.3	31.4			2:35:53 PM	1995.262315
	1:36:00	1:36:00		35.2	38.1	32			2:36:53 PM	3311.311215
	1:37:00	1:37:00		34.8	39.8	32			2:37:53 PM	3019.95172
	1:38:00	1:38:00		37	40.2	34.5			2:38:53 PM	5011.872336
	1:39:00	1:39:00		36	39.5	32.1			2:39:53 PM	3981.071706
	1:40:00	1:40:00		34.8	38	32.2			2:40:53 PM	3019.95172
	1:41:00	1:41:00		34.9	38.2	32.6			2:41:53 PM	3090.295433
	1:42:00	1:42:00		35.7	40.4	32.9			2:42:53 PM	3715.352291
	1:43:00	1:43:00		34.5	39	32.5			2:43:53 PM	2818.382931
	1:44:00	1:44:00		35.7	39.4	32.2			2:44:53 PM	3715.352291
	1:45:00	1:45:00		35.3	39.7	32.5			2:45:53 PM	3388.441561
	1:46:00	1:46:00		33.7	37.3	31.6			2:46:53 PM	2344.228815
	1:47:00	1:47:00		33.5	35.7	31.5			2:47:53 PM	2238.721139
	1:48:00	1:48:00		33.1	35.4	31.7			2:48:53 PM	2041.737945
	1:49:00	1:49:00		34.3	37.1	32.7			2:49:53 PM	2691.534804
	1:50:00	1:50:00		33.8	39.2	31.7			2:50:53 PM	2398.832919
	1:51:00	1:51:00		55.2	72.4	32			2:51:53 PM	331131.1215
	1:52:00	1:52:00		38.9	46.3	33.4			2:52:53 PM	7762.471166
	1:53:00	1:53:00		37.6	44.7	32.1			2:53:53 PM	5754.399373
	1:54:00	1:54:00		37.5	47.3	33.2			2:54:53 PM	5623.413252
	1:55:00	1:55:00		38.9	50.2	31.7			2:55:53 PM	7762.471166
	1:56:00	1:56:00		37.1	46.4	32			2:56:53 PM	5128.61384
	1:57:00	1:57:00		40.3	54	32.5			2:57:53 PM	10715.19305
	1:58:00	1:58:00		33.5	39.3	31.7			2:58:53 PM	2238.721139
	1:59:00	1:59:00		32.9	35	31.4			2:59:53 PM	1949.8446
	2:00:00	2:00:00		33	35.3	31.4			3:00:53 PM	1995.262315
	2:01:00	2:01:00		33.7	36	31.7			3:01:53 PM	2344.228815
	2:02:00	2:02:00		36.6	46.3	31.5			3:02:53 PM	4570.881896
	2:03:00	2:03:00		34.1	42.8	31.7			3:03:53 PM	2570.395783
	2:04:00	2:04:00		38.2	44.3	32.2			3:04:53 PM	6606.93448
	2:05:00	2:05:00		39.8	44.7	33.7			3:05:53 PM	9549.92586
	2:06:00	2:06:00		33.9	37.2	31.7			3:06:53 PM	2454.708916
	2:07:00	2:07:00		33.9	37.7	31.8			3:07:53 PM	2454.708916
	2:08:00	2:08:00		33.2	43.4	31.2			3:08:53 PM	2089.296131
	2:09:00	2:09:00		32.5	34.2	31.4			3:09:53 PM	1778.27941
	2:10:00	2:10:00		34.6	40.2	32.2			3:10:53 PM	2884.031503
	2:11:00	2:11:00		33.7	36	32.6			3:11:53 PM	2344.228815
	2:12:00	2:12:00		33.5	34.8	32.2			3:12:53 PM	2238.721139
	2:13:00	2:13:00		33.5	34.7	32.3			3:13:53 PM	2238.721139
	2:14:00	2:14:00		33.4	35.3	32.4			3:14:53 PM	2187.761624
	2:15:00	2:15:00		33	34.2	31.9			3:15:53 PM	1995.262315
	2:16:00	2:16:00		34.4	36.2	32.8			3:16:53 PM	2754.228703
	2:17:00	2:17:00		35.8	37.2	34.7			3:17:53 PM	3801.893963
	2:18:00	2:18:00		34.6	36.7	33			3:18:53 PM	2884.031503
	2:19:00	2:19:00		38.3	44.5	33.5			3:19:53 PM	6760.829754
	2:20:00	2:20:00		38.9	45.3	34.4			3:20:53 PM	7762.471166
	2:21:00	2:21:00		35.5	42.1	33.3			3:21:53 PM	3548.133892
	2:22:00	2:22:00		37.9	49	33.8			3:22:53 PM	6165.950019
	2:23:00	2:23:00		35.6	38.4	34			3:23:53 PM	3630.780548
	2:24:00	2:24:00		41.6	45.6	34.1			3:24:53 PM	14454.39771
	2:25:00	2:25:00		38	47.9	35.1			3:25:53 PM	6309.573445
	2:26:00	2:26:00		38	42.5	35.8			3:26:53 PM	6309.573445
	2:27:00	2:27:00		37	43.5	34.4			3:27:53 PM	5011.872336
	2:28:00	2:28:00		41	47.3	36.1			3:28:53 PM	12589.25412
	2:29:00	2:29:00		62.7	70.9	39.7			3:29:53 PM	1862087.137
	2:30:00	2:30:00		47.6	54	37.2			3:30:53 PM	57543.99373
	2:31:00	2:31:00		39.5	42.2	36.1			3:31:53 PM	8912.509381
	2:32:00	2:32:00		39.5	42.9	35.9			3:32:53 PM	8912.509381
	2:33:00	2:33:00		38.4	49	34.6			3:33:53 PM	6918.309709
	2:34:00	2:34:00		37.1	40.1	35.1			3:34:53 PM	5128.61384
	2:35:00	2:35:00		39.5	44.4	35.2			3:35:53 PM	8912.509381
	2:36:00	2:36:00		40.6	47.3	36			3:36:53 PM	11481.53621
	2:37:00	2:37:00		37.4	44.7	35.5	R1	Study #2	3:37:53 PM	5495.408739
	2:38:00	2:38:00		37.7	44.2	35.3	R1	Study #2	3:38:53 PM	5888.436554
	2:39:00	2:39:00		37.4	45	35.1	R1	Study #2	3:39:53 PM	5495.408739
	2:40:00	2:40:00		38.2	46.7	35.3	R1	Study #2	3:40:53 PM	6606.93448
	2:41:00	2:41:00		38.1	46.3	35.4	R1	Study #2	3:41:53 PM	6456.54229
	2:42:00	2:42:00		43.5	60.8	36	R1	Study #2	3:42:53 PM	22387.21139
	2:43:00	2:43:00		58.8	70.2	35.8	R1	Study #2	3:43:53 PM	758577.575
	2:44:00	2:44:00		53.6	66.3	36.1	R1	Study #2	3:44:53 PM	229086.7653
	2:45:00	2:45:00		50.6	62.3	35.2	R1	Study #2	3:45:53 PM	114815.3621
	2:46:00	2:46:00		53.4	65.7	34.8	R1	Study #2	3:46:53 PM	218776.1624
	2:47:00	2:47:00		53.9	68.7	34.9	R1	Study #2	3:47:53 PM	245470.8916

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	2:48:00	2:48:00		36.5	38.3	35.2
	2:49:00	2:49:00		37.6	44.8	34.4
	2:50:00	2:50:00		35.1	39.2	34
	2:51:00	2:51:00		35.1	38.1	34.2
	2:52:00	2:52:00		35.2	36.7	34.1
	2:53:00	2:53:00		35.4	36.8	34.3
	2:54:00	2:54:00		35.9	39.4	34.7
	2:55:00	2:55:00		35.2	37.5	34
	2:56:00	2:56:00		35.1	36.4	34.2
	2:57:00	2:57:00		35.4	40.6	33.6
	2:58:00	2:58:00		36.8	42.2	33.8
	2:59:00	2:59:00		38.9	43.9	33.7
	3:00:00	3:00:00		37.1	42.3	33.8
	3:01:00	3:01:00		42.5	54.1	33.8
	3:02:00	3:02:00		36.2	38.7	34.1
	3:03:00	3:03:00		34.7	36.2	33.4
	3:04:00	3:04:00		34	36.5	32.9
	3:05:00	3:05:00		33.8	35.2	33
	3:06:00	3:06:00		37.9	47.7	33
	3:07:00	3:07:00		41.1	51.7	34.2
	3:08:00	3:08:00		42.4	55.9	34.2
	3:09:00	3:09:00		38.7	47.1	33.9
	3:10:00	3:10:00		39.9	49.7	34.2
	3:11:00	3:11:00		35.9	39.1	33.5
	3:12:00	3:12:00		35.2	38.4	34.1
	3:13:00	3:13:00		35.1	37.7	34.1
	3:14:00	3:14:00		34.6	36.3	33.7
	3:15:00	3:15:00		35.4	36.8	34.3
	3:16:00	3:16:00		35.5	37.7	34.2
	3:17:00	3:17:00		34.3	37.5	33.2
	3:18:00	3:18:00		34.1	36.4	33.1
	3:19:00	3:19:00		34.3	36.9	33
	3:20:00	3:20:00		35.6	41.8	33.4
	3:21:00	3:21:00		37.9	42.7	34.6
	3:22:00	3:22:00		43.7	55.1	35.9
	3:23:00	3:23:00		41.3	52.3	34.1
	3:24:00	3:24:00		37.1	46.8	33.8
	3:25:00	3:25:00		35.3	39.6	34
	3:26:00	3:26:00		34	35	32.9
	3:27:00	3:27:00		35	37.6	32.8
	3:28:00	3:28:00		36.1	40.9	33.2
	3:29:00	3:29:00		35.6	40.5	33.6
	3:30:00	3:30:00		37.4	40.1	34.1
	3:31:00	3:31:00		33.8	35.8	32.8
	3:32:00	3:32:00		34.4	40	32.9
	3:33:00	3:33:00		33.4	34.6	32.5
	3:34:00	3:34:00		33.3	35.4	32.4
	3:35:00	3:35:00		33.4	35.8	32.5
	3:36:00	3:36:00		34.3	38.8	32.4
	3:37:00	3:37:00		36.3	41.3	32.6
	3:38:00	3:38:00		37.8	42.5	34.1
	3:39:00	3:39:00		43.7	53	33.3
	3:40:00	3:40:00		36.9	44.8	32.7
	3:41:00	3:41:00		43.9	52.9	33.6
	3:42:00	3:42:00		37.2	45.8	32.6
	3:43:00	3:43:00		33.5	35.2	32.8
	3:44:00	3:44:00		33.6	34.4	32.7
	3:45:00	3:45:00		33.3	34	32.3
	3:46:00	3:46:00		33.7	35.2	32.7
	3:47:00	3:47:00		34.4	36.7	33
	3:48:00	3:48:00		39.8	43.2	34.4
	3:49:00	3:49:00		35.1	38.1	32.6
	3:50:00	3:50:00		33.8	35.2	32.6
	3:51:00	3:51:00		35.4	37.4	33
	3:52:00	3:52:00		37.3	44.4	34.4
	3:53:00	3:53:00		34.5	38.4	33
	3:54:00	3:54:00		35.2	41.9	32.8
	3:55:00	3:55:00		34.2	35.6	33
	3:56:00	3:56:00		47.6	55.5	33.4
	3:57:00	3:57:00		54.2	59.9	34.1
	3:58:00	3:58:00		34	44	32.1
	3:59:00	3:59:00		34.3	40.7	32.4
	4:00:00	4:00:00		33.1	35.6	31.7
	4:01:00	4:01:00		32.1	33	31.5
	4:02:00	4:02:00		38.2	45.5	31.9
	4:03:00	4:03:00		48.3	60	34.4
	4:04:00	4:04:00		43.3	51.3	37.3
	4:05:00	4:05:00		37.2	40.7	32
	4:06:00	4:06:00		35.2	39.2	32.6
	4:07:00	4:07:00		49.7	56.4	32.9
	4:08:00	4:08:00		40.9	49.5	33.3
	4:09:00	4:09:00		33.9	34.6	32.8
	4:10:00	4:10:00		34.6	42.7	31.7
	4:11:00	4:11:00		33.2	37.2	30.9

			Baseline SPL
R1	Study #2	3:48:53 PM	4466.835922
R1	Study #2	3:49:53 PM	5754.399373
R1	Study #2	3:50:53 PM	3235.936569
R1	Study #2	3:51:53 PM	3235.936569
R1	Study #2	3:52:53 PM	3311.311215
		3:53:53 PM	3467.368505
		3:54:53 PM	3890.45145
		3:55:53 PM	3311.311215
		3:56:53 PM	3235.936569
		3:57:53 PM	3467.368505
		3:58:53 PM	4786.300923
		3:59:53 PM	7762.471166
		4:00:53 PM	5128.61384
		4:01:53 PM	17782.7941
		4:02:53 PM	4168.693835
		4:03:53 PM	2951.209227
		4:04:53 PM	2511.886432
		4:05:53 PM	2398.832919
		4:06:53 PM	6165.950019
		4:07:53 PM	12882.49552
		4:08:53 PM	17378.00829
		4:09:53 PM	7413.102413
		4:10:53 PM	9772.37221
		4:11:53 PM	3890.45145
		4:12:53 PM	3311.311215
		4:13:53 PM	3235.936569
		4:14:53 PM	2884.031503
		4:15:53 PM	3467.368505
		4:16:53 PM	3548.133892
		4:17:53 PM	2691.534804
		4:18:53 PM	2570.395783
		4:19:53 PM	2691.534804
		4:20:53 PM	3630.780548
		4:21:53 PM	6165.950019
		4:22:53 PM	23442.28815
		4:23:53 PM	13489.62883
		4:24:53 PM	5128.61384
		4:25:53 PM	3388.441561
		4:26:53 PM	2511.886432
		4:27:53 PM	3162.27766
		4:28:53 PM	4073.802778
		4:29:53 PM	3630.780548
		4:30:53 PM	5495.408739
		4:31:53 PM	2398.832919
		4:32:53 PM	2754.228703
		4:33:53 PM	2187.761624
		4:34:53 PM	2137.96209
		4:35:53 PM	2187.761624
		4:36:53 PM	2691.534804
		4:37:53 PM	4265.795188
		4:38:53 PM	6025.595861
		4:39:53 PM	23442.28815
		4:40:53 PM	4897.788194
		4:41:53 PM	24547.08916
		4:42:53 PM	5248.074602
		4:43:53 PM	2238.721139
		4:44:53 PM	2290.867653
		4:45:53 PM	2137.96209
		4:46:53 PM	2344.228815
		4:47:53 PM	2754.228703
		4:48:53 PM	9549.92586
		4:49:53 PM	3235.936569
		4:50:53 PM	2398.832919
		4:51:53 PM	3467.368505
		4:52:53 PM	5370.317964
		4:53:53 PM	2818.382931
		4:54:53 PM	3311.311215
		4:55:53 PM	2630.267992
		4:56:53 PM	57543.99373
		4:57:53 PM	263026.7992
		4:58:53 PM	2511.886432
		4:59:53 PM	2691.534804
		5:00:53 PM	2041.737945
		5:01:53 PM	1621.810097
		5:02:53 PM	6606.93448
		5:03:53 PM	67608.29754
		5:04:53 PM	21379.6209
		5:05:53 PM	5248.074602
		5:06:53 PM	3311.311215
		5:07:53 PM	93325.43008
		5:08:53 PM	12302.68771
		5:09:53 PM	2454.708916
		5:10:53 PM	2884.031503
		5:11:53 PM	2089.296131

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	4:12:00	4:12:00		38.8	49.3	31
	4:13:00	4:13:00		37.8	46.6	32.3
	4:14:00	4:14:00		33.3	41.9	31.7
	4:15:00	4:15:00		32.5	33.3	31.9
	4:16:00	4:16:00		33.7	35.9	32.3
	4:17:00	4:17:00		32.8	34.6	31.9
	4:18:00	4:18:00		33.4	38.7	31.9
	4:19:00	4:19:00		34.5	45	31.8
	4:20:00	4:20:00		32.7	34.8	31.9
	4:21:00	4:21:00		32.8	35	31.9
	4:22:00	4:22:00		33.6	36.2	32.6
	4:23:00	4:23:00		34.5	36.8	33
	4:24:00	4:24:00		34.3	35.5	33.5
	4:25:00	4:25:00		40.1	45.3	34
	4:26:00	4:26:00		38	42.8	35.7
	4:27:00	4:27:00		41.3	46.7	33.7
	4:28:00	4:28:00		34.5	36	33.6
	4:29:00	4:29:00		38.7	41.9	35.4
	4:30:00	4:30:00		42.9	46.5	39
	4:31:00	4:31:00		37.2	39.4	36
	4:32:00	4:32:00		37.3	39.2	35.6
	4:33:00	4:33:00		34.6	35.9	33.7
	4:34:00	4:34:00		34.6	35.6	33.7
	4:35:00	4:35:00		35.1	36	33.8
	4:36:00	4:36:00		36.3	42.7	34.1
	4:37:00	4:37:00		35.3	38.1	34
	4:38:00	4:38:00		35.1	36.5	34.1
	4:39:00	4:39:00		35	37.2	34
	4:40:00	4:40:00		34.8	35.4	34.1
	4:41:00	4:41:00		35.4	36.5	34.5
	4:42:00	4:42:00		35.3	37.9	34
	4:43:00	4:43:00		34.8	36.2	33.8
	4:44:00	4:44:00		34.4	35.4	33.7
	4:45:00	4:45:00		34.6	36.5	33.3
	4:46:00	4:46:00		35.2	39.6	33.9
	4:47:00	4:47:00		37	47.7	33.7
	4:48:00	4:48:00		34.4	35.8	33.3
	4:49:00	4:49:00		34.1	35.3	32.8
	4:50:00	4:50:00		33.7	34.6	32.7
	4:51:00	4:51:00		34.3	36.1	33.2
	4:52:00	4:52:00		33.9	37.4	32.9
	4:53:00	4:53:00		34.6	36.6	33.2
	4:54:00	4:54:00		34.5	35.9	33.6
	4:55:00	4:55:00		35	38.2	34.1
	4:56:00	4:56:00		34	34.8	33.4
	4:57:00	4:57:00		35	37.6	33.6
	4:58:00	4:58:00		34.7	35.6	33.9
	4:59:00	4:59:00		35.1	36.2	33.9
	5:00:00	5:00:00		42.4	49.5	34.6
	5:01:00	5:01:00		35.8	37.8	34.4
	5:02:00	5:02:00		36.5	37.7	35.2
	5:03:00	5:03:00		35.8	36.9	34.9
	5:04:00	5:04:00		37.6	45.1	35.2
	5:05:00	5:05:00		35.8	39.3	34.4
	5:06:00	5:06:00		34.9	35.9	34
	5:07:00	5:07:00		35.5	36.1	34.8
	5:08:00	5:08:00		35	36.4	33.8
	5:09:00	5:09:00		39.9	46.9	33.8
	5:10:00	5:10:00		44.2	52.4	33.8
	5:11:00	5:11:00		35.1	43.7	33
	5:12:00	5:12:00		38.2	41	35
	5:13:00	5:13:00		35.1	36.8	33.9
	5:14:00	5:14:00		34.2	35.5	33
	5:15:00	5:15:00		35.5	37.6	34.2
	5:16:00	5:16:00		35.9	38	34
	5:17:00	5:17:00		35.7	37.9	33.9
	5:18:00	5:18:00		34	35.9	32.1
	5:19:00	5:19:00		34.2	37.2	32.7
	5:20:00	5:20:00		36.4	38.6	34.2
	5:21:00	5:21:00		35	37.3	32.7
	5:22:00	5:22:00		34.2	36.2	31.9
	5:23:00	5:23:00		33.8	35.7	32.1
	5:24:00	5:24:00		33.9	34.9	33
	5:25:00	5:25:00		32.6	33.8	31.9
	5:26:00	5:26:00		32.9	34.8	31.9
	5:27:00	5:27:00		33.7	35.2	32.4
	5:28:00	5:28:00		37.6	41.6	33.7
	5:29:00	5:29:00		39.3	42.3	34.1
	5:30:00	5:30:00		38.6	40	37.6
	5:31:00	5:31:00		38.2	39.6	37.4
	5:32:00	5:32:00		38.2	39.8	37.5
	5:33:00	5:33:00		38	38.7	37.4
	5:34:00	5:34:00		38.4	40.9	37.5
	5:35:00	5:35:00		38	38.8	37.1

	Baseline SPL
5:12:53 PM	7585.77575
5:13:53 PM	6025.595861
5:14:53 PM	2137.96209
5:15:53 PM	1778.27941
5:16:53 PM	2344.228815
5:17:53 PM	1905.460718
5:18:53 PM	2187.761624
5:19:53 PM	2818.382931
5:20:53 PM	1862.087137
5:21:53 PM	1905.460718
5:22:53 PM	2290.867653
5:23:53 PM	2818.382931
5:24:53 PM	2691.534804
5:25:53 PM	10232.92992
5:26:53 PM	6309.573445
5:27:53 PM	13489.62883
5:28:53 PM	2818.382931
5:29:53 PM	7413.102413
5:30:53 PM	19498.446
5:31:53 PM	5248.074602
5:32:53 PM	5370.317964
5:33:53 PM	2884.031503
5:34:53 PM	2884.031503
5:35:53 PM	3235.936569
5:36:53 PM	4265.795188
5:37:53 PM	3388.441561
5:38:53 PM	3235.936569
5:39:53 PM	3162.27766
5:40:53 PM	3019.95172
5:41:53 PM	3467.368505
5:42:53 PM	3388.441561
5:43:53 PM	3019.95172
5:44:53 PM	2754.228703
5:45:53 PM	2884.031503
5:46:53 PM	3311.311215
5:47:53 PM	5011.872336
5:48:53 PM	2754.228703
5:49:53 PM	2570.395783
5:50:53 PM	2344.228815
5:51:53 PM	2691.534804
5:52:53 PM	2454.708916
5:53:53 PM	2884.031503
5:54:53 PM	2818.382931
5:55:53 PM	3162.27766
5:56:53 PM	2511.886432
5:57:53 PM	3162.27766
5:58:53 PM	2951.209227
5:59:53 PM	3235.936569
6:00:53 PM	17378.00829
6:01:53 PM	3801.893963
6:02:53 PM	4466.835922
6:03:53 PM	3801.893963
6:04:53 PM	5754.399373
6:05:53 PM	3801.893963
6:06:53 PM	3090.295433
6:07:53 PM	3548.133892
6:08:53 PM	3162.27766
6:09:53 PM	9772.37221
6:10:53 PM	26302.67992
6:11:53 PM	3235.936569
6:12:53 PM	6606.93448
6:13:53 PM	3235.936569
6:14:53 PM	2630.267992
6:15:53 PM	3548.133892
6:16:53 PM	3890.45145
6:17:53 PM	3715.352291
6:18:53 PM	2511.886432
6:19:53 PM	2630.267992
6:20:53 PM	4365.158322
6:21:53 PM	3162.27766
6:22:53 PM	2630.267992
6:23:53 PM	2398.832919
6:24:53 PM	2454.708916
6:25:53 PM	1819.700859
6:26:53 PM	1949.8446
6:27:53 PM	2344.228815
6:28:53 PM	5754.399373
6:29:53 PM	8511.380382
6:30:53 PM	7244.359601
6:31:53 PM	6606.93448
6:32:53 PM	6606.93448
6:33:53 PM	6309.573445
6:34:53 PM	6918.309709
6:35:53 PM	6309.573445

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	5:36:00	5:36:00		38.2	38.9	37.6
	5:37:00	5:37:00		38.2	39.7	37.9
	5:38:00	5:38:00		38.7	39.6	38.1
	5:39:00	5:39:00		38.7	40	38.1
	5:40:00	5:40:00		39.4	40.8	38
	5:41:00	5:41:00		38.6	39.6	37.7
	5:42:00	5:42:00		39.1	40.5	38.2
	5:43:00	5:43:00		38.3	39.2	37.6
	5:44:00	5:44:00		39	40.5	37.8
	5:45:00	5:45:00		38.9	40.7	37.7
	5:46:00	5:46:00		39.5	42.7	37.5
	5:47:00	5:47:00		38.1	38.8	37.3
	5:48:00	5:48:00		38.3	39.9	37.7
	5:49:00	5:49:00		38.2	39.2	37.7
	5:50:00	5:50:00		38.3	40.1	37.6
	5:51:00	5:51:00		37.9	38.3	37.5
	5:52:00	5:52:00		38.1	38.8	37.4
	5:53:00	5:53:00		38.2	40.3	37.6
	5:54:00	5:54:00		38.5	39.4	37.7
	5:55:00	5:55:00		38.6	39.6	38
	5:56:00	5:56:00		44.2	47	39.4
	5:57:00	5:57:00		41.1	46.3	38.2
	5:58:00	5:58:00		38.1	38.8	37.6
	5:59:00	5:59:00		38	39.3	37.3
	6:00:00	6:00:00		38.3	41.5	37.5
	6:01:00	6:01:00		38.4	40.9	37.5
	6:02:00	6:02:00		37.6	37.9	37.3
	6:03:00	6:03:00		37.9	39.8	37
	6:04:00	6:04:00		38.6	41	37.6
	6:05:00	6:05:00		39.1	41.7	37.4
	6:06:00	6:06:00		39.1	43.1	37.4
	6:07:00	6:07:00		38.4	40.1	37.3
	6:08:00	6:08:00		38.6	41.1	37.5
	6:09:00	6:09:00		39.7	41.2	38.4
	6:10:00	6:10:00		38.4	39.4	37.7
	6:11:00	6:11:00		38.4	39.5	37.7
	6:12:00	6:12:00		38.4	39.1	37.7
	6:13:00	6:13:00		38.1	39.7	37.4
	6:14:00	6:14:00		38.8	42.9	37.1
	6:15:00	6:15:00		40.8	46.5	37.6
	6:16:00	6:16:00		39.4	45.2	37.6
	6:17:00	6:17:00		38	38.8	37.4
	6:18:00	6:18:00		38.3	41	37.3
	6:19:00	6:19:00		37.9	40.2	37.1
	6:20:00	6:20:00		37.5	38.4	37
	6:21:00	6:21:00		37.9	40.9	36.8
	6:22:00	6:22:00		37.8	39.3	37
	6:23:00	6:23:00		38.2	40.9	37.2
	6:24:00	6:24:00		38.5	41.7	37.4
	6:25:00	6:25:00		38.7	40.8	37.1
	6:26:00	6:26:00		38.3	39.4	37.1
	6:27:00	6:27:00		38.8	41.3	37.7
	6:28:00	6:28:00		35.4	38.5	32.8
	6:29:00	6:29:00		34.1	35.7	33.1
	6:30:00	6:30:00		40.2	45.9	34.1
	6:31:00	6:31:00		40.1	47.6	34.5
	6:32:00	6:32:00		36.2	38.5	34.4
	6:33:00	6:33:00		35.9	39.4	32.3
	6:34:00	6:34:00		37.9	40.9	34.4
	6:35:00	6:35:00		39.1	41.5	35.7
	6:36:00	6:36:00		38.2	43.2	34.9
	6:37:00	6:37:00		35.7	38.4	33.9
	6:38:00	6:38:00		35.7	40.6	31.9
	6:39:00	6:39:00		40	52.6	33.2
	6:40:00	6:40:00		34.5	37.9	32.7
	6:41:00	6:41:00		34.6	37.8	32.1
	6:42:00	6:42:00		34.7	36.5	32.7
	6:43:00	6:43:00		34	35.8	32.7
	6:44:00	6:44:00		33.6	35.3	32.7
	6:45:00	6:45:00		34.3	35.9	33.2
	6:46:00	6:46:00		34.4	37.3	32.3
	6:47:00	6:47:00		34	36	32.7
	6:48:00	6:48:00		33.2	35.1	31.9
	6:49:00	6:49:00		32.4	33.6	31.7
	6:50:00	6:50:00		32.6	34	31.6
	6:51:00	6:51:00		32.1	32.9	31.3
	6:52:00	6:52:00		32.5	33.8	31.5
	6:53:00	6:53:00		32.5	33.7	31.5
	6:54:00	6:54:00		32.5	33.9	31.3
	6:55:00	6:55:00		31.8	32.5	31.1
	6:56:00	6:56:00		36.6	47.7	31.4
	6:57:00	6:57:00		32.7	36.8	31.2
	6:58:00	6:58:00		32.1	33	31.4
	6:59:00	6:59:00		32.5	33.9	31.8

	Baseline SPL
6:36:53 PM	6606.93448
6:37:53 PM	6606.93448
6:38:53 PM	7413.102413
6:39:53 PM	7413.102413
6:40:53 PM	8709.6359
6:41:53 PM	7244.359601
6:42:53 PM	8128.305162
6:43:53 PM	6760.829754
6:44:53 PM	7943.282347
6:45:53 PM	7762.471166
6:46:53 PM	8912.509381
6:47:53 PM	6456.54229
6:48:53 PM	6760.829754
6:49:53 PM	6606.93448
6:50:53 PM	6760.829754
6:51:53 PM	6165.950019
6:52:53 PM	6456.54229
6:53:53 PM	6606.93448
6:54:53 PM	7079.457844
6:55:53 PM	7244.359601
6:56:53 PM	26302.67992
6:57:53 PM	12882.49552
6:58:53 PM	6456.54229
6:59:53 PM	6309.573445
7:00:53 PM	6760.829754
7:01:53 PM	6918.309709
7:02:53 PM	5754.399373
7:03:53 PM	6165.950019
7:04:53 PM	7244.359601
7:05:53 PM	8128.305162
7:06:53 PM	8128.305162
7:07:53 PM	6918.309709
7:08:53 PM	7244.359601
7:09:53 PM	9332.543008
7:10:53 PM	6918.309709
7:11:53 PM	6918.309709
7:12:53 PM	6918.309709
7:13:53 PM	6456.54229
7:14:53 PM	7585.77575
7:15:53 PM	12022.64435
7:16:53 PM	8709.6359
7:17:53 PM	6309.573445
7:18:53 PM	6760.829754
7:19:53 PM	6165.950019
7:20:53 PM	5623.413252
7:21:53 PM	6165.950019
7:22:53 PM	6025.595861
7:23:53 PM	6606.93448
7:24:53 PM	7079.457844
7:25:53 PM	7413.102413
7:26:53 PM	6760.829754
7:27:53 PM	7585.77575
7:28:53 PM	3467.368505
7:29:53 PM	2570.395783
7:30:53 PM	10471.28548
7:31:53 PM	10232.92992
7:32:53 PM	4168.693835
7:33:53 PM	3890.45145
7:34:53 PM	6165.950019
7:35:53 PM	8128.305162
7:36:53 PM	6606.93448
7:37:53 PM	3715.352291
7:38:53 PM	3715.352291
7:39:53 PM	10000
7:40:53 PM	2818.382931
7:41:53 PM	2884.031503
7:42:53 PM	2951.209227
7:43:53 PM	2511.886432
7:44:53 PM	2290.867653
7:45:53 PM	2691.534804
7:46:53 PM	2754.228703
7:47:53 PM	2511.886432
7:48:53 PM	2089.296131
7:49:53 PM	1737.800829
7:50:53 PM	1819.700859
7:51:53 PM	1621.810097
7:52:53 PM	1778.27941
7:53:53 PM	1778.27941
7:54:53 PM	1778.27941
7:55:53 PM	1513.561248
7:56:53 PM	4570.881896
7:57:53 PM	1862.087137
7:58:53 PM	1621.810097
7:59:53 PM	1778.27941

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	7:00:00	7:00:00		34.3	38.2	32.3
	7:01:00	7:01:00		34.7	38.2	32.9
	7:02:00	7:02:00		34.8	40.9	31.9
	7:03:00	7:03:00		33.2	34.7	32
	7:04:00	7:04:00		32.7	34.2	31.9
	7:05:00	7:05:00		32.9	34.5	31.7
	7:06:00	7:06:00		33.4	35.3	32.6
	7:07:00	7:07:00		34.8	39.3	32.3
	7:08:00	7:08:00		33.9	35.9	32.5
	7:09:00	7:09:00		37.6	45.1	32.7
	7:10:00	7:10:00		36.6	40.8	32.4
	7:11:00	7:11:00		32.7	33.7	31.4
	7:12:00	7:12:00		32.9	34.3	32
	7:13:00	7:13:00		32.9	34.2	32.2
	7:14:00	7:14:00		33.9	36.9	32.5
	7:15:00	7:15:00		40	43.9	35.2
	7:16:00	7:16:00		36.9	43.4	32.3
	7:17:00	7:17:00		33.2	34.3	32.2
	7:18:00	7:18:00		35.4	36.9	33.3
	7:19:00	7:19:00		39.2	44.7	35.2
	7:20:00	7:20:00		40.9	47.7	34.4
	7:21:00	7:21:00		34.7	36.5	33.2
	7:22:00	7:22:00		33	34.8	32.2
	7:23:00	7:23:00		45.3	51.4	33.3
	7:24:00	7:24:00		33.6	37.7	32.5
	7:25:00	7:25:00		34.6	39.5	32.3
	7:26:00	7:26:00		33.1	33.8	32.6
	7:27:00	7:27:00		32.7	34	31.9
	7:28:00	7:28:00		33.4	35.1	31.9
	7:29:00	7:29:00		33.6	35.4	32.2
	7:30:00	7:30:00		33.1	35.2	32.4
	7:31:00	7:31:00		34.3	40.9	32.1
	7:32:00	7:32:00		33.4	34.7	32.3
	7:33:00	7:33:00		33.5	35.7	32.3
	7:34:00	7:34:00		33.6	39.3	32.3
	7:35:00	7:35:00		33.8	35.1	32.5
	7:36:00	7:36:00		34.6	36.5	33.5
	7:37:00	7:37:00		34.2	35.3	33.2
	7:38:00	7:38:00		37.8	39.6	34.1
	7:39:00	7:39:00		35.8	39.3	34.1
	7:40:00	7:40:00		36.1	40.9	33.3
	7:41:00	7:41:00		34.5	36.1	32.9
	7:42:00	7:42:00		34.1	35.6	32.9
	7:43:00	7:43:00		33.7	35.1	32.7
	7:44:00	7:44:00		33.4	34.4	32.5
	7:45:00	7:45:00		33.4	34.8	32.2
	7:46:00	7:46:00		34.6	38	33
	7:47:00	7:47:00		35.7	38	34.4
	7:48:00	7:48:00		36.5	41.6	34.8
	7:49:00	7:49:00		36.8	41.7	34.6
	7:50:00	7:50:00		36.5	38.1	35.5
	7:51:00	7:51:00		37	38.7	35.2
	7:52:00	7:52:00		36.5	40	34.5
	7:53:00	7:53:00		36.7	38.2	34.3
	7:54:00	7:54:00		37.7	40.2	35.9
	7:55:00	7:55:00		36.9	39.3	34.8
	7:56:00	7:56:00		37.6	45.9	33.4
	7:57:00	7:57:00		35	39.5	32.5
	7:58:00	7:58:00		33.8	35.5	32.3
	7:59:00	7:59:00		34.6	35.8	33.4
	8:00:00	8:00:00		35.2	37.9	33.8
	8:01:00	8:01:00		35.3	37	33.6
	8:02:00	8:02:00		35.2	37.8	34
	8:03:00	8:03:00		35.2	36.5	34.3
	8:04:00	8:04:00		35.9	39.6	33.4
	8:05:00	8:05:00		34.6	36.6	33.3
	8:06:00	8:06:00		33.1	34.5	32
	8:07:00	8:07:00		33.4	35.5	32.1
	8:08:00	8:08:00		34	36.9	32.4
	8:09:00	8:09:00		33.1	36.8	32
	8:10:00	8:10:00		33.7	35.8	32.5
	8:11:00	8:11:00		35.9	37.3	34.4
	8:12:00	8:12:00		35.1	35.9	34.3
	8:13:00	8:13:00		34.8	36.8	33.5
	8:14:00	8:14:00		34.9	36.8	33.4
	8:15:00	8:15:00		35.3	37.8	33.2
	8:16:00	8:16:00		34.8	37.1	32.6
	8:17:00	8:17:00		34.9	38.4	32.6
	8:18:00	8:18:00		32.8	35.5	31.7
	8:19:00	8:19:00		33.5	35.9	31.6
	8:20:00	8:20:00		34.8	38.5	31.6
	8:21:00	8:21:00		34.6	37.1	32.8
	8:22:00	8:22:00		34	37.4	31.9
	8:23:00	8:23:00		33.1	36.1	30.9

	Baseline SPL
8:00:53 PM	2691.534804
8:01:53 PM	2951.209227
8:02:53 PM	3019.95172
8:03:53 PM	2089.296131
8:04:53 PM	1862.087137
8:05:53 PM	1949.8446
8:06:53 PM	2187.761624
8:07:53 PM	3019.95172
8:08:53 PM	2454.708916
8:09:53 PM	5754.399373
8:10:53 PM	4570.881896
8:11:53 PM	1862.087137
8:12:53 PM	1949.8446
8:13:53 PM	1949.8446
8:14:53 PM	2454.708916
8:15:53 PM	10000
8:16:53 PM	4897.788194
8:17:53 PM	2089.296131
8:18:53 PM	3467.368505
8:19:53 PM	8317.637711
8:20:53 PM	12302.68771
8:21:53 PM	2951.209227
8:22:53 PM	1995.262315
8:23:53 PM	33884.41561
8:24:53 PM	2290.867653
8:25:53 PM	2884.031503
8:26:53 PM	2041.737945
8:27:53 PM	1862.087137
8:28:53 PM	2187.761624
8:29:53 PM	2290.867653
8:30:53 PM	2041.737945
8:31:53 PM	2691.534804
8:32:53 PM	2187.761624
8:33:53 PM	2238.721139
8:34:53 PM	2290.867653
8:35:53 PM	2398.832919
8:36:53 PM	2884.031503
8:37:53 PM	2630.267992
8:38:53 PM	6025.595861
8:39:53 PM	3801.893963
8:40:53 PM	4073.802778
8:41:53 PM	2818.382931
8:42:53 PM	2570.395783
8:43:53 PM	2344.228815
8:44:53 PM	2187.761624
8:45:53 PM	2187.761624
8:46:53 PM	2884.031503
8:47:53 PM	3715.352291
8:48:53 PM	4466.835922
8:49:53 PM	4786.300923
8:50:53 PM	4466.835922
8:51:53 PM	5011.872336
8:52:53 PM	4466.835922
8:53:53 PM	4677.351413
8:54:53 PM	5888.436554
8:55:53 PM	4897.788194
8:56:53 PM	5754.399373
8:57:53 PM	3162.27766
8:58:53 PM	2398.832919
8:59:53 PM	2884.031503
9:00:53 PM	3311.311215
9:01:53 PM	3388.441561
9:02:53 PM	3311.311215
9:03:53 PM	3311.311215
9:04:53 PM	3890.45145
9:05:53 PM	2884.031503
9:06:53 PM	2041.737945
9:07:53 PM	2187.761624
9:08:53 PM	2511.886432
9:09:53 PM	2041.737945
9:10:53 PM	2344.228815
9:11:53 PM	3890.45145
9:12:53 PM	3235.936569
9:13:53 PM	3019.95172
9:14:53 PM	3090.295433
9:15:53 PM	3388.441561
9:16:53 PM	3019.95172
9:17:53 PM	3090.295433
9:18:53 PM	1905.460718
9:19:53 PM	2238.721139
9:20:53 PM	3019.95172
9:21:53 PM	2884.031503
9:22:53 PM	2511.886432
9:23:53 PM	2041.737945

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	8:24:00	8:24:00		34.7	37.2	32.8
	8:25:00	8:25:00		37.1	40.3	32.8
	8:26:00	8:26:00		35	38.8	32.3
	8:27:00	8:27:00		36.5	40	33.2
	8:28:00	8:28:00		34.1	36.2	32.1
	8:29:00	8:29:00		34.9	38.8	31.2
	8:30:00	8:30:00		35.2	39.1	31.6
	8:31:00	8:31:00		32	33.2	31.1
	8:32:00	8:32:00		31.7	33	30.9
	8:33:00	8:33:00		31.7	32.8	30.5
	8:34:00	8:34:00		32.9	33.9	31.7
	8:35:00	8:35:00		32.6	36.7	31
	8:36:00	8:36:00		31.5	32.8	30.7
	8:37:00	8:37:00		31.9	32.7	31
	8:38:00	8:38:00		32.5	34.3	31.3
	8:39:00	8:39:00		32.1	33.5	31.5
	8:40:00	8:40:00		32.5	35.1	31.4
	8:41:00	8:41:00		32.5	34.3	31.7
	8:42:00	8:42:00		41.5	46.8	33.2
	8:43:00	8:43:00		40.5	46.5	34.6
	8:44:00	8:44:00		35	36.3	33.6
	8:45:00	8:45:00		33.6	35.9	31.7
	8:46:00	8:46:00		32.2	33.9	31.3
	8:47:00	8:47:00		34.6	38.3	32.2
	8:48:00	8:48:00		36.1	40.5	31.8
	8:49:00	8:49:00		35.2	40.9	32.8
	8:50:00	8:50:00		35.8	41.9	31.3
	8:51:00	8:51:00		34.1	37.7	31.6
	8:52:00	8:52:00		35	38.6	32
	8:53:00	8:53:00		33.8	39.3	31.4
	8:54:00	8:54:00		32.8	36.8	31.5
	8:55:00	8:55:00		33.5	36.5	31.3
	8:56:00	8:56:00		33	35.5	31.3
	8:57:00	8:57:00		34.9	38.5	32.4
	8:58:00	8:58:00		36.9	39.9	33.4
	8:59:00	8:59:00		37.4	41.3	34.4
	9:00:00	9:00:00		37.3	40.8	33.7
	9:01:00	9:01:00		37.6	41.5	33.8
	9:02:00	9:02:00		35.4	37.9	33
	9:03:00	9:03:00		36.3	38.8	34
	9:04:00	9:04:00		37.7	40.6	35.3
	9:05:00	9:05:00		35.1	38.1	32.5
	9:06:00	9:06:00		35	38.1	33.4
	9:07:00	9:07:00		34.8	36.4	33.6
	9:08:00	9:08:00		35.5	42	33
	9:09:00	9:09:00		33.8	35.6	32.4
	9:10:00	9:10:00		36.2	39	33.6
	9:11:00	9:11:00		35.2	38.6	33.1
	9:12:00	9:12:00		34.9	37.7	32.8
	9:13:00	9:13:00		34.9	39.1	32.9
	9:14:00	9:14:00		35.4	37.6	33.3
	9:15:00	9:15:00		33.8	38.2	31.4
	9:16:00	9:16:00		33.9	36.7	31.9
	9:17:00	9:17:00		33.8	35.9	32
	9:18:00	9:18:00		33	35.1	30.6
	9:19:00	9:19:00		34	36.1	32.4
	9:20:00	9:20:00		34.8	37.2	32.8
	9:21:00	9:21:00		35.9	40.5	33.4
	9:22:00	9:22:00		37.3	40.9	32.7
	9:23:00	9:23:00		34.1	37.1	32.5
	9:24:00	9:24:00		33.9	37.2	32.1
	9:25:00	9:25:00		37.7	41	33.3
	9:26:00	9:26:00		36.5	40.2	33.3
	9:27:00	9:27:00		34	38	31.8
	9:28:00	9:28:00		36.2	39	33.9
	9:29:00	9:29:00		35.9	41.3	32.7
	9:30:00	9:30:00		37.5	41.6	33.5
	9:31:00	9:31:00		35.6	39.4	32.8
	9:32:00	9:32:00		36.5	39.4	32.9
	9:33:00	9:33:00		36.4	40	33.8
	9:34:00	9:34:00		40.1	46.7	33.7
	9:35:00	9:35:00		37	39.2	34.1
	9:36:00	9:36:00		34.8	38.6	31.4
	9:37:00	9:37:00		35.4	39.1	33
	9:38:00	9:38:00		33.8	37	31
	9:39:00	9:39:00		35.8	39.9	31.6
	9:40:00	9:40:00		34.2	37.3	32
	9:41:00	9:41:00		34.5	36.4	32.3
	9:42:00	9:42:00		33.8	36.1	31.6
	9:43:00	9:43:00		33.4	36.5	31.3
	9:44:00	9:44:00		32.4	35.1	30.7
	9:45:00	9:45:00		35.5	39.1	33.5
	9:46:00	9:46:00		37.7	41.8	32.7
	9:47:00	9:47:00		34.7	38.5	31.3

	Baseline SPL
9:24:53 PM	2951.209227
9:25:53 PM	5128.61384
9:26:53 PM	3162.27766
9:27:53 PM	4466.835922
9:28:53 PM	2570.395783
9:29:53 PM	3090.295433
9:30:53 PM	3311.311215
9:31:53 PM	1584.893192
9:32:53 PM	1479.108388
9:33:53 PM	1479.108388
9:34:53 PM	1949.8446
9:35:53 PM	1819.700859
9:36:53 PM	1412.537545
9:37:53 PM	1548.816619
9:38:53 PM	1778.27941
9:39:53 PM	1621.810097
9:40:53 PM	1778.27941
9:41:53 PM	1778.27941
9:42:53 PM	14125.37545
9:43:53 PM	11220.18454
9:44:53 PM	3162.27766
9:45:53 PM	2290.867653
9:46:53 PM	1659.586907
9:47:53 PM	2884.031503
9:48:53 PM	4073.802778
9:49:53 PM	3311.311215
9:50:53 PM	3801.893963
9:51:53 PM	2570.395783
9:52:53 PM	3162.27766
9:53:53 PM	2398.832919
9:54:53 PM	1905.460718
9:55:53 PM	2238.721139
9:56:53 PM	1995.262315
9:57:53 PM	3090.295433
9:58:53 PM	4897.788194
9:59:53 PM	5495.408739
10:00:53 PM	5370.317964
10:01:53 PM	5754.399373
10:02:53 PM	3467.368505
10:03:53 PM	4265.795188
10:04:53 PM	5888.436554
10:05:53 PM	3235.936569
10:06:53 PM	3162.27766
10:07:53 PM	3019.95172
10:08:53 PM	3548.133892
10:09:53 PM	2398.832919
10:10:53 PM	4168.693835
10:11:53 PM	3311.311215
10:12:53 PM	3090.295433
10:13:53 PM	3090.295433
10:14:53 PM	3467.368505
10:15:53 PM	2398.832919
10:16:53 PM	2454.708916
10:17:53 PM	2398.832919
10:18:53 PM	1995.262315
10:19:53 PM	2511.886432
10:20:53 PM	3019.95172
10:21:53 PM	3890.45145
10:22:53 PM	5370.317964
10:23:53 PM	2570.395783
10:24:53 PM	2454.708916
10:25:53 PM	5888.436554
10:26:53 PM	4466.835922
10:27:53 PM	2511.886432
10:28:53 PM	4168.693835
10:29:53 PM	3890.45145
10:30:53 PM	5623.413252
10:31:53 PM	3630.780548
10:32:53 PM	4466.835922
10:33:53 PM	4365.158322
10:34:53 PM	10232.92992
10:35:53 PM	5011.872336
10:36:53 PM	3019.95172
10:37:53 PM	3467.368505
10:38:53 PM	2398.832919
10:39:53 PM	3801.893963
10:40:53 PM	2630.267992
10:41:53 PM	2818.382931
10:42:53 PM	2398.832919
10:43:53 PM	2187.761624
10:44:53 PM	1737.800829
10:45:53 PM	3548.133892
10:46:53 PM	5888.436554
10:47:53 PM	2951.209227

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	9:48:00	9:48:00		35.5	39.5	32.1
	9:49:00	9:49:00		34.4	37.9	31.7
	9:50:00	9:50:00		34.3	37.9	31.4
	9:51:00	9:51:00		34.8	36.8	31.8
	9:52:00	9:52:00		34.1	36.8	32.2
	9:53:00	9:53:00		35.4	38.4	32.5
	9:54:00	9:54:00		34.8	39.1	30.9
	9:55:00	9:55:00		33.6	37.6	30.4
	9:56:00	9:56:00		34	38.1	31.2
	9:57:00	9:57:00		32.3	34.5	30.5
	9:58:00	9:58:00		31.7	34	30.1
	9:59:00	9:59:00		31.2	33.6	29.8
	10:00:00	10:00:00		33.7	38.6	30.3
	10:01:00	10:01:00		35.3	40.4	31.6
	10:02:00	10:02:00		34.2	37.6	32.1
	10:03:00	10:03:00		34.4	37.5	32.2
	10:04:00	10:04:00		33.6	35.8	31.5
	10:05:00	10:05:00		34.7	37.6	31.9
	10:06:00	10:06:00		33.8	38.9	30.7
	10:07:00	10:07:00		31.1	32.7	30
	10:08:00	10:08:00		33.2	36.8	30.6
	10:09:00	10:09:00		34.4	38.8	30.4
	10:10:00	10:10:00		36.7	39	31.2
	10:11:00	10:11:00		32.8	36.6	29.8
	10:12:00	10:12:00		34	39.2	29.2
	10:13:00	10:13:00		31.8	36	29.3
	10:14:00	10:14:00		33.5	38.7	29.3
	10:15:00	10:15:00		34.1	36.4	32.4
	10:16:00	10:16:00		34.2	37.9	32.4
	10:17:00	10:17:00		37.1	39.7	34.9
	10:18:00	10:18:00		37.2	39.7	34.2
	10:19:00	10:19:00		36.4	43.5	30.7
	10:20:00	10:20:00		31.1	33.2	29.4
	10:21:00	10:21:00		32.5	37.5	29.8
	10:22:00	10:22:00		36.9	39.8	30.1
	10:23:00	10:23:00		32.4	37.3	29.5
	10:24:00	10:24:00		30.7	33.7	29
	10:25:00	10:25:00		31.9	35.9	29.6
	10:26:00	10:26:00		29.7	32.4	28
	10:27:00	10:27:00		28.6	29.4	28
	10:28:00	10:28:00		28.8	30.6	28.1
	10:29:00	10:29:00		28.3	29.6	27.8
	10:30:00	10:30:00		29	31.6	27.9
	10:31:00	10:31:00		31.3	37.8	28.9
	10:32:00	10:32:00		30.2	34.4	28.3
	10:33:00	10:33:00		31	34.1	29.2
	10:34:00	10:34:00		32.9	36.7	29.8
	10:35:00	10:35:00		30.1	34.3	29.1
	10:36:00	10:36:00		31.7	34.4	30
	10:37:00	10:37:00		30	33.2	28.7
	10:38:00	10:38:00		29	29.5	28.5
	10:39:00	10:39:00		29.2	30.1	28.8
	10:40:00	10:40:00		29.6	30.7	28.9
	10:41:00	10:41:00		29.6	32.1	28.6
	10:42:00	10:42:00		29.9	35.1	28.4
	10:43:00	10:43:00		31.8	37.8	28.8
	10:44:00	10:44:00		35.9	43.3	29.1
	10:45:00	10:45:00		38.5	45.2	29.1
	10:46:00	10:46:00		37.4	44.2	29.2
	10:47:00	10:47:00		29.7	34.5	28.7
	10:48:00	10:48:00		29.4	30.3	28.9
	10:49:00	10:49:00		29.4	30	28.8
	10:50:00	10:50:00		29.7	30.9	29
	10:51:00	10:51:00		30.9	32.5	29.4
	10:52:00	10:52:00		30.3	32.9	29
	10:53:00	10:53:00		30.4	33.3	28.6
	10:54:00	10:54:00		29.1	29.8	28.4
	10:55:00	10:55:00		30.1	31.9	28.8
	10:56:00	10:56:00		29.6	32.4	28.7
	10:57:00	10:57:00		29	29.7	28.3
	10:58:00	10:58:00		29.2	33	28.3
	10:59:00	10:59:00		29.3	32	28
	11:00:00	11:00:00		29.2	30.5	28.3
	11:01:00	11:01:00		31.3	33.7	29.5
	11:02:00	11:02:00		29.8	32.8	28.3
	11:03:00	11:03:00		29.7	32.7	28.4
	11:04:00	11:04:00		30	33.2	28.5
	11:05:00	11:05:00		29.2	30.9	28.3
	11:06:00	11:06:00		29.8	31.7	28.6
	11:07:00	11:07:00		30.3	32.4	29
	11:08:00	11:08:00		29.5	31	28.7
	11:09:00	11:09:00		30.9	34.3	28.9
	11:10:00	11:10:00		30.2	33.5	28.7
	11:11:00	11:11:00		30.9	34.9	28.9

	Baseline SPL
10:48:53 PM	3548.133892
10:49:53 PM	2754.228703
10:50:53 PM	2691.534804
10:51:53 PM	3019.95172
10:52:53 PM	2570.395783
10:53:53 PM	3467.368505
10:54:53 PM	3019.95172
10:55:53 PM	2290.867653
10:56:53 PM	2511.886432
10:57:53 PM	1698.243652
10:58:53 PM	1479.108388
10:59:53 PM	1318.256739
11:00:53 PM	2344.228815
11:01:53 PM	3388.441561
11:02:53 PM	2630.267992
11:03:53 PM	2754.228703
11:04:53 PM	2290.867653
11:05:53 PM	2951.209227
11:06:53 PM	2398.832919
11:07:53 PM	1288.249552
11:08:53 PM	2089.296131
11:09:53 PM	2754.228703
11:10:53 PM	4677.351413
11:11:53 PM	1905.460718
11:12:53 PM	2511.886432
11:13:53 PM	1513.561248
11:14:53 PM	2238.721139
11:15:53 PM	2570.395783
11:16:53 PM	2630.267992
11:17:53 PM	5128.61384
11:18:53 PM	5248.074602
11:19:53 PM	4365.158322
11:20:53 PM	1288.249552
11:21:53 PM	1778.27941
11:22:53 PM	4897.788194
11:23:53 PM	1737.800829
11:24:53 PM	1174.897555
11:25:53 PM	1548.816619
11:26:53 PM	933.2543008
11:27:53 PM	724.4359601
11:28:53 PM	758.577575
11:29:53 PM	676.0829754
11:30:53 PM	794.3282347
11:31:53 PM	1348.962883
11:32:53 PM	1047.128548
11:33:53 PM	1258.925412
11:34:53 PM	1949.8446
11:35:53 PM	1023.292992
11:36:53 PM	1479.108388
11:37:53 PM	1000
11:38:53 PM	794.3282347
11:39:53 PM	831.7637711
11:40:53 PM	912.0108394
11:41:53 PM	912.0108394
11:42:53 PM	977.237221
11:43:53 PM	1513.561248
11:44:53 PM	3890.45145
11:45:53 PM	7079.457844
11:46:53 PM	5495.408739
11:47:53 PM	933.2543008
11:48:53 PM	870.96359
11:49:53 PM	870.96359
11:50:53 PM	933.2543008
11:51:53 PM	1230.268771
11:52:53 PM	1071.519305
11:53:53 PM	1096.478196
11:54:53 PM	812.8305162
11:55:53 PM	1023.292992
11:56:53 PM	912.0108394
11:57:53 PM	794.3282347
11:58:53 PM	831.7637711
11:59:53 PM	851.1380382
12:00:53 AM	831.7637711
12:01:53 AM	1348.962883
12:02:53 AM	954.992586
12:03:53 AM	933.2543008
12:04:53 AM	1000
12:05:53 AM	831.7637711
12:06:53 AM	954.992586
12:07:53 AM	1071.519305
12:08:53 AM	891.2509381
12:09:53 AM	1230.268771
12:10:53 AM	1047.128548
12:11:53 AM	1230.268771

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1		Baseline SPL
	11:12:00	11:12:00		29.8	32.6	29	12:12:53 AM	954.992586
	11:13:00	11:13:00		31.1	33.9	29.5	12:13:53 AM	1288.249552
	11:14:00	11:14:00		30.4	34.4	28.7	12:14:53 AM	1096.478196
	11:15:00	11:15:00		30	32.6	28.7	12:15:53 AM	1000
	11:16:00	11:16:00		29.1	30.7	28.2	12:16:53 AM	812.8305162
	11:17:00	11:17:00		29.3	31.1	28.3	12:17:53 AM	851.1380382
	11:18:00	11:18:00		31.3	33	29.7	12:18:53 AM	1348.962883
	11:19:00	11:19:00		30.7	36.8	29	12:19:53 AM	1174.897555
	11:20:00	11:20:00		29.9	31	28.8	12:20:53 AM	977.237221
	11:21:00	11:21:00		30.1	31.5	29.3	12:21:53 AM	1023.292992
	11:22:00	11:22:00		31.4	33.8	29.8	12:22:53 AM	1380.384265
	11:23:00	11:23:00		32.4	34.8	30.4	12:23:53 AM	1737.800829
	11:24:00	11:24:00		33	36.9	30.2	12:24:53 AM	1995.262315
	11:25:00	11:25:00		31.4	33.4	29.9	12:25:53 AM	1380.384265
	11:26:00	11:26:00		39.3	51	30.5	12:26:53 AM	8511.380382
	11:27:00	11:27:00		31.5	33.7	29.2	12:27:53 AM	1412.537545
	11:28:00	11:28:00		30.3	32	28.9	12:28:53 AM	1071.519305
	11:29:00	11:29:00		30.9	34.5	29.1	12:29:53 AM	1230.268771
	11:30:00	11:30:00		30.9	34.2	28.9	12:30:53 AM	1230.268771
	11:31:00	11:31:00		37.9	47.5	29.8	12:31:53 AM	6165.950019
	11:32:00	11:32:00		31.2	36.8	28.6	12:32:53 AM	1318.256739
	11:33:00	11:33:00		30.3	36.2	28.2	12:33:53 AM	1071.519305
	11:34:00	11:34:00		30.7	34	28.2	12:34:53 AM	1174.897555
	11:35:00	11:35:00		30.3	32.8	28.5	12:35:53 AM	1071.519305
	11:36:00	11:36:00		28.5	29.4	28.1	12:36:53 AM	707.9457844
	11:37:00	11:37:00		28.5	29	28.1	12:37:53 AM	707.9457844
	11:38:00	11:38:00		28.3	29.2	27.8	12:38:53 AM	676.0829754
	11:39:00	11:39:00		29.8	33.3	28.1	12:39:53 AM	954.992586
	11:40:00	11:40:00		29.8	33.6	28.6	12:40:53 AM	954.992586
	11:41:00	11:41:00		30.6	34.6	28.4	12:41:53 AM	1148.153621
	11:42:00	11:42:00		29	31.9	28.2	12:42:53 AM	794.3282347
	11:43:00	11:43:00		28.4	29.2	28	12:43:53 AM	691.8309709
	11:44:00	11:44:00		29.5	36.3	27.9	12:44:53 AM	891.2509381
	11:45:00	11:45:00		28.4	31.2	27.5	12:45:53 AM	691.8309709
	11:46:00	11:46:00		28.1	31.5	27.5	12:46:53 AM	645.654229
	11:47:00	11:47:00		28	30	27.4	12:47:53 AM	630.9573445
	11:48:00	11:48:00		28.4	31.7	27.4	12:48:53 AM	691.8309709
	11:49:00	11:49:00		28.4	32.3	27.3	12:49:53 AM	691.8309709
	11:50:00	11:50:00		27.5	28.6	27.2	12:50:53 AM	562.3413252
	11:51:00	11:51:00		27.5	27.9	27.3	12:51:53 AM	562.3413252
	11:52:00	11:52:00		27.6	28	27.1	12:52:53 AM	575.4399373
	11:53:00	11:53:00		27.8	28.2	27.5	12:53:53 AM	602.5595861
	11:54:00	11:54:00		28.3	29.3	27.5	12:54:53 AM	676.0829754
	11:55:00	11:55:00		29.4	32.1	27.9	12:55:53 AM	870.96359
	11:56:00	11:56:00		29.9	32	28.8	12:56:53 AM	977.237221
	11:57:00	11:57:00		33.3	40.6	29.6	12:57:53 AM	2137.96209
	11:58:00	11:58:00		35.7	39.8	31.1	12:58:53 AM	3715.352291
	11:59:00	11:59:00		33.2	37.3	30.8	12:59:53 AM	2089.296131
	12:00:00	12:00:00		33.5	37	30.7	1:00:53 AM	2238.721139
	12:01:00	12:01:00		31.8	34	30.2	1:01:53 AM	1513.561248
	12:02:00	12:02:00		30.4	32.6	28.9	1:02:53 AM	1096.478196
	12:03:00	12:03:00		29	30	28.2	1:03:53 AM	794.3282347
	12:04:00	12:04:00		29.9	33.3	28.2	1:04:53 AM	977.237221
	12:05:00	12:05:00		29.4	30.7	28.6	1:05:53 AM	870.96359
	12:06:00	12:06:00		29.3	30.5	28.6	1:06:53 AM	851.1380382
	12:07:00	12:07:00		30.1	32.6	29.1	1:07:53 AM	1023.292992
	12:08:00	12:08:00		29.8	31.1	28.9	1:08:53 AM	954.992586
	12:09:00	12:09:00		29	30.1	28.4	1:09:53 AM	794.3282347
	12:10:00	12:10:00		28.8	29.4	28.2	1:10:53 AM	758.577575
	12:11:00	12:11:00		28.7	29.3	28.1	1:11:53 AM	741.3102413
	12:12:00	12:12:00		28.5	29	28	1:12:53 AM	707.9457844
	12:13:00	12:13:00		28.6	29.1	28.1	1:13:53 AM	724.4359601
	12:14:00	12:14:00		28.9	29.4	28.3	1:14:53 AM	776.2471166
	12:15:00	12:15:00		28.7	29.6	28	1:15:53 AM	741.3102413
	12:16:00	12:16:00		28.6	29	28.1	1:16:53 AM	724.4359601
	12:17:00	12:17:00		28.1	28.4	27.8	1:17:53 AM	645.654229
	12:18:00	12:18:00		29	31.3	28.2	1:18:53 AM	794.3282347
	12:19:00	12:19:00		28.7	30.1	28.1	1:19:53 AM	741.3102413
	12:20:00	12:20:00		28.3	28.9	27.8	1:20:53 AM	676.0829754
	12:21:00	12:21:00		28	28.4	27.7	1:21:53 AM	630.9573445
	12:22:00	12:22:00		28.1	28.6	27.7	1:22:53 AM	645.654229
	12:23:00	12:23:00		28.4	31.3	27.8	1:23:53 AM	691.8309709
	12:24:00	12:24:00		28.3	29.5	27.7	1:24:53 AM	676.0829754
	12:25:00	12:25:00		29.1	30.5	28.3	1:25:53 AM	812.8305162
	12:26:00	12:26:00		30.4	31.8	29.3	1:26:53 AM	1096.478196
	12:27:00	12:27:00		29	29.9	28.2	1:27:53 AM	794.3282347
	12:28:00	12:28:00		28.6	29.4	28	1:28:53 AM	724.4359601
	12:29:00	12:29:00		28	28.6	27.7	1:29:53 AM	630.9573445
	12:30:00	12:30:00		28.4	29.2	27.9	1:30:53 AM	691.8309709
	12:31:00	12:31:00		28.6	29.5	28	1:31:53 AM	724.4359601
	12:32:00	12:32:00		29.1	29.9	28.4	1:32:53 AM	812.8305162
	12:33:00	12:33:00		30.6	34.7	28	1:33:53 AM	1148.153621
	12:34:00	12:34:00		28.4	29.5	27.9	1:34:53 AM	691.8309709
	12:35:00	12:35:00		29.7	33.2	27.8	1:35:53 AM	933.2543008

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	12:36:00	12:36:00		29.3	32.4	28
	12:37:00	12:37:00		28.6	32.9	27.9
	12:38:00	12:38:00		30.6	38.1	28.1
	12:39:00	12:39:00		29.7	31.8	28.6
	12:40:00	12:40:00		29.1	30.7	27.9
	12:41:00	12:41:00		28.3	28.9	27.8
	12:42:00	12:42:00		28.3	30	27.6
	12:43:00	12:43:00		27.6	28	27.3
	12:44:00	12:44:00		27.6	28	27.4
	12:45:00	12:45:00		27.6	28	27.3
	12:46:00	12:46:00		27.3	28	27
	12:47:00	12:47:00		27.3	27.8	27
	12:48:00	12:48:00		27.4	27.9	27.1
	12:49:00	12:49:00		29.7	37.3	27.2
	12:50:00	12:50:00		28.1	34.1	27
	12:51:00	12:51:00		27.6	28.8	27.1
	12:52:00	12:52:00		28.4	31.5	27.5
	12:53:00	12:53:00		28.1	29	27.7
	12:54:00	12:54:00		27.9	28.7	27.2
	12:55:00	12:55:00		27.6	28	27.2
	12:56:00	12:56:00		27.6	28.8	27.3
	12:57:00	12:57:00		28.1	29.1	27.5
	12:58:00	12:58:00		28	28.5	27.6
	12:59:00	12:59:00		28.3	28.8	27.7
	13:00:00	13:00:00		28.1	28.5	27.7
	13:01:00	13:01:00		28	29.5	27.5
	13:02:00	13:02:00		28	28.3	27.7
	13:03:00	13:03:00		28.3	29.7	27.7
	13:04:00	13:04:00		28.3	29.3	27.7
	13:05:00	13:05:00		28.3	28.9	27.8
	13:06:00	13:06:00		28.4	29.3	27.9
	13:07:00	13:07:00		28.2	29.2	27.7
	13:08:00	13:08:00		28	28.9	27.6
	13:09:00	13:09:00		27.9	28.4	27.4
	13:10:00	13:10:00		28.3	30.4	27.8
	13:11:00	13:11:00		27.8	29.3	27.5
	13:12:00	13:12:00		28	28.7	27.7
	13:13:00	13:13:00		28.3	29.7	27.7
	13:14:00	13:14:00		28	28.6	27.6
	13:15:00	13:15:00		27.8	28.2	27.5
	13:16:00	13:16:00		28.1	29	27.6
	13:17:00	13:17:00		28.3	29.6	27.7
	13:18:00	13:18:00		27.9	28.7	27.4
	13:19:00	13:19:00		28.3	32.2	27.5
	13:20:00	13:20:00		32.2	41	27.5
	13:21:00	13:21:00		27.9	28.4	27.4
	13:22:00	13:22:00		28.6	30.3	27.8
	13:23:00	13:23:00		29.8	30.7	29.1
	13:24:00	13:24:00		29.6	31.3	28.7
	13:25:00	13:25:00		28.6	29.7	28
	13:26:00	13:26:00		28.6	29.2	28.1
	13:27:00	13:27:00		28.8	29.6	28.1
	13:28:00	13:28:00		29	30.2	28.4
	13:29:00	13:29:00		29.8	31.9	29.2
	13:30:00	13:30:00		29.4	30	28.8
	13:31:00	13:31:00		28.7	29.8	28.2
	13:32:00	13:32:00		29.1	29.9	28.4
	13:33:00	13:33:00		29.9	31.8	28.9
	13:34:00	13:34:00		29.3	33.1	27.9
	13:35:00	13:35:00		28.1	29.1	27.6
	13:36:00	13:36:00		28.2	30.6	27.6
	13:37:00	13:37:00		28	28.6	27.6
	13:38:00	13:38:00		27.9	28.7	27.5
	13:39:00	13:39:00		27.7	28	27.3
	13:40:00	13:40:00		28.2	29.1	27.5
	13:41:00	13:41:00		30	37.3	28.7
	13:42:00	13:42:00		29.7	36.8	28.5
	13:43:00	13:43:00		29.9	31.2	28.9
	13:44:00	13:44:00		33.9	36.8	30.5
	13:45:00	13:45:00		30.5	34	29
	13:46:00	13:46:00		29.2	30.3	28.4
	13:47:00	13:47:00		28.9	33.7	28.1
	13:48:00	13:48:00		28.5	29.4	28.1
	13:49:00	13:49:00		28.2	29.4	27.9
	13:50:00	13:50:00		28.5	31.9	27.8
	13:51:00	13:51:00		28.6	30.8	27.6
	13:52:00	13:52:00		28.5	30.9	27.6
	13:53:00	13:53:00		28.7	30.4	27.9
	13:54:00	13:54:00		29.9	31.1	29
	13:55:00	13:55:00		30.5	35.6	29.2
	13:56:00	13:56:00		29.8	32.5	28.8
	13:57:00	13:57:00		30.9	42.5	28.7
	13:58:00	13:58:00		29.6	32.8	29
	13:59:00	13:59:00		29.8	30.6	29.2

	Baseline SPL
1:36:53 AM	851.1380382
1:37:53 AM	724.4359601
1:38:53 AM	1148.153621
1:39:53 AM	933.2543008
1:40:53 AM	812.8305162
1:41:53 AM	676.0829754
1:42:53 AM	676.0829754
1:43:53 AM	575.4399373
1:44:53 AM	575.4399373
1:45:53 AM	575.4399373
1:46:53 AM	537.0317964
1:47:53 AM	537.0317964
1:48:53 AM	549.5408739
1:49:53 AM	933.2543008
1:50:53 AM	645.654229
1:51:53 AM	575.4399373
1:52:53 AM	691.8309709
1:53:53 AM	645.654229
1:54:53 AM	616.5950019
1:55:53 AM	575.4399373
1:56:53 AM	575.4399373
1:57:53 AM	645.654229
1:58:53 AM	630.9573445
1:59:53 AM	676.0829754
2:00:53 AM	645.654229
2:01:53 AM	630.9573445
2:02:53 AM	630.9573445
2:03:53 AM	676.0829754
2:04:53 AM	676.0829754
2:05:53 AM	676.0829754
2:06:53 AM	691.8309709
2:07:53 AM	660.693448
2:08:53 AM	630.9573445
2:09:53 AM	616.5950019
2:10:53 AM	676.0829754
2:11:53 AM	602.5595861
2:12:53 AM	630.9573445
2:13:53 AM	676.0829754
2:14:53 AM	630.9573445
2:15:53 AM	602.5595861
2:16:53 AM	645.654229
2:17:53 AM	676.0829754
2:18:53 AM	616.5950019
2:19:53 AM	676.0829754
2:20:53 AM	1659.586907
2:21:53 AM	616.5950019
2:22:53 AM	724.4359601
2:23:53 AM	954.992586
2:24:53 AM	912.0108394
2:25:53 AM	724.4359601
2:26:53 AM	724.4359601
2:27:53 AM	758.577575
2:28:53 AM	794.3282347
2:29:53 AM	954.992586
2:30:53 AM	870.96359
2:31:53 AM	741.3102413
2:32:53 AM	812.8305162
2:33:53 AM	977.237221
2:34:53 AM	851.1380382
2:35:53 AM	645.654229
2:36:53 AM	660.693448
2:37:53 AM	630.9573445
2:38:53 AM	616.5950019
2:39:53 AM	588.8436554
2:40:53 AM	660.693448
2:41:53 AM	1000
2:42:53 AM	933.2543008
2:43:53 AM	977.237221
2:44:53 AM	2454.708916
2:45:53 AM	1122.018454
2:46:53 AM	831.7637711
2:47:53 AM	776.2471166
2:48:53 AM	707.9457844
2:49:53 AM	660.693448
2:50:53 AM	707.9457844
2:51:53 AM	724.4359601
2:52:53 AM	707.9457844
2:53:53 AM	741.3102413
2:54:53 AM	977.237221
2:55:53 AM	1122.018454
2:56:53 AM	954.992586
2:57:53 AM	1230.268771
2:58:53 AM	912.0108394
2:59:53 AM	954.992586

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	14:00:00	14:00:00		29.7	30.1	29.3
	14:01:00	14:01:00		29.6	30.4	29
	14:02:00	14:02:00		29.7	30.1	29.4
	14:03:00	14:03:00		30.3	31.4	29.5
	14:04:00	14:04:00		30.6	31.6	29.9
	14:05:00	14:05:00		31	33.3	29.9
	14:06:00	14:06:00		31.1	32.3	30.2
	14:07:00	14:07:00		31.7	34	30.5
	14:08:00	14:08:00		30.7	31.4	30.2
	14:09:00	14:09:00		30.6	32.2	29.7
	14:10:00	14:10:00		29.7	31.4	29
	14:11:00	14:11:00		29.5	30.7	28.9
	14:12:00	14:12:00		30.4	32.5	29.5
	14:13:00	14:13:00		29.8	31.8	29
	14:14:00	14:14:00		29.7	30.3	29
	14:15:00	14:15:00		30.5	32	29.7
	14:16:00	14:16:00		29.9	31.2	29.3
	14:17:00	14:17:00		29.3	30.4	28.5
	14:18:00	14:18:00		29	29.5	28.3
	14:19:00	14:19:00		29	30.2	28.3
	14:20:00	14:20:00		28.4	29	27.9
	14:21:00	14:21:00		28.2	28.6	27.7
	14:22:00	14:22:00		28.3	29.1	27.7
	14:23:00	14:23:00		28.3	30.2	27.7
	14:24:00	14:24:00		29.1	30.8	27.9
	14:25:00	14:25:00		29.6	31.8	28.4
	14:26:00	14:26:00		29.8	32.6	28.5
	14:27:00	14:27:00		28.6	29.2	28.1
	14:28:00	14:28:00		29	29.9	28.3
	14:29:00	14:29:00		28.8	29.7	28
	14:30:00	14:30:00		28.7	29.6	28.2
	14:31:00	14:31:00		28.8	30	28.3
	14:32:00	14:32:00		28.6	28.9	28.2
	14:33:00	14:33:00		28.7	29.7	28.2
	14:34:00	14:34:00		28.7	29.4	28.2
	14:35:00	14:35:00		28.8	29.7	28.4
	14:36:00	14:36:00		29	29.5	28.3
	14:37:00	14:37:00		28.9	30.2	28.4
	14:38:00	14:38:00		48.2	65.4	29
	14:39:00	14:39:00		31.4	42.7	29.6
	14:40:00	14:40:00		30	31.3	29.3
	14:41:00	14:41:00		29.9	31.4	29.2
	14:42:00	14:42:00		30.1	31	29.3
	14:43:00	14:43:00		30.5	31.1	29.9
	14:44:00	14:44:00		31	31.8	30.3
	14:45:00	14:45:00		31.7	32.6	30.6
	14:46:00	14:46:00		31.6	32.6	30.7
	14:47:00	14:47:00		30.8	31.8	30.2
	14:48:00	14:48:00		31.5	32.2	30.7
	14:49:00	14:49:00		31.1	31.7	30.5
	14:50:00	14:50:00		32	33.5	30.9
	14:51:00	14:51:00		33.1	35.8	31.8
	14:52:00	14:52:00		33.4	34.8	32.3
	14:53:00	14:53:00		33.9	38.6	31.3
	14:54:00	14:54:00		33.3	35.3	32.2
	14:55:00	14:55:00		32.6	33.3	32
	14:56:00	14:56:00		32.3	33.1	31.5
	14:57:00	14:57:00		35.6	42.9	32.1
	14:58:00	14:58:00		32.2	34.1	30.6
	14:59:00	14:59:00		31.4	32.5	30.5
	15:00:00	15:00:00		30.6	31.9	30
	15:01:00	15:01:00		29.9	30.6	29.3
	15:02:00	15:02:00		30.2	31.9	29
	15:03:00	15:03:00		29.6	30.7	28.9
	15:04:00	15:04:00		30.5	32.1	29.3
	15:05:00	15:05:00		30.4	31.1	29.7
	15:06:00	15:06:00		32.3	34.6	30.5
	15:07:00	15:07:00		31.2	33.7	30.3
	15:08:00	15:08:00		30.8	34	29.9
	15:09:00	15:09:00		30	31.3	29.5
	15:10:00	15:10:00		30	31	29.3
	15:11:00	15:11:00		29.7	30.5	29.1
	15:12:00	15:12:00		29.5	32	28.8
	15:13:00	15:13:00		29.7	30.1	29.1
	15:14:00	15:14:00		30.4	31.2	29.6
	15:15:00	15:15:00		31.2	32.5	30.3
	15:16:00	15:16:00		32.4	33.2	31.4
	15:17:00	15:17:00		32.1	33.5	31.2
	15:18:00	15:18:00		32	33.6	31.1
	15:19:00	15:19:00		31.3	32.3	30.5
	15:20:00	15:20:00		31	31.8	30.3
	15:21:00	15:21:00		31.3	32.2	30.2
	15:22:00	15:22:00		30.9	32.2	30
	15:23:00	15:23:00		30.7	31.7	29.8

	Baseline SPL
3:00:53 AM	933.2543008
3:01:53 AM	912.0108394
3:02:53 AM	933.2543008
3:03:53 AM	1071.519305
3:04:53 AM	1148.153621
3:05:53 AM	1258.925412
3:06:53 AM	1288.249552
3:07:53 AM	1479.108388
3:08:53 AM	1174.897555
3:09:53 AM	1148.153621
3:10:53 AM	933.2543008
3:11:53 AM	891.2509381
3:12:53 AM	1096.478196
3:13:53 AM	954.992586
3:14:53 AM	933.2543008
3:15:53 AM	1122.018454
3:16:53 AM	977.237221
3:17:53 AM	851.1380382
3:18:53 AM	794.3282347
3:19:53 AM	794.3282347
3:20:53 AM	691.8309709
3:21:53 AM	660.693448
3:22:53 AM	676.0829754
3:23:53 AM	676.0829754
3:24:53 AM	812.8305162
3:25:53 AM	912.0108394
3:26:53 AM	954.992586
3:27:53 AM	724.4359601
3:28:53 AM	794.3282347
3:29:53 AM	758.577575
3:30:53 AM	741.3102413
3:31:53 AM	758.577575
3:32:53 AM	724.4359601
3:33:53 AM	741.3102413
3:34:53 AM	741.3102413
3:35:53 AM	758.577575
3:36:53 AM	794.3282347
3:37:53 AM	776.2471166
3:38:53 AM	66069.3448
3:39:53 AM	1380.384265
3:40:53 AM	1000
3:41:53 AM	977.237221
3:42:53 AM	1023.292992
3:43:53 AM	1122.018454
3:44:53 AM	1258.925412
3:45:53 AM	1479.108388
3:46:53 AM	1445.439771
3:47:53 AM	1202.264435
3:48:53 AM	1412.537545
3:49:53 AM	1288.249552
3:50:53 AM	1584.893192
3:51:53 AM	2041.737945
3:52:53 AM	2187.761624
3:53:53 AM	2454.708916
3:54:53 AM	2137.96209
3:55:53 AM	1819.700859
3:56:53 AM	1698.243652
3:57:53 AM	3630.780548
3:58:53 AM	1659.586907
3:59:53 AM	1380.384265
4:00:53 AM	1148.153621
4:01:53 AM	977.237221
4:02:53 AM	1047.128548
4:03:53 AM	912.0108394
4:04:53 AM	1122.018454
4:05:53 AM	1096.478196
4:06:53 AM	1698.243652
4:07:53 AM	1318.256739
4:08:53 AM	1202.264435
4:09:53 AM	1000
4:10:53 AM	1000
4:11:53 AM	933.2543008
4:12:53 AM	891.2509381
4:13:53 AM	933.2543008
4:14:53 AM	1096.478196
4:15:53 AM	1318.256739
4:16:53 AM	1737.800829
4:17:53 AM	1621.810097
4:18:53 AM	1584.893192
4:19:53 AM	1348.962883
4:20:53 AM	1258.925412
4:21:53 AM	1348.962883
4:22:53 AM	1230.268771
4:23:53 AM	1174.897555

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	15:24:00	15:24:00		30.5	31.5	29.8
	15:25:00	15:25:00		30.8	32.4	29.8
	15:26:00	15:26:00		30.6	32.2	29.8
	15:27:00	15:27:00		30.8	31.9	30
	15:28:00	15:28:00		30.7	31.5	30
	15:29:00	15:29:00		31.3	32.5	30.6
	15:30:00	15:30:00		31.3	32.1	30.8
	15:31:00	15:31:00		31.5	32.4	30.8
	15:32:00	15:32:00		31.7	32.7	30.9
	15:33:00	15:33:00		31.1	32.3	30.5
	15:34:00	15:34:00		31.2	32.3	30.2
	15:35:00	15:35:00		32.4	33.2	31.6
	15:36:00	15:36:00		32.7	33.8	31.9
	15:37:00	15:37:00		33	34.5	32.2
	15:38:00	15:38:00		33.1	34.2	32.4
	15:39:00	15:39:00		31.8	33.2	31.1
	15:40:00	15:40:00		32.9	35.9	31.7
	15:41:00	15:41:00		32.9	34.5	31.7
	15:42:00	15:42:00		32	33.2	30.8
	15:43:00	15:43:00		31.6	32.8	30.6
	15:44:00	15:44:00		32.7	35.5	31.1
	15:45:00	15:45:00		31.7	33.4	30.7
	15:46:00	15:46:00		31.9	32.7	31.2
	15:47:00	15:47:00		32.4	33.3	31.4
	15:48:00	15:48:00		32.9	34.4	31.9
	15:49:00	15:49:00		32.4	34.2	31.6
	15:50:00	15:50:00		33.9	36.4	32.6
	15:51:00	15:51:00		32.4	33.1	31.7
	15:52:00	15:52:00		31.8	32.5	31.1
	15:53:00	15:53:00		32.8	34.4	31.3
	15:54:00	15:54:00		33	34.1	32.2
	15:55:00	15:55:00		35.7	39.6	32.4
	15:56:00	15:56:00		33.7	35.2	33
	15:57:00	15:57:00		33.2	34.1	31.8
	15:58:00	15:58:00		32.5	34.3	31.3
	15:59:00	15:59:00		32.3	33.5	31.3
	16:00:00	16:00:00		33.2	34.5	32
	16:01:00	16:01:00		32.8	34.3	31.6
	16:02:00	16:02:00		33.3	34.7	32.1
	16:03:00	16:03:00		32.6	33.9	31.5
	16:04:00	16:04:00		32.4	33.3	31.7
	16:05:00	16:05:00		32.5	33.5	31.5
	16:06:00	16:06:00		32.6	34.2	31.2
	16:07:00	16:07:00		33.2	34.5	32.1
	16:08:00	16:08:00		33.6	36.3	32.7
	16:09:00	16:09:00		33.3	35.1	31.9
	16:10:00	16:10:00		32.5	33.2	31.6
	16:11:00	16:11:00		32.5	34.7	31.5
	16:12:00	16:12:00		32.7	36.8	31.4
	16:13:00	16:13:00		32.8	39.1	30.8
	16:14:00	16:14:00		32.3	33.4	31.3
	16:15:00	16:15:00		32.5	33.4	31.6
	16:16:00	16:16:00		33.1	35.9	31.9
	16:17:00	16:17:00		32.5	35	31.2
	16:18:00	16:18:00		32.2	34.3	31.3
	16:19:00	16:19:00		33.4	37.3	32.1
	16:20:00	16:20:00		32.6	34.2	31.7
	16:21:00	16:21:00		34.8	37.4	33
	16:22:00	16:22:00		33.8	36.4	32.3
	16:23:00	16:23:00		33.9	36.2	32.4
	16:24:00	16:24:00		36.3	40.5	34.2
	16:25:00	16:25:00		37.4	40.5	35.1
	16:26:00	16:26:00		34.5	37.4	32.8
	16:27:00	16:27:00		34.8	36.2	33.3
	16:28:00	16:28:00		45	47.3	34.9
	16:29:00	16:29:00		44.6	45.8	43.6
	16:30:00	16:30:00		44.4	45.6	43.3
	16:31:00	16:31:00		44.7	45.8	43.5
	16:32:00	16:32:00		45.6	46.9	44.5
	16:33:00	16:33:00		46.5	50.6	44.5
	16:34:00	16:34:00		46.5	48.4	44.7
	16:35:00	16:35:00		46.2	48.5	44.5
	16:36:00	16:36:00		45.4	47.3	44.2
	16:37:00	16:37:00		44.6	45.8	43.7
	16:38:00	16:38:00		44.2	44.8	43.5
	16:39:00	16:39:00		44	45	42.6
	16:40:00	16:40:00		44.6	45.8	43.5
	16:41:00	16:41:00		44.3	46.4	43.3
	16:42:00	16:42:00		44.8	45.8	44
	16:43:00	16:43:00		44.3	45.2	43.2
	16:44:00	16:44:00		45.3	47.2	43.3
	16:45:00	16:45:00		47	50.9	44.7
	16:46:00	16:46:00		46.6	48.2	45.1
	16:47:00	16:47:00		46.6	50	45

	Baseline SPL
4:24:53 AM	1122.018454
4:25:53 AM	1202.264435
4:26:53 AM	1148.153621
4:27:53 AM	1202.264435
4:28:53 AM	1174.897555
4:29:53 AM	1348.962883
4:30:53 AM	1348.962883
4:31:53 AM	1412.537545
4:32:53 AM	1479.108388
4:33:53 AM	1288.249552
4:34:53 AM	1318.256739
4:35:53 AM	1737.800829
4:36:53 AM	1862.087137
4:37:53 AM	1995.262315
4:38:53 AM	2041.737945
4:39:53 AM	1513.561248
4:40:53 AM	1949.8446
4:41:53 AM	1949.8446
4:42:53 AM	1584.893192
4:43:53 AM	1445.439771
4:44:53 AM	1862.087137
4:45:53 AM	1479.108388
4:46:53 AM	1548.816619
4:47:53 AM	1737.800829
4:48:53 AM	1949.8446
4:49:53 AM	1737.800829
4:50:53 AM	2454.708916
4:51:53 AM	1737.800829
4:52:53 AM	1513.561248
4:53:53 AM	1905.460718
4:54:53 AM	1995.262315
4:55:53 AM	3715.352291
4:56:53 AM	2344.228815
4:57:53 AM	2089.296131
4:58:53 AM	1778.27941
4:59:53 AM	1698.243652
5:00:53 AM	2089.296131
5:01:53 AM	1905.460718
5:02:53 AM	2137.96209
5:03:53 AM	1819.700859
5:04:53 AM	1737.800829
5:05:53 AM	1778.27941
5:06:53 AM	1819.700859
5:07:53 AM	2089.296131
5:08:53 AM	2290.867653
5:09:53 AM	2137.96209
5:10:53 AM	1778.27941
5:11:53 AM	1778.27941
5:12:53 AM	1862.087137
5:13:53 AM	1905.460718
5:14:53 AM	1698.243652
5:15:53 AM	1778.27941
5:16:53 AM	2041.737945
5:17:53 AM	1778.27941
5:18:53 AM	1659.586907
5:19:53 AM	2187.761624
5:20:53 AM	1819.700859
5:21:53 AM	3019.95172
5:22:53 AM	2398.832919
5:23:53 AM	2454.708916
5:24:53 AM	4265.795188
5:25:53 AM	5495.408739
5:26:53 AM	2818.382931
5:27:53 AM	3019.95172
5:28:53 AM	31622.7766
5:29:53 AM	28840.31503
5:30:53 AM	27542.28703
5:31:53 AM	29512.09227
5:32:53 AM	36307.80548
5:33:53 AM	44668.35922
5:34:53 AM	44668.35922
5:35:53 AM	41686.93835
5:36:53 AM	34673.68505
5:37:53 AM	28840.31503
5:38:53 AM	26302.67992
5:39:53 AM	25118.86432
5:40:53 AM	28840.31503
5:41:53 AM	26915.34804
5:42:53 AM	30199.5172
5:43:53 AM	26915.34804
5:44:53 AM	33884.41561
5:45:53 AM	50118.72336
5:46:53 AM	45708.81896
5:47:53 AM	45708.81896

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	16:48:00	16:48:00		45.6	47.4	44.7
	16:49:00	16:49:00		45	46.6	43.6
	16:50:00	16:50:00		45.1	46.6	43
	16:51:00	16:51:00		46.6	51.3	44.5
	16:52:00	16:52:00		46.5	49.4	44.7
	16:53:00	16:53:00		46.7	51.6	44.6
	16:54:00	16:54:00		45.7	47.2	44.8
	16:55:00	16:55:00		44.7	45.7	43.9
	16:56:00	16:56:00		44.3	45.1	43.5
	16:57:00	16:57:00		44.4	45.4	43.6
	16:58:00	16:58:00		44.7	46.6	43.9
	16:59:00	16:59:00		45	48	43.5
	17:00:00	17:00:00		45.1	47.1	43.9
	17:01:00	17:01:00		45.6	48	44.3
	17:02:00	17:02:00		47.2	51	44.7
	17:03:00	17:03:00		48.6	53.2	45.1
	17:04:00	17:04:00		48.7	53.8	45.1
	17:05:00	17:05:00		49.6	54.1	46.5
	17:06:00	17:06:00		51.2	54.8	48
	17:07:00	17:07:00		52.7	57.1	49.5
	17:08:00	17:08:00		52.8	56.9	47.5
	17:09:00	17:09:00		52.6	60.1	48.5
	17:10:00	17:10:00		50.1	55.2	47.6
	17:11:00	17:11:00		54.4	63.1	48.7
	17:12:00	17:12:00		54.4	59.5	48.9
	17:13:00	17:13:00		51.6	55.9	48.3
	17:14:00	17:14:00		54.6	59.9	49
	17:15:00	17:15:00		55.1	59.1	50.5
	17:16:00	17:16:00		53.2	58.9	48.8
	17:17:00	17:17:00		51.6	55.5	48.2
	17:18:00	17:18:00		47.9	52.1	45.6
	17:19:00	17:19:00		46.8	50.8	45.3
	17:20:00	17:20:00		46.8	49.5	45.5
	17:21:00	17:21:00		45.8	47.4	44.4
	17:22:00	17:22:00		46.5	51.1	44.8
	17:23:00	17:23:00		45.9	46.9	44.9
	17:24:00	17:24:00		46.4	50.9	44.6
	17:25:00	17:25:00		46.2	48.4	44.7
	17:26:00	17:26:00		45.6	46.9	44.8
	17:27:00	17:27:00		45.1	45.8	44.4
	17:28:00	17:28:00		44.7	45.4	44
	17:29:00	17:29:00		44.8	47.3	43.5
	17:30:00	17:30:00		45.1	47.3	43.8
	17:31:00	17:31:00		44.7	46.1	43.6
	17:32:00	17:32:00		45.1	45.9	44.3
	17:33:00	17:33:00		44.5	45.5	43.3
	17:34:00	17:34:00		44.4	44.9	43.9
	17:35:00	17:35:00		44.4	44.8	44
	17:36:00	17:36:00		44.4	44.9	43.6
	17:37:00	17:37:00		44.3	44.9	43.6
	17:38:00	17:38:00		44.2	45	43.5
	17:39:00	17:39:00		44.2	44.6	43.8
	17:40:00	17:40:00		44.1	44.6	43.7
	17:41:00	17:41:00		44.4	49	43.7
	17:42:00	17:42:00		44.2	45.8	43.7
	17:43:00	17:43:00		44.4	45.3	43.6
	17:44:00	17:44:00		44.3	44.9	43.7
	17:45:00	17:45:00		44.2	44.8	43.6
	17:46:00	17:46:00		44.1	44.5	43.8
	17:47:00	17:47:00		44.1	44.6	43.7
	17:48:00	17:48:00		44.3	44.7	43.8
	17:49:00	17:49:00		44.1	44.7	43.7
	17:50:00	17:50:00		44	44.5	43.4
	17:51:00	17:51:00		44.7	46.1	43.7
	17:52:00	17:52:00		46.3	48.2	44.5
	17:53:00	17:53:00		44.5	46.1	43.7
	17:54:00	17:54:00		44	44.6	43.1
	17:55:00	17:55:00		44.2	45.3	43.4
	17:56:00	17:56:00		43.9	44.6	43.3
	17:57:00	17:57:00		43.9	44.4	43.2
	17:58:00	17:58:00		44.2	44.8	43.3
	17:59:00	17:59:00		44.3	44.9	43.9
	18:00:00	18:00:00		44.3	44.6	43.9
	18:01:00	18:01:00		44.1	45.3	43.6
	18:02:00	18:02:00		44.2	45.1	43.6
	18:03:00	18:03:00		44.6	47.3	43.8
	18:04:00	18:04:00		44.1	45	43.4
	18:05:00	18:05:00		44.1	44.6	43.6
	18:06:00	18:06:00		44.2	45.4	43.3
	18:07:00	18:07:00		44.4	45.9	43.6
	18:08:00	18:08:00		44.4	45	44
	18:09:00	18:09:00		44.5	45.7	44
	18:10:00	18:10:00		44.4	44.9	43.8
	18:11:00	18:11:00		44.4	44.8	43.9

	Baseline SPL
5:48:53 AM	36307.80548
5:49:53 AM	31622.7766
5:50:53 AM	32359.36569
5:51:53 AM	45708.81896
5:52:53 AM	44668.35922
5:53:53 AM	46773.51413
5:54:53 AM	37153.52291
5:55:53 AM	29512.09227
5:56:53 AM	26915.34804
5:57:53 AM	27542.28703
5:58:53 AM	29512.09227
5:59:53 AM	31622.7766
6:00:53 AM	32359.36569
6:01:53 AM	36307.80548
6:02:53 AM	52480.74602
6:03:53 AM	72443.59601
6:04:53 AM	74131.02413
6:05:53 AM	91201.08394
6:06:53 AM	131825.6739
6:07:53 AM	186208.7137
6:08:53 AM	190546.0718
6:09:53 AM	181970.0859
6:10:53 AM	102329.2992
6:11:53 AM	275422.8703
6:12:53 AM	275422.8703
6:13:53 AM	144543.9771
6:14:53 AM	288403.1503
6:15:53 AM	323593.6569
6:16:53 AM	208929.6131
6:17:53 AM	144543.9771
6:18:53 AM	61659.50019
6:19:53 AM	47863.00923
6:20:53 AM	47863.00923
6:21:53 AM	38018.93963
6:22:53 AM	44668.35922
6:23:53 AM	38904.5145
6:24:53 AM	43651.58322
6:25:53 AM	41686.93835
6:26:53 AM	36307.80548
6:27:53 AM	32359.36569
6:28:53 AM	29512.09227
6:29:53 AM	30199.5172
6:30:53 AM	32359.36569
6:31:53 AM	29512.09227
6:32:53 AM	32359.36569
6:33:53 AM	28183.82931
6:34:53 AM	27542.28703
6:35:53 AM	27542.28703
6:36:53 AM	27542.28703
6:37:53 AM	26915.34804
6:38:53 AM	26302.67992
6:39:53 AM	26302.67992
6:40:53 AM	25703.95783
6:41:53 AM	27542.28703
6:42:53 AM	26302.67992
6:43:53 AM	27542.28703
6:44:53 AM	26915.34804
6:45:53 AM	26302.67992
6:46:53 AM	25703.95783
6:47:53 AM	25703.95783
6:48:53 AM	26915.34804
6:49:53 AM	25703.95783
6:50:53 AM	25118.86432
6:51:53 AM	29512.09227
6:52:53 AM	42657.95188
6:53:53 AM	28183.82931
6:54:53 AM	25118.86432
6:55:53 AM	26302.67992
6:56:53 AM	24547.08916
6:57:53 AM	24547.08916
6:58:53 AM	26302.67992
6:59:53 AM	26915.34804
7:00:53 AM	26915.34804
7:01:53 AM	25703.95783
7:02:53 AM	26302.67992
7:03:53 AM	28840.31503
7:04:53 AM	25703.95783
7:05:53 AM	25703.95783
7:06:53 AM	26302.67992
7:07:53 AM	27542.28703
7:08:53 AM	27542.28703
7:09:53 AM	28183.82931
7:10:53 AM	27542.28703
7:11:53 AM	27542.28703

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	18:12:00	18:12:00		44.3	44.8	43.8
	18:13:00	18:13:00		44.7	45.7	44.1
	18:14:00	18:14:00		45.4	49.8	43.6
	18:15:00	18:15:00		48.6	61.6	44.3
	18:16:00	18:16:00		44.7	45.7	43.9
	18:17:00	18:17:00		44.9	46.5	43.8
	18:18:00	18:18:00		45.3	47.4	44.1
	18:19:00	18:19:00		44.7	45.9	43.8
	18:20:00	18:20:00		44.5	45.7	43.5
	18:21:00	18:21:00		45.1	47.3	44.1
	18:22:00	18:22:00		46	51	44.5
	18:23:00	18:23:00		44.5	45.2	44
	18:24:00	18:24:00		44.9	46.3	43.5
	18:25:00	18:25:00		44.9	46.1	43.9
	18:26:00	18:26:00		44.7	46	43.4
	18:27:00	18:27:00		44.8	45.7	44.1
	18:28:00	18:28:00		45	47.6	43.9
	18:29:00	18:29:00		45.1	46.8	44.3
	18:30:00	18:30:00		45.7	53.9	43.6
	18:31:00	18:31:00		45.1	48.1	43.9
	18:32:00	18:32:00		45.2	47.9	43.8
	18:33:00	18:33:00		44.7	45.6	43.9
	18:34:00	18:34:00		45.4	50	44.1
	18:35:00	18:35:00		45.3	49.3	43.8
	18:36:00	18:36:00		44.2	44.8	43.5
	18:37:00	18:37:00		44.5	45.1	43.9
	18:38:00	18:38:00		44.7	45.8	44
	18:39:00	18:39:00		44.8	46.3	43.6
	18:40:00	18:40:00		44.5	44.9	43.9
	18:41:00	18:41:00		44.7	47.3	43.7
	18:42:00	18:42:00		44.9	46.8	43.9
	18:43:00	18:43:00		45	46.9	44
	18:44:00	18:44:00		44.3	44.8	43.7
	18:45:00	18:45:00		44.6	45.3	43.8
	18:46:00	18:46:00		45.2	46.9	44.2
	18:47:00	18:47:00		45.1	48.7	43.8
	18:48:00	18:48:00		48.7	53.5	45.4
	18:49:00	18:49:00		47.4	53.6	44.4
	18:50:00	18:50:00		46.9	50.3	44
	18:51:00	18:51:00		45	47.7	43.9
	18:52:00	18:52:00		47.9	52	45
	18:53:00	18:53:00		47.5	50.8	44.8
	18:54:00	18:54:00		50.2	59.6	45.3
	18:55:00	18:55:00		47.9	52.2	45.2
	18:56:00	18:56:00		50.6	56.6	44.9
	18:57:00	18:57:00		47.9	53.5	45.4
	18:58:00	18:58:00		45.3	48.2	44.1
	18:59:00	18:59:00		45.3	48	44.5
	19:00:00	19:00:00		44.9	46.5	44
	19:01:00	19:01:00		44.7	45.3	44.2
	19:02:00	19:02:00		45.2	46.2	44.3
	19:03:00	19:03:00		45.7	46.6	44.7
	19:04:00	19:04:00		44.9	46	44.2
	19:05:00	19:05:00		44.6	45.1	44.1
	19:06:00	19:06:00		44.4	44.8	44
	19:07:00	19:07:00		44.7	45.2	44
	19:08:00	19:08:00		44.7	45.4	44.2
	19:09:00	19:09:00		44.7	45.5	44.4
	19:10:00	19:10:00		44.7	45	44.3
	19:11:00	19:11:00		44.8	45.1	44.5
	19:12:00	19:12:00		44.8	45.2	44.5
	19:13:00	19:13:00		45	45.5	44.6
	19:14:00	19:14:00		45.2	50.2	44.4
	19:15:00	19:15:00		44.6	45.8	43.6
	19:16:00	19:16:00		44.6	45.2	44
	19:17:00	19:17:00		44.5	44.8	44.2
	19:18:00	19:18:00		44.6	44.9	44.2
	19:19:00	19:19:00		44.6	44.9	44.2
	19:20:00	19:20:00		44.5	44.9	44.1
	19:21:00	19:21:00		44.6	45.1	44.1
	19:22:00	19:22:00		44.6	45.9	44
	19:23:00	19:23:00		44.6	45	44.1
	19:24:00	19:24:00		44.9	45.4	44.4
	19:25:00	19:25:00		44.9	45.8	44.6
	19:26:00	19:26:00		45	45.4	44.7
	19:27:00	19:27:00		44.9	45.2	44.6
	19:28:00	19:28:00		44.8	45.2	44.6
	19:29:00	19:29:00		44.8	45.2	44.5
	19:30:00	19:30:00		44.7	45	44.5
	19:31:00	19:31:00		44.8	45.2	44.5
	19:32:00	19:32:00		44.9	45.9	44.6
	19:33:00	19:33:00		44.7	45	44.4
	19:34:00	19:34:00		44.8	45.1	44.5
	19:35:00	19:35:00		44.8	45.1	44.5

	Baseline SPL
7:12:53 AM	26915.34804
7:13:53 AM	29512.09227
7:14:53 AM	34673.68505
7:15:53 AM	72443.59601
7:16:53 AM	29512.09227
7:17:53 AM	30902.95433
7:18:53 AM	33884.41561
7:19:53 AM	29512.09227
7:20:53 AM	28183.82931
7:21:53 AM	32359.36569
7:22:53 AM	39810.71706
7:23:53 AM	28183.82931
7:24:53 AM	30902.95433
7:25:53 AM	30902.95433
7:26:53 AM	29512.09227
7:27:53 AM	30199.5172
7:28:53 AM	31622.7766
7:29:53 AM	32359.36569
7:30:53 AM	37153.52291
7:31:53 AM	32359.36569
7:32:53 AM	33113.11215
7:33:53 AM	29512.09227
7:34:53 AM	34673.68505
7:35:53 AM	33884.41561
7:36:53 AM	26302.67992
7:37:53 AM	28183.82931
7:38:53 AM	29512.09227
7:39:53 AM	30199.5172
7:40:53 AM	28183.82931
7:41:53 AM	29512.09227
7:42:53 AM	30902.95433
7:43:53 AM	31622.7766
7:44:53 AM	26915.34804
7:45:53 AM	28840.31503
7:46:53 AM	33113.11215
7:47:53 AM	32359.36569
7:48:53 AM	74131.02413
7:49:53 AM	54954.08739
7:50:53 AM	48977.88194
7:51:53 AM	31622.7766
7:52:53 AM	61659.50019
7:53:53 AM	56234.13252
7:54:53 AM	104712.8548
7:55:53 AM	61659.50019
7:56:53 AM	114815.3621
7:57:53 AM	61659.50019
7:58:53 AM	33884.41561
7:59:53 AM	33884.41561
8:00:53 AM	30902.95433
8:01:53 AM	29512.09227
8:02:53 AM	33113.11215
8:03:53 AM	37153.52291
8:04:53 AM	30902.95433
8:05:53 AM	28840.31503
8:06:53 AM	27542.28703
8:07:53 AM	29512.09227
8:08:53 AM	29512.09227
8:09:53 AM	29512.09227
8:10:53 AM	29512.09227
8:11:53 AM	30199.5172
8:12:53 AM	30199.5172
8:13:53 AM	31622.7766
8:14:53 AM	33113.11215
8:15:53 AM	28840.31503
8:16:53 AM	28840.31503
8:17:53 AM	28183.82931
8:18:53 AM	28840.31503
8:19:53 AM	28840.31503
8:20:53 AM	28183.82931
8:21:53 AM	28840.31503
8:22:53 AM	28840.31503
8:23:53 AM	28840.31503
8:24:53 AM	30902.95433
8:25:53 AM	30902.95433
8:26:53 AM	31622.7766
8:27:53 AM	30902.95433
8:28:53 AM	30199.5172
8:29:53 AM	30199.5172
8:30:53 AM	29512.09227
8:31:53 AM	30199.5172
8:32:53 AM	30902.95433
8:33:53 AM	29512.09227
8:34:53 AM	30199.5172
8:35:53 AM	30199.5172

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	19:36:00	19:36:00		44.7	45	44.4
	19:37:00	19:37:00		44.8	45.3	44.1
	19:38:00	19:38:00		44.8	45.3	44.2
	19:39:00	19:39:00		44.8	45.2	44.5
	19:40:00	19:40:00		44.8	45.3	44.4
	19:41:00	19:41:00		44.6	45	44.3
	19:42:00	19:42:00		44.8	45	44.5
	19:43:00	19:43:00		45	45.6	44.6
	19:44:00	19:44:00		45	45.4	44.7
	19:45:00	19:45:00		45	45.6	44.7
	19:46:00	19:46:00		45.3	45.7	45
	19:47:00	19:47:00		45.2	45.8	44.7
	19:48:00	19:48:00		45.1	45.6	44.6
	19:49:00	19:49:00		45	45.4	44.5
	19:50:00	19:50:00		45.2	45.6	44.7
	19:51:00	19:51:00		45.4	45.7	45
	19:52:00	19:52:00		45.2	45.6	44.8
	19:53:00	19:53:00		45.1	45.6	44.6
	19:54:00	19:54:00		45.2	45.9	44.5
	19:55:00	19:55:00		45.2	45.8	44.6
	19:56:00	19:56:00		45.3	46.3	44.7
	19:57:00	19:57:00		45.4	46.6	44.3
	19:58:00	19:58:00		45.2	45.7	44.6
	19:59:00	19:59:00		45.4	47	44.8
	20:00:00	20:00:00		46.1	48.6	44.8
	20:01:00	20:01:00		49.9	53.7	45.4
	20:02:00	20:02:00		46	47.6	45
	20:03:00	20:03:00		45.5	46.8	44.6
	20:04:00	20:04:00		45.6	46.7	44.8
	20:05:00	20:05:00		45.4	46.5	44.4
	20:06:00	20:06:00		46	48.5	44.6
	20:07:00	20:07:00		45	45.5	44.3
	20:08:00	20:08:00		44.9	45.4	44.5
	20:09:00	20:09:00		45.1	46.5	44.3
	20:10:00	20:10:00		45	45.6	44
	20:11:00	20:11:00		45	45.9	44.4
	20:12:00	20:12:00		44.9	46.2	44.3
	20:13:00	20:13:00		44.8	45.4	44.3
	20:14:00	20:14:00		44.6	45	44.1
	20:15:00	20:15:00		44.7	45.4	43.9
	20:16:00	20:16:00		45.3	45.9	44.7
	20:17:00	20:17:00		45.7	46.3	45.2
	20:18:00	20:18:00		46.3	47.5	45.5
	20:19:00	20:19:00		46.3	47.1	45.1
	20:20:00	20:20:00		46	48.4	44.9
	20:21:00	20:21:00		45.6	46.6	44.6
	20:22:00	20:22:00		46.7	50.3	45
	20:23:00	20:23:00		49.6	54.4	45.3
	20:24:00	20:24:00		46.6	47.9	45.3
	20:25:00	20:25:00		45	47.2	44.2
	20:26:00	20:26:00		45.1	46.3	44.3
	20:27:00	20:27:00		45.2	46	44.2
	20:28:00	20:28:00		45.8	47.3	44.9
	20:29:00	20:29:00		46.8	49.7	44.9
	20:30:00	20:30:00		46.6	48.8	44.9
	20:31:00	20:31:00		46.4	49	45
	20:32:00	20:32:00		46.3	47.5	45.1
	20:33:00	20:33:00		45.7	47.8	44.6
	20:34:00	20:34:00		45	45.9	44.1
	20:35:00	20:35:00		45.4	46.9	44.2
	20:36:00	20:36:00		45.1	46.9	44.5
	20:37:00	20:37:00		45.2	46	44.6
	20:38:00	20:38:00		45.1	45.8	44.5
	20:39:00	20:39:00		45.3	46.4	44.6
	20:40:00	20:40:00		45.8	47	45
	20:41:00	20:41:00		45.7	47.6	44.8
	20:42:00	20:42:00		45.7	46.6	44.9
	20:43:00	20:43:00		46	49.2	45
	20:44:00	20:44:00		50.1	57.1	44.8
	20:45:00	20:45:00		48.3	52.7	45.3
	20:46:00	20:46:00		46.1	48.6	45.2
	20:47:00	20:47:00		45.8	47.1	44.7
	20:48:00	20:48:00		45.4	46.3	44.7
	20:49:00	20:49:00		45.2	46	44.7
	20:50:00	20:50:00		45.2	46.6	44.4
	20:51:00	20:51:00		45.1	47.3	44.3
	20:52:00	20:52:00		45.2	47.1	44.5
	20:53:00	20:53:00		44.9	45.9	44.3
	20:54:00	20:54:00		45.9	47.4	44.7
	20:55:00	20:55:00		44.8	45.2	44.3
	20:56:00	20:56:00		45.1	46.3	44.5
	20:57:00	20:57:00		45	45.9	44.1
	20:58:00	20:58:00		45.4	47.1	44.6
	20:59:00	20:59:00		44.8	45.4	43.8

	Baseline SPL
8:36:53 AM	29512.09227
8:37:53 AM	30199.5172
8:38:53 AM	30199.5172
8:39:53 AM	30199.5172
8:40:53 AM	30199.5172
8:41:53 AM	28840.31503
8:42:53 AM	30199.5172
8:43:53 AM	31622.7766
8:44:53 AM	31622.7766
8:45:53 AM	31622.7766
8:46:53 AM	33884.41561
8:47:53 AM	33113.11215
8:48:53 AM	32359.36569
8:49:53 AM	31622.7766
8:50:53 AM	33113.11215
8:51:53 AM	34673.68505
8:52:53 AM	33113.11215
8:53:53 AM	32359.36569
8:54:53 AM	33113.11215
8:55:53 AM	33113.11215
8:56:53 AM	33884.41561
8:57:53 AM	34673.68505
8:58:53 AM	33113.11215
8:59:53 AM	34673.68505
9:00:53 AM	40738.02778
9:01:53 AM	97723.7221
9:02:53 AM	39810.71706
9:03:53 AM	35481.33892
9:04:53 AM	36307.80548
9:05:53 AM	34673.68505
9:06:53 AM	39810.71706
9:07:53 AM	31622.7766
9:08:53 AM	30902.95433
9:09:53 AM	32359.36569
9:10:53 AM	31622.7766
9:11:53 AM	31622.7766
9:12:53 AM	30902.95433
9:13:53 AM	30199.5172
9:14:53 AM	28840.31503
9:15:53 AM	29512.09227
9:16:53 AM	33884.41561
9:17:53 AM	37153.52291
9:18:53 AM	42657.95188
9:19:53 AM	42657.95188
9:20:53 AM	39810.71706
9:21:53 AM	36307.80548
9:22:53 AM	46773.51413
9:23:53 AM	91201.08394
9:24:53 AM	45708.81896
9:25:53 AM	31622.7766
9:26:53 AM	32359.36569
9:27:53 AM	33113.11215
9:28:53 AM	38018.93963
9:29:53 AM	47863.00923
9:30:53 AM	45708.81896
9:31:53 AM	43651.58322
9:32:53 AM	42657.95188
9:33:53 AM	37153.52291
9:34:53 AM	31622.7766
9:35:53 AM	34673.68505
9:36:53 AM	32359.36569
9:37:53 AM	33113.11215
9:38:53 AM	32359.36569
9:39:53 AM	33884.41561
9:40:53 AM	38018.93963
9:41:53 AM	37153.52291
9:42:53 AM	37153.52291
9:43:53 AM	39810.71706
9:44:53 AM	102329.2992
9:45:53 AM	67608.29754
9:46:53 AM	40738.02778
9:47:53 AM	38018.93963
9:48:53 AM	34673.68505
9:49:53 AM	33113.11215
9:50:53 AM	33113.11215
9:51:53 AM	32359.36569
9:52:53 AM	33113.11215
9:53:53 AM	30902.95433
9:54:53 AM	38904.5145
9:55:53 AM	30199.5172
9:56:53 AM	32359.36569
9:57:53 AM	31622.7766
9:58:53 AM	34673.68505
9:59:53 AM	30199.5172

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	21:00:00	21:00:00		44.7	45.1	43.9
	21:01:00	21:01:00		44.6	45.4	44.1
	21:02:00	21:02:00		44.7	45.1	44.1
	21:03:00	21:03:00		44.7	45.2	44.1
	21:04:00	21:04:00		44.7	45.2	44.3
	21:05:00	21:05:00		44.7	45.5	43.9
	21:06:00	21:06:00		44.6	45.5	43.7
	21:07:00	21:07:00		44.6	45.4	43.9
	21:08:00	21:08:00		44.7	45.3	44
	21:09:00	21:09:00		44.7	45.5	44
	21:10:00	21:10:00		44.8	45.4	44.1
	21:11:00	21:11:00		44.9	45.4	44.5
	21:12:00	21:12:00		45.4	48.5	44.5
	21:13:00	21:13:00		45.2	47.1	44.5
	21:14:00	21:14:00		44.8	45.2	44.4
	21:15:00	21:15:00		44.5	44.9	44.1
	21:16:00	21:16:00		44.6	46.2	44
	21:17:00	21:17:00		45.1	47.3	44.1
	21:18:00	21:18:00		48.5	53.7	44.8
	21:19:00	21:19:00		45	46.2	44
	21:20:00	21:20:00		45	46.1	44.3
	21:21:00	21:21:00		45	45.6	44.5
	21:22:00	21:22:00		45.1	45.7	44.6
	21:23:00	21:23:00		44.9	45.5	44.5
	21:24:00	21:24:00		44.6	45.1	44.2
	21:25:00	21:25:00		44.5	45.3	44.1
	21:26:00	21:26:00		47	49.2	44.5
	21:27:00	21:27:00		45.4	48.1	44.3
	21:28:00	21:28:00		44.4	44.8	44.1
	21:29:00	21:29:00		44.2	44.8	43.5
	21:30:00	21:30:00		44.1	44.7	43.5
	21:31:00	21:31:00		44	44.6	43.3
	21:32:00	21:32:00		44.2	44.5	43.7
	21:33:00	21:33:00		44.9	51	43.8
	21:34:00	21:34:00		44.8	48.5	43.8
	21:35:00	21:35:00		47.2	50.7	44.5
	21:36:00	21:36:00		46.9	54.8	44.2
	21:37:00	21:37:00		45.6	53.9	43.8
	21:38:00	21:38:00		44.3	44.7	44
	21:39:00	21:39:00		44.4	45.1	43.9
	21:40:00	21:40:00		45	46.6	43.8
	21:41:00	21:41:00		47.9	50.7	45.4
	21:42:00	21:42:00		44.8	45.5	44.1
	21:43:00	21:43:00		44.4	44.7	44.1
	21:44:00	21:44:00		44.5	45.6	44.2
	21:45:00	21:45:00		44.6	45.6	43.9
	21:46:00	21:46:00		44.6	46.4	43.4
	21:47:00	21:47:00		45.7	49.1	44.5
	21:48:00	21:48:00		45.1	47.8	44
	21:49:00	21:49:00		54.9	62.1	45.5
	21:50:00	21:50:00		46.1	54.9	44.5
	21:51:00	21:51:00		44.7	45.6	44.1
	21:52:00	21:52:00		44.5	45.4	44.1
	21:53:00	21:53:00		44.5	45.1	44
	21:54:00	21:54:00		45	45.9	44.2
	21:55:00	21:55:00		44.6	45.1	44
	21:56:00	21:56:00		44.5	45.1	43.9
	21:57:00	21:57:00		44.7	46.4	44.2
	21:58:00	21:58:00		45.5	48.7	44.3
	21:59:00	21:59:00		44.7	45.5	44.1
	22:00:00	22:00:00		44.5	45	43.8
	22:01:00	22:01:00		44.5	46.2	44
	22:02:00	22:02:00		44.5	45	43.9
	22:03:00	22:03:00		44.4	44.7	44.1
	22:04:00	22:04:00		44.5	45.1	44
	22:05:00	22:05:00		44.4	44.8	44
	22:06:00	22:06:00		44.7	45.5	44.2
	22:07:00	22:07:00		44.8	45.5	44
	22:08:00	22:08:00		44.4	44.9	43.9
	22:09:00	22:09:00		44.5	44.9	44
	22:10:00	22:10:00		44.4	45	43.8
	22:11:00	22:11:00		44.3	44.9	43.4
	22:12:00	22:12:00		44.4	46	43.8
	22:13:00	22:13:00		44.5	44.9	43.9
	22:14:00	22:14:00		44.3	44.7	43.8
	22:15:00	22:15:00		44.5	45	44.1
	22:16:00	22:16:00		44.8	45.8	44.2
	22:17:00	22:17:00		45.1	46.8	44.3
	22:18:00	22:18:00		44.5	44.9	44.1
	22:19:00	22:19:00		44.6	45	43.9
	22:20:00	22:20:00		44.4	45	44
	22:21:00	22:21:00		44.2	44.7	43.8
	22:22:00	22:22:00		44.3	44.9	43.8
	22:23:00	22:23:00		45	46.2	44.2

	Baseline SPL
10:00:53 AM	29512.09227
10:01:53 AM	28840.31503
10:02:53 AM	29512.09227
10:03:53 AM	29512.09227
10:04:53 AM	29512.09227
10:05:53 AM	29512.09227
10:06:53 AM	28840.31503
10:07:53 AM	28840.31503
10:08:53 AM	29512.09227
10:09:53 AM	29512.09227
10:10:53 AM	30199.5172
10:11:53 AM	30902.95433
10:12:53 AM	34673.68505
10:13:53 AM	33113.11215
10:14:53 AM	30199.5172
10:15:53 AM	28183.82931
10:16:53 AM	28840.31503
10:17:53 AM	32359.36569
10:18:53 AM	70794.57844
10:19:53 AM	31622.7766
10:20:53 AM	31622.7766
10:21:53 AM	31622.7766
10:22:53 AM	32359.36569
10:23:53 AM	30902.95433
10:24:53 AM	28840.31503
10:25:53 AM	28183.82931
10:26:53 AM	50118.72336
10:27:53 AM	34673.68505
10:28:53 AM	27542.28703
10:29:53 AM	26302.67992
10:30:53 AM	25703.95783
10:31:53 AM	25118.86432
10:32:53 AM	26302.67992
10:33:53 AM	30902.95433
10:34:53 AM	30199.5172
10:35:53 AM	52480.74602
10:36:53 AM	48977.88194
10:37:53 AM	36307.80548
10:38:53 AM	26915.34804
10:39:53 AM	27542.28703
10:40:53 AM	31622.7766
10:41:53 AM	61659.50019
10:42:53 AM	30199.5172
10:43:53 AM	27542.28703
10:44:53 AM	28183.82931
10:45:53 AM	28840.31503
10:46:53 AM	28840.31503
10:47:53 AM	37153.52291
10:48:53 AM	32359.36569
10:49:53 AM	309029.5433
10:50:53 AM	40738.02778
10:51:53 AM	29512.09227
10:52:53 AM	28183.82931
10:53:53 AM	28183.82931
10:54:53 AM	31622.7766
10:55:53 AM	28840.31503
10:56:53 AM	28183.82931
10:57:53 AM	29512.09227
10:58:53 AM	35481.33892
10:59:53 AM	29512.09227
11:00:53 AM	28183.82931
11:01:53 AM	28183.82931
11:02:53 AM	28183.82931
11:03:53 AM	27542.28703
11:04:53 AM	28183.82931
11:05:53 AM	27542.28703
11:06:53 AM	29512.09227
11:07:53 AM	30199.5172
11:08:53 AM	27542.28703
11:09:53 AM	28183.82931
11:10:53 AM	27542.28703
11:11:53 AM	26915.34804
11:12:53 AM	27542.28703
11:13:53 AM	28183.82931
11:14:53 AM	26915.34804
11:15:53 AM	28183.82931
11:16:53 AM	30199.5172
11:17:53 AM	32359.36569
11:18:53 AM	28183.82931
11:19:53 AM	28840.31503
11:20:53 AM	27542.28703
11:21:53 AM	26302.67992
11:22:53 AM	26915.34804
11:23:53 AM	31622.7766

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	22:24:00	22:24:00		47.7	50.8	44.8
	22:25:00	22:25:00		44.5	45.6	43.9
	22:26:00	22:26:00		44.3	44.8	43.6
	22:27:00	22:27:00		54.6	62.6	44.1
	22:28:00	22:28:00		50	59.9	44.2
	22:29:00	22:29:00		44.8	46.1	44.1
	22:30:00	22:30:00		44.4	45.5	43.9
	22:31:00	22:31:00		44.1	44.7	43.6
	22:32:00	22:32:00		45.8	48.3	43.9
	22:33:00	22:33:00		46.7	53.4	44.2
	22:34:00	22:34:00		50	55.8	44
	22:35:00	22:35:00		44.3	44.9	43.5
	22:36:00	22:36:00		44.3	45	43.3
	22:37:00	22:37:00		44.3	44.8	43.6
	22:38:00	22:38:00		44.5	45	43.9
	22:39:00	22:39:00		44.5	45	44.1
	22:40:00	22:40:00		44.9	46.4	44.2
	22:41:00	22:41:00		44	44.6	43.7
	22:42:00	22:42:00		44.4	44.8	43.7
	22:43:00	22:43:00		44.3	45.1	43.7
	22:44:00	22:44:00		44.3	44.8	43.6
	22:45:00	22:45:00		45.1	52.5	43.6
	22:46:00	22:46:00		45	47.3	43.8
	22:47:00	22:47:00		44.6	45.4	43.7
	22:48:00	22:48:00		44.6	45.4	43.9
	22:49:00	22:49:00		44.4	44.8	43.7
	22:50:00	22:50:00		44.4	44.9	43.7
	22:51:00	22:51:00		44.8	46.1	44.1
	22:52:00	22:52:00		44.9	47.3	43.8
	22:53:00	22:53:00		44.4	45	43.8
	22:54:00	22:54:00		44.6	47.1	43.9
	22:55:00	22:55:00		44.6	45.4	43.9
	22:56:00	22:56:00		44.5	45.1	44
	22:57:00	22:57:00		45.9	49.1	43.8
	22:58:00	22:58:00		44.3	44.7	43.7
	22:59:00	22:59:00		44.7	45.9	43.8
	23:00:00	23:00:00		44.5	45.5	43.8
	23:01:00	23:01:00		44.4	47.2	43.2
	23:02:00	23:02:00		44.4	45.1	43.6
	23:03:00	23:03:00		44.7	46.2	43.6
	23:04:00	23:04:00		45.3	47.8	44
	23:05:00	23:05:00		45.4	48.2	43.6
	23:06:00	23:06:00		44.3	45.1	43.6
	23:07:00	23:07:00		44.5	45.5	43.9
	23:08:00	23:08:00		44.5	45.6	43.5
	23:09:00	23:09:00		44.5	45.3	43.6
	23:10:00	23:10:00		44.3	45.1	43.4
	23:11:00	23:11:00		44.2	45.4	43.5
	23:12:00	23:12:00		44.2	44.7	43.5
	23:13:00	23:13:00		44.4	45.1	43.7
	23:14:00	23:14:00		58.6	67.3	44.3
	23:15:00	23:15:00		47.2	54.5	43.9
	23:16:00	23:16:00		44.3	45	43.5
	23:17:00	23:17:00		44.6	46	43.7
	23:18:00	23:18:00		45.3	46.6	44.1
	23:19:00	23:19:00		44.4	44.9	43.5
	23:20:00	23:20:00		46.2	49.8	44.3
	23:21:00	23:21:00		44.4	46.1	43.9
	23:22:00	23:22:00		44.5	47.1	43.8
	23:23:00	23:23:00		45.6	56.2	43.6
	23:24:00	23:24:00		47.7	50	45.3
	23:25:00	23:25:00		45.8	48.1	44.5
	23:26:00	23:26:00		45.1	47.3	44.1
	23:27:00	23:27:00		44.6	45.2	44
	23:28:00	23:28:00		38.6	44.7	32.8
	23:29:00	23:29:00		34.7	39.4	33
	23:30:00	23:30:00		36.1	39.6	33.6
	23:31:00	23:31:00		37.1	40.4	34.1
	23:32:00	23:32:00		40.3	47.7	33.7
	23:33:00	23:33:00		39.9	44.9	34.1
	23:34:00	23:34:00		34.5	36.6	32.5
	23:35:00	23:35:00		33.3	34.6	32.5
	23:36:00	23:36:00		33.5	34.9	31.9
	23:37:00	23:37:00		35.2	41.5	31.9
	23:38:00	23:38:00		35.7	41.4	33.4
	23:39:00	23:39:00		33.4	34.9	32.3
	23:40:00	23:40:00		40.2	46.2	31.9
	23:41:00	23:41:00		38.2	41.2	35.2
	23:42:00	23:42:00		40.2	44.5	36.9
	23:43:00	23:43:00		41.3	45.9	36.7
	23:44:00	23:44:00		36.4	40.4	33.4
	23:45:00	23:45:00		37.4	40.4	34
	23:46:00	23:46:00		38	42.4	33.2
	23:47:00	23:47:00		39.1	41.9	36.1

	Baseline SPL
11:24:53 AM	58884.36554
11:25:53 AM	28183.82931
11:26:53 AM	26915.34804
11:27:53 AM	288403.1503
11:28:53 AM	100000
11:29:53 AM	30199.5172
11:30:53 AM	27542.28703
11:31:53 AM	25703.95783
11:32:53 AM	38018.93963
11:33:53 AM	46773.51413
11:34:53 AM	100000
11:35:53 AM	26915.34804
11:36:53 AM	26915.34804
11:37:53 AM	26915.34804
11:38:53 AM	28183.82931
11:39:53 AM	28183.82931
11:40:53 AM	30902.95433
11:41:53 AM	25118.86432
11:42:53 AM	27542.28703
11:43:53 AM	26915.34804
11:44:53 AM	26915.34804
11:45:53 AM	32359.36569
11:46:53 AM	31622.7766
11:47:53 AM	28840.31503
11:48:53 AM	28840.31503
11:49:53 AM	27542.28703
11:50:53 AM	27542.28703
11:51:53 AM	30199.5172
11:52:53 AM	30902.95433
11:53:53 AM	27542.28703
11:54:53 AM	28840.31503
11:55:53 AM	28840.31503
11:56:53 AM	28183.82931
11:57:53 AM	38904.5145
11:58:53 AM	26915.34804
11:59:53 AM	29512.09227
12:00:53 PM	28183.82931
12:01:53 PM	27542.28703
12:02:53 PM	27542.28703
12:03:53 PM	29512.09227
12:04:53 PM	33884.41561
12:05:53 PM	34673.68505
12:06:53 PM	26915.34804
12:07:53 PM	28183.82931
12:08:53 PM	28183.82931
12:09:53 PM	28183.82931
12:10:53 PM	26915.34804
12:11:53 PM	26302.67992
12:12:53 PM	26302.67992
12:13:53 PM	27542.28703
12:14:53 PM	724435.9601
12:15:53 PM	52480.74602
12:16:53 PM	26915.34804
12:17:53 PM	28840.31503
12:18:53 PM	33884.41561
12:19:53 PM	27542.28703
12:20:53 PM	41686.93835
12:21:53 PM	27542.28703
12:22:53 PM	28183.82931
12:23:53 PM	36307.80548
12:24:53 PM	58884.36554
12:25:53 PM	38018.93963
12:26:53 PM	32359.36569
12:27:53 PM	28840.31503
12:28:53 PM	7244.359601
12:29:53 PM	2951.209227
12:30:53 PM	4073.802778
12:31:53 PM	5128.61384
12:32:53 PM	10715.19305
12:33:53 PM	9772.37221
12:34:53 PM	2818.382931
12:35:53 PM	2137.96209
12:36:53 PM	2238.721139
12:37:53 PM	3311.311215
12:38:53 PM	3715.352291
12:39:53 PM	2187.761624
12:40:53 PM	10471.28548
12:41:53 PM	6606.93448
12:42:53 PM	10471.28548
12:43:53 PM	13489.62883
12:44:53 PM	4365.158322
12:45:53 PM	5495.408739
12:46:53 PM	6309.573445
12:47:53 PM	8128.305162

Study #1 - Facility
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
	23:48:00	23:48:00		38.1	41.3	35.4
	23:49:00	23:49:00		36.2	39.7	34.1
	23:50:00	23:50:00		37.5	40.8	34.7
	23:51:00	23:51:00		38.7	41.4	35.5
	23:52:00	23:52:00		45.8	55.5	35
	23:53:00	23:53:00		45.6	53.8	34.7
	23:54:00	23:54:00		37.5	41.4	34
	23:55:00	23:55:00		38.7	42	36.1
	23:56:00	23:56:00		38.9	43.8	35.1
	23:57:00	23:57:00		40.9	44.8	36
	23:58:00	23:58:00		37.9	42.5	34.2
	23:59:00	23:59:00		38.5	41.1	34.9
	24:00:00	24:00:00		39.7	42.2	36.9

	Baseline SPL
12:48:53 PM	6456.54229
12:49:53 PM	4168.693835
12:50:53 PM	5623.413252
12:51:53 PM	7413.102413
12:52:53 PM	38018.93963
12:53:53 PM	36307.80548
12:54:53 PM	5623.413252
12:55:53 PM	7413.102413
12:56:53 PM	7762.471166
12:57:53 PM	12302.68771
12:58:53 PM	6165.950019
12:59:53 PM	7079.457844
1:00:53 PM	9332.543008

Study #2 - Facility
Short-Duration (15-Minute)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1	Time	Baseline SPL ($10^{(Leq/10)}$)
Study #2	0:00:10	1:00:10		46.9	49.5	45.7	3:37:31 PM	48977.8819
Receptor 1	0:00:20	1:00:20		48.6	57.4	43.9	3:37:41 PM	72443.596
	0:00:30	1:00:30		46	53.6	42.2	3:37:51 PM	39810.7171
	0:00:40	1:00:40		44	45.6	43	3:38:01 PM	25118.8643
	0:00:50	1:00:50		44.3	45.1	43.3	3:38:11 PM	26915.348
	0:01:00	1:01:00		43.8	44.8	42.9	3:38:21 PM	23988.3292
	0:01:10	1:01:10		44.4	46.2	42.9	3:38:31 PM	27542.287
	0:01:20	1:01:20		44.4	45.8	42.5	3:38:41 PM	27542.287
	0:01:30	1:01:30		43.7	44.9	42.6	3:38:51 PM	23442.2882
	0:01:40	1:01:40		44.4	45.1	43.6	3:39:01 PM	27542.287
	0:01:50	1:01:50		44.5	45.4	43.6	3:39:11 PM	28183.8293
	0:02:00	1:02:00		44.1	45.4	42.9	3:39:21 PM	25703.9578
	0:02:10	1:02:10		44.6	45.2	43.4	3:39:31 PM	28840.315
	0:02:20	1:02:20		45.3	46.2	44.6	3:39:41 PM	33884.4156
	0:02:30	1:02:30		44	45.2	43.3	3:39:51 PM	25118.8643
	0:02:40	1:02:40		43.2	44.8	42.2	3:40:01 PM	20892.9613
	0:02:50	1:02:50		44	45	43.1	3:40:11 PM	25118.8643
	0:03:00	1:03:00		44.4	46.4	42.9	3:40:21 PM	27542.287
	0:03:10	1:03:10		45.1	45.9	43.8	3:40:31 PM	32359.3657
	0:03:20	1:03:20		45.6	47	43.9	3:40:41 PM	36307.8055
	0:03:30	1:03:30		45.7	47.9	44.3	3:40:51 PM	37153.5229
	0:03:40	1:03:40		48.8	51.6	46.4	3:41:01 PM	75857.7575
	0:03:50	1:03:50		50.2	51.1	48.5	3:41:11 PM	104712.855
	0:04:00	1:04:00		46.9	48.5	45.1	3:41:21 PM	48977.8819
	0:04:10	1:04:10		46.2	47.4	45.1	3:41:31 PM	41686.9383
	0:04:20	1:04:20		46.6	47.7	45.4	3:41:41 PM	45708.819
	0:04:30	1:04:30		46.6	47.8	45.4	3:41:51 PM	45708.819
	0:04:40	1:04:40		49.2	51	45.3	3:42:01 PM	83176.3771
	0:04:50	1:04:50		48	49.6	46.4	3:42:11 PM	63095.7344
	0:05:00	1:05:00		47.2	47.9	46.1	3:42:21 PM	52480.746
	0:05:10	1:05:10		48	48.8	47.1	3:42:31 PM	63095.7344
	0:05:20	1:05:20		48	49.1	46.8	3:42:41 PM	63095.7344
	0:05:30	1:05:30		47.5	48.2	46	3:42:51 PM	56234.1325
	0:05:40	1:05:40		47.1	48.5	45.8	3:43:01 PM	51286.1384
	0:05:50	1:05:50		48.2	48.6	47.7	3:43:11 PM	66069.3448
	0:06:00	1:06:00		47.1	48	46.1	3:43:21 PM	51286.1384
	0:06:10	1:06:10		48.8	49.7	47.8	3:43:31 PM	75857.7575
	0:06:20	1:06:20		50.4	51.8	49.6	3:43:41 PM	109647.82
	0:06:30	1:06:30		51	52.3	49.9	3:43:51 PM	125892.541
	0:06:40	1:06:40		50.5	51.8	49.4	3:44:01 PM	112201.845
	0:06:50	1:06:50		50.3	52	48.9	3:44:11 PM	107151.931
	0:07:00	1:07:00		52.3	53.9	50.4	3:44:21 PM	169824.365
	0:07:10	1:07:10		52.3	53.6	49.4	3:44:31 PM	169824.365
	0:07:20	1:07:20		49.1	50.1	48.5	3:44:41 PM	81283.0516
	0:07:30	1:07:30		48.2	49.4	46.9	3:44:51 PM	66069.3448
	0:07:40	1:07:40		47.4	48.6	46.4	3:45:01 PM	54954.0874
	0:07:50	1:07:50		47	48.8	45.3	3:45:11 PM	50118.7234
	0:08:00	1:08:00		45.1	46.2	43.4	3:45:21 PM	32359.3657
	0:08:10	1:08:10		44.3	45.4	43.1	3:45:31 PM	26915.348
	0:08:20	1:08:20		44.4	45.8	43.3	3:45:41 PM	27542.287
	0:08:30	1:08:30		43.9	45.4	42.3	3:45:51 PM	24547.0892
	0:08:40	1:08:40		42.9	43.5	41.9	3:46:01 PM	19498.446
	0:08:50	1:08:50		43.4	44.5	42.4	3:46:11 PM	21877.6162
	0:09:00	1:09:00		43.7	45.2	42.5	3:46:21 PM	23442.2882
	0:09:10	1:09:10		42.9	44.4	41.8	3:46:31 PM	19498.446
	0:09:20	1:09:20		42.4	43.6	41.1	3:46:41 PM	17378.0083
	0:09:30	1:09:30		42.3	43.4	41.4	3:46:51 PM	16982.4365
	0:09:40	1:09:40		41.6	42.7	40.8	3:47:01 PM	14454.3977
	0:09:50	1:09:50		41.8	43.2	41.1	3:47:11 PM	15135.6125
	0:10:00	1:10:00		41.8	43	41.1	3:47:21 PM	15135.6125
	0:10:10	1:10:10		40.9	42.2	39.9	3:47:31 PM	12302.6877
	0:10:20	1:10:20		41.9	42.8	40.8	3:47:41 PM	15488.1662
	0:10:30	1:10:30		41.9	42.6	41.3	3:47:51 PM	15488.1662
	0:10:40	1:10:40		42.4	43.3	41.2	3:48:01 PM	17378.0083
	0:10:50	1:10:50		43.3	45.8	40.4	3:48:11 PM	21379.6209
	0:11:00	1:11:00		42.1	43.6	40	3:48:21 PM	16218.101

Start:	3:37:21 PM
End:	3:52:21 PM
Measured:	12/20/2018

Baseline Noise Level (15-Min.)

L_{eq}:	46.9

Study #2 - Facility
Short-Duration (15-Minute)

0:11:10	1:11:10	42.8	44	41.9	3:48:31 PM	19054.6072
0:11:20	1:11:20	42.8	43.8	41.3	3:48:41 PM	19054.6072
0:11:30	1:11:30	43	44.9	41.3	3:48:51 PM	19952.6231
0:11:40	1:11:40	42.4	43.5	41.6	3:49:01 PM	17378.0083
0:11:50	1:11:50	42.9	44.2	42.3	3:49:11 PM	19498.446
0:12:00	1:12:00	45	46.1	43.8	3:49:21 PM	31622.7766
0:12:10	1:12:10	44	45.4	42.9	3:49:31 PM	25118.8643
0:12:20	1:12:20	44.9	46	43	3:49:41 PM	30902.9543
0:12:30	1:12:30	44.1	45.7	42.9	3:49:51 PM	25703.9578
0:12:40	1:12:40	43.7	45	42.4	3:50:01 PM	23442.2882
0:12:50	1:12:50	44.7	46.6	42.4	3:50:11 PM	29512.0923
0:13:00	1:13:00	45.4	48	43.6	3:50:21 PM	34673.685
0:13:10	1:13:10	49.8	51	47.9	3:50:31 PM	95499.2586
0:13:20	1:13:20	47.4	49.1	44.7	3:50:41 PM	54954.0874
0:13:30	1:13:30	46.7	48.2	44.7	3:50:51 PM	46773.5141
0:13:40	1:13:40	46.3	47.4	45.3	3:51:01 PM	42657.9519
0:13:50	1:13:50	47.5	50.3	45.7	3:51:11 PM	56234.1325
0:14:00	1:14:00	46.7	48.4	45.3	3:51:21 PM	46773.5141
0:14:10	1:14:10	50.4	51.6	47.4	3:51:31 PM	109647.82
0:14:20	1:14:20	51.4	52.4	50.2	3:51:41 PM	138038.426
0:14:30	1:14:30	50.4	51.7	49.2	3:51:51 PM	109647.82
0:14:40	1:14:40	50.6	51.7	49.2	3:52:01 PM	114815.362
0:14:50	1:14:50	49.9	50.7	49.3	3:52:11 PM	97723.7221
0:15:00	1:15:00	50	50.8	49.4	3:52:21 PM	100000

Study #3 - Haul Route
Long-Duration (24-Hours)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
Study #3	0:01:00	0:01:00		54.8	61.6	40.4
Receptor 4	0:02:00	0:02:00		52.1	59.5	45.5
	0:03:00	0:03:00		61.5	73.9	46
	0:04:00	0:04:00		54.9	67.4	41.2
	0:05:00	0:05:00		41.7	46.5	40.4
	0:06:00	0:06:00		44	51.4	41.3
	0:07:00	0:07:00		45.4	49.7	42
	0:08:00	0:08:00		44.5	52.6	40.8
	0:09:00	0:09:00		47	58.1	41
	0:10:00	0:10:00		44.1	53.7	39.2
	0:11:00	0:11:00		53.9	61.5	42.8
	0:12:00	0:12:00		52.5	57.9	44.2
	0:13:00	0:13:00		56.6	59.1	53.7
	0:14:00	0:14:00		51.1	57.2	44.5
	0:15:00	0:15:00		59.5	72.5	45.4
	0:16:00	0:16:00		58.6	69.8	43.6
	0:17:00	0:17:00		53.5	63.8	41.1
	0:18:00	0:18:00		44.3	47.6	41.6
	0:19:00	0:19:00		50.6	54.5	44.8
	0:20:00	0:20:00		50.7	56.8	43.6
	0:21:00	0:21:00		50.7	54.4	45.3
	0:22:00	0:22:00		45.9	50.1	43.5
	0:23:00	0:23:00		54.1	57.1	48.8
	0:24:00	0:24:00		51.2	56.4	43
	0:25:00	0:25:00		50.9	61.7	43
	0:26:00	0:26:00		50.3	56.9	44
	0:27:00	0:27:00		59.2	70.6	43.3
	0:28:00	0:28:00		55.7	59.8	44.5
	0:29:00	0:29:00		52.3	58.8	44
	0:30:00	0:30:00		59.4	66.5	52.1
	0:31:00	0:31:00		55.6	60	51.7
	0:32:00	0:32:00		59.2	66.4	43.6
	0:33:00	0:33:00		57.3	66.9	40.5
	0:34:00	0:34:00		40	43.3	38
	0:35:00	0:35:00		39	40.8	37.9
	0:36:00	0:36:00		50.1	60.9	40.3
	0:37:00	0:37:00		55.7	65.6	40.7
	0:38:00	0:38:00		39.9	42	37.8
	0:39:00	0:39:00		39.6	40.5	38.2
	0:40:00	0:40:00		42	44.2	39.6
	0:41:00	0:41:00		49.8	59.5	39.7
	0:42:00	0:42:00		52.9	62.7	40.8
	0:43:00	0:43:00		55.6	62.5	44.7
	0:44:00	0:44:00		40.9	45.6	37.9
	0:45:00	0:45:00		39.3	41.4	38.1
	0:46:00	0:46:00		39.9	41.7	38.7
	0:47:00	0:47:00		39.7	40.8	38.7
	0:48:00	0:48:00		39.2	40.2	38.5
	0:49:00	0:49:00		39.2	41.2	38.1
	0:50:00	0:50:00		39.1	41.5	38
	0:51:00	0:51:00		39.7	41.9	38
	0:52:00	0:52:00		39	40.2	38.3
	0:53:00	0:53:00		38.7	40.2	38
	0:54:00	0:54:00		42.1	46.1	38
	0:55:00	0:55:00		42.5	52.3	38.5
	0:56:00	0:56:00		40.5	44.7	38.2
	0:57:00	0:57:00		42.4	47.8	38
	0:58:00	0:58:00		57.1	67.6	41.8
	0:59:00	0:59:00		40.6	43.5	39
	1:00:00	1:00:00		40.8	43.6	39.6
	1:01:00	1:01:00		45.4	60.9	37.9
	1:02:00	1:02:00		40.2	48.1	37.7
	1:03:00	1:03:00		40.1	42.4	38.3
	1:04:00	1:04:00		39.9	45.5	37.8
	1:05:00	1:05:00		41.3	43.6	38.6
	1:06:00	1:06:00		41.1	43.8	39.3
	1:07:00	1:07:00		41	43.3	39.2
	1:08:00	1:08:00		41.8	48.8	38.4
	1:09:00	1:09:00		41.3	43	39.2
	1:10:00	1:10:00		40.4	42.9	38.6
	1:11:00	1:11:00		43	54	38.6
	1:12:00	1:12:00		40.6	43.4	38.9
	1:13:00	1:13:00		51.6	56.2	42
	1:14:00	1:14:00		54.3	60.7	43.1
	1:15:00	1:15:00		61.7	74.7	46.1
	1:16:00	1:16:00		51.7	57.6	41
	1:17:00	1:17:00		54.1	62.6	45.5
	1:18:00	1:18:00		45.4	46.4	44.7
	1:19:00	1:19:00		48.3	59.5	45
	1:20:00	1:20:00		56.8	63	42.1
	1:21:00	1:21:00		40.5	43.5	37.7
	1:22:00	1:22:00		38.8	40	37.7
	1:23:00	1:23:00		38.3	39.5	37.4
	1:24:00	1:24:00		38.5	41.7	37
	1:25:00	1:25:00		42.6	46.5	39.6
	1:26:00	1:26:00		40.9	43	38.9
	1:27:00	1:27:00		39.4	41.5	37.5
	1:28:00	1:28:00		38.4	39.7	37.5
	1:29:00	1:29:00		39.5	41.1	37.8
	1:30:00	1:30:00		38.6	40.6	37.5
	1:31:00	1:31:00		44	52.1	37.9

	Time	Date
Start:	7:43:29 PM	1/23/2019
End:	7:43:29 PM	1/24/2019

Baseline Noise Level (24-Hour)

24-Hour L_{eq}:	57.5

Baseline Noise Level - CNEL

R4:	58.9
R5:	62.2

Baseline Noise Level (L_{eq}1H) @ R4

Daytime:	59.8
Evening:	50.7
Nighttime:	47.9

	15-Min L_{eq}	24-Hour L_{eq}	Difference
Study #4A	56.3	55.1	1.3
Study #5	66.3	46.4	19.8
Study #4B	62.4	52.7	9.7
Study #4C	67.7	50.8	16.9
Study #6	69.9	52.3	17.5

Composite Correction Factor @ R4: 13.0

	Daytime L_{eq}	Evening L_{eq}	Nighttime L_{eq}
Study #4A	61.1	52.0	49.2
Study #5	79.7	70.6	67.7
Study #4B	69.5	60.4	57.6
Study #4C	76.7	67.6	64.8
Study #6	77.4	68.3	65.4

	Daytime L_{eq}	Evening L_{eq}	Nighttime L_{eq}
Study #4	77.6	69.0	65.6
Study #5	79.7	66.3	67.7
Study #6	77.4	69.9	65.4

		Time	Baseline SPL ($10^{(Leq/10)}$)
		7:44:29 PM	301995.172
		7:45:29 PM	162181.0097
		7:46:29 PM	1412537.545
		7:47:29 PM	309029.5433
		7:48:29 PM	14791.08388
		7:49:29 PM	25118.86432
		7:50:29 PM	34673.68505
		7:51:29 PM	28183.82931
		7:52:29 PM	50118.72336
		7:53:29 PM	25703.95783
		7:54:29 PM	245470.8916
		7:55:29 PM	177827.941
		7:56:29 PM	457088.1896
		7:57:29 PM	128824.9552
R5-A	Study #4A	7:58:29 PM	891250.9381
R5-A	Study #4A	7:59:29 PM	724435.9601
R5-A	Study #4A	8:00:29 PM	223872.1139
R5-A	Study #4A	8:01:29 PM	26915.34804
R5-A	Study #4A	8:02:29 PM	114815.3621
R5-A	Study #4A	8:03:29 PM	117489.7555
R5-A	Study #4A	8:04:29 PM	117489.7555
R5-A	Study #4A	8:05:29 PM	38904.5145
R5-A	Study #4A	8:06:29 PM	257039.5783
R5-A	Study #4A	8:07:29 PM	131825.6739
R5-A	Study #4A	8:08:29 PM	123026.8771
R5-A	Study #4A	8:09:29 PM	107151.9305
R5-A	Study #4A	8:10:29 PM	831763.7711
R5-A	Study #4A	8:11:29 PM	371535.2291
R5-A	Study #4A	8:12:29 PM	169824.3652
R5-A	Study #4A	8:13:29 PM	870963.59
		8:14:29 PM	363078.0548
		8:15:29 PM	831763.7711
		8:16:29 PM	537031.7964
		8:17:29 PM	10000
		8:18:29 PM	7943.282347
		8:19:29 PM	102329.2992
		8:20:29 PM	371535.2291
		8:21:29 PM	9772.37221
		8:22:29 PM	9120.108394
		8:23:29 PM	15848.93192
		8:24:29 PM	95499.2586
		8:25:29 PM	194984.46
		8:26:29 PM	363078.0548
		8:27:29 PM	12302.68771
		8:28:29 PM	8511.380382
		8:29:29 PM	9772.37221
		8:30:29 PM	9332.543008
		8:31:29 PM	8317.637711
R5-B	Study #5	8:32:29 PM	8317.637711
R5-B	Study #5	8:33:29 PM	8128.305162
R5-B	Study #5	8:34:29 PM	9332.543008
R5-B	Study #5	8:35:29 PM	7943.282347
R5-B	Study #5	8:36:29 PM	7413.102413
R5-B	Study #5	8:37:29 PM	16218.10097
R5-B	Study #5	8:38:29 PM	17782.7941
R5-B	Study #5	8:39:29 PM	11220.18454
R5-B	Study #5	8:40:29 PM	17378.00829
R5-B	Study #5	8:41:29 PM	512861.384
R5-B	Study #5	8:42:29 PM	11481.53621
R5-B	Study #5	8:43:29 PM	12022.64435
R5-B	Study #5	8:44:29 PM	34673.68505
R5-B	Study #5	8:45:29 PM	10471.28548
R5-B	Study #5	8:46:29 PM	10232.92992
R5-B	Study #5	8:47:29 PM	9772.37221
R5-A	Study #4B	8:48:29 PM	13489.62883
R5-A	Study #4B	8:49:29 PM	12882.49552
R5-A	Study #4B	8:50:29 PM	12589.25412
R5-A	Study #4B	8:51:29 PM	15135.61248
R5-A	Study #4B	8:52:29 PM	13489.62883
R5-A	Study #4B	8:53:29 PM	10964.78196
R5-A	Study #4B	8:54:29 PM	19952.62315
R5-A	Study #4B	8:55:29 PM	11481.53621
R5-A	Study #4B	8:56:29 PM	144543.9771
R5-A	Study #4B	8:57:29 PM	269153.4804
R5-A	Study #4B	8:58:29 PM	1479108.388
R5-A	Study #4B	8:59:29 PM	147910.8388
R5-A	Study #4B	9:00:29 PM	257039.5783
R5-A	Study #4B	9:01:29 PM	34673.68505
R5-A	Study #4B	9:02:29 PM	67608.29754
R5-A	Study #4B	9:03:29 PM	478630.0923
		9:04:29 PM	11220.18454
		9:05:29 PM	7585.77575
		9:06:29 PM	6760.829754
		9:07:29 PM	7079.457844
		9:08:29 PM	18197.00859
		9:09:29 PM	12302.68771
		9:10:29 PM	8709.6359
		9:11:29 PM	6918.309709
		9:12:29 PM	8912.509381
		9:13:29 PM	7244.359601
		9:14:29 PM	25118.86432

1:32:00	1:32:00	52.6	57.8	42.2	9:15:29 PM	181970.0859
1:33:00	1:33:00	39.7	43	37.8	9:16:29 PM	9332.543008
1:34:00	1:34:00	39	41.9	37.4	9:17:29 PM	7943.282347
1:35:00	1:35:00	38.2	39.9	37.1	9:18:29 PM	6606.93448
1:36:00	1:36:00	39.1	40.5	38.3	9:19:29 PM	8128.305162
1:37:00	1:37:00	41.8	45.1	38.8	9:20:29 PM	15135.61248
1:38:00	1:38:00	39.1	41.1	37.8	9:21:29 PM	8128.305162
1:39:00	1:39:00	40.3	41.6	38.5	9:22:29 PM	10715.19305
1:40:00	1:40:00	40.6	44.7	38.6	9:23:29 PM	11481.53621
1:41:00	1:41:00	42.1	46	39.3	9:24:29 PM	16218.10097
1:42:00	1:42:00	39.8	42.1	38.7	9:25:29 PM	9549.92586
1:43:00	1:43:00	40.4	41.7	39.2	9:26:29 PM	10964.78196
1:44:00	1:44:00	39.7	41.1	38.4	9:27:29 PM	9332.543008
1:45:00	1:45:00	39.3	41.9	38	9:28:29 PM	8511.380382
1:46:00	1:46:00	42	47.9	38.9	9:29:29 PM	15848.93192
1:47:00	1:47:00	41.9	46.6	39.4	9:30:29 PM	15488.16619
1:48:00	1:48:00	40.2	43.2	38.8	9:31:29 PM	10471.28548
1:49:00	1:49:00	39.4	41.3	38.4	9:32:29 PM	8709.6359
1:50:00	1:50:00	39.5	41.3	38.2	9:33:29 PM	8912.509381
1:51:00	1:51:00	39.1	41.4	37.4	9:34:29 PM	8128.305162
1:52:00	1:52:00	38	39.2	37.1	9:35:29 PM	6309.573445
1:53:00	1:53:00	41.1	43.5	37.8	9:36:29 PM	12882.49552
1:54:00	1:54:00	38.9	40.4	37.3	9:37:29 PM	7762.471166
1:55:00	1:55:00	38.2	40.6	37	9:38:29 PM	6606.93448
1:56:00	1:56:00	39.3	40.4	37.8	9:39:29 PM	8511.380382
1:57:00	1:57:00	39.1	40	37.6	9:40:29 PM	8128.305162
1:58:00	1:58:00	38.3	40.5	37.4	9:41:29 PM	6760.829754
1:59:00	1:59:00	40.8	50.1	37.3	9:42:29 PM	12022.64435
2:00:00	2:00:00	40.7	43.1	39	9:43:29 PM	11748.97555
2:01:00	2:01:00	40.6	42.5	38.6	9:44:29 PM	11481.53621
2:02:00	2:02:00	41.2	43.3	39	9:45:29 PM	13182.56739
2:03:00	2:03:00	39.6	41.9	38.5	9:46:29 PM	9120.108394
2:04:00	2:04:00	38.4	39.8	37	9:47:29 PM	6918.309709
2:05:00	2:05:00	40.8	42.5	37.7	9:48:29 PM	12022.64435
2:06:00	2:06:00	38.8	40.4	37.3	9:49:29 PM	7585.77575
2:07:00	2:07:00	39	40.9	37	9:50:29 PM	7943.282347
2:08:00	2:08:00	38	39	37	9:51:29 PM	6309.573445
2:09:00	2:09:00	37.9	40.6	36.7	9:52:29 PM	6165.950019
2:10:00	2:10:00	37.1	38.4	36.2	9:53:29 PM	5128.61384
2:11:00	2:11:00	37.4	38.9	36.6	9:54:29 PM	5495.408739
2:12:00	2:12:00	37.8	39.4	36.5	9:55:29 PM	6025.595861
2:13:00	2:13:00	38.7	40.1	37.6	9:56:29 PM	7413.102413
2:14:00	2:14:00	39.4	42.4	37.3	9:57:29 PM	8709.6359
2:15:00	2:15:00	52.4	58.2	41.6	9:58:29 PM	173780.0829
2:16:00	2:16:00	50.5	55.9	42.1	9:59:29 PM	112201.8454
2:17:00	2:17:00	41.2	43.3	39.5	10:00:29 PM	13182.56739
2:18:00	2:18:00	40.1	41.8	39	10:01:29 PM	10232.92992
2:19:00	2:19:00	40.8	42.2	39	10:02:29 PM	12022.64435
2:20:00	2:20:00	39.6	41.1	38.1	10:03:29 PM	9120.108394
2:21:00	2:21:00	39.9	41.1	38.9	10:04:29 PM	9772.37221
2:22:00	2:22:00	39.8	41.3	38.6	10:05:29 PM	9549.92586
2:23:00	2:23:00	39.4	40.9	38.4	10:06:29 PM	8709.6359
2:24:00	2:24:00	38.7	41.7	37.3	10:07:29 PM	7413.102413
2:25:00	2:25:00	38.1	38.9	37.1	10:08:29 PM	6456.54229
2:26:00	2:26:00	38.5	39.6	37.5	10:09:29 PM	7079.457844
2:27:00	2:27:00	38.9	39.7	37.8	10:10:29 PM	7762.471166
2:28:00	2:28:00	38.9	40.4	37.7	10:11:29 PM	7762.471166
2:29:00	2:29:00	40.3	43	38.6	10:12:29 PM	10715.19305
2:30:00	2:30:00	52.8	59.2	40.3	10:13:29 PM	190546.0718
2:31:00	2:31:00	51.2	55.3	44.8	10:14:29 PM	131825.6739
2:32:00	2:32:00	43.8	45.9	42.3	10:15:29 PM	23988.32919
2:33:00	2:33:00	42.8	46	40.4	10:16:29 PM	19054.60718
2:34:00	2:34:00	46.7	53.7	39.8	10:17:29 PM	46773.51413
2:35:00	2:35:00	54.3	60.3	40.6	10:18:29 PM	269153.4804
2:36:00	2:36:00	41.6	44.9	39.1	10:19:29 PM	14454.39771
2:37:00	2:37:00	42.2	44.3	40.5	10:20:29 PM	16595.86907
2:38:00	2:38:00	41.6	44.6	40.1	10:21:29 PM	14454.39771
2:39:00	2:39:00	41.7	43.7	40.5	10:22:29 PM	14791.08388
2:40:00	2:40:00	42.5	45.5	40.6	10:23:29 PM	17782.7941
2:41:00	2:41:00	43.6	45.7	41.4	10:24:29 PM	22908.67653
2:42:00	2:42:00	43.5	51.5	39.9	10:25:29 PM	22387.21139
2:43:00	2:43:00	42.1	49.6	40.4	10:26:29 PM	16218.10097
2:44:00	2:44:00	41.6	43.7	40	10:27:29 PM	14454.39771
2:45:00	2:45:00	43.3	46.1	40.3	10:28:29 PM	21379.6209
2:46:00	2:46:00	59.3	68.5	45.7	10:29:29 PM	851138.0382
2:47:00	2:47:00	54.9	64.6	48.4	10:30:29 PM	309029.5433
2:48:00	2:48:00	43.7	48.5	40.1	10:31:29 PM	23442.28815
2:49:00	2:49:00	40.3	42.5	38.9	10:32:29 PM	10715.19305
2:50:00	2:50:00	42.4	45.6	40.4	10:33:29 PM	17378.00829
2:51:00	2:51:00	42.7	46	41.1	10:34:29 PM	18620.87137
2:52:00	2:52:00	42.2	44.1	40.6	10:35:29 PM	16595.86907
2:53:00	2:53:00	43.5	45.3	41.4	10:36:29 PM	22387.21139
2:54:00	2:54:00	44	45.5	41.8	10:37:29 PM	25118.86432
2:55:00	2:55:00	44.5	46.2	42.6	10:38:29 PM	28183.82931
2:56:00	2:56:00	44.3	51.1	41.2	10:39:29 PM	26915.34804
2:57:00	2:57:00	41.8	43.1	40.7	10:40:29 PM	15135.61248
2:58:00	2:58:00	42.4	44.5	41.2	10:41:29 PM	17378.00829
2:59:00	2:59:00	42	43.4	41.3	10:42:29 PM	15848.93192
3:00:00	3:00:00	41.7	44.3	40.4	10:43:29 PM	14791.08388
3:01:00	3:01:00	41.1	41.8	40.1	10:44:29 PM	12882.49552
3:02:00	3:02:00	42.1	43	41.5	10:45:29 PM	16218.10097
3:03:00	3:03:00	42.3	44.1	41.1	10:46:29 PM	16982.43652
3:04:00	3:04:00	42.4	44.3	40.8	10:47:29 PM	17378.00829
3:05:00	3:05:00	43.4	46.7	42.2	10:48:29 PM	21877.61624
3:06:00	3:06:00	45.3	50.3	42.8	10:49:29 PM	33884.41561

3:07:00	3:07:00	42.5	43.8	41.3	10:50:29 PM	17782.7941
3:08:00	3:08:00	41.8	45.1	39.9	10:51:29 PM	15135.61248
3:09:00	3:09:00	42.2	46.6	39.7	10:52:29 PM	16595.86907
3:10:00	3:10:00	56.6	67.4	41.4	10:53:29 PM	457088.1896
3:11:00	3:11:00	39.7	41.6	38.7	10:54:29 PM	9332.543008
3:12:00	3:12:00	39.9	41.8	38.4	10:55:29 PM	9772.37221
3:13:00	3:13:00	43	46.9	40.3	10:56:29 PM	19952.62315
3:14:00	3:14:00	42.6	44.2	41.2	10:57:29 PM	18197.00859
3:15:00	3:15:00	42.2	42.9	41.5	10:58:29 PM	16595.86907
3:16:00	3:16:00	41.2	44.1	39	10:59:29 PM	13182.56739
3:17:00	3:17:00	42.7	45.8	40.3	11:00:29 PM	18620.87137
3:18:00	3:18:00	40.7	42	39.3	11:01:29 PM	11748.97555
3:19:00	3:19:00	41.1	43.7	40.1	11:02:29 PM	12882.49552
3:20:00	3:20:00	42.7	47.8	38.5	11:03:29 PM	18620.87137
3:21:00	3:21:00	41.9	45.6	39.7	11:04:29 PM	15488.16619
3:22:00	3:22:00	41	42.9	39	11:05:29 PM	12589.25412
3:23:00	3:23:00	43.2	50.9	39	11:06:29 PM	20892.96131
3:24:00	3:24:00	39.7	41.3	38.7	11:07:29 PM	9332.543008
3:25:00	3:25:00	40.5	43.3	38.7	11:08:29 PM	11220.18454
3:26:00	3:26:00	40.3	42.2	39	11:09:29 PM	10715.19305
3:27:00	3:27:00	42.4	46.6	38.9	11:10:29 PM	17378.00829
3:28:00	3:28:00	57.9	72.4	41.9	11:11:29 PM	616595.0019
3:29:00	3:29:00	43.3	47	40.1	11:12:29 PM	21379.6209
3:30:00	3:30:00	42.8	46	40.4	11:13:29 PM	19054.60718
3:31:00	3:31:00	41.7	43.9	40.3	11:14:29 PM	14791.08388
3:32:00	3:32:00	42.6	47.3	40.4	11:15:29 PM	18197.00859
3:33:00	3:33:00	42.1	43.9	40.6	11:16:29 PM	16218.10097
3:34:00	3:34:00	40.4	41.2	39.4	11:17:29 PM	10964.78196
3:35:00	3:35:00	42.8	45.1	40.7	11:18:29 PM	19054.60718
3:36:00	3:36:00	41.8	43.4	41	11:19:29 PM	15135.61248
3:37:00	3:37:00	41.2	42.6	39.7	11:20:29 PM	13182.56739
3:38:00	3:38:00	40.8	42.1	39.8	11:21:29 PM	12022.64435
3:39:00	3:39:00	42.2	48.7	40	11:22:29 PM	16595.86907
3:40:00	3:40:00	41.6	44.3	40.1	11:23:29 PM	14454.39771
3:41:00	3:41:00	41.9	44.5	40.4	11:24:29 PM	15488.16619
3:42:00	3:42:00	42.6	48	39.8	11:25:29 PM	18197.00859
3:43:00	3:43:00	44.7	51.9	42.7	11:26:29 PM	29512.09227
3:44:00	3:44:00	44.6	48.6	41.4	11:27:29 PM	28840.31503
3:45:00	3:45:00	44.9	48.8	42.4	11:28:29 PM	30902.95433
3:46:00	3:46:00	42.8	44.2	41.5	11:29:29 PM	19054.60718
3:47:00	3:47:00	42.5	44.7	40.7	11:30:29 PM	17782.7941
3:48:00	3:48:00	44.8	48.4	42.5	11:31:29 PM	30199.5172
3:49:00	3:49:00	42.5	44.7	41	11:32:29 PM	17782.7941
3:50:00	3:50:00	41.2	42.6	39.7	11:33:29 PM	13182.56739
3:51:00	3:51:00	40.5	43.3	38.8	11:34:29 PM	11220.18454
3:52:00	3:52:00	41.3	44.1	39.9	11:35:29 PM	13489.62883
3:53:00	3:53:00	41.5	44.2	39.7	11:36:29 PM	14125.37545
3:54:00	3:54:00	41.2	44.3	39.6	11:37:29 PM	13182.56739
3:55:00	3:55:00	42.3	44.1	40.7	11:38:29 PM	16982.43652
3:56:00	3:56:00	42.1	44.6	40.1	11:39:29 PM	16218.10097
3:57:00	3:57:00	41.9	43.4	39.6	11:40:29 PM	15488.16619
3:58:00	3:58:00	40.5	41.7	39.2	11:41:29 PM	11220.18454
3:59:00	3:59:00	42	44.8	40.6	11:42:29 PM	15848.93192
4:00:00	4:00:00	40.4	41.5	39.3	11:43:29 PM	10964.78196
4:01:00	4:01:00	43.7	45.7	41.4	11:44:29 PM	23442.28815
4:02:00	4:02:00	48.2	52.6	45.4	11:45:29 PM	66069.3448
4:03:00	4:03:00	49.3	57.6	40.2	11:46:29 PM	85113.80382
4:04:00	4:04:00	41.5	45	39.7	11:47:29 PM	14125.37545
4:05:00	4:05:00	42	44.7	40.7	11:48:29 PM	15848.93192
4:06:00	4:06:00	42.3	43.6	41.1	11:49:29 PM	16982.43652
4:07:00	4:07:00	43.6	44.8	42.3	11:50:29 PM	22908.67653
4:08:00	4:08:00	42.6	44.9	41.3	11:51:29 PM	18197.00859
4:09:00	4:09:00	41.7	43	40.4	11:52:29 PM	14791.08388
4:10:00	4:10:00	41.5	42.9	39.7	11:53:29 PM	14125.37545
4:11:00	4:11:00	49.4	60.4	40.8	11:54:29 PM	87096.359
4:12:00	4:12:00	43.5	44.6	42.4	11:55:29 PM	22387.21139
4:13:00	4:13:00	43.9	45	42.6	11:56:29 PM	24547.08916
4:14:00	4:14:00	43.4	49.5	41.6	11:57:29 PM	21877.61624
4:15:00	4:15:00	42.5	45.1	41	11:58:29 PM	17782.7941
4:16:00	4:16:00	42	44	40.3	11:59:29 PM	15848.93192
4:17:00	4:17:00	41.4	43.3	39.9	12:00:29 AM	13803.84265
4:18:00	4:18:00	41.2	42.6	40	12:01:29 AM	13182.56739
4:19:00	4:19:00	40.7	43.4	39.5	12:02:29 AM	11748.97555
4:20:00	4:20:00	40.6	41.8	39.7	12:03:29 AM	11481.53621
4:21:00	4:21:00	40.7	42.5	39.3	12:04:29 AM	11748.97555
4:22:00	4:22:00	39.7	43.5	37.5	12:05:29 AM	9332.543008
4:23:00	4:23:00	37.7	39.8	36.8	12:06:29 AM	5888.436554
4:24:00	4:24:00	38.9	41.3	37.6	12:07:29 AM	7762.471166
4:25:00	4:25:00	40.4	42.7	38.9	12:08:29 AM	10964.78196
4:26:00	4:26:00	40.3	42.1	38.1	12:09:29 AM	10715.19305
4:27:00	4:27:00	39.5	41.2	38	12:10:29 AM	8912.509381
4:28:00	4:28:00	40	41.4	39.1	12:11:29 AM	10000
4:29:00	4:29:00	42.5	45.1	40.6	12:12:29 AM	17782.7941
4:30:00	4:30:00	41.4	46.8	39.8	12:13:29 AM	13803.84265
4:31:00	4:31:00	39.6	40.9	38.7	12:14:29 AM	9120.108394
4:32:00	4:32:00	40	41.8	38.9	12:15:29 AM	10000
4:33:00	4:33:00	40.8	41.8	39.4	12:16:29 AM	12022.64435
4:34:00	4:34:00	40.4	42	39.2	12:17:29 AM	10964.78196
4:35:00	4:35:00	40.4	41.2	39.5	12:18:29 AM	10964.78196
4:36:00	4:36:00	51.2	59	39.7	12:19:29 AM	131825.6739
4:37:00	4:37:00	56.3	68.5	44.3	12:20:29 AM	426579.5188
4:38:00	4:38:00	42.1	46.8	40.5	12:21:29 AM	16218.10097
4:39:00	4:39:00	42.5	46.2	40.6	12:22:29 AM	17782.7941
4:40:00	4:40:00	41.5	43.5	40.5	12:23:29 AM	14125.37545
4:41:00	4:41:00	41.8	43.4	40.3	12:24:29 AM	15135.61248

4:42:00	4:42:00	40.9	43.2	39.3	12:25:29 AM	12302.68771
4:43:00	4:43:00	41.3	42.6	40.5	12:26:29 AM	13489.62883
4:44:00	4:44:00	41.3	42.7	40.1	12:27:29 AM	13489.62883
4:45:00	4:45:00	42.8	46.4	40.3	12:28:29 AM	19054.60718
4:46:00	4:46:00	43.4	45	42.3	12:29:29 AM	21877.61624
4:47:00	4:47:00	41.9	43.4	40.4	12:30:29 AM	15488.16619
4:48:00	4:48:00	40.1	41.2	38.9	12:31:29 AM	10232.92992
4:49:00	4:49:00	40.7	42.7	39.7	12:32:29 AM	11748.97555
4:50:00	4:50:00	40.2	41.5	39.6	12:33:29 AM	10471.28548
4:51:00	4:51:00	41.5	42.6	39.8	12:34:29 AM	14125.37545
4:52:00	4:52:00	42.2	43.5	40.8	12:35:29 AM	16595.86907
4:53:00	4:53:00	43.2	44.8	41.6	12:36:29 AM	20892.96131
4:54:00	4:54:00	42.4	44.9	40.8	12:37:29 AM	17378.00829
4:55:00	4:55:00	42.2	44.4	41	12:38:29 AM	16595.86907
4:56:00	4:56:00	41.9	44.7	39.6	12:39:29 AM	15488.16619
4:57:00	4:57:00	41.7	45.4	40	12:40:29 AM	14791.08388
4:58:00	4:58:00	42	45.7	40.2	12:41:29 AM	15848.93192
4:59:00	4:59:00	41.4	42.6	40.5	12:42:29 AM	13803.84265
5:00:00	5:00:00	41	42.3	39.9	12:43:29 AM	12589.25412
5:01:00	5:01:00	42	46	40.1	12:44:29 AM	15848.93192
5:02:00	5:02:00	40.7	42.7	38.7	12:45:29 AM	11748.97555
5:03:00	5:03:00	40.4	42.4	39.2	12:46:29 AM	10964.78196
5:04:00	5:04:00	43.3	48.7	38.5	12:47:29 AM	21379.6209
5:05:00	5:05:00	43.2	48.3	38.2	12:48:29 AM	20892.96131
5:06:00	5:06:00	40.8	42.2	38.9	12:49:29 AM	12022.64435
5:07:00	5:07:00	39.7	41.9	38.5	12:50:29 AM	9332.543008
5:08:00	5:08:00	40.6	46.8	38.2	12:51:29 AM	11481.53621
5:09:00	5:09:00	42.2	46.2	38.9	12:52:29 AM	16595.86907
5:10:00	5:10:00	40.8	42.5	39.4	12:53:29 AM	12022.64435
5:11:00	5:11:00	42.4	45.6	40.1	12:54:29 AM	17378.00829
5:12:00	5:12:00	43.1	45	40.5	12:55:29 AM	20417.37945
5:13:00	5:13:00	40.6	42.8	38.5	12:56:29 AM	11481.53621
5:14:00	5:14:00	39.5	40.4	38.4	12:57:29 AM	8912.509381
5:15:00	5:15:00	40.9	44.3	39.2	12:58:29 AM	12302.68771
5:16:00	5:16:00	39.7	40.5	38.9	12:59:29 AM	9332.543008
5:17:00	5:17:00	40.7	41.8	40.1	1:00:29 AM	11748.97555
5:18:00	5:18:00	41.9	42.9	41	1:01:29 AM	15488.16619
5:19:00	5:19:00	41.2	42.7	40.3	1:02:29 AM	13182.56739
5:20:00	5:20:00	59.5	69.9	40.7	1:03:29 AM	891250.9381
5:21:00	5:21:00	54.3	65.1	40.4	1:04:29 AM	269153.4804
5:22:00	5:22:00	51.9	57.5	42	1:05:29 AM	154881.6619
5:23:00	5:23:00	45.4	53.6	41.2	1:06:29 AM	34673.68505
5:24:00	5:24:00	40.3	45.1	37.9	1:07:29 AM	10715.19305
5:25:00	5:25:00	37.7	40	36.1	1:08:29 AM	5888.436554
5:26:00	5:26:00	38.9	41.1	37.3	1:09:29 AM	7762.471166
5:27:00	5:27:00	39.1	42.7	36.9	1:10:29 AM	8128.305162
5:28:00	5:28:00	38.7	42.1	37.2	1:11:29 AM	7413.102413
5:29:00	5:29:00	37.8	38.8	36.9	1:12:29 AM	6025.595861
5:30:00	5:30:00	36.7	37.8	35.7	1:13:29 AM	4677.351413
5:31:00	5:31:00	36.4	38.5	35.1	1:14:29 AM	4365.158322
5:32:00	5:32:00	36.7	38.4	35.8	1:15:29 AM	4677.351413
5:33:00	5:33:00	37.9	39.6	36.2	1:16:29 AM	6165.950019
5:34:00	5:34:00	38	38.7	37.4	1:17:29 AM	6309.573445
5:35:00	5:35:00	40	41.3	37.5	1:18:29 AM	10000
5:36:00	5:36:00	40.5	45.8	38.6	1:19:29 AM	11220.18454
5:37:00	5:37:00	41	47.8	38.8	1:20:29 AM	12589.25412
5:38:00	5:38:00	41.6	45.5	38.9	1:21:29 AM	14454.39771
5:39:00	5:39:00	42.9	44.7	41.7	1:22:29 AM	19498.446
5:40:00	5:40:00	41.6	44.6	38.8	1:23:29 AM	14454.39771
5:41:00	5:41:00	41.3	43.3	39.2	1:24:29 AM	13489.62883
5:42:00	5:42:00	41.2	43.6	40.1	1:25:29 AM	13182.56739
5:43:00	5:43:00	43.4	46.6	40.3	1:26:29 AM	21877.61624
5:44:00	5:44:00	42.2	46	41	1:27:29 AM	16595.86907
5:45:00	5:45:00	41.6	45	40	1:28:29 AM	14454.39771
5:46:00	5:46:00	38.4	41.9	36.1	1:29:29 AM	6918.309709
5:47:00	5:47:00	37.5	40	35.8	1:30:29 AM	5623.413252
5:48:00	5:48:00	41.6	46.6	38.4	1:31:29 AM	14454.39771
5:49:00	5:49:00	39.4	44.4	37.5	1:32:29 AM	8709.6359
5:50:00	5:50:00	38.2	39.6	37	1:33:29 AM	6606.93448
5:51:00	5:51:00	38.7	40.1	37.4	1:34:29 AM	7413.102413
5:52:00	5:52:00	39.9	40.7	38.9	1:35:29 AM	9772.37221
5:53:00	5:53:00	40	40.7	39.1	1:36:29 AM	10000
5:54:00	5:54:00	40.2	41.3	39.3	1:37:29 AM	10471.28548
5:55:00	5:55:00	40.2	45.7	38.5	1:38:29 AM	10471.28548
5:56:00	5:56:00	46.9	50.7	38.8	1:39:29 AM	48977.88194
5:57:00	5:57:00	39.2	40.8	37.9	1:40:29 AM	8317.637711
5:58:00	5:58:00	38.8	41	37.1	1:41:29 AM	7585.77575
5:59:00	5:59:00	39.6	40.7	38.8	1:42:29 AM	9120.108394
6:00:00	6:00:00	40.3	42.6	38.6	1:43:29 AM	10715.19305
6:01:00	6:01:00	40.5	43	39.2	1:44:29 AM	11220.18454
6:02:00	6:02:00	42.9	45.3	39.3	1:45:29 AM	19498.446
6:03:00	6:03:00	39.9	41.3	38.5	1:46:29 AM	9772.37221
6:04:00	6:04:00	50.6	54.2	39.1	1:47:29 AM	114815.3621
6:05:00	6:05:00	49.6	54.6	43.1	1:48:29 AM	91201.08394
6:06:00	6:06:00	52	61.8	44	1:49:29 AM	158489.3192
6:07:00	6:07:00	43.8	45.9	42	1:50:29 AM	23988.32919
6:08:00	6:08:00	39.7	42.8	38.4	1:51:29 AM	9332.543008
6:09:00	6:09:00	53.8	64.7	38.9	1:52:29 AM	239883.2919
6:10:00	6:10:00	43.8	56.6	38.7	1:53:29 AM	23988.32919
6:11:00	6:11:00	40.6	43	37.7	1:54:29 AM	11481.53621
6:12:00	6:12:00	39.3	40.6	38	1:55:29 AM	8511.380382
6:13:00	6:13:00	39.5	40.8	38.2	1:56:29 AM	8912.509381
6:14:00	6:14:00	38.7	40	37.8	1:57:29 AM	7413.102413
6:15:00	6:15:00	39.7	41.7	38.6	1:58:29 AM	9332.543008
6:16:00	6:16:00	38.9	39.9	38.2	1:59:29 AM	7762.471166

6:17:00	6:17:00	39.7	43.1	37.7
6:18:00	6:18:00	39.2	42	38.3
6:19:00	6:19:00	42.9	48.5	38.2
6:20:00	6:20:00	38.4	39.2	37.7
6:21:00	6:21:00	39.2	41.1	37.8
6:22:00	6:22:00	40.1	41.7	38.7
6:23:00	6:23:00	40.3	42.6	38.9
6:24:00	6:24:00	40	41.3	38.8
6:25:00	6:25:00	40	41.6	38.6
6:26:00	6:26:00	41.5	44.1	39
6:27:00	6:27:00	41.8	46.9	40.3
6:28:00	6:28:00	44.7	49.8	39.7
6:29:00	6:29:00	45.5	48.9	39.8
6:30:00	6:30:00	43	48.1	40
6:31:00	6:31:00	44.2	49.5	38.2
6:32:00	6:32:00	42.6	47.9	38.6
6:33:00	6:33:00	39.4	40.5	38.4
6:34:00	6:34:00	38.4	39.2	37.6
6:35:00	6:35:00	38.9	39.8	38
6:36:00	6:36:00	39.7	41.2	38.4
6:37:00	6:37:00	41.3	43.3	40
6:38:00	6:38:00	43.3	45.9	41.6
6:39:00	6:39:00	45.1	48.3	43.5
6:40:00	6:40:00	42.6	44.6	40.8
6:41:00	6:41:00	46	50.8	40.1
6:42:00	6:42:00	39.5	43.1	38.6
6:43:00	6:43:00	41.4	42.9	39.6
6:44:00	6:44:00	41.5	42.6	40.8
6:45:00	6:45:00	40.9	41.9	39.6
6:46:00	6:46:00	42.2	43.7	40.9
6:47:00	6:47:00	43	44.7	41.1
6:48:00	6:48:00	41.8	43.3	40.7
6:49:00	6:49:00	41.5	44.2	40.4
6:50:00	6:50:00	41.2	43.6	40.2
6:51:00	6:51:00	43.3	45	41.2
6:52:00	6:52:00	44.4	46.6	42.6
6:53:00	6:53:00	45	46.4	43.9
6:54:00	6:54:00	44.7	45.9	42.9
6:55:00	6:55:00	41.9	43.5	40.4
6:56:00	6:56:00	43.1	45	41.4
6:57:00	6:57:00	43.5	45.1	41.6
6:58:00	6:58:00	45.3	48.3	43.2
6:59:00	6:59:00	54.3	64.9	42.1
7:00:00	7:00:00	40.6	42.8	39.1
7:01:00	7:01:00	41.8	43.1	40.5
7:02:00	7:02:00	41.9	44	40.4
7:03:00	7:03:00	41.7	43.2	40.2
7:04:00	7:04:00	40.6	42.3	39.5
7:05:00	7:05:00	51.2	57.9	42
7:06:00	7:06:00	44.3	48.3	40.8
7:07:00	7:07:00	41	43.6	39.3
7:08:00	7:08:00	42	43.8	40.5
7:09:00	7:09:00	40.1	41.4	39.2
7:10:00	7:10:00	39.3	39.9	38.8
7:11:00	7:11:00	40.3	42	38.9
7:12:00	7:12:00	40.1	41.6	38.8
7:13:00	7:13:00	40.3	42.7	38.7
7:14:00	7:14:00	40.1	41.6	39
7:15:00	7:15:00	41.2	43	40.3
7:16:00	7:16:00	41.9	43.1	41
7:17:00	7:17:00	40.7	42.7	39.4
7:18:00	7:18:00	41.8	44.1	40.3
7:19:00	7:19:00	41.8	43.9	40.4
7:20:00	7:20:00	42	43.2	40.7
7:21:00	7:21:00	42.1	44.1	40
7:22:00	7:22:00	40.8	43.2	39.3
7:23:00	7:23:00	40.1	41.1	39.1
7:24:00	7:24:00	40.1	41.1	39.1
7:25:00	7:25:00	41.1	42.2	39.6
7:26:00	7:26:00	42.2	45.1	40.5
7:27:00	7:27:00	43.8	48.3	40
7:28:00	7:28:00	39.2	41.6	37.9
7:29:00	7:29:00	41.7	43.2	39.4
7:30:00	7:30:00	41.8	45.8	40.7
7:31:00	7:31:00	41.4	43.6	39.4
7:32:00	7:32:00	41.1	42.7	39.4
7:33:00	7:33:00	40.4	41.6	38.9
7:34:00	7:34:00	40.9	41.9	39.8
7:35:00	7:35:00	42.1	44	41
7:36:00	7:36:00	42.6	45	41.6
7:37:00	7:37:00	43.6	45.5	41.7
7:38:00	7:38:00	42.5	46.6	40.1
7:39:00	7:39:00	40.8	42	39.6
7:40:00	7:40:00	42.9	44.9	41.7
7:41:00	7:41:00	43.5	45.5	41.6
7:42:00	7:42:00	44.2	46	42.9
7:43:00	7:43:00	43.5	45.5	41.1
7:44:00	7:44:00	42.2	44.1	40.4
7:45:00	7:45:00	42.8	44.9	41.2
7:46:00	7:46:00	41.6	43.1	40
7:47:00	7:47:00	42.3	43.5	41.3
7:48:00	7:48:00	42.7	44.4	41.2
7:49:00	7:49:00	43.2	44.7	42
7:50:00	7:50:00	43.8	46.4	42.1
7:51:00	7:51:00	43.8	47	40.8

2:00:29 AM	9332.543008
2:01:29 AM	8317.637711
2:02:29 AM	19498.446
2:03:29 AM	6918.309709
2:04:29 AM	8317.637711
2:05:29 AM	10232.92992
2:06:29 AM	10715.19305
2:07:29 AM	10000
2:08:29 AM	10000
2:09:29 AM	14125.37545
2:10:29 AM	15135.61248
2:11:29 AM	29512.09227
2:12:29 AM	35481.33892
2:13:29 AM	19952.62315
2:14:29 AM	26302.67992
2:15:29 AM	18197.00859
2:16:29 AM	8709.6359
2:17:29 AM	6918.309709
2:18:29 AM	7762.471166
2:19:29 AM	9332.543008
2:20:29 AM	13489.62883
2:21:29 AM	21379.6209
2:22:29 AM	32359.36569
2:23:29 AM	18197.00859
2:24:29 AM	39810.71706
2:25:29 AM	8912.509381
2:26:29 AM	13803.84265
2:27:29 AM	14125.37545
2:28:29 AM	12302.68771
2:29:29 AM	16595.86907
2:30:29 AM	19952.62315
2:31:29 AM	15135.61248
2:32:29 AM	14125.37545
2:33:29 AM	13182.56739
2:34:29 AM	21379.6209
2:35:29 AM	27542.28703
2:36:29 AM	31622.7766
2:37:29 AM	29512.09227
2:38:29 AM	15488.16619
2:39:29 AM	20417.37945
2:40:29 AM	22387.21139
2:41:29 AM	33884.41561
2:42:29 AM	269153.4804
2:43:29 AM	11481.53621
2:44:29 AM	15135.61248
2:45:29 AM	15488.16619
2:46:29 AM	14791.08388
2:47:29 AM	11481.53621
2:48:29 AM	131825.6739
2:49:29 AM	26915.34804
2:50:29 AM	12589.25412
2:51:29 AM	15848.93192
2:52:29 AM	10232.92992
2:53:29 AM	8511.380382
2:54:29 AM	10715.19305
2:55:29 AM	10232.92992
2:56:29 AM	10715.19305
2:57:29 AM	10232.92992
2:58:29 AM	13182.56739
2:59:29 AM	15488.16619
3:00:29 AM	11748.97555
3:01:29 AM	15135.61248
3:02:29 AM	15135.61248
3:03:29 AM	15848.93192
3:04:29 AM	16218.10097
3:05:29 AM	12022.64435
3:06:29 AM	10232.92992
3:07:29 AM	10232.92992
3:08:29 AM	12882.49552
3:09:29 AM	16595.86907
3:10:29 AM	23988.32919
3:11:29 AM	8317.637711
3:12:29 AM	14791.08388
3:13:29 AM	15135.61248
3:14:29 AM	13803.84265
3:15:29 AM	12882.49552
3:16:29 AM	10964.78196
3:17:29 AM	12302.68771
3:18:29 AM	16218.10097
3:19:29 AM	18197.00859
3:20:29 AM	22908.67653
3:21:29 AM	17782.7941
3:22:29 AM	12022.64435
3:23:29 AM	19498.446
3:24:29 AM	22387.21139
3:25:29 AM	26302.67992
3:26:29 AM	22387.21139
3:27:29 AM	16595.86907
3:28:29 AM	19054.60718
3:29:29 AM	14454.39771
3:30:29 AM	16982.43652
3:31:29 AM	18620.87137
3:32:29 AM	20892.96131
3:33:29 AM	23988.32919
3:34:29 AM	23988.32919

Study #3 - Haul Route
Long-Duration (24-Hours)

7:52:00	7:52:00	44.1	46.4	41.9	3:35:29 AM	25703.95783
7:53:00	7:53:00	44.9	47.4	42.8	3:36:29 AM	30902.95433
7:54:00	7:54:00	44.4	46.7	42.3	3:37:29 AM	27542.28703
7:55:00	7:55:00	45.9	50.9	42.9	3:38:29 AM	38904.5145
7:56:00	7:56:00	46.9	49.9	45.1	3:39:29 AM	48977.88194
7:57:00	7:57:00	48.2	50.4	46.5	3:40:29 AM	66069.3448
7:58:00	7:58:00	47.5	50.5	46.1	3:41:29 AM	56234.13252
7:59:00	7:59:00	48.5	50.9	46.9	3:42:29 AM	70794.57844
8:00:00	8:00:00	46	49.4	44	3:43:29 AM	39810.71706
8:01:00	8:01:00	46.8	48.5	44.7	3:44:29 AM	47863.00923
8:02:00	8:02:00	48.2	50.3	46.3	3:45:29 AM	66069.3448
8:03:00	8:03:00	47.4	50.3	44.9	3:46:29 AM	54954.08739
8:04:00	8:04:00	44.1	45.9	42.5	3:47:29 AM	25703.95783
8:05:00	8:05:00	44.5	47.1	43.2	3:48:29 AM	28183.82931
8:06:00	8:06:00	45.3	49	42.1	3:49:29 AM	33884.41561
8:07:00	8:07:00	43.3	44.8	41.8	3:50:29 AM	21379.6209
8:08:00	8:08:00	46.5	48.5	43.7	3:51:29 AM	44668.35922
8:09:00	8:09:00	44.7	46.8	43.1	3:52:29 AM	29512.09227
8:10:00	8:10:00	44.5	46.6	42.6	3:53:29 AM	28183.82931
8:11:00	8:11:00	45.3	48.4	42.8	3:54:29 AM	33884.41561
8:12:00	8:12:00	46.4	51.2	42.2	3:55:29 AM	43651.58322
8:13:00	8:13:00	42.7	44.6	40.8	3:56:29 AM	18620.87137
8:14:00	8:14:00	42.9	45	41.1	3:57:29 AM	19498.446
8:15:00	8:15:00	47.5	50.3	44.3	3:58:29 AM	56234.13252
8:16:00	8:16:00	45.3	47.6	43.7	3:59:29 AM	33884.41561
8:17:00	8:17:00	45.9	48	43.9	4:00:29 AM	38904.5145
8:18:00	8:18:00	47.4	49.2	44.5	4:01:29 AM	54954.08739
8:19:00	8:19:00	47.7	50.3	44.3	4:02:29 AM	58884.36554
8:20:00	8:20:00	45.7	47.7	44.4	4:03:29 AM	37153.52291
8:21:00	8:21:00	46.6	48.7	44.4	4:04:29 AM	45708.81896
8:22:00	8:22:00	47.1	49.1	45.1	4:05:29 AM	51286.1384
8:23:00	8:23:00	46.7	49	45.2	4:06:29 AM	46773.51413
8:24:00	8:24:00	45.1	47.2	43.4	4:07:29 AM	32359.36569
8:25:00	8:25:00	45	46.9	44	4:08:29 AM	31622.7766
8:26:00	8:26:00	45.2	46.4	43.8	4:09:29 AM	33113.11215
8:27:00	8:27:00	46.5	49.8	44.6	4:10:29 AM	44668.35922
8:28:00	8:28:00	66.4	78.1	49.7	4:11:29 AM	4365158.322
8:29:00	8:29:00	50.7	56.5	45	4:12:29 AM	117489.7555
8:30:00	8:30:00	45.3	47.9	44.1	4:13:29 AM	33884.41561
8:31:00	8:31:00	46.3	48.8	44.9	4:14:29 AM	42657.95188
8:32:00	8:32:00	46.7	49.2	45.1	4:15:29 AM	46773.51413
8:33:00	8:33:00	46.7	51.1	44.7	4:16:29 AM	46773.51413
8:34:00	8:34:00	46.8	48.8	45.4	4:17:29 AM	47863.00923
8:35:00	8:35:00	47.6	49.4	45.9	4:18:29 AM	57543.99373
8:36:00	8:36:00	46.2	47.2	45.3	4:19:29 AM	41686.93835
8:37:00	8:37:00	46.6	48.1	45.2	4:20:29 AM	45708.81896
8:38:00	8:38:00	47.8	51.4	46.2	4:21:29 AM	60255.95861
8:39:00	8:39:00	48.5	50.8	46.7	4:22:29 AM	70794.57844
8:40:00	8:40:00	46.6	47.8	45	4:23:29 AM	45708.81896
8:41:00	8:41:00	46.3	47.7	44.5	4:24:29 AM	42657.95188
8:42:00	8:42:00	47	48.3	45.9	4:25:29 AM	50118.72336
8:43:00	8:43:00	47.7	49.2	46.4	4:26:29 AM	58884.36554
8:44:00	8:44:00	47.6	49.6	46	4:27:29 AM	57543.99373
8:45:00	8:45:00	47	48.1	45.7	4:28:29 AM	50118.72336
8:46:00	8:46:00	47.6	49.4	45.9	4:29:29 AM	57543.99373
8:47:00	8:47:00	47.5	48.6	46.6	4:30:29 AM	56234.13252
8:48:00	8:48:00	47	47.9	46.2	4:31:29 AM	50118.72336
8:49:00	8:49:00	46.7	48.4	45.2	4:32:29 AM	46773.51413
8:50:00	8:50:00	50.4	55.7	45.4	4:33:29 AM	109647.8196
8:51:00	8:51:00	48.4	49.7	47.4	4:34:29 AM	69183.09709
8:52:00	8:52:00	46.4	49.9	45.2	4:35:29 AM	43651.58322
8:53:00	8:53:00	45.4	46.7	44.4	4:36:29 AM	34673.68505
8:54:00	8:54:00	46	48.7	42.6	4:37:29 AM	39810.71706
8:55:00	8:55:00	44	45	43.2	4:38:29 AM	25118.86432
8:56:00	8:56:00	46.2	47.8	44.3	4:39:29 AM	41686.93835
8:57:00	8:57:00	46.2	47.3	45	4:40:29 AM	41686.93835
8:58:00	8:58:00	45.5	48.2	43.6	4:41:29 AM	35481.33892
8:59:00	8:59:00	46.6	48.9	44.2	4:42:29 AM	45708.81896
9:00:00	9:00:00	44.7	46.2	43.3	4:43:29 AM	29512.09227
9:01:00	9:01:00	45.6	47.1	43.7	4:44:29 AM	36307.80548
9:02:00	9:02:00	46.3	51.3	43.6	4:45:29 AM	42657.95188
9:03:00	9:03:00	43.4	44.7	42.3	4:46:29 AM	21877.61624
9:04:00	9:04:00	42.5	44.7	41	4:47:29 AM	17782.7941
9:05:00	9:05:00	42.6	43.9	41.1	4:48:29 AM	18197.00859
9:06:00	9:06:00	43.4	45.2	42	4:49:29 AM	21877.61624
9:07:00	9:07:00	44	45.6	42.7	4:50:29 AM	25118.86432
9:08:00	9:08:00	43.8	45	42.9	4:51:29 AM	23988.32919
9:09:00	9:09:00	43.6	45.5	42.2	4:52:29 AM	22908.67653
9:10:00	9:10:00	46.1	48.6	44.1	4:53:29 AM	40738.02778
9:11:00	9:11:00	44.2	48	42	4:54:29 AM	26302.67992
9:12:00	9:12:00	44.9	48.2	42.6	4:55:29 AM	30902.95433
9:13:00	9:13:00	44.6	46.8	42.9	4:56:29 AM	28840.31503
9:14:00	9:14:00	45.1	48.2	43.7	4:57:29 AM	32359.36569
9:15:00	9:15:00	45.7	48.7	44	4:58:29 AM	37153.52291
9:16:00	9:16:00	55.6	65.3	46.6	4:59:29 AM	363078.0548
9:17:00	9:17:00	57.5	63.9	47.6	5:00:29 AM	562341.3252
9:18:00	9:18:00	48.1	51.9	44.4	5:01:29 AM	64565.4229
9:19:00	9:19:00	44.7	45.9	43.3	5:02:29 AM	29512.09227
9:20:00	9:20:00	46.7	56.1	44.2	5:03:29 AM	46773.51413
9:21:00	9:21:00	53.4	63.2	46.4	5:04:29 AM	218776.1624
9:22:00	9:22:00	48.1	51.1	45.6	5:05:29 AM	64565.4229
9:23:00	9:23:00	46.8	48.7	44.3	5:06:29 AM	47863.00923
9:24:00	9:24:00	46.5	48	45	5:07:29 AM	44668.35922
9:25:00	9:25:00	46.4	49.6	45	5:08:29 AM	43651.58322
9:26:00	9:26:00	45.4	47.4	44.1	5:09:29 AM	34673.68505

Study #3 - Haul Route
Long-Duration (24-Hours)

9:27:00	9:27:00	45.8	48	43.6	5:10:29 AM	38018.93963
9:28:00	9:28:00	48.3	54.6	44.2	5:11:29 AM	67608.29754
9:29:00	9:29:00	46.3	48.7	44.2	5:12:29 AM	42657.95188
9:30:00	9:30:00	47.3	50.2	44.7	5:13:29 AM	53703.17964
9:31:00	9:31:00	45.4	47.6	43.4	5:14:29 AM	34673.68505
9:32:00	9:32:00	44.6	46.1	43.3	5:15:29 AM	28840.31503
9:33:00	9:33:00	44	46.5	41.6	5:16:29 AM	25118.86432
9:34:00	9:34:00	44	46.8	42.2	5:17:29 AM	25118.86432
9:35:00	9:35:00	44.1	46.4	42.1	5:18:29 AM	25703.95783
9:36:00	9:36:00	44.8	47.7	43	5:19:29 AM	30199.5172
9:37:00	9:37:00	45	49	43.3	5:20:29 AM	31622.7766
9:38:00	9:38:00	44.6	46.5	43.5	5:21:29 AM	28840.31503
9:39:00	9:39:00	52.5	62.3	44.7	5:22:29 AM	177827.941
9:40:00	9:40:00	46.6	50.1	44.5	5:23:29 AM	45708.81896
9:41:00	9:41:00	44	45.3	43	5:24:29 AM	25118.86432
9:42:00	9:42:00	45.8	49.9	43.3	5:25:29 AM	38018.93963
9:43:00	9:43:00	44.7	47.2	42.8	5:26:29 AM	29512.09227
9:44:00	9:44:00	44.1	45.8	42.8	5:27:29 AM	25703.95783
9:45:00	9:45:00	47.2	50.6	43.4	5:28:29 AM	52480.74602
9:46:00	9:46:00	57.2	64.1	44	5:29:29 AM	524807.4602
9:47:00	9:47:00	45.7	48.7	43	5:30:29 AM	37153.52291
9:48:00	9:48:00	44.4	47	42.4	5:31:29 AM	27542.28703
9:49:00	9:49:00	43.4	45.4	42.2	5:32:29 AM	21877.61624
9:50:00	9:50:00	44.1	45.3	42.5	5:33:29 AM	25703.95783
9:51:00	9:51:00	44.7	46	43.8	5:34:29 AM	29512.09227
9:52:00	9:52:00	44.1	47.3	42.4	5:35:29 AM	25703.95783
9:53:00	9:53:00	57.5	68.2	42.8	5:36:29 AM	562341.3252
9:54:00	9:54:00	47	55.3	43.9	5:37:29 AM	50118.72336
9:55:00	9:55:00	43.6	45.5	42.5	5:38:29 AM	22908.67653
9:56:00	9:56:00	44.2	46	42.9	5:39:29 AM	26302.67992
9:57:00	9:57:00	43.9	44.8	42.3	5:40:29 AM	24547.08916
9:58:00	9:58:00	44.1	45.2	43	5:41:29 AM	25703.95783
9:59:00	9:59:00	52.7	61.4	43.7	5:42:29 AM	186208.7137
10:00:00	10:00:00	44.7	45.9	43.8	5:43:29 AM	29512.09227
10:01:00	10:01:00	45.3	47.5	43.5	5:44:29 AM	33884.41561
10:02:00	10:02:00	55.9	64.3	45	5:45:29 AM	389045.145
10:03:00	10:03:00	60	68.8	48.7	5:46:29 AM	1000000
10:04:00	10:04:00	53.6	59.8	45.2	5:47:29 AM	229086.7653
10:05:00	10:05:00	50.4	57.9	44.7	5:48:29 AM	109647.8196
10:06:00	10:06:00	47.1	53.3	43	5:49:29 AM	51286.1384
10:07:00	10:07:00	49.4	57.3	43.5	5:50:29 AM	87096.359
10:08:00	10:08:00	55.7	63.4	44.3	5:51:29 AM	371535.2291
10:09:00	10:09:00	45.7	50	42.6	5:52:29 AM	37153.52291
10:10:00	10:10:00	55.7	63	43.6	5:53:29 AM	371535.2291
10:11:00	10:11:00	56.4	65.8	43.7	5:54:29 AM	436515.8322
10:12:00	10:12:00	55.6	61.6	47.9	5:55:29 AM	363078.0548
10:13:00	10:13:00	60.1	69.2	50	5:56:29 AM	1023292.992
10:14:00	10:14:00	61.3	68.5	57.8	5:57:29 AM	1348962.883
10:15:00	10:15:00	59.2	63.3	52	5:58:29 AM	831763.7711
10:16:00	10:16:00	56.1	63	46.3	5:59:29 AM	407380.2778
10:17:00	10:17:00	57.7	64.5	46.7	6:00:29 AM	588843.6554
10:18:00	10:18:00	49.3	58	43.5	6:01:29 AM	85113.80382
10:19:00	10:19:00	56.8	63.5	49.8	6:02:29 AM	478630.0923
10:20:00	10:20:00	52	59.9	44.7	6:03:29 AM	158489.3192
10:21:00	10:21:00	53.3	59.7	44.6	6:04:29 AM	213796.209
10:22:00	10:22:00	56.6	63	49.1	6:05:29 AM	457088.1896
10:23:00	10:23:00	53.2	57.8	46.9	6:06:29 AM	208929.6131
10:24:00	10:24:00	54.1	59.9	46.7	6:07:29 AM	257039.5783
10:25:00	10:25:00	59.9	68.9	48.8	6:08:29 AM	977237.221
10:26:00	10:26:00	53	62.3	48.4	6:09:29 AM	199526.2315
10:27:00	10:27:00	49.1	54.7	45.2	6:10:29 AM	81283.05162
10:28:00	10:28:00	58.3	65	49.8	6:11:29 AM	676082.9754
10:29:00	10:29:00	60.7	67.8	48.4	6:12:29 AM	1174897.555
10:30:00	10:30:00	58.7	64.4	50.9	6:13:29 AM	741310.2413
10:31:00	10:31:00	56.3	62.3	51.3	6:14:29 AM	426579.5188
10:32:00	10:32:00	57.1	64	52.6	6:15:29 AM	512861.384
10:33:00	10:33:00	54.2	59.7	45.2	6:16:29 AM	263026.7992
10:34:00	10:34:00	54.2	59.3	45.2	6:17:29 AM	263026.7992
10:35:00	10:35:00	57.9	62.5	49.5	6:18:29 AM	616595.0019
10:36:00	10:36:00	57.3	63.1	48.3	6:19:29 AM	537031.7964
10:37:00	10:37:00	58.6	65.7	50.6	6:20:29 AM	724435.9601
10:38:00	10:38:00	52.1	58.2	46.7	6:21:29 AM	162181.0097
10:39:00	10:39:00	54.7	61.5	47.9	6:22:29 AM	295120.9227
10:40:00	10:40:00	60.7	69.3	51	6:23:29 AM	1174897.555
10:41:00	10:41:00	59.1	66	51.1	6:24:29 AM	812830.5162
10:42:00	10:42:00	67.1	76.4	53.6	6:25:29 AM	5128613.84
10:43:00	10:43:00	58.4	65	51.5	6:26:29 AM	691830.9709
10:44:00	10:44:00	57.2	60.7	52.2	6:27:29 AM	524807.4602
10:45:00	10:45:00	58.2	63.7	49.6	6:28:29 AM	660693.448
10:46:00	10:46:00	57.1	62.1	48.4	6:29:29 AM	512861.384
10:47:00	10:47:00	60.6	64.6	56.3	6:30:29 AM	1148153.621
10:48:00	10:48:00	62.4	70.7	46.4	6:31:29 AM	1737800.829
10:49:00	10:49:00	55.3	59.5	45.1	6:32:29 AM	338844.1561
10:50:00	10:50:00	60	66.6	52.4	6:33:29 AM	1000000
10:51:00	10:51:00	59.7	71	53	6:34:29 AM	933254.3008
10:52:00	10:52:00	61.2	68.4	53.2	6:35:29 AM	1318256.739
10:53:00	10:53:00	58	63.4	49.5	6:36:29 AM	630957.3445
10:54:00	10:54:00	56.7	67.3	51.2	6:37:29 AM	467735.1413
10:55:00	10:55:00	52.8	59.9	45.9	6:38:29 AM	190546.0718
10:56:00	10:56:00	62.5	73.4	51.6	6:39:29 AM	1778279.41
10:57:00	10:57:00	57.3	67.7	48.4	6:40:29 AM	537031.7964
10:58:00	10:58:00	54.9	62.3	47.8	6:41:29 AM	309029.5433
10:59:00	10:59:00	53.5	62.2	45.6	6:42:29 AM	223872.1139
11:00:00	11:00:00	55.8	64.7	48.3	6:43:29 AM	380189.3963
11:01:00	11:01:00	54.7	62.6	49	6:44:29 AM	295120.9227

Study #3 - Haul Route
Long-Duration (24-Hours)

11:02:00	11:02:00	57	64.6	49.3	6:45:29 AM	501187.2336
11:03:00	11:03:00	54.5	60.9	46.8	6:46:29 AM	281838.2931
11:04:00	11:04:00	49.5	59.2	44.5	6:47:29 AM	89125.09381
11:05:00	11:05:00	48.1	50.5	45.7	6:48:29 AM	64565.4229
11:06:00	11:06:00	56.8	65.7	48.2	6:49:29 AM	478630.0923
11:07:00	11:07:00	67.1	77.8	47.5	6:50:29 AM	5128613.84
11:08:00	11:08:00	63.3	72.2	52.2	6:51:29 AM	2137962.09
11:09:00	11:09:00	54.9	60.8	49.8	6:52:29 AM	309029.5433
11:10:00	11:10:00	58.8	66.7	49.6	6:53:29 AM	758577.575
11:11:00	11:11:00	57.7	65	51.9	6:54:29 AM	588843.6554
11:12:00	11:12:00	52.8	63.6	47.6	6:55:29 AM	190546.0718
11:13:00	11:13:00	52	57.1	48.5	6:56:29 AM	158489.3192
11:14:00	11:14:00	49.7	52.7	48.1	6:57:29 AM	93325.43008
11:15:00	11:15:00	48.2	49.6	46.7	6:58:29 AM	66069.3448
11:16:00	11:16:00	55.3	63.7	48.3	6:59:29 AM	338844.1561
11:17:00	11:17:00	53.3	61.4	49.8	7:00:29 AM	213796.209
11:18:00	11:18:00	56.7	64.4	51.4	7:01:29 AM	467735.1413
11:19:00	11:19:00	61.3	71.2	50.3	7:02:29 AM	1348962.883
11:20:00	11:20:00	51	57.2	48.5	7:03:29 AM	125892.5412
11:21:00	11:21:00	56.6	65.1	49.8	7:04:29 AM	457088.1896
11:22:00	11:22:00	62.7	71.9	51.4	7:05:29 AM	1862087.137
11:23:00	11:23:00	58.5	66.9	47.7	7:06:29 AM	707945.7844
11:24:00	11:24:00	58.6	64.6	48.5	7:07:29 AM	724435.9601
11:25:00	11:25:00	51.1	55.2	47.5	7:08:29 AM	128824.9552
11:26:00	11:26:00	53.7	58.2	49.5	7:09:29 AM	234422.8815
11:27:00	11:27:00	50.4	53	48.4	7:10:29 AM	109647.8196
11:28:00	11:28:00	54.3	61.4	48	7:11:29 AM	269153.4804
11:29:00	11:29:00	57.8	65.9	48.1	7:12:29 AM	602559.5861
11:30:00	11:30:00	54.5	59	48.8	7:13:29 AM	281838.2931
11:31:00	11:31:00	51.8	55.6	48.3	7:14:29 AM	151356.1248
11:32:00	11:32:00	51.1	55.1	47.2	7:15:29 AM	128824.9552
11:33:00	11:33:00	58.5	70	48.7	7:16:29 AM	707945.7844
11:34:00	11:34:00	57.3	65.2	48.9	7:17:29 AM	537031.7964
11:35:00	11:35:00	57	61.3	50.5	7:18:29 AM	501187.2336
11:36:00	11:36:00	60.2	67.9	54.4	7:19:29 AM	1047128.548
11:37:00	11:37:00	57.7	62.1	54.5	7:20:29 AM	588843.6554
11:38:00	11:38:00	62	69.5	54	7:21:29 AM	1584893.192
11:39:00	11:39:00	60.7	65.5	50.7	7:22:29 AM	1174897.555
11:40:00	11:40:00	52.8	58.4	48.9	7:23:29 AM	190546.0718
11:41:00	11:41:00	50.9	54.4	47.9	7:24:29 AM	123026.8771
11:42:00	11:42:00	55	60.5	50.7	7:25:29 AM	316227.766
11:43:00	11:43:00	56.3	62.7	49.2	7:26:29 AM	426579.5188
11:44:00	11:44:00	52.5	56.2	48.6	7:27:29 AM	177827.941
11:45:00	11:45:00	56.3	62.7	51.6	7:28:29 AM	426579.5188
11:46:00	11:46:00	55.3	60.4	51.6	7:29:29 AM	338844.1561
11:47:00	11:47:00	57	63.1	50.9	7:30:29 AM	501187.2336
11:48:00	11:48:00	64.8	74.3	50.3	7:31:29 AM	3019951.72
11:49:00	11:49:00	59	63.3	53.9	7:32:29 AM	794328.2347
11:50:00	11:50:00	53.6	58.4	50.5	7:33:29 AM	229086.7653
11:51:00	11:51:00	64.6	74	54.1	7:34:29 AM	2884031.503
11:52:00	11:52:00	62.3	68.8	53.8	7:35:29 AM	1698243.652
11:53:00	11:53:00	58.3	65.6	52.2	7:36:29 AM	676082.9754
11:54:00	11:54:00	61.7	67.5	53.9	7:37:29 AM	1479108.388
11:55:00	11:55:00	60.5	71.6	51.4	7:38:29 AM	1122018.454
11:56:00	11:56:00	63.5	71.9	54.6	7:39:29 AM	2238721.139
11:57:00	11:57:00	61.1	66	55	7:40:29 AM	1288249.552
11:58:00	11:58:00	65.4	71.5	58.2	7:41:29 AM	3467368.505
11:59:00	11:59:00	74.4	84.1	51.2	7:42:29 AM	27542287.03
12:00:00	12:00:00	60.8	65.3	53.4	7:43:29 AM	1202264.435
12:01:00	12:01:00	55	60.2	49.6	7:44:29 AM	316227.766
12:02:00	12:02:00	59.1	63.2	52.3	7:45:29 AM	812830.5162
12:03:00	12:03:00	55.6	62.5	50.1	7:46:29 AM	363078.0548
12:04:00	12:04:00	59.5	64.5	53.5	7:47:29 AM	891250.9381
12:05:00	12:05:00	59.2	63.7	55.2	7:48:29 AM	831763.7711
12:06:00	12:06:00	55.7	60.5	51.5	7:49:29 AM	371535.2291
12:07:00	12:07:00	56.1	61.6	49.9	7:50:29 AM	407380.2778
12:08:00	12:08:00	52.4	55	49	7:51:29 AM	173780.0829
12:09:00	12:09:00	49.1	52.2	45.8	7:52:29 AM	81283.05162
12:10:00	12:10:00	54.3	61.5	48.8	7:53:29 AM	269153.4804
12:11:00	12:11:00	56.3	63.5	51	7:54:29 AM	426579.5188
12:12:00	12:12:00	56.4	63.8	51.1	7:55:29 AM	436515.8322
12:13:00	12:13:00	53	62.4	49.5	7:56:29 AM	199526.2315
12:14:00	12:14:00	55.2	62.4	50	7:57:29 AM	331131.1215
12:15:00	12:15:00	56.9	64.4	49.7	7:58:29 AM	489778.8194
12:16:00	12:16:00	55.4	64.9	48.7	7:59:29 AM	346736.8505
12:17:00	12:17:00	59.1	65.4	51	8:00:29 AM	812830.5162
12:18:00	12:18:00	64.4	74.3	53	8:01:29 AM	2754228.703
12:19:00	12:19:00	55.7	64.6	48.5	8:02:29 AM	371535.2291
12:20:00	12:20:00	52.1	59	48.8	8:03:29 AM	162181.0097
12:21:00	12:21:00	53.1	59.3	50	8:04:29 AM	204173.7945
12:22:00	12:22:00	64	73.4	51	8:05:29 AM	2511886.432
12:23:00	12:23:00	51.6	57.1	48.3	8:06:29 AM	144543.9771
12:24:00	12:24:00	50.9	55	47.7	8:07:29 AM	123026.8771
12:25:00	12:25:00	59.5	69.2	49.9	8:08:29 AM	891250.9381
12:26:00	12:26:00	53.1	57.7	48.6	8:09:29 AM	204173.7945
12:27:00	12:27:00	62.2	71	53.2	8:10:29 AM	1659586.907
12:28:00	12:28:00	53.5	57.4	48.3	8:11:29 AM	223872.1139
12:29:00	12:29:00	48.3	51.5	45.9	8:12:29 AM	67608.29754
12:30:00	12:30:00	62	71.5	48.9	8:13:29 AM	1584893.192
12:31:00	12:31:00	54.2	58.9	50.7	8:14:29 AM	263026.7992
12:32:00	12:32:00	49.9	54.9	46.4	8:15:29 AM	97723.7221
12:33:00	12:33:00	50	55.3	47	8:16:29 AM	100000
12:34:00	12:34:00	50.8	55.5	46.9	8:17:29 AM	120226.4435
12:35:00	12:35:00	49.5	54	46.4	8:18:29 AM	89125.09381
12:36:00	12:36:00	50.1	57.3	45.9	8:19:29 AM	102329.2992

Study #3 - Haul Route
Long-Duration (24-Hours)

12:37:00	12:37:00	51.3	56.7	47.3	8:20:29 AM	134896.2883
12:38:00	12:38:00	52	57.9	49	8:21:29 AM	158489.3192
12:39:00	12:39:00	65.5	72.9	56.2	8:22:29 AM	3548133.892
12:40:00	12:40:00	57.7	66.3	50.4	8:23:29 AM	588843.6554
12:41:00	12:41:00	50.5	55.1	47.1	8:24:29 AM	112201.8454
12:42:00	12:42:00	61.7	70.5	49.2	8:25:29 AM	1479108.388
12:43:00	12:43:00	58.5	66.4	48.8	8:26:29 AM	707945.7844
12:44:00	12:44:00	48	50.3	45.8	8:27:29 AM	63095.73445
12:45:00	12:45:00	51.5	57.3	48.6	8:28:29 AM	141253.7545
12:46:00	12:46:00	49	53.5	45.7	8:29:29 AM	79432.82347
12:47:00	12:47:00	55.6	62.5	47.2	8:30:29 AM	363078.0548
12:48:00	12:48:00	49.2	52.7	46.3	8:31:29 AM	83176.37711
12:49:00	12:49:00	60.7	69.8	49.4	8:32:29 AM	1174897.555
12:50:00	12:50:00	55.3	68.3	45.5	8:33:29 AM	338844.1561
12:51:00	12:51:00	61.9	73.8	46.8	8:34:29 AM	1548816.619
12:52:00	12:52:00	59.9	68.5	49	8:35:29 AM	977237.221
12:53:00	12:53:00	58.2	63.5	52.9	8:36:29 AM	660693.448
12:54:00	12:54:00	64.4	72.8	55.2	8:37:29 AM	2754228.703
12:55:00	12:55:00	61.4	67.6	54.4	8:38:29 AM	1380384.265
12:56:00	12:56:00	55.8	61.4	48.4	8:39:29 AM	380189.3963
12:57:00	12:57:00	58.7	66.6	49.3	8:40:29 AM	741310.2413
12:58:00	12:58:00	49.8	56.7	46.3	8:41:29 AM	95499.2586
12:59:00	12:59:00	62.6	71.2	50.3	8:42:29 AM	1819700.859
13:00:00	13:00:00	61	69.6	49.7	8:43:29 AM	1258925.412
13:01:00	13:01:00	51.9	58.1	46.2	8:44:29 AM	154881.6619
13:02:00	13:02:00	58	66.3	46.3	8:45:29 AM	630957.3445
13:03:00	13:03:00	48.1	55.3	44.9	8:46:29 AM	64565.4229
13:04:00	13:04:00	48.7	51.2	45.9	8:47:29 AM	74131.02413
13:05:00	13:05:00	58.2	68.3	46	8:48:29 AM	660693.448
13:06:00	13:06:00	46.8	50.2	44.9	8:49:29 AM	47863.00923
13:07:00	13:07:00	49.2	53.1	45.7	8:50:29 AM	83176.37711
13:08:00	13:08:00	62.7	69.4	49.9	8:51:29 AM	1862087.137
13:09:00	13:09:00	70.9	81.9	53.7	8:52:29 AM	12302687.71
13:10:00	13:10:00	53.5	59	49.8	8:53:29 AM	223872.1139
13:11:00	13:11:00	48.1	51.3	46	8:54:29 AM	64565.4229
13:12:00	13:12:00	47.8	53.5	45.4	8:55:29 AM	60255.95861
13:13:00	13:13:00	47.1	51.7	44.2	8:56:29 AM	51286.1384
13:14:00	13:14:00	61.3	72.6	43.9	8:57:29 AM	1348962.883
13:15:00	13:15:00	59.3	71.2	44.6	8:58:29 AM	851138.0382
13:16:00	13:16:00	51.9	56.1	47.4	8:59:29 AM	154881.6619
13:17:00	13:17:00	53	59.1	47.4	9:00:29 AM	199526.2315
13:18:00	13:18:00	53.5	58.1	47.8	9:01:29 AM	223872.1139
13:19:00	13:19:00	48.3	53.8	45.1	9:02:29 AM	67608.29754
13:20:00	13:20:00	53.1	59.7	45.6	9:03:29 AM	204173.7945
13:21:00	13:21:00	57.9	65.2	48.7	9:04:29 AM	616595.0019
13:22:00	13:22:00	64.8	76.3	48.5	9:05:29 AM	3019951.72
13:23:00	13:23:00	59.1	70.3	48.7	9:06:29 AM	812830.5162
13:24:00	13:24:00	56.1	63.1	47.4	9:07:29 AM	407380.2778
13:25:00	13:25:00	48.4	52.6	44.8	9:08:29 AM	69183.09709
13:26:00	13:26:00	45.5	48.9	43.3	9:09:29 AM	35481.33892
13:27:00	13:27:00	44.9	47.7	43.4	9:10:29 AM	30902.95433
13:28:00	13:28:00	46.7	49.5	43.4	9:11:29 AM	46773.51413
13:29:00	13:29:00	49.3	56.1	44.7	9:12:29 AM	85113.80382
13:30:00	13:30:00	59.9	67.7	50.8	9:13:29 AM	977237.221
13:31:00	13:31:00	62.6	72.9	45.9	9:14:29 AM	1819700.859
13:32:00	13:32:00	55.2	66	45.4	9:15:29 AM	331131.1215
13:33:00	13:33:00	57.6	66.1	45.9	9:16:29 AM	575439.9373
13:34:00	13:34:00	54.9	63.4	50.2	9:17:29 AM	309029.5433
13:35:00	13:35:00	52.3	59	47.6	9:18:29 AM	169824.3652
13:36:00	13:36:00	55.6	62	44.5	9:19:29 AM	363078.0548
13:37:00	13:37:00	55.1	60.1	46.3	9:20:29 AM	323593.6569
13:38:00	13:38:00	53.7	59.9	45.1	9:21:29 AM	234422.8815
13:39:00	13:39:00	54.8	63.8	47.9	9:22:29 AM	301995.172
13:40:00	13:40:00	57.9	64.4	50.3	9:23:29 AM	616595.0019
13:41:00	13:41:00	50.1	55.9	45.4	9:24:29 AM	102329.2992
13:42:00	13:42:00	51.9	57.1	44.3	9:25:29 AM	154881.6619
13:43:00	13:43:00	52.2	56.6	48.8	9:26:29 AM	165958.6907
13:44:00	13:44:00	58.1	65	49.2	9:27:29 AM	645654.229
13:45:00	13:45:00	58.8	63.6	51.9	9:28:29 AM	758577.575
13:46:00	13:46:00	56.9	64	47.7	9:29:29 AM	489778.8194
13:47:00	13:47:00	56.4	62.9	49.8	9:30:29 AM	436515.8322
13:48:00	13:48:00	50.9	56.2	47.1	9:31:29 AM	123026.8771
13:49:00	13:49:00	52.2	57.3	48.2	9:32:29 AM	165958.6907
13:50:00	13:50:00	51.4	57.4	48.3	9:33:29 AM	138038.4265
13:51:00	13:51:00	60.5	71.1	47.8	9:34:29 AM	1122018.454
13:52:00	13:52:00	52.7	55.9	50.3	9:35:29 AM	186208.7137
13:53:00	13:53:00	56.2	61	49.4	9:36:29 AM	416869.3835
13:54:00	13:54:00	54.5	61.7	50.3	9:37:29 AM	281838.2931
13:55:00	13:55:00	50.6	60.6	43.7	9:38:29 AM	114815.3621
13:56:00	13:56:00	53.7	59.9	44.5	9:39:29 AM	234422.8815
13:57:00	13:57:00	64.5	75.8	52.4	9:40:29 AM	2818382.931
13:58:00	13:58:00	59	68.3	50.6	9:41:29 AM	794328.2347
13:59:00	13:59:00	54.1	61.1	47.6	9:42:29 AM	257039.5783
14:00:00	14:00:00	57.5	64.4	49	9:43:29 AM	562341.3252
14:01:00	14:01:00	55	64	48.6	9:44:29 AM	316227.766
14:02:00	14:02:00	59.2	64.3	50.4	9:45:29 AM	831763.7711
14:03:00	14:03:00	56.3	66.7	48.6	9:46:29 AM	426579.5188
14:04:00	14:04:00	54.3	63.3	48.5	9:47:29 AM	269153.4804
14:05:00	14:05:00	55.3	60.1	48.6	9:48:29 AM	338844.1561
14:06:00	14:06:00	61.3	69.2	52	9:49:29 AM	1348962.883
14:07:00	14:07:00	55.9	61	51	9:50:29 AM	389045.145
14:08:00	14:08:00	57	63.5	48.3	9:51:29 AM	501187.2336
14:09:00	14:09:00	55.8	61.2	50.8	9:52:29 AM	380189.3963
14:10:00	14:10:00	55.8	61.9	51.2	9:53:29 AM	380189.3963
14:11:00	14:11:00	52	58.2	47.8	9:54:29 AM	158489.3192

14:12:00	14:12:00	47.3	51.2	45.1	9:55:29 AM	53703.17964
14:13:00	14:13:00	51.3	57.4	47.2	9:56:29 AM	134896.2883
14:14:00	14:14:00	58.8	67.9	49.5	9:57:29 AM	758577.575
14:15:00	14:15:00	59.3	65.1	50.2	9:58:29 AM	851138.0382
14:16:00	14:16:00	56.3	63.8	49.1	9:59:29 AM	426579.5188
14:17:00	14:17:00	50.8	57.9	48	10:00:29 AM	120226.4435
14:18:00	14:18:00	53.5	58.7	47.2	10:01:29 AM	223872.1139
14:19:00	14:19:00	58.5	64.4	50.6	10:02:29 AM	707945.7844
14:20:00	14:20:00	55.7	64.7	47.3	10:03:29 AM	371535.2291
14:21:00	14:21:00	54.6	60.4	47.9	10:04:29 AM	288403.1503
14:22:00	14:22:00	61.3	73.6	48.3	10:05:29 AM	1348962.883
14:23:00	14:23:00	54	57.8	48.2	10:06:29 AM	251188.6432
14:24:00	14:24:00	58.2	65.7	50.7	10:07:29 AM	660693.448
14:25:00	14:25:00	57.8	62.6	51.9	10:08:29 AM	602559.5861
14:26:00	14:26:00	54.1	62.1	47.7	10:09:29 AM	257039.5783
14:27:00	14:27:00	59.9	67.8	48.6	10:10:29 AM	977237.221
14:28:00	14:28:00	53.5	58.9	47.1	10:11:29 AM	223872.1139
14:29:00	14:29:00	57.7	64.5	51.6	10:12:29 AM	588843.6554
14:30:00	14:30:00	51.7	58.5	47.8	10:13:29 AM	147910.8388
14:31:00	14:31:00	54.6	62.9	48.7	10:14:29 AM	288403.1503
14:32:00	14:32:00	53	61.3	45.6	10:15:29 AM	199526.2315
14:33:00	14:33:00	59.4	66.7	46.6	10:16:29 AM	870963.59
14:34:00	14:34:00	59.3	66.4	51.8	10:17:29 AM	851138.0382
14:35:00	14:35:00	60.9	70.7	51	10:18:29 AM	1230268.771
14:36:00	14:36:00	51.8	60.1	47.5	10:19:29 AM	151356.1248
14:37:00	14:37:00	58.8	67.5	47.9	10:20:29 AM	758577.575
14:38:00	14:38:00	57.6	64.5	52.7	10:21:29 AM	575439.9373
14:39:00	14:39:00	57.6	63.9	48.6	10:22:29 AM	575439.9373
14:40:00	14:40:00	50.3	54.7	47	10:23:29 AM	107151.9305
14:41:00	14:41:00	57.8	67.8	46.3	10:24:29 AM	602559.5861
14:42:00	14:42:00	59	63.6	52.8	10:25:29 AM	794328.2347
14:43:00	14:43:00	56.7	67.4	49	10:26:29 AM	467735.1413
14:44:00	14:44:00	50.1	55.3	47.3	10:27:29 AM	102329.2992
14:45:00	14:45:00	56.1	60.8	49.9	10:28:29 AM	407380.2778
14:46:00	14:46:00	57.2	62.7	51.2	10:29:29 AM	524807.4602
14:47:00	14:47:00	56.3	63.3	51.1	10:30:29 AM	426579.5188
14:48:00	14:48:00	61	70.9	49.5	10:31:29 AM	1258925.412
14:49:00	14:49:00	58.6	64.9	51.1	10:32:29 AM	724435.9601
14:50:00	14:50:00	62.9	68.9	58.7	10:33:29 AM	1949844.6
14:51:00	14:51:00	56.9	64.7	50.9	10:34:29 AM	489778.8194
14:52:00	14:52:00	58	63.9	50	10:35:29 AM	630957.3445
14:53:00	14:53:00	58.5	66.4	53.2	10:36:29 AM	707945.7844
14:54:00	14:54:00	55.4	57.8	52.8	10:37:29 AM	346736.8505
14:55:00	14:55:00	57.4	62.2	51.4	10:38:29 AM	549540.8739
14:56:00	14:56:00	57.4	66.2	48.8	10:39:29 AM	549540.8739
14:57:00	14:57:00	57.4	64.2	52.3	10:40:29 AM	549540.8739
14:58:00	14:58:00	55.1	60.3	50.3	10:41:29 AM	323593.6569
14:59:00	14:59:00	60.9	68.5	53.4	10:42:29 AM	1230268.771
15:00:00	15:00:00	55.2	62.7	50.9	10:43:29 AM	331131.1215
15:01:00	15:01:00	51.8	54.8	48.1	10:44:29 AM	151356.1248
15:02:00	15:02:00	58.7	65.9	51	10:45:29 AM	741310.2413
15:03:00	15:03:00	58.4	63.4	51.9	10:46:29 AM	691830.9709
15:04:00	15:04:00	55	60.6	50.7	10:47:29 AM	316227.766
15:05:00	15:05:00	52.5	61	47.9	10:48:29 AM	177827.941
15:06:00	15:06:00	57.9	67.7	45.9	10:49:29 AM	616595.0019
15:07:00	15:07:00	55	61.1	49.1	10:50:29 AM	316227.766
15:08:00	15:08:00	53.6	61.2	48	10:51:29 AM	229086.7653
15:09:00	15:09:00	54.1	63.3	48.4	10:52:29 AM	257039.5783
15:10:00	15:10:00	56.9	64.8	51.1	10:53:29 AM	489778.8194
15:11:00	15:11:00	55.7	61	49.9	10:54:29 AM	371535.2291
15:12:00	15:12:00	59.2	63.9	52.7	10:55:29 AM	831763.7711
15:13:00	15:13:00	59.3	68.4	49.8	10:56:29 AM	851138.0382
15:14:00	15:14:00	58.5	66.5	53.1	10:57:29 AM	707945.7844
15:15:00	15:15:00	55.5	60.5	50.8	10:58:29 AM	354813.3892
15:16:00	15:16:00	62.9	70.5	57.1	10:59:29 AM	1949844.6
15:17:00	15:17:00	62	69.7	55.7	11:00:29 AM	1584893.192
15:18:00	15:18:00	63.8	72.9	55.6	11:01:29 AM	2398832.919
15:19:00	15:19:00	59.2	63.7	51.3	11:02:29 AM	831763.7711
15:20:00	15:20:00	60.7	64.3	53.8	11:03:29 AM	1174897.555
15:21:00	15:21:00	59.8	70.5	48	11:04:29 AM	954992.586
15:22:00	15:22:00	55.2	61.1	49.4	11:05:29 AM	331131.1215
15:23:00	15:23:00	57.1	65.2	51.7	11:06:29 AM	512861.384
15:24:00	15:24:00	55.6	64.4	49.8	11:07:29 AM	363078.0548
15:25:00	15:25:00	56	62.1	50.1	11:08:29 AM	398107.1706
15:26:00	15:26:00	57.1	62.4	52.4	11:09:29 AM	512861.384
15:27:00	15:27:00	57.9	63.8	51.3	11:10:29 AM	616595.0019
15:28:00	15:28:00	54.8	59	50.4	11:11:29 AM	301995.172
15:29:00	15:29:00	57.4	60.8	52.4	11:12:29 AM	549540.8739
15:30:00	15:30:00	58.1	66	51	11:13:29 AM	645654.229
15:31:00	15:31:00	56.3	65.4	49.7	11:14:29 AM	426579.5188
15:32:00	15:32:00	60.3	67.6	48.4	11:15:29 AM	1071519.305
15:33:00	15:33:00	59.7	66.4	50.2	11:16:29 AM	933254.3008
15:34:00	15:34:00	60.1	65.2	54.8	11:17:29 AM	1023292.992
15:35:00	15:35:00	59.4	65.4	50.2	11:18:29 AM	870963.59
15:36:00	15:36:00	59.2	63.8	53.7	11:19:29 AM	831763.7711
15:37:00	15:37:00	58.2	64.9	53.2	11:20:29 AM	660693.448
15:38:00	15:38:00	61.7	68.1	55.1	11:21:29 AM	1479108.388
15:39:00	15:39:00	61.2	66.2	55	11:22:29 AM	1318256.739
15:40:00	15:40:00	62.4	69.4	54.6	11:23:29 AM	1737800.829
15:41:00	15:41:00	62.4	71.9	50.7	11:24:29 AM	1737800.829
15:42:00	15:42:00	57.6	62.6	51.1	11:25:29 AM	575439.9373
15:43:00	15:43:00	53.7	62	48.1	11:26:29 AM	234422.8815
15:44:00	15:44:00	64.3	72.1	52.6	11:27:29 AM	2691534.804
15:45:00	15:45:00	57.2	64.6	48	11:28:29 AM	524807.4602
15:46:00	15:46:00	56.6	62.7	50.1	11:29:29 AM	457088.1896

15:47:00	15:47:00	52.7	59.1	47	11:30:29 AM	186208.7137
15:48:00	15:48:00	50.6	56.5	46.6	11:31:29 AM	114815.3621
15:49:00	15:49:00	55.4	59.5	48.7	11:32:29 AM	346736.8505
15:50:00	15:50:00	56.8	62.8	49.2	11:33:29 AM	478630.0923
15:51:00	15:51:00	55	63.8	46.1	11:34:29 AM	316227.766
15:52:00	15:52:00	57.3	63	49.5	11:35:29 AM	537031.7964
15:53:00	15:53:00	56.7	65.2	50.1	11:36:29 AM	467735.1413
15:54:00	15:54:00	57.9	63.7	54.4	11:37:29 AM	616595.0019
15:55:00	15:55:00	58.4	66.7	54.9	11:38:29 AM	691830.9709
15:56:00	15:56:00	64.7	75.4	54.3	11:39:29 AM	2951209.227
15:57:00	15:57:00	62	71.5	53.8	11:40:29 AM	1584893.192
15:58:00	15:58:00	53.7	56.8	51.6	11:41:29 AM	234422.8815
15:59:00	15:59:00	58.5	64.8	51.5	11:42:29 AM	707945.7844
16:00:00	16:00:00	64.1	72.5	57.1	11:43:29 AM	2570395.783
16:01:00	16:01:00	62.1	69.3	52.6	11:44:29 AM	1621810.097
16:02:00	16:02:00	56.4	62.2	50.6	11:45:29 AM	436515.8322
16:03:00	16:03:00	65.2	73.8	54.1	11:46:29 AM	3311311.215
16:04:00	16:04:00	65.2	70.3	61.1	11:47:29 AM	3311311.215
16:05:00	16:05:00	72.1	81.6	64.1	11:48:29 AM	16218100.97
16:06:00	16:06:00	72.8	78.6	71.7	11:49:29 AM	19054607.18
16:07:00	16:07:00	72.7	78.2	71.7	11:50:29 AM	18620871.37
16:08:00	16:08:00	72.7	77.9	71.6	11:51:29 AM	18620871.37
16:09:00	16:09:00	72.6	78.4	71.5	11:52:29 AM	18197008.59
16:10:00	16:10:00	72.8	78.1	71.5	11:53:29 AM	19054607.18
16:11:00	16:11:00	75.5	82.5	59.5	11:54:29 AM	35481338.92
16:12:00	16:12:00	59.4	65.6	53.5	11:55:29 AM	870963.59
16:13:00	16:13:00	56.2	61.1	52.6	11:56:29 AM	416869.3835
16:14:00	16:14:00	56.2	62.5	50.8	11:57:29 AM	416869.3835
16:15:00	16:15:00	60	65.9	53.4	11:58:29 AM	1000000
16:16:00	16:16:00	57.1	61.5	52.8	11:59:29 AM	512861.384
16:17:00	16:17:00	53.2	58.5	46.9	12:00:29 PM	208929.6131
16:18:00	16:18:00	54.5	60.2	47.9	12:01:29 PM	281838.2931
16:19:00	16:19:00	53.8	60.5	47	12:02:29 PM	239883.2919
16:20:00	16:20:00	52.1	56.6	48.4	12:03:29 PM	162181.0097
16:21:00	16:21:00	57	62.3	49.3	12:04:29 PM	501187.2336
16:22:00	16:22:00	49.6	54.1	46.6	12:05:29 PM	91201.08394
16:23:00	16:23:00	55.3	61.8	47.5	12:06:29 PM	338844.1561
16:24:00	16:24:00	54.7	58.5	47.3	12:07:29 PM	295120.9227
16:25:00	16:25:00	58.9	71.5	47.2	12:08:29 PM	776247.1166
16:26:00	16:26:00	58.3	64.9	52.6	12:09:29 PM	676082.9754
16:27:00	16:27:00	57.8	64.4	51.8	12:10:29 PM	602559.5861
16:28:00	16:28:00	62.2	69.8	49.9	12:11:29 PM	1659586.907
16:29:00	16:29:00	60.7	69.3	55.5	12:12:29 PM	1174897.555
16:30:00	16:30:00	58.5	63.7	50.3	12:13:29 PM	707945.7844
16:31:00	16:31:00	61.4	70.4	54	12:14:29 PM	1380384.265
16:32:00	16:32:00	59.1	68.6	50.1	12:15:29 PM	812830.5162
16:33:00	16:33:00	55.5	60.2	51.1	12:16:29 PM	354813.3892
16:34:00	16:34:00	63	74.1	52.4	12:17:29 PM	1995262.315
16:35:00	16:35:00	66	73	51.4	12:18:29 PM	3981071.706
16:36:00	16:36:00	59.7	68.2	50.2	12:19:29 PM	933254.3008
16:37:00	16:37:00	57.1	64.5	49.2	12:20:29 PM	512861.384
16:38:00	16:38:00	61.9	70.3	52.5	12:21:29 PM	1548816.619
16:39:00	16:39:00	55.1	60.4	49.3	12:22:29 PM	323593.6569
16:40:00	16:40:00	52.4	57.8	48.6	12:23:29 PM	173780.0829
16:41:00	16:41:00	58.2	68.1	49.3	12:24:29 PM	660693.448
16:42:00	16:42:00	59.2	71.7	47.3	12:25:29 PM	831763.7711
16:43:00	16:43:00	66.4	77.5	50.4	12:26:29 PM	4365158.322
16:44:00	16:44:00	64.8	71.5	54.6	12:27:29 PM	3019951.72
16:45:00	16:45:00	62.1	70.1	54.5	12:28:29 PM	1621810.097
16:46:00	16:46:00	59.7	65.8	52.9	12:29:29 PM	933254.3008
16:47:00	16:47:00	59.4	64.8	54.3	12:30:29 PM	870963.59
16:48:00	16:48:00	61.1	67.2	55.1	12:31:29 PM	1288249.552
16:49:00	16:49:00	57	66	49.1	12:32:29 PM	501187.2336
16:50:00	16:50:00	58.8	65.1	53.5	12:33:29 PM	758577.575
16:51:00	16:51:00	61.2	67.3	53.2	12:34:29 PM	1318256.739
16:52:00	16:52:00	60.1	66	50.1	12:35:29 PM	1023292.992
16:53:00	16:53:00	60.8	66.3	51.6	12:36:29 PM	1202264.435
16:54:00	16:54:00	55.1	62.1	49.9	12:37:29 PM	323593.6569
16:55:00	16:55:00	62.2	69	55	12:38:29 PM	1659586.907
16:56:00	16:56:00	59.1	65.2	53	12:39:29 PM	812830.5162
16:57:00	16:57:00	55.6	61.6	52.4	12:40:29 PM	363078.0548
16:58:00	16:58:00	58	62.9	52.8	12:41:29 PM	630957.3445
16:59:00	16:59:00	59.5	65.8	51.2	12:42:29 PM	891250.9381
17:00:00	17:00:00	57.9	65.9	50.8	12:43:29 PM	616595.0019
17:01:00	17:01:00	58.6	64.4	51	12:44:29 PM	724435.9601
17:02:00	17:02:00	60.9	68.3	54	12:45:29 PM	1230268.771
17:03:00	17:03:00	59.8	70	51.9	12:46:29 PM	954992.586
17:04:00	17:04:00	54.2	60.9	50.3	12:47:29 PM	263026.7992
17:05:00	17:05:00	56.2	63.3	48.8	12:48:29 PM	416869.3835
17:06:00	17:06:00	54.9	59.9	48.2	12:49:29 PM	309029.5433
17:07:00	17:07:00	70.3	82.3	52.8	12:50:29 PM	10715193.05
17:08:00	17:08:00	60.1	66.9	50.4	12:51:29 PM	1023292.992
17:09:00	17:09:00	61.8	66.3	57.2	12:52:29 PM	1513561.248
17:10:00	17:10:00	62.3	71.5	49.4	12:53:29 PM	1698243.652
17:11:00	17:11:00	54.6	62.8	49.1	12:54:29 PM	288403.1503
17:12:00	17:12:00	59	65.3	53.4	12:55:29 PM	794328.2347
17:13:00	17:13:00	52.9	58.3	47.8	12:56:29 PM	194984.46
17:14:00	17:14:00	58.9	67.3	49.9	12:57:29 PM	776247.1166
17:15:00	17:15:00	56.5	63	48.2	12:58:29 PM	446683.5922
17:16:00	17:16:00	62	67.3	56.4	12:59:29 PM	1584893.192
17:17:00	17:17:00	61.1	68.6	52.8	1:00:29 PM	1288249.552
17:18:00	17:18:00	61.5	71.8	50.5	1:01:29 PM	1412537.545
17:19:00	17:19:00	58.9	63.6	51.8	1:02:29 PM	776247.1166
17:20:00	17:20:00	56.9	62.5	52.7	1:03:29 PM	489778.8194
17:21:00	17:21:00	60.4	67.2	52.5	1:04:29 PM	1096478.196

Study #3 - Haul Route
Long-Duration (24-Hours)

17:22:00	17:22:00	57.4	67.9	49.8	1:05:29 PM	549540.8739
17:23:00	17:23:00	52.9	61.7	44.7	1:06:29 PM	194984.46
17:24:00	17:24:00	52.1	54.9	49.1	1:07:29 PM	162181.0097
17:25:00	17:25:00	50	53.8	46.7	1:08:29 PM	100000
17:26:00	17:26:00	53.6	60.3	46.9	1:09:29 PM	229086.7653
17:27:00	17:27:00	55.9	62.2	46.3	1:10:29 PM	389045.145
17:28:00	17:28:00	60.9	69.3	51.3	1:11:29 PM	1230268.771
17:29:00	17:29:00	59.8	67.4	51.5	1:12:29 PM	954992.586
17:30:00	17:30:00	58.5	62	52.3	1:13:29 PM	707945.7844
17:31:00	17:31:00	60.1	68.1	53.3	1:14:29 PM	1023292.992
17:32:00	17:32:00	62.1	72.2	50.5	1:15:29 PM	1621810.097
17:33:00	17:33:00	54.7	58.6	49.2	1:16:29 PM	295120.9227
17:34:00	17:34:00	56.3	63.8	51.1	1:17:29 PM	426579.5188
17:35:00	17:35:00	58.5	63.6	52.7	1:18:29 PM	707945.7844
17:36:00	17:36:00	65	75.8	53.4	1:19:29 PM	3162277.66
17:37:00	17:37:00	54.4	59.2	49.1	1:20:29 PM	275422.8703
17:38:00	17:38:00	55.2	59.5	51.5	1:21:29 PM	331131.1215
17:39:00	17:39:00	57.7	65.7	52.3	1:22:29 PM	588843.6554
17:40:00	17:40:00	60.7	68	51.3	1:23:29 PM	1174897.555
17:41:00	17:41:00	62.3	72.1	55.6	1:24:29 PM	1698243.652
17:42:00	17:42:00	62.6	70.9	52.2	1:25:29 PM	1819700.859
17:43:00	17:43:00	59.3	65.3	50.8	1:26:29 PM	851138.0382
17:44:00	17:44:00	52.9	59.2	46.9	1:27:29 PM	194984.46
17:45:00	17:45:00	55.4	63.1	47.3	1:28:29 PM	346736.8505
17:46:00	17:46:00	59.6	65.2	51.8	1:29:29 PM	912010.8394
17:47:00	17:47:00	56.1	59.4	52	1:30:29 PM	407380.2778
17:48:00	17:48:00	62.2	70.6	52.7	1:31:29 PM	1659586.907
17:49:00	17:49:00	56.4	60.6	49.3	1:32:29 PM	436515.8322
17:50:00	17:50:00	61.1	67.3	51.3	1:33:29 PM	1288249.552
17:51:00	17:51:00	62.1	69	55.6	1:34:29 PM	1621810.097
17:52:00	17:52:00	60.2	66.1	53.4	1:35:29 PM	1047128.548
17:53:00	17:53:00	60.6	67.3	53.8	1:36:29 PM	1148153.621
17:54:00	17:54:00	53.6	60.8	46.7	1:37:29 PM	229086.7653
17:55:00	17:55:00	54.9	62.2	45.7	1:38:29 PM	309029.5433
17:56:00	17:56:00	62.1	67.4	54.6	1:39:29 PM	1621810.097
17:57:00	17:57:00	59.7	65.2	53.2	1:40:29 PM	933254.3008
17:58:00	17:58:00	55.1	59.5	51.6	1:41:29 PM	323593.6569
17:59:00	17:59:00	53.4	59.6	47.6	1:42:29 PM	218776.1624
18:00:00	18:00:00	52.9	59.1	47.7	1:43:29 PM	194984.46
18:01:00	18:01:00	60.6	65.1	53.8	1:44:29 PM	1148153.621
18:02:00	18:02:00	56.9	62.6	49.5	1:45:29 PM	489778.8194
18:03:00	18:03:00	58.2	61.9	48.3	1:46:29 PM	660693.448
18:04:00	18:04:00	61.3	67.9	54.7	1:47:29 PM	1348962.883
18:05:00	18:05:00	56.2	60.2	52.6	1:48:29 PM	416869.3835
18:06:00	18:06:00	60.2	66	54.5	1:49:29 PM	1047128.548
18:07:00	18:07:00	59	69.1	53.6	1:50:29 PM	794328.2347
18:08:00	18:08:00	61.5	67.8	57.1	1:51:29 PM	1412537.545
18:09:00	18:09:00	61.4	67.6	54.5	1:52:29 PM	1380384.265
18:10:00	18:10:00	64.8	74.9	57.7	1:53:29 PM	3019951.72
18:11:00	18:11:00	63.9	73.4	55	1:54:29 PM	2454708.916
18:12:00	18:12:00	65.4	74.2	58.7	1:55:29 PM	3467368.505
18:13:00	18:13:00	62.4	68.1	57.1	1:56:29 PM	1737800.829
18:14:00	18:14:00	60.7	68.8	52.2	1:57:29 PM	1174897.555
18:15:00	18:15:00	59.9	66.5	52	1:58:29 PM	977237.221
18:16:00	18:16:00	75.1	85.9	53.3	1:59:29 PM	32359365.69
18:17:00	18:17:00	57.5	62	52.4	2:00:29 PM	562341.3252
18:18:00	18:18:00	59.7	67.7	53.4	2:01:29 PM	933254.3008
18:19:00	18:19:00	64.1	71.8	55.8	2:02:29 PM	2570395.783
18:20:00	18:20:00	63.8	74.3	54.5	2:03:29 PM	2398832.919
18:21:00	18:21:00	62.7	70	54.6	2:04:29 PM	1862087.137
18:22:00	18:22:00	58.3	63.2	55.2	2:05:29 PM	676082.9754
18:23:00	18:23:00	61.8	67.5	55.6	2:06:29 PM	1513561.248
18:24:00	18:24:00	55	60.5	51.6	2:07:29 PM	316227.766
18:25:00	18:25:00	66	73	54.9	2:08:29 PM	3981071.706
18:26:00	18:26:00	55.8	59.8	52.9	2:09:29 PM	380189.3963
18:27:00	18:27:00	59.7	64.8	53.1	2:10:29 PM	933254.3008
18:28:00	18:28:00	59.1	63.2	54.4	2:11:29 PM	812830.5162
18:29:00	18:29:00	59.5	68.6	53.5	2:12:29 PM	891250.9381
18:30:00	18:30:00	65.6	75.6	56.1	2:13:29 PM	3630780.548
18:31:00	18:31:00	61.1	74.5	51.4	2:14:29 PM	1288249.552
18:32:00	18:32:00	58.3	64.3	55.1	2:15:29 PM	676082.9754
18:33:00	18:33:00	60.6	68.5	49.7	2:16:29 PM	1148153.621
18:34:00	18:34:00	59.8	64.6	50.5	2:17:29 PM	954992.586
18:35:00	18:35:00	59	64.9	51.2	2:18:29 PM	794328.2347
18:36:00	18:36:00	61.4	66.6	53.5	2:19:29 PM	1380384.265
18:37:00	18:37:00	60.9	71.7	54.4	2:20:29 PM	1230268.771
18:38:00	18:38:00	63.2	75.1	56.7	2:21:29 PM	2089296.131
18:39:00	18:39:00	63.7	76.8	49.4	2:22:29 PM	2344228.815
18:40:00	18:40:00	55.3	64.2	48	2:23:29 PM	338844.1561
18:41:00	18:41:00	63.8	71.2	56.6	2:24:29 PM	2398832.919
18:42:00	18:42:00	58.6	62.1	54.1	2:25:29 PM	724435.9601
18:43:00	18:43:00	56.3	62	48.5	2:26:29 PM	426579.5188
18:44:00	18:44:00	57.1	63.2	49.9	2:27:29 PM	512861.384
18:45:00	18:45:00	58.7	66.6	47.4	2:28:29 PM	741310.2413
18:46:00	18:46:00	51	54.6	46.6	2:29:29 PM	125892.5412
18:47:00	18:47:00	59.6	66	51.9	2:30:29 PM	912010.8394
18:48:00	18:48:00	57.8	61.8	52.8	2:31:29 PM	602559.5861
18:49:00	18:49:00	54.9	62.7	48.4	2:32:29 PM	309029.5433
18:50:00	18:50:00	58.2	65.3	50.4	2:33:29 PM	660693.448
18:51:00	18:51:00	55.2	61.3	51.2	2:34:29 PM	331131.1215
18:52:00	18:52:00	60.6	68.1	52.3	2:35:29 PM	1148153.621
18:53:00	18:53:00	55.5	62.3	50.6	2:36:29 PM	354813.3892
18:54:00	18:54:00	58	65.9	52.1	2:37:29 PM	630957.3445
18:55:00	18:55:00	52	53.6	50.1	2:38:29 PM	158489.3192
18:56:00	18:56:00	56.9	68.6	50.6	2:39:29 PM	489778.8194

18:57:00	18:57:00	54.1	59.1	49.1	2:40:29 PM	257039.5783
18:58:00	18:58:00	55.5	60.8	46.1	2:41:29 PM	354813.3892
18:59:00	18:59:00	53.3	60.7	45.2	2:42:29 PM	213796.209
19:00:00	19:00:00	58.9	66.1	52.4	2:43:29 PM	776247.1166
19:01:00	19:01:00	56.9	61.3	49	2:44:29 PM	489778.8194
19:02:00	19:02:00	55.1	59.7	50.2	2:45:29 PM	323593.6569
19:03:00	19:03:00	51.8	57.3	48.3	2:46:29 PM	151356.1248
19:04:00	19:04:00	62	71.4	48.8	2:47:29 PM	1584893.192
19:05:00	19:05:00	58.3	65.1	51.6	2:48:29 PM	676082.9754
19:06:00	19:06:00	56.2	62.5	50	2:49:29 PM	416869.3835
19:07:00	19:07:00	56.9	64.9	49.7	2:50:29 PM	489778.8194
19:08:00	19:08:00	53.8	62	48.4	2:51:29 PM	239883.2919
19:09:00	19:09:00	54.9	62.5	44.8	2:52:29 PM	309029.5433
19:10:00	19:10:00	56.7	64	47.1	2:53:29 PM	467735.1413
19:11:00	19:11:00	59.8	64.6	51.4	2:54:29 PM	954992.586
19:12:00	19:12:00	60.5	67.3	49.9	2:55:29 PM	1122018.454
19:13:00	19:13:00	56.5	66.5	46.5	2:56:29 PM	446683.5922
19:14:00	19:14:00	56.4	64	50.6	2:57:29 PM	436515.8322
19:15:00	19:15:00	55.1	61.3	50	2:58:29 PM	323593.6569
19:16:00	19:16:00	60.6	70.2	51.7	2:59:29 PM	1148153.621
19:17:00	19:17:00	62.8	74.7	50.4	3:00:29 PM	1905460.718
19:18:00	19:18:00	59.6	66.8	56.6	3:01:29 PM	912010.8394
19:19:00	19:19:00	60.7	65.6	52.6	3:02:29 PM	1174897.555
19:20:00	19:20:00	58	62.3	52.9	3:03:29 PM	630957.3445
19:21:00	19:21:00	59.1	67	53	3:04:29 PM	812830.5162
19:22:00	19:22:00	61.6	71.3	51.4	3:05:29 PM	1445439.771
19:23:00	19:23:00	59.9	64.6	52.8	3:06:29 PM	977237.221
19:24:00	19:24:00	56.9	61.7	50.1	3:07:29 PM	489778.8194
19:25:00	19:25:00	56	61.5	50.6	3:08:29 PM	398107.1706
19:26:00	19:26:00	59.2	68.5	49.5	3:09:29 PM	831763.7711
19:27:00	19:27:00	54.1	57.9	48.9	3:10:29 PM	257039.5783
19:28:00	19:28:00	54.5	59	50.4	3:11:29 PM	281838.2931
19:29:00	19:29:00	51.8	57	48.4	3:12:29 PM	151356.1248
19:30:00	19:30:00	57.4	64.9	48.7	3:13:29 PM	549540.8739
19:31:00	19:31:00	55.7	63.3	48.5	3:14:29 PM	371535.2291
19:32:00	19:32:00	54.8	59.8	49	3:15:29 PM	301995.172
19:33:00	19:33:00	63	75.7	57	3:16:29 PM	1995262.315
19:34:00	19:34:00	55.5	58.3	51.4	3:17:29 PM	354813.3892
19:35:00	19:35:00	58.2	67.2	48.7	3:18:29 PM	660693.448
19:36:00	19:36:00	63	67.7	57.2	3:19:29 PM	1995262.315
19:37:00	19:37:00	61.8	70.7	54.6	3:20:29 PM	1513561.248
19:38:00	19:38:00	58	62.2	53.7	3:21:29 PM	630957.3445
19:39:00	19:39:00	59.2	68.1	52.8	3:22:29 PM	831763.7711
19:40:00	19:40:00	61.1	69.2	55.1	3:23:29 PM	1288249.552
19:41:00	19:41:00	59.3	66.1	51.9	3:24:29 PM	851138.0382
19:42:00	19:42:00	52.5	59.6	48.9	3:25:29 PM	177827.941
19:43:00	19:43:00	60.7	67.5	47.1	3:26:29 PM	1174897.555
19:44:00	19:44:00	58.6	68.2	47.8	3:27:29 PM	724435.9601
19:45:00	19:45:00	58.8	67.1	51.1	3:28:29 PM	758577.575
19:46:00	19:46:00	57.3	63.2	50.9	3:29:29 PM	537031.7964
19:47:00	19:47:00	55.6	59.3	50.5	3:30:29 PM	363078.0548
19:48:00	19:48:00	56.9	60.2	52.3	3:31:29 PM	489778.8194
19:49:00	19:49:00	60.6	63.8	58.1	3:32:29 PM	1148153.621
19:50:00	19:50:00	54.6	61	48.5	3:33:29 PM	288403.1503
19:51:00	19:51:00	56.8	62.1	49	3:34:29 PM	478630.0923
19:52:00	19:52:00	57.6	65	50	3:35:29 PM	575439.9373
19:53:00	19:53:00	54.6	60.8	48.7	3:36:29 PM	288403.1503
19:54:00	19:54:00	54.3	59.4	45	3:37:29 PM	269153.4804
19:55:00	19:55:00	56.7	64.6	45.1	3:38:29 PM	467735.1413
19:56:00	19:56:00	55.5	62.9	49.6	3:39:29 PM	354813.3892
19:57:00	19:57:00	63.5	71	54.5	3:40:29 PM	2238721.139
19:58:00	19:58:00	58.9	64.5	52.4	3:41:29 PM	776247.1166
19:59:00	19:59:00	59	68.5	49.3	3:42:29 PM	794328.2347
20:00:00	20:00:00	59	64.4	51.6	3:43:29 PM	794328.2347
20:01:00	20:01:00	57.5	64.5	46.5	3:44:29 PM	562341.3252
20:02:00	20:02:00	48.7	57.2	45	3:45:29 PM	74131.02413
20:03:00	20:03:00	57	69.4	44.7	3:46:29 PM	501187.2336
20:04:00	20:04:00	58.3	68.7	48.1	3:47:29 PM	676082.9754
20:05:00	20:05:00	62.7	71.7	51.8	3:48:29 PM	1862087.137
20:06:00	20:06:00	58.1	65.4	48.5	3:49:29 PM	645654.229
20:07:00	20:07:00	60.6	67.3	52.9	3:50:29 PM	1148153.621
20:08:00	20:08:00	60	63.6	54.7	3:51:29 PM	1000000
20:09:00	20:09:00	60.2	67.9	54.1	3:52:29 PM	1047128.548
20:10:00	20:10:00	61.2	68.9	53.8	3:53:29 PM	1318256.739
20:11:00	20:11:00	56.5	64.6	48.6	3:54:29 PM	446683.5922
20:12:00	20:12:00	60.4	67.7	52.7	3:55:29 PM	1096478.196
20:13:00	20:13:00	57.2	63.5	49.8	3:56:29 PM	524807.4602
20:14:00	20:14:00	64.2	74.8	51.7	3:57:29 PM	2630267.992
20:15:00	20:15:00	62.9	69.9	56.6	3:58:29 PM	1949844.6
20:16:00	20:16:00	59.7	67.4	50.9	3:59:29 PM	933254.3008
20:17:00	20:17:00	50.9	56.3	45.5	4:00:29 PM	123026.8771
20:18:00	20:18:00	53.8	59.8	48.4	4:01:29 PM	239883.2919
20:19:00	20:19:00	57.4	63.5	48.9	4:02:29 PM	549540.8739
20:20:00	20:20:00	52.6	63.6	42.6	4:03:29 PM	181970.0859
20:21:00	20:21:00	54	61.1	45.4	4:04:29 PM	251188.6432
20:22:00	20:22:00	53	58.2	46.2	4:05:29 PM	199526.2315
20:23:00	20:23:00	51.1	56	47	4:06:29 PM	128824.9552
20:24:00	20:24:00	66.9	76.3	52.4	4:07:29 PM	4897788.194
20:25:00	20:25:00	59.4	65	54.6	4:08:29 PM	870963.59
20:26:00	20:26:00	58.3	64.4	49.2	4:09:29 PM	676082.9754
20:27:00	20:27:00	54	58.5	49.8	4:10:29 PM	251188.6432
20:28:00	20:28:00	50.2	55.2	47	4:11:29 PM	104712.8548
20:29:00	20:29:00	55.3	64.4	48.6	4:12:29 PM	338844.1561
20:30:00	20:30:00	54.5	58.8	50.3	4:13:29 PM	281838.2931
20:31:00	20:31:00	50	56.9	46.2	4:14:29 PM	100000

20:32:00	20:32:00	47.8	51.8	44.7	4:15:29 PM	60255.95861
20:33:00	20:33:00	57.2	65.4	46.3	4:16:29 PM	524807.4602
20:34:00	20:34:00	57.5	65.4	43.2	4:17:29 PM	562341.3252
20:35:00	20:35:00	50.9	56.7	41.3	4:18:29 PM	123026.8771
20:36:00	20:36:00	49.3	57.1	43	4:19:29 PM	85113.80382
20:37:00	20:37:00	61.5	67.9	43.5	4:20:29 PM	1412537.545
20:38:00	20:38:00	58.3	66.7	46.2	4:21:29 PM	676082.9754
20:39:00	20:39:00	48.3	54.4	44.4	4:22:29 PM	67608.29754
20:40:00	20:40:00	54.8	61.3	46.6	4:23:29 PM	301995.172
20:41:00	20:41:00	61.3	70.5	45.5	4:24:29 PM	1348962.883
20:42:00	20:42:00	55.6	61.4	48.8	4:25:29 PM	363078.0548
20:43:00	20:43:00	58.3	62.1	54	4:26:29 PM	676082.9754
20:44:00	20:44:00	55	61.3	42.8	4:27:29 PM	316227.766
20:45:00	20:45:00	55.7	60.1	45.7	4:28:29 PM	371535.2291
20:46:00	20:46:00	52.7	59.6	45.2	4:29:29 PM	186208.7137
20:47:00	20:47:00	54.2	59.5	47.3	4:30:29 PM	263026.7992
20:48:00	20:48:00	56.5	61.4	50.3	4:31:29 PM	446683.5922
20:49:00	20:49:00	52.7	57.9	48.1	4:32:29 PM	186208.7137
20:50:00	20:50:00	53.2	62.1	46.6	4:33:29 PM	208929.6131
20:51:00	20:51:00	62	70.5	50.7	4:34:29 PM	1584893.192
20:52:00	20:52:00	57.3	63.3	45.8	4:35:29 PM	537031.7964
20:53:00	20:53:00	56.5	61.6	49.9	4:36:29 PM	446683.5922
20:54:00	20:54:00	54.7	61.1	48.7	4:37:29 PM	295120.9227
20:55:00	20:55:00	49.5	57.5	41.9	4:38:29 PM	89125.09381
20:56:00	20:56:00	51.8	59.2	43.6	4:39:29 PM	151356.1248
20:57:00	20:57:00	49.7	55.3	44.1	4:40:29 PM	93325.43008
20:58:00	20:58:00	54.1	59.2	43.8	4:41:29 PM	257039.5783
20:59:00	20:59:00	52.5	57	46	4:42:29 PM	177827.941
21:00:00	21:00:00	56	60.7	46.7	4:43:29 PM	398107.1706
21:01:00	21:01:00	55.2	60.1	45.3	4:44:29 PM	331131.1215
21:02:00	21:02:00	53.5	59.3	47.9	4:45:29 PM	223872.1139
21:03:00	21:03:00	53.7	57.9	46.8	4:46:29 PM	234422.8815
21:04:00	21:04:00	50.8	56.8	43.4	4:47:29 PM	120226.4435
21:05:00	21:05:00	62.3	71	45.3	4:48:29 PM	1698243.652
21:06:00	21:06:00	62.9	70.6	46.6	4:49:29 PM	1949844.6
21:07:00	21:07:00	57.4	62.9	51.8	4:50:29 PM	549540.8739
21:08:00	21:08:00	51.3	54.6	47.8	4:51:29 PM	134896.2883
21:09:00	21:09:00	61	64.8	53.6	4:52:29 PM	1258925.412
21:10:00	21:10:00	55.9	62.2	45.2	4:53:29 PM	389045.145
21:11:00	21:11:00	57.8	64.2	45.3	4:54:29 PM	602559.5861
21:12:00	21:12:00	60.3	68.6	52	4:55:29 PM	1071519.305
21:13:00	21:13:00	59.2	64.8	47.7	4:56:29 PM	831763.7711
21:14:00	21:14:00	56.3	63	49.5	4:57:29 PM	426579.5188
21:15:00	21:15:00	57.5	72.8	48.5	4:58:29 PM	562341.3252
21:16:00	21:16:00	57.7	63.4	47.2	4:59:29 PM	588843.6554
21:17:00	21:17:00	56.2	62.7	47.1	5:00:29 PM	416869.3835
21:18:00	21:18:00	59.1	68	45.4	5:01:29 PM	812830.5162
21:19:00	21:19:00	66.3	76.2	44.7	5:02:29 PM	4265795.188
21:20:00	21:20:00	52.1	58.8	42.3	5:03:29 PM	162181.0097
21:21:00	21:21:00	60.5	69.7	41.9	5:04:29 PM	1122018.454
21:22:00	21:22:00	48.4	54.2	44.2	5:05:29 PM	69183.09709
21:23:00	21:23:00	51.3	56.4	44.1	5:06:29 PM	134896.2883
21:24:00	21:24:00	51.1	54.7	46.8	5:07:29 PM	128824.9552
21:25:00	21:25:00	51.3	57.4	46	5:08:29 PM	134896.2883
21:26:00	21:26:00	49.4	56	43.9	5:09:29 PM	87096.359
21:27:00	21:27:00	47.2	53.6	43.4	5:10:29 PM	52480.74602
21:28:00	21:28:00	52.9	58.9	43.7	5:11:29 PM	194984.46
21:29:00	21:29:00	46.9	49.2	44.3	5:12:29 PM	48977.88194
21:30:00	21:30:00	54.1	59.7	48.9	5:13:29 PM	257039.5783
21:31:00	21:31:00	53.3	60.3	47.2	5:14:29 PM	213796.209
21:32:00	21:32:00	57.8	64.3	47.9	5:15:29 PM	602559.5861
21:33:00	21:33:00	54.7	61.2	45.1	5:16:29 PM	295120.9227
21:34:00	21:34:00	53.1	58.6	47	5:17:29 PM	204173.7945
21:35:00	21:35:00	54.7	62.1	49.4	5:18:29 PM	295120.9227
21:36:00	21:36:00	55.2	65	46.2	5:19:29 PM	331131.1215
21:37:00	21:37:00	57.2	62	51.1	5:20:29 PM	524807.4602
21:38:00	21:38:00	50.9	56.8	44.7	5:21:29 PM	123026.8771
21:39:00	21:39:00	53.1	62.7	44.2	5:22:29 PM	204173.7945
21:40:00	21:40:00	44.6	51.3	41.6	5:23:29 PM	28840.31503
21:41:00	21:41:00	43.6	47.7	41	5:24:29 PM	22908.67653
21:42:00	21:42:00	56	64.6	47.7	5:25:29 PM	398107.1706
21:43:00	21:43:00	64.5	76.8	48.1	5:26:29 PM	2818382.931
21:44:00	21:44:00	49.3	59.2	42.7	5:27:29 PM	85113.80382
21:45:00	21:45:00	56.8	66.5	43.1	5:28:29 PM	478630.0923
21:46:00	21:46:00	53.5	61.1	44	5:29:29 PM	223872.1139
21:47:00	21:47:00	51.9	57.6	44.2	5:30:29 PM	154881.6619
21:48:00	21:48:00	49.4	57	42.7	5:31:29 PM	87096.359
21:49:00	21:49:00	46.5	53.9	42.9	5:32:29 PM	44668.35922
21:50:00	21:50:00	48.8	56.4	42.8	5:33:29 PM	75857.7575
21:51:00	21:51:00	52.2	57.8	44.5	5:34:29 PM	165958.6907
21:52:00	21:52:00	45.7	49.9	43.5	5:35:29 PM	37153.52291
21:53:00	21:53:00	48.1	54.4	42.8	5:36:29 PM	64565.4229
21:54:00	21:54:00	55.5	58	48.6	5:37:29 PM	354813.3892
21:55:00	21:55:00	60.1	69.1	48.7	5:38:29 PM	1023292.992
21:56:00	21:56:00	56.4	62.8	47.7	5:39:29 PM	436515.8322
21:57:00	21:57:00	51.4	57.7	42.3	5:40:29 PM	138038.4265
21:58:00	21:58:00	43.1	44.9	41.6	5:41:29 PM	20417.37945
21:59:00	21:59:00	47.8	53.7	42.7	5:42:29 PM	60255.95861
22:00:00	22:00:00	47.1	55.4	41.6	5:43:29 PM	51286.1384
22:01:00	22:01:00	41.9	44.5	40.6	5:44:29 PM	15488.16619
22:02:00	22:02:00	42.5	44.7	40.7	5:45:29 PM	17782.7941
22:03:00	22:03:00	52.3	61	42.3	5:46:29 PM	169824.3652
22:04:00	22:04:00	54.3	62	42.7	5:47:29 PM	269153.4804
22:05:00	22:05:00	44.4	48.6	41.7	5:48:29 PM	27542.28703
22:06:00	22:06:00	45	50.5	42.2	5:49:29 PM	31622.7766

Study #3 - Haul Route
Long-Duration (24-Hours)

22:07:00	22:07:00	51.4	61.4	42.4			5:50:29 PM	138038.4265
22:08:00	22:08:00	46.2	50.6	42.2			5:51:29 PM	41686.93835
22:09:00	22:09:00	44.9	47.7	43.1			5:52:29 PM	30902.95433
22:10:00	22:10:00	50.9	58.7	42.4			5:53:29 PM	123026.8771
22:11:00	22:11:00	49.8	55.6	44.2			5:54:29 PM	95499.2586
22:12:00	22:12:00	56.2	64.4	43.8			5:55:29 PM	416869.3835
22:13:00	22:13:00	44	47.7	41.6			5:56:29 PM	25118.86432
22:14:00	22:14:00	44.4	49.5	40.8			5:57:29 PM	27542.28703
22:15:00	22:15:00	55.4	65.1	43.5			5:58:29 PM	346736.8505
22:16:00	22:16:00	49.5	56.1	43.1			5:59:29 PM	89125.09381
22:17:00	22:17:00	43.4	45.6	41.8			6:00:29 PM	21877.61624
22:18:00	22:18:00	57.5	68.7	41.8			6:01:29 PM	562341.3252
22:19:00	22:19:00	42.8	45.9	41.3			6:02:29 PM	19054.60718
22:20:00	22:20:00	45.4	48.1	42.1			6:03:29 PM	34673.68505
22:21:00	22:21:00	44.5	49.3	41.5			6:04:29 PM	28183.82931
22:22:00	22:22:00	42.4	44	40.3			6:05:29 PM	17378.00829
22:23:00	22:23:00	44.3	51.4	41.4			6:06:29 PM	26915.34804
22:24:00	22:24:00	49.6	57.8	42.3			6:07:29 PM	91201.08394
22:25:00	22:25:00	52.7	63.7	41.5			6:08:29 PM	186208.7137
22:26:00	22:26:00	43.9	49.3	41.3			6:09:29 PM	24547.08916
22:27:00	22:27:00	65.1	78.1	44.2			6:10:29 PM	3235936.569
22:28:00	22:28:00	46.9	52.8	42.2			6:11:29 PM	48977.88194
22:29:00	22:29:00	42.7	44.8	41.6			6:12:29 PM	18620.87137
22:30:00	22:30:00	54.9	65.7	41.2			6:13:29 PM	309029.5433
22:31:00	22:31:00	50.4	58.1	41.9			6:14:29 PM	109647.8196
22:32:00	22:32:00	47.9	53.7	44.3			6:15:29 PM	61659.50019
22:33:00	22:33:00	48.4	53	44.7			6:16:29 PM	69183.09709
22:34:00	22:34:00	45.9	49.8	44			6:17:29 PM	38904.5145
22:35:00	22:35:00	48.4	53.6	43.6			6:18:29 PM	69183.09709
22:36:00	22:36:00	46.1	49.3	43.6			6:19:29 PM	40738.02778
22:37:00	22:37:00	43.3	44.9	41.6			6:20:29 PM	21379.6209
22:38:00	22:38:00	43.3	46.3	41.3			6:21:29 PM	21379.6209
22:39:00	22:39:00	43	45.9	41			6:22:29 PM	19952.62315
22:40:00	22:40:00	41.2	42.8	40.2			6:23:29 PM	13182.56739
22:41:00	22:41:00	41.4	44.3	39.9			6:24:29 PM	13803.84265
22:42:00	22:42:00	46.3	53.6	40.9			6:25:29 PM	42657.95188
22:43:00	22:43:00	64.7	71	52.5			6:26:29 PM	2951209.227
22:44:00	22:44:00	46.3	52.9	41.9			6:27:29 PM	42657.95188
22:45:00	22:45:00	55.5	65.8	43.7			6:28:29 PM	354813.3892
22:46:00	22:46:00	49.3	53.7	43.7			6:29:29 PM	85113.80382
22:47:00	22:47:00	55.7	65.1	45.4			6:30:29 PM	371535.2291
22:48:00	22:48:00	49	55.9	43.2			6:31:29 PM	79432.82347
22:49:00	22:49:00	55.3	67	45.3			6:32:29 PM	338844.1561
22:50:00	22:50:00	47.4	53.4	42.4			6:33:29 PM	54954.08739
22:51:00	22:51:00	47.2	47.6	46.9			6:34:29 PM	52480.74602
22:52:00	22:52:00	54.6	63.1	43.9			6:35:29 PM	288403.1503
22:53:00	22:53:00	41.7	43.9	40.1			6:36:29 PM	14791.08388
22:54:00	22:54:00	41.8	43	40.6			6:37:29 PM	15135.61248
22:55:00	22:55:00	41.2	43.1	39.4			6:38:29 PM	13182.56739
22:56:00	22:56:00	41.3	44.2	39.4			6:39:29 PM	13489.62883
22:57:00	22:57:00	43.5	47.2	40.9			6:40:29 PM	22387.21139
22:58:00	22:58:00	46.9	54.4	43.4			6:41:29 PM	48977.88194
22:59:00	22:59:00	49.3	55	42			6:42:29 PM	85113.80382
23:00:00	23:00:00	47.3	54.6	42.1			6:43:29 PM	53703.17964
23:01:00	23:01:00	55.8	62.8	48.9			6:44:29 PM	380189.3963
23:02:00	23:02:00	44.2	49.7	40.6			6:45:29 PM	26302.67992
23:03:00	23:03:00	43.3	46.2	41.4			6:46:29 PM	21379.6209
23:04:00	23:04:00	47.8	54.7	40.9			6:47:29 PM	60255.95861
23:05:00	23:05:00	47.6	53.6	42			6:48:29 PM	57543.99373
23:06:00	23:06:00	49	57.5	42.3			6:49:29 PM	79432.82347
23:07:00	23:07:00	44.7	50.2	42.5			6:50:29 PM	29512.09227
23:08:00	23:08:00	44.2	52.3	39.9			6:51:29 PM	26302.67992
23:09:00	23:09:00	51.2	54.8	46.7			6:52:29 PM	131825.6739
23:10:00	23:10:00	48.9	56.5	44.6			6:53:29 PM	77624.71166
23:11:00	23:11:00	45.4	47.8	42.7			6:54:29 PM	34673.68505
23:12:00	23:12:00	43.4	44.6	42.1			6:55:29 PM	21877.61624
23:13:00	23:13:00	41.7	44.8	40.3			6:56:29 PM	14791.08388
23:14:00	23:14:00	41.9	44.1	41			6:57:29 PM	15488.16619
23:15:00	23:15:00	42.6	44.2	41			6:58:29 PM	18197.00859
23:16:00	23:16:00	44.7	47.4	41.7			6:59:29 PM	29512.09227
23:17:00	23:17:00	44.6	47.7	42.5	R5-A	Study #4C	7:00:29 PM	28840.31503
23:18:00	23:18:00	55.9	65.3	42.4	R5-A	Study #4C	7:01:29 PM	389045.145
23:19:00	23:19:00	44.1	48.9	41.4	R5-A	Study #4C	7:02:29 PM	25703.95783
23:20:00	23:20:00	42.6	45.5	40.3	R5-A	Study #4C	7:03:29 PM	18197.00859
23:21:00	23:21:00	43.1	48.6	41.7	R5-A	Study #4C	7:04:29 PM	20417.37945
23:22:00	23:22:00	59	68.8	48.6	R5-A	Study #4C	7:05:29 PM	794328.2347
23:23:00	23:23:00	49.5	62.5	41.8	R5-A	Study #4C	7:06:29 PM	89125.09381
23:24:00	23:24:00	45.6	51.6	41.3	R5-A	Study #4C	7:07:29 PM	36307.80548
23:25:00	23:25:00	45.7	51.6	41.8	R5-A	Study #4C	7:08:29 PM	37153.52291
23:26:00	23:26:00	44.2	46.7	41.1	R5-A	Study #4C	7:09:29 PM	26302.67992
23:27:00	23:27:00	43.7	47.2	42.1	R5-A	Study #4C	7:10:29 PM	23442.28815
23:28:00	23:28:00	42.6	44.3	41.2	R5-A	Study #4C	7:11:29 PM	18197.00859
23:29:00	23:29:00	51.6	59.2	41.8	R5-A	Study #4C	7:12:29 PM	144543.9771
23:30:00	23:30:00	44.6	48.9	42	R5-A	Study #4C	7:13:29 PM	28840.31503
23:31:00	23:31:00	49.8	58.2	40.4	R5-A	Study #4C	7:14:29 PM	95499.2586
23:32:00	23:32:00	51.8	57.9	41.5	R5-A	Study #4C	7:15:29 PM	151356.1248
23:33:00	23:33:00	43.6	45.4	41.7			7:16:29 PM	22908.67653
23:34:00	23:34:00	45	50.2	42.1			7:17:29 PM	31622.7766
23:35:00	23:35:00	43.2	44.6	42			7:18:29 PM	20892.96131
23:36:00	23:36:00	45.1	50.9	42.4			7:19:29 PM	32359.36569
23:37:00	23:37:00	44.1	45.2	43.1			7:20:29 PM	25703.95783
23:38:00	23:38:00	44.6	47.3	42.5			7:21:29 PM	28840.31503
23:39:00	23:39:00	44.8	47.2	42.7			7:22:29 PM	30199.5172
23:40:00	23:40:00	46	48	44			7:23:29 PM	39810.71706
23:41:00	23:41:00	50.3	57.7	46			7:24:29 PM	107151.9305

Study #3 - Haul Route
Long-Duration (24-Hours)

23:42:00	23:42:00	45.9	52	41.9
23:43:00	23:43:00	43.9	47	41.5
23:44:00	23:44:00	51.3	57.9	43.7
23:45:00	23:45:00	51.3	60.6	41.7
23:46:00	23:46:00	44.7	46.9	42.4
23:47:00	23:47:00	53.2	60.3	42.8
23:48:00	23:48:00	54.7	64.8	46.1
23:49:00	23:49:00	54.7	63.8	47
23:50:00	23:50:00	47.9	51.4	43.8
23:51:00	23:51:00	48.7	53.4	45
23:52:00	23:52:00	48.5	54.7	44.8
23:53:00	23:53:00	45.4	49.1	42.5
23:54:00	23:54:00	49.6	57.8	42.7
23:55:00	23:55:00	51.8	58.3	46.6
23:56:00	23:56:00	52.6	59.5	44.9
23:57:00	23:57:00	50.3	59.6	43
23:58:00	23:58:00	48	54.1	43.6
23:59:00	23:59:00	59.1	74.1	45.9
24:00:00	24:00:00	51.2	56.4	43

		7:25:29 PM	38904.5145
		7:26:29 PM	24547.08916
R5-C	Study #6	7:27:29 PM	134896.2883
R5-C	Study #6	7:28:29 PM	134896.2883
R5-C	Study #6	7:29:29 PM	29512.09227
R5-C	Study #6	7:30:29 PM	208929.6131
R5-C	Study #6	7:31:29 PM	295120.9227
R5-C	Study #6	7:32:29 PM	295120.9227
R5-C	Study #6	7:33:29 PM	61659.50019
R5-C	Study #6	7:34:29 PM	74131.02413
R5-C	Study #6	7:35:29 PM	70794.57844
R5-C	Study #6	7:36:29 PM	34673.68505
R5-C	Study #6	7:37:29 PM	91201.08394
R5-C	Study #6	7:38:29 PM	151356.1248
R5-C	Study #6	7:39:29 PM	181970.0859
R5-C	Study #6	7:40:29 PM	107151.9305
R5-C	Study #6	7:41:29 PM	63095.73445
R5-C	Study #6	7:42:29 PM	812830.5162
		7:43:29 PM	131825.6739

Study #4, #5, #6 - Haul Route
Short-Duration (15-Minute)

Study	Study Time	Session Time	OL Status	L_{avg} Meter1	L_{max} Meter1	L_{min} Meter1
Study #4A	0:00:10	0:00:10		61	66.4	49.1
R5-A	0:00:20	0:00:20		45.4	49	42.4
	0:00:30	0:00:30		41.8	42.6	41.1
	0:00:40	0:00:40		41.4	42.2	41.1
	0:00:50	0:00:50		43.8	45.1	41.4
	0:01:00	0:01:00		41.8	43.6	41.2
	0:01:10	0:01:10		43	44.6	41.3
	0:01:20	0:01:20		46	48.4	44.4
	0:01:30	0:01:30		48.4	55.7	44.1
	0:01:40	0:01:40		44.3	45.6	43.7
	0:01:50	0:01:50		46.2	47.6	45.3
	0:02:00	0:02:00		49.1	51.2	45.7
	0:02:10	0:02:10		51.6	52.7	50.6
	0:02:20	0:02:20		52.5	53.5	50.7
	0:02:30	0:02:30		50.7	52.5	48.4
	0:02:40	0:02:40		47.2	50.1	44.7
	0:02:50	0:02:50		46.9	53.3	43.6
	0:03:00	0:03:00		44.7	46.4	43.7
	0:03:10	0:03:10		47.6	50	46.5
	0:03:20	0:03:20		50.3	51.6	49.4
	0:03:30	0:03:30		53.8	55.6	51
	0:03:40	0:03:40		56.2	58.3	54.1
	0:03:50	0:03:50		52.3	54.1	50.1
	0:04:00	0:04:00		53.7	54.4	52.8
	0:04:10	0:04:10		54.3	55.5	53.4
	0:04:20	0:04:20		51.8	53.8	50.9
	0:04:30	0:04:30		49.6	51.8	47.1
	0:04:40	0:04:40		46.4	47.1	45.5
	0:04:50	0:04:50		45.5	45.9	45.1
	0:05:00	0:05:00		44.5	46.4	43.7
	0:05:10	0:05:10		45.2	47.7	43.4
	0:05:20	0:05:20		45.4	47.4	43.9
	0:05:30	0:05:30		45.2	46	44.7
	0:05:40	0:05:40		47.1	48.8	44.8
	0:05:50	0:05:50		51.6	55.3	48.7
	0:06:00	0:06:00		55.1	57.5	52.6
	0:06:10	0:06:10		57.2	58	54.8
	0:06:20	0:06:20		56.7	59.1	55
	0:06:30	0:06:30		55	56.4	53.5
	0:06:40	0:06:40		52.6	53.6	51.7
	0:06:50	0:06:50		53	53.6	52.1
	0:07:00	0:07:00		53.4	55.8	52
	0:07:10	0:07:10		56.5	57.8	54.5
	0:07:20	0:07:20		52.5	55.4	49.3
	0:07:30	0:07:30		48.5	49.4	46.4
	0:07:40	0:07:40		45.4	46.5	43.6
	0:07:50	0:07:50		43.5	44.5	43
	0:08:00	0:08:00		44.4	45.1	43.5
	0:08:10	0:08:10		46	47.6	44.8
	0:08:20	0:08:20		46.4	49.5	44.3
	0:08:30	0:08:30		54.5	60	49.3
	0:08:40	0:08:40		58.8	63.9	44.8
	0:08:50	0:08:50		55	64.1	44
	0:09:00	0:09:00		50.5	57.5	46.5
	0:09:10	0:09:10		50.1	56.3	45.5
	0:09:20	0:09:20		54.8	58.4	51.5
	0:09:30	0:09:30		52.6	53.2	51.9
	0:09:40	0:09:40		52.1	52.8	51
	0:09:50	0:09:50		47.7	51	45
	0:10:00	0:10:00		44.5	45.3	43.7
	0:10:10	0:10:10		45.2	47.2	44.4
	0:10:20	0:10:20		48.3	49.5	47
	0:10:30	0:10:30		57.9	62.1	48.9
	0:10:40	0:10:40		68	72.5	61.6

Start:	7:58:44 PM
End:	8:13:44 PM
Measured:	1/23/2019
	Evening

Baseline Noise Level

L_{eq}:	56.3
CNEL:	61.3

Time	Baseline SPL ($10^{(Leq/10)}$)
7:58:54 PM	1258925.412
7:59:04 PM	34673.68505
7:59:14 PM	15135.61248
7:59:24 PM	13803.84265
7:59:34 PM	23988.32919
7:59:44 PM	15135.61248
7:59:54 PM	19952.62315
8:00:04 PM	39810.71706
8:00:14 PM	69183.09709
8:00:24 PM	26915.34804
8:00:34 PM	41686.93835
8:00:44 PM	81283.05162
8:00:54 PM	144543.9771
8:01:04 PM	177827.941
8:01:14 PM	117489.7555
8:01:24 PM	52480.74602
8:01:34 PM	48977.88194
8:01:44 PM	29512.09227
8:01:54 PM	57543.99373
8:02:04 PM	107151.9305
8:02:14 PM	239883.2919
8:02:24 PM	416869.3835
8:02:34 PM	169824.3652
8:02:44 PM	234422.8815
8:02:54 PM	269153.4804
8:03:04 PM	151356.1248
8:03:14 PM	91201.08394
8:03:24 PM	43651.58322
8:03:34 PM	35481.33892
8:03:44 PM	28183.82931
8:03:54 PM	33113.11215
8:04:04 PM	34673.68505
8:04:14 PM	33113.11215
8:04:24 PM	51286.1384
8:04:34 PM	144543.9771
8:04:44 PM	323593.6569
8:04:54 PM	524807.4602
8:05:04 PM	467735.1413
8:05:14 PM	316227.766
8:05:24 PM	181970.0859
8:05:34 PM	199526.2315
8:05:44 PM	218776.1624
8:05:54 PM	446683.5922
8:06:04 PM	177827.941
8:06:14 PM	70794.57844
8:06:24 PM	34673.68505
8:06:34 PM	22387.21139
8:06:44 PM	27542.28703
8:06:54 PM	39810.71706
8:07:04 PM	43651.58322
8:07:14 PM	281838.2931
8:07:24 PM	758577.575
8:07:34 PM	316227.766
8:07:44 PM	112201.8454
8:07:54 PM	102329.2992
8:08:04 PM	301995.172
8:08:14 PM	181970.0859
8:08:24 PM	162181.0097
8:08:34 PM	58884.36554
8:08:44 PM	28183.82931
8:08:54 PM	33113.11215
8:09:04 PM	67608.29754
8:09:14 PM	616595.0019
8:09:24 PM	6309573.445

	0:10:50	0:10:50	60.5	63.8	57.9			8:09:34 PM	1122018.454
	0:11:00	0:11:00	59	67	57.2			8:09:44 PM	794328.2347
	0:11:10	0:11:10	58.7	66.5	50.2			8:09:54 PM	741310.2413
	0:11:20	0:11:20	47.7	50.5	45.3			8:10:04 PM	58884.36554
	0:11:30	0:11:30	49.4	53.3	46.5			8:10:14 PM	87096.359
	0:11:40	0:11:40	59.6	61	53.3			8:10:24 PM	912010.8394
	0:11:50	0:11:50	59.6	60.4	58.2			8:10:34 PM	912010.8394
	0:12:00	0:12:00	56.7	58.4	53.8			8:10:44 PM	467735.1413
	0:12:10	0:12:10	52.4	54	50.3			8:10:54 PM	173780.0829
	0:12:20	0:12:20	48.1	51.5	45.5			8:11:04 PM	64565.4229
	0:12:30	0:12:30	45.9	46.6	45.3			8:11:14 PM	38904.5145
	0:12:40	0:12:40	46.4	51.5	45.1			8:11:24 PM	43651.58322
	0:12:50	0:12:50	56.2	60.4	48.8			8:11:34 PM	416869.3835
	0:13:00	0:13:00	58.9	61	56			8:11:44 PM	776247.1166
	0:13:10	0:13:10	58.7	60.5	56.5			8:11:54 PM	741310.2413
	0:13:20	0:13:20	58.8	60.9	56.8			8:12:04 PM	758577.575
	0:13:30	0:13:30	61.1	66.1	55.5			8:12:14 PM	1288249.552
	0:13:40	0:13:40	64.4	67.4	61.6			8:12:24 PM	2754228.703
	0:13:50	0:13:50	57.9	61.6	53.9			8:12:34 PM	616595.0019
	0:14:00	0:14:00	54.6	57.1	52.5			8:12:44 PM	288403.1503
	0:14:10	0:14:10	56.4	58.8	54.1			8:12:54 PM	436515.8322
	0:14:20	0:14:20	57.7	59.7	56.1			8:13:04 PM	588843.6554
	0:14:30	0:14:30	57.6	61.1	52.9			8:13:14 PM	575439.9373
	0:14:40	0:14:40	53.4	55.3	52.3			8:13:24 PM	218776.1624
	0:14:50	0:14:50	58.1	61.6	55.3			8:13:34 PM	645654.229
	0:15:00	0:15:00	67.9	71.4	57			8:13:44 PM	6165950.019
Study #5	0:00:10	0:00:10	61.4	63.7	59.3	Start:	8:32:50 PM	8:33:00 PM	1380384.265
R5-B	0:00:20	0:00:20	61.8	63	59.5	End:	8:47:50 PM	8:33:10 PM	1513561.248
	0:00:30	0:00:30	65.7	67.8	62.3	Measured:	1/23/2019	8:33:20 PM	3715352.291
	0:00:40	0:00:40	62.7	64.2	60.5		**Evening**	8:33:30 PM	1862087.137
	0:00:50	0:00:50	63.2	65.4	59			8:33:40 PM	2089296.131
	0:01:00	0:01:00	56.2	59	53.5			8:33:50 PM	416869.3835
	0:01:10	0:01:10	57.4	58.3	56	**Baseline Noise Level**		8:34:00 PM	549540.8739
	0:01:20	0:01:20	55.5	58.7	53.4	**L_{eq}:**	66.3	8:34:10 PM	354813.3892
	0:01:30	0:01:30	60.5	62.3	58.4	**CNEL:**	71.3	8:34:20 PM	1122018.454
	0:01:40	0:01:40	59.8	61.5	58.2			8:34:30 PM	954992.586
	0:01:50	0:01:50	60.3	61.6	58.9			8:34:40 PM	1071519.305
	0:02:00	0:02:00	60.3	62.4	58			8:34:50 PM	1071519.305
	0:02:10	0:02:10	60.7	63.6	58.5			8:35:00 PM	1174897.555
	0:02:20	0:02:20	63.3	67.5	61.3			8:35:10 PM	2137962.09
	0:02:30	0:02:30	59.8	62.3	55.5			8:35:20 PM	954992.586
	0:02:40	0:02:40	60.7	68.2	54			8:35:30 PM	1174897.555
	0:02:50	0:02:50	69.3	72.4	60.2			8:35:40 PM	8511380.382
	0:03:00	0:03:00	61.6	64.1	57.7			8:35:50 PM	1445439.771
	0:03:10	0:03:10	60	64	56.1			8:36:00 PM	1000000
	0:03:20	0:03:20	60.5	63.4	56.2			8:36:10 PM	1122018.454
	0:03:30	0:03:30	62.5	65	58.4			8:36:20 PM	1778279.41
	0:03:40	0:03:40	64.7	67.6	61.1			8:36:30 PM	2951209.227
	0:03:50	0:03:50	62.8	64.8	60			8:36:40 PM	1905460.718
	0:04:00	0:04:00	62.1	62.9	60			8:36:50 PM	1621810.097
	0:04:10	0:04:10	63.4	64.2	62.6			8:37:00 PM	2187761.624
	0:04:20	0:04:20	64.1	66	60.1			8:37:10 PM	2570395.783
	0:04:30	0:04:30	63.7	65.4	62.4			8:37:20 PM	2344228.815
	0:04:40	0:04:40	63.9	66.1	61.5			8:37:30 PM	2454708.916
	0:04:50	0:04:50	70.7	74.1	64.3			8:37:40 PM	11748975.55
	0:05:00	0:05:00	66.5	68.6	63.6			8:37:50 PM	4466835.922
	0:05:10	0:05:10	65.5	67.8	64.4			8:38:00 PM	3548133.892
	0:05:20	0:05:20	65.3	67.2	63.8			8:38:10 PM	3388441.561
	0:05:30	0:05:30	61.6	63.8	58.2			8:38:20 PM	1445439.771
	0:05:40	0:05:40	68.2	76.7	58			8:38:30 PM	6606934.48
	0:05:50	0:05:50	70.1	76.2	64.8			8:38:40 PM	10232929.92
	0:06:00	0:06:00	61	64.7	54.9			8:38:50 PM	1258925.412
	0:06:10	0:06:10	57.6	59.2	55.8			8:39:00 PM	575439.9373
	0:06:20	0:06:20	55.9	58.8	53.2			8:39:10 PM	389045.145
	0:06:30	0:06:30	58.7	60.4	56.2			8:39:20 PM	741310.2413
	0:06:40	0:06:40	58.7	59.9	56.6			8:39:30 PM	741310.2413
	0:06:50	0:06:50	58.8	60.7	54.1			8:39:40 PM	758577.575

	0:07:00	0:07:00	58.8	61.1	54			8:39:50 PM	758577.575
	0:07:10	0:07:10	59.9	62.4	57.1			8:40:00 PM	977237.221
	0:07:20	0:07:20	62.7	65.3	56.9			8:40:10 PM	1862087.137
	0:07:30	0:07:30	62.4	65.4	60.1			8:40:20 PM	1737800.829
	0:07:40	0:07:40	62	64.4	57.5			8:40:30 PM	1584893.192
	0:07:50	0:07:50	60.1	61.8	57.5			8:40:40 PM	1023292.992
	0:08:00	0:08:00	60.7	65.3	57.6			8:40:50 PM	1174897.555
	0:08:10	0:08:10	72.6	74.9	65.3			8:41:00 PM	18197008.59
	0:08:20	0:08:20	75.6	79.1	67.1			8:41:10 PM	36307805.48
	0:08:30	0:08:30	79.5	83.1	70.2			8:41:20 PM	89125093.81
	0:08:40	0:08:40	65.5	70.2	62.4			8:41:30 PM	3548133.892
	0:08:50	0:08:50	64.7	66.9	63.2			8:41:40 PM	2951209.227
	0:09:00	0:09:00	65.5	66.5	64.5			8:41:50 PM	3548133.892
	0:09:10	0:09:10	62.1	65.9	58.4			8:42:00 PM	1621810.097
	0:09:20	0:09:20	65.3	67.8	62.7			8:42:10 PM	3388441.561
	0:09:30	0:09:30	62.6	64.8	59.4			8:42:20 PM	1819700.859
	0:09:40	0:09:40	66.5	69	61.3			8:42:30 PM	4466835.922
	0:09:50	0:09:50	64.4	66.8	63			8:42:40 PM	2754228.703
	0:10:00	0:10:00	67.9	69.5	65.5			8:42:50 PM	6165950.019
	0:10:10	0:10:10	64.9	69.4	61.5			8:43:00 PM	3090295.433
	0:10:20	0:10:20	60.9	63.5	56			8:43:10 PM	1230268.771
	0:10:30	0:10:30	63.1	65.6	58.7			8:43:20 PM	2041737.945
	0:10:40	0:10:40	61.6	66.1	57.8			8:43:30 PM	1445439.771
	0:10:50	0:10:50	63.1	66.4	59.1			8:43:40 PM	2041737.945
	0:11:00	0:11:00	64.4	66.2	62.2			8:43:50 PM	2754228.703
	0:11:10	0:11:10	63.2	66.4	61.6			8:44:00 PM	2089296.131
	0:11:20	0:11:20	63.8	70.1	60.5			8:44:10 PM	2398832.919
	0:11:30	0:11:30	66.9	71.2	59.3			8:44:20 PM	4897788.194
	0:11:40	0:11:40	62.4	66.6	55.5			8:44:30 PM	1737800.829
	0:11:50	0:11:50	53.6	55.6	52			8:44:40 PM	229086.7653
	0:12:00	0:12:00	53.4	54.5	51.7			8:44:50 PM	218776.1624
	0:12:10	0:12:10	58	59.7	54			8:45:00 PM	630957.3445
	0:12:20	0:12:20	63.4	67.8	59.7			8:45:10 PM	2187761.624
	0:12:30	0:12:30	65.9	69.2	62.5			8:45:20 PM	3890451.45
	0:12:40	0:12:40	62.1	63.1	61.4			8:45:30 PM	1621810.097
	0:12:50	0:12:50	58.8	62.7	53.1			8:45:40 PM	758577.575
	0:13:00	0:13:00	52.9	55	51.9			8:45:50 PM	194984.46
	0:13:10	0:13:10	59.2	62.3	55			8:46:00 PM	831763.7711
	0:13:20	0:13:20	61.2	63.7	56.2			8:46:10 PM	1318256.739
	0:13:30	0:13:30	63.9	65.3	60.6			8:46:20 PM	2454708.916
	0:13:40	0:13:40	60.1	63.2	57.5			8:46:30 PM	1023292.992
	0:13:50	0:13:50	58.7	60.6	55.6			8:46:40 PM	741310.2413
	0:14:00	0:14:00	55.9	57.5	53.9			8:46:50 PM	389045.145
	0:14:10	0:14:10	76.4	82.1	56			8:47:00 PM	43651583.22
	0:14:20	0:14:20	61.7	66.1	57.9			8:47:10 PM	1479108.388
	0:14:30	0:14:30	59.4	61.3	55.8			8:47:20 PM	870963.59
	0:14:40	0:14:40	58.1	60.8	53.7			8:47:30 PM	645654.229
	0:14:50	0:14:50	62.3	65.4	58.2			8:47:40 PM	1698243.652
	0:15:00	0:15:00	70.6	73.5	65.2			8:47:50 PM	11481536.21
Study #4B	0:00:10	0:00:10	62.8	66.6	60	Start:	8:48:59 PM	8:49:09 PM	1905460.718
R5-A	0:00:20	0:00:20	63.8	66.6	61.1	End:	9:03:59 PM	8:49:19 PM	2398832.919
	0:00:30	0:00:30	67.2	70.1	61.4	Measured:	1/23/2019	8:49:29 PM	5248074.602
	0:00:40	0:00:40	64.2	68.9	59		**Evening**	8:49:39 PM	2630267.992
	0:00:50	0:00:50	58.1	60.1	55.4			8:49:49 PM	645654.229
	0:01:00	0:01:00	60	66.9	53.2			8:49:59 PM	1000000
	0:01:10	0:01:10	62.1	67	51.4	**Baseline Noise Level**		8:50:09 PM	1621810.097
	0:01:20	0:01:20	50.6	51.8	49.6	**L_{eq}:**	62.4	8:50:19 PM	114815.3621
	0:01:30	0:01:30	50.2	50.6	49.7	**CNEL:**	67.4	8:50:29 PM	104712.8548
	0:01:40	0:01:40	52.5	55.6	50			8:50:39 PM	177827.941
	0:01:50	0:01:50	57.5	59.3	55.6			8:50:49 PM	562341.3252
	0:02:00	0:02:00	62.7	64.5	59			8:50:59 PM	1862087.137
	0:02:10	0:02:10	60.2	62.3	57.8			8:51:09 PM	1047128.548
	0:02:20	0:02:20	55.9	58	52.9			8:51:19 PM	389045.145
	0:02:30	0:02:30	51.9	54.4	50.5			8:51:29 PM	154881.6619
	0:02:40	0:02:40	57.2	61.4	52.7			8:51:39 PM	524807.4602
	0:02:50	0:02:50	63.8	70.5	57.2			8:51:49 PM	2398832.919
	0:03:00	0:03:00	57.8	66.4	51.8			8:51:59 PM	602559.5861

0:03:10	0:03:10	56.4	59.9	52.7	8:52:09 PM	436515.8322
0:03:20	0:03:20	61.1	64.3	54	8:52:19 PM	1288249.552
0:03:30	0:03:30	60.6	62.6	55.8	8:52:29 PM	1148153.621
0:03:40	0:03:40	66.7	71.5	60.4	8:52:39 PM	4677351.413
0:03:50	0:03:50	60.5	61.7	59.5	8:52:49 PM	1122018.454
0:04:00	0:04:00	64.8	66.4	61.8	8:52:59 PM	3019951.72
0:04:10	0:04:10	60	63.4	55.1	8:53:09 PM	1000000
0:04:20	0:04:20	58.3	59.6	55.8	8:53:19 PM	676082.9754
0:04:30	0:04:30	51.9	55.8	50.3	8:53:29 PM	154881.6619
0:04:40	0:04:40	54.9	59.2	50.2	8:53:39 PM	309029.5433
0:04:50	0:04:50	58.1	62.5	53	8:53:49 PM	645654.229
0:05:00	0:05:00	58.8	65.2	52.8	8:53:59 PM	758577.575
0:05:10	0:05:10	62.2	65.7	57.5	8:54:09 PM	1659586.907
0:05:20	0:05:20	62.4	64	59.7	8:54:19 PM	1737800.829
0:05:30	0:05:30	57.1	60.6	53.2	8:54:29 PM	512861.384
0:05:40	0:05:40	58.9	62.4	54.1	8:54:39 PM	776247.1166
0:05:50	0:05:50	64.4	67.3	58.2	8:54:49 PM	2754228.703
0:06:00	0:06:00	63	66.1	57.1	8:54:59 PM	1995262.315
0:06:10	0:06:10	53.1	57.1	50.2	8:55:09 PM	204173.7945
0:06:20	0:06:20	51.8	54.4	50.6	8:55:19 PM	151356.1248
0:06:30	0:06:30	57.5	60.9	51.6	8:55:29 PM	562341.3252
0:06:40	0:06:40	60.8	64.3	51.4	8:55:39 PM	1202264.435
0:06:50	0:06:50	57.7	63	50.7	8:55:49 PM	588843.6554
0:07:00	0:07:00	52.9	53.8	51.1	8:55:59 PM	194984.46
0:07:10	0:07:10	49.6	51.1	48.6	8:56:09 PM	91201.08394
0:07:20	0:07:20	63.5	70.7	50.4	8:56:19 PM	2238721.139
0:07:30	0:07:30	58.2	62.8	55.4	8:56:29 PM	660693.448
0:07:40	0:07:40	57.7	62.6	50.7	8:56:39 PM	588843.6554
0:07:50	0:07:50	55.9	58.8	50.9	8:56:49 PM	389045.145
0:08:00	0:08:00	54.6	58.9	50.1	8:56:59 PM	288403.1503
0:08:10	0:08:10	58.2	59.4	56.2	8:57:09 PM	660693.448
0:08:20	0:08:20	54.4	56.9	53	8:57:19 PM	275422.8703
0:08:30	0:08:30	68.4	76.6	53.7	8:57:29 PM	6918309.709
0:08:40	0:08:40	71	76.8	64.2	8:57:39 PM	12589254.12
0:08:50	0:08:50	73	77.4	65.9	8:57:49 PM	19952623.15
0:09:00	0:09:00	62.6	66	58.4	8:57:59 PM	1819700.859
0:09:10	0:09:10	60.7	62.6	58.3	8:58:09 PM	1174897.555
0:09:20	0:09:20	73.4	77.5	60.7	8:58:19 PM	21877616.24
0:09:30	0:09:30	63.9	72.2	52	8:58:29 PM	2454708.916
0:09:40	0:09:40	56.7	59.9	52	8:58:39 PM	467735.1413
0:09:50	0:09:50	57.7	62.8	53.6	8:58:49 PM	588843.6554
0:10:00	0:10:00	62	64	59.3	8:58:59 PM	1584893.192
0:10:10	0:10:10	61.1	62.6	57	8:59:09 PM	1288249.552
0:10:20	0:10:20	61.1	64.3	55.1	8:59:19 PM	1288249.552
0:10:30	0:10:30	53.9	58.4	51.1	8:59:29 PM	245470.8916
0:10:40	0:10:40	60.7	67.4	55	8:59:39 PM	1174897.555
0:10:50	0:10:50	67.7	70.7	58.3	8:59:49 PM	5888436.554
0:11:00	0:11:00	58.5	61	53.4	8:59:59 PM	707945.7844
0:11:10	0:11:10	58.4	61.6	51.8	9:00:09 PM	691830.9709
0:11:20	0:11:20	51.6	54.9	49.9	9:00:19 PM	144543.9771
0:11:30	0:11:30	51.4	52.7	51	9:00:29 PM	138038.4265
0:11:40	0:11:40	51.5	53.2	49.3	9:00:39 PM	141253.7545
0:11:50	0:11:50	59.9	64.9	51.2	9:00:49 PM	977237.221
0:12:00	0:12:00	59.8	64.9	57.3	9:00:59 PM	954992.586
0:12:10	0:12:10	63.9	65.8	59.2	9:01:09 PM	2454708.916
0:12:20	0:12:20	65.9	67.8	62.7	9:01:19 PM	3890451.45
0:12:30	0:12:30	59.9	64.1	53.9	9:01:29 PM	977237.221
0:12:40	0:12:40	53	54.6	51.9	9:01:39 PM	199526.2315
0:12:50	0:12:50	57.2	61.8	52.4	9:01:49 PM	524807.4602
0:13:00	0:13:00	61.5	65.7	57.1	9:01:59 PM	1412537.545
0:13:10	0:13:10	58.8	64.1	55.6	9:02:09 PM	758577.575
0:13:20	0:13:20	53	55.6	50.4	9:02:19 PM	199526.2315
0:13:30	0:13:30	55.2	58.2	51.2	9:02:29 PM	331131.1215
0:13:40	0:13:40	58.2	61.3	53.9	9:02:39 PM	660693.448
0:13:50	0:13:50	58.8	60.8	57	9:02:49 PM	758577.575
0:14:00	0:14:00	60.7	63.1	58	9:02:59 PM	1174897.555
0:14:10	0:14:10	60.9	65.4	56.5	9:03:09 PM	1230268.771

	0:14:20	0:14:20	54.3	57.6	49.9			9:03:19 PM	269153.4804
	0:14:30	0:14:30	50.2	50.9	49.5			9:03:29 PM	104712.8548
	0:14:40	0:14:40	50.1	51.6	49			9:03:39 PM	102329.2992
	0:14:50	0:14:50	56.1	62.5	50.9			9:03:49 PM	407380.2778
	0:15:00	0:15:00	56.4	62.4	50.5			9:03:59 PM	436515.8322
Study #4C	0:00:10	0:00:10	60.2	61.1	59.4	Start:	7:00:42 PM	7:00:52 PM	1047128.548
R5-A	0:00:20	0:00:20	65.7	68	60	End:	7:15:42 PM	7:01:02 PM	3715352.291
	0:00:30	0:00:30	67.5	73.8	61.3	Measured:	1/24/2019	7:01:12 PM	5623413.252
	0:00:40	0:00:40	72.1	75.6	65.2		**Evening**	7:01:22 PM	16218100.97
	0:00:50	0:00:50	63.2	65.2	62			7:01:32 PM	2089296.131
	0:01:00	0:01:00	63.6	64.5	62.7			7:01:42 PM	2290867.653
	0:01:10	0:01:10	64.4	64.9	64	**Baseline Noise Level**		7:01:52 PM	2754228.703
	0:01:20	0:01:20	64.9	66	63.4	**L_{eq}:**	67.7	7:02:02 PM	3090295.433
	0:01:30	0:01:30	64.3	66.1	62.8	**CNEL:**	72.7	7:02:12 PM	2691534.804
	0:01:40	0:01:40	64.4	65.7	63.1			7:02:22 PM	2754228.703
	0:01:50	0:01:50	62.9	63.9	61.6			7:02:32 PM	1949844.6
	0:02:00	0:02:00	63.1	64.2	61.4			7:02:42 PM	2041737.945
	0:02:10	0:02:10	63.7	67.3	61.2			7:02:52 PM	2344228.815
	0:02:20	0:02:20	68.7	73.6	64.1			7:03:02 PM	7413102.413
	0:02:30	0:02:30	64	65.7	63.1			7:03:12 PM	2511886.432
	0:02:40	0:02:40	64.5	65.8	63			7:03:22 PM	2818382.931
	0:02:50	0:02:50	64.5	65.8	62.8			7:03:32 PM	2818382.931
	0:03:00	0:03:00	64	66.2	61.4			7:03:42 PM	2511886.432
	0:03:10	0:03:10	66.4	67.2	65.8			7:03:52 PM	4365158.322
	0:03:20	0:03:20	71.4	75.2	64.4			7:04:02 PM	13803842.65
	0:03:30	0:03:30	64.2	65.9	62.5			7:04:12 PM	2630267.992
	0:03:40	0:03:40	61.7	63.8	59.8			7:04:22 PM	1479108.388
	0:03:50	0:03:50	62.8	63.5	61.8			7:04:32 PM	1905460.718
	0:04:00	0:04:00	61.9	63.1	60.2			7:04:42 PM	1548816.619
	0:04:10	0:04:10	62	62.7	61.2			7:04:52 PM	1584893.192
	0:04:20	0:04:20	61.2	62.4	60.2			7:05:02 PM	1318256.739
	0:04:30	0:04:30	62.3	65.1	60.8			7:05:12 PM	1698243.652
	0:04:40	0:04:40	65.3	67.9	64.2			7:05:22 PM	3388441.561
	0:04:50	0:04:50	65.7	68.5	62.2			7:05:32 PM	3715352.291
	0:05:00	0:05:00	63.1	66.9	61.4			7:05:42 PM	2041737.945
	0:05:10	0:05:10	67.7	68.4	66.6			7:05:52 PM	5888436.554
	0:05:20	0:05:20	66.7	68	64.8			7:06:02 PM	4677351.413
	0:05:30	0:05:30	81.5	88.1	64.1			7:06:12 PM	141253754.5
	0:05:40	0:05:40	65.4	68.6	64			7:06:22 PM	3467368.505
	0:05:50	0:05:50	64.5	67.6	62.2			7:06:32 PM	2818382.931
	0:06:00	0:06:00	67.4	68	66.7			7:06:42 PM	5495408.739
	0:06:10	0:06:10	66.3	67.8	63.8			7:06:52 PM	4265795.188
	0:06:20	0:06:20	63.9	65.2	62.3			7:07:02 PM	2454708.916
	0:06:30	0:06:30	64.6	66.2	62.5			7:07:12 PM	2884031.503
	0:06:40	0:06:40	61.2	62.6	59.7			7:07:22 PM	1318256.739
	0:06:50	0:06:50	59.5	61.5	57.7			7:07:32 PM	891250.9381
	0:07:00	0:07:00	62.7	68	60.6			7:07:42 PM	1862087.137
	0:07:10	0:07:10	66.3	68.3	63.5			7:07:52 PM	4265795.188
	0:07:20	0:07:20	63.7	64.4	63			7:08:02 PM	2344228.815
	0:07:30	0:07:30	62.6	63.6	61.7			7:08:12 PM	1819700.859
	0:07:40	0:07:40	75.5	82.8	56.8			7:08:22 PM	35481338.92
	0:07:50	0:07:50	67	74.5	55.7			7:08:32 PM	5011872.336
	0:08:00	0:08:00	56	59.2	53.5			7:08:42 PM	398107.1706
	0:08:10	0:08:10	59.5	63.8	55.5			7:08:52 PM	891250.9381
	0:08:20	0:08:20	64	65.9	62			7:09:02 PM	2511886.432
	0:08:30	0:08:30	63.8	65.8	61.5			7:09:12 PM	2398832.919
	0:08:40	0:08:40	62.9	66	58			7:09:22 PM	1949844.6
	0:08:50	0:08:50	64	66.3	61.3			7:09:32 PM	2511886.432
	0:09:00	0:09:00	62.4	65.4	57.2			7:09:42 PM	1737800.829
	0:09:10	0:09:10	62.2	62.9	61.3			7:09:52 PM	1659586.907
	0:09:20	0:09:20	59.9	61.6	58.2			7:10:02 PM	977237.221
	0:09:30	0:09:30	58.5	61.4	55.7			7:10:12 PM	707945.7844
	0:09:40	0:09:40	61.1	66.2	56.5			7:10:22 PM	1288249.552
	0:09:50	0:09:50	64.4	66.4	62.3			7:10:32 PM	2754228.703
	0:10:00	0:10:00	64.6	68.2	61.3			7:10:42 PM	2884031.503
	0:10:10	0:10:10	65.5	67.8	61.5			7:10:52 PM	3548133.892
	0:10:20	0:10:20	61.9	65.6	58.8			7:11:02 PM	1548816.619

	0:10:30	0:10:30	63.2	65.4	60				7:11:12 PM	2089296.131
	0:10:40	0:10:40	63.5	64.4	61.9				7:11:22 PM	2238721.139
	0:10:50	0:10:50	61.7	64.2	57.7				7:11:32 PM	1479108.388
	0:11:00	0:11:00	57.3	60	54				7:11:42 PM	537031.7964
	0:11:10	0:11:10	59.8	61.1	55.2				7:11:52 PM	954992.586
	0:11:20	0:11:20	63.5	66.8	60.1				7:12:02 PM	2238721.139
	0:11:30	0:11:30	63.2	65.6	61				7:12:12 PM	2089296.131
	0:11:40	0:11:40	64.8	67.9	61.1				7:12:22 PM	3019951.72
	0:11:50	0:11:50	61.3	63.5	59.4				7:12:32 PM	1348962.883
	0:12:00	0:12:00	61.2	64.2	57.1				7:12:42 PM	1318256.739
	0:12:10	0:12:10	60.6	61.7	58.6				7:12:52 PM	1148153.621
	0:12:20	0:12:20	63.3	65.4	58.8				7:13:02 PM	2137962.09
	0:12:30	0:12:30	64.6	66.3	62.9				7:13:12 PM	2884031.503
	0:12:40	0:12:40	64.8	67.4	62.6				7:13:22 PM	3019951.72
	0:12:50	0:12:50	67	69.1	64.6				7:13:32 PM	5011872.336
	0:13:00	0:13:00	65.9	66.9	63.9				7:13:42 PM	3890451.45
	0:13:10	0:13:10	80	84.7	63.9				7:13:52 PM	100000000
	0:13:20	0:13:20	64.9	70.2	61.8				7:14:02 PM	3090295.433
	0:13:30	0:13:30	68.3	70	65.8				7:14:12 PM	6760829.754
	0:13:40	0:13:40	64	65.9	62.3				7:14:22 PM	2511886.432
	0:13:50	0:13:50	64.2	65.3	62.8				7:14:32 PM	2630267.992
	0:14:00	0:14:00	67.4	69.4	64.2				7:14:42 PM	5495408.739
	0:14:10	0:14:10	64	66.1	60.9				7:14:52 PM	2511886.432
	0:14:20	0:14:20	61.2	64.4	58.9				7:15:02 PM	1318256.739
	0:14:30	0:14:30	66.5	68.5	64.4				7:15:12 PM	4466835.922
	0:14:40	0:14:40	62.9	65.9	60.7				7:15:22 PM	1949844.6
	0:14:50	0:14:50	58.6	61.3	57.6				7:15:32 PM	724435.9601
	0:15:00	0:15:00	62	65.1	58.2				7:15:42 PM	1584893.192
Study #6	0:00:10	0:00:10	70.4	74.4	65.4	Start:	7:27:34 PM		7:27:44 PM	10964781.96
R5-C	0:00:20	0:00:20	72.6	76.7	66.4	End:	7:42:34 PM		7:27:54 PM	18197008.59
	0:00:30	0:00:30	67.3	70.9	61.7	Measured:	1/24/2019		7:28:04 PM	5370317.964
	0:00:40	0:00:40	69.1	70.6	63.4		**Evening**		7:28:14 PM	8128305.162
	0:00:50	0:00:50	58.1	63.4	54.4				7:28:24 PM	645654.229
	0:01:00	0:01:00	72.1	76.6	59.7				7:28:34 PM	16218100.97
	0:01:10	0:01:10	71.9	73.3	69.3	**Baseline Noise Level**			7:28:44 PM	15488166.19
	0:01:20	0:01:20	69.4	71.3	62.5	**L_{eq}:**	69.9		7:28:54 PM	8709635.9
	0:01:30	0:01:30	68.9	74.6	61.5	**CNEL:**	74.9		7:29:04 PM	7762471.166
	0:01:40	0:01:40	73.6	78.1	61				7:29:14 PM	22908676.53
	0:01:50	0:01:50	67.4	74.1	57.6				7:29:24 PM	5495408.739
	0:02:00	0:02:00	72.3	75.1	61.4				7:29:34 PM	16982436.52
	0:02:10	0:02:10	66.5	69.4	60.2				7:29:44 PM	4466835.922
	0:02:20	0:02:20	60.8	67.7	51.6				7:29:54 PM	1202264.435
	0:02:30	0:02:30	67.4	72.4	54.9				7:30:04 PM	5495408.739
	0:02:40	0:02:40	67.4	72	54.5				7:30:14 PM	5495408.739
	0:02:50	0:02:50	67.5	73.2	52.9				7:30:24 PM	5623413.252
	0:03:00	0:03:00	73.9	75.9	69.5				7:30:34 PM	24547089.16
	0:03:10	0:03:10	77.3	82.4	66.9				7:30:44 PM	53703179.64
	0:03:20	0:03:20	68.6	71.9	65.7				7:30:54 PM	7244359.601
	0:03:30	0:03:30	68.7	70.2	66.6				7:31:04 PM	7413102.413
	0:03:40	0:03:40	63.6	69	54.8				7:31:14 PM	2290867.653
	0:03:50	0:03:50	63.9	66.6	56.9				7:31:24 PM	2454708.916
	0:04:00	0:04:00	66.3	69.7	58.2				7:31:34 PM	4265795.188
	0:04:10	0:04:10	71.1	75.8	65.3				7:31:44 PM	12882495.52
	0:04:20	0:04:20	69.4	71.3	64.9				7:31:54 PM	8709635.9
	0:04:30	0:04:30	74.3	77.3	71.4				7:32:04 PM	26915348.04
	0:04:40	0:04:40	71.2	75.1	64				7:32:14 PM	13182567.39
	0:04:50	0:04:50	70.5	72.2	63.9				7:32:24 PM	11220184.54
	0:05:00	0:05:00	68.3	71.1	61.4				7:32:34 PM	6760829.754
	0:05:10	0:05:10	71.1	75.8	63.7				7:32:44 PM	12882495.52
	0:05:20	0:05:20	72.9	76.7	68.4				7:32:54 PM	19498446
	0:05:30	0:05:30	70.7	76.7	61.7				7:33:04 PM	11748975.55
	0:05:40	0:05:40	72.1	76	66.2				7:33:14 PM	16218100.97
	0:05:50	0:05:50	73.2	75	71.2				7:33:24 PM	20892961.31
	0:06:00	0:06:00	71.9	76.9	67.8				7:33:34 PM	15488166.19
	0:06:10	0:06:10	70	73.7	65.9				7:33:44 PM	10000000
	0:06:20	0:06:20	70.8	72.7	67.3				7:33:54 PM	12022644.35
	0:06:30	0:06:30	64.7	70.9	53.2				7:34:04 PM	2951209.227

Study #4, #5, #6 - Haul Route
Short-Duration (15-Minute)

0:06:40	0:06:40	69.1	74.3	53.2	7:34:14 PM	8128305.162
0:06:50	0:06:50	57.9	63.8	53.9	7:34:24 PM	616595.0019
0:07:00	0:07:00	73.9	78.2	60.4	7:34:34 PM	24547089.16
0:07:10	0:07:10	69.9	74.7	61.4	7:34:44 PM	9772372.21
0:07:20	0:07:20	55.5	61.3	49.7	7:34:54 PM	354813.3892
0:07:30	0:07:30	66.2	68.7	58.4	7:35:04 PM	4168693.835
0:07:40	0:07:40	70.3	75.8	59.9	7:35:14 PM	10715193.05
0:07:50	0:07:50	64.5	71.9	50.8	7:35:24 PM	2818382.931
0:08:00	0:08:00	55	62	50	7:35:34 PM	316227.766
0:08:10	0:08:10	63.8	67.1	57.6	7:35:44 PM	2398832.919
0:08:20	0:08:20	68.3	74.5	58.5	7:35:54 PM	6760829.754
0:08:30	0:08:30	73.1	76.9	64.3	7:36:04 PM	20417379.45
0:08:40	0:08:40	72.6	77.1	67.6	7:36:14 PM	18197008.59
0:08:50	0:08:50	70.2	73.6	63.5	7:36:24 PM	10471285.48
0:09:00	0:09:00	57.3	63.5	49.1	7:36:34 PM	537031.7964
0:09:10	0:09:10	55.3	62.7	49	7:36:44 PM	338844.1561
0:09:20	0:09:20	74.9	81.1	62.7	7:36:54 PM	30902954.33
0:09:30	0:09:30	66.5	70.1	64	7:37:04 PM	4466835.922
0:09:40	0:09:40	73.2	76.2	65.2	7:37:14 PM	20892961.31
0:09:50	0:09:50	68.2	71.2	62.7	7:37:24 PM	6606934.48
0:10:00	0:10:00	72.8	78.7	58.9	7:37:34 PM	19054607.18
0:10:10	0:10:10	67.4	69.8	58.8	7:37:44 PM	5495408.739
0:10:20	0:10:20	59	64	54.4	7:37:54 PM	794328.2347
0:10:30	0:10:30	53.8	56.3	52.2	7:38:04 PM	239883.2919
0:10:40	0:10:40	72.2	77.4	56.3	7:38:14 PM	16595869.07
0:10:50	0:10:50	74.2	77.2	67.4	7:38:24 PM	26302679.92
0:11:00	0:11:00	72.8	76.7	63.5	7:38:34 PM	19054607.18
0:11:10	0:11:10	67.6	73.5	61.2	7:38:44 PM	5754399.373
0:11:20	0:11:20	70.6	76	63	7:38:54 PM	11481536.21
0:11:30	0:11:30	67.1	69.8	63.5	7:39:04 PM	5128613.84
0:11:40	0:11:40	69.7	76.1	55.7	7:39:14 PM	9332543.008
0:11:50	0:11:50	62.8	66.8	55.8	7:39:24 PM	1905460.718
0:12:00	0:12:00	68.4	75.1	55.6	7:39:34 PM	6918309.709
0:12:10	0:12:10	68	71.3	59.9	7:39:44 PM	6309573.445
0:12:20	0:12:20	55.3	59.9	52	7:39:54 PM	338844.1561
0:12:30	0:12:30	73.1	78	56.2	7:40:04 PM	20417379.45
0:12:40	0:12:40	68.9	70.5	65.7	7:40:14 PM	7762471.166
0:12:50	0:12:50	58.9	65.7	53.1	7:40:24 PM	776247.1166
0:13:00	0:13:00	67	69.9	56.5	7:40:34 PM	5011872.336
0:13:10	0:13:10	69.4	75	56.9	7:40:44 PM	8709635.9
0:13:20	0:13:20	51.6	56.8	48.4	7:40:54 PM	144543.9771
0:13:30	0:13:30	59.3	66	49.3	7:41:04 PM	851138.0382
0:13:40	0:13:40	70.3	74.2	63.7	7:41:14 PM	10715193.05
0:13:50	0:13:50	69.4	71.8	62.1	7:41:24 PM	8709635.9
0:14:00	0:14:00	56.7	62	52.8	7:41:34 PM	467735.1413
0:14:10	0:14:10	64.5	69.1	54.2	7:41:44 PM	2818382.931
0:14:20	0:14:20	51.9	55.2	49.5	7:41:54 PM	154881.6619
0:14:30	0:14:30	67.3	72.7	55.2	7:42:04 PM	5370317.964
0:14:40	0:14:40	55.5	62.9	49.1	7:42:14 PM	354813.3892
0:14:50	0:14:50	55.9	64.2	49.3	7:42:24 PM	389045.145
0:15:00	0:15:00	73	78.4	64.2	7:42:34 PM	19952623.15

APPENDIX D

NON-TRANSPORTATION SOURCES – NOISE IMPACT DETERMINATION

Insertion Loss Calculations @ R2 + R3

Mountain Range/Topography Barrier Noise Attenuation

Insertion Loss Calculations @ Receptors 2 (R2) & 3 (R3)

Insertion Loss (IL) Equation = 5dB + 20log((√2pN)/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."
Because the intervening mountain range is a large earthen mass (similar to an earthen berm), an additional -3 dBA of noise attenuation is assumed.

Fresnel Number (N): $((a + b - ʅ)ƒ)/c_0$

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.)
ƒ - Equipment sound frequency in hertz (Hz)
c_0 - Speed of sound propagation in air (approximately 1,100 ft./sec.)

Receptor & Equipment Source Elevation Data

940	feet (amsl)	(approximate elevation of the lowest intervening mountain peak between closest excavation area and Receptors 2 (R2) and 3 (R3))
865	feet (amsl)	(approximate elevation of Receptors 2 (R2) and 3 (R3))
830	feet	(approximate distance between closest/lowest intervening mountain peak and Receptor 2 (R2) and 3 (R3))
875	feet (amsl)	(approximate elevation of the excavation area closest to Receptor 2 (R2) and 3 (R3))
400	feet	(approximate distance between closest/lowest intervening mountain peak and closest excavation area)

True Distances

833.4	feet	(straight line distance between lowest intervening mountain ridge and Receptor 2 (R2) and 3 (R3))
405.2	feet	(straight line distance between lowest intervening mountain ridge and excavation area closest to Receptor 2 (R2) and 3 (R3))

Project Results

ʅ -	1,238.63	feet	(total true distance between closest excavation/equipment area(s) and R2/R3)
a -	405.33	feet	(direct distance between the closest/lowest mountain peak and top of excavation equipment)
b -	833.40	feet	(direct distance between the closest/lowest mountain peak and R2/R3)
ƒ -	2,000.00	hertz	(2,000 is appropriate for crushing/screening, conservatively applied to mobile mining equipment)
Fresnel Number (N)	0.16		
Estimated Insertion Loss [A]	**10.4**	dBA reduction @ R2/R3 due to intervening mountain range	

Footnotes:

Note - Mining equipment (e.g., loaders, excavators, dozers, etc.) height is estimated to be 8-feet above the ground surface. Receiver/receptor height is estimated to be 5-feet above the ground surface.
amsl = above mean sea level (feet). Elevations were estimated using topographic data provided by Pacific Rock.
A - Per Caltrans *Technical Noise Supplement* (2013) guidance referenced above, an additional -3 dB of noise attenuation is assumed due to mountain range being the equivalent of an "earthen berm" as opposed to a hard surfaced soundwall.

Facility/Onsite Noise Impact Calculations

Excavation Equipment (Mobile Sources) Noise Reference Data				
Equipment	**L_{max} at 50-feet** [A]	**Usage Factor (%)** [B]	**Adjusted L_{eq}1H at 50-feet**	**Source of Data**
Front-End Loader	80	0.33	75.2	Equipment noise data sourced from the Federal Highway Administration's (FHWA's) *Roadway Construction Noise Model* and Ventura County's *Construction Noise Threshold Criteria and Control Plan*. Usage factor (UF) is "the percentage of time during the work period that the equipment is operating under full load or near full power". Usage factors are based on the default equipment specific usage factors from FHWA's *Roadway Construction Noise Model* multiplied by an efficiency factor. An efficiency factor of 83% (50 minutes/hour) is utilized to account for operator inefficiencies and breaks. Rock drill and water truck efficiencies are assumed to be 25% (15 minutes/hour) due to their less frequent and shorter activity cycles.
Dozer (Bulldozer)	85	0.33	80.2	
Excavator	85	0.33	80.2	
Rock Drill	85	0.05	72.0	
Water Truck	94	0.10	84.0	
Mobile Source Noise Levels (L_{eq}1H):	**95.5**	**dBA**	**87.1**	**dBA**

Footnotes:

A - L_{max} noise levels for mobile equipment are defaults from the FHWA's *Roadway Construction Noise Model*. Water truck L_{max} taken from Ventura County's *Construction Noise Threshold Criteria and Control Plan.*

B - Default usage factors (UF %) taken from the FHWA's *Roadway Construction Noise Model*. Default UF's % are multiplied by an efficiency factor to account for operator inefficiencies and breaks.

Front-End Loader = 40%, Dozer (Bulldozer) = 40%, Excavator = 40%, Rock Drill = 20%, Water Truck = 40% (utilized "Dump Truck" UF %).

Unmitigated Mobile Source Noise Levels @ Facility Receptors (L_{eq}1H)							
		Nearest Mining/Facility Boundary			**Nearest Mining Area with Line-of-Sight (LoS)** [F]		
Receptor [A]	**Ambient Daytime Noise Level (dBA)** [C]	**Distance Nearest Mine Boundary to Receptor (ft.)** [B]	**Noise Attenuation due to Topography (dBA)** [E]	**Mobile Sources Noise with Attenuation (dBA)** [D, E]	**Distance Nearest Mining Area with Direct Line-of-Sight (LoS) to Receptor (ft.)**	**Noise Attenuation due to Topography (dBA)**	**Mobile Sources Noise with Attenuation (dBA)** [D]
Receptor 1 (R1)	41.6	1,160	0	59.8	1,160	0	59.8
Receptor 2-A (R2-A)	44.8	1,161	-10	49.8	---	---	---
Receptor 2-B (R2-B)	44.8	1,194	-10	49.5	1,652	0	56.7
Receptor 2-C (R2-C)	44.8	943	-10	51.6	---	---	---
Receptor 3 (R3)	44.8	390	-10	59.2	---	---	---

Footnotes:

A - Please see Figure 2 which shows the location of Receptors R1, R2 and R3. R2 receptors (R2-A, R2-B and R2-C) collectively represent residential properties in the Dos Vientos community in Newbury Park.

B - Distances (feet) between receptors and closest excavation boundaries were estimated using Google Earth (see Figure 2).

C - Ambient measurements were collected at Receptors R1 and R2/R3 on 12/20/2018 and 12/21/2018. Please see Appendix C for more detail.

D - L_{eq}/L_{max} = Total Equipment L_{eq}/L_{max} @ 50-feet - 20*log(D/50). D = distance between source and receptor. (Source: Ventura County's *Construction Noise Threshold and Control Plan* and FHWA's *Roadway Construction Noise Model*).

E - As shown on Figures 4A, 4B, and 4C, none of the residences that comprise Receptor 2 (R2) or the portion of the Powerline hiking trail represented by Receptor 3 (R3) will have direct line-of-sight to mobile equipment sources operating within the mining areas closest to each receptor. Therefore, due to intervening mountain ranges blocking line-of-sight between noise sources (i.e., mobile mining equipment) and receptors, an additional -10 dBA of noise attenuation is assumed at Receptors 2 (R2) and 3 (R3). See the noise barrier insertion loss calculations (Appendix D) for more detail. Based on the intervening topography, -10 dBA of sound attenuation represents a conservative estimate of noise attenuation provided by the mountain ridge.

F - As shown on Figures 4A and 4C, Receptors 2-A (R2-A), 2-C (R2-C) and 3 (R3) do not have a direct line-of-sight to any of the expanded mining boundaries. Therefore, worst case noise impacts will occur when mobile equipment is operating at the nearest mining boundary (see previous calculations) with a -10 dBA attenuation assumed due to the intervening topography. However, for Receptor 2-B (R2-B) there are three (3) areas within the expanded mining boundary where this receptor will have direct line-of-sight to operating mobile equipment (e.g., loaders, excavators, water truck, etc.), and therefore no noise attenuation can be assumed. Please see Figure 4B and Figure 5 which show the three (3) mining areas where Receptor 2-B (R2-B) will have direct line-of-sight to operating mining equipment, the closest of which is approximately 1,652-feet away. Mobile equipment operating in these areas will produce the worst case noise impacts at Receptor 2-B (R2-B), and are therefore analyzed to determine the significance of noise impacts at this receptor.

Facility/Onsite Noise Impacts @ Receptor 2-B (R2-B)

Unmitigated Noise Impacts with Line-of-Sight/Attenuation

Facility/Onsite Noise Impact Calculations @ Receptor 2-B (R2-B)

Excavation (i.e., mobile) Equipment Noise Reference Data

Equipment	L_{max} at 50-feet [A]	Usage Factor (%) [B]	Adjusted L_{eq}1H at 50-feet	Source of Data
Front-End Loader	80	0.33	75.2	Equipment noise data sourced from the Federal Highway Administration's (FHWA's) *Roadway Construction Noise Model* and Ventura County's *Construction Noise Threshold Criteria and Control Plan*. Usage factor (UF) is "the percentage of time during the work period that the equipment is operating under full load or near full power". Usage factors are based on the default equipment specific usage factors from FHWA's *Roadway Construction Noise Model* multiplied by an efficiency factor. An efficiency factor of 83% (50 minutes/hour) is utilized to account for operator inefficiencies and breaks. Rock drill and water truck efficiencies are assumed to be 25% (15 minutes/hour) due to their less frequent and shorter activity cycles.
Dozer (Bulldozer)	85	0.33	80.2	
Excavator	85	0.33	80.2	
Rock Drill	85	0.05	72.0	
Water Truck	94	0.10	84.0	
Mobile Source Noise Levels - L_{eq}1H (dBA):	**95.5**		**87.1**	

Aggregate + Recycle Plant Equipment (Stationary Source) Noise Reference Data

Equipment	Measured L_{eq} at 50-feet [C]	Source of Data
Recycle Plant	84.1	The existing Aggregate Plant and the proposed Recycle Plant noise levels based on field measurements of rock crushing/recycling activities from a previous Sespe noise study completed in Otay Mesa, California (Sespe, 2020). This reference data is a conservative representation of Pacific Rock's existing and proposed operations. See Appendix B for relevant equipment measurement data and additional explanation from the Sespe's 2020 study.
Aggregate Plant	84.1	

Recycle/Aggregate Plant Noise @ R2-B

Recycle Plant Noise @ 50-feet:	84.1	dBA
Aggregate Plant Noise @ 50-feet:	84.1	dBA
Distance (ft.) from R2-B to Recycle Plant [B]:	2,688	feet
Distance (ft.) from R2-B to Aggregate Plant [B]:	2,781	feet
Assumed LoS Attenuation [D]:	-10	dba
Recycle Plant Noise Level @ R2-B:	39.5	dBA
Aggregate Plant Noise Level @ R2-B:	39.2	dBA
Total Stationary Source Noise @ R2-B:	**42.4**	dBA

Ambient Noise Level @ R2-B

Measured Ambient Noise Level (Daytime):	44.8	dBA

Unmitigated Noise Propagation Calculations @ Receptor 2-B (R2-B)

	Receptor 2-A [E]	Receptor 2-B [G]	Receptor 2-C [E]	
Excavation Noise @ 50-feet =	---	87.1	---	dBA
Distance to LoS-A = [F]	---	1,652	---	feet
Peak Noise Level (L_{eq}1H) at LoS-A =	---	**57.1**	---	dBA
Distance to LoS-B = [F]	---	2,486	---	feet
Peak Noise Level (L_{eq}1H) at LoS-B =	---	54.0	---	dBA
Distance to LoS-C = [F]	---	3,528	---	feet
Peak Noise Level (L_{eq}1H) at LoS-C =	---	51.8	---	dBA

Footnotes:

A - L_{max} noise levels for equipment are defaults from the FHWA's *Roadway Construction Noise Model*. Water truck L_{max} taken from Ventura County's *Construction Noise Threshold Criteria and Control Plan.*

B - Default usage factors (UF %) taken from the FHWA's *Roadway Construction Noise Model*. Default UF's % are multiplied by an efficiency factor to account for operator inefficiencies and breaks.

Front-End Loader = 40%, Dozer (Bulldozer) = 40%, Excavator = 40%, Rock Drill = 20%, Water Truck = 40% (utilized "Dump Truck" UF %).

C - Aggregate and Recycle Plant L_{eq} noise levels at 50-feet based on field measurements of a rock crushing/aggregate processing plant from a previous Sespe noise study conducted in Otay Mesa, California (Sespe, 2020). See Appendix B more detail.

D - Due to intervening mountain ranges/excavation pit walls blocking line-of-sight between Receptor 2-B (R2-B) and the Aggregate Plant and Recycle Plant locations, an additional -10 dBA of noise attenuation is assumed.

E - Please see Figure 5 which displays the LoS areas and associated distances in relation to Receptor 2-B (R2-B). Receptor 2-A (see Figure 4A) and 2-C (see Figure 4C) do not have line-of-sight to the areas designated as LoS-A, LoS-B or LoS-C, and therefore calculations are not shown (see previous sheet).

F - Distances (feet) between R2-B and closest line-of-sight (LoS) areas estimated using Google Earth (see Figure 5).

G - Since Line-of-Sight Area A (LoS-A) is the visible mining area (i.e. has line-of-sight) nearest to Receptor 2-B, mining in LoS-A will result in the worst case noise impacts to receptor R2-B and is therefore utilized to determine the significance of Facility noise impacts at this receptor.

Facility/Onsite Noise Impact Calculations

Excavation Equipment (Mobile Sources) Noise Reference Data				
Equipment	L_{max} at 50-feet [A]	Usage Factor (%) [B]	Adjusted L_{eq}1H at 50-feet	Source of Data
Front-End Loader	80	0.33	75.2	Equipment noise data sourced from the Federal Highway Administration's (FHWA's) *Roadway Construction Noise Model* and Ventura County's *Construction Noise Threshold Criteria and Control Plan*. Usage factor (UF) is "the percentage of time during the work period that the equipment is operating under full load or near full power". Usage factors are based on the default equipment specific usage factors from FHWA's *Roadway Construction Noise Model* multiplied by an efficiency factor. An efficiency factor of 83% (50 minutes/hour) is utilized to account for operator inefficiencies and breaks. Rock drill and water truck efficiencies are assumed to be 25% (15 minutes/hour) due to their less frequent and shorter activity cycles.
Dozer (Bulldozer)	85	0.33	80.2	
Excavator	85	0.33	80.2	
Rock Drill	85	0.05	72.0	
Water Truck	94	0.10	84.0	
Mobile Source Noise Levels (L_{eq}1H):	**95.5**	**dBA**	**87.1**	**dBA**

Aggregate + Recycle Plant Equipment (Stationary Source) Noise Reference Data		
Equipment	Measured L_{eq} at 50-feet [C]	Source of Data
Recycle Plant	84.1	The existing Aggregate Plant and the proposed Recycle Plant noise levels based on field measurements of rock crushing/recycling activities from a previous Sespe noise study completed in Otay Mesa, California (Sespe, 2020). This reference data is a conservative representation of Pacific Rock's existing and proposed operations. See Appendix B for relevant equipment measurement data and additional explanation from the Sespe's 2020 study.
Aggregate Plant	84.1	

Footnotes:

A - L_{max} noise levels for mobile equipment are defaults from the FHWA's *Roadway Construction Noise Model*. Water truck L_{max} taken from Ventura County's *Construction Noise Threshold Criteria and Control Plan.*

B - Default usage factors (UF %) taken from the FHWA's *Roadway Construction Noise Model*. Default UF's % are multiplied by an efficiency factor to account for operator inefficiencies and breaks.

Front-End Loader = 40%, Dozer (Bulldozer) = 40%, Excavator = 40%, Rock Drill = 20%, Water Truck = 40% (utilized "Dump Truck" UF %).

C - Existing Aggregate Plant and proposed Recycle Plant L_{eq} noise level at 50-feet is based on field measurements of a rock crushing/processing plant from a previous Sespe noise study completed in Otay Mesa, California (Sespe, 2020). See Appendix B for relevant excerpt and source measurement data from Sespe's 2020 study.

Unmitigated Onsite Noise Levels @ Facility Receptors (L_{eq}1H)		Mobile Source Noise Levels		Stationary Source Noise Levels				Project Impacts & Significance Determination		
Receptor [A]	Ambient Daytime Noise Level (dBA) [C]	Distance Mobile Sources to Receptor (ft.) [B]	Mobile Sources Noise with Attenuation (dBA) [D, E, H]	Distance to Existing Aggregate Plant to Receptor (ft.) [B]	Existing Aggregate Plant Noise with Attenuation (dBA) [D, E]	Distance to Proposed Recycle Plant to Receptor (ft.) [B]	Proposed Recycle Plant Noise with Attenuation (dBA) [D, E]	Total Project Noise Level @ Receptor (dBA) [F]	Significance Threshold (dBA) [G]	Significant?
Receptor 1 (R1)	41.6	1,160	59.8	2,474	50.2	1,833	52.8	**61.0**	**55**	**Yes**
Receptor 2-A (R2-A)	44.8	1,161	49.8	2,728	39.4	2,547	40.0	51.6	55	No
Receptor 2-B (R2-B)	44.8	1,652	56.7	2,781	39.2	2,688	39.5	**57.1**	**55**	**Yes**
Receptor 2-C (R2-C)	44.8	943	51.6	2,730	39.4	2,580	39.8	52.8	55	No
Receptor 3 (R3)	44.8	390	59.2	2,201	41.2	1,955	42.3	**59.5**	**55**	**Yes**

Footnotes:

A - Please see Figure 2 which shows the location of Receptors R1, R2 and R3. R2 receptors (R2-A, R2-B and R2-C) collectively represent residential properties in the Dos Vientos community in Newbury Park.

B - Distances (feet) between receptors and closest excavation boundaries/line-of-sight areas as well as the stationary Aggregate Plant and potential Recycle Plant locations estimated using Google Earth (see Figure 2 and 5).

C - Ambient measurements were collected at Receptors R1 and R2/R3 on 12/20/2018 and 12/21/2018. Please see Appendix C for more detail.

D - L_{eq}/L_{max} = Total Equipment L_{eq}/L_{max} @ 50-feet - 20*log(D/50). D = distance between source and receptor. (Source: Ventura County's *Construction Noise Threshold and Control Plan* and FHWA's *Roadway Construction Noise Model*).

E - Due to intervening mountain ranges blocking line-of-sight between noise sources (i.e., mining equipment, recycle plant) and receptors, an additional -10 dBA of noise attenuation is assumed. Specifically, none of the Facility receptors to the east (R2 and R3) have a direct line-of-sight to the existing Aggregate Plant or proposed Recycle Plant due to its proposed location within the bottom of the existing mine pit. Additionally, the intervening mountain range blocks line-of-sight between excavation equipment and Receptors R2-A (Figure 4A) as well as R2-C and R-3 (Figure 4C). See the noise barrier insertion loss calculations (Appendix D) for more detail. Based on the intervening topography, -10 dBA of sound attenuation represents a conservative estimate. Conservatively, no attenuation was assumed at Receptor 1 (R1) as portions of this receptor may have an unobstructed view of both the existing Aggregate Plant and proposed Recycle Plant.

F - Total Project noise levels (L_{eq}1H) at each receptor represents the calculated Facility noise level (i.e., operating mobile and stationary equipment) added to the measured ambient noise level. This represents the total unmitigated noise level (L_{eq}1H, dBA) experienced at receptors as a result of the Project. Please note, these Project noise levels take into account applicable line-of-sight attenuation.

G - Because excavation operations will continue to occur during daytime hours only (7:00 a.m. - 4:00 p.m.), only the daytime significance thresholds are utilized to determine the significance of noise impacts at Facility receptors. Ventura County General Plan Noise Element has a daytime (6:00 a.m. - 7:00 p.m.) significance threshold of 55 L_{eq}1H dBA.

H - As discussed previously, there are areas within the expanded mining boundary where Receptor 2-B (R2-B) will have a direct line-of-sight to mobile equipment (e.g., loaders, excavators, water truck, etc.) within the expanded mine areas, and therefore no noise attenuation can be assumed. Please see Figure 4B and Figure 5 which show the three (3) mining areas where Receptor 2-B (R2-B) will have direct line-of-sight to operating mining equipment, the closest of which is approximately 1,652-feet away. Mobile equipment operating in these areas will produce the worst case noise impacts at Receptor 2-B (R2-B), and are therefore analyzed to determine the significance of noise impacts at this receptor.

Mitigation Measure NO-2 - Mitigated Noise Impacts

Mitigated Noise Levels at Impacted Receptors

Expected Decrease in Excavation Equipment (Mobile Sources) Noise Levels due to Mitigation

Equipment	Dominant Noise Components [A]	Unmitigated L_{eq} @ 50-feet (dBA)	Noise Component to Mitigated [B, C]	Control Techniques [B, C]	Probable Noise Reduction (dBA) [C]	Mitigated L_{eq}1H @ 50-feet (dBA) [D]	L_{avg} $10^{(X/10)}$
Front-End Loader	E, C, F, I, H	75.2	Exhaust (E)	Install improved muffler	-10	65.2	3320000.0
Dozer (Bulldozer)	E, C, F, I, H	80.2	Exhaust (E)	Install improved muffler	-10	70.2	10498761.8
Excavator (Shovel)	E, C, F, I, H, W	80.2	Exhaust (E)	Install improved muffler	-10	70.2	10498761.8
Rock Drill	W, E, P	72.0	Exhaust (E)	Install improved muffler	-5	67.0	5000000.0
Water Truck	W, E, C, F, I, T	84.0	Exhaust (E)	Install improved muffler	-5	79.0	79432823.5
						Total Mitigated Excavation Noise Level (L_{eq}1H):	**80.4** dBA

Footnotes:

A - Ranked noisy components. C = casing, E = exhaust, F = fan, H = hydraulics, I = intake air, P = pneumatic exhaust, T = transmission, W = work tool. These represent the equipment components that can be controlled/altered to reduce reduce the overall noise level generated by the equipment. (Sources: Ventura County's *Construction Noise Threshold Criteria and Control Plan,* EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances).*

B - Ventura County's *Construction Noise Threshold Criteria and Control Plan* has unmitigated and mitigated noise levels for the equipment shown at 50-feet. Mitigated noise levels are the "estimated level obtainable by quieter methods or equipment and implementing feasible noise control." These can be achieved by controlling the noisy equipment components (e.g., the exhaust).

C - The EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* notes that installation of an "improved muffler" on each equipment's "exhaust" would result in a "probable noise reduction" of -10 dBA. Conservatively, this NVIA assumes this control measure would achieve only a -5 dBA noise reduction for the rock drill and water truck, as the exhaust port is not the dominant noise component. This mitigation is also presented in Ventura County's *Construction Noise Threshold Criteria and Control Plan*, which references the EPA's mitigated equipment noise levels. An excerpt from the EPA's guidance document is included in Appendix B.

D - Following installation of an "improved muffler" on each piece of mining equipment, the mitigated noise level (L_{eq}) is expected to be achieved. (Source: EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*).

Plant Equipment (Stationary Source) Noise Reference Data

Equipment	Measured L_{eq} at 50-feet [G]	Source of Data
Recycle Plant	84.1	See previous sheet/Appendix B.
Aggregate Plant	84.1	

Mitigated Onsite Noise Levels @ Facility Receptors (L_{eq}1H)

Receptor [A]	Ambient Daytime Noise Level (dBA) [C]	Mitigated Mobile Source Noise Levels: Distance Mobile Source to Receptor (ft.) [A, F]	Mitigated Mobile Source Noise Levels: Mobile Source Noise with Attenuation (dBA) [B, C]	Stationary Source Noise Levels: Distance to Existing Aggregate Plant to Receptor (ft.) [A]	Stationary Source Noise Levels: Existing Aggregate Plant Noise with Attenuation (dBA) [B, C]	Stationary Source Noise Levels: Distance to Proposed Recycle Plant to Receptor (ft.) [A]	Stationary Source Noise Levels: Proposed Recycle Plant Noise with Attenuation (dBA) [B, C]	Mitigated Project Impacts & Significance Determination: Total Project Noise Level @ Receptor (dBA) [D]	Significance Threshold (dBA) [E]	Significant?
Receptor 1 (R1)	41.6	1,160	53.1	2,474	50.2	1,833	52.8	**57.1**	**55**	**Yes**
Receptor 2-A (R2-A)	44.8	1,161	43.0	2,728	39.4	2,547	40.0	48.4	55	No
Receptor 2-B (R2-B)	44.8	1,652	50.0	2,781	39.2	2,688	39.5	51.7	55	No
Receptor 2-C (R2-C)	44.8	943	44.9	2,730	39.4	2,580	39.8	49.0	55	No
Receptor 3 (R3)	44.8	390	52.5	2,201	41.2	1,955	42.3	53.8	55	No

Note: Prior to mitigation, noise impacts at Residence 2A (R2-A) and Residence 2C (R2-C) were shown to be below the significance threshold due to intervening topography (see previous sheet). However, since the proposed mitigation will apply to all excavation equipment, including equipment operating near R2-A and R2-C, the mitigated noise levels at these receptors are also shown here for informational purposes.

Footnotes:

A - Distances estimated using Google Earth (see Figure 2 & Figure 5).

B - L_{eq}/L_{max} = Total Equipment L_{eq}/L_{max} @ 50-feet - 20*log(D/50). D = distance between source and receptor. (Source: Ventura County's *Construction Noise Threshold and Control Plan* and FHWA's *Roadway Construction Noise Model*).

C - Due to intervening mountain ranges blocking line-of-sight between noise sources (i.e., mining equipment, recycle plant) and receptors, an additional -10 dBA of noise attenuation is assumed. Specifically, none of the Facility receptors to the east (R2 and R3) have a direct line-of-sight to the existing Aggregate Plant or proposed Recycle Plant due to its proposed location within the bottom of the existing mine pit. Additionally, the intervening mountain range blocks line-of-sight between excavation equipment and Receptors R2-A (Figure 4A) as well as R2-C and R-3 (Figure 4C). See the noise barrier insertion loss calculations (Appendix D) for more detail. Based on the intervening topography, -10 dBA of sound attenuation represents a conservative estimate. Conservatively, no attenuation was assumed at Receptor 1 (R1) as portions of this receptor may have an unobstructed view of both the existing Aggregate Plant and proposed Recycle Plant.

D - Total Project noise levels (L_{eq}1H) at each receptor represents the calculated Facility noise level (i.e., operating mobile and stationary equipment) added to the measured ambient noise level. This represents the total noise level (L_{eq}1H, dBA) experienced at receptors as a result of the Project. Please note, these Project noise levels take into account applicable line-of-sight attenuation as well as equipment mitigations (i.e., improved mufflers on mobile equipment) described above.

E - Ventura County *2040 General Plan* Health and Safety Element has the daytime (6:00 a.m. - 7:00 p.m.) significance threshold of 55 L_{eq}1H dBA.

F - Since Line-of-Sight Area A (LoS-A) is the visible mining area (i.e., has line-of-sight) nearest to Receptor 2-B, mining in LoS-A will result in the worst case noise impacts to receptor R2-B and is therefore utilized to determine the significance of Facility noise impacts. Distances (feet) between R2-B and closest line-of-sight (LoS) areas estimated using Google Earth (see Figure 5).

G - Ambient measurements were collected at Receptors R1 and R2/R3 on 12/20/2018 and 12/21/2018. Please see Appendix C for more detail.

Mitigation Measure NO-4 - Mitigated Noise Impacts

Mitigated Noise Levels at Impacted Receptors

Expected Decrease in Excavation Equipment (Mobile Sources) Noise Levels due to Mitigation

Equipment	Dominant Noise Components [A]	Unmitigated L_{eq} @ 50-feet (dBA)	Noise Component to Mitigated [B, C]	Control Techniques [B, C]	Probable Noise Reduction (dBA) [C]	Mitigated L_{eq}1H @ 50-feet (dBA) [D]	L_{avg} $10^{(X/10)}$
Front-End Loader	E, C, F, I, H	75.2	Exhaust (E)	Install improved muffler	-10	65.2	3320000.0
Dozer (Bulldozer)	E, C, F, I, H	80.2	Exhaust (E)	Install improved muffler	-10	70.2	10498761.8
Excavator (Shovel)	E, C, F, I, H, W	80.2	Exhaust (E)	Install improved muffler	-10	70.2	10498761.8
Rock Drill	W, E, P	72.0	Exhaust (E)	Install improved muffler	-5	67.0	5000000.0
Water Truck	W, E, C, F, I, T	84.0	Exhaust (E)	Install improved muffler	-5	79.0	79432823.5
						Total Mitigated Excavation Noise Level (L_{eq}1H):	**80.4** dBA

Footnotes:

A - Ranked noisy components. C = casing, E = exhaust, F = fan, H = hydraulics, I = intake air, P = pneumatic exhaust, T = transmission, W = work tool. These represent the equipment components that can be controlled/altered to reduce reduce the overall noise level generated by the equipment. (Sources: Ventura County's *Construction Noise Threshold Criteria and Control Plan,* EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances).*

B - Ventura County's *Construction Noise Threshold Criteria and Control Plan* has unmitigated and mitigated noise levels for the equipment shown at 50-feet. Mitigated noise levels are the "estimated level obtainable by quieter methods or equipment and implementing feasible noise control." These can be achieved by controlling the noisy equipment components (e.g., the exhaust).

C - The EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* notes that installation of an "improved muffler" on each equipment's "exhaust" would result in a "probable noise reduction" of -10 dBA. Conservatively, this NVIA assumes this control measure would achieve only a -5 dBA noise reduction for the rock drill and water truck, as the exhaust port is not the dominant noise component. This mitigation is also presented in Ventura County's *Construction Noise Threshold Criteria and Control Plan* , which references the EPA's mitigated equipment noise levels. An excerpt from the EPA's guidance document is included in Appendix B.

D - Following installation of an "improved muffler" on each piece of mining equipment, the mitigated noise level (L_{eq}) is expected to be achieved. (Source: EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*).

Plant Equipment (Stationary Source) Noise Reference Data

Equipment	Measured L_{eq} at 50-feet [G]	Source of Data
Recycle Plant	84.1	See previous
Aggregate Plant	84.1	sheet/Appendix B.

Mitigated Onsite Noise Levels @ Facility Receptors (L_{eq}1H)

Receptor [A]	Ambient Daytime Noise Level (dBA) [C]	Mitigated Mobile Source Noise Levels: Distance Mobile Source to Receptor (ft.) [A, F]	Mitigated Mobile Source Noise Levels: Mobile Source Noise with Attenuation (dBA) [B, C]	Stationary Source Noise Levels: Distance to Existing Aggregate Plant to Receptor (ft.) [A]	Stationary Source Noise Levels: Existing Aggregate Plant Noise with Attenuation (dBA) [H]	Stationary Source Noise Levels: Distance to Proposed Recycle Plant to Receptor (ft.) [A]	Stationary Source Noise Levels: Proposed Recycle Plant Noise with Attenuation (dBA) [B, C]	Mitigated Project Impacts & Significance Determination: Total Project Noise Level @ Receptor (dBA) [D, H]	Significance Threshold (dBA) [E]	Significant?
Receptor 1 (R1)	41.6	1,160	53.1	2,474	---	1,833	52.8	**56.1**	**55**	**Yes**
Receptor 2-A (R2-A)	44.8	1,161	43.0	2,728	---	2,547	40.0	47.8	55	No
Receptor 2-B (R2-B)	44.8	1,652	50.0	2,781	---	2,688	39.5	51.4	55	No
Receptor 2-C (R2-C)	44.8	943	44.9	2,730	---	2,580	39.8	48.5	55	No
Receptor 3 (R3)	44.8	390	52.5	2,201	---	1,955	42.3	53.5	55	No

Note: Prior to mitigation, noise impacts at Receptor 2 (R2) and Receptor 3 (R3) were shown to be below the significance threshold due to intervening topography (see previous sheet). However, since the proposed mitigation will apply to all excavation equipment, including stationary and mobile equipment operating near R2 and R3, the mitigated noise levels at these receptors are also shown here for informational purposes.

Footnotes:

A - Distances estimated using Google Earth (see Figure 2 & Figure 5).

B - L_{eq}/L_{max} = Total Equipment L_{eq}/L_{max} @ 50-feet - 20*log(D/50). D = distance between source and receptor. (Source: Ventura County's *Construction Noise Threshold and Control Plan* and FHWA's *Roadway Construction Noise Model*).

C - Due to intervening mountain ranges blocking line-of-sight between noise sources (i.e., mining equipment, recycle plant) and receptors , an additional -10 dBA of noise attenuation is assumed. Specifically, none of the Facility receptors to the east (R2 and R3) have a direct line-of-sight to the existing Aggregate Plant or proposed Recycle Plant due to its proposed location within the bottom of the existing mine pit. Additionally, the intervening mountain range blocks line-of-sight between excavation equipment and Receptors R2-A (Figure 4A) as well as R2-C and R-3 (Figure 4C). See the noise barrier insertion loss calculations (Appendix D) for more detail. Based on the intervening topography, -10 dBA of sound attenuation represents a conservative estimate. Conservatively, no attenuation was assumed at Receptor 1 (R1) as portions of this receptor may have an unobstructed view of both the existing Aggregate Plant and proposed Recycle Plant.

D - Total Project noise levels (L_{eq}1H) at each receptor represents the calculated Facility noise level (i.e., operating mobile and stationary equipment) added to the measured ambient noise level. This represents the total noise level (L_{eq}1H, dBA) experienced at receptors as a result of the Project. Please note, these Project noise levels take into account applicable line-of-sight attenuation as well as mobile equipment mitigations (i.e., improved mufflers on mobile equipment) and stationary equipment mitigations (i.e., no simultaneous operation of processing equipment).

E - Ventura County *2040 General Plan* Health and Safety Element has the daytime (6:00 a.m. - 7:00 p.m.) significance threshold of 55 L_{eq}1H dBA.

F - Since Line-of-Sight Area A (LoS-A) is the visible mining area (i.e., has line-of-sight) nearest to Receptor 2-B, mining in LoS-A will result in the worst case noise impacts to receptor R2-B and is therefore utilized to determine the significance of Facility noise impacts. Distances (feet) between R2-B and closest line-of-sight (LoS) areas estimated using Google Earth (see Figure 5).

G - Ambient measurements were collected at Receptors R1 and R2/R3 on 12/20/2018 and 12/21/2018. Please see Appendix C for more detail.

H - Per recommend Mitigation Measure NO-4, the existing Aggregate Plant and proposed Recycle Plant will not operate simultaneously for any time period. As such, the noise contribution from the existing Aggregate Plant has been removed from the total Project noise impacts determined at Receptors 1 (R1), 2 (R2) and 3 (R3). As shown on the previous calculation sheet, the Aggregate Plant is estimated to produce less noise than the Recycle Plant at all Facility receptors. Therefore, assuming the Recycle Plant is operational but the Aggregate Plant does not operate per Mitigation Measure NO-4, produces the conservative worst-case noise impacts at Facility receptors (R1, R2 and R3). With the implementation of Mitigation Measure NO-4, impacts are less than significant at Facility receptors except for Receptor 1 (please see Mitigation Measure NO-5 for additional recommendations).

Mitigation Measure NO-5 - Mitigated Noise Impacts

Mitigated Noise Levels at Impacted Receptors

Expected Decrease in Excavation Equipment (Mobile Sources) Noise Levels due to Mitigation

Equipment	Dominant Noise Components [A]	Unmitigated L_{eq} @ 50-feet (dBA)	Noise Component to Mitigated [B, C]	Control Techniques [B, C]	Probable Noise Reduction (dBA) [C]	Mitigated L_{eq}1H @ 50-feet (dBA) [D]	L_{avg} $10^{(X/10)}$
Front-End Loader	E, C, F, I, H	75.2	Exhaust (E)	Install improved muffler	-10	65.2	3320000.0
Dozer (Bulldozer)	E, C, F, I, H	80.2	Exhaust (E)	Install improved muffler	-10	70.2	10498761.8
Excavator (Shovel)	E, C, F, I, H, W	80.2	Exhaust (E)	Install improved muffler	-10	70.2	10498761.8
Rock Drill	W, E, P	72.0	Exhaust (E)	Install improved muffler	-5	67.0	5000000.0
Water Truck	W, E, C, F, I, T	84.0	Exhaust (E)	Install improved muffler	-5	79.0	79432823.5
						Total Mitigated Excavation Noise Level (L_{eq}1H):	**80.4** dBA

Footnotes:

A - Ranked noisy components. C = casing, E = exhaust, F = fan, H = hydraulics, I = intake air, P = pneumatic exhaust, T = transmission, W = work tool. These represent the equipment components that can be controlled/altered to reduce reduce the overall noise level generated by the equipment. (Sources: Ventura County's *Construction Noise Threshold Criteria and Control Plan,* EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances).*

B - Ventura County's *Construction Noise Threshold Criteria and Control Plan* has unmitigated and mitigated noise levels for the equipment shown at 50-feet. Mitigated noise levels are the "estimated level obtainable by quieter methods or equipment and implementing feasible noise control." These can be achieved by controlling the noisy equipment components (e.g. the exhaust).

C - The EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* notes that installation of an "improved muffler" on each equipment's "exhaust" would result in a "probable noise reduction" of -10 dBA. Conservatively, this NVIA assumes this control measure would achieve only a -5 dBA noise reduction for the rock drill and water truck, as the exhaust port is not the dominant noise component. This mitigation is also presented in Ventura County's *Construction Noise Threshold Criteria and Control Plan* , which references the EPA's mitigated equipment noise levels. An excerpt from the EPA's guidance document is included in Appendix B.

D - Following installation of an "improved muffler" on each piece of mining equipment, the mitigated noise level (L_{eq}) is expected to be achieved. (Source: EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*).

Plant Equipment (Stationary Source) Noise Reference Data @ R1

Equipment	Measured L_{eq} at 50-feet [G]	Distance to R1 to Stationary Source (ft.) [A]	Plant Noise Level @ R1 with Attenuation (dBA) [C]	Source of Data
Recycle Plant	84.1	1,833	52.8	See previous sheet/Appendix B.
Aggregate Plant	84.1	2,474	---	
		Total Stationary Source Noise Level @ R1:	**52.8**	dBA

Ambient Noise Levels @ R1

Receptor	Ambient Daytime Noise Level (dBA) F	Source of Data
Receptor 1 (R1)	41.6	See Appendix C.

Receptor 1 (R1) - Distance Propagation Calculations

Distance Assessed [A]	Noise Level (L_{eq}1H) @ Receptor without Attenuation (dBA) [D]	Ventura County Significance Threshold (L_{eq}) [E]	Significant
1,160	56.1	55	Yes
1,310	55.6	55	Yes
1,460	55.2	55	Yes
1,610	**54.9**	**55**	**No**
1,760	54.7	55	No
1,910	54.5	55	No

Note: As shown above, cumulative worst-case noise impacts (i.e., Recycle Plant and mobile excavation equipment) experienced at Receptor 1 (R1) are below the County General Plan threshold when excavation equipment is operating a minimum of 1,600-feet away from R1.
Therefore, per Mitigation Measure NO-5, to ensure noise impacts are less than significant at R1, neither the proposed Recycle Plant nor the existing Aggregate Plant shall operated when excavation is occurring within 1,600-feet of R1 in accordance with recommended Mitigation Measure NO-5.
Please note, with the implementation of Mitigation Measure NO-5, worst-case noise impacts experienced at R1 when excavation is occurring at the closest mining boundary (i.e., 1,160-feet between source and receptor), noise levels experienced at R1 would be 53.4 dBA, which is below the General Plan threshold of 55 dBA.
Please see Figure 8 which displays the potential mining areas less than 1,600-feet away from Receptor R1. If excavation is occurring within the area shown on Figure 8, Mitigation Measure NO-5 (i.e., no processing operations) shall be implemented.

Footnotes:

A - Distances estimated using Google Earth (see Figure 8).

B - L_{eq}/L_{max} = Total Equipment L_{eq}/L_{max} @ 50-feet - 20*log(D/50). D = distance between source and receptor. (Source: Ventura County's *Construction Noise Threshold and Control Plan* and FHWA's *Roadway Construction Noise Model*).

C - Per recommend Mitigation Measure NO-4, the existing Aggregate Plant and proposed Recycle Plant will not operate simultaneously for any time period. As such, the noise contribution from the existing Aggregate Plant has been removed from the total Project noise impacts determined at Receptors 1 (R1), 2 (R2) and 3 (R3). As shown on the previous calculation sheet, the Aggregate Plant is estimated to produce less noise than the Recycle Plant at the Facility receptors. Therefore, assuming the Recycle Plant is operational but the Aggregate Plant does not operate per Mitigation Measure NO-4, produces the conservative worst-case noise impacts at Facility receptors (R1, R2 and R3).

D - Total Project noise levels (L_{eq}1H) at each receptor represents the calculated Facility noise level (i.e. operating mobile and stationary equipment) added to the measured ambient noise level. This represents the total noise level (L_{eq}1H, dBA) experienced as a result of the Project. Please note, these Project noise levels take into account applicable line-of-sight attenuation as well as mobile equipment mitigations (i.e., improved mufflers on mobile equipment), stationary equipment mitigations (i.e., no simultaneous operation of processing equipment), and distance mitigations at Receptor 1 (i.e., no processing operations when excavation occurring within 1,600-feet of R1).

E - Ventura County *2040 General Plan* Health and Safety Element has the daytime (6:00 a.m. - 7:00 p.m.) significance threshold of 55 L_{eq}1H dBA.

F - Ambient measurements were collected at Receptors R1 and R2/R3 on 12/20/2018 and 12/21/2018. Please see Appendix C for more detail.

APPENDIX E

TRANSPORTATION SOURCES – NOISE IMPACT DETERMINATION

SoundPLAN Essential 4.0 - Model Settings & Data

Noise Standards Utilized

Noise Source	Noise Standard
Traffic/Road	Traffic Noise Model - FHWA; 1998 (TNM)
Industrial	ISO 9613-2: 1996

Environmental/Meteorological Settings

Parameter	Setting	Unit
Temperature	61.2	F°
	16.2	C°
Humidity	79	%
Air Pressure	1014	mbar (SoundPLAN default)

Note: Average temperature and humidity data for Oxnard/Camarillo taken from the Western Regional Climate Center (WRCC).

Calculation Settings

Grid Noise Map		
Height above ground:	1.5	meters
	4.9	feet
Grid distance:	5.0	meters
	16.4	feet
Limit Lines		
Height above ground:	1.5	meters
	4.9	feet

Receiver Settings

Height above ground for free field receivers:	1.5	meters
	4.9	feet
Height above ground floor for building receivers:	2	meters
	6.6	feet
Floor height:	3.7	meters
	12.1	feet

Volume Attenuation Areas

Type	Description	Height	
Wall	Soundwall along residences located on Pleasant Valley Road & Pancho Road	1.8	meters
		6	feet
Ground Absorbption	Grass/shrubs in front of R4	1.0	Ground factor

Receptor Building Data

Receptor	Description	Height	
Facility Receptors			
R1	Conejo Mountain Funeral Home	2	floors
		3.7	meters
		12.0	feet
R2	Residence(s)	2	floors
		3.7	meters
		12.0	feet
Haul Route Receptors			
R4	Residence	1	floors
		3.7	meters
		12.0	feet
R5	Residence(s)	1	floors
		3.7	meters
		12.0	feet

Traffic Model Data

Daily Truck Trips			
Vehicle Type	**Daily Loads**	**Daily Trips**	**Source**
Aggregate Truck (HHD)	60	120	Condition #38, CUP 3817-3

Note: There are no proposed changes to existing daily CUP truck trip limit (i.e. 60 loads/day, 120 one-way trips/day)

Affected Roadway Attributes & Distribution of Project Trips						
Roadway	**Segment Length (km)**	**Speed Limit (km/h)**	**Road Width (m)**	**Road Material**	**Project Trips/Day**	**% of Trips**
Howard Road (near facility)	0.77	8 (5 mph)	8	OGAC	120	100%
Howard Road (near Receptor 3)	0.76	24 (15 mph)	8	DGAC	120	100%
Pancho Road	1.55	48 (30 mph)	8	Average (of DGAC and PCC)	120	100%
Pleasant Valley Road (northbound/southbound)	0.76	80 (50 mph)	24	PCC	102	85%
Pleasant Valley Road (westbound/eastbound)	0.44	80 (50 mph)	24	PCC	18	15%

Based on information provided by Pacific Rock, it is assumed that 85% of daily truck trips leaving the Facility will head north/south on Pleasant Valley Road toward the 101 Freeway, and the other 15% will head west/east toward the Pacific Coast Highway/Oxnard.

OGAC = open-graded asphaltic concrete
DGAC = dense-graded asphaltic concrete
PCC = Portland cement concrete

24-Hour Traffic Measurment Data

VRPA Technologies Inc.

PLEASANT VALLEY ROAD (Lewis Road → Pancho Road)

Day Measured: Tuesday
Date Measured: 11/27/2018

EASTBOUND														
Time	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**Total**
12:00 AM	0	23	2	0	2	0	0	0	0	0	0	0	0	**27**
1:00 AM	0	24	5	0	0	0	0	0	0	0	0	0	0	**29**
2:00 AM	0	14	1	0	1	0	0	0	0	0	0	0	0	**16**
3:00 AM	0	40	5	0	2	0	0	0	0	0	0	0	0	**47**
4:00 AM	0	217	32	0	8	0	0	0	0	0	0	0	0	**257**
5:00 AM	0	470	64	0	18	0	0	0	0	0	0	0	0	**552**
6:00 AM	1	638	115	0	36	1	0	3	0	0	0	0	0	**794**
7:00 AM	2	744	128	3	49	1	0	1	1	0	0	0	0	**929**
8:00 AM	2	527	88	2	37	1	0	2	5	0	0	0	0	**664**
9:00 AM	1	373	59	2	34	1	0	0	0	0	0	0	0	**470**
10:00 AM	0	304	69	0	33	0	0	0	2	0	0	0	0	**408**
11:00 AM	1	340	58	1	25	1	0	4	0	0	0	0	0	**430**
12:00 PM	1	461	74	2	38	3	0	3	3	0	0	0	0	**585**
1:00 PM	0	446	81	4	38	0	0	1	1	0	0	0	0	**571**
2:00 PM	1	491	77	2	40	1	0	2	1	0	0	0	0	**615**
3:00 PM	2	761	127	1	41	3	1	1	0	0	0	0	0	**937**
4:00 PM	3	779	98	0	35	0	0	3	0	0	0	0	0	**918**
5:00 PM	1	640	96	2	32	0	0	2	1	0	0	0	0	**774**
6:00 PM	3	525	60	0	27	0	0	1	0	0	0	0	0	**616**
7:00 PM	2	271	34	0	10	0	0	0	0	0	0	0	0	**317**
8:00 PM	0	235	26	0	7	0	0	0	0	0	0	0	0	**268**
9:00 PM	0	183	20	0	4	0	0	0	0	0	0	0	0	**207**
10:00 PM	0	81	7	0	0	0	0	0	0	0	0	0	0	**88**
11:00 PM	0	50	4	0	1	0	0	0	0	0	0	0	0	**55**
Totals:	**20**	**8,637**	**1,330**	**19**	**518**	**12**	**1**	**23**	**14**	**0**	**0**	**0**	**0**	**10,574**
% of Totals	0%	82%	13%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	100%

AM Volumes	7	3,714	626	8	245	5	0	10	8	0	0	0	0	4,623
% AM	0%	35%	6%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	44%
AM Peak Hour	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	6:00 AM	---	11:00 AM	8:00 AM	---	---	---	---	7:00 AM
Volume	2	744	128	3	49	1	---	4	5	---	---	---	---	936
PM Volumes	13	4,923	704	11	273	7	1	13	6	0	0	0	0	5,951
% PM	0%	47%	7%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	56%
PM Peak Hour	4:00 PM	4:00 PM	3:00 PM	1:00 PM	3:00 PM	12:00 PM	3:00 PM	12:00 PM	12:00 PM	---	---	---	---	3:00 PM
Volume	3	779	127	4	41	3	1	3	3	---	---	---	---	964

Directional Peak Periods	**AM 7:00 a.m. - 9:00 a.m.**			**Noon 12:00 p.m. - 2:00 p.m.**			**PM 4:00 p.m. - 6:00 p.m.**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	1,593	↔	15%	1,156	↔	11%	1,692	↔	16%	6,133	↔	58%

Classification Definitions

1 Motorcycles
2 Passenger Cars (Auto)
3 2-Axle, 4-Tire Single Units (Auto)
4 Buses
5 2-Axle, 6-Tire Single Units (Med.)
6 3-Axle Single Units (Med.)
7 >= 4-Axle Single Units (Med.)
8 <= 4-Axle Single Trailers (Heavy)
9 5-Axle Single Trailers (Heavy)
10 >= 6-Axle Single Trailers (Heavy)
11 <= 5-Axle Multi-Trailers (Heavy)
12 6-Axle Multi-Trailers (Heavy)
13 >= 7-Axle Multi-Trailers (Heavy)

PLEASANT VALLEY ROAD (Lewis Road → Pancho Road)

Day Measured: Tuesday
Date Measured: 11/27/2018

WESTBOUND														
Time	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**Total**
12:00 AM	0	79	5	1	1	0	0	0	0	0	0	0	0	**86**
1:00 AM	0	60	4	0	0	0	0	0	0	0	0	0	0	**64**
2:00 AM	0	50	4	0	0	0	0	0	0	0	0	0	0	**54**
3:00 AM	0	13	1	0	0	0	0	0	0	0	0	0	0	**14**
4:00 AM	0	35	8	0	1	0	0	0	0	0	0	0	0	**44**
5:00 AM	0	156	20	0	6	0	0	2	0	0	0	0	0	**184**
6:00 AM	3	386	54	0	12	0	0	0	0	0	0	0	0	**455**
7:00 AM	1	627	74	1	21	0	0	0	0	0	0	0	0	**724**
8:00 AM	1	599	64	0	18	1	0	0	0	0	0	0	0	**683**
9:00 AM	1	375	35	0	13	0	0	1	0	0	0	0	0	**425**
10:00 AM	0	288	46	0	10	0	0	0	2	0	0	0	0	**346**
11:00 AM	2	313	48	0	13	0	0	1	0	0	0	0	0	**377**
12:00 PM	1	357	54	0	13	0	0	0	0	0	0	0	0	**425**
1:00 PM	1	389	55	1	15	0	0	0	1	0	0	0	0	**462**
2:00 PM	1	516	73	1	21	0	0	1	1	0	0	0	0	**614**
3:00 PM	4	875	120	2	33	0	0	0	1	0	0	0	0	**1,035**
4:00 PM	2	956	143	4	34	1	0	0	0	0	0	0	0	**1,140**
5:00 PM	2	986	117	2	26	0	0	0	0	0	0	0	0	**1,133**
6:00 PM	0	529	52	1	14	0	0	0	0	0	0	0	0	**596**
7:00 PM	0	203	20	0	7	0	0	0	0	0	0	0	0	**230**
8:00 PM	0	144	17	0	3	0	0	0	0	0	0	0	0	**164**
9:00 PM	0	136	10	0	1	0	0	0	0	0	0	0	0	**147**
10:00 PM	0	107	12	0	1	0	0	0	0	0	0	0	0	**120**
11:00 PM	0	78	5	0	1	0	0	0	0	0	0	0	0	**84**
Totals:	**19**	**8,257**	**1,041**	**13**	**264**	**2**	**0**	**5**	**5**	**0**	**0**	**0**	**0**	**9,606**
% of Totals	0%	86%	11%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	100%

AM Volumes	8	2,981	363	2	95	1	0	4	2	0	0	0	0	3,456
% AM	0%	31%	4%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	36%
AM Peak Hour	6:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	8:00 AM	---	5:00 AM	10:00 AM	---	---	---	---	7:00 AM
Volume	3	627	74	1	21	1	---	2	2	---	---	---	---	731
PM Volumes	11	5,276	678	11	169	1	0	1	3	0	0	0	0	6,150
% PM	0%	55%	7%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	64%
PM Peak Hour	3:00 PM	5:00 PM	4:00 PM	4:00 PM	4:00 PM	4:00 PM	---	2:00 PM	1:00 PM	---	---	---	---	3:00 PM
Volume	4	986	143	4	34	1	---	1	1	---	---	---	---	1,174

Directional Peak Periods	**AM 7:00 a.m. - 9:00 a.m.**			**Noon 12:00 p.m. - 2:00 p.m.**			**PM 4:00 p.m. - 6:00 p.m.**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	1,407	↔	15%	887	↔	9%	2,273	↔	24%	5,039	↔	52%

Classification Definitions

1 Motorcycles
2 Passenger Cars (Auto)
3 2-Axle, 4-Tire Single Units (Auto)
4 Buses
5 2-Axle, 6-Tire Single Units (Med.)
6 3-Axle Single Units (Med.)
7 >= 4-Axle Single Units (Med.)
8 <= 4-Axle Single Trailers (Heavy)
9 5-Axle Single Trailers (Heavy)
10 >= 6-Axle Single Trailers (Heavy)
11 <= 5-Axle Multi-Trailers (Heavy)
12 6-Axle Multi-Trailers (Heavy)
13 >= 7-Axle Multi-Trailers (Heavy)

PLEASANT VALLEY ROAD (US 101 Freeway → Pancho Road)

Day Measured: Tuesday
Date Measured: 11/27/2018

NORTHBOUND														
Time	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**Total**
12:00 AM	0	47	2	0	1	0	0	1	0	0	0	0	0	**51**
1:00 AM	0	35	2	0	0	0	0	0	0	0	0	0	0	**37**
2:00 AM	0	53	1	0	2	0	0	0	0	0	0	0	0	**56**
3:00 AM	0	24	3	0	0	0	0	1	0	0	0	0	0	**28**
4:00 AM	0	89	14	0	4	0	0	0	0	0	0	0	0	**107**
5:00 AM	0	289	50	1	12	0	0	0	0	0	0	0	0	**352**
6:00 AM	0	469	64	0	18	0	0	3	0	0	0	0	0	**554**
7:00 AM	0	822	94	1	28	0	0	0	0	0	0	0	0	**945**
8:00 AM	0	584	80	0	25	0	0	1	0	0	0	0	0	**690**
9:00 AM	0	408	54	1	26	3	0	1	0	0	0	0	0	**493**
10:00 AM	0	423	43	3	31	0	0	3	1	0	0	0	0	**504**
11:00 AM	0	478	62	1	23	0	0	0	1	0	0	0	0	**565**
12:00 PM	0	591	60	0	29	0	0	3	1	0	0	0	0	**684**
1:00 PM	0	530	68	0	26	1	0	2	0	0	0	0	0	**627**
2:00 PM	0	654	68	0	28	0	0	1	0	0	0	0	0	**751**
3:00 PM	1	853	98	0	31	0	0	0	0	0	0	0	0	**983**
4:00 PM	1	987	88	0	27	0	0	0	1	0	0	0	0	**1,104**
5:00 PM	1	958	98	0	20	0	0	1	0	0	0	0	0	**1,078**
6:00 PM	0	645	43	0	28	0	0	2	0	0	0	0	0	**718**
7:00 PM	0	380	27	0	9	0	0	0	0	0	0	0	0	**416**
8:00 PM	0	226	10	0	7	0	0	0	0	0	0	0	0	**243**
9:00 PM	0	193	7	0	6	0	0	0	0	0	0	0	0	**206**
10:00 PM	0	103	1	0	1	0	0	0	1	0	0	0	0	**106**
11:00 PM	0	54	3	0	2	0	0	0	0	0	0	0	0	**59**
Totals:	**3**	**9,895**	**1,040**	**7**	**384**	**4**	**0**	**19**	**5**	**0**	**0**	**0**	**0**	**11,357**
% of Totals	0%	87%	9%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	100%

AM Volumes	0	3,721	469	7	170	3	0	10	2	0	0	0	0	4,382
% AM	0%	33%	4%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	39%
AM Peak Hour	---	7:00 AM	7:00 AM	#######	10:00 AM	9:00 AM	---	6:00 AM	10:00 AM	---	---	---	---	7:00 AM
Volume	---	822	94	3	31	3	---	3	1	---	---	---	---	957
PM Volumes	3	6,174	571	0	214	1	0	9	3	0	0	0	0	6,975
% PM	0%	54%	5%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	61%
PM Peak Hour	3:00 PM	4:00 PM	3:00 PM	---	3:00 PM	1:00 PM	---	12:00 PM	12:00 PM	---	---	---	---	3:00 PM
Volume	1	987	98	---	31	1	---	3	1	---	---	---	---	1,122

Directional Peak Periods	**AM 7:00 a.m. - 9:00 a.m.**			**Noon 12:00 p.m. - 2:00 p.m.**			**PM 4:00 p.m. - 6:00 p.m.**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	1,635	↔	14%	1,311	↔	12%	2,182	↔	19%	6,229	↔	55%

Classification Definitions

1 Motorcycles
2 Passenger Cars (Auto)
3 2-Axle, 4-Tire Single Units (Auto)
4 Buses
5 2-Axle, 6-Tire Single Units (Med.)
6 3-Axle Single Units (Med.)
7 >= 4-Axle Single Units (Med.)
8 <= 4-Axle Single Trailers (Heavy)
9 5-Axle Single Trailers (Heavy)
10 >= 6-Axle Single Trailers (Heavy)
11 <= 5-Axle Multi-Trailers (Heavy)
12 6-Axle Multi-Trailers (Heavy)
13 >= 7-Axle Multi-Trailers (Heavy)

PLEASANT VALLEY ROAD (US 101 Freeway → Pancho Road)

Day Measured: Tuesday
Date Measured: 11/27/2018

SOUTHBOUND													
Time	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**Total**
12:00 AM	0	30	1	0	2	0	0	1	0	0	0	0	0	**34**
1:00 AM	0	18	4	0	1	0	0	0	0	0	0	0	0	**23**
2:00 AM	0	16	4	0	4	0	0	0	0	0	0	0	0	**24**
3:00 AM	0	15	2	0	0	0	0	0	0	0	0	0	0	**17**
4:00 AM	0	123	18	0	6	0	0	0	0	0	0	0	0	**147**
5:00 AM	0	276	33	0	18	1	0	1	1	0	0	0	0	**330**
6:00 AM	1	540	80	0	33	0	0	0	0	0	0	0	0	**654**
7:00 AM	2	747	113	3	59	1	0	2	0	0	0	0	0	**927**
8:00 AM	1	706	99	1	39	4	1	2	0	0	0	0	0	**853**
9:00 AM	1	425	68	1	24	0	1	1	0	0	0	0	0	**521**
10:00 AM	1	328	49	0	23	2	1	1	0	0	0	0	0	**405**
11:00 AM	1	367	67	1	21	1	0	0	1	0	0	0	0	**459**
12:00 PM	1	476	78	2	33	0	0	0	0	0	0	0	0	**590**
1:00 PM	1	456	82	2	28	2	0	1	1	0	0	0	0	**573**
2:00 PM	0	496	78	1	40	1	0	2	0	0	0	0	0	**618**
3:00 PM	1	650	100	1	40	1	0	0	0	0	0	0	0	**793**
4:00 PM	1	728	107	3	59	0	0	0	0	0	0	0	0	**898**
5:00 PM	0	723	120	1	37	0	0	1	1	0	0	0	0	**883**
6:00 PM	0	516	64	0	24	0	0	0	0	0	0	0	0	**604**
7:00 PM	0	251	26	0	12	0	0	0	0	0	0	0	0	**289**
8:00 PM	0	178	25	0	8	0	0	0	0	0	0	0	0	**211**
9:00 PM	0	174	26	0	7	0	0	0	0	0	0	0	0	**207**
10:00 PM	0	120	18	0	5	0	0	0	0	0	0	0	0	**143**
11:00 PM	0	73	3	0	3	0	0	0	0	0	0	0	0	**79**
Totals:	**11**	**8,432**	**1,265**	**16**	**526**	**13**	**3**	**12**	**4**	**0**	**0**	**0**	**0**	**10,282**
% of Totals	0%	82%	12%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	100%

AM Volumes	7	3,591	538	6	230	9	3	8	2	0	0	0	0	4,394
% AM	0%	35%	5%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	43%
AM Peak Hour	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	8:00 AM	8:00 AM	7:00 AM	5:00 AM	---	---	---	---	7:00 AM
Volume	2	747	113	3	59	4	1	2	1	---	---	---	---	932
PM Volumes	4	4,841	727	10	296	4	0	4	2	0	0	0	0	5,888
% PM	0%	47%	7%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	57%
PM Peak Hour	12:00 PM	4:00 PM	5:00 PM	4:00 PM	4:00 PM	1:00 PM	---	2:00 PM	1:00 PM	---	---	---	---	3:00 PM
Volume	1	728	120	3	59	2	---	2	1	---	---	---	---	916

Directional Peak Periods	**AM 7:00 a.m. - 9:00 a.m.**			**Noon 12:00 p.m. - 2:00 p.m.**			**PM 4:00 p.m. - 6:00 p.m.**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	1,780	↔	17%	1,163	↔	11%	1,781	↔	17%	5,558	↔	54%

Classification Definitions

1 Motorcycles
2 Passenger Cars (Auto)
3 2-Axle, 4-Tire Single Units (Auto)
4 Buses
5 2-Axle, 6-Tire Single Units (Med.)
6 3-Axle Single Units (Med.)
7 >= 4-Axle Single Units (Med.)
8 <= 4-Axle Single Trailers (Heavy)
9 5-Axle Single Trailers (Heavy)
10 >= 6-Axle Single Trailers (Heavy)
11 <= 5-Axle Multi-Trailers (Heavy)
12 6-Axle Multi-Trailers (Heavy)
13 >= 7-Axle Multi-Trailers (Heavy)

PANCHO ROAD (Howard Road → Pleasant Valley Road)

Day Measured: Tuesday
Date Measured: 11/27/2018

NORTHBOUND														
Time	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**Total**
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	1	1	0	2	0	0	0	0	0	0	0	0	**4**
6:00 AM	0	5	1	1	3	0	0	0	0	0	0	0	0	**10**
7:00 AM	0	10	2	0	5	0	0	1	1	0	0	0	0	**19**
8:00 AM	0	11	1	0	4	0	0	0	1	0	0	0	0	**17**
9:00 AM	0	8	5	0	6	0	0	2	1	0	0	0	0	**22**
10:00 AM	0	9	2	0	3	1	0	0	2	0	0	0	0	**17**
11:00 AM	1	26	4	1	5	0	1	0	2	0	0	0	0	**40**
12:00 PM	1	32	11	0	2	0	0	0	2	0	0	0	0	**48**
1:00 PM	0	20	5	0	4	0	0	0	0	0	0	0	0	**29**
2:00 PM	0	43	10	1	6	2	0	0	0	0	0	0	0	**62**
3:00 PM	0	55	13	0	10	0	0	0	0	0	0	0	0	**78**
4:00 PM	0	56	11	1	7	0	0	0	0	0	0	0	0	**75**
5:00 PM	0	19	6	0	4	0	0	0	0	0	0	0	0	**29**
6:00 PM	0	4	1	0	2	0	0	0	0	0	0	0	0	**7**
7:00 PM	0	8	1	0	1	0	0	0	0	0	0	0	0	**10**
8:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
9:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	**2**
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
Totals:	**2**	**311**	**74**	**4**	**66**	**3**	**1**	**4**	**9**	**0**	**0**	**0**	**0**	**474**
% of Totals	0%	66%	16%	1%	14%	1%	0%	1%	2%	0%	0%	0%	0%	100%

AM Volumes	1	70	16	2	28	1	1	4	7	0	0	0	0	130
% AM	0%	15%	3%	0%	6%	0%	0%	1%	1%	0%	0%	0%	0%	27%
AM Peak Hour	11:00 AM	11:00 AM	9:00 AM	6:00 AM	9:00 AM	10:00 AM	11:00 AM	9:00 AM	10:00 AM	---	---	---	---	11:00 AM
Volume	1	26	5	1	6	1	1	2	2	---	---	---	---	45
PM Volumes	1	241	58	2	38	2	0	0	2	0	0	0	0	344
% PM	0%	51%	12%	0%	8%	0%	0%	0%	0%	0%	0%	0%	0%	73%
PM Peak Hour	12:00 PM	4:00 PM	3:00 PM	2:00 PM	3:00 PM	2:00 PM	---	---	12:00 PM	---	---	---	---	3:00 PM
Volume	1	56	13	1	10	2	---	---	2	---	---	---	---	85

Directional Peak Periods	**AM 7:00 a.m. - 9:00 a.m.**			**Noon 12:00 p.m. - 2:00 p.m.**			**PM 4:00 p.m. - 6:00 p.m.**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	36	↔	8%	77	↔	16%	104	↔	22%	257	↔	54%

Classification Definitions

1 Motorcycles
2 Passenger Cars (Auto)
3 2-Axle, 4-Tire Single Units (Auto)
4 Buses
5 2-Axle, 6-Tire Single Units (Med.)
6 3-Axle Single Units (Med.)
7 >= 4-Axle Single Units (Med.)
8 <= 4-Axle Single Trailers (Heavy)
9 5-Axle Single Trailers (Heavy)
10 >= 6-Axle Single Trailers (Heavy)
11 <= 5-Axle Multi-Trailers (Heavy)
12 6-Axle Multi-Trailers (Heavy)
13 >= 7-Axle Multi-Trailers (Heavy)

PANCHO ROAD (Howard Road → Pleasant Valley Road)

Day Measured: Tuesday
Date Measured: 11/27/2018

SOUTHBOUND														
Time	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**#13**	**Total**
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
5:00 AM	0	5	2	0	0	0	0	0	0	0	0	0	0	**7**
6:00 AM	0	89	14	1	8	0	0	0	1	0	0	0	0	**113**
7:00 AM	0	17	5	0	3	0	0	1	0	0	0	0	0	**26**
8:00 AM	1	16	5	0	7	1	0	0	0	0	0	0	0	**30**
9:00 AM	2	13	2	0	5	1	0	0	1	0	0	0	0	**24**
10:00 AM	0	19	1	0	3	1	0	0	2	0	0	0	0	**26**
11:00 AM	1	27	5	0	6	0	0	0	1	0	0	0	0	**40**
12:00 PM	1	32	9	0	3	1	0	0	1	0	0	0	0	**47**
1:00 PM	0	19	5	0	7	1	0	0	0	0	0	0	0	**32**
2:00 PM	0	21	3	1	2	0	0	0	0	0	0	0	0	**27**
3:00 PM	0	26	3	0	3	0	0	0	0	0	0	0	0	**32**
4:00 PM	0	17	3	0	4	0	0	0	0	0	0	0	0	**24**
5:00 PM	0	11	4	0	2	0	0	0	0	0	0	0	0	**17**
6:00 PM	0	11	2	0	0	0	0	0	0	0	0	0	0	**13**
7:00 PM	0	6	0	0	0	0	0	0	0	0	0	0	0	**6**
8:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
9:00 PM	0	2	0	0	0	0	0	1	0	0	0	0	0	**3**
10:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	**2**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Totals:	**5**	**335**	**64**	**2**	**53**	**5**	**0**	**2**	**6**	**0**	**0**	**0**	**0**	**472**
% of Totals	1%	71%	14%	0%	11%	1%	0%	0%	1%	0%	0%	0%	0%	100%

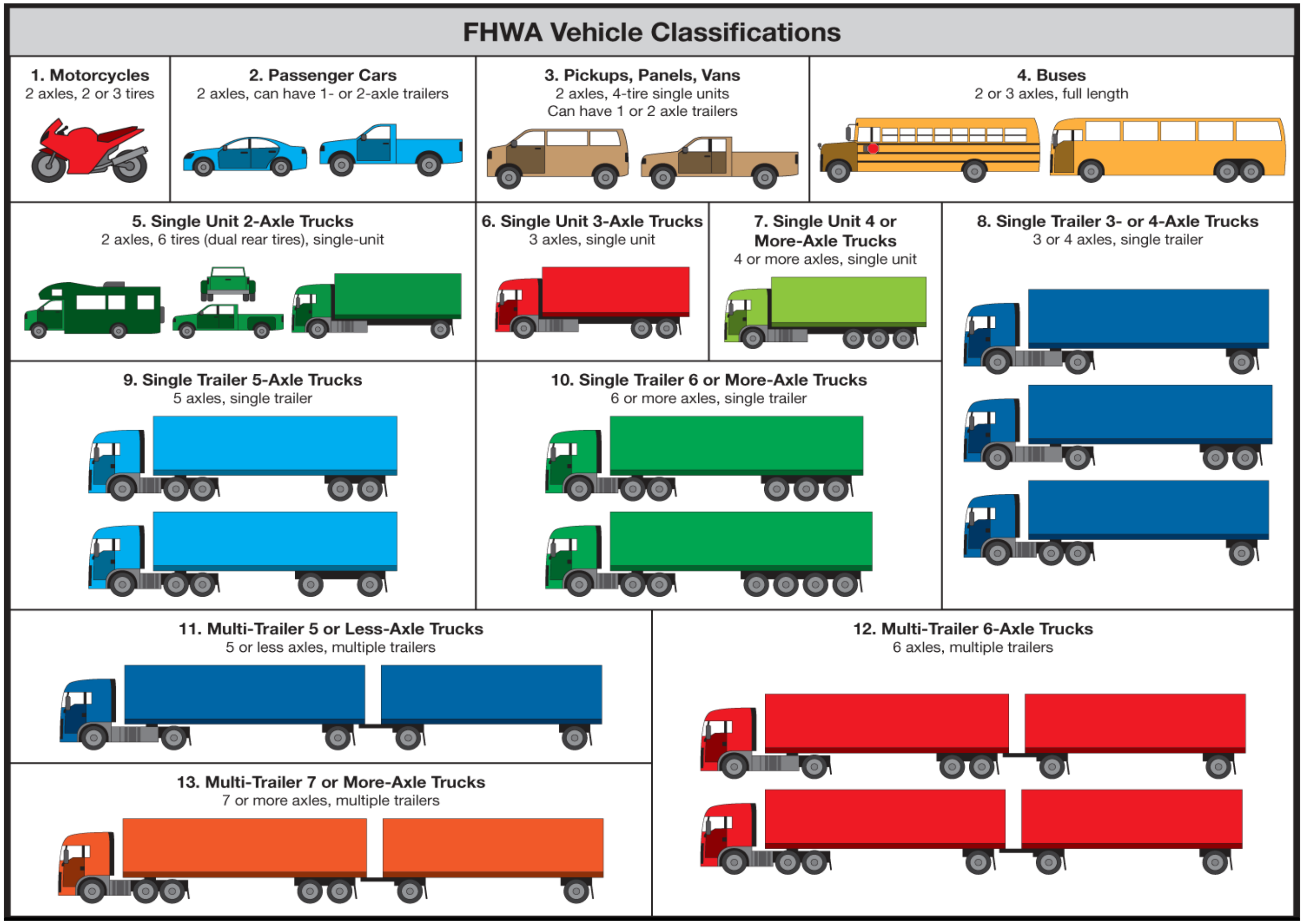
AM Volumes	4	187	34	1	32	3	0	1	5	0	0	0	0	267
% AM	1%	40%	7%	0%	7%	1%	0%	0%	1%	0%	0%	0%	0%	57%
AM Peak Hour	9:00 AM	6:00 AM	6:00 AM	6:00 AM	6:00 AM	8:00 AM	---	7:00 AM	10:00 AM	---	---	---	---	6:00 AM
Volume	2	89	14	1	8	1	---	1	2	---	---	---	---	118
PM Volumes	1	148	30	1	21	2	0	1	1	0	0	0	0	205
% PM	0%	31%	6%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	43%
PM Peak Hour	12:00 PM	12:00 PM	12:00 PM	2:00 PM	1:00 PM	12:00 PM	---	9:00 PM	12:00 PM	---	---	---	---	12:00 PM
Volume	1	32	9	1	7	1	---	1	1	---	---	---	---	53

Directional Peak Periods	**AM 7:00 a.m. - 9:00 a.m.**			**Noon 12:00 p.m. - 2:00 p.m.**			**PM 4:00 p.m. - 6:00 p.m.**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	56	↔	12%	79	↔	17%	41	↔	9%	296	↔	63%

Classification Definitions

1 Motorcycles
2 Passenger Cars (Auto)
3 2-Axle, 4-Tire Single Units (Auto)
4 Buses
5 2-Axle, 6-Tire Single Units (Med.)
6 3-Axle Single Units (Med.)
7 >= 4-Axle Single Units (Med.)
8 <= 4-Axle Single Trailers (Heavy)
9 5-Axle Single Trailers (Heavy)
10 >= 6-Axle Single Trailers (Heavy)
11 <= 5-Axle Multi-Trailers (Heavy)
12 6-Axle Multi-Trailers (Heavy)
13 >= 7-Axle Multi-Trailers (Heavy)

Vehicle Type Visual Guide



Existing/Baseline - Daytime (6:00 a.m. - 7:00 p.m.) Traffic Data													
				Actual Traffic Counts by Vehicle Type					Average Traffic Counts by Vehicle Type				
Roadway	Segment	Direction	Time	Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks	Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks
Pleasant Valley Road	Lewis Road → Pancho Road	eastbound	6:00 a.m.	1	0	753	37	3	1	1	628	37	3
			7:00 a.m.	2	3	872	50	2					
			8:00 a.m.	2	2	615	38	7					
			9:00 a.m.	1	2	432	35	0					
			10:00 a.m.	0	0	373	33	2					
			11:00 a.m.	1	1	398	26	4					
			12:00 p.m.	1	2	535	41	6					
			1:00 p.m.	0	4	527	38	2					
			2:00 p.m.	1	2	568	41	3					
			3:00 p.m.	2	1	888	45	1					
			4:00 p.m.	3	0	877	35	3					
			5:00 p.m.	1	2	736	32	3					
			6:00 p.m.	3	0	585	27	1					
		westbound	6:00 a.m.	3	0	440	12	0	1	1	625	19	1
			7:00 a.m.	1	1	701	21	0					
			8:00 a.m.	1	0	663	19	0					
			9:00 a.m.	1	0	410	13	1					
			10:00 a.m.	0	0	334	10	2					
			11:00 a.m.	2	0	361	13	1					
			12:00 p.m.	1	0	411	13	0					
			1:00 p.m.	1	1	444	15	1					
			2:00 p.m.	1	1	589	21	2					
			3:00 p.m.	4	2	995	33	1					
			4:00 p.m.	2	4	1,099	35	0					
			5:00 p.m.	2	2	1,103	26	0					
			6:00 p.m.	0	1	581	14	0					
	US 101 → Pancho Road	northbound	6:00 a.m.	0	0	533	18	3	0	0	717	26	2
			7:00 a.m.	0	1	916	28	0					
			8:00 a.m.	0	0	664	25	1					
			9:00 a.m.	0	1	462	29	1					
			10:00 a.m.	0	3	466	31	4					
			11:00 a.m.	0	1	540	23	1					
			12:00 p.m.	0	0	651	29	4					
			1:00 p.m.	0	0	598	27	2					
			2:00 p.m.	0	0	722	28	1					
			3:00 p.m.	1	0	951	31	0					
			4:00 p.m.	1	0	1,075	27	1					
			5:00 p.m.	1	0	1,056	20	1					
			6:00 p.m.	0	0	688	28	2					
		southbound	6:00 a.m.	1	0	620	33	0	1	1	636	37	1
			7:00 a.m.	2	3	860	60	2					
			8:00 a.m.	1	1	805	44	2					
			9:00 a.m.	1	1	493	25	1					
			10:00 a.m.	1	0	377	26	1					
			11:00 a.m.	1	1	434	22	1					
			12:00 p.m.	1	2	554	33	0					
			1:00 p.m.	1	2	538	30	2					
			2:00 p.m.	0	1	574	41	2					
			3:00 p.m.	1	1	750	41	0					
			4:00 p.m.	1	3	835	59	0					
			5:00 p.m.	0	1	843	37	2					
			6:00 p.m.	0	0	580	24	0					
Pancho Road / Howard Road	Pleasant Valley Road → Howard Road	northbound	6:00 a.m.	0	1	6	3	0	0	0	28	5	1
			7:00 a.m.	0	0	12	5	2					
			8:00 a.m.	0	0	12	4	1					
			9:00 a.m.	0	0	13	6	3					
			10:00 a.m.	0	0	11	4	2					
			11:00 a.m.	1	1	30	6	2					
			12:00 p.m.	1	0	43	2	2					
			1:00 p.m.	0	0	25	4	0					
			2:00 p.m.	0	1	53	8	0					
			3:00 p.m.	0	0	68	10	0					
			4:00 p.m.	0	1	67	7	0					
			5:00 p.m.	0	0	25	4	0					
			6:00 p.m.	0	0	5	2	0					
		southbound	6:00 a.m.	0	1	103	8	1	0	0	29	4	1
			7:00 a.m.	0	0	22	3	1					
			8:00 a.m.	1	0	21	8	0					
			9:00 a.m.	2	0	15	6	1					
			10:00 a.m.	0	0	20	4	2					
			11:00 a.m.	1	0	32	6	1					
			12:00 p.m.	1	0	41	4	1					
			1:00 p.m.	0	0	24	8	0					
			2:00 p.m.	0	1	24	2	0					
			3:00 p.m.	0	0	29	3	0					
			4:00 p.m.	0	0	20	4	0					
			5:00 p.m.	0	0	15	2	0					
			6:00 p.m.	0	0	13	0	0					

Day Measured: Tuesday
Date Measured: 11/27/2018

Baseline Traffic Summary - Evening

VRPA Technologies Inc.

Existing/Baseline - Evening Hours (7:00 p.m. - 10:00 p.m.) Traffic Data

Roadway	Segment	Direction	Time	Actual Traffic Counts by Vehicle Type					Average Traffic Counts by Vehicle Type				
				Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks	Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks
Pleasant Valley Road	Lewis Road → Pancho Road	eastbound	7:00 p.m.	2	0	305	10	0	1	0	256	7	0
			8:00 p.m.	0	0	261	7	0					
			9:00 p.m.	0	0	203	4	0					
		westbound	7:00 p.m.	0	0	223	7	0	0	0	177	4	0
			8:00 p.m.	0	0	161	3	0					
			9:00 p.m.	0	0	146	1	0					
	US 101 → Pancho Road	northbound	7:00 p.m.	0	0	407	9	0	0	0	281	7	0
			8:00 p.m.	0	0	236	7	0					
			9:00 p.m.	0	0	200	6	0					
		southbound	7:00 p.m.	0	0	277	12	0	0	0	227	9	0
			8:00 p.m.	0	0	203	8	0					
			9:00 p.m.	0	0	200	7	0					
Pancho Road	Pleasant Valley Road → Howard Road	northbound	7:00 p.m.	0	0	9	1	0	0	0	4	1	0
			8:00 p.m.	0	0	2	0	0					
			9:00 p.m.	0	0	0	2	0					
		southbound	7:00 p.m.	0	0	6	0	0	0	0	3	0	0
			8:00 p.m.	0	0	2	0	0					
			9:00 p.m.	0	0	2	0	1					

Day Measured: Tuesday
Date Measured: 11/27/2018

Baseline Traffic Summary - Nighttime

VRPA Technologies Inc.

Existing/Baseline - Nighttime (10:00 p.m. - 6:00 a.m.) Traffic Data													
				Actual Traffic Counts by Vehicle Type					Average Traffic Counts by Vehicle Type				
Roadway	Segment	Direction	Time	Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks	Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks
Pleasant Valley Road	Lewis Road → Pancho Road	eastbound	10:00 p.m.	0	0	88	0	0	0	0	130	4	0
			11:00 p.m.	0	0	54	1	0					
			12:00 a.m.	0	0	25	2	0					
			1:00 a.m.	0	0	29	0	0					
			2:00 a.m.	0	0	15	1	0					
			3:00 a.m.	0	0	45	2	0					
			4:00 a.m.	0	0	249	8	0					
			5:00 a.m.	0	0	534	18	0					
		westbound	10:00 p.m.	0	0	119	1	0	0	0	80	1	0
			11:00 p.m.	0	0	83	1	0					
			12:00 a.m.	0	1	84	1	0					
			1:00 a.m.	0	0	64	0	0					
			2:00 a.m.	0	0	54	0	0					
			3:00 a.m.	0	0	14	0	0					
			4:00 a.m.	0	0	43	1	0					
			5:00 a.m.	0	0	176	6	2					
	US 101 → Pancho Road	northbound	10:00 p.m.	0	0	104	1	1	0	0	96	3	0
			11:00 p.m.	0	0	57	2	0					
			12:00 a.m.	0	0	49	1	1					
			1:00 a.m.	0	0	37	0	0					
			2:00 a.m.	0	0	54	2	0					
			3:00 a.m.	0	0	27	0	1					
			4:00 a.m.	0	0	103	4	0					
			5:00 a.m.	0	1	339	12	0					
		southbound	10:00 p.m.	0	0	138	5	0	0	0	94	5	0
			11:00 p.m.	0	0	76	3	0					
			12:00 a.m.	0	0	31	2	1					
			1:00 a.m.	0	0	22	1	0					
			2:00 a.m.	0	0	20	4	0					
			3:00 a.m.	0	0	17	0	0					
			4:00 a.m.	0	0	141	6	0					
			5:00 a.m.	0	0	309	19	2					
Pancho Road	Pleasant Valley Road → Howard Road	northbound	10:00 p.m.	0	0	0	0	0	0	0	1	0	0
			11:00 p.m.	0	0	2	0	0					
			12:00 a.m.	0	0	0	0	0					
			1:00 a.m.	0	0	0	0	0					
			2:00 a.m.	0	0	0	0	1					
			3:00 a.m.	0	0	0	0	0					
			4:00 a.m.	0	0	0	0	0					
			5:00 a.m.	0	0	2	2	0					
		southbound	10:00 p.m.	0	0	2	0	0	0	0	1	0	0
			11:00 p.m.	0	0	0	0	0					
			12:00 a.m.	0	0	0	0	0					
			1:00 a.m.	0	0	0	0	0					
			2:00 a.m.	0	0	0	0	0					
			3:00 a.m.	0	0	0	0	0					
			4:00 a.m.	0	0	1	0	0					
			5:00 a.m.	0	0	7	0	0					

Day Measured: Tuesday
Date Measured: 11/27/2018

Community Equivalent Noise Level (CNEL) - Model Inputs

Baseline + Project Traffic Counts

Existing/Baseline - Facility Haul Truck/Traffic Data								
Parameter	Daily Limits - CUP 3817-3		Average Trips/Hour					
	Loads	One-Way Trip	Baseline[A]			Project[B]		
			Daytime	Evening	Nighttime	Daytime	Evening	Nighttime
Haul Trucks	60	120	13	---	---	5	5	5

Note: There are no proposed changes to existing daily CUP truck trip limit (i.e. 60 loads/day, 120 one-way trips/day)

A - Per the existing CUP, a maximum of 120 haul truck trips/day occur during the operating hours of 7:00 a.m. and 4:00 p.m. (9 hours total). To model baseline traffic noise impacts at haul road receptors, it is assumed that the maximum number of haul truck trips occurs (120 trips/day) spread evenly throughout each hour of the daytime operating hours (120 trips ÷ 9 hours = 13 trips/hour).

B - There are no proposed changes to existing CUP limit 120 truck trips/day. However, the Project involves limited 24 hour/day haul truck operations during special projects. To model Project traffic noise impacts at haul road receptors, it is assumed that the maximum number of haul truck trips occurs (120 trips/day) spread evenly throughout 24-hour daytime, evening, and nighttime operating hours (120 trips ÷ 24 hours = 5 trips/hour).

Daytime (7:00 a.m. - 7:00 p.m.) - CNEL Model											
Road Segment	Direction	BASELINE[C]					PROJECT[D]				
		Average Hourly Traffic Trip Counts					Average Hourly Traffic Trip Counts				
		Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks	Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks
Howard Road / Pancho Road	Northbound	0	0	28	5	14	0	0	28	5	19
	Southbound	0	0	29	4	14	0	0	29	4	19
	Eastbound	---	---	---	---	---	---	---	---	---	---
	Westbound	---	---	---	---	---	---	---	---	---	---
Pleasant Valley Road	Northbound	0	0	717	26	13	0	0	717	26	17
	Southbound	1	1	636	37	12	1	1	636	37	17
	Eastbound	1	1	628	37	5	1	1	628	37	6
	Westbound	1	1	625	19	3	1	1	625	19	3

Evening (7:00 p.m. - 10:00 p.m.) - CNEL Model											
Road Segment	Direction	BASELINE[C]					PROJECT[D]				
		Average Hourly Traffic Trip Counts					Average Hourly Traffic Trip Counts				
		Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks	Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks
Howard Road / Pancho Road	Northbound	0	0	4	1	0	0	0	4	1	5
	Southbound	0	0	3	0	0	0	0	3	0	5
	Eastbound	---	---	---	---	---	---	---	---	---	---
	Westbound	---	---	---	---	---	---	---	---	---	---
Pleasant Valley Road	Northbound	0	0	281	7	0	0	0	281	7	4
	Southbound	0	0	227	9	0	0	0	227	9	4
	Eastbound	1	0	256	7	0	1	0	256	7	1
	Westbound	0	0	177	4	0	0	0	177	4	1

Nighttime (10:00 p.m. - 7:00 a.m.) - CNEL Model											
Road Segment	Direction	BASELINE[C]					PROJECT[D]				
		Average Hourly Traffic Trip Counts					Average Hourly Traffic Trip Counts				
		Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks	Motorcycles	Buses	Automobiles	Medium Trucks	Heavy Trucks
Howard Road / Pancho Road	Northbound	0	0	1	0	0	0	0	1	0	5
	Southbound	0	0	1	0	0	0	0	1	0	5
	Eastbound	---	---	---	---	---	---	---	---	---	---
	Westbound	---	---	---	---	---	---	---	---	---	---
Pleasant Valley Road	Northbound	0	0	96	3	0	0	0	96	3	5
	Southbound	0	0	94	5	0	0	0	94	5	5
	Eastbound	0	0	130	4	0	0	0	130	4	1
	Westbound	0	0	80	1	0	0	0	80	1	1

C - Modeled baseline traffic data was collected by VRBA on 11/28/2018 (see previous sheets). To account for existing/permitted Pacific Rock Quarry haul truck activity during daytime hours (7:00 a.m. - 4:00 p.m.), the baseline daytime "Heavy Truck" traffic numbers were scaled up appropriately.

D - Modeled Project traffic data includes the baseline VRBA/Pacific Rock data, with the Project "Heavy Truck" totals scaled up appropriately to account for the new Project truck trips during the evening and nighttime hours.

Haul Route Noise Model - CNEL Results

Model Results + Impact Determination

Haul Route Receptors				
Receptor	**Description**	**Nearby Roadway**	**# of Floors**	**Existing Barriers**
R4	Residential Dwelling	Howard Road / Pancho Road	1	Front Yard Hedges/Trees
R5-A	Residential Dwelling	Pleasant Valley Road / Pancho Road	1	5-Foot Soundwall along Pleasant Valley Road
R5-B	Residential Dwelling	Pleasant Valley Road	1	5-Foot Soundwall along Pleasant Valley Road
R5-C	Residential Dwelling	Pleasant Valley Road	1	5-Foot Soundwall along Pleasant Valley Road

See Figures 3, 6, and 7 (Appendix A) which show the location of the receptors included in the SoundPLAN model.

CNEL Noise Levels @ Haul Route Receptors						
Receptor	**Baseline (dBA) Outdoor CNEL[B]**	**County Evening CNEL Fixed Significance Threshold[A]**	**Adjusted Evening CNEL Significance Threshold[A]**	**Total Project (dBA) Outdoor CNEL[B]**	**Applicable Evening CNEL Significance Threshold[A]**	**Exceed Threshold?**
R4	50.3	60	60	55.2	60	No
R5-A	59.7	60	62.7	61.1	62.7	No
R5-B	60.3	60	63.3	61.4	63.3	No
R5-C	61.3	60	64.3	61.6	64.3	No

As discussed on the previous sheet, it is assumed the permit limit of 120 trips would be spread evenly throughout the operating day.

Specifically, Project haul trucks would be limited to 5 loads (10 one-way trips) during the average daytime, evening, and nighttime hours.

CNEL Indoor Noise Levels @ Haul Route Receptors						
Receptor	**Baseline (dBA) Indoor CNEL[B, C]**	**County Evening CNEL Fixed Significance Threshold[A]**	**Adjusted Evening CNEL Significance Threshold[A]**	**Total Project (dBA) Indoor CNEL[B, C]**	**Applicable Evening CNEL Significance Threshold[A]**	**Exceed Threshold?**
R4	30.3	45	45	35.2	45	No
R5-A	39.7	45	45	41.1	45	No
R5-B	40.3	45	45	41.4	45	No
R5-C	41.3	45	45	41.6	45	No

As discussed on the previous sheet, it is assumed the permit limit of 120 trips would be spread evenly throughout the operating day.

Specifically, Project haul trucks would be limited to 5 loads (10 one-way trips) during the average daytime, evening, and nighttime hours.

Footnotes:

A - Per the Ventura County General Plan/CEQA Guidelines (see Appendix C), the outdoor "fixed" CNEL significance threshold is 60 dBA and the indoor "fixed" CNEL significance threshold is 45 dBA. However, as with the Facility tresholds, if the modeled ambient/baseline noise levels exceed the "fixed" threshold, the modeled "ambient noise level +3 decibels (dBA)" is utilized to determine the significance of haul route noise impacts. As shown above, the "ambient +3 dBA" CNEL threshold is utilized at Receptors R5-A, R5-B, and R5-C to determine the significance of outdoor noise impacts.

However, the "fixed" CNEL thresholds are utilized to determine the significance of outdoor noise impacts (60 dBA) at R4 and indoor impacts (45 dBA) at all receptors (R4, R5-A, R5-B, R5-C).

B - Both the baseline and Project traffic noise levels at haul route receptors were modeled in SoundPLAN Essential. See previous sheets which describes the methodologies and traffic counts input into both the baseline and Project traffic noise models. Please see Figure 6 (Appendix A) for the baseline model results and Figure 7 (Appendix A) for the Project traffic model results.

C - Based on the EPA's *Protective Noise Levels* document (March, 1974), an outdoor to indoor attenuation of 20 dBA is assumed. This takes into account the average noise reduction provided while windows are closed (25 dBA) and while windows are open (15 dBA). This is a conservatively low estimate of noise attenuation as residences are expected to generally keep windows closed, especially those facing sources of noise. The 20 dBA attenuation is applied to the baseline and Project CNEL values. See Appendix B for the applicable excerpt from the EPA guidance document.

Noise Emissions of Road Traffic

Statior km	ADT Veh/24	Traffic values Vehicles type	Vehicle name	day Veh/h	evenin Veh/h	night Veh/h	Speed km/h	Control device	Constr Speed km/h	Affect. veh. %	Road surface	Gradier Min / M %
Pancho (northbound)			Traffic direction: In entry direction									
0+00(	588	Total	-	47	5	1	-	none	-	-	OGAC (open-graded asphaltic	0.0
		Automobiles	-	28	4	1	8					
		Medium trucks	-	5	1	-	8					
		Heavy trucks	-	14	-	-	8					
		Buses	-	-	-	-	8					
		Motorcycles	-	-	-	-	8					
		Auxiliary Vehicle	-	-	-	-	8					
0+782	588	Total	-	47	5	1	-	none	-	-	DGAC (dense-graded asphaltic	0.0
		Automobiles	-	28	4	1	24					
		Medium trucks	-	5	1	-	24					
		Heavy trucks	-	14	-	-	24					
		Buses	-	-	-	-	24					
		Motorcycles	-	-	-	-	24					
		Auxiliary Vehicle	-	-	-	-	24					
1+486	588	Total	-	47	5	1	-	none	-	-	Average (of DGAC and PCC)	0.0
		Automobiles	-	28	4	1	48					
		Medium trucks	-	5	1	-	48					
		Heavy trucks	-	14	-	-	48					
		Buses	-	-	-	-	48					
		Motorcycles	-	-	-	-	48					
		Auxiliary Vehicle	-	-	-	-	48					
3+067	588	Total	-	47	5	1	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	28	4	1	72					
		Medium trucks	-	5	1	-	72					
		Heavy trucks	-	14	-	-	72					
		Buses	-	-	-	-	72					
		Motorcycles	-	-	-	-	72					
		Auxiliary Vehicle	-	-	-	-	72					
3+105	-							-	-	-	-	-
Pancho (southbound)			Traffic direction: In entry direction									
0+00(	582	Total	-	47	3	1	-	Traffic light	0.0	25.0	PCC (Portland cement concrete	0.0
		Automobiles	-	29	3	1	72					
		Medium trucks	-	4	-	-	72					
		Heavy trucks	-	14	-	-	72					
		Buses	-	-	-	-	72					
		Motorcycles	-	-	-	-	72					
		Auxiliary Vehicle	-	-	-	-	72					
0+032	582	Total	-	47	3	1	-	none	-	-	Average (of DGAC and PCC)	0.0
		Automobiles	-	29	3	1	48					
		Medium trucks	-	4	-	-	48					
		Heavy trucks	-	14	-	-	48					
		Buses	-	-	-	-	48					
		Motorcycles	-	-	-	-	48					
		Auxiliary Vehicle	-	-	-	-	48					
1+613	582	Total	-	47	3	1	-	none	-	-	DGAC (dense-graded asphaltic	0.0
		Automobiles	-	29	3	1	24					
		Medium trucks	-	4	-	-	24					
		Heavy trucks	-	14	-	-	24					
		Buses	-	-	-	-	24					
		Motorcycles	-	-	-	-	24					
		Auxiliary Vehicle	-	-	-	-	24					
2+323	582	Total	-	47	3	1	-	none	-	-	OGAC (open-graded asphaltic	0.0
		Automobiles	-	29	3	1	8					
		Medium trucks	-	4	-	-	8					
		Heavy trucks	-	14	-	-	8					
		Buses	-	-	-	-	8					
		Motorcycles	-	-	-	-	8					
		Auxiliary Vehicle	-	-	-	-	8					
3+106	-							-	-	-	-	-

Noise Emissions of Road Traffic

Station km	ADT Veh/24	Vehicles type	Vehicle name	Traffic values day Veh/h	evenin Veh/h	night Veh/h	Speed km/h	Control device	Constr Speed km/h	Affect. veh. %	Road surface	Gradient Min / M %
Pleasant (northbound)				Traffic direction: In entry direction								
0+000	10827	Total	-	756	288	99	-	Traffic light	0.0	25.0	PCC (Portland cement concrete	0.0
		Automobiles	-	717	281	96	80					
		Medium trucks	-	26	7	3	80					
		Heavy trucks	-	13	-	-	80					
		Buses	-	-	-	-	80					
		Motorcycles	-	-	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+104	10827	Total	-	756	288	99	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	717	281	96	80					
		Medium trucks	-	26	7	3	80					
		Heavy trucks	-	13	-	-	80					
		Buses	-	-	-	-	80					
		Motorcycles	-	-	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+790	-							-	-	-	-	-
Pleasant (southbound)				Traffic direction: In entry direction								
0+000	9843	Total	-	687	236	99	-	Stop sign	0.0	50.0	PCC (Portland cement concrete	0.0
		Automobiles	-	636	227	94	80					
		Medium trucks	-	37	9	5	80					
		Heavy trucks	-	12	-	-	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+193	9843	Total	-	687	236	99	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	636	227	94	80					
		Medium trucks	-	37	9	5	80					
		Heavy trucks	-	12	-	-	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+701	-							-	-	-	-	-
Pleasant (westbound)				Traffic direction: In entry direction								
0+000	9060	Total	-	649	181	81	-	Traffic light	0.0	25.0	PCC (Portland cement concrete	0.0
		Automobiles	-	625	177	80	80					
		Medium trucks	-	19	4	1	80					
		Heavy trucks	-	3	-	-	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+075	9060	Total	-	649	181	81	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	625	177	80	80					
		Medium trucks	-	19	4	1	80					
		Heavy trucks	-	3	-	-	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+795	-							-	-	-	-	-
Pleasant (eastbound)				Traffic direction: In entry direction								
0+000	10062	Total	-	672	264	134	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	628	256	130	80					
		Medium trucks	-	37	7	4	80					
		Heavy trucks	-	5	-	-	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	1	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+800	-							-	-	-	-	-

Receiver List

No.	Receiver name	Coordinates X (in meter)	Coordinates Y (in meter)	Building side	Floor	Height m	Limit Day dB(A)	Limit Evening dB(A)	Limit Night dB(A)	Limit Lden dB(A)	Level Day dB(A)	Level Evening dB(A)	Level Night dB(A)	Level Lden dB(A)	Conflict Day dB(A)	Conflict Evening dB(A)	Conflict Night dB(A)	Conflict Lden dB(A)
1	R4	314595.9	3785170		1.Fl	1.50	-	-	-	-	53.2	34.6	25.6	50.3	-	-	-	-
2	R5-A	314626.5	3786889		1.Fl	1.50	-	-	-	-	59.9	53.8	49.8	59.7	-	-	-	-
3	R5-B	314822.7	3787273		1.Fl	1.50	-	-	-	-	60.2	54.7	50.6	60.3	-	-	-	-
4	R5-C	314409.7	3786799		1.Fl	1.50	-	-	-	-	60.8	55.4	52.1	61.3	-	-	-	-

Contribution Levels of the Receivers

Source name	Lane	Level Day dB(A)	Level Evening dB(A)	Level Night dB(A)	Level Lden dB(A)
R3 1.Fl		53.2	34.6	25.6	50.3
Pancho (northbound)		51.7	34.0	23.4	48.8
Pancho (southbound)		47.9	21.1	16.4	44.9
Pleasant (eastbound)		23.3	18.4	15.0	24.0
Pleasant (northbound)		23.9	17.8	13.3	23.6
Pleasant (southbound)		23.8	17.1	13.7	23.6
Pleasant (westbound)		23.8	17.2	13.4	23.5
R4-A 1.Fl		59.9	53.8	49.8	59.7
Pancho (northbound)		41.8	24.1	12.8	38.9
Pancho (southbound)		41.9	18.3	13.5	39.0
Pleasant (eastbound)		46.5	41.8	38.7	47.5
Pleasant (northbound)		56.6	50.7	46.2	56.3
Pleasant (southbound)		55.8	49.8	46.2	55.9
Pleasant (westbound)		47.2	40.8	37.1	47.0
R4-B 1.Fl		60.2	54.7	50.6	60.3
Pancho (northbound)		34.0	15.2	3.4	31.1
Pancho (southbound)		31.9	7.2	2.4	28.9
Pleasant (eastbound)		34.5	29.0	25.7	35.0
Pleasant (northbound)		56.7	51.7	47.2	56.9
Pleasant (southbound)		57.6	51.5	47.9	57.6
Pleasant (westbound)		35.2	27.9	24.1	34.6
R4-C 1.Fl		60.8	55.4	52.1	61.3
Pancho (northbound)		39.0	19.3	7.6	36.1
Pancho (southbound)		37.6	13.2	8.5	34.6
Pleasant (eastbound)		57.4	52.7	49.7	58.5
Pleasant (northbound)		43.1	35.6	31.1	42.2
Pleasant (southbound)		41.8	34.2	30.7	41.1
Pleasant (westbound)		57.8	51.8	48.2	57.8

Spectra of the Receivers

No	Name	Floor	Time	50 H	63 H	80 H	100	125	160	200	250	315	400	500	630	800	1 kH	1 kH	2 kH	2 kH	2 kH	3 kH	4 kH	5 kH	6 kH	8 kH	10 k
1	R4	1.Fl	Day	25.4	31.7	36.5	39.4	41.2	42.7	43.5	43.2	40.1	36.0	37.7	38.4	40.3	41.1	40.9	39.0	39.2	40.4	40.5	38.5	35.7	35.1	32.1	28.0
			Even	11.4	16.8	20.5	22.5	23.0	24.1	24.0	21.8	21.0	21.7	22.9	24.0	21.8	22.3	21.0	21.4	20.8	19.0	17.0	14.5	11.5	10.7	7.6	3.8
			Night	1.9	9.1	13.1	14.9	15.7	16.1	15.8	11.3	11.2	11.7	13.0	14.4	12.0	13.3	11.9	11.9	10.3	8.0	5.6	2.4	-0.6	-1.4	-4.1	-7.3
			Lden	22.7	29.0	33.7	36.0	38.4	39.8	40.0	40.3	37.2	33.8	34.9	35.0	37.4	38.2	38.0	36.7	36.2	37.4	37.5	35.5	32.7	32.1	29.1	25.0
3	R5-B	1.Fl	Day	28.7	36.2	40.9	43.4	45.0	46.1	46.4	43.4	42.7	42.5	45.7	49.4	51.1	52.8	51.0	49.0	48.4	46.5	43.5	40.3	36.3	35.9	32.0	28.3
			Even	22.8	30.2	34.7	37.2	38.0	39.0	39.8	36.7	36.3	36.8	39.9	44.0	45.5	47.0	46.0	44.7	43.3	40.9	36.0	31.4	25.0	25.2	22.2	20.2
			Night	19.0	26.3	30.9	33.4	34.8	35.8	36.0	32.8	32.4	32.8	35.8	40.0	41.4	43.5	42.4	40.0	39.1	36.7	31.8	27.3	20.9	21.2	18.2	16.0
			Lden	28.7	36.1	40.8	43.3	44.8	45.8	46.1	43.0	42.4	42.5	45.0	49.0	51.2	53.1	51.9	50.0	48.7	46.5	42.7	39.0	34.4	34.1	30.9	27.2
2	R5-A	1.Fl	Day	29.7	37.1	42.0	44.7	46.3	47.3	47.5	44.4	43.3	42.1	44.0	47.8	49.5	51.0	51.0	49.7	47.7	46.3	44.5	40.8	37.5	37.0	33.0	29.0
			Even	24.1	31.1	35.0	38.0	39.5	40.3	40.4	36.9	36.1	35.7	38.0	42.0	43.0	46.2	45.7	44.8	42.3	39.0	36.0	30.3	24.0	24.4	21.4	19.2
			Night	20.0	27.1	31.0	34.0	35.5	36.3	36.4	32.8	32.0	31.7	34.0	38.1	39.7	42.2	41.7	40.7	38.2	35.5	31.9	26.2	20.0	20.4	17.4	15.1
			Lden	29.8	37.0	41.7	44.3	45.8	46.7	46.9	43.0	42.0	41.8	44.2	47.8	49.5	51.8	51.2	50.1	47.8	45.8	43.3	39.0	35.3	34.8	31.5	27.4
4	R5-C	1.Fl	Day	28.8	36.2	40.8	43.2	44.8	45.9	46.2	42.8	42.3	43.4	47.5	51.0	52.3	52.8	51.4	51.4	48.8	46.3	43.1	38.9	34.5	33.9	30.7	27.1
			Even	22.9	30.4	34.9	37.3	38.9	39.9	40.2	36.0	36.2	37.7	41.7	46.1	47.0	47.7	46.3	46.3	43.7	40.9	36.8	31.0	25.5	25.3	22.4	20.4
			Night	19.5	27.0	31.5	33.9	35.3	36.3	36.5	33.0	32.8	34.4	38.5	42.8	43.7	44.5	43.1	43.1	40.0	37.7	33.0	28.4	22.3	22.1	19.1	17.2
			Lden	29.0	36.4	40.9	43.4	44.9	45.9	46.2	42.8	42.4	43.7	47.8	52.0	52.9	53.5	52.1	52.1	49.5	46.8	43.2	38.5	33.4	32.9	29.8	26.9

MODEL OUTPUT FILES - ROAD NOISE (PROJECT)

Noise Emissions of Road Traffic

Statior km	ADT Veh/24	Vehicles type	Traffic values Vehicle name	day Veh/h	evenin Veh/h	night Veh/h	Speed km/h	Control device	Constr Speed km/h	Affect. veh. %	Road surface	Gradier Min / M %
Pancho (northbound)			Traffic direction: In entry direction									
0+000	552	Total	-	39	10	6	-	none	-	-	OGAC (open-graded asphaltic	0.0
		Automobiles	-	28	4	1	8					
		Medium trucks	-	5	1	-	8					
		Heavy trucks	-	6	5	5	8					
		Buses	-	-	-	-	8					
		Motorcycles	-	-	-	-	8					
		Auxiliary Vehicle	-	-	-	-	8					
0+782	552	Total	-	39	10	6	-	none	-	-	DGAC (dense-graded asphaltic	0.0
		Automobiles	-	28	4	1	24					
		Medium trucks	-	5	1	-	24					
		Heavy trucks	-	6	5	5	24					
		Buses	-	-	-	-	24					
		Motorcycles	-	-	-	-	24					
		Auxiliary Vehicle	-	-	-	-	24					
1+486	552	Total	-	39	10	6	-	none	-	-	Average (of DGAC and PCC)	0.0
		Automobiles	-	28	4	1	48					
		Medium trucks	-	5	1	-	48					
		Heavy trucks	-	6	5	5	48					
		Buses	-	-	-	-	48					
		Motorcycles	-	-	-	-	48					
		Auxiliary Vehicle	-	-	-	-	48					
3+067	552	Total	-	39	10	6	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	28	4	1	72					
		Medium trucks	-	5	1	-	72					
		Heavy trucks	-	6	5	5	72					
		Buses	-	-	-	-	72					
		Motorcycles	-	-	-	-	72					
		Auxiliary Vehicle	-	-	-	-	72					
3+105	-							-	-	-	-	-
Pancho (southbound)			Traffic direction: In entry direction									
0+000	546	Total	-	39	8	6	-	Traffic light	0.0	25.0	PCC (Portland cement concrete	0.0
		Automobiles	-	29	3	1	72					
		Medium trucks	-	4	-	-	72					
		Heavy trucks	-	6	5	5	72					
		Buses	-	-	-	-	72					
		Motorcycles	-	-	-	-	72					
		Auxiliary Vehicle	-	-	-	-	72					
0+032	546	Total	-	39	8	6	-	none	-	-	Average (of DGAC and PCC)	0.0
		Automobiles	-	29	3	1	48					
		Medium trucks	-	4	-	-	48					
		Heavy trucks	-	6	5	5	48					
		Buses	-	-	-	-	48					
		Motorcycles	-	-	-	-	48					
		Auxiliary Vehicle	-	-	-	-	48					
1+613	546	Total	-	39	8	6	-	none	-	-	DGAC (dense-graded asphaltic	0.0
		Automobiles	-	29	3	1	24					
		Medium trucks	-	4	-	-	24					
		Heavy trucks	-	6	5	5	24					
		Buses	-	-	-	-	24					
		Motorcycles	-	-	-	-	24					
		Auxiliary Vehicle	-	-	-	-	24					
2+323	546	Total	-	39	8	6	-	none	-	-	OGAC (open-graded asphaltic	0.0
		Automobiles	-	29	3	1	8					
		Medium trucks	-	4	-	-	8					
		Heavy trucks	-	6	5	5	8					
		Buses	-	-	-	-	8					
		Motorcycles	-	-	-	-	8					
		Auxiliary Vehicle	-	-	-	-	8					
3+106	-							-	-	-	-	-

Noise Emissions of Road Traffic

Station km	ADT Veh/24	Vehicles type	Vehicle name	Traffic values day Veh/h	evenin Veh/h	night Veh/h	Speed km/h	Control device	Constr Speed km/h	Affect. veh. %	Road surface	Gradier Min / M %
Pleasant (northbound)		Traffic direction: In entry direction										
0+000	10800	Total	-	749	292	104	-	Traffic light	0.0	25.0	PCC (Portland cement concrete	0.0
		Automobiles	-	717	281	96	80					
		Medium trucks	-	26	7	3	80					
		Heavy trucks	-	6	4	5	80					
		Buses	-	-	-	-	80					
		Motorcycles	-	-	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+104	10800	Total	-	749	292	104	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	717	281	96	80					
		Medium trucks	-	26	7	3	80					
		Heavy trucks	-	6	4	5	80					
		Buses	-	-	-	-	80					
		Motorcycles	-	-	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+790	-							-	-	-	-	-
Pleasant (southbound)		Traffic direction: In entry direction										
0+000	9816	Total	-	680	240	104	-	Stop sign	0.0	50.0	PCC (Portland cement concrete	0.0
		Automobiles	-	636	227	94	80					
		Medium trucks	-	37	9	5	80					
		Heavy trucks	-	5	4	5	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+193	9816	Total	-	680	240	104	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	636	227	94	80					
		Medium trucks	-	37	9	5	80					
		Heavy trucks	-	5	4	5	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+701	-							-	-	-	-	-
Pleasant (westbound)		Traffic direction: In entry direction										
0+000	9048	Total	-	647	182	82	-	Traffic light	0.0	25.0	PCC (Portland cement concrete	0.0
		Automobiles	-	625	177	80	80					
		Medium trucks	-	19	4	1	80					
		Heavy trucks	-	1	1	1	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+075	9048	Total	-	647	182	82	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	625	177	80	80					
		Medium trucks	-	19	4	1	80					
		Heavy trucks	-	1	1	1	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	-	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+795	-							-	-	-	-	-
Pleasant (eastbound)		Traffic direction: In entry direction										
0+000	10062	Total	-	671	265	135	-	none	-	-	PCC (Portland cement concrete	0.0
		Automobiles	-	628	256	130	80					
		Medium trucks	-	37	7	4	80					
		Heavy trucks	-	4	1	1	80					
		Buses	-	1	-	-	80					
		Motorcycles	-	1	1	-	80					
		Auxiliary Vehicle	-	-	-	-	80					
0+800	-							-	-	-	-	-

Receiver List

No.	Receiver name	Coordinates X	Coordinates Y	Buildir side	Floor	Heigl	Limit Day	Limit Evenir	Limit Night	Limit Lden	Level Day	Level Evenir	Level Night	Level Lden	Conflict Day	Conflict Evenir	Conflict Night	Conflict Lden
		in meter				m	dB(A)				dB(A)				dB(A)			
1	R4	314595.9	3785170		1.Fl	1.50	-	-	-	-	50.0	48.5	48.3	55.2	-	-	-	-
2	R5-A	314626.5	3786889		1.Fl	1.50	-	-	-	-	59.1	55.2	53.1	61.1	-	-	-	-
3	R5-B	314822.7	3787273		1.Fl	1.50	-	-	-	-	59.7	55.6	53.1	61.4	-	-	-	-
4	R5-C	314409.7	3786799		1.Fl	1.50	-	-	-	-	60.6	55.8	52.9	61.6	-	-	-	-

Contribution Levels of the Receivers

Source name	Lane	Level Day dB(A)	Evening	Night	Lden
R3 1.Fl		50.0	48.5	48.3	55.2
Pancho (northbound)		48.5	47.0	46.8	53.7
Pancho (southbound)		44.6	43.2	43.1	50.0
Pleasant (eastbound)		23.2	18.7	15.6	24.3
Pleasant (northbound)		23.1	19.3	17.3	25.3
Pleasant (southbound)		23.0	18.8	17.4	25.2
Pleasant (westbound)		23.4	18.0	15.0	24.0
R4-A 1.Fl		59.1	55.2	53.1	61.1
Pancho (northbound)		38.6	37.1	36.9	43.8
Pancho (southbound)		38.7	37.0	37.0	43.9
Pleasant (eastbound)		46.4	42.0	39.1	47.7
Pleasant (northbound)		55.8	52.1	49.9	57.9
Pleasant (southbound)		55.2	51.0	49.1	57.1
Pleasant (westbound)		46.8	41.6	38.7	47.6
R4-B 1.Fl		59.7	55.6	53.1	61.4
Pancho (northbound)		30.8	29.4	29.3	36.1
Pancho (southbound)		28.7	27.0	27.0	33.9
Pleasant (eastbound)		34.3	29.6	26.9	35.5
Pleasant (northbound)		56.3	52.3	49.0	57.6
Pleasant (southbound)		56.9	52.8	50.8	58.9
Pleasant (westbound)		34.3	29.6	27.4	35.8
R4-C 1.Fl		60.6	55.8	52.9	61.6
Pancho (northbound)		35.7	34.4	34.3	41.2
Pancho (southbound)		34.4	32.8	32.8	39.6
Pleasant (eastbound)		57.3	52.9	50.1	58.6
Pleasant (northbound)		41.7	38.3	37.2	44.7
Pleasant (southbound)		40.5	36.9	36.0	43.5
Pleasant (westbound)		57.6	52.2	49.0	58.1

Spectra of the Receivers

No	Name	Floor	Time	50 H	63 H	80 H	100	125	160	200	250	315	400	500	630	800	1 kH	1 kH	2 kH	2 kH	2 kH	3 kH	4 kH	5 kH	6 kH	8 kH	10 k
1	R4	1.Fl	Day	23.	29.	33.	36.	38.	39.	40.	39.	37.	34.	35.	35.	37.	38.	37.	36.	36.	37.	37.	35.	32.	31.	28.	24.
			Even	19.	26.	31.	34.	36.	38.	38.	38.	35.	31.	32.	33.	35.	36.	36.	34.	34.	35.	35.	33.	31.	30.	27.	23.
			Night	19.	26.	31.	34.	36.	37.	38.	38.	35.	31.	32.	32.	35.	36.	36.	34.	34.	35.	35.	33.	31.	30.	27.	23.
			Lden	26.	33.	38.	41.	43.	44.	45.	45.	42.	38.	39.	40.	42.	43.	43.	41.	41.	42.	42.	40.	37.	37.	34.	30.
3	R5-B	1.Fl	Day	28.	35.	40.	42.	44.	45.	45.	42.	41.	42.	45.	49.	50.	52.	51.	49.	48.	45.	42.	38.	33.	33.	30.	26.
			Even	23.	31.	36.	38.	40.	41.	41.	38.	37.	37.	41.	44.	46.	48.	47.	45.	44.	42.	38.	35.	31.	31.	27.	23.
			Night	21.	29.	34.	36.	38.	39.	39.	36.	35.	35.	38.	42.	44.	45.	44.	41.	41.	39.	37.	35.	31.	31.	27.	22.
			Lden	29.	37.	42.	44.	46.	47.	47.	44.	44.	43.	46.	50.	52.	53.	52.	50.	49.	47.	45.	42.	38.	38.	34.	30.
2	R5-A	1.Fl	Day	29.	36.	41.	43.	45.	46.	46.	43.	42.	41.	43.	47.	48.	51.	50.	49.	47.	45.	42.	38.	34.	34.	31.	26.
			Even	25.	32.	37.	39.	41.	42.	42.	39.	38.	37.	39.	43.	44.	47.	46.	45.	43.	41.	39.	35.	32.	32.	28.	24.
			Night	22.	30.	35.	38.	39.	40.	41.	38.	37.	35.	38.	40.	42.	44.	43.	42.	40.	40.	39.	35.	33.	32.	29.	24.
			Lden	30.	38.	43.	46.	47.	48.	48.	46.	44.	43.	46.	49.	50.	52.	52.	50.	48.	47.	46.	42.	39.	39.	35.	31.
4	R5-C	1.Fl	Day	28.	35.	40.	42.	44.	45.	45.	42.	41.	43.	47.	51.	52.	52.	51.	51.	48.	46.	42.	37.	33.	32.	29.	26.
			Even	23.	31.	35.	38.	39.	40.	41.	37.	37.	38.	42.	46.	47.	47.	46.	46.	44.	41.	38.	33.	29.	28.	25.	22.
			Night	20.	28.	33.	35.	36.	38.	38.	35.	34.	35.	39.	43.	44.	44.	43.	43.	41.	38.	36.	32.	28.	27.	24.	20.
			Lden	29.	37.	41.	44.	45.	46.	47.	43.	43.	44.	48.	52.	53.	53.	52.	52.	49.	47.	44.	40.	35.	35.	31.	28.

APPENDIX F

BLASTING VIBRATION IMPACT DETERMINATION

Blasting Vibration Impacts

Blasting Vibration

Based on the 17th Edition ISEE *Blasters Handbook* (1998), Cleveland Ohio, for average ground response.

$$PPV = 160\left(\frac{D}{\sqrt{W}}\right)^{-1.6}$$

Receptor:	R1	R2-A	R2-B	R3-C	R3	
D = distance from blast to structure:	1,165	1,211	1,266	943	390	feet
W = maximum lbs explosives/delay:	110	110	110	110	110	lbs
PPV = peak particle velocity:	0.085	0.080	0.075	0.120	0.492	in/sec
Significance Threshold (PPV):	0.50	0.50	0.50	0.50	0.50	
Significant?	No	No	No	No	No	

Vibration Significance Thresholds

Vibration Structure Damage	
Category	**PPV (in/sec)**
Equivalent to jumping on the floor:	0.3
Equivalent to door slam:	0.5
Equivalent to nail driving:	0.9
No damaged to a residential structure:	< 2.0
Probable damage to a residential structure:	> 4.0

Human Response to Blasting Vibration	
Average Human Response	**PPV (in/sec)**
Barely to distinctly perceptible:	0.02 - 0.10
Distinctly to strongly perceptible:	0.1 - 0.5
Strongly perceptible to mildly unpleasant:	0.5 - 1.0
Mildly to distinctly unpleasant:	1.0 - 2.0
Distinctly unpleasant to intolerable:	2.0 - 1.0

Source: Caltrans *Transportation and Construction Vibration Guidance Manual* (September 2013)

APPENDIX F-1

PACIFIC ROCK QUARRY EXPANSION PROJECT
TRANSPORTATION IMPACT STUDY

BENCHMARK RESOURCES

Pacific Rock Quarry Expansion Project

Transportation Impact Study
May 2020

Prepared for:
BENCHMARK RESOURCES
2515 East Bidwell Street
Folsom, California 95630

Prepared by:
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Pacific Rock Quarry Expansion Project
Transportation Impact Study

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Executive Summary

This Transportation Impact Study (TIS) has been prepared for the purpose of analyzing transportation-related impacts associated with the proposed Pacific Rock Quarry Expansion Project (Project) to support the County's preparation of an Environmental Impact Report (EIR) for the Project for compliance with the California Environmental Quality Act (CEQA).

Pacific Rock, Inc. (Applicant) is requesting an amendment to the existing conditional use permit (CUP) and approved reclamation plan to extend the life of the existing mining operation by an additional 30 years, expand the mining area, extend the operational days from 6 to 7 days per week (adding Sunday for material load out) with additional material load out hours and limited extended 24 hour operations (60 days maximum per year), extend the daily hours of operation (for materials hauling) from the currently permitted 7:00 AM to 4:00 PM to the proposed 5:30 AM to 10:00 PM, allow construction and mobile mining equipment in outdoor storage areas, allow concrete and asphalt recycling, allow for imported material to be used as reclamation fill, and replace an existing mobile home to be used as a 24-hour security trailer.

Although the Applicant does not propose a change in the daily number of permitted loads of aggregate that can be hauled from the site (60 loads), the Project would expand the permitted hours and days of operation and would permit other changes in operations that would create the potential for increased haul truck and worker trips as compared to existing/baseline conditions.

This TIS includes an evaluation of the Project effects on traffic delay on public roads. Traffic delay has been a traditional measure of project traffic impacts under CEQA for several decades, but recent changes to CEQA direct public agencies to no longer consider traffic delay as a CEQA impact. The CEQA Guidelines were amended in December 2018 as a result of amendments to the CEQA statute pursuant to Senate Bill 743 (SB 743) of 2013. Except as provided for certain transportation-related projects, Section 15064.3 of the CEQA Guidelines directs that a project's effect on automobile delay *shall not constitute a significant environmental impact*. CEQA Guidelines Section 15064.3 describes specific considerations for evaluating a project's transportation impacts and advises that vehicle miles traveled (VMT) is generally the most appropriate measure of transportation impacts. These amendments to CEQA and the CEQA Guidelines change the way that transportation studies must be conducted for environmental documents. Traffic delay-based metrics such as roadway capacity and level of service performance measures that have traditionally been used to assess transportation impacts of projects under CEQA must be replaced by new performance measures such as VMT or other similar measures. July 1, 2020 is the statewide date by which implementation of VMT or other similar metric must be used for transportation impact analysis, however, agencies may opt-in use of new metrics prior to that date.

Notwithstanding these recent changes to CEQA, the traffic operations analysis in this TIS uses the traditional practice of measuring delay, vehicle/capacity ratios, and levels of service for informational purposes. Ultimately, the County will determine the proper characterization of this information in the EIR for consideration by decisionmakers. For instance, the County may elect to use this analysis as a means of considering the Project consistency with local agency General Plan goals and objectives associated with traffic operations, but without correlating traffic congestion to a CEQA impact. Thus, although Project effects on traffic delay are presented in this TIS, these effects should not be interpreted as an environmental "impact" under CEQA.

At the time of preparation of this TIS, Ventura County is considering VMT analysis methodologies and significance thresholds for CEQA review of projects within the County; however, the County has not yet adopted, and is not yet required under CEQA to adopt or implement, a transportation impact evaluation approach using VMT or similar metric as an alternative to the congestion-based analysis discussed above. This TIS does not include an evaluation of VMT associated with the Project; however, it is anticipated that the County will prepare and include an estimate of Project-related VMT in the EIR for the purposes of disclosure and in consideration of the intent of SB 743 and CEQA Guidelines.

TRAFFIC OPERATIONS SUMMARY

Project Trip Generation

The Project would generate up to 30 truckloads (resulting in 60 one-way trips) per hour during AM peak hours and up to 15 truckloads per hour (resulting 30 one-way trips) during PM peak hours. This study evaluates the Project as if all trips associated with haul trucks during the AM peak-hour period would be new trips that do not currently occur under baseline conditions. A "Passenger Car Equivalent" (PCE) factor of 2.5 is applied to Project truck trips. The Project is also expected to generate up to 12 worker trips during the AM and PM peak hours. Supply and equipment delivery trips are anticipated to be minimal and would not be expected to have a measurable influence on traffic operations.

Study Area and Evaluation Scenarios

This TIS evaluates traffic operations within a study area that includes four signalized intersections along Pleasant Valley Road (Lewis Road, Pancho Road, US 101 southbound ramps, and US 101 northbound ramps) and five road segments including two segments on Pancho Road, two segments on Pleasant Valley Road, and one segment of Santa Rosa Road. Each study location is evaluated for potential effects on traffic operations during the AM peak period and the PM peak period. In consideration of level of service standards of jurisdiction agencies (including Ventura County, the City of Camarillo, and California Department of Transportation [Caltrans]), level of service (LOS) "C" is considered the lowest acceptable level of service.

The following three scenarios are evaluated, each for conditions without and with the Project:

- Existing Conditions

- Existing Plus Approved/Pending Projects
- Year 2030

Ventura County Traffic Impact Mitigation Fee Program and Ventura County-City of Camarillo Reciprocal Agreement

Ventura County has a Traffic Impact Mitigation Fee (TIMF) program established to collect fees from planned development projects for use in maintaining and improving County roads. The County also has a reciprocal agreement with the City of Camarillo through which the County and City have agreed to require development projects to pay traffic impact fees to the respective jurisdictions when projects would be located in one jurisdiction but would result in trips within the other jurisdiction. Because the study area roads are located within the City of Camarillo, it may be appropriate for the Project to provide funding toward both the County and the City of Camarillo's traffic mitigation fee programs. However, a determination of the specific traffic mitigation fee requirements of the Project is beyond the scope of this TIS.

Intersection Operations

Table E-1 summarizes the results of the traffic operations analysis at study area intersections for the evaluation scenarios. Results of the analysis show that the addition of Project-related trips to Existing Conditions would not cause or contribute to LOS D or worse conditions at study area intersections. However, the addition of Project-related trips to Existing Plus Approved/Pending Projects and Cumulative Year 2030 Without Project conditions on study area intersections would contribute to LOS D or worse conditions.

Table E-1
Intersection Operations

INTERSECTION	CONTROL	PEAK HOUR	EXISTING		EXISTING PLUS PROJECT		EXISTING PLUS APPROVED/ PENDING		EXISTING PLUS APPROVED/ PENDING PLUS PROJECT		CUMULATIVE YEAR 2030 WITHOUT PROJECT		CUMULATIVE YEAR 2030 PLUS PROJECT	
			ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS
1. Lewis Road / Pleasant Valley Road	Signalized	AM	62.4	B	62.6	B	63.8	B	64.2	C	77.9	D	78.3	D
		PM	65.4	C	65.8	C	66.3	C	66.7	C	80.2	D	80.6	D
2. Pancho Road / Pleasant Valley Road	Signalized	AM	58.5	B	61.3	B	60.0	B	62.8	B	69.5	C	72.3	C
		PM	60.8	B	63.2	B	62.0	B	64.4	C	66.8	C	69.2	C
3. US Route 101 SB Ramps / Pleasant Valley Road	Signalized	AM	77.8	D *	77.8	D *	86.5	E	86.5	E	102.8	G	102.8	G
		PM	62.0	B	62.7	B	69.8	C	69.8	C	98.1	F	98.1	F
4. US Route 101 NB Off Ramp / Pleasant Valley Road	Signalized	AM	47.4	A	47.8	A	53.2	A	53.3	A	69.4	C	69.4	C
		PM	54.2	A	55.6	B	56.6	B	58.0	B	69.5	C	69.5	C

ICU = Intersection Capacity Utilization (expressed as a percentage)
For signalized controlled intersections, the LOS is based on the ICU method.
* Existing State highway facility is operating at less than the target LOS; the existing MOE shall be maintained.
Project contributes to LOS D or worse (excluding U.S. 101 SB Ramps)*

Queuing Analysis

Table E-2 provides a queue length summary for left and right turn lanes at the study intersections for various study scenarios. The queuing analysis presented in this TIS is provided for informational purposes only and does not represent a CEQA impact.

Segments

Results of the study area roadway segment analysis are reflected in Table E-3. The performance criteria used for evaluating volumes and capacities on the road and highway system for this study were estimated using the Modified Arterial Level of Service Tables included in Appendix A. Results of the analysis show that the Project would contribute to existing deficient levels of service (LOS D or worse) on two segments of Pleasant Valley Road, one segment of Santa Rosa Road, and one segment of Pancho Road, and the Project would cause a deficient level of service (LOS D) on the northbound segment of Pancho Road between Calle Quetzal and Pleasant Valley Road during the AM peak hour. The Project would also contribute to unacceptable levels of service on these road segments and the study area segment of Santa Rosa Road.

Table E-2
Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		EXISTING CONDITIONS		EXISTING PLUS PROJECT		EXISTING PLUS APPROVED/ PENDING		EXISTING PLUS APPROVED/ PENDING PLUS PROJECT		CUMULATIVE YEAR 2030 WITHOUT PROJECT		CUMULATIVE YEAR 2030 PLUS PROJECT	
			AM Queue	PM Queue	AM Queue	PM Queue	AM Queue	PM Queue	AM Queue	PM Queue	AM Queue	PM Queue	AM Queue	PM Queue
Lewis Road / Pleasant Valley Road	NB Left	600	42	74	42	74	42	74	42	74	53	89	53	89
	NB Right	600	214	378	218	379	217	380	220	382	303	540	306	542
	SB Left	150	109	101	113	103	109	101	113	103	**176**	111	**188**	113
	SB Right	275	170	224	170	224	203	239	203	239	208	262	208	262
	EB Left	2 @ 175	172	171	172	171	179	198	179	198	197	215	197	215
	EB Right	150	15	14	15	14	15	14	15	14	25	26	25	26
	WB Left	2 @ 200	333	266	337	268	345	282	348	283	**532**	308	**535**	310
	WB Left	175	**185**	**224**	**188**	**226**	**185**	**224**	**188**	**226**	**203**	**247**	**207**	**248**
Pancho Road / Pleasant Valley Road	NB Left	2 @ 50	62	**368**	71	**378**	73	**373**	82	**382**	**110**	**393**	**119**	**403**
	NB Right	200	62	**321**	115	**353**	70	**326**	123	**358**	97	**358**	150	**391**
	SB Left	100	22	8	22	8	22	8	22	8	27	12	27	12
	EB Left	225	9	22	9	22	9	22	9	22	14	28	14	28
	WB Left	2 @ 350	245	53	304	79	255	62	314	88	323	76	383	103
US 101 SB Ramps / Pleasant Valley Road	SB Left	125	14	8	14	8	14	8	14	8	18	21	18	21
	SB Right	1075	658	436	658	436	741	519	741	519	903	788	903	788
	EB Left	2 @ 100	**703**	**711**	**703**	**711**	**779**	**773**	**779**	**773**	**910**	**1023**	**910**	**1023**
	EB Right	125	**148**	82	**162**	88	**149**	88	**163**	95	**178**	97	**192**	103
	WB Left	50	3	9	3	9	3	9	3	9	3	10	3	10
US 101 NB Off Ramp / Pleasant Valley Road	WB Left	350	202	343	245	**363**	203	349	247	**370**	321	**383**	**364**	**404**
	WB Right	2 @ 200	350	**495**	350	**495**	**428**	**564**	**428**	**564**	**590**	**631**	**590**	**631**

Queue is measured in feet / **BOLD** denotes exceedance

Table E-3
Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	PEAK HOUR	DIRECTION	EXISTING		EXISTING PLUS PROJECT		EXISTING PLUS APPROVED/ PENDING		EXISTING PLUS APPROVED/ PENDING PLUS PROJECT		CUMULATIVE YEAR 2030 WITHOUT PROJECT		CUMULATIVE YEAR 2030 PLUS PROJECT	
				VOLUME	LOS	VOLUME	LOS	VOLUME	LOS	VOLUME	LOS	VOLUME	LOS	VOLUME	LOS
Pleasant Valley Road															
Lewis Road to Pancho Road	2 Lanes Divided	AM	EB	1,070	C	1,089	C	1,101	C	1,117	C	**1,313**	**D**	**1,329**	**D**
		PM	EB	972	C	978	C	994	C	1,000	C	**1,238**	**D**	**1,244**	**D**
	2 Lanes Divided	AM	WB	966	C	977	C	1,003	C	1,014	C	**1,283**	**D**	**1,294**	**D**
		PM	WB	**1,365**	**D**	**1,376**	**D**	**1,410**	**D**	**1,421**	**D**	**1,517**	**D**	**1,528**	**D**
Pancho Road to US 101 SB Ramps	2 Lanes Divided	AM	NB	1,149	C	1,213	C	1,198	C	**1,262**	**D**	**1,266**	**D**	**1,330**	**D**
		PM	NB	**1,240**	**D**	**1,279**	**D**	**1,276**	**D**	**1,315**	**D**	**1,377**	**D**	**1,416**	**D**
	2 Lanes Divided	AM	SB	1,043	C	1,114	C	1,078	C	1,149	C	**1,249**	**D**	**1,320**	**D**
		PM	SB	1,085	C	1,117	C	1,137	C	1,169	C	**1,245**	**D**	**1,277**	**D**
Santa Rosa Road															
US 101 NB Ramps to Adolfo Road	3 Lanes Divided	AM	NB	1,819	C	1,823	C	**2,038**	**D**	**2,042**	**D**	**2,312**	**D**	**2,316**	**D**
		PM	NB	**2,069**	**D**	**2,073**	**D**	**2,254**	**D**	**2,258**	**D**	**2,612**	**F**	**2,616**	**F**
	3 Lanes Divided	AM	SB	**2,355**	**D**	**2,361**	**D**	**2,570**	**F**	**2,576**	**F**	**3,231**	**F**	**3,237**	**F**
		PM	SB	1,787	C	1,789	C	**2,017**	**D**	**2,019**	**D**	**2,886**	**F**	**2,888**	**F**
Pancho Road															
Pleasant Valley Road to Calle Quetzal	1 Lane Undivided	AM	NB	150	C	**225**	**D**	173	C	**248**	**D**	**250**	**D**	**325**	**D**
		PM	NB	**831**	**E**	**880**	**E**	**842**	**E**	**891**	**F**	**908**	**F**	**957**	**F**
	1 Lane Undivided	AM	SB	**450**	**D**	**537**	**D**	**465**	**D**	**552**	**D**	**668**	**E**	**755**	**E**
		PM	SB	140	C	178	C	161	C	**199**	**D**	**268**	**D**	**306**	**D**
Calle Quetzal to Howard Road	1 Lane Undivided	AM	NB	19	C	94	C	19	C	94	C	69	C	144	C
		PM	NB	75	C	125	C	75	C	125	C	114	C	164	C
	1 Lane Undivided	AM	SB	30	C	117	C	30	C	117	C	90	C	177	C
		PM	SB	24	C	62	C	24	C	62	C	88	C	126	C

BOLD denotes LOS standard has been exceeded.
Project causes LOS D.
Project contributes to LOS D or worse.

SUMMARY OF TRANSPORTATION IMPACTS

Appendix G of the CEQA Guidelines and the County's April 26, 2011, Initial Study Assessment Guidelines (ISAG) identify certain transportation-related topics for consideration during CEQA review. These issues include potential policy or land use plan conflicts, potential impacts associated with safety on public roads and private access driveways, potential impacts on bicycle and pedestrian circulation and safety, and potential impacts on transit operations.[3] Each of these is discussed the sections below and in Section 4.0 of this TIS. (As discussed in the introduction, CEQA and the CEQA Guidelines as amended in 2018 also required that by July 1, 2020, CEQA lead agencies must evaluate transportation impacts in consideration of vehicle miles traveled or similar metric. This TIS does not include an evaluation of VMT associated with the Project, and it is anticipated that the County will separately address Project-related VMT in the EIR in consideration of SB 743 and CEQA Guidelines.)

Potential Conflict with a Program, Plan, Ordinance or Policy Addressing the Circulation System

Notwithstanding the recent CEQA amendments discussed in the introduction above, Ventura County, the City of Camarillo, and Caltrans seek to maintain acceptable levels of service along the highway, street, and road network. These agencies adopt minimum levels of service in an attempt to control congestion that may result as new development occurs.[4] The traffic operations evaluation in this TIS as summarized above and discussed in detail in the main body of this TIS discusses the various level of service goals and policies of these agencies and evaluates predicted levels of service associated with various with-Project evaluation scenarios. An assessment of the Project's consistency with programs, plans, ordinances, and policies is beyond the scope of this TIS and it is anticipated that Project consistency will be addressed by the County in the EIR to be prepared for the Project.

Potential Impacts on Transit Services

Transit services within the City of Camarillo are served by Fixed Route, Dial-A-Ride and Ventura County Transportation Commission (VCTC) Intercity service. The Fixed Route service, provided by Camarillo Area Transit (CAT), does not include transit routes in the study area. The VCTC Intercity is a Countywide service, which connects Camarillo with Thousand Oaks, Oxnard and Ventura. The Oxnard/Camarillo/CSUCI route traverses Pleasant Valley Road along Lewis Road, with a stop located along Lewis Road just south of US 101. The additional Project trips would not interfere with these transit routes or stops and, thus, would not result in significant adverse effects on existing or planned transit facilities in the Project study area.

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3 The ISAG also identifies Transportation Level of Service as an issue to consider, and levels of service are evaluated in detail in this TIS. The ISAG also identifies other transportation items associated with railroads, airports, harbor facilities, and pipelines; however, addressing those items is outside the scope of this TIS.
4 At the time of preparation of this TIS, agencies including Ventura County and Caltrans, are considering amendments to policies pertaining to congestion in efforts to implement and comply with the requirements of amendments to CEQA and the CEQA Guidelines pursuant to SB 743.

Potential Impacts on Bicycle and Pedestrian Safety and Circulation

Bicycling is considered an effective alternative mode of transportation that can help to improve air quality and reduce the number of vehicles traveling along existing highways, especially within the cities and unincorporated communities. The City of Camarillo Bikeway Master Plan identifies existing Class II bike lanes along the study segments of Pleasant Valley Road and Santa Rosa Road and a planned Class II bike lane along Pancho Road, which would be designed in accordance with City of Camarillo standards. Sidewalks presently exist along the north/west side of the Pleasant Valley Road study segment, both sides of the Santa Rosa Road study segment, and along the east side of Pancho Road.

The existing Class II bike lanes and pedestrian facilities crossing Lewis Road, Pancho Road, and US 101 NB and SB ramps, do so at traffic-controlled intersections. All of the study intersections evaluated in this TIS are signalized and include pedestrian signal phasing which accommodates pedestrians utilizing the crosswalk. Though traffic within the study area is expected to increase over time, these traffic control devices will help maintain pedestrian and bicycle safety within the study area. Class II bike lanes are identified in the City of Camarillo's General Plan Circulation Element on all study roadway segments, and it is anticipated that the City will retain and add Class II bike lanes on these segments sufficient to accommodate bicycle and pedestrian safety and circulation. The additional Project trips would not adversely affect existing or planned bicycle or pedestrian facilities in the Project study area.

Potential Impacts Associated with Hazards on Public Roads or Private Access Roads due to Design or Incompatible Uses

The proposed Project will not create any new design features on or off the Project site. The existing on-site circulation pattern will remain the same as the currently approved surface mining permit. Although there will be an increase in the volume of vehicles accessing the site during peak-hour periods and some of the incoming haul trucks will be loaded for delivery of recycle materials or fill material, the same types of vehicles (heavy-duty haul trucks and personal vehicles) will continue to access the site. The existing site access/egress is located at a sufficient distance from any intersection to allow for safe vehicular access/egress to and from the site. Therefore, this impact is considered less than significant, and no mitigation is required.

Potential Impacts Related to Emergency Access

The Project site is currently accessed/egressed via an existing entrance road from Howard Road, a private road that provides access to the Project site and to the Conejo Mountain Memorial Cemetery. Emergency access to the site would be unaffected by the Project. Therefore, this impact is considered less than significant, and no mitigation is required.

1.0 Introduction

This Transportation Impact Study (TIS) has been prepared for the purpose of identifying traffic operations and analyzing potential transportation-related impacts of the proposed Pacific Rock Quarry Expansion Project (Project). Pacific Rock, Inc. (Applicant) is requesting a Conditional Use Permit Modification to extend the life of the existing permitted mining operation by an additional 30 years, expand the mining area, extend the operational days from 6 to 7 days per week (adding Sunday for material load out) with additional material load out hours and limited extended 24 hour operations (60 days maximum per year), extend the daily hours of operation (for materials hauling) from the currently permitted 7:00 AM to 4:00 PM to the proposed 5:30 AM to 10:00 PM, allow construction and mobile mining equipment in outdoor storage areas, allow concrete and asphalt recycling, allow for imported material to be used as reclamation fill, and replace an existing mobile home to be used as a 24-hour security trailer.

1.1 Description of the Region/Project

The Project is located approximately two miles south of U.S. Highway 101 (US 101) in unincorporated Ventura County. Figures 1-1 and 1-2 show the location of the Project, major roadways and highways in the Project area, and the road segments and intersections evaluated in this TIS.

1.1.1 *Project Access*

Access to the Project site is provided by a gated private access road from Howard Road. Under existing operations, trucks leaving the site travel down Howard Road to Pancho Road then to Pleasant Valley Road from where they travel either turn left (west) and travel toward to Lewis Road or turn right (north) and travel toward State Highway 101 for delivery of aggregate materials to various destinations. Trucks traveling to the site use these same roads. The existing permit limits the daily number of haul trucks from the site to 60 loads, but does not prescribe haul truck routes or destinations. Limited information pertaining to existing operations hauling, routes, and destinations; however, the applicant has advised the County that material is generally delivered within Ventura, Los Angeles and Santa Barbara counties.[3]

1.1.2 *Study Area*

The study area includes intersections and roadway segments nearest the site and on which most Project-related vehicle trips would occur. Project-related vehicle trips would extend to other various intersections and road segments depending on the specific material destination and source locations. The study area for this analysis focuses on the intersections and segments with

3 “Trucks leave the site and travel down Howard Road to Lewis Road; Lewis Road to State Highway 101 for delivery to Ventura, Los Angeles and Santa Barbara Counties.” (Sespe Consulting, “Project Description-Pacific Rock Quarry Conditional Use Permit Modification Application LU10-0003”, pg. 3. April 1, 2019.)

the highest anticipated and reasonably foreseeable potential for Project-related transportation effects, and is considered sufficient for the purposes of this TIS. The following intersections and roadway segments are evaluated in this TIS:

Intersections

1. Lewis Road / Pleasant Valley Road
2. Pancho Road / Pleasant Valley Road
3. US 101 SB Ramps / Pleasant Valley Road
4. US 101 NB Off Ramp / Pleasant Valley Road

Roadway Segments

1. Pleasant Valley Road
   - Between Lewis Road and Pancho Road
   - Between Pancho Road and US 101 SB Ramps

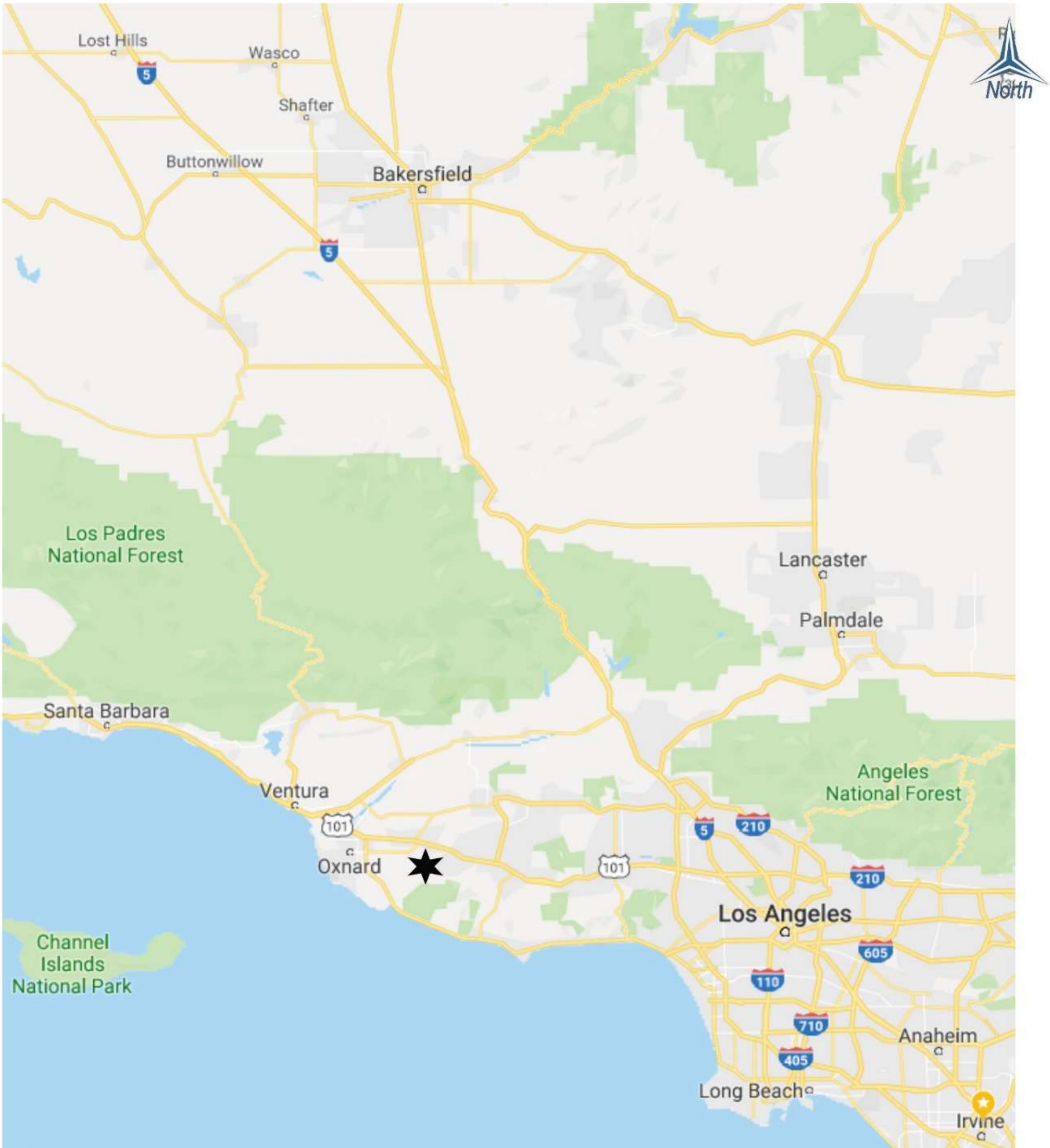
2. Santa Rosa Road
   - Between US 101 NB Ramps and Adolfo Road

3. Pancho Road
   - Between Pleasant Valley Road and Calle Quetzal
   - Between Calle Quetzal and Howard Road

As shown on Figure 1-2, Howard Road provides direct access between the Project site and the southern end of Pancho Road. Howard Road also provides access to the Conejo Mountain Memorial Cemetery and a small number of agricultural parcels in the immediate area. Traffic volumes on Howard Road are minimal (less than 100 trips in the AM and PM peak hours) based upon twenty-four (24) hour classification counts collected in the study area as noted in Section 2.0. As a result, the Project would not result in the potential to cause levels of service on this segment to decline below acceptable conditions. Therefore, Howard Road is not evaluated as a study area roadway segment in this TIS.

Pacific Rock Quarry Expansion Project
Regional Location

Figure 1-1



LEGEND
Project Location

VRPA TECHNOLOGIES, INC.

Pacific Rock Quarry Expansion Project
Project Location

Figure 1-2

LEGEND
- Project Location
- Study Intersections
- Study Segments

VRPA TECHNOLOGIES, INC.

1.1.3 *Study Scenarios*

This TIS includes Level of Service (LOS) analyses for the following scenarios:

- Existing Conditions
- Existing Plus Project
- Existing Plus Approved/Pending
- Existing Plus Approved/Pending Plus Project
- Cumulative Year 2030 Without Project
- Cumulative Year 2030 Plus Project

1.2 Methodology

The sections below discuss the methods used in this TIS for analyzing street and intersection capacities and changes in levels of service for the study scenarios listed above. Intersection turning movement counts and roadway geometrics used for the analysis were obtained from field review findings and vehicle count data as described further in Section 2.1.

1.2.1 *Intersection Analysis*

Intersection analysis was conducted using Intersection Capacity Utilization (ICU) methodology to determine intersection levels of service for the study intersections under the various study scenarios. Thus, the 2003 ICU Worksheets for signalized intersections was used to determine the volume-to-capacity (V/C) ratio and the associated level of service (LOS) for each intersection. Traffic signal timing sheets for each of the study intersections were obtained from City of Camarillo and Caltrans staff and were incorporated into the 2003 ICU Worksheets accordingly.

Table 1-1 indicates the ICU LOS, which is based upon the critical flow ratio for the intersection. Associated levels of service ranging from LOS “A” to “H” are provided below with the corresponding Maximum ICU.

1.2.2 *Roadway Segment Analysis*

Roadway segment evaluation was performed for this TIS to assess the potential for the Project to cause or contribute to an exceedance of acceptable segment capacity under the various study scenarios. The Highway Capacity Manual (HCM)[4], categorizes roadway segment levels of service based on two parameters of traffic: uninterrupted and interrupted flow. Uninterrupted flow facilities do not have fixed elements such as traffic signals that cause interruptions in traffic flow. Interrupted flow facilities do have fixed elements that cause an interruption in the flow of traffic, such as stop signs and signalized intersections along arterial roads. A roadway segment is defined

4 “Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis” (Transportation Research Board, 2016)

as a stretch of roadway generally located between signalized or controlled intersections. The roads evaluated in this TIS are considered interrupted flow facilities, and each study roadway segment is located between two signalized intersections.

Table 1-2 provides a definition of segment LOS based on the HCM interrupted flow facilities criteria. Street segment capacity was determined using information shown in Table 1-3 which is based on the LOS Tables included in Appendix A. The tables consider the capacity of individual road segments based on numerous roadway variables (design speed, passing opportunities, signalized intersections per mile, number of lanes, saturation flow, etc.). These variables were identified and applied to study roadway segments to reflect segment LOS conditions.

Table 1-1
ICU LOS Thresholds

LEVEL OF SERVICE	MAXIMUM ICU
A	55%
B	64%
C	73%
D	82%
E	91%
F	100%
G	109%
H	over 109%

Table 1-2
Roadway Segment Level of Service Definitions
(Highway Capacity Manual)

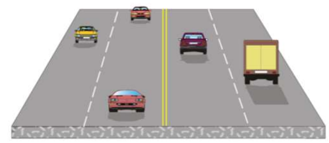
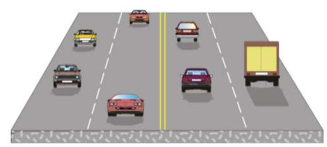
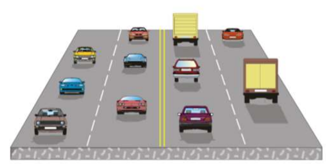
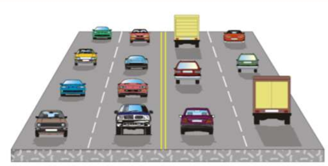
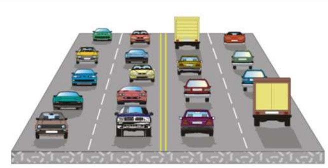
LEVEL OF SERVICE	DEFINITION	
A	Represents free flow. Individual vehicles are virtually unaffected by the presence of others in the traffic stream.	
B	Is in the range of stable flow, but the presence of other vehicles in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.	
C	Is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual vehicles becomes significantly affected by interactions with other vehicles in the traffic stream.	
D	Is a crowded segment of roadway with a large number of vehicles restricting mobility and a stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.	
E	Represents operating conditions at or near the level capacity. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.	
F	Is used to define forced or breakdown flow (stop-and-go gridlock). This condition exists when the amount of traffic approaches a point where the amount of traffic exceeds the amount that can travel to a destination. Operations within the queues are characterized by stop and go waves, and they are extremely unstable.	

Table 1-3
Peak Hour Directional Volumes – Urban

		Level of Service			
Lanes	Divided	B	C	D	E
State Roadways					
1	Undivided	*	200	690	930
1	Divided	*	210	725	977
2	Divided	50	1,350	1,790	1,870
3	Divided	80	2,040	2,690	2,820
Non-State Roadways					
1	Undivided	*	180	621	837
1	Divided	*	190	656	884
2	Divided	45	1,215	1,611	1,683
3	Divided	72	1,836	2,421	2,538

Source: 2018 FDOT Quality/Level Of Service Handbook Tables

* Cannot be achieved using table input value defaults

1.2.3 *Agency Level of Service Standards*

The intersections and roadway segments evaluated in this TIS are located either in the City of Camarillo or on the boundary of the City of Camarillo and unincorporated Ventura County, and the U.S. 101 ramps are under the jurisdiction of the California Department of Transportation (Caltrans). As a result of the combination of jurisdictional agencies, this TIS considers adopted level of service standards of these various agencies in assessing whether predicted operations with the Project would be within the range of levels of service considered acceptable to these agencies. The traffic operations analysis in this TIS uses the traditional practice of measuring delay, vehicle/capacity ratios, and levels of service for informational purposes. Ultimately, the County will determine the proper characterization of this information in the EIR for consideration by decisionmakers. Thus, although Project effects on traffic delay are presented in this TIS and measured against "acceptable" levels of service, these effects should not be interpreted as an environmental "impact" under CEQA.

Ventura County General Plan Goals, Policies & Programs (03-19-19 edition) Transportation and Circulation section specifies minimum acceptable levels of service for road segments and intersections that identifies, in relevant part, LOS "D" as the minimum acceptable level of service for County thoroughfares and Federal and State highways in unincorporated areas of the County and LOS "C" as the minimum acceptable level of service for all County maintained local roads. The City of Camarillo General Plan Circulation Element (2014), Policy 1.2.6 states, "The City should maintain a level of service (LOS) of "C" or better on all streets and intersections. Brief periods of LOS "D" during peak a.m. and p.m. traffic hours may be tolerated where improving to LOS "C" would be unreasonably costly."

Caltrans, "A Guide For the Preparation of Traffic Impact Studies, 2002" identifies a minimum LOS of "C" as the minimum acceptable level of service for its facilities, except where the existing LOS is "D" or below, in which case Caltrans generally seeks to maintain the existing LOS.

Table 1-4 summarizes the minimum acceptable LOS for each intersection and roadway segment based upon its jurisdictional location. In consideration of these various agency level of service standards, this TIS uses LOS C as the minimum acceptable level of service for all study intersections and roadway segments, unless the existing condition (discussed further in Chapter 2) is worse than LOS C in which case the existing condition LOS is used as the minimum acceptable level of service.

Table 1-4
Minimum Acceptable LOS by Jurisdiction

INTERSECTION	JURISDICTION	MINIMUM ACCEPTABLE LOS
1. Lewis Road / Pleasant Valley Road	City of Camarillo	C
	Ventura County	D
2. Pancho Road / Pleasant Valley Road	City of Camarillo	C
3. US Route 101 SB Ramps / Pleasant Valley Road	Caltrans	LOS C or existing LOS if worse than C
4. US Route 101 NB Off Ramp / Pleasant Valley Road	Caltrans	LOS C or existing LOS if worse than C
ROADWAY SEGMENT	**JURISDICTION**	**MINIMUM ACCEPTABLE LOS**
Pleasant Valley Road		
Lewis Road to Pancho Road	City of Camarillo	C
	Ventura County	D
Pancho Road to US 101 SB Ramps	City of Camarillo	C
Santa Rosa Road		
US 101 NB Ramps to Adolfo Road	City of Camarillo	C
Pancho Road		
Pleasant Valley Road to Calle Quetzal	City of Camarillo	C
	Ventura County	D
Calle Quetzal to Howard Road	City of Camarillo	C
	Ventura County	D

Level of service standards for study area jurisdictional agencies

2.0 Existing Conditions

2.1 Existing Conditions Traffic Counts and Roadway Geometrics

To assess existing traffic conditions, AM and PM peak hour turning movements were collected at each study intersection by National Data and Surveying Services. Intersection turning movement counts were conducted for the periods of 7:00-9:00 AM and 4:00-6:00 PM for all study intersections on Tuesday, November 27, 2018. Traffic count data worksheets are provided in Appendix B. Twenty-four (24) hour classification counts were also collected on Tuesday, November 27, at three locations in within the study area to identify existing truck travel patterns in the study area. The days on which counts were taken are considered sufficiently representative of typical traffic volumes within the study area. Schools were in session and weather was mild.

The existing lane geometry at study area intersections is shown in Figure 2-1 and was determined through field reconnaissance. Figures 2-2 and 2-3 show existing traffic volumes for the AM and PM peak hours in the study area. The traffic volumes include all background trips (i.e., those trips not associated with existing Pacific Rock Quarry operations) as well as any trips associated with Pacific Rock Quarry operations on the days and during the period counts were taken. The Operator advised the County that on November 27, 2018 (the day traffic counts were taken) there were 3 worker trips to and 3 worker trips from the site (resulting in 6 total worker trips) and 9 haul loads from the site (resulting in 18 total trips when trips to the site by unloaded trucks are included). However, the time of day that these trips occurred was not provided by the Operator and it is undetermined whether these trips are within peak-hour counts. To more conservatively evaluate changes in levels of services associated with the Project (i.e., tending to overstate changes as opposed to understating changes), it is assumed for this TIS that any Project-related trips that occurred during the period when counts were taken did not occur during the AM or PM peak hour periods. The traffic counts taken in 2018 are considered representative of baseline peak-hour traffic conditions and are appropriate for this evaluation.

2.2 Existing Functional Roadway Classifications System

Functional roadway classification is the process by which streets and highways are grouped into classes, or systems, according to their design and the type of service they are intended to provide. Fundamental to this process is the recognition that individual streets and highways do not serve travel independently; rather, most travel involves movement through a network of roads. The following summarizes classifications relevant to this analysis and describes the study area roadways and their classifications based on the City of Camarillo General Plan Circulation Element.

- **Freeways** – Limited-access facilities designed for high speed regional mobility. Freeways may include up to eight lanes (four lanes in each direction). The one study segment freeway is:

- **US 101 (Ventura Freeway)** currently exists as a six-lane freeway with a posted speed limit of 65 miles per hour (mph) near the study area. According to the Caltrans website, the annual average daily trips (AADT) along US 101 in 2017 (most recent available year at the time of preparation of this TIS) was 132,000.

- **Arterial** – Streets which provide for the maximum movement of large volumes of traffic between major traffic generators. The City of Camarillo Circulation Element recognizes two classes of arterial streets: primary and secondary. The three study segments that are arterials:

    - **Lewis Road** is a four-lane divided roadway with bike lanes in the study area.
    - **Pleasant Valley Road** is a four-lane divided roadway with bike lanes in the study area both east and west of the Pancho Road intersection.
    - **Santa Rosa Road** is a 6-lane divided roadway with bike lanes in the study area north of US 101.

- **Collectors** – Streets which provide access and movement between residential, commercial, and industrial areas. The primary function of collector streets is to collect and distribute traffic between local streets and the arterial roadway system. The City of Camarillo Circulation Element recognizes three types of collector street: major, minor, and industrial. The one study segment that falls under the Collector classification is designated by the City of Camarillo Circulation Element as an Industrial Collector, as defined below.

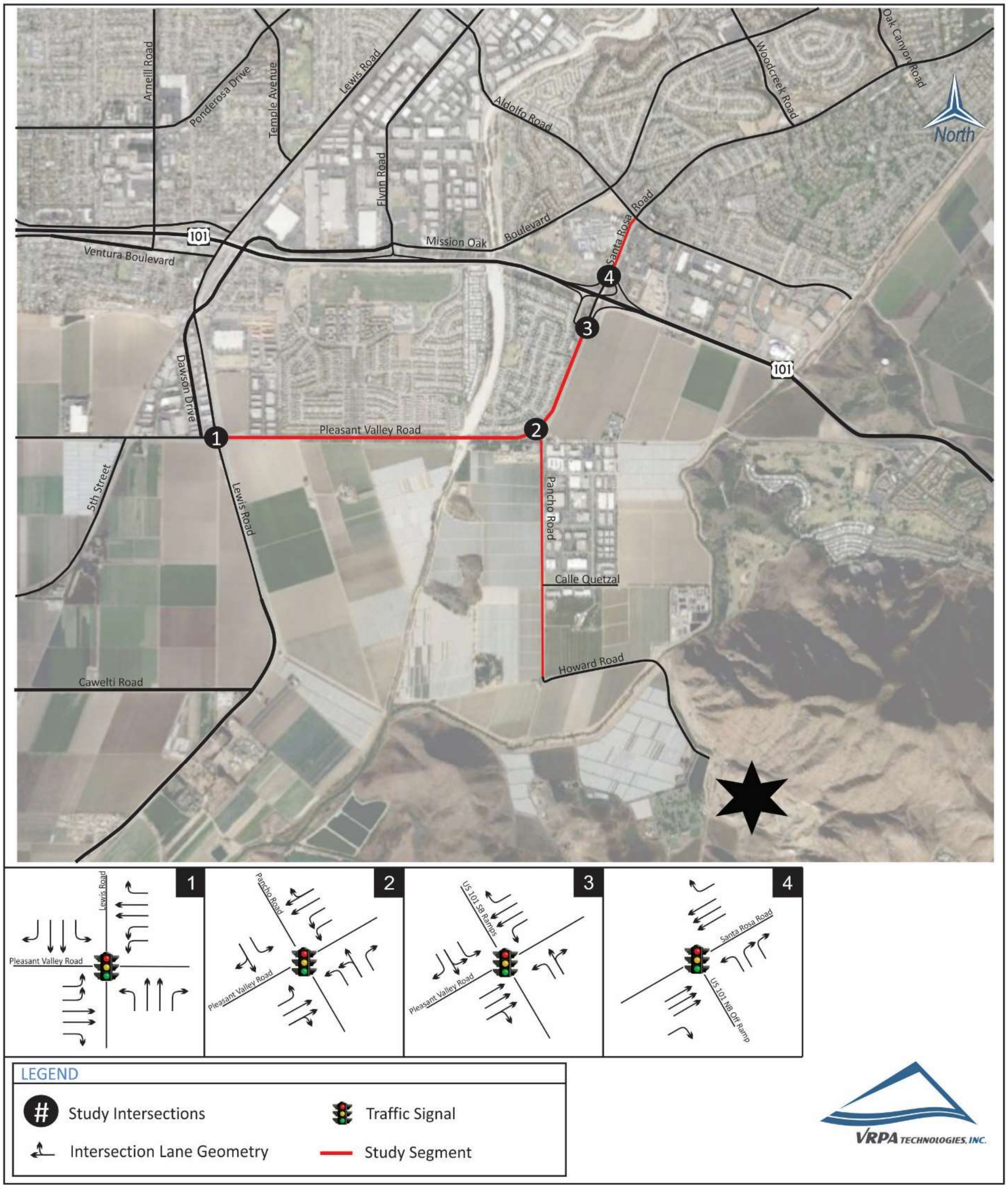
- **Industrial Collector** – Streets that are intended as the intermediate route to accommodate traffic between local industrial streets and arterial streets. This system includes those streets that provide for traffic movements within a relatively small area, such as a commercial or industrial zone. Individual streets are designed specifically to facilitate truck traffic, which is an element of the industrial district. The one study segment Industrial Collector is:

    - **Pancho Road** connects Howard Road and Pleasant Valley Road. Pancho Road is a four-lane undivided roadway from Pleasant Valley Road to just south of Adohr Lane. Pancho Road is a three-lane undivided roadway (Two-Way-Left-Turn-Lane) without bike lanes from just south of Adohr Lane to Calle Alto. Pancho Road is a two-lane undivided roadway (Two-Way-Left-Turn-Lane) with parallel parking on the eastside of the roadway from Calle Alto to Calle Quetzal. Finally, Pancho Road is a two-lane undivided roadway without bike lanes from Calle Quetzal to Howard Road. At its intersection with Pleasant Valley Road, Pancho Road includes two left-turn lanes, one of which is also a through lane, and a right-turn lane.

- **Local Streets** – Roadways which provide access to individual homes and businesses. Local streets should not carry through traffic or buses and heavy trucks, except in commercial and industrial districts. None of the study segments are local streets.

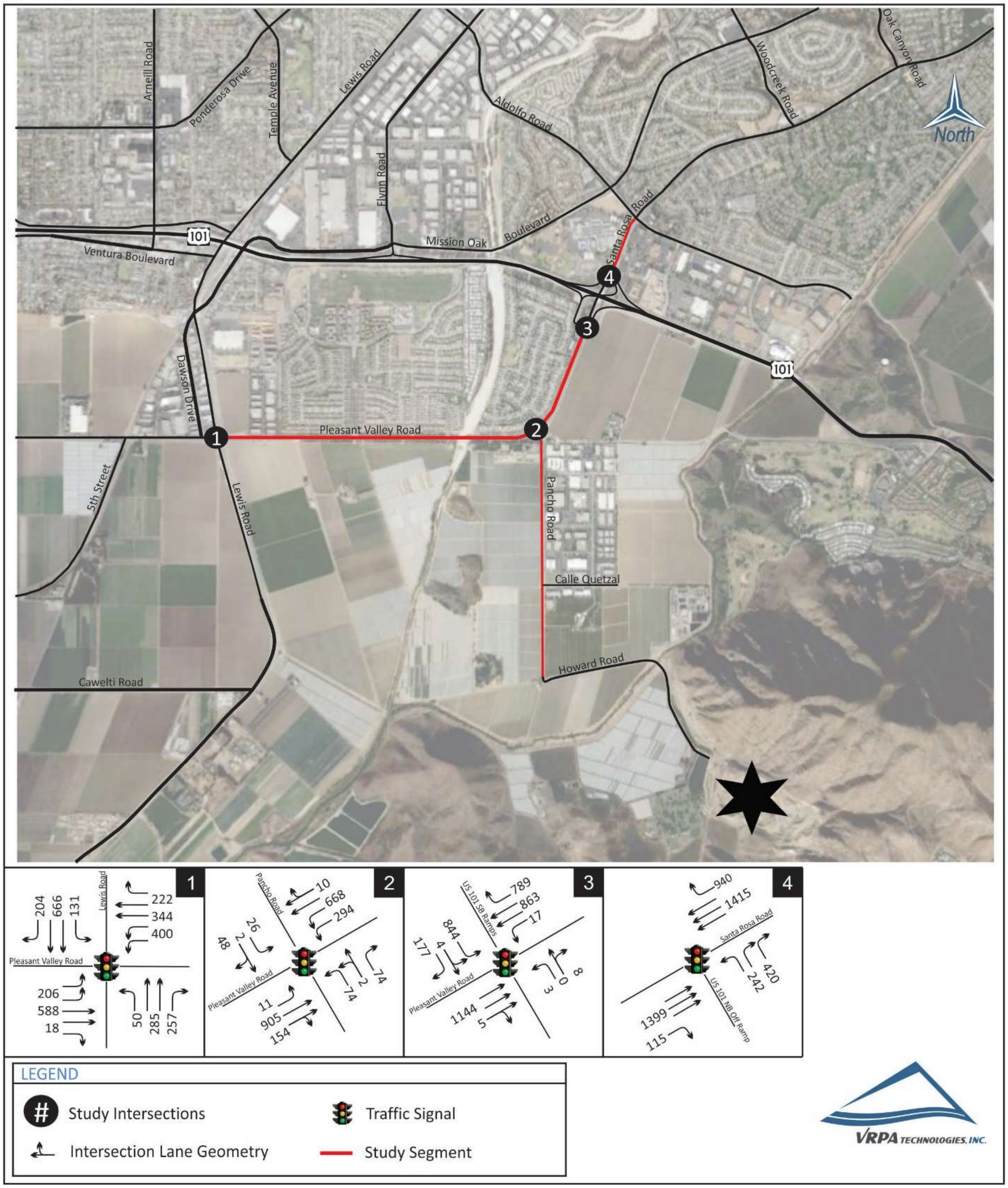
Pacific Rock Quarry Expansion Project
Existing Lane Geometry

Figure 2-1



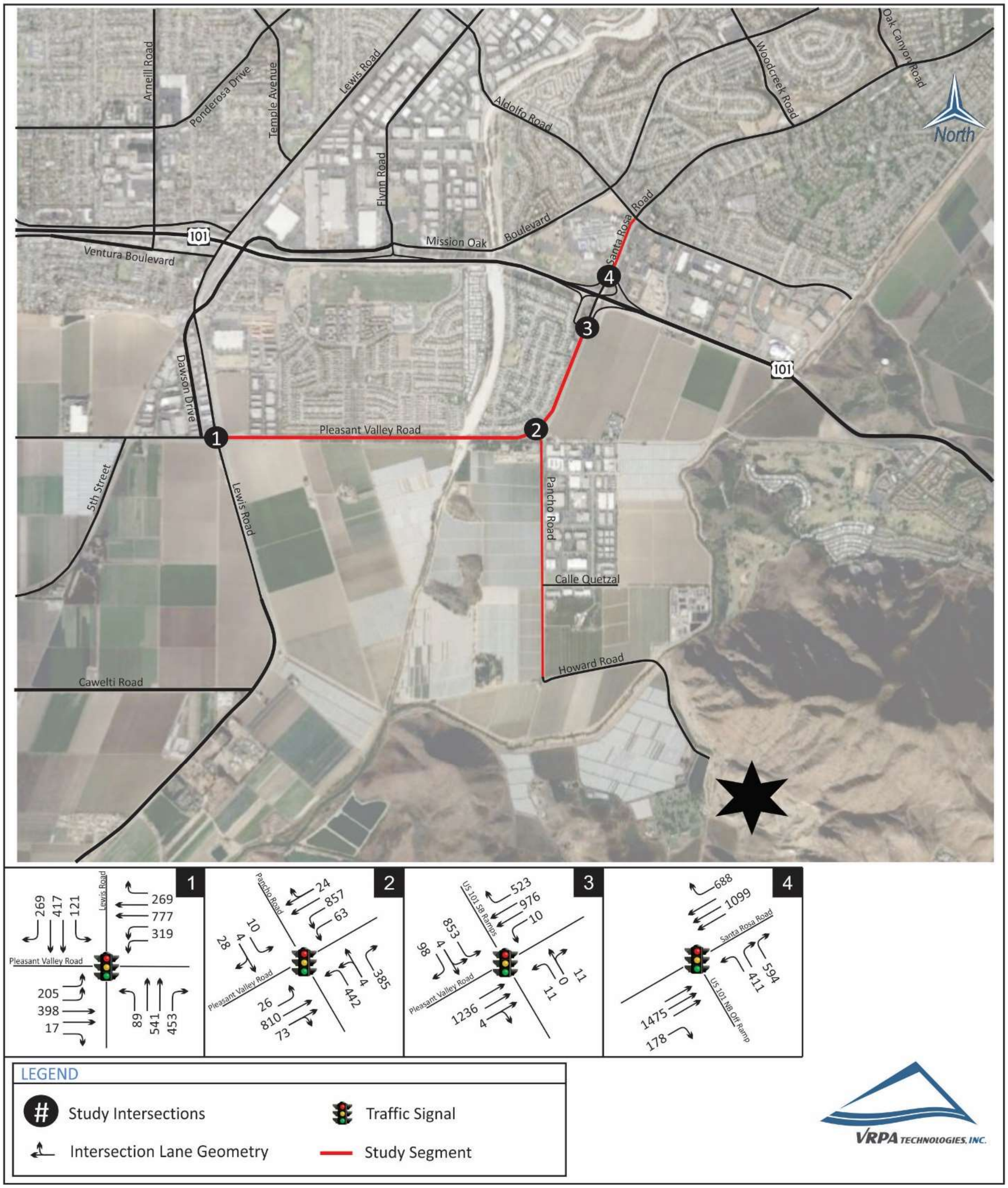
Pacific Rock Quarry Expansion Project
Existing AM Peak Hour Trips

Figure 2-2



Pacific Rock Quarry Expansion Project
Existing PM Peak Hour Trips

Figure 2-3



2.3 Affected Streets and Highways

Street and highway intersections and segments near and adjacent to the Project site were analyzed to determine levels of service using methodologies described previously. The study intersections and street and highway segments included in this TIS are listed below.

Intersections

1. Lewis Road / Pleasant Valley Road
2. Pancho Road / Pleasant Valley Road
3. US 101 SB Ramps / Pleasant Valley Road
4. US 101 NB Off Ramp / Pleasant Valley Road

Roadway Segments

1. Pleasant Valley Road
   - Lewis Road and Pancho Road
   - Pancho Road to US 101 SB Ramps

2. Santa Rosa Road
   - US 101 NB Ramps and Adolfo Road

3. Pancho Road
   - Pleasant Valley Road to Calle Quetzal
   - Calle Quetzal to Howard Road

2.4 Level of Service

2.4.1 *Intersection Capacity Analysis*

Study intersection LOS analyses were assessed using 2003 ICU methodology. The roadway geometrics, traffic volumes, and signal timing properties (lost time, minimum green time, etc.) of each intersection were input into the 2003 ICU Worksheets in order to determine the LOS for each study scenario. The intersection reported LOS represents the ICU methodology.

Results of the analysis show that under Existing Conditions all of the study intersections are LOS C or better and meet the minimum acceptable level of service criteria during both the AM and PM peak hour, with the exception of the US 101 SB Ramps / Pleasant Valley Road intersection during the AM peak hour. Based on this analysis, this intersection operates at LOS ”D” during the AM peak hour under Existing Conditions. Table 2-1 shows the intersection LOS for Existing Conditions. ICU Worksheets are provided in Appendix C.

2.4.2 *Queuing Analysis*

Table 2-2 provides a queue length summary for left and right turn lanes at the study intersections for Existing Conditions. Queuing analysis was completed using Section 400 of Caltrans' Highway Design Manual. The vehicular queue presented in Table 2-2 represents the approximate queue length requirements for the respective lane movements under Existing Conditions. As shown in Table 2-2, under Existing Conditions, the queue lengths for certain movements at each of the study intersections exceed the existing queue lane storage lengths. It should be noted that the queuing analysis presented in this traffic study is provided for informational purposes only.

2.4.3 *Roadway Segment Capacity Analysis*

Results of the segment analysis for Existing Conditions are presented in Table 2-3. The performance criteria used for evaluating volumes and capacities on the road and highway system for this study were estimated using the Arterial Level of Service Tables included in Table 1-3 and Appendix A. Results of the analysis show six instances in which LOS "C" is exceeded under Existing Conditions as summarized below:

- Pleasant Valley Road westbound from Pancho Road to Lewis Road during the PM peak hour (LOS D)
- Pleasant Valley Road northbound between Pancho Road and US 101 southbound ramps during the PM peak hour (LOS D)
- Santa Rosa Road northbound between US 101 northbound ramps and Adolfo Road during the PM peak hour (LOS D)
- Santa Rosa Road southbound between Adolfo Road and US 101 northbound ramps during the AM peak hour (LOS D)
- Pancho Road northbound between Calle Quetzal and Pleasant Valley Road during the PM peak hour (LOS E)
- Pancho Road southbound between Pleasant Valley Road during the AM peak hour (LOS D)

Table 2-1
Existing Intersection Operations

INTERSECTION	CONTROL	PEAK HOUR	EXISTING	
			ICU	LOS
1. Lewis Road / Pleasant Valley Road	Signalized	AM	62.4	B
		PM	65.4	C
2. Pancho Road / Pleasant Valley Road	Signalized	AM	58.5	B
		PM	60.8	B
3. US Route 101 SB Ramps / Pleasant Valley Road	Signalized	AM	**77.8**	**D ***
		PM	62.0	B
4. US Route 101 NB Off Ramp / Pleasant Valley Road	Signalized	AM	47.4	A
		PM	54.2	A

ICU = Intersection Capacity Utilization (expressed as a percentage) / **BOLD** denotes LOS has been exceeded
For signalized controlled intersections, the LOS is based on the ICU method.
* Existing State highway facility is operating at less than the target LOS; the existing MOE shall be maintained.

Table 2-2
Existing Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		EXISTING CONDITIONS AM Queue	EXISTING CONDITIONS PM Queue
Lewis Road / Pleasant Valley Road	NB Left	600	42	74
	NB Right	600	214	378
	SB Left	150	109	101
	SB Right	275	170	224
	EB Left	2 @ 175	172	171
	EB Right	150	15	14
	WB Left	2 @ 200	333	266
	WB Left	175	**185**	**224**
Pancho Road / Pleasant Valley Road	NB Left	2 @ 50	62	**368**
	NB Right	200	62	**321**
	SB Left	100	22	8
	EB Left	225	9	22
	WB Left	2 @ 350	245	53
US 101 EB Off Ramp / Pleasant Valley Road	SB Left	125	14	8
	SB Right	1075	658	436
	EB Left	2 @ 100	**703**	**711**
	EB Right	125	**148**	82
	WB Left	50	3	9
US 101 WB Off Ramp / Pleasant Valley Road	WB Left	350	202	343
	WB Right	2 @ 200	350	**495**

Queue is measured in feet / **BOLD** denotes exceedance

Table 2-3
Existing Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	PEAK HOUR	DIRECTION	EXISTING	
				VOLUME	LOS
Pleasant Valley Road					
Lewis Road to Pancho Road	2 Lanes Divided	AM	EB	1,070	C
		PM	EB	972	C
	2 Lanes Divided	AM	WB	966	C
		PM	WB	**1,365**	**D**
Pancho Road to US 101 SB Ramps	2 Lanes Divided	AM	NB	1,149	C
		PM	NB	**1,240**	**D**
	2 Lanes Divided	AM	SB	1,043	C
		PM	SB	1,085	C
Santa Rosa Road					
US 101 NB Ramps to Adolfo Road	3 Lanes Divided	AM	NB	1,819	C
		PM	NB	**2,069**	**D**
	3 Lanes Divided	AM	SB	**2,355**	**D**
		PM	SB	1,787	C
Pancho Road					
Pleasant Valley Road to Calle Quetzal	1 Lane Undivided	AM	NB	150	C
		PM	NB	**831**	**E**
	1 Lane Undivided	AM	SB	**450**	**D**
		PM	SB	140	C
Calle Quetzal to Howard Road	1 Lane Undivided	AM	NB	19	C
		PM	NB	75	C
	1 Lane Undivided	AM	SB	30	C
		PM	SB	24	C

BOLD denotes LOS standard has been exceeded.

3.0 Traffic Operations

This chapter provides an assessment of the vehicle trips the Project is expected to generate and the resulting predicted changes in traffic operations levels of service at study area road segments and intersections.

3.1 Trip Generation

To assess Project changes in traffic operations, the first step is to determine Project trip generation. The Project's trip generation was estimated based on information in the CUP amendment application. The Project's estimated AM peak hour and PM peak hour trips are shown in Table 3-1.

Proposed modifications to the existing CUP include: extend the life of the existing permitted operations by an additional 30 years, expand the mining area, extend the operational days from 6 to 7 days per week (adding Sunday for material load out) with additional material load out hours and limited extended 24 hour operations (60 days maximum per year), extend the daily hours of operation (for materials hauling) from the currently permitted 7:00 AM to 4:00 PM to the proposed 5:30 AM to 10:00 PM, allow construction and mobile mining equipment in outdoor storage areas, allow concrete and asphalt recycling, allow for imported material to be used as reclamation fill, and replace an existing mobile home to be used as a 24-hour security trailer.

The operation is currently permitted to transport up to 60 daily loads from the site (resulting 120 one-way trips), and the Project would not change this permitted daily maximum. The applicant has advised the County that the existing operation can generate up to 30 loads per hour (resulting in 60 one-way trips) during morning operations and up to 15 loads per hour (resulting 30 one-way trips) during afternoon periods. The County does not have sufficient information documenting actual AM peak-hour trips associated with the existing operation to establish baseline AM peak-hour trips, therefore, this study evaluates the Project as if all trips associated with haul trucks during the AM peak-hour period would be new trips that do not currently occur under existing operations. This approach is conservative inasmuch as it will tend to overestimate changes in traffic operations associated with the Project during the AM peak-hour period. Further, because the existing operation is permitted for operations between 7:00 AM and 4:00 PM, there are no baseline haul trips during the PM peak-hour period of 4:00 PM to 6:00 PM under Existing Conditions. Thus, this study evaluates changes in traffic operations associated with the Project's 15 loads (30 one-way trips) during the PM peak-hour period. In addition to trucks that would be used for transporting aggregate from the site, the Project would also involve truck trips associated with the delivery of asphalt and concrete to the site for recycling and for the delivery of fill material that would be used for reclamation. The application advises that these recycle material and fill import truck trips would be included within the requested permitted maximum of 60 truck loads per day. Thus, this analysis assumes that no more than 120 daily one-way haul truck trips would occur each day, consisting of up to 60 loaded trucks exiting or entering the facility, and 60 empty trucks exiting or entering the facility. On an hourly basis, this evaluation assumes that no more than 60 AM peak-hour one-way truck trips (up to 30 loaded trucks entering or exiting the facility and 30 empty trucks entering or exiting the facility) and that no more than 30 PM peak-hour one-way truck trips (up to 15 loaded trucks entering or exiting the facility and 15 empty trucks entering or exiting the facility) would occur as a result of the Project.

Due to the size and weight of haul trucks, they operate more slowly than passenger vehicles. Therefore, a "Passenger Car Equivalent" (PCE) factor is applied to haul truck trips to account for the greater effect each truck has on traffic as compared to a passenger vehicle. For this evaluation, a PCE of 2.5 is used for Project-related haul truck trips. Thus, for the modeling, the truck trips shown in Table 3-1 are multiplied by 2.5, resulting in the total Project trips with PCE as also presented in the table.

Additional Project-related trips would be associated with ancillary delivery of supplies and equipment to the site periodically and worker trips. Supply and equipment delivery trips are anticipated to be minimal and would not be expected to substantively influence on traffic operations. Worker trips are accounted for and for this analysis assume up to 12 worker trips to the site during the AM peak hour and 12 worker trips from the site during the PM peak hour.

Table 3-1
Project Trip Generation

TRIP TYPE	AM PEAK HOUR				PM PEAK HOUR			
	IN:OUT SPLIT	VOLUME			IN:OUT SPLIT	VOLUME		
		IN	OUT	TOTAL		IN	OUT	TOTAL
Truck Trips	50:50	30	30	60	50:50	15	15	30
Employee Trips	100:0	12	0	12	0:100	0	12	12
TOTAL PROJECT TRIPS		**42**	**30**	**72**		**15**	**27**	**42**
TOTAL PROJECT TRIPS W/ PCE[1]		**87**	**75**	**162**		**38**	**50**	**88**

A "trip" is defined as a "one-way" trip

1 PCE of 2.5:1 was applied to truck trips

3.2 Trip Distribution

Project-related truck trip distribution is estimated based on consideration of the anticipated market for aggregate materials produced at the site and anticipated source locations for imported fill and recycle material (i.e., various locations primarily in Ventura, Los Angeles, and Santa Barbara counties), engineering judgement, prevailing traffic patterns in the study area, primary roads and travel routes, and population centers. Employee trip distribution is estimated considering population centers and local road system travel options. Thus, the employee trip distribution varies from the truck trip distribution, reflecting employee travel to and from the site.

The trip distribution estimates are intended to reflect anticipated typical travel patterns associated with Project-related vehicles. It is recognized that travel patterns will vary depending largely on market demand and the locations of aggregate deliveries to construction sites that cannot be presently determined. The distribution used here provides for a reasonable estimate of typical travel patterns appropriate for this TIS. Project trip distribution was assigned to the roadway system using the trip distribution percentages shown in Figure 3-1.

3.3 Project Trips and Distribution Summary

Project trips as shown in Table 3-1 were distributed to the roadway system using the trip distribution percentages shown in Figure 3-1. A graphical representation of the resulting AM and PM peak hour Project trips is shown in Figures 3-2 and 3-3. (Figures 3-2 and 3-3 include the PCE of 2.5 for Project truck trips, as discussed previously.)

3.4 Existing Plus Project Traffic Conditions

An Existing Plus Project scenario was analyzed to include existing traffic plus traffic generated by the Project. Existing Plus Project traffic conditions during the AM and PM peak hours are shown in Figures 3-4 and 3-5.

3.4.1 *Existing Plus Project Intersection Capacity Analysis*

Table 3-2 summarizes traffic operations under Existing Conditions without the Project and under Existing Conditions with the Project. As shown in the table, the addition of Project-related trips to Existing Conditions at study area intersections would not result in deficient levels of service. Results of the analysis show that all of the study intersections meet the minimum acceptable level of service criteria during both the AM and PM peak hour with the addition of Project related trips.

3.4.2 *Existing Plus Project Queuing Analysis*

Table 3-3 summarizes queuing operations under Existing Conditions without the Project and under Existing Conditions with the Project. Queuing analysis was completed using Section 400 of Caltrans' Highway Design Manual. As discussed in Section 2.0, the queuing analysis presented in this TIS is provided for informational purposes only. The City of Camarillo, Ventura County, and Caltrans have not established CEQA impact significance criteria related to the exceedance of left and right turn storage pockets.

3.4.3 *Existing Plus Project Roadway Segment Capacity Analysis*

Table 3-4 summarizes traffic operations under Existing Conditions without the Project and under Existing Conditions with the Project. As shown in the table, the addition of Project-related trips to Existing Conditions on study area roadway segments would contribute trips in six instances in which segment volumes already exceed LOS C and would result in one instance in which the addition of Project trips would cause LOS C to worsen to LOS D, as summarized below:

- Pleasant Valley Road westbound from Pancho Road to Lewis Road during the PM peak hour (worsen existing LOS D)
- Pleasant Valley Road northbound between Pancho Road and US 101 southbound ramps during the PM peak hour (worsen existing LOS D)
- Santa Rosa Road northbound between US 101 northbound ramps and Adolfo Road during the PM peak hour (worsen existing LOS D)
- Santa Rosa Road southbound between Adolfo Road and US 101 northbound ramps during the AM peak hour (worsen existing LOS D)
- Pancho Road northbound between Calle Quetzal and Pleasant Valley Road during the AM peak hour (degrade from LOS C to LOS D)
- Pancho Road northbound between Calle Quetzal and Pleasant Valley Road during the PM peak hour (worsen existing LOS E)
- Pancho Road southbound between Pleasant Valley Road during the AM peak hour (worsen existing LOS D)

Pacific Rock Quarry Expansion Project
Trip Distribution

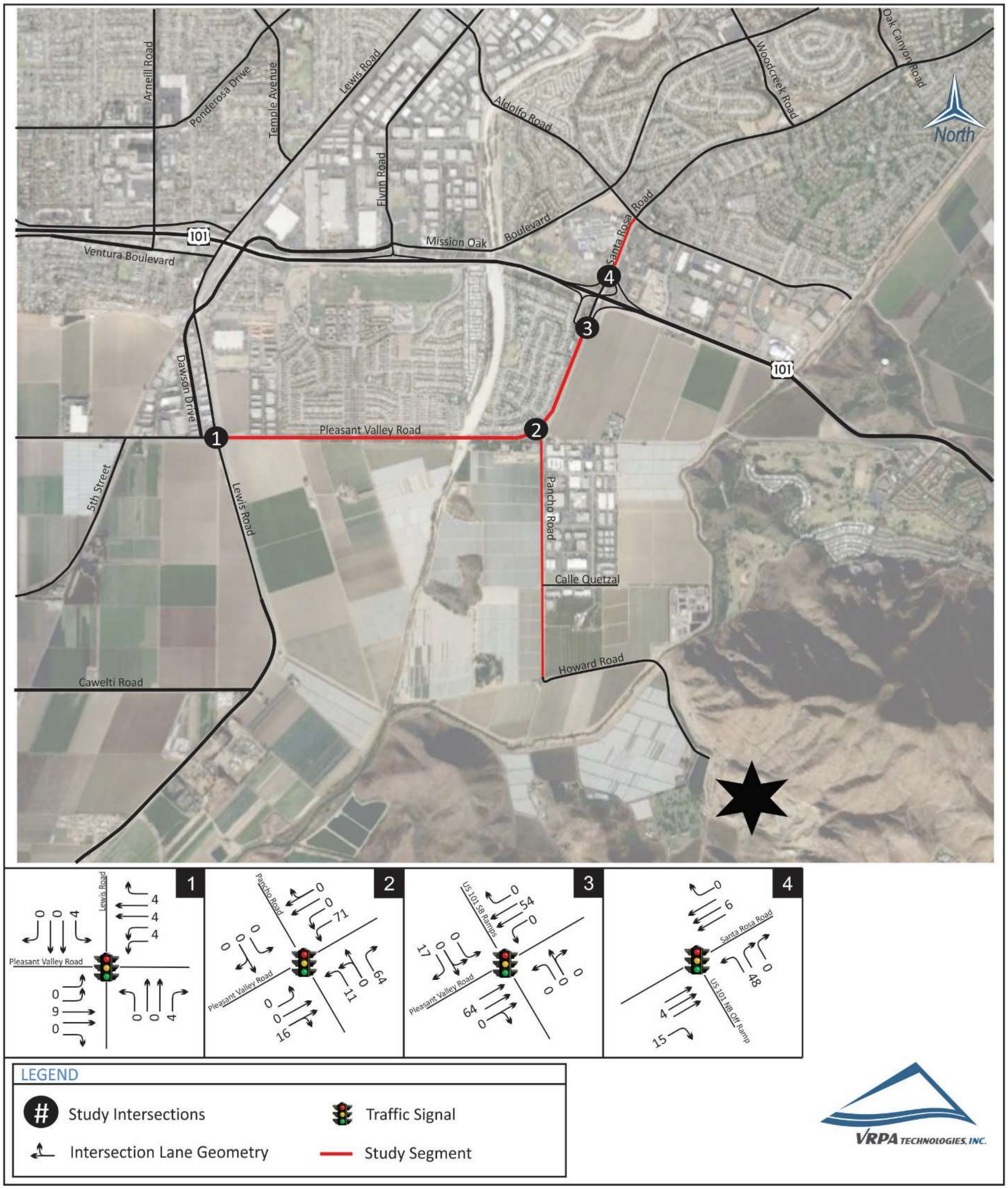
Figure 3-1

LEGEND	
# Study Intersections	## Truck Distribution
Study Segment	(##) Employee Distribution

VRPA TECHNOLOGIES, INC.

Pacific Rock Quarry Expansion Project
AM Peak Hour Project Trips

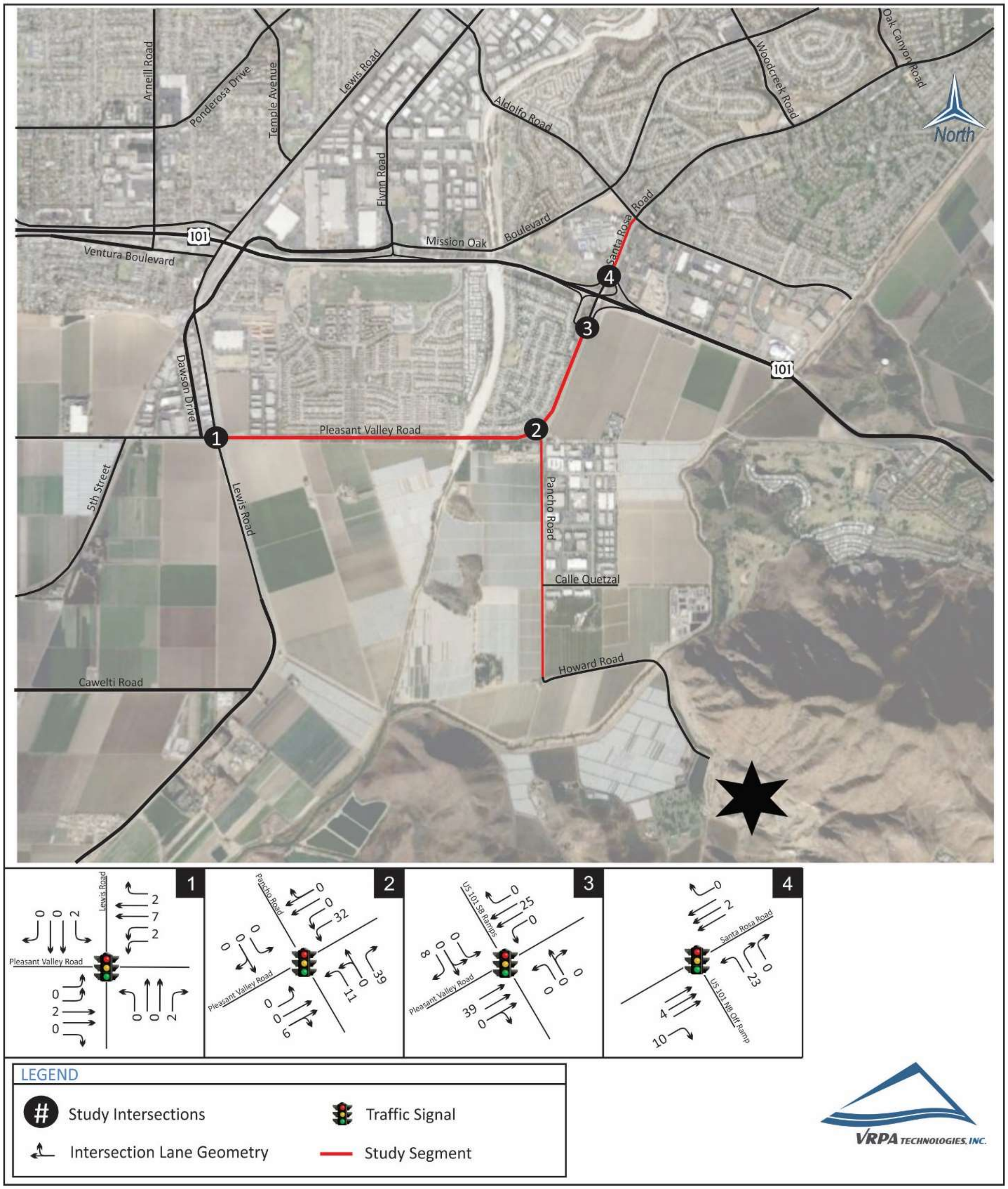
Figure 3-2



Note: A PCE of 2.5 is used for Project-related haul truck trips

Pacific Rock Quarry Expansion Project
PM Peak Hour Project Trips

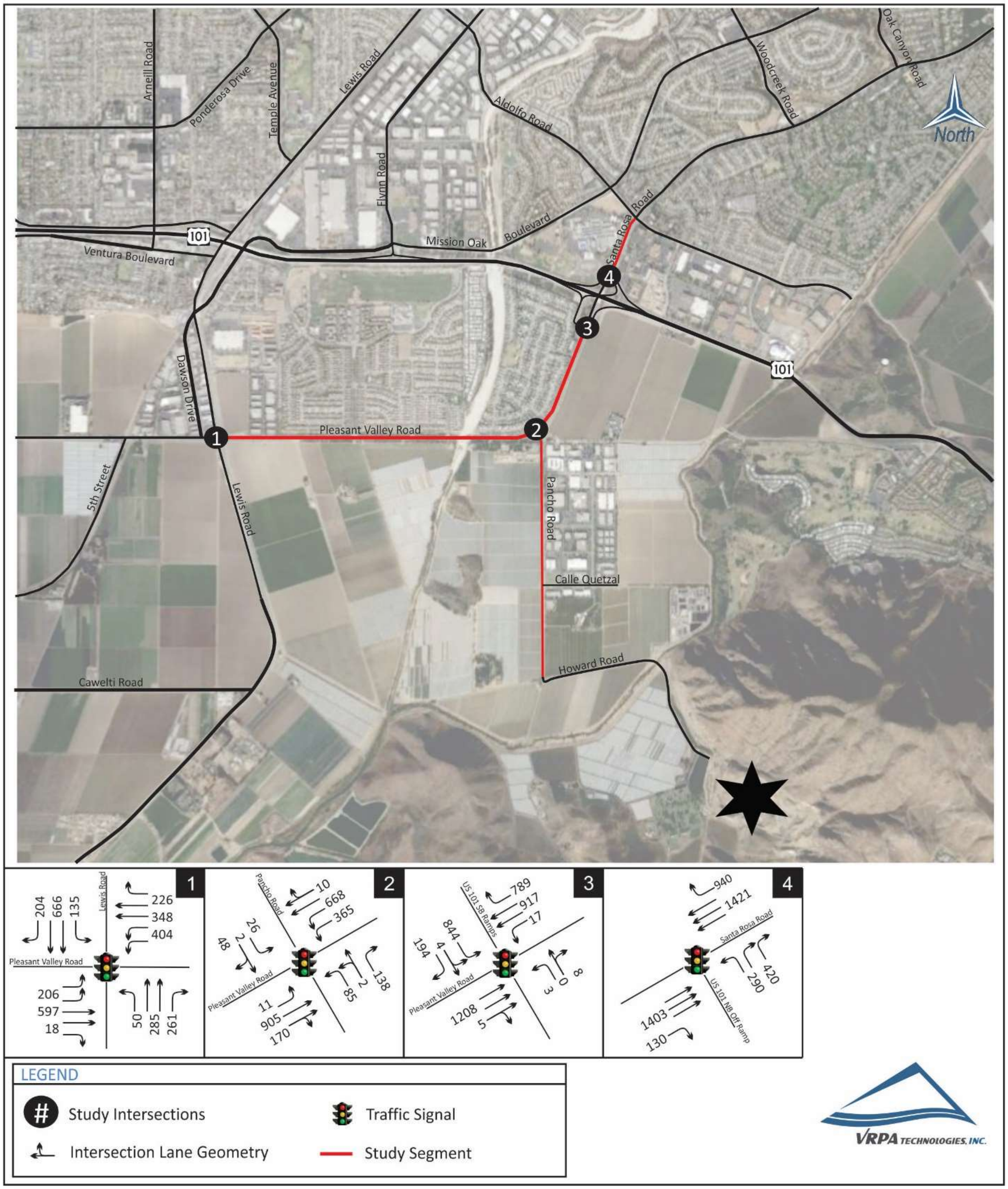
Figure 3-3



Note: A PCE of 2.5 is used for Project-related haul truck trips

Pacific Rock Quarry Expansion Project
Existing Plus Project AM Peak Hour Trips

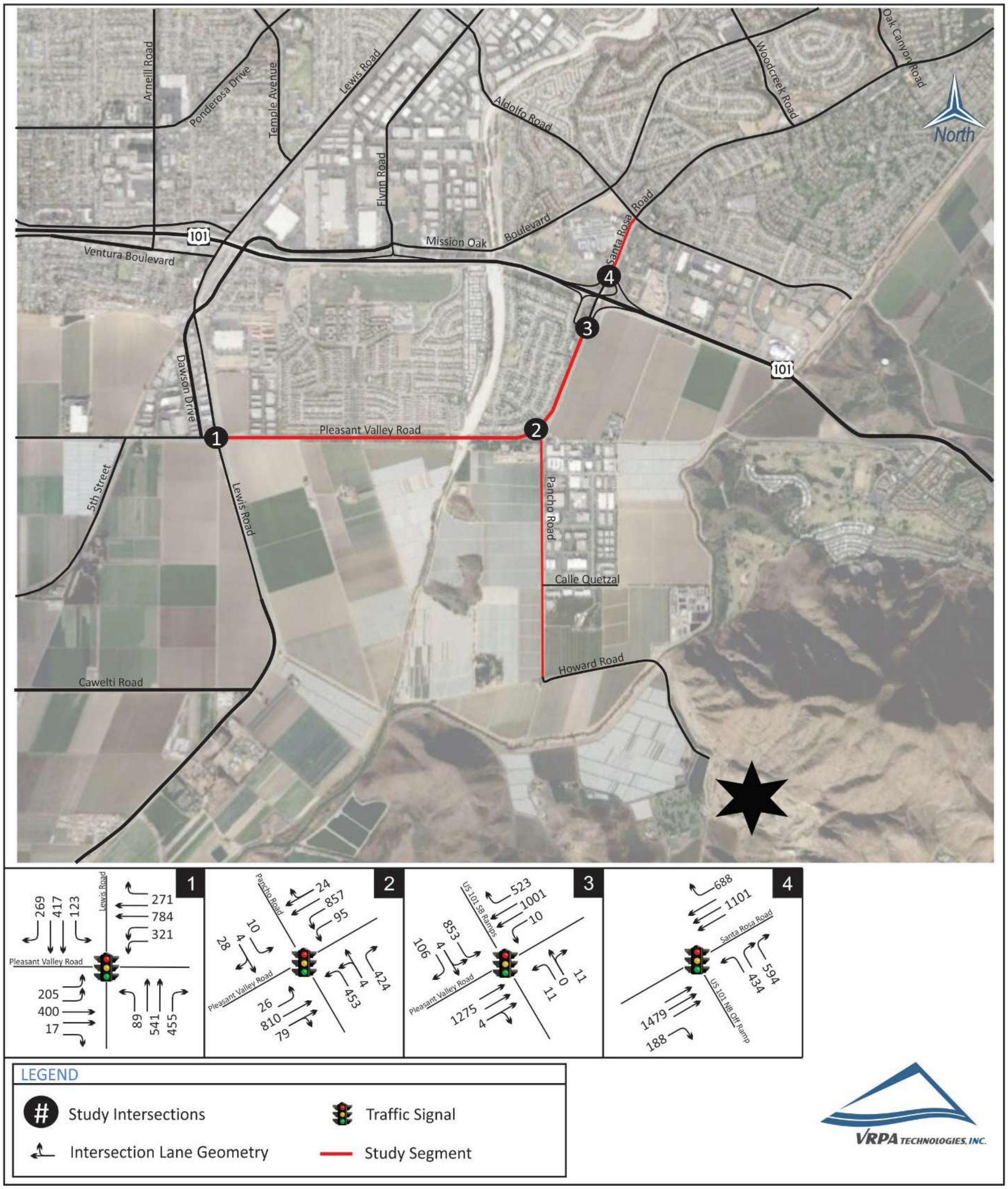
Figure 3-4



Note: A PCE of 2.5 is used for Project-related haul truck trips

Pacific Rock Quarry Expansion Project
Existing Plus Project PM Peak Hour Trips

Figure 3-5



Note: A PCE of 2.5 is used for Project-related haul truck trips

Table 3-2
Existing Plus Project Intersection Operations

INTERSECTION	CONTROL	PEAK HOUR	EXISTING		EXISTING PLUS PROJECT	
			ICU	LOS	ICU	LOS
1. Lewis Road / Pleasant Valley Road	Signalized	AM	62.4	B	62.6	B
		PM	65.4	C	65.8	C
2. Pancho Road / Pleasant Valley Road	Signalized	AM	58.5	B	61.3	B
		PM	60.8	B	63.2	B
3. US Route 101 SB Ramps / Pleasant Valley Road	Signalized	AM	77.8	D *	77.8	D *
		PM	62.0	B	62.7	B
4. US Route 101 NB Off Ramp / Pleasant Valley Road	Signalized	AM	47.4	A	47.8	A
		PM	54.2	A	55.6	B

ICU = Intersection Capacity Utilization (expressed as a percentage) / **BOLD** denotes LOS has been exceeded
For signalized controlled intersections, the LOS is based on the ICU method.
* Existing State highway facility is operating at less than the target LOS; the existing MOE shall be maintained.

Table 3-3
Existing Plus Project Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		EXISTING CONDITIONS		EXISTING PLUS PROJECT	
			AM Queue	PM Queue	AM Queue	PM Queue
Lewis Road / Pleasant Valley Road	NB Left	600	42	74	42	74
	NB Right	600	214	378	218	379
	SB Left	150	109	101	113	103
	SB Right	275	170	224	170	224
	EB Left	2 @ 175	172	171	172	171
	EB Right	150	15	14	15	14
	WB Left	2 @ 200	333	266	337	268
	WB Left	175	**185**	**224**	**188**	**226**
Pancho Road / Pleasant Valley Road	NB Left	2 @ 50	62	**368**	71	**378**
	NB Right	200	62	**321**	115	**353**
	SB Left	100	22	8	22	8
	EB Left	225	9	22	9	22
	WB Left	2 @ 350	245	53	304	79
US 101 SB Ramps / Pleasant Valley Road	SB Left	125	14	8	14	8
	SB Right	1075	658	436	658	436
	EB Left	2 @ 100	**703**	**711**	**703**	**711**
	EB Right	125	**148**	82	**162**	88
	WB Left	50	3	9	3	9
US 101 NB Off Ramp / Pleasant Valley Road	WB Left	350	202	343	245	**363**
	WB Right	2 @ 200	350	**495**	350	**495**

Queue is measured in feet / **BOLD** denotes exceedance

Table 3-4
Existing Plus Project Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	PEAK HOUR	DIRECTION	EXISTING		EXISTING PLUS PROJECT	
				VOLUME	LOS	VOLUME	LOS
Pleasant Valley Road							
Lewis Road to Pancho Road	2 Lanes Divided	AM	EB	1,070	C	1,089	C
		PM	EB	972	C	978	C
	2 Lanes Divided	AM	WB	966	C	977	C
		PM	WB	**1,365**	**D**	**1,376**	**D**
Pancho Road to US 101 SB Ramps	2 Lanes Divided	AM	NB	1,149	C	1,213	C
		PM	NB	**1,240**	**D**	**1,279**	**D**
	2 Lanes Divided	AM	SB	1,043	C	1,114	C
		PM	SB	1,085	C	1,117	C
Santa Rosa Road							
US 101 NB Ramps to Adolfo Road	3 Lanes Divided	AM	NB	1,819	C	1,823	C
		PM	NB	**2,069**	**D**	**2,073**	**D**
	3 Lanes Divided	AM	SB	**2,355**	**D**	**2,361**	**D**
		PM	SB	1,787	C	1,789	C
Pancho Road							
Pleasant Valley Road to Calle Quetzal	1 Lane Undivided	AM	NB	150	C	**225**	**D**
		PM	NB	**831**	**E**	**880**	**E**
	1 Lane Undivided	AM	SB	**450**	**D**	**537**	**D**
		PM	SB	140	C	178	C
Calle Quetzal to Howard Road	1 Lane Undivided	AM	NB	19	C	94	C
		PM	NB	75	C	125	C
	1 Lane Undivided	AM	SB	30	C	117	C
		PM	SB	24	C	62	C

BOLD denotes LOS standard has been exceeded.
Project causes LOS D.
Project contributes to LOS D or worse.

3.5 Existing Plus Approved/Pending Projects and Existing Plus Approved/Pending Projects Plus Project Traffic Conditions

The Existing Plus Approved/Pending Traffic Conditions scenario considers approved or pending developments that have not yet been built in the vicinity of the Project but that are anticipated to add trips and affect traffic operation in the near-term. The Ventura County Planning Division's and City of Camarillo Community Development's approved/pending projects lists were consulted for recently approved or pending developments in the study area. The following developments were identified that are anticipated to add new trips to the study intersections and roadway segments:

- Camarillo Springs Golf Course – 300 (55+ Community) dwelling units (DUs)
- St. John's Seminary Residential Development – 281 single-family dwelling units (SFDUs)
- Camino Ruiz Residential Project – 386 multi-family dwelling units (MFDUs)
- Teso Robles Townhomes – 129 Townhomes
- Castle Building and Developments New Single-Family Development – 38 SFDUs
- Mission Oaks Business Park – 344,515 sq. ft. light industrial/office buildings
- Camarillo Village Homes – 309 Townhomes and 12,000 sq. ft. of retail
- Park West Town Homes – 87 Townhomes

An Existing Plus Approved/Pending Scenario was analyzed to include existing traffic plus traffic anticipated to be generated by the approved/pending projects in the study area. The resulting traffic operations during the AM and PM peak hour periods are shown in Figures 3-6 and 3-7.

To consider Project changes in levels of service associated with the near-term scenario, an Existing Plus Approved/Pending Projects Plus Project Scenario was analyzed to include existing traffic plus traffic generated by the approved/pending projects in the study area (as discussed above) and trips that would be generated by the Project (as discussed above in Sections 3.1 and 3.2). The resulting traffic operations during the AM and PM peak hour periods are shown in Figures 3-8 and 3-9.

3.5.1 *Existing Plus Approved/Pending Projects Plus Project Intersection Capacity Analysis*

Table 3-6 summarizes traffic operations under existing plus approved/pending projects conditions without the Project and under existing plus approved/pending projects conditions with the Project. As shown in the table, under existing plus approved/pending projects conditions without the Project, the US 101 SB Ramps/Pleasant Valley Road intersection is predicted to operate at LOS "E" with an ICU percentage of 86.5 during the AM peak hour. The addition of Project-related trips would not measurably change the ICU percentage or reduce the LOS at this intersection. All other intersections are predicted to operate at LOS "C" or better under existing plus approved/pending projects conditions both with and without the Project.

3.5.2 *Existing Plus Approved/Pending Projects Plus Project Queuing Analysis*

Table 3-8 summarizes queuing operations under existing plus approved/pending projects conditions without the Project and under existing plus approved/pending projects conditions with the Project. Queuing analysis was completed using Section 400 of Caltrans' Highway Design Manual. As discussed in Section 2.0, the queuing analysis presented in this TIS is provided for informational purposes only. The City of Camarillo, Ventura County, and Caltrans have not established CEQA impact significance criteria related to the exceedance of left and right turn storage pockets.

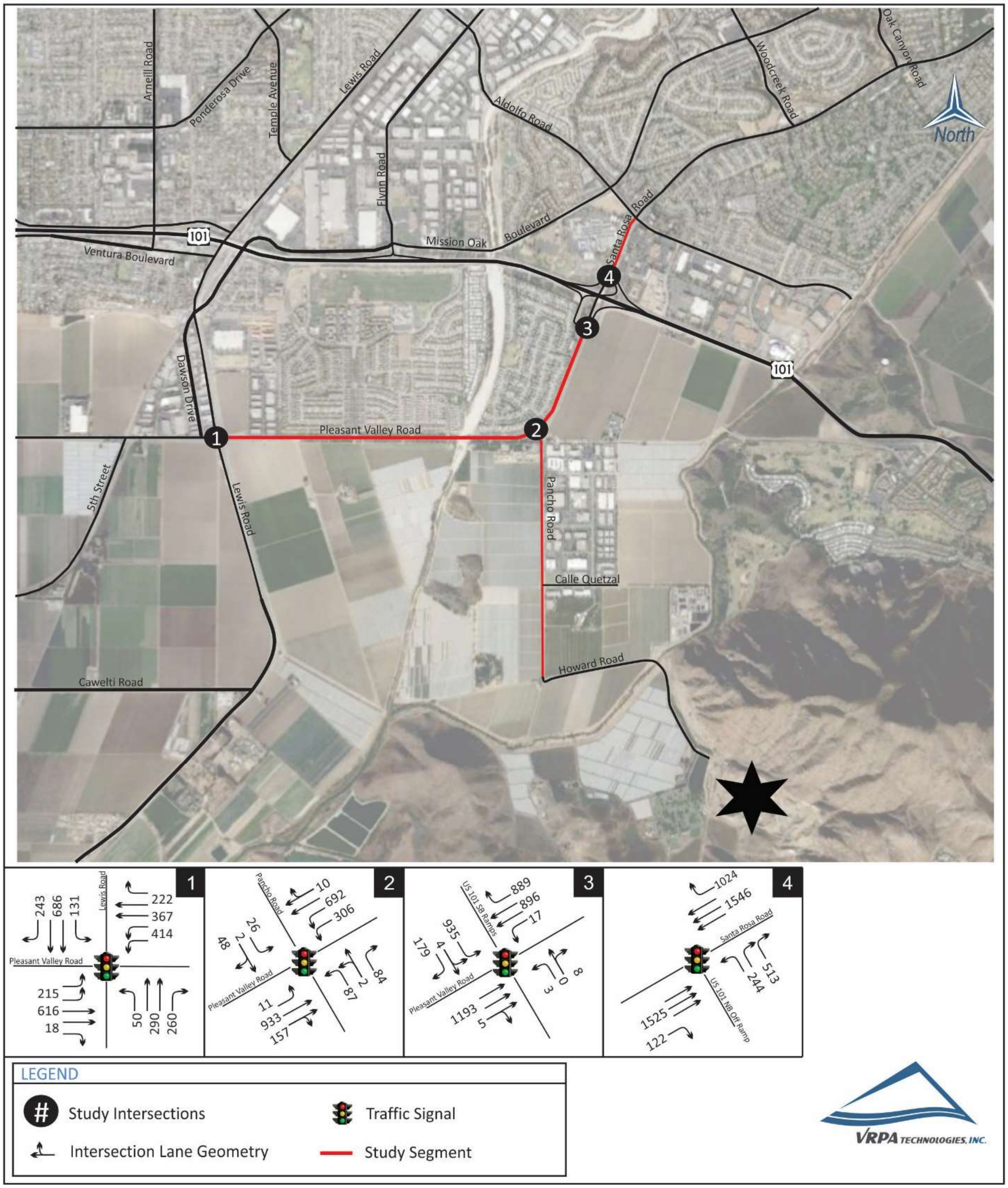
3.5.3 *Existing Plus Approved/Pending Projects Plus Project Roadway Segment Capacity Analysis*

Table 3-9 summarizes traffic operations under existing plus approved/pending projects conditions without the Project and under existing plus approved/pending projects conditions with the Project and assumes that the improvements needed to address Existing Plus Project conditions have not been installed. As shown in the table, the addition of Project-related trips to Existing Plus Approved/Pending Projects conditions on study area roadway segments would result in three instances in which the Project would degrade conditions from LOS C to LOS D, six instances in which the Project would worsen LOS D conditions, one instance in which the Project would degrade conditions from LOS E to LOS F, and one instance in which the Project would worsen LOS F conditions, as summarized below:

- Pleasant Valley Road westbound from Pancho Road to Lewis Road during the PM peak hour (worsen LOS D)
- Pleasant Valley Road northbound between Pancho Road and US 101 southbound ramps during the AM peak hour (degrade from LOS C to LOS D)
- Pleasant Valley Road northbound between Pancho Road and US 101 southbound ramps during the PM peak hour (worsen LOS D)
- Santa Rosa Road northbound between US 101 northbound ramps and Adolfo Road during the AM peak hour (worsen LOS D)
- Santa Rosa Road northbound between US 101 northbound ramps and Adolfo Road during the PM peak hour (worsen LOS D)
- Santa Rosa Road southbound between Adolfo Road and US 101 northbound ramps during the AM peak hour (worsen LOS F)
- Santa Rosa Road southbound between Adolfo Road and US 101 northbound ramps during the PM peak hour (worsen LOS D)
- Pancho Road northbound between Calle Quetzal and Pleasant Valley Road during the AM peak hour (degrade from LOS C to LOS D)
- Pancho Road northbound between Calle Quetzal and Pleasant Valley Road during the PM peak hour (degrade from LOS E to LOS F)
- Pancho Road southbound between Pleasant Valley Road and Calle Quetzal during the AM peak hour (worsen existing LOS D)
- Pancho Road southbound between Pleasant Valley Road and Calle Quetzal during the PM peak hour (degrade from LOS C to LOS D)

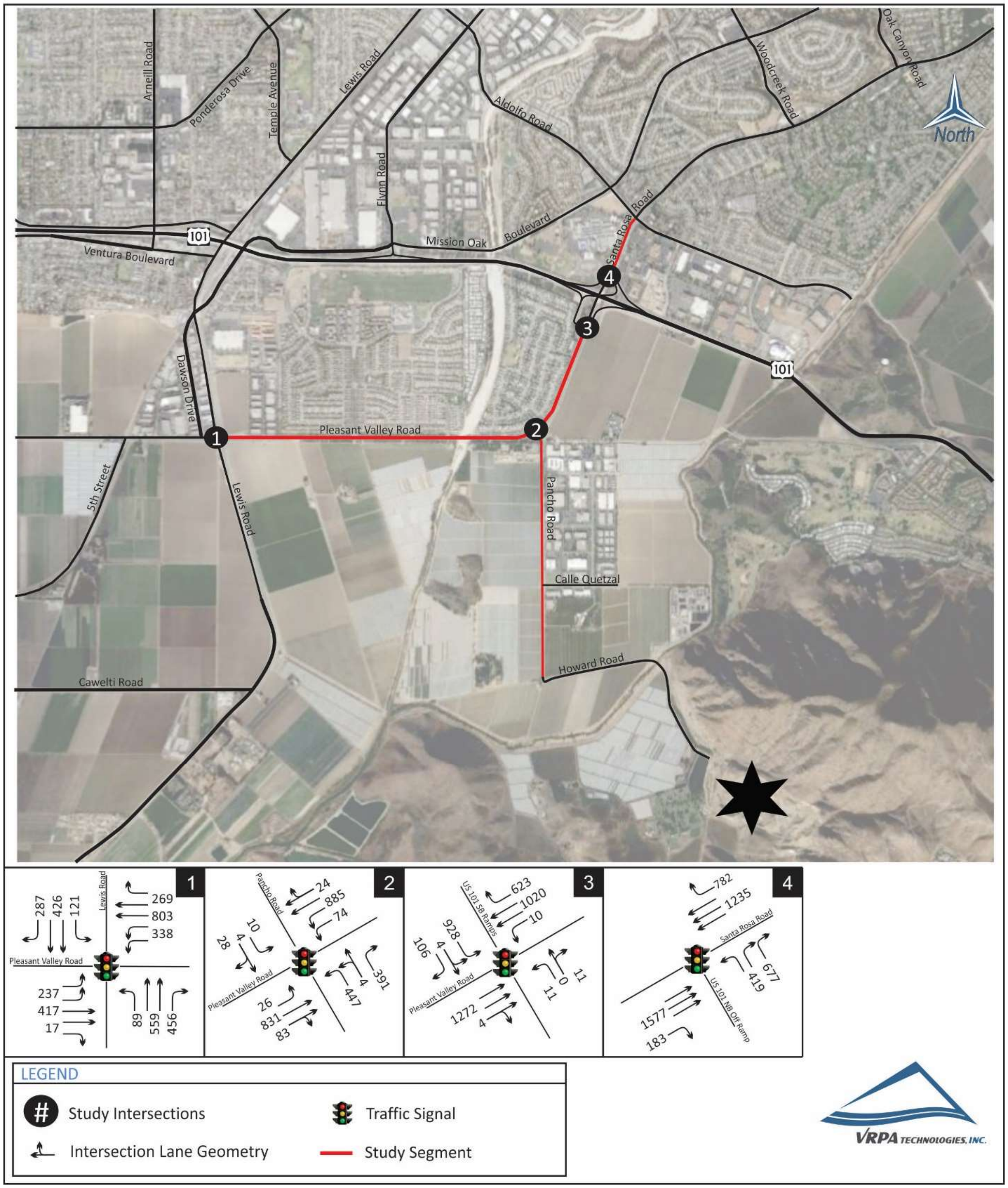
Pacific Rock Quarry Expansion Project
Existing Plus Approved/Pending AM Peak Hour Trips

Figure 3-6



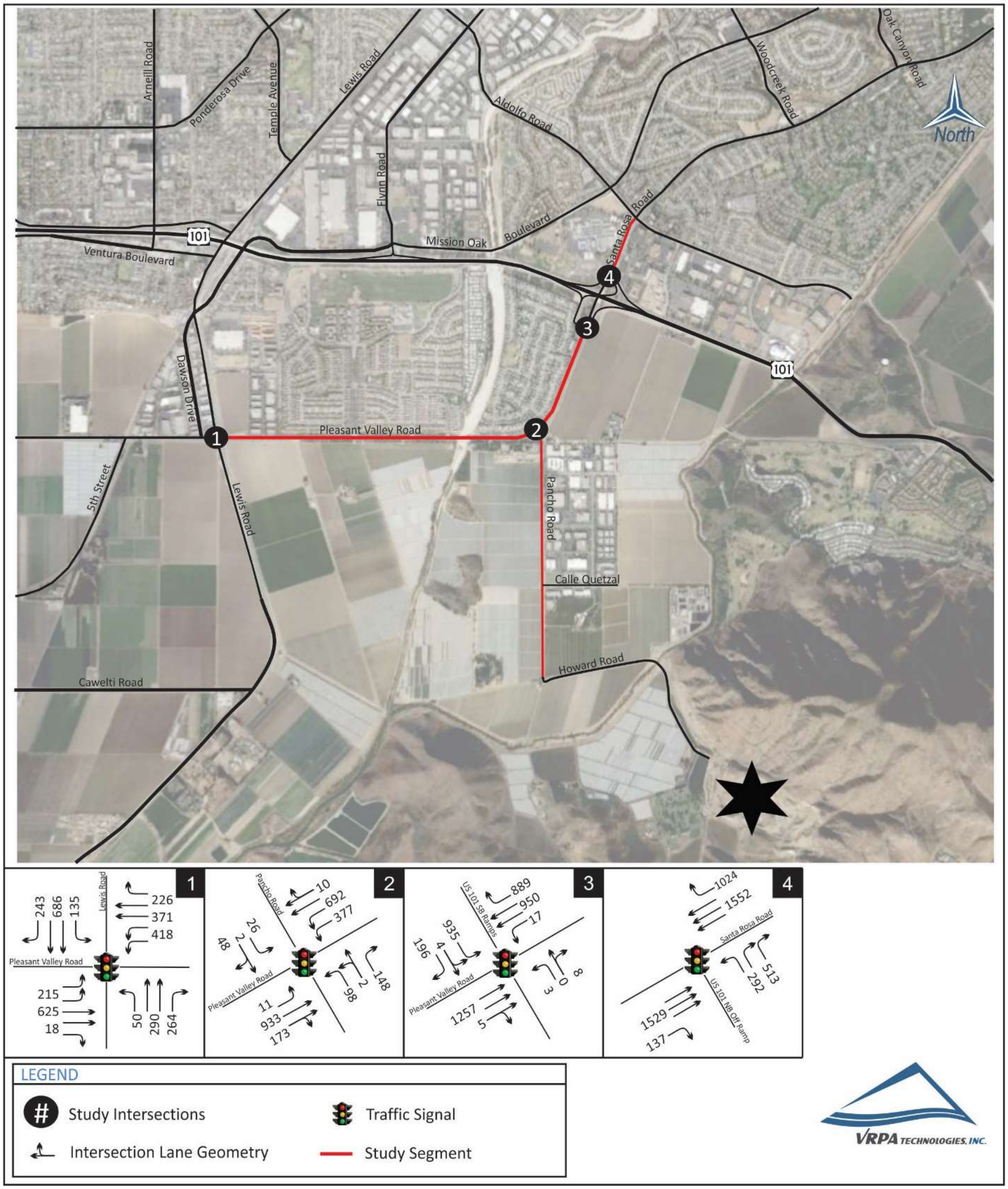
Pacific Rock Quarry Expansion Project
Existing Plus Approved/Pending PM Peak Hour Trips

Figure 3-7



Pacific Rock Quarry Expansion Project
Existing Plus Approved/Pending Plus Project AM Peak Hour Trips

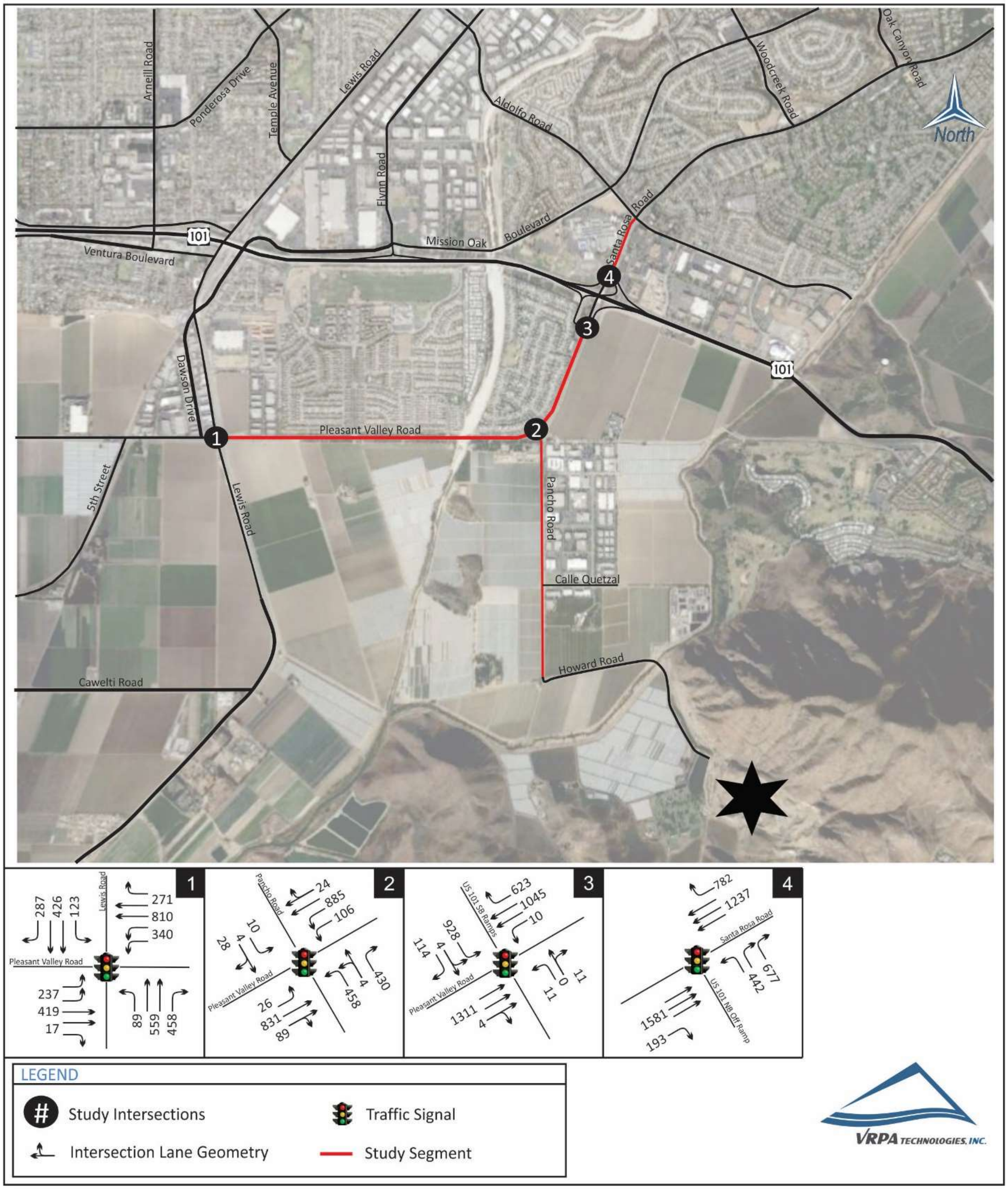
Figure 3-8



Note: A PCE of 2.5 is used for Project-related haul truck trips

Pacific Rock Quarry Expansion Project
Existing Plus Approved/Pending Plus Project PM Peak Hour Trips

Figure 3-9



Note: A PCE of 2.5 is used for Project-related haul truck trips

Table 3-5
Existing Plus Approved/Pending and Existing Plus Approved/Pending Plus Project Intersection Operations

INTERSECTION	CONTROL	PEAK HOUR	EXISTING PLUS APPROVED/ PENDING		EXISTING PLUS APPROVED/ PENDING PLUS PROJECT	
			ICU	LOS	ICU	LOS
1. Lewis Road / Pleasant Valley Road	Signalized	AM	63.8	B	64.2	C
		PM	66.3	C	66.7	C
2. Pancho Road / Pleasant Valley Road	Signalized	AM	60.0	B	62.8	B
		PM	62.0	B	64.4	C
3. US Route 101 SB Ramps / Pleasant Valley Road	Signalized	AM	**86.5**	**E**	**86.5**	**E**
		PM	69.8	C	69.8	C
4. US Route 101 NB Off Ramp / Pleasant Valley Road	Signalized	AM	53.2	A	53.3	A
		PM	56.6	B	58.0	B

ICU = Intersection Capacity Utilization (expressed as a percentage) / **BOLD** denotes LOS has been exceeded
For signalized controlled intersections, the LOS is based on the ICU method.
Project contributes to LOS D or worse.

Table 3-6
Existing Plus Approved/Pending and Existing Plus Approved/Pending Plus Project Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		EXISTING PLUS APPROVED/ PENDING		EXISTING PLUS APPROVED/ PENDING PLUS PROJECT	
			AM Queue	PM Queue	AM Queue	PM Queue
Lewis Road / Pleasant Valley Road	NB Left	600	42	74	42	74
	NB Right	600	217	380	220	382
	SB Left	150	109	101	113	103
	SB Right	275	203	239	203	239
	EB Left	2 @ 175	179	198	179	198
	EB Right	150	15	14	15	14
	WB Left	2 @ 200	345	282	348	283
	WB Left	175	**185**	**224**	**188**	**226**
Pancho Road / Pleasant Valley Road	NB Left	2 @ 50	73	**373**	82	**382**
	NB Right	200	70	**326**	123	**358**
	SB Left	100	22	8	22	8
	EB Left	225	9	22	9	22
	WB Left	2 @ 350	255	62	314	88
US 101 SB Ramps / Pleasant Valley Road	SB Left	125	14	8	14	8
	SB Right	1075	741	519	741	519
	EB Left	2 @ 100	**779**	**773**	**779**	**773**
	EB Right	125	**149**	88	**163**	95
	WB Left	50	3	9	3	9
US 101 NB Off Ramp / Pleasant Valley Road	WB Left	350	203	349	247	**370**
	WB Right	2 @ 200	**428**	**564**	**428**	**564**

Queue is measured in feet / **BOLD** denotes exceedance

Table 3-7
Existing Plus Approved/Pending and Existing Plus Approved/Pending Plus Project Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	PEAK HOUR	DIRECTION	EXISTING PLUS APPROVED/ PENDING		EXISTING PLUS APPROVED/ PENDING PLUS PROJECT	
				VOLUME	LOS	VOLUME	LOS
Pleasant Valley Road							
Lewis Road to Pancho Road	2 Lanes Divided	AM	EB	1,101	C	1,117	C
		PM	EB	994	C	1,000	C
	2 Lanes Divided	AM	WB	1,003	C	1,014	C
		PM	WB	**1,410**	**D**	**1,421**	**D**
Pancho Road to US 101 SB Ramps	2 Lanes Divided	AM	NB	1,198	C	**1,262**	**D**
		PM	NB	**1,276**	**D**	**1,315**	**D**
	2 Lanes Divided	AM	SB	1,078	C	1,149	C
		PM	SB	1,137	C	1,169	C
Santa Rosa Road							
US 101 NB Ramps to Adolfo Road	3 Lanes Divided	AM	NB	**2,038**	**D**	**2,042**	**D**
		PM	NB	**2,254**	**D**	**2,258**	**D**
	3 Lanes Divided	AM	SB	**2,570**	**F**	**2,576**	**F**
		PM	SB	**2,017**	**D**	**2,019**	**D**
Pancho Road							
Pleasant Valley Road to Calle Quetzal	1 Lane Undivided	AM	NB	173	C	**248**	**D**
		PM	NB	**842**	**E**	**891**	**F**
	1 Lane Undivided	AM	SB	**465**	**D**	**552**	**D**
		PM	SB	161	C	**199**	**D**
Calle Quetzal to Howard Road	1 Lane Undivided	AM	NB	19	C	94	C
		PM	NB	75	C	125	C
	1 Lane Undivided	AM	SB	30	C	117	C
		PM	SB	24	C	62	C

BOLD denotes LOS standard has been exceeded.
Project causes or contributes to LOS D or worse.

3.6 Cumulative Year 2030 Traffic Conditions

Traffic volumes expected in 2030 consider existing traffic and increases in traffic over time resulting from development projected in the General Plans of local agencies, including the County of Ventura and City of Camarillo. Changes in traffic operations resulting from the Project were analyzed considering the long-range buildout under the City of Camarillo General Plan which considers future development in the City of Camarillo and surrounding region (Ventura County) through the year 2030. Use of the City of Camarillo General Plan is appropriate for this TIS since all study are intersections are within the City of Camarillo's sphere of influence. The buildout traffic volumes for the study area intersections and roadway segments were derived from the City of Camarillo's Traffic Analysis Model (CTAM) as noted in the TIS prepared for the Camino Ruiz Residential Project (Stantec December 7, 2019). The CTAM was prepared and is maintained by VCTC and is a sub-area derivation of the Ventura Countywide Traffic Model (VCTM). Updated in the year 2010, the CTAM is based upon the latest VCTM projections and the latest land use projections and roadway improvement plans for the City of Camarillo and the surrounding region. Forecast adjustments were applied accordingly and were based on engineering judgment. In a few cases, the traffic volumes derived from CTAM were slightly lower than the Existing Plus Approved/Pending trips discussed in Section 3.5. Adjustments were made to eliminate any decreases in traffic volumes between the Existing scenario and the Cumulative Year 2030 Without Project scenario. Traffic operations during the AM and PM peak hour periods under the Year 2030 scenario without the Project are shown in Figures 3-10 and 3-11.

To consider changes in traffic operations resulting from the Project associated with the Year 2030 scenario, trips that would be generated by the Project (as discussed above in Sections 3.1 and 3.2) were added to the Cumulative Year 2030 without Project scenario. Traffic operations during the AM and PM peak hour periods under the Cumulative Year 2030 Plus Project scenario are shown in Figures 3-12 and 3-13.

3.6.1 *Cumulative Year 2030 Intersection Capacity Analysis*

Table 3-11 summarizes traffic operations under Cumulative Year 2030 conditions without the Project and under Cumulative Year 2030 conditions with the Project. As shown in the table, the addition of Project-related trips to Cumulative Year 2030 Without Project conditions on study area intersections would contribute to trips and increase delay at two intersections predicted to be below LOS "C" under Year 2030 conditions without the Project: Lewis Road at Pleasant Valley Road and US Route 101 SB Ramps at Pleasant Valley Road contributing to LOS "D" at the Lewis Road/Pleasant Valley Road intersection and contributing to LOS "F" (PM) and LOS "G" (AM) conditions at the US Route 101 SB Ramps/Pleasant Valley Road intersection.

3.6.2 *Cumulative Year 2030 Queuing Analysis*

Table 3-13 summarizes queuing operations under Cumulative Year 2030 conditions without the Project and under Cumulative Year 2030 conditions with the Project. Queuing analysis was completed using Section 400 of Caltrans' Highway Design Manual. As discussed in Section 2.0, the queuing analysis presented in this TIS is provided for informational purposes only. The City of Camarillo, Ventura County, and Caltrans have not established CEQA impact significance criteria related to the exceedance of left and right turn storage pockets.

Table 3-14 identifies left turn and right turn lane pocket lengths required for the Cumulative Year 2030 scenario. Although the need for extended turn lane pockets would occur at some locations prior to the Cumulative Year 2030 scenario, this scenario provides the maximum length needed and therefore these lengths would also provide for projected traffic volumes under the Existing Plus Project and Existing Plus Approved/Pending Project Plus Project scenarios. The storage length required to provide sufficient capacity for projected traffic volumes under each evaluation scenario was determined by the queuing analysis and recommendations of storage lengths found in Chapter 400 of Caltrans' Highway Design Manual. The left turn and right turn pocket length do not include deceleration lengths.

A queuing assessment of the US 101 NB Off Ramp and US 101 SB Off Ramp to Pleasant Valley Road was also conducted to determine the adequacy of the existing ramp lengths. The Cumulative Year 2030 Plus Project traffic volume at the US 101 NB Off Ramp to Pleasant Valley Road will yield a combined storage requirement of 1,025 feet. The existing total ramp length of the US 101 SB Off Ramp is approximately 1,300 feet. The Cumulative Year 2030 Plus Project traffic volume at the US 101 SB Off Ramp to Pleasant Valley Road will yield a combined storage requirement of 1,125 feet. The existing total ramp length of the US 101 NB Off Ramp is approximately 1,225 feet. The existing ramp lengths are sufficient to accommodate Cumulative Year 2030 Plus Project traffic. It should be noted that Caltrans recommended auxiliary lane improvements between Village Park Drive and Pleasant Valley Road in the southbound direction of US 101 in the VCTC US 101 HOT Lanes Financial Feasibility Study. The auxiliary lane would provide drivers with additional space to accelerate or decelerate when entering or exiting the freeway which enhances the traffic flow along the freeway.

3.6.3 *Cumulative Year 2030 Roadway Segment Capacity Analysis*

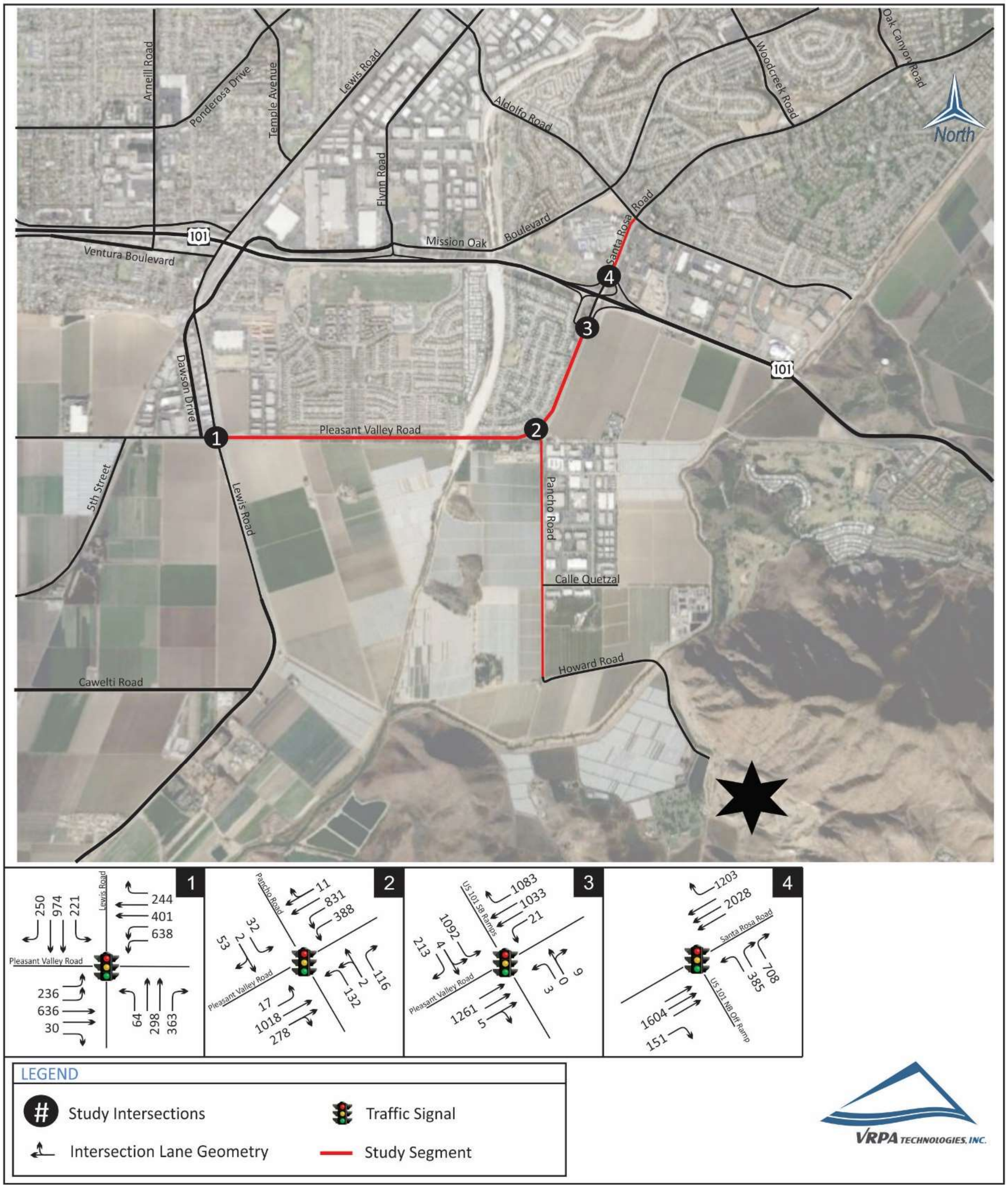
Table 3-15 summarizes traffic operations under Cumulative Year 2030 conditions without the Project and under Cumulative Year 2030 conditions with the Project, and assumes existing road and intersection configurations. As shown in the table, the addition of Project-related trips to Cumulative Year 2030 Without Project conditions on study area roadway segments would result in eleven instances in which the Project would worsen LOS D conditions, one instance in which the Project would worsen LOS E conditions, and four instances in which the Project would worsen LOS F conditions, as summarized below:

- Pleasant Valley Road eastbound from Lewis Road to Pancho Road during the AM peak hour (worsen LOS D)
- Pleasant Valley Road eastbound from Lewis Road to Pancho Road during the PM peak hour (worsen LOS D)
- Pleasant Valley Road westbound from Pancho Road to Lewis Road during the AM peak hour (worsen LOS D)

- Pleasant Valley Road westbound from Pancho Road to Lewis Road during the PM peak hour (worsen LOS D)
- Pleasant Valley Road northbound between Pancho Road and US 101 southbound ramps during the AM peak hour (worsen LOS D)
- Pleasant Valley Road northbound between Pancho Road and US 101 southbound ramps during the PM peak hour (worsen LOS D)
- Pleasant Valley Road southbound between US 101 southbound ramps and Pancho Road during the AM peak hour (worsen LOS D)
- Pleasant Valley Road southbound between US 101 southbound ramps and Pancho Road during the PM peak hour (worsen LOS D)
- Santa Rosa Road northbound between US 101 northbound ramps and Adolfo Road during the AM peak hour (worsen LOS D)
- Santa Rosa Road northbound between US 101 northbound ramps and Adolfo Road during the PM peak hour (worsen LOS F)
- Santa Rosa Road southbound between Adolfo Road and US 101 northbound ramps during the AM peak hour (worsen LOS F)
- Santa Rosa Road southbound between Adolfo Road and US 101 northbound ramps during the PM peak hour (worsen LOS F)
- Pancho Road northbound between Calle Quetzal and Pleasant Valley Road during the AM peak hour (worsen LOS D)
- Pancho Road northbound between Calle Quetzal and Pleasant Valley Road during the PM peak hour (worsen LOS F)
- Pancho Road southbound between Pleasant Valley Road and Calle Quetzal during the AM peak hour (worsen LOS E)
- Pancho Road southbound between Pleasant Valley Road and Calle Quetzal during the PM peak hour (worsen LOS D)

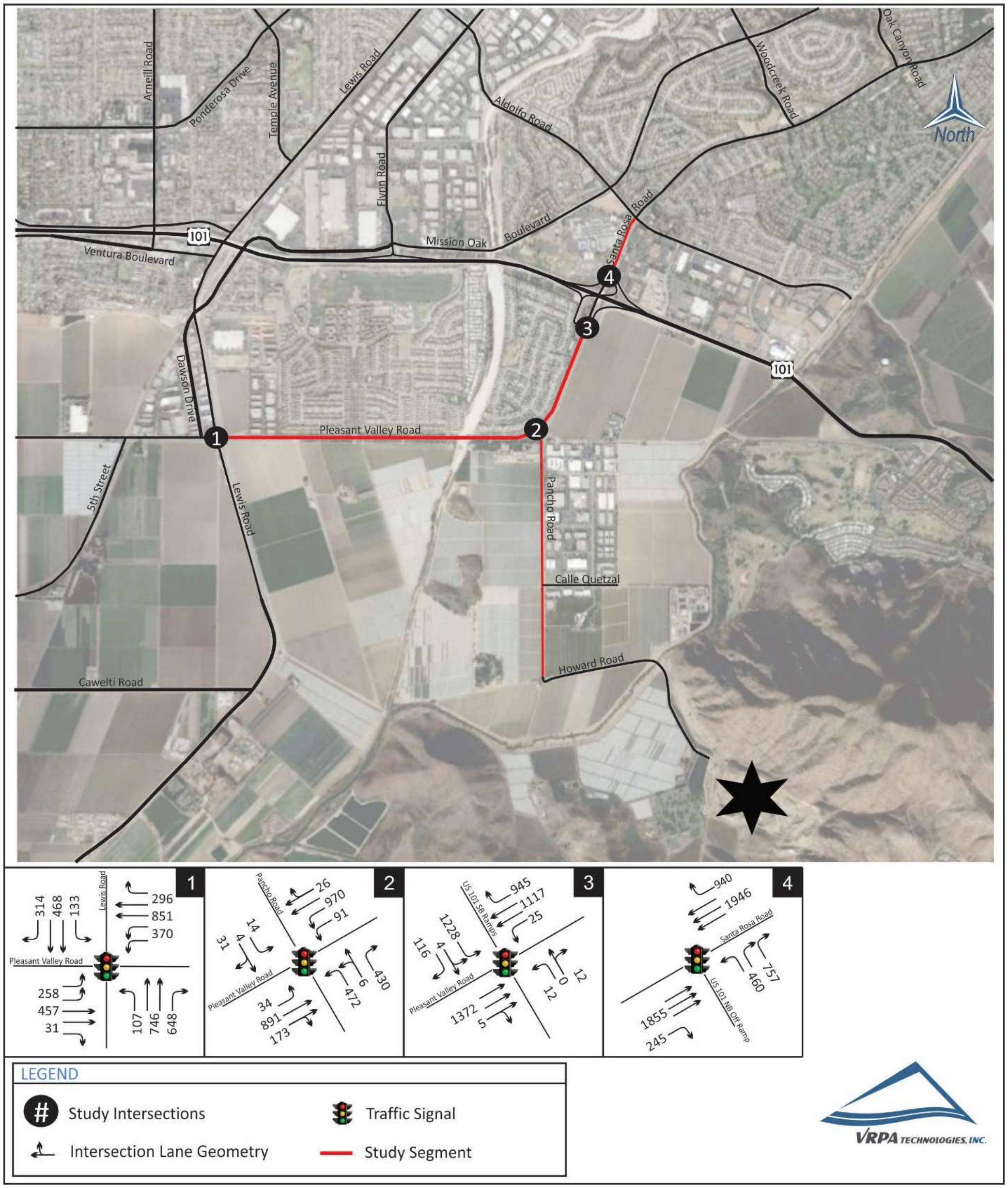
Pacific Rock Quarry Expansion Project
Cumulative Year 2030 Without Project AM Peak Hour Trips

Figure 3-10



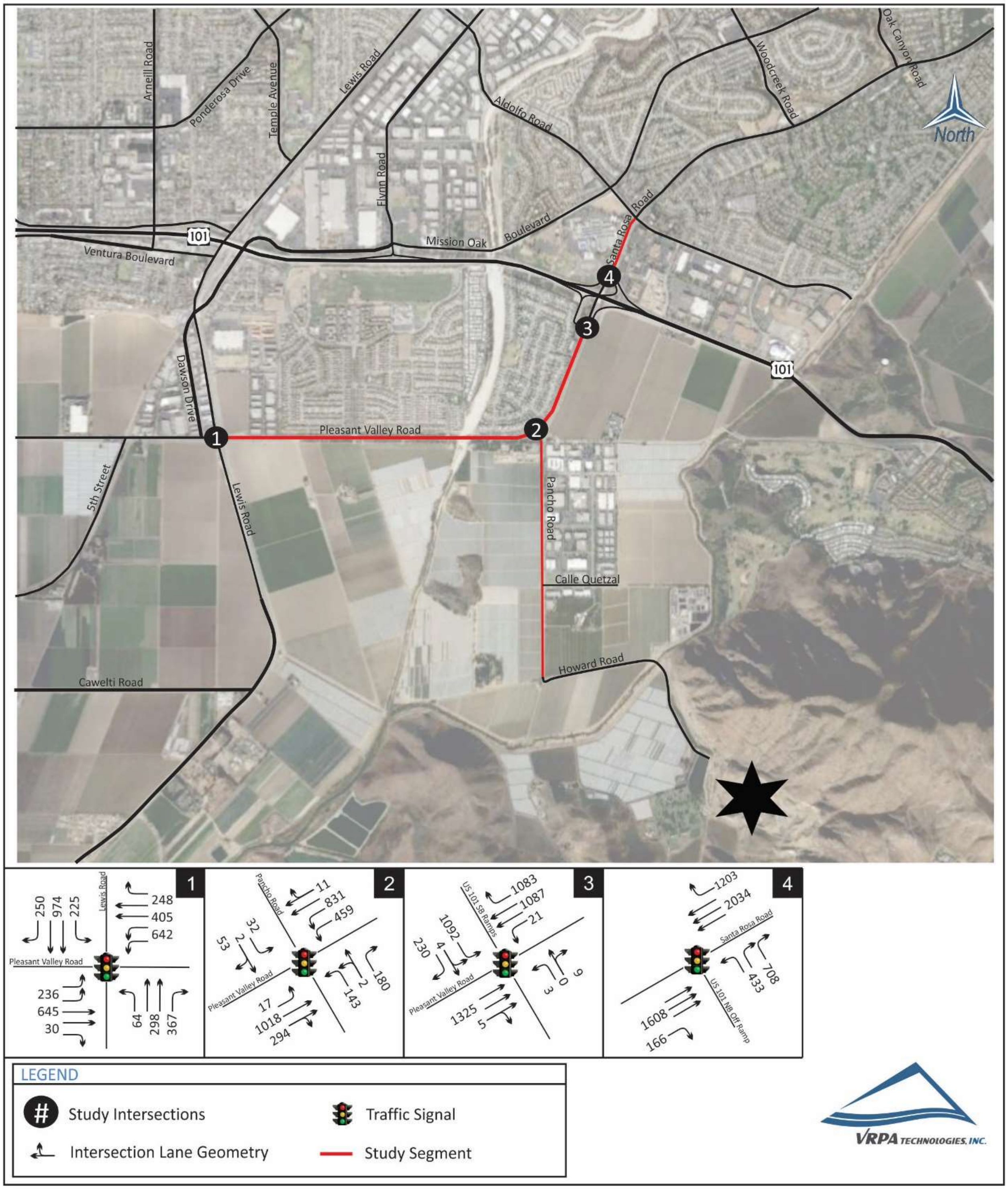
Pacific Rock Quarry Expansion Project
Cumulative Year 2030 Without Project PM Peak Hour Trips

Figure
3-11



Pacific Rock Quarry Expansion Project
Cumulative Year 2030 Plus Project AM Peak Hour Trips

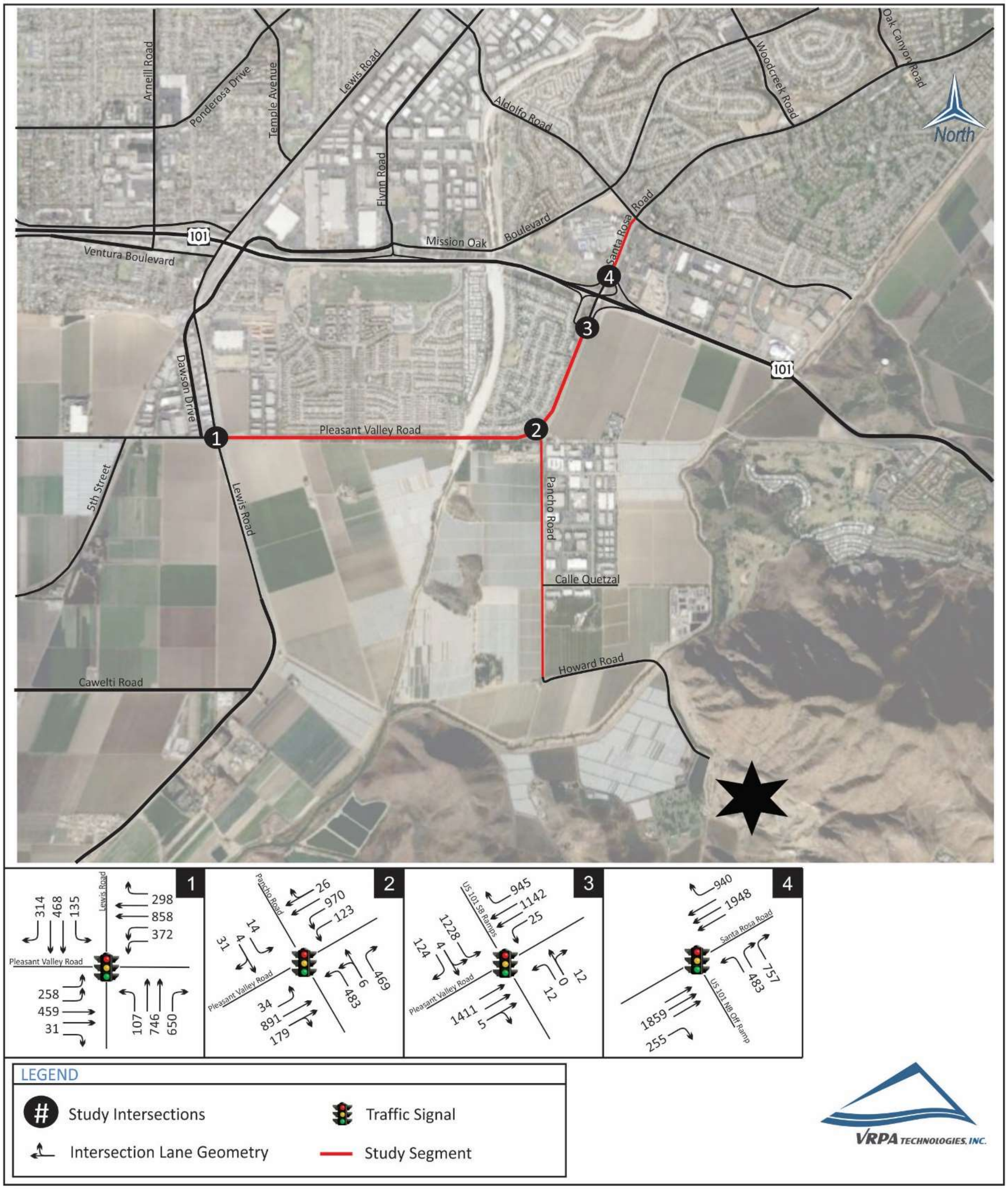
Figure 3-12



Note: A PCE of 2.5 is used for Project-related haul truck trips

Pacific Rock Quarry Expansion Project
Cumulative Year 2030 Plus Project PM Peak Hour Trips

Figure 3-13



Note: A PCE of 2.5 is used for Project-related haul truck trips

Table 3-8
Cumulative Year 2030 Intersection Operations

INTERSECTION	CONTROL	PEAK HOUR	CUMULATIVE YEAR 2030 WITHOUT PROJECT		CUMULATIVE YEAR 2030 PLUS PROJECT	
			ICU	LOS	ICU	LOS
1. Lewis Road / Pleasant Valley Road	Signalized	AM	**77.9**	**D**	**78.3**	**D**
		PM	**80.2**	**D**	**80.6**	**D**
2. Pancho Road / Pleasant Valley Road	Signalized	AM	69.5	C	72.3	C
		PM	66.8	C	69.2	C
3. US Route 101 SB Ramps / Pleasant Valley Road	Signalized	AM	**102.8**	**G**	**102.8**	**G**
		PM	**98.1**	**F**	**98.1**	**F**
4. US Route 101 NB Off Ramp / Pleasant Valley Road	Signalized	AM	69.4	C	69.4	C
		PM	69.5	C	69.5	C

ICU = Intersection Capacity Utilization (expressed as a percentage) / **BOLD** denotes LOS has been exceeded
For signalized controlled intersections, the LOS is based on the ICU method.
Project contributes to LOS D or worse.

Table 3-9
Cumulative Year 2030 Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		CUMULATIVE YEAR 2030 WITHOUT PROJECT		CUMULATIVE YEAR 2030 PLUS PROJECT	
			AM Queue	PM Queue	AM Queue	PM Queue
Lewis Road / Pleasant Valley Road	NB Left	600	53	89	53	89
	NB Right	600	303	540	306	542
	SB Left	150	**176**	111	**188**	113
	SB Right	275	208	262	208	262
	EB Left	2 @ 175	197	215	197	215
	EB Right	150	25	26	25	26
	WB Left	2 @ 200	**532**	308	**535**	310
	WB Left	175	**203**	**247**	**207**	**248**
Pancho Road / Pleasant Valley Road	NB Left	2 @ 50	**110**	**393**	**119**	**403**
	NB Right	200	97	**358**	150	**391**
	SB Left	100	27	12	27	12
	EB Left	225	14	28	14	28
	WB Left	2 @ 350	323	76	383	103
US 101 SB Ramps / Pleasant Valley Road	SB Left	125	18	21	18	21
	SB Right	1075	903	788	903	788
	EB Left	2 @ 100	**910**	**1023**	**910**	**1023**
	EB Right	125	**178**	97	**192**	103
	WB Left	50	3	10	3	10
US 101 NB Off Ramp / Pleasant Valley Road	WB Left	350	321	**383**	**364**	**404**
	WB Right	2 @ 200	**590**	**631**	**590**	**631**

Queue is measured in feet / **BOLD** denotes exceedance

Table 3-10
Left Turn and Right Turn Storage Requirements

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		CUMULATIVE YEAR 2030 PLUS PROJECT RECOMMENDED STORAGE LENGTH (ft)	
Lewis Road / Pleasant Valley Road	NB Left	600	NB Left	600
	NB Right	600	NB Right	600
	SB Left	150	SB Left	**200**
	SB Right	275	SB Right	275
	EB Left	2 @ 175	EB Left	2 @ 175
	EB Right	150	EB Right	150
	WB Left	2 @ 200	WB Left	**2 @ 275**
	WB Left	175	WB Left	**250**
Pancho Road / Pleasant Valley Road	NB Left	2 @ 50	NB Left	2 @ 50
	NB Right	200	NB Right	200
	SB Left	100	SB Left	100
	EB Left	225	EB Left	225
	WB Left	2 @ 350	WB Left	2 @ 350
US 101 SB Ramps / Pleasant Valley Road	SB Left	125	SB Left	125
	SB Right	1075	SB Right	1075
	EB Left	2 @ 100	EB Left	**2 @ 700**
	EB Right	125	EB Right	**200**
	WB Left	50	WB Left	50
US 101 NB Off Ramp / Pleasant Valley Road	WB Left	350	WB Left	**400**
	WB Right	2 @ 200	WB Right	**2 @ 325**

BOLD denotes change in storage length

Table 3-11
Cumulative Year 2030 Segment Operations

STREET SEGMENT	SEGMENT DESCRIPTION	PEAK HOUR	DIRECTION	CUMULATIVE YEAR 2030 WITHOUT PROJECT		CUMULATIVE YEAR 2030 PLUS PROJECT	
				VOLUME	LOS	VOLUME	LOS
Pleasant Valley Road							
Lewis Road to Pancho Road	2 Lanes Divided	AM	EB	**1,313**	**D**	**1,329**	**D**
		PM	EB	**1,238**	**D**	**1,244**	**D**
	2 Lanes Divided	AM	WB	**1,283**	**D**	**1,294**	**D**
		PM	WB	**1,517**	**D**	**1,528**	**D**
Pancho Road to US 101 SB Ramps	2 Lanes Divided	AM	NB	**1,266**	**D**	**1,330**	**D**
		PM	NB	**1,377**	**D**	**1,416**	**D**
	2 Lanes Divided	AM	SB	**1,249**	**D**	**1,320**	**D**
		PM	SB	**1,245**	**D**	**1,277**	**D**
Santa Rosa Road							
US 101 NB Ramps to Adolfo Road	3 Lanes Divided	AM	NB	**2,312**	**D**	**2,316**	**D**
		PM	NB	**2,612**	**F**	**2,616**	**F**
	3 Lanes Divided	AM	SB	**3,231**	**F**	**3,237**	**F**
		PM	SB	**2,886**	**F**	**2,888**	**F**
Pancho Road							
Pleasant Valley Road to Calle Quetzal	1 Lane Undivided	AM	NB	**250**	**D**	**325**	**D**
		PM	NB	**908**	**F**	**957**	**F**
	1 Lane Undivided	AM	SB	**668**	**E**	**755**	**E**
		PM	SB	**268**	**D**	**306**	**D**
Calle Quetzal to Howard Road	1 Lane Undivided	AM	NB	69	C	144	C
		PM	NB	114	C	164	C
	1 Lane Undivided	AM	SB	90	C	177	C
		PM	SB	88	C	126	C

BOLD denotes LOS standard has been exceeded.
Project contributes to LOS D or worse.

4.0 Impact Determinations

Appendix G of the CEQA Guidelines and the County's April 26, 2011, Initial Study Assessment Guidelines (ISAG) identify certain transportation-related topics for consideration during CEQA review. These issues include potential policy or land use plan conflicts, potential impacts associated with safety on public roads and private access driveways, potential impacts on bicycle and pedestrian circulation and safety, and potential impacts on transit operations.[3] Each of these is discussed the following sections. (As discussed in the introduction, CEQA and the CEQA Guidelines as amended in 2018 also required that by July 1, 2020, CEQA lead agencies must evaluate transportation impacts in consideration of vehicle miles traveled or similar metric. This TIS does not include an evaluation of VMT associated with the Project, and it is anticipated that the County will separately address Project-related VMT in the EIR in consideration of SB 743 and CEQA Guidelines.)

Potential Conflict with a Program, Plan, Ordinance or Policy Addressing the Circulation System

Ventura County, the City of Camarillo, and Caltrans seek to maintain acceptable levels of service along the highway, street, and road network. These agencies adopt minimum levels of service in an attempt to control congestion that may result as new development occurs.4 The traffic operations evaluation in this TIS discusses the various level of service goals and policies of these agencies and evaluates predicted levels of service associated with various with-Project evaluation scenarios. As assessment of the Project's consistency with programs, plans, ordinances, and policies is beyond the scope of this TIS and it is anticipated that Project consistency will be addressed by the County in the EIR to the prepared for the Project.

Potential Impacts on Transit Services

Transit services within the City of Camarillo are served by Fixed Route, Dial-A-Ride and Ventura County Transportation Commission (VCTC) Intercity service. The Fixed Route service, provided by Camarillo Area Transit (CAT), does not include transit routes in the study area. The VCTC Intercity is a Countywide service, which connects Camarillo with Thousand Oaks, Oxnard and Ventura. The Oxnard/Camarillo/CSUCI route traverses Pleasant Valley Road along Lewis Road, with a stop located along Lewis Road just south of US-101. The additional Project trips would not interfere with these transit routes or stops and, thus, would not result in significant adverse effects on existing or planned transit facilities in the Project study area.

Potential Impacts on Bicycle and Pedestrian Safety and Circulation

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3 The ISAG also identifies Transportation Level of Service as an issue to consider, and levels of service are evaluated in detail in this TIS. The ISAG also identifies transportation items associated with railroads, airports, harbor facilities, and pipelines; however, addressing those items is outside the scope of this TIS.

4 At the time of preparation of this TIS, agencies including Ventura County and Caltrans, are considering amendments to policies pertaining to congestion in efforts to implement and comply with the requirements of amendments to CEQA and the CEQA Guidelines pursuant to SB 743.

Bicycling is considered an effective alternative mode of transportation that can help to improve air quality and reduce the number of vehicles traveling along existing highways, especially within the cities and unincorporated communities. The City of Camarillo Bikeway Master Plan identifies existing Class II bike lanes along the study segments of Pleasant Valley Road and Santa Rosa Road and a planned Class II bike lane along Pancho Road, which would be designed in accordance with City of Camarillo standards. Sidewalks presently exist along the north/west side of Pleasant Valley Road study segment, both sides of the Santa Rosa Road study segment, and along the east side of Pancho Road.

The existing Class II bike lanes and pedestrian facilities crossing Lewis Road, Pancho Road, and US 101 NB and SB ramps, do so at traffic-controlled intersections. All of the study intersections evaluated in this TIS are signalized and include pedestrian signal phasing which accommodates pedestrians utilizing the crosswalk. Though traffic within the study area is expected to increase over time, these traffic control devices will help maintain pedestrian and bicycle safety within the study area. Class II bike lanes are identified in the City of Camarillo's General Plan Circulation Element on all study roadway segments, and it is anticipated that the City will retain and add Class II bike lanes on these segments sufficient to accommodate bicycle and pedestrian safety and circulation. The additional Project trips would not adversely affect existing or planned bicycle or pedestrian facilities in the Project study area.

Potential Impacts Associated with Hazards on Public Roads or Private Access Roads due to Design or Incompatible Uses

The proposed Project will not create any new design features on or off the Project site. The existing on-site circulation pattern will remain the same as the currently approved surface mining permit. Although there will be an increase in the volume of vehicles accessing the site during peak-hour periods and some of the incoming haul trucks will be loaded for delivery of recycle materials or fill material, the same types of vehicles (heavy-duty haul trucks and personal vehicles) will continue to access the site. The existing site access/egress is located at a sufficient distance from any intersection to allow for safe vehicular access/egress to and from the site. Therefore, this impact is considered less than significant, and no mitigation is required.

Potential Impacts Related to Emergency Access

The Project site is currently accessed/egressed via an existing entrance road from Howard Road, a private road that provides access to the Project site and to the Conejo Mountain Memorial Cemetery. Emergency access to the site would be unaffected by the Project. Therefore, this impact is considered less than significant, and no mitigation is required.

APPENDIX A

HCM-Based LOS Tables (Florida Tables)

TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**[1]

03/14/2018

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Principal (1 signal per half mile)

Lanes	Median	B	C	D	E
1	Undivided	*	200	690	930
2	Divided	50	1,350	1,790	1,870
3	Divided	80	2,040	2,690	2,820

Minor (1 signal per quarter mile)

Lanes	Median	B	C	D	E
1	Undivided	*	*	210	710
2	Divided	*	470	1,390	1,840
3	Divided	*	880	2,190	2,780

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes
by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding directional
volumes in this table by 1.2

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,510	3,410	4,230	4,330
3	3,660	5,030	6,240	6,500
4	4,820	6,670	8,310	8,670
5	6,580	9,240	10,840	**
6	8,150	10,990	13,000	**

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	610	930	1,260	1,690
2	Divided	1,840	2,660	3,350	3,760
3	Divided	2,770	3,990	5,020	5,640

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	150	390	1,000
50-84%	110	340	1,000	>1,000
85-100%	470	1,000	>1,000	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

[1]Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

TABLE 7
(continued)

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**

03/14/2018

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities					
	Freeways	Highways		Principal Arterials		Minor Arterials		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS									
Area type (urban, rural)	urban								
Number of through lanes (both dir.)	4-12	2	4-6	2-4	6	2-4	6	4	4
Posted speed (mph)	70	50	50	50	50	40	40	45	45
Free flow speed (mph)	75	55	55	55	55	45	45	50	50
Auxiliary Lanes (n, y)	n								
Median (d, u, twlt)			d						
Terrain (l,r)	l	l	l	l	l	l	l	l	l
% no passing zone		80							
Exclusive left turn lane impact (n, y)		[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)				n	y	n	y		
Facility length (mi)	3	5	5	2	2	2	2	2	2
Interchange Density (intch/mi)	1								
TRAFFIC CHARACTERISTICS									
Planning analysis hour factor (K)	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.565	0.565
Peak hour factor (PHF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Base saturation flow rate (pcphpl)	2,400	1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.0
Speed Adjustment Factor (SAF)	0.950		0.950						
Capacity Adjustment Factor (CAF)	0.939		0.939						
% left turns				12	12	12	12	12	12
% right turns				12	12	12	12	12	12
CONTROL CHARACTERISTICS									
Number of signals				5	5	9	9	4	6
Arrival type (1-6)				3	3	3	3	4	4
Signal type (a, c, p)				c	c	c	c	c	c
Cycle length (C)				150	150	120	120	120	120
Effective green ratio (g/C)				0.44	0.44	0.44	0.44	0.44	0.44
MULTIMODAL CHARACTERISTICS									
Paved shoulder/bicycle lane (n, y)								n, 50%, y	n
Outside lane width								t	t
Pavement condition								t	
On-street parking								n	n
Sidewalk (n, y)									n, 50%, y
Sidewalk/roadway separation (a, t, w)									t
Sidewalk protective barrier (n, y)									n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials	Bicycle	Ped	Bus
	Density pc/mi/ln	Two-Lane %ffs	Multilane Density pc/mi/ln	Principal & Minor %bffs	Score	Score	Buses/hr.
B	≤ 18	> 83.3	≤ 18	> 67	≤ 2.75	≤ 2.75	≤ 6
C	≤ 26	> 75.0	≤ 26	> 50	≤ 3.50	≤ 3.50	≤ 4
D	≤ 35	> 66.7	≤ 35	> 40	≤ 4.25	≤ 4.25	< 3
E	≤ 45	≤ 66.7	≤ 45	> 30	≤ 5.00	≤ 5.00	< 2

pc/mi/ln = passenger cars per mile per lane %ffs = percent free flow speed %bffs = percent base free flow speed

APPENDIX B

Traffic Count Data Worksheets

National Data & Surveying Services

Intersection Turning Movement Count

Location: S Lewis Rd & Pleasant Valley Rd
City: Camarillo
Control: Siganlized

Project ID: 18-05719-001
Date: 11/27/2018

Total

NS/EW Streets:	S Lewis Rd				S Lewis Rd				Pleasant Valley Rd				Pleasant Valley Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	2	2	1	0	2	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	9	45	40	0	27	136	40	0	45	100	4	0	94	62	28	0	630
7:15 AM	10	58	63	0	26	147	42	0	37	164	4	0	86	75	43	0	755
7:30 AM	17	83	68	0	35	165	60	0	60	137	7	0	109	75	56	0	872
7:45 AM	17	76	68	0	34	171	54	0	57	171	5	0	89	121	69	0	932
8:00 AM	6	68	58	0	36	183	48	0	52	116	2	0	116	73	54	0	812
8:15 AM	10	42	41	0	32	168	37	0	30	110	1	0	98	70	46	0	685
8:30 AM	9	41	38	0	22	224	39	0	21	82	4	0	116	57	24	0	677
8:45 AM	9	66	43	0	37	182	40	0	34	70	7	0	89	63	30	0	670
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	87	479	419	0	249	1376	360	0	336	950	34	0	797	596	350	0	6033
APPROACH %'s :	8.83%	48.63%	42.54%	0.00%	12.54%	69.32%	18.14%	0.00%	25.45%	71.97%	2.58%	0.00%	45.73%	34.19%	20.08%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	50	285	257	0	131	666	204	0	206	588	18	0	400	344	222	0	3371
PEAK HR FACTOR :	0.735	0.858	0.945	0.000	0.910	0.910	0.850	0.000	0.858	0.860	0.643	0.000	0.862	0.711	0.804	0.000	0.904
	0.881				0.937				0.871				0.866				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	2	2	1	0	2	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	18	109	116	0	26	123	62	0	47	83	5	0	63	160	50	0	862
4:15 PM	26	169	68	0	28	93	47	0	50	83	7	0	103	172	33	0	879
4:30 PM	32	156	113	0	22	101	77	0	45	82	4	0	77	225	75	0	1009
4:45 PM	14	125	100	0	36	105	70	0	59	97	4	0	93	183	61	0	947
5:00 PM	24	135	118	0	31	107	69	0	50	113	5	0	81	198	71	0	1002
5:15 PM	19	125	122	0	32	104	53	0	51	106	4	0	68	171	62	0	917
5:30 PM	24	122	91	0	21	134	71	0	65	100	1	0	76	180	41	0	926
5:45 PM	11	141	118	0	31	106	41	0	45	98	4	0	37	170	45	0	847
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	168	1082	846	0	227	873	490	0	412	762	34	0	598	1459	438	0	7389
APPROACH %'s :	8.02%	51.62%	40.36%	0.00%	14.28%	54.91%	30.82%	0.00%	34.11%	63.08%	2.81%	0.00%	23.97%	58.48%	17.56%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	89	541	453	0	121	417	269	0	205	398	17	0	319	777	269	0	3875
PEAK HR FACTOR :	0.695	0.867	0.928	0.000	0.840	0.974	0.873	0.000	0.869	0.881	0.850	0.000	0.858	0.863	0.897	0.000	0.960
	0.900				0.956				0.923				0.905				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Pleasant Valley Rd & Pancho Rd
City: Camarillo
Control: Siganlized

Project ID: 18-05719-002
Date: 11/27/2018

Total

NS/EW Streets:	Pleasant Valley Rd				Pleasant Valley Rd				Pancho Rd				Pancho Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	2	2	0	0	1	0.5	0.5	0	1.5	0.5	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	3	158	38	0	64	131	2	0	4	0	4	0	12	0	18	0	434
7:15 AM	2	246	25	0	71	147	1	0	7	0	10	0	14	0	25	0	548
7:30 AM	1	238	34	0	50	166	2	0	5	0	17	0	16	1	22	0	552
7:45 AM	3	223	56	0	88	226	3	0	8	2	14	0	23	1	16	0	663
8:00 AM	4	198	39	1	85	129	4	0	6	0	7	0	21	0	11	0	505
8:15 AM	1	158	27	0	72	161	3	0	1	1	6	0	12	0	20	0	462
8:30 AM	1	129	24	0	53	174	1	0	6	0	3	0	18	0	13	0	422
8:45 AM	7	122	34	0	58	129	1	0	7	1	7	0	17	0	25	0	408
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	22	1472	277	1	541	1263	17	0	44	4	68	0	133	2	150	0	3994
APPROACH %'s :	1.24%	83.07%	15.63%	0.06%	29.71%	69.36%	0.93%	0.00%	37.93%	3.45%	58.62%	0.00%	46.67%	0.70%	52.63%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	10	905	154	1	294	668	10	0	26	2	48	0	74	2	74	0	2268
PEAK HR FACTOR :	0.625	0.920	0.688	0.250	0.835	0.739	0.625	0.000	0.813	0.250	0.706	0.000	0.804	0.500	0.740	0.000	0.855
	0.949				0.767				0.792				0.938				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	2	2	0	0	1	0.5	0.5	0	1.5	0.5	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	8	200	16	0	22	186	3	0	4	0	5	0	79	0	103	0	626
4:15 PM	2	179	21	0	12	199	3	0	1	1	2	0	77	1	65	0	563
4:30 PM	7	184	14	0	26	213	7	0	4	2	7	0	144	1	129	0	738
4:45 PM	8	202	26	0	13	221	5	0	3	0	5	0	78	1	60	0	622
5:00 PM	5	201	14	0	17	234	8	0	0	2	8	0	129	1	110	0	729
5:15 PM	6	223	19	0	7	189	4	0	3	0	8	0	91	1	86	0	637
5:30 PM	3	193	15	0	14	224	3	0	2	0	3	0	109	3	43	0	612
5:45 PM	4	191	13	0	3	199	8	0	0	0	4	0	94	1	52	0	569
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	43	1573	138	0	114	1665	41	0	17	5	42	0	801	9	648	0	5096
APPROACH %'s :	2.45%	89.68%	7.87%	0.00%	6.26%	91.48%	2.25%	0.00%	26.56%	7.81%	65.63%	0.00%	54.94%	0.62%	44.44%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	26	810	73	0	63	857	24	0	10	4	28	0	442	4	385	0	2726
PEAK HR FACTOR :	0.813	0.908	0.702	0.000	0.606	0.916	0.750	0.000	0.625	0.500	0.875	0.000	0.767	1.000	0.746	0.000	0.923
	0.916				0.911				0.808				0.758				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Pleasant Valley Rd & SR-101 EB Ramps
City: Camarillo
Control: Siganlized

Project ID: 18-05719-003
Date: 11/27/2018

Total

NS/EW Streets:	Pleasant Valley Rd					Pleasant Valley Rd					SR-101 EB Ramps					SR-101 EB Ramps											
AM	NORTHBOUND					SOUTHBOUND					EASTBOUND					WESTBOUND					SOUTHBOUND2						
	0	4	0	0	0	1	2	1	0	0	1.5	0.5	1	0	0	1	1	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	NT2	SL	ST	SR	SU	SU2	EL	ET	ER	EU	EL2	WL	WT	WR	WU	WR2	S2L	S2U	S2L2	S2T2	S2R2	S2U2	TOTAL
7:00 AM	0	103	2	0	100	3	182	162	0	1	129	5	35	0	3	2	0	5	0	1		0	0	0	0	0	733
7:15 AM	0	127	1	0	138	2	165	206	0	1	202	1	45	0	5	1	0	2	0	1		0	0	0	0	0	897
7:30 AM	0	215	0	0	134	0	218	223	2	2	203	0	37	0	5	0	0	2	0	0		0	0	0	0	0	1041
7:45 AM	0	179	3	0	88	1	265	187	4	0	235	0	42	0	4	0	0	1	0	0		0	0	0	0	0	1009
8:00 AM	0	162	1	0	101	3	215	173	0	2	189	3	53	0	1	2	0	2	0	0		0	0	0	0	0	907
8:15 AM	0	117	1	0	84	0	193	155	0	0	192	0	28	0	4	0	0	3	0	1		0	0	0	0	0	778
8:30 AM	0	113	0	0	68	0	222	144	0	0	161	1	31	0	0	1	0	1	0	0		0	0	0	0	0	742
8:45 AM	0	103	2	0	66	4	170	142	1	2	187	0	28	0	6	0	0	0	0	0		0	0	0	0	0	711
	NL	NT	NR	NU	NT2	SL	ST	SR	SU	SU2	EL	ET	ER	EU	EL2	WL	WT	WR	WU	WR2	S2L	S2U	S2L2	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	0	1119	10	0	779	13	1630	1392	7	8	1498	10	299	0	28	6	0	16	0	3	0	0	0	0	0	0	6818
APPROACH %'s :	0.00%	58.65%	0.52%	0.00%	40.83%	0.43%	53.44%	45.64%	0.23%	0.26%	81.63%	0.54%	16.29%	0.00%	1.53%	24.00%	0.00%	64.00%	0.00%	12.00%							
PEAK HR :	07:15 AM - 08:15 AM																										TOTAL
PEAK HR VOL :	0	683	5	0	461	6	863	789	6	5	829	4	177	0	15	3	0	7	0	1	0	0	0	0	0	0	3854
PEAK HR FACTOR :	0.000	0.794	0.417	0.000	0.835	0.500	0.814	0.885	0.375	0.625	0.882	0.333	0.835	0.000	0.750	0.375	0.000	0.875	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.926
			0.823					0.913					0.912					0.688									

PM	NORTHBOUND					SOUTHBOUND					EASTBOUND					WESTBOUND					SOUTHBOUND2						
	0	4	0	0	0	1	2	1	0	0	1.5	0.5	1	0	0	1	1	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	NT2	SL	ST	SR	SU	SU2	EL	ET	ER	EU	EL2	WL	WT	WR	WU	WR2	S2L	S2U	S2L2	S2T2	S2R2	S2U2	TOTAL
4:00 PM	0	199	2	0	112	4	210	144	1	0	229	0	26	0	2	1	0	7	0	0		0	0	0	0	0	937
4:15 PM	0	163	2	0	95	0	217	130	2	0	230	1	22	0	1	0	0	3	0	0		0	0	0	0	0	866
4:30 PM	0	231	1	0	103	2	259	134	0	0	194	1	28	0	0	2	0	4	0	2		0	0	0	0	0	961
4:45 PM	0	197	1	0	91	1	229	114	1	1	131	2	19	0	2	2	0	3	0	2		0	0	0	0	0	796
5:00 PM	0	205	1	0	98	2	272	159	2	0	269	1	27	0	3	1	0	3	0	0		0	0	0	0	0	1043
5:15 PM	0	181	1	0	130	1	216	116	0	0	250	0	24	0	4	2	0	1	0	0		0	0	0	0	0	926
5:30 PM	0	163	1	0	101	1	243	144	0	0	216	1	18	0	3	2	0	2	0	1		0	0	0	0	0	896
5:45 PM	0	156	0	0	98	3	228	109	1	0	178	0	19	0	1	1	0	6	0	1		0	0	0	0	0	801
	NL	NT	NR	NU	NT2	SL	ST	SR	SU	SU2	EL	ET	ER	EU	EL2	WL	WT	WR	WU	WR2	S2L	S2U	S2L2	S2T2	S2R2	S2U2	TOTAL
TOTAL VOLUMES :	0	1495	9	0	828	14	1874	1050	7	1	1697	6	183	0	16	11	0	29	0	6	0	0	0	0	0	0	7226
APPROACH %'s :	0.00%	64.11%	0.39%	0.00%	35.51%	0.48%	63.61%	35.64%	0.24%	0.03%	89.22%	0.32%	9.62%	0.00%	0.84%	23.91%	0.00%	63.04%	0.00%	13.04%							
PEAK HR :	04:30 PM - 05:30 PM																										TOTAL
PEAK HR VOL :	0	814	4	0	422	6	976	523	3	1	844	4	98	0	9	7	0	11	0	4	0	0	0	0	0	0	3726
PEAK HR FACTOR :	0.000	0.881	1.000	0.000	0.812	0.750	0.897	0.822	0.375	0.250	0.784	0.500	0.875	0.000	0.563	0.875	0.000	0.688	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.893
			0.925					0.867					0.796					0.688									

National Data & Surveying Services

Intersection Turning Movement Count

Location: Pleasant Valley Rd & SR-101 WB Ramps
City: Camarillo
Control: Siganlized

Project ID: 18-05719-004
Date: 11/27/2018

Total

NS/EW Streets:	Pleasant Valley Rd				Pleasant Valley Rd				SR-101 WB Ramps				SR-101 WB Ramps				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	3	1	0	0	3	2	0	0	0	0	0	1	0	2	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	217	27	0	0	278	176	0	0	0	0	0	48	0	61	0	807
7:15 AM	0	291	28	0	0	325	220	0	0	0	0	0	69	0	85	0	1018
7:30 AM	0	380	30	0	0	380	238	0	0	0	0	0	48	0	90	0	1166
7:45 AM	0	393	37	0	0	387	277	0	0	0	0	0	73	0	135	0	1302
8:00 AM	0	335	20	0	0	323	205	0	0	0	0	0	52	0	110	0	1045
8:15 AM	0	286	19	0	0	300	232	0	0	0	0	0	58	0	96	0	991
8:30 AM	0	251	25	0	0	270	248	0	0	0	0	0	79	0	79	0	952
8:45 AM	0	256	30	0	0	261	217	0	0	0	0	0	52	0	83	0	899
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2409	216	0	0	2524	1813	0	0	0	0	0	479	0	739	0	8180
APPROACH %'s :	0.00%	91.77%	8.23%	0.00%	0.00%	58.20%	41.80%	0.00%					39.33%	0.00%	60.67%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	1399	115	0	0	1415	940	0	0	0	0	0	242	0	420	0	4531
PEAK HR FACTOR :	0.000	0.890	0.777	0.000	0.000	0.914	0.848	0.000	0.000	0.000	0.000	0.000	0.829	0.000	0.778	0.000	0.870
	0.880				0.887								0.796				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	3	1	0	0	3	2	0	0	0	0	0	1	0	2	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	377	60	0	0	293	216	0	0	0	0	0	76	0	122	0	1144
4:15 PM	0	375	33	0	0	251	171	0	0	0	0	0	87	0	140	0	1057
4:30 PM	0	354	64	0	0	311	200	0	0	0	0	0	88	0	145	0	1162
4:45 PM	0	274	30	0	0	228	140	0	0	0	0	0	101	0	158	0	931
5:00 PM	0	440	50	0	0	335	201	0	0	0	0	0	109	0	137	0	1272
5:15 PM	0	407	34	0	0	225	147	0	0	0	0	0	113	0	154	0	1080
5:30 PM	0	366	23	0	0	270	125	0	0	0	0	0	101	0	188	0	1073
5:45 PM	0	329	25	0	0	235	140	0	0	0	0	0	105	0	143	0	977
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2922	319	0	0	2148	1340	0	0	0	0	0	780	0	1187	0	8696
APPROACH %'s :	0.00%	90.16%	9.84%	0.00%	0.00%	61.58%	38.42%	0.00%					39.65%	0.00%	60.35%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	1475	178	0	0	1099	688	0	0	0	0	0	411	0	594	0	4445
PEAK HR FACTOR :	0.000	0.838	0.695	0.000	0.000	0.820	0.856	0.000	0.000	0.000	0.000	0.000	0.909	0.000	0.940	0.000	0.874
	0.843				0.833								0.941				

Prepared by National Data & Surveying Services

CLASSIFICATION

Pleasant Valley Rd Bet. Lewis Rd & Pancho Rd

Day: Tuesday
Date: 11/27/2018

City: Camarillo
Project #: CA18_5720_001e

East Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	23	2	0	2	0	0	0	0	0	0	0	0	27
01:00	0	24	5	0	0	0	0	0	0	0	0	0	0	29
02:00	0	14	1	0	1	0	0	0	0	0	0	0	0	16
03:00	0	40	5	0	2	0	0	0	0	0	0	0	0	47
04:00	0	217	32	0	8	0	0	0	0	0	0	0	0	257
05:00	0	470	64	0	18	0	0	0	0	0	0	0	0	552
06:00	1	638	115	0	36	1	0	3	0	0	0	0	0	794
07:00	2	744	128	3	49	1	0	1	1	0	0	0	0	929
08:00	2	527	88	2	37	1	0	2	5	0	0	0	0	664
09:00	1	373	59	2	34	1	0	0	0	0	0	0	0	470
10:00	0	304	69	0	33	0	0	0	2	0	0	0	0	408
11:00	1	340	58	1	25	1	0	4	0	0	0	0	0	430
12:00 PM	1	461	74	2	38	3	0	3	3	0	0	0	0	585
13:00	0	446	81	4	38	0	0	1	1	0	0	0	0	571
14:00	1	491	77	2	40	1	0	2	1	0	0	0	0	615
15:00	2	761	127	1	41	3	1	1	0	0	0	0	0	937
16:00	3	779	98	0	35	0	0	3	0	0	0	0	0	918
17:00	1	640	96	2	32	0	0	2	1	0	0	0	0	774
18:00	3	525	60	0	27	0	0	1	0	0	0	0	0	616
19:00	2	271	34	0	10	0	0	0	0	0	0	0	0	317
20:00	0	235	26	0	7	0	0	0	0	0	0	0	0	268
21:00	0	183	20	0	4	0	0	0	0	0	0	0	0	207
22:00	0	81	7	0	0	0	0	0	0	0	0	0	0	88
23:00	0	50	4	0	1	0	0	0	0	0	0	0	0	55
Totals	20	8637	1330	19	518	12	1	23	14					10574
% of Totals	0%	82%	13%	0%	5%	0%	0%	0%	0%					100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	7	3714	626	8	245	5	0	10	8	0	0	0	0	4623
% AM	0%	35%	6%	0%	2%	0%		0%	0%					44%
AM Peak Hour	07:00	07:00	07:00	07:00	07:00	06:00		11:00	08:00					07:00
Volume	2	744	128	3	49	1		4	5					929
PM Volumes	13	4923	704	11	273	7	1	13	6	0	0	0	0	5951
% PM	0%	47%	7%	0%	3%	0%	0%	0%	0%					56%
PM Peak Hour	16:00	16:00	15:00	13:00	15:00	12:00	15:00	12:00	12:00					15:00
Volume	3	779	127	4	41	3	1	3	3					937

Directional Peak Periods All Classes	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
	Volume	%	Volume	%	Volume	%	Volume	%
	1593 ⟷	15%	1156 ⟷	11%	1692 ⟷	16%	6133 ⟷	58%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

Pleasant Valley Rd Bet. Lewis Rd & Pancho Rd

Day: Tuesday
Date: 11/27/2018

City: Camarillo
Project #: CA18_5720_001w

West Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	79	5	1	1	0	0	0	0	0	0	0	0	86
01:00	0	60	4	0	0	0	0	0	0	0	0	0	0	64
02:00	0	50	4	0	0	0	0	0	0	0	0	0	0	54
03:00	0	13	1	0	0	0	0	0	0	0	0	0	0	14
04:00	0	35	8	0	1	0	0	0	0	0	0	0	0	44
05:00	0	156	20	0	6	0	0	2	0	0	0	0	0	184
06:00	3	386	54	0	12	0	0	0	0	0	0	0	0	455
07:00	1	627	74	1	21	0	0	0	0	0	0	0	0	724
08:00	1	599	64	0	18	1	0	0	0	0	0	0	0	683
09:00	1	375	35	0	13	0	0	1	0	0	0	0	0	425
10:00	0	288	46	0	10	0	0	0	2	0	0	0	0	346
11:00	2	313	48	0	13	0	0	1	0	0	0	0	0	377
12:00 PM	1	357	54	0	13	0	0	0	0	0	0	0	0	425
13:00	1	389	55	1	15	0	0	0	1	0	0	0	0	462
14:00	1	516	73	1	21	0	0	1	1	0	0	0	0	614
15:00	4	875	120	2	33	0	0	0	1	0	0	0	0	1035
16:00	2	956	143	4	34	1	0	0	0	0	0	0	0	1140
17:00	2	986	117	2	26	0	0	0	0	0	0	0	0	1133
18:00	0	529	52	1	14	0	0	0	0	0	0	0	0	596
19:00	0	203	20	0	7	0	0	0	0	0	0	0	0	230
20:00	0	144	17	0	3	0	0	0	0	0	0	0	0	164
21:00	0	136	10	0	1	0	0	0	0	0	0	0	0	147
22:00	0	107	12	0	1	0	0	0	0	0	0	0	0	120
23:00	0	78	5	0	1	0	0	0	0	0	0	0	0	84
Totals	19	8257	1041	13	264	2		5	5					9606
% of Totals	0%	86%	11%	0%	3%	0%		0%	0%					100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	8	2981	363	2	95	1	0	4	2	0	0	0	0	3456
% AM	0%	31%	4%	0%	1%	0%		0%	0%					36%
AM Peak Hour	06:00	07:00	07:00		07:00	08:00		05:00	10:00					07:00
Volume	3	627	74	1	21	1		2	2					724
PM Volumes	11	5276	678	11	169	1	0	1	3	0	0	0	0	6150
% PM	0%	55%	7%	0%	2%	0%		0%	0%					64%
PM Peak Hour	15:00	17:00	16:00	16:00	16:00	16:00		14:00	13:00					16:00
Volume	4	986	143	4	34	1		1	1					1140

Directional Peak Periods All Classes	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
	Volume	%	Volume	%	Volume	%	Volume	%
	1407 ⟷	15%	887 ⟷	9%	2273 ⟷	24%	5039 ⟷	52%

Classification Definitions

1 Motorcycles	4 Buses	7 >=4-Axle Single Units	10 >=6-Axle Single Trailers	13 >=7-Axle Multi-Trailers
2 Passenger Cars	5 2-Axle, 6-Tire Single Units	8 <=4-Axle Single Trailers	11 <=5-Axle Multi-Trailers	
3 2-Axle, 4-Tire Single Units	6 3-Axle Single Units	9 5-Axle Single Trailers	12 6-Axle Multi-Trailers	

Prepared by National Data & Surveying Services

CLASSIFICATION

Pleasant Valley Rd Bet. Pancho Rd & SR-101 EB Ramps

Day: Tuesday
Date: 11/27/2018

City: Camarillo
Project #: CA18_5720_002n

North Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	47	2	0	1	0	0	1	0	0	0	0	0	51
01:00	0	35	2	0	0	0	0	0	0	0	0	0	0	37
02:00	0	53	1	0	2	0	0	0	0	0	0	0	0	56
03:00	0	24	3	0	0	0	0	1	0	0	0	0	0	28
04:00	0	89	14	0	4	0	0	0	0	0	0	0	0	107
05:00	0	289	50	1	12	0	0	0	0	0	0	0	0	352
06:00	0	469	64	0	18	0	0	3	0	0	0	0	0	554
07:00	0	822	94	1	28	0	0	0	0	0	0	0	0	945
08:00	0	584	80	0	25	0	0	1	0	0	0	0	0	690
09:00	0	408	54	1	26	3	0	1	0	0	0	0	0	493
10:00	0	423	43	3	31	0	0	3	1	0	0	0	0	504
11:00	0	478	62	1	23	0	0	0	1	0	0	0	0	565
12:00 PM	0	591	60	0	29	0	0	3	1	0	0	0	0	684
13:00	0	530	68	0	26	1	0	2	0	0	0	0	0	627
14:00	0	654	68	0	28	0	0	1	0	0	0	0	0	751
15:00	1	853	98	0	31	0	0	0	0	0	0	0	0	983
16:00	1	987	88	0	27	0	0	0	1	0	0	0	0	1104
17:00	1	958	98	0	20	0	0	1	0	0	0	0	0	1078
18:00	0	645	43	0	28	0	0	2	0	0	0	0	0	718
19:00	0	380	27	0	9	0	0	0	0	0	0	0	0	416
20:00	0	226	10	0	7	0	0	0	0	0	0	0	0	243
21:00	0	193	7	0	6	0	0	0	0	0	0	0	0	206
22:00	0	103	1	0	1	0	0	0	1	0	0	0	0	106
23:00	0	54	3	0	2	0	0	0	0	0	0	0	0	59
Totals	3	9895	1040	7	384	4		19	5					11357
% of Totals	0%	87%	9%	0%	3%	0%		0%	0%					100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	0	3721	469	7	170	3	0	10	2	0	0	0	0	4382
% AM		33%	4%	0%	1%	0%		0%	0%					39%
AM Peak Hour		07:00	07:00	10:00	10:00	09:00		06:00	10:00					07:00
Volume		822	94	3	31	3		3	1					945
PM Volumes	3	6174	571	0	214	1	0	9	3	0	0	0	0	6975
% PM	0%	54%	5%		2%	0%		0%	0%					61%
PM Peak Hour	15:00	16:00	15:00		15:00	13:00		12:00	12:00					16:00
Volume	1	987	98		31	1		3	1					1104

Directional Peak Periods	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
All Classes	Volume	%	Volume	%	Volume	%	Volume	%
	1635	14%	1311	12%	2182	19%	6229	55%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

Pleasant Valley Rd Bet. Pancho Rd & SR-101 EB Ramps

Day: Tuesday
Date: 11/27/2018

City: Camarillo
Project #: CA18_5720_002s

South Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	30	1	0	2	0	0	1	0	0	0	0	0	34
01:00	0	18	4	0	1	0	0	0	0	0	0	0	0	23
02:00	0	16	4	0	4	0	0	0	0	0	0	0	0	24
03:00	0	15	2	0	0	0	0	0	0	0	0	0	0	17
04:00	0	123	18	0	6	0	0	0	0	0	0	0	0	147
05:00	0	276	33	0	18	1	0	1	1	0	0	0	0	330
06:00	1	540	80	0	33	0	0	0	0	0	0	0	0	654
07:00	2	747	113	3	59	1	0	2	0	0	0	0	0	927
08:00	1	706	99	1	39	4	1	2	0	0	0	0	0	853
09:00	1	425	68	1	24	0	1	1	0	0	0	0	0	521
10:00	1	328	49	0	23	2	1	1	0	0	0	0	0	405
11:00	1	367	67	1	21	1	0	0	1	0	0	0	0	459
12:00 PM	1	476	78	2	33	0	0	0	0	0	0	0	0	590
13:00	1	456	82	2	28	2	0	1	1	0	0	0	0	573
14:00	0	496	78	1	40	1	0	2	0	0	0	0	0	618
15:00	1	650	100	1	40	1	0	0	0	0	0	0	0	793
16:00	1	728	107	3	59	0	0	0	0	0	0	0	0	898
17:00	0	723	120	1	37	0	0	1	1	0	0	0	0	883
18:00	0	516	64	0	24	0	0	0	0	0	0	0	0	604
19:00	0	251	26	0	12	0	0	0	0	0	0	0	0	289
20:00	0	178	25	0	8	0	0	0	0	0	0	0	0	211
21:00	0	174	26	0	7	0	0	0	0	0	0	0	0	207
22:00	0	120	18	0	5	0	0	0	0	0	0	0	0	143
23:00	0	73	3	0	3	0	0	0	0	0	0	0	0	79
Totals	11	8432	1265	16	526	13	3	12	4					10282
% of Totals	0%	82%	12%	0%	5%	0%	0%	0%	0%					100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	7	3591	538	6	230	9	3	8	2	0	0	0	0	4394
% AM	0%	35%	5%	0%	2%	0%	0%	0%	0%					43%
AM Peak Hour	07:00	07:00	07:00	07:00	07:00	08:00	08:00	07:00	05:00					07:00
Volume	2	747	113	3	59	4	1	2	1					927
PM Volumes	4	4841	727	10	296	4	0	4	2	0	0	0	0	5888
% PM	0%	47%	7%	0%	3%	0%		0%	0%					57%
PM Peak Hour	12:00	16:00	17:00	16:00	16:00	13:00		14:00	13:00					16:00
Volume	1	728	120	3	59	2		2	1					898

Directional Peak Periods All Classes	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
	Volume	%	Volume	%	Volume	%	Volume	%
	1780	17%	1163	11%	1781	17%	5558	54%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

Pancho Rd Bet. Calle Quetzal & Howard Rd

Day: Tuesday
Date: 11/27/2018

City: Camarillo
Project #: CA18_5720_003n

North Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	1	1	0	2	0	0	0	0	0	0	0	0	4
06:00	0	5	1	1	3	0	0	0	0	0	0	0	0	10
07:00	0	10	2	0	5	0	0	1	1	0	0	0	0	19
08:00	0	11	1	0	4	0	0	0	1	0	0	0	0	17
09:00	0	8	5	0	6	0	0	2	1	0	0	0	0	22
10:00	0	9	2	0	3	1	0	0	2	0	0	0	0	17
11:00	1	26	4	1	5	0	1	0	2	0	0	0	0	40
12:00 PM	1	32	11	0	2	0	0	0	2	0	0	0	0	48
13:00	0	20	5	0	4	0	0	0	0	0	0	0	0	29
14:00	0	43	10	1	6	2	0	0	0	0	0	0	0	62
15:00	0	55	13	0	10	0	0	0	0	0	0	0	0	78
16:00	0	56	11	1	7	0	0	0	0	0	0	0	0	75
17:00	0	19	6	0	4	0	0	0	0	0	0	0	0	29
18:00	0	4	1	0	2	0	0	0	0	0	0	0	0	7
19:00	0	8	1	0	1	0	0	0	0	0	0	0	0	10
20:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
21:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Totals	2	311	74	4	66	3	1	4	9					474
% of Totals	0%	66%	16%	1%	14%	1%	0%	1%	2%					100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	1	70	16	2	28	1	1	4	7	0	0	0	0	130
% AM	0%	15%	3%	0%	6%	0%	0%	1%	1%					27%
AM Peak Hour	11:00	11:00	09:00	06:00	09:00	10:00	11:00	09:00	10:00					11:00
Volume	1	26	5	1	6	1	1	2	2					40
PM Volumes	1	241	58	2	38	2	0	0	2	0	0	0	0	344
% PM	0%	51%	12%	0%	8%	0%			0%					73%
PM Peak Hour	12:00	16:00	15:00	14:00	15:00	14:00			12:00					15:00
Volume	1	56	13	1	10	2			2					78

Directional Peak Periods All Classes	AM 7-9	NOON 12-2	PM 4-6	Off Peak Volumes
Volume	36	77	104	257
%	8%	16%	22%	54%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

Pancho Rd Bet. Calle Quetzal & Howard Rd

Day: Tuesday
Date: 11/27/2018

City: Camarillo
Project #: CA18_5720_003s

South Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	5	2	0	0	0	0	0	0	0	0	0	0	7
06:00	0	89	14	1	8	0	0	0	1	0	0	0	0	113
07:00	0	17	5	0	3	0	0	1	0	0	0	0	0	26
08:00	1	16	5	0	7	1	0	0	0	0	0	0	0	30
09:00	2	13	2	0	5	1	0	0	1	0	0	0	0	24
10:00	0	19	1	0	3	1	0	0	2	0	0	0	0	26
11:00	1	27	5	0	6	0	0	0	1	0	0	0	0	40
12:00 PM	1	32	9	0	3	1	0	0	1	0	0	0	0	47
13:00	0	19	5	0	7	1	0	0	0	0	0	0	0	32
14:00	0	21	3	1	2	0	0	0	0	0	0	0	0	27
15:00	0	26	3	0	3	0	0	0	0	0	0	0	0	32
16:00	0	17	3	0	4	0	0	0	0	0	0	0	0	24
17:00	0	11	4	0	2	0	0	0	0	0	0	0	0	17
18:00	0	11	2	0	0	0	0	0	0	0	0	0	0	13
19:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
20:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
21:00	0	2	0	0	0	0	0	1	0	0	0	0	0	3
22:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	5	335	64	2	53	5		2	6					472
% of Totals	1%	71%	14%	0%	11%	1%		0%	1%					100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	4	187	34	1	32	3	0	1	5	0	0	0	0	267
% AM	1%	40%	7%	0%	7%	1%		0%	1%					57%
AM Peak Hour	09:00	06:00	06:00	06:00	06:00	08:00		07:00	10:00					06:00
Volume	2	89	14	1	8	1		1	2					113
PM Volumes	1	148	30	1	21	2	0	1	1	0	0	0	0	205
% PM	0%	31%	6%	0%	4%	0%		0%	0%					43%
PM Peak Hour	12:00	12:00	12:00	14:00	13:00	12:00		21:00	12:00					12:00
Volume	1	32	9	1	7	1		1	1					47

Directional Peak Periods All Classes	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
	Volume	%	Volume	%	Volume	%	Volume	%
	56 ⟷	12%	79 ⟷	17%	41 ⟷	9%	296 ⟷	63%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

APPENDIX C

ICU 2003 Worksheets

EXISTING WORKSHEETS

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / Lewis Road	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing
Date and Time of Data:	AM Peak	**Project:**	Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	206	588	18	400	344	222	50	285	257	131	666	204
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	206.0	588.0	18.0	400.0	344.0	222.0	50.0	285.0	257.0	131.0	666.0	204.0
14	Volume Separate Left	206.0	588.0		400.0	344.0		50.0	285.0		131.0	666.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	7.1	19.5	1.3	13.7	11.4	16.5	3.3	9.5	19.1	8.7	22.1	15.2
23	Adjusted Reference Time	10.1	23.6	14.0	16.7	17.0	20.5	7.0	19.1	23.1	11.7	27.5	19.2
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	103	294		200	172		50	143		131	333	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	105.8	19.5		205.4	11.4		49.9	9.5		8.7	22.1	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		105.8			205.4			49.9			22.1	
35	Adjusted Reference Time		109.8			209.4			53.9			27.5	
	Split Timing												
36	Ref Time Combined		19.5			11.4			9.5			22.1	
37	Ref Time By Movement	7.1	19.5		13.7	11.4		3.3	9.5		8.7	22.1	
38	Reference Time		19.5			13.7			9.5			22.1	
39	Adjusted Reference Time	23.6	23.6		18.6	18.6		19.1	19.1		27.5	27.5	

	Summary	**East West**	**North South**
40	Protected Option	40.3	34.5
41	Permitted Option	209.4	53.9
42	Split Option	42.3	46.6
43	Minimum	40.3	34.5
44	Combined	74.8	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	14.0	20.5	23.1	19.2
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	19.1	27.5	17.0	23.6
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	16.7	10.1	11.7	7.0
50	Combined	49.8	58.0	51.8	49.8
51	**Intersection Capacity Utilization**	**62.4%**			
52	**Level Of Service**	**B**			

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / Lewis Road
Analyzed by:	VRPA Technologies, Inc
Date and Time of Data:	PM Peak
City:	Ventura County
Alternative:	Existing
Project:	Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	205	398	17	319	777	269	89	541	453	121	417	269
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	205.0	398.0	17.0	319.0	777.0	269.0	89.0	541.0	453.0	121.0	417.0	269.0
14	Volume Separate Left	205.0	398.0		319.0	777.0		89.0	541.0		121.0	417.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	7.0	13.2	1.3	10.9	25.8	20.0	5.9	17.9	33.7	8.0	13.8	20.0
23	Adjusted Reference Time	10.0	19.1	14.0	13.9	29.8	24.0	8.9	24.8	37.7	11.0	21.6	24.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	102.5	199		159.5	389		89	271		121	209	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	105.3	13.2		163.8	25.8		88.8	17.9		8.0	13.8	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		105.3			163.8			88.8			13.8	
35	Adjusted Reference Time		109.3			167.8			92.8			21.6	
	Split Timing												
36	Ref Time Combined		13.2			25.8			17.9			13.8	
37	Ref Time By Movement	7.0	13.2		10.9	25.8		5.9	17.9		8.0	13.8	
38	Reference Time		13.2			25.8			17.9			13.8	
39	Adjusted Reference Time	19.1	19.1		29.8	29.8		24.8	24.8		21.6	21.6	

	Summary	**East West**	**North South**
40	Protected Option	39.8	35.8
41	Permitted Option	167.8	92.8
42	Split Option	48.9	46.4
43	Minimum	39.8	35.8
44	Combined	75.6	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	14.0	24.0	37.7	24.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	24.8	21.6	29.8	19.1
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	13.9	10.0	11.0	8.9
50	Combined	52.7	55.6	78.5	52.0

51	**Intersection Capacity Utilization**	**65.4%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	11	905	154	294	668	10	74	2	74	26	2	48
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	11.0	1059.0	0.0	294.0	678.0	0.0	0.0	76.0	74.0	26.0	50.0	0.0
14	Volume Separate Left	11.0	1059.0		294.0	678.0		74.0	2.0		26.0	50.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.978	0.850	0.950	0.998	0.850	0.950	0.951	0.850	0.950	0.856	0.850
17	Saturated Flow Combined	1805.0	3538.7	0.0	3505.3	3609.6	0.0	0.0	3615.0	1615.0	1805.0	1626.4	0.0
18	Saturated Flow Separate	1805.0	3538.7		3505.3	3609.6		3610.0	1900.0		1805.0	1626.4	
19	Pedestrian Interference Time		0.2	1.2		0.0	1.2		0.0	1.2		1.2	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	0.7	36.1	0.0	10.1	22.6	0.0	NA	NA	5.5	NA	NA	0.0
23	Adjusted Reference Time	5.0	40.1	9.0	13.1	26.6	9.0	NA	NA	8.5	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.97		1	0.00	
25	Volume Left Lane	11	530		147	339		0	76		26	50	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.97		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.1		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1769.3		116.8	1804.8		0.0	245.2		1925.3	1626.4	
30	Reference Time A	11.0	36.1		151.0	22.6		0.0	37.2		1.7	4.9	
31	Adjusted Saturation B		3538.7			3609.6			0.0			1626.4	
32	Reference Time B		NA			NA			10.5			4.9	
33	Reference Time Lefts	NA			NA			10.5			9.7		
34	Reference Time		36.1			151.0			10.5			4.9	
35	Adjusted Reference Time		40.1			155.0			17.1			8.0	
	Split Timing												
36	Ref Time Combined		36.1			22.6			2.5			4.9	
37	Ref Time By Movement	0.7	36.1		10.1	22.6		2.5	0.1		1.7	4.9	
38	Reference Time		36.1			22.6			2.5			4.9	
39	Adjusted Reference Time	40.1	40.1		26.6	26.6		13.1	13.1		8.0	8.0	

#	Summary	East West	North South
40	Protected Option	53.2	NA
41	Permitted Option	155.0	17.1
42	Split Option	66.7	21.1
43	Minimum	53.2	17.1
44	Combined	70.2	

#	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	9.0	9.0	8.5	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	13.1	8.0	26.6	40.1
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	13.1	5.0	8.0	13.1
50	Combined	35.2	22.0	43.1	61.2

#		
51	**Intersection Capacity Utilization**	**58.5%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	26	810	73	63	857	24	442	4	385	10	4	28
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	26.0	883.0	0.0	63.0	881.0	0.0	0.0	446.0	385.0	10.0	32.0	0.0
14	Volume Separate Left	26.0	883.0		63.0	881.0		442.0	4.0		10.0	32.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.988	0.850	0.950	0.996	0.850	0.950	0.950	0.850	0.950	0.869	0.850
17	Saturated Flow Combined	1805.0	3572.7	0.0	3505.3	3602.8	0.0	0.0	3611.7	1615.0	1805.0	1650.6	0.0
18	Saturated Flow Separate	1805.0	3572.7		3505.3	3602.8		3610.0	1900.0		1805.0	1650.6	
19	Pedestrian Interference Time		0.1	1.2		0.0	1.2		0.0	1.2		1.1	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	1.7	29.8	0.0	2.2	29.4	0.0	NA	NA	28.6	NA	NA	0.0
23	Adjusted Reference Time	5.0	33.8	9.0	5.2	33.4	9.0	NA	NA	31.6	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.99		1	0.00	
25	Volume Left Lane	26	442		31.5	441		0	446		10	32	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.99		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1786.4		116.8	1801.4		0.0	242.2		1925.3	1650.6	
30	Reference Time A	25.9	29.8		32.4	29.4		0.0	221.0		0.7	3.4	
31	Adjusted Saturation B		3572.7			3602.8			0.0			1650.6	
32	Reference Time B		NA			NA			22.8			3.4	
33	Reference Time Lefts	NA			NA			22.7			8.7		
34	Reference Time		29.8			32.4			22.8			3.4	
35	Adjusted Reference Time		33.8			36.4			25.9			8.0	
	Split Timing												
36	Ref Time Combined		29.8			29.4			14.8			3.4	
37	Ref Time By Movement	1.7	29.8		2.2	29.4		14.7	0.3		0.7	3.4	
38	Reference Time		29.8			29.4			14.8			3.4	
39	Adjusted Reference Time	33.8	33.8		33.4	33.4		20.1	20.1		8.0	8.0	

	Summary	**East West**	**North South**
40	Protected Option	38.9	NA
41	Permitted Option	36.4	25.9
42	Split Option	67.1	28.1
43	Minimum	36.4	25.9
44	Combined	62.2	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	9.0	9.0	31.6	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	20.1	8.0	33.4	33.8
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	5.2	5.0	8.0	20.1
50	Combined	34.3	22.0	73.0	61.9

51	**Intersection Capacity Utilization**	**60.8%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 SB Ramps
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	844	4	177	3	0	8	0	1144	5	17	863	789
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	848.0	177.0	3.0	8.0	0.0	0.0	1149.0	0.0	17.0	863.0	789.0
14	Volume Separate Left	844.0	4.0		3.0	8.0		0.0	1149.0		17.0	863.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	0.999	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.9	1615.0	1805.0	1615.0	0.0	0.0	5172.2	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5172.2		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	13.2	NA	NA	0.0	0.0	26.7	0.0	1.1	28.6	58.6
23	Adjusted Reference Time	NA	NA	16.2	NA	NA	7.0	0.0	30.2	13.5	7.0	32.1	62.1
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	848		3	8		0	383		17	432	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.5		120.3	1615.0		0.0	1724.1		1925.3	1808.8	
30	Reference Time A	0.0	421.5		3.0	1.8		0.0	26.7		1.1	28.6	
31	Adjusted Saturation B		0.0			1615.0			5172.2			3617.6	
32	Reference Time B		36.2			1.8			NA			NA	
33	Reference Time Lefts	36.1			8.2			NA			NA		
34	Reference Time		36.2			3.0			26.7			28.6	
35	Adjusted Reference Time		39.2			7.0			30.2			32.1	
	Split Timing												
36	Ref Time Combined		28.2			1.8			26.7			28.6	
37	Ref Time By Movement	28.1	0.3		0.2	1.8		0.0	26.7		1.1	28.6	
38	Reference Time		28.2			1.8			26.7			28.6	
39	Adjusted Reference Time	31.2	31.2		7.0	7.0		30.2	30.2		32.1	32.1	

#	Summary	East West	North South
40	Protected Option	NA	37.2
41	Permitted Option	39.2	32.1
42	Split Option	38.2	62.3
43	Minimum	38.2	32.1
44	Combined	70.3	

#	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	16.2	7.0	13.5	62.1
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	30.2	32.1	7.0	31.2
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	31.2	7.0	0.0
50	Combined	53.3	70.3	27.5	93.3

#		
51	**Intersection Capacity Utilization**	**77.8%**
52	**Level Of Service**	**D**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 SB Ramps	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing
Date and Time of Data:	PM Peak	**Project:**	Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	853	4	98	11	0	11	0	1236	4	10	976	523
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	857.0	98.0	11.0	11.0	0.0	0.0	1240.0	0.0	10.0	976.0	523.0
14	Volume Separate Left	853.0	4.0		11.0	11.0		0.0	1240.0		10.0	976.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.9	1615.0	1805.0	1615.0	0.0	0.0	5173.1	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5173.1		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	7.3	NA	NA	0.0	0.0	28.8	0.0	0.7	32.4	38.9
23	Adjusted Reference Time	NA	NA	10.3	NA	NA	7.0	0.0	32.3	13.5	7.0	35.9	42.4
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	857		11	11		0	413		10	488	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.4		120.3	1615.0		0.0	1724.4		1925.3	1808.8	
30	Reference Time A	0.0	425.9		11.0	2.1		0.0	28.8		0.7	32.4	
31	Adjusted Saturation B		0.0			1615.0			5173.1			3617.6	
32	Reference Time B		36.5			2.1			NA			NA	
33	Reference Time Lefts	36.4			8.7			NA			NA		
34	Reference Time		36.5			8.7			28.8			32.4	
35	Adjusted Reference Time		39.5			11.7			32.3			35.9	
	Split Timing												
36	Ref Time Combined		28.5			2.1			28.8			32.4	
37	Ref Time By Movement	28.4	0.3		0.7	2.1		0.0	28.8		0.7	32.4	
38	Reference Time		28.5			2.1			28.8			32.4	
39	Adjusted Reference Time	31.5	31.5		7.0	7.0		32.3	32.3		35.9	35.9	

	Summary	**East West**	**North South**
40	Protected Option	NA	39.3
41	Permitted Option	39.5	35.9
42	Split Option	38.5	68.1
43	Minimum	38.5	35.9
44	Combined	74.4	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	10.3	7.0	13.5	42.4
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	32.3	35.9	7.0	31.5
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	31.5	7.0	0.0
50	Combined	49.5	74.4	27.5	73.8

51	**Intersection Capacity Utilization**	**62.0%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 NB Off Ra
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	242	0	420	0	1399	115	0	1415	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	242.0	0.0	420.0	0.0	1399.0	115.0	0.0	1415.0	0.0
14	Volume Separate Left	0.0	0.0		242.0	0.0		0.0	1399.0		0.0	1415.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	16.1	0.0	17.6	0.0	32.4	8.5	0.0	32.8	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	19.1	0.0	20.6	0.0	35.9	13.5	0.0	36.3	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		242	0		0	466		0	472	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		241.3	0.0		0.0	32.4		0.0	32.8	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			24.1			NA			NA		
34	Reference Time		0.0			24.1			32.4			32.8	
35	Adjusted Reference Time		0.0			24.1			35.9			36.3	
	Split Timing												
36	Ref Time Combined		0.0			0.0			32.4			32.8	
37	Ref Time By Movement	0.0	0.0		16.1	0.0		0.0	32.4		0.0	32.8	
38	Reference Time		0.0			16.1			32.4			32.8	
39	Adjusted Reference Time	0.0	0.0		16.1	16.1		35.9	35.9		36.3	36.3	

#	Summary	East West	North South
40	Protected Option	19.1	36.3
41	Permitted Option	24.1	36.3
42	Split Option	16.1	72.2
43	Minimum	16.1	36.3
44	Combined	52.4	

#	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	0.0	20.6	13.5	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	35.9	36.3	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	16.1	0.0	0.0	0.0
50	Combined	52.0	56.9	13.5	0.0

#		
51	**Intersection Capacity Utilization**	**47.4%**
52	**Level Of Service**	**A**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 NB Off Ra
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Existing
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	411	0	594	0	1475	178	0	1099	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	411.0	0.0	594.0	0.0	1475.0	178.0	0.0	1099.0	0.0
14	Volume Separate Left	0.0	0.0		411.0	0.0		0.0	1475.0		0.0	1099.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	27.3	0.0	24.9	0.0	34.2	13.2	0.0	25.5	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	30.3	0.0	27.9	0.0	37.7	16.7	0.0	29.0	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		411	0		0	492		0	366	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		409.9	0.0		0.0	34.2		0.0	25.5	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			35.3			NA			NA		
34	Reference Time		0.0			35.3			34.2			25.5	
35	Adjusted Reference Time		0.0			35.3			37.7			29.0	
	Split Timing												
36	Ref Time Combined		0.0			0.0			34.2			25.5	
37	Ref Time By Movement	0.0	0.0		27.3	0.0		0.0	34.2		0.0	25.5	
38	Reference Time		0.0			27.3			34.2			25.5	
39	Adjusted Reference Time	0.0	0.0		27.3	27.3		37.7	37.7		29.0	29.0	

	Summary	East West	North South
40	Protected Option	30.3	37.7
41	Permitted Option	35.3	37.7
42	Split Option	27.3	66.7
43	Minimum	27.3	37.7
44	Combined	65.0	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	0.0	27.9	16.7	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	37.7	29.0	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	27.3	0.0	0.0	0.0
50	Combined	65.0	56.9	16.7	0.0

51	**Intersection Capacity Utilization**	**54.2%**
52	**Level Of Service**	**A**

Revision 2003.0

EXISTING PLUS PROJECT WORKSHEETS

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / Lewis Road	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus Project
Date and Time of Data:	AM Peak	**Project:**	Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	206	597	18	404	348	226	50	285	261	135	666	204
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	206.0	597.0	18.0	404.0	348.0	226.0	50.0	285.0	261.0	135.0	666.0	204.0
14	Volume Separate Left	206.0	597.0		404.0	348.0		50.0	285.0		135.0	666.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	7.1	19.8	1.3	13.8	11.5	16.8	3.3	9.5	19.4	9.0	22.1	15.2
23	Adjusted Reference Time	10.1	23.9	14.0	16.8	17.1	20.8	7.0	19.1	23.4	12.0	27.5	19.2
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	103	299		202	174		50	143		135	333	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	105.8	19.8		207.5	11.5		49.9	9.5		9.0	22.1	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		105.8			207.5			49.9			22.1	
35	Adjusted Reference Time		109.8			211.5			53.9			27.5	
	Split Timing												
36	Ref Time Combined		19.8			11.5			9.5			22.1	
37	Ref Time By Movement	7.1	19.8		13.8	11.5		3.3	9.5		9.0	22.1	
38	Reference Time		19.8			13.8			9.5			22.1	
39	Adjusted Reference Time	23.9	23.9		18.7	18.7		19.1	19.1		27.5	27.5	

	Summary	**East West**	**North South**
40	Protected Option	40.7	34.5
41	Permitted Option	211.5	53.9
42	Split Option	42.6	46.6
43	Minimum	40.7	34.5
44	Combined	75.2	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	14.0	20.8	23.4	19.2
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	19.1	27.5	17.1	23.9
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	16.8	10.1	12.0	7.0
50	Combined	49.9	58.3	52.5	50.0

51	**Intersection Capacity Utilization**	**62.6%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / Lewis Road	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus Project
Date and Time of Data:	PM Peak	**Project:**	Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	205	400	17	321	784	271	89	541	455	123	417	269
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	205.0	400.0	17.0	321.0	784.0	271.0	89.0	541.0	455.0	123.0	417.0	269.0
14	Volume Separate Left	205.0	400.0		321.0	784.0		89.0	541.0		123.0	417.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	7.0	13.3	1.3	11.0	26.0	20.1	5.9	17.9	33.8	8.2	13.8	20.0
23	Adjusted Reference Time	10.0	19.2	14.0	14.0	30.0	24.1	8.9	24.8	37.8	11.2	21.6	24.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	102.5	200		160.5	392		89	271		123	209	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	105.3	13.3		164.8	26.0		88.8	17.9		8.2	13.8	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		105.3			164.8			88.8			13.8	
35	Adjusted Reference Time		109.3			168.8			92.8			21.6	
	Split Timing												
36	Ref Time Combined		13.3			26.0			17.9			13.8	
37	Ref Time By Movement	7.0	13.3		11.0	26.0		5.9	17.9		8.2	13.8	
38	Reference Time		13.3			26.0			17.9			13.8	
39	Adjusted Reference Time	19.2	19.2		30.0	30.0		24.8	24.8		21.6	21.6	

	Summary	**East West**	**North South**
40	Protected Option	40.0	36.0
41	Permitted Option	168.8	92.8
42	Split Option	49.2	46.4
43	Minimum	40.0	36.0
44	Combined	76.0	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	14.0	24.1	37.8	24.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	24.8	21.6	30.0	19.2
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	14.0	10.0	11.2	8.9
50	Combined	52.8	55.7	79.0	52.1

51	**Intersection Capacity Utilization**	**65.8%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	11	905	170	365	668	10	85	2	138	26	2	48
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	11.0	1075.0	0.0	365.0	678.0	0.0	0.0	87.0	138.0	26.0	50.0	0.0
14	Volume Separate Left	11.0	1075.0		365.0	678.0		85.0	2.0		26.0	50.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.976	0.850	0.950	0.998	0.850	0.950	0.951	0.850	0.950	0.856	0.850
17	Saturated Flow Combined	1805.0	3531.8	0.0	3505.3	3609.6	0.0	0.0	3614.4	1615.0	1805.0	1626.4	0.0
18	Saturated Flow Separate	1805.0	3531.8		3505.3	3609.6		3610.0	1900.0		1805.0	1626.4	
19	Pedestrian Interference Time		0.2	1.2		0.0	1.2		0.0	1.2		1.2	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	0.7	36.7	0.0	12.5	22.6	0.0	NA	NA	10.3	NA	NA	0.0
23	Adjusted Reference Time	5.0	40.7	9.0	15.5	26.6	9.0	NA	NA	13.3	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.98		1	0.00	
25	Volume Left Lane	11	538		182.5	339		0	87		26	50	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.98		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.1		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1765.9		116.8	1804.8		0.0	244.6		1925.3	1626.4	
30	Reference Time A	11.0	36.7		187.4	22.6		0.0	42.7		1.7	4.9	
31	Adjusted Saturation B		3531.8			3609.6			0.0			1626.4	
32	Reference Time B		NA			NA			10.9			4.9	
33	Reference Time Lefts	NA			NA			10.8			9.7		
34	Reference Time		36.7			187.4			10.9			4.9	
35	Adjusted Reference Time		40.7			191.4			17.3			8.0	
	Split Timing												
36	Ref Time Combined		36.7			22.6			2.9			4.9	
37	Ref Time By Movement	0.7	36.7		12.5	22.6		2.8	0.1		1.7	4.9	
38	Reference Time		36.7			22.6			2.9			4.9	
39	Adjusted Reference Time	40.7	40.7		26.6	26.6		13.1	13.1		8.0	8.0	

	Summary	**East West**	**North South**
40	Protected Option	56.2	NA
41	Permitted Option	191.4	17.3
42	Split Option	67.3	21.1
43	Minimum	56.2	17.3
44	Combined	73.5	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	9.0	9.0	13.3	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	13.1	8.0	26.6	40.7
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	15.5	5.0	8.0	13.1
50	Combined	37.6	22.0	47.8	61.8

51	**Intersection Capacity Utilization**	**61.3%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	26	810	79	95	857	24	453	4	424	10	4	28
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	26.0	889.0	0.0	95.0	881.0	0.0	0.0	457.0	424.0	10.0	32.0	0.0
14	Volume Separate Left	26.0	889.0		95.0	881.0		453.0	4.0		10.0	32.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.987	0.850	0.950	0.996	0.850	0.950	0.950	0.850	0.950	0.869	0.850
17	Saturated Flow Combined	1805.0	3569.4	0.0	3505.3	3602.8	0.0	0.0	3611.7	1615.0	1805.0	1650.6	0.0
18	Saturated Flow Separate	1805.0	3569.4		3505.3	3602.8		3610.0	1900.0		1805.0	1650.6	
19	Pedestrian Interference Time		0.1	1.2		0.0	1.2		0.0	1.2		1.1	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	1.7	30.0	0.0	3.3	29.4	0.0	NA	NA	31.5	NA	NA	0.0
23	Adjusted Reference Time	5.0	34.0	9.0	6.3	33.4	9.0	NA	NA	34.5	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.99		1	0.00	
25	Volume Left Lane	26	445		47.5	441		0	457		10	32	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.99		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1784.7		116.8	1801.4		0.0	242.1		1925.3	1650.6	
30	Reference Time A	25.9	30.0		48.8	29.4		0.0	226.5		0.7	3.4	
31	Adjusted Saturation B		3569.4			3602.8			0.0			1650.6	
32	Reference Time B		NA			NA			23.2			3.4	
33	Reference Time Lefts	NA			NA			23.1			8.7		
34	Reference Time		30.0			48.8			23.2			3.4	
35	Adjusted Reference Time		34.0			52.8			26.2			8.0	
	Split Timing												
36	Ref Time Combined		30.0			29.4			15.2			3.4	
37	Ref Time By Movement	1.7	30.0		3.3	29.4		15.1	0.3		0.7	3.4	
38	Reference Time		30.0			29.4			15.2			3.4	
39	Adjusted Reference Time	34.0	34.0		33.4	33.4		20.4	20.4		8.0	8.0	

	Summary	East West	North South
40	Protected Option	40.3	NA
41	Permitted Option	52.8	26.2
42	Split Option	67.4	28.4
43	Minimum	40.3	26.2
44	Combined	66.4	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	9.0	9.0	34.5	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	20.4	8.0	33.4	34.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	6.3	5.0	8.0	20.4
50	Combined	35.7	22.0	75.9	62.4

51	**Intersection Capacity Utilization**	**63.2%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 SB Ramps	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus Project
Date and Time of Data:	AM Peak	**Project:**	Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	844	4	194	3	0	8	0	1208	5	17	917	789
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	848.0	194.0	3.0	8.0	0.0	0.0	1213.0	0.0	17.0	917.0	789.0
14	Volume Separate Left	844.0	4.0		3.0	8.0		0.0	1213.0		17.0	917.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	0.999	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.9	1615.0	1805.0	1615.0	0.0	0.0	5172.4	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5172.4		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	14.4	NA	NA	0.0	0.0	28.1	0.0	1.1	30.4	58.6
23	Adjusted Reference Time	NA	NA	17.4	NA	NA	7.0	0.0	31.6	13.5	7.0	33.9	62.1
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	848		3	8		0	404		17	459	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.5		120.3	1615.0		0.0	1724.1		1925.3	1808.8	
30	Reference Time A	0.0	421.5		3.0	1.8		0.0	28.1		1.1	30.4	
31	Adjusted Saturation B		0.0			1615.0			5172.4			3617.6	
32	Reference Time B		36.2			1.8			NA			NA	
33	Reference Time Lefts	36.1			8.2			NA			NA		
34	Reference Time		36.2			3.0			28.1			30.4	
35	Adjusted Reference Time		39.2			7.0			31.6			33.9	
	Split Timing												
36	Ref Time Combined		28.2			1.8			28.1			30.4	
37	Ref Time By Movement	28.1	0.3		0.2	1.8		0.0	28.1		1.1	30.4	
38	Reference Time		28.2			1.8			28.1			30.4	
39	Adjusted Reference Time	31.2	31.2		7.0	7.0		31.6	31.6		33.9	33.9	

	Summary	**East West**	**North South**
40	Protected Option	NA	38.6
41	Permitted Option	39.2	33.9
42	Split Option	38.2	65.6
43	Minimum	38.2	33.9
44	Combined	72.1	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	17.4	7.0	13.5	62.1
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	31.6	33.9	7.0	31.2
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	31.2	7.0	0.0
50	Combined	56.1	72.1	27.5	93.3

51	**Intersection Capacity Utilization**	**77.8%**
52	**Level Of Service**	**D**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 SB Ramps
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Existing Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	853	4	106	11	0	11	0	1275	4	10	1001	523
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	857.0	106.0	11.0	11.0	0.0	0.0	1279.0	0.0	10.0	1001.0	523.0
14	Volume Separate Left	853.0	4.0		11.0	11.0		0.0	1279.0		10.0	1001.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.9	1615.0	1805.0	1615.0	0.0	0.0	5173.2	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5173.2		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	7.9	NA	NA	0.0	0.0	29.7	0.0	0.7	33.2	38.9
23	Adjusted Reference Time	NA	NA	10.9	NA	NA	7.0	0.0	33.2	13.5	7.0	36.7	42.4
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	857		11	11		0	426		10	501	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.4		120.3	1615.0		0.0	1724.4		1925.3	1808.8	
30	Reference Time A	0.0	425.9		11.0	2.1		0.0	29.7		0.7	33.2	
31	Adjusted Saturation B		0.0			1615.0			5173.2			3617.6	
32	Reference Time B		36.5			2.1			NA			NA	
33	Reference Time Lefts	36.4			8.7			NA			NA		
34	Reference Time		36.5			8.7			29.7			33.2	
35	Adjusted Reference Time		39.5			11.7			33.2			36.7	
	Split Timing												
36	Ref Time Combined		28.5			2.1			29.7			33.2	
37	Ref Time By Movement	28.4	0.3		0.7	2.1		0.0	29.7		0.7	33.2	
38	Reference Time		28.5			2.1			29.7			33.2	
39	Adjusted Reference Time	31.5	31.5		7.0	7.0		33.2	33.2		36.7	36.7	

	Summary	East West	North South
40	Protected Option	NA	40.2
41	Permitted Option	39.5	36.7
42	Split Option	38.5	69.9
43	Minimum	38.5	36.7
44	Combined	75.2	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	10.9	7.0	13.5	42.4
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	33.2	36.7	7.0	31.5
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	31.5	7.0	0.0
50	Combined	51.0	75.2	27.5	73.8

51	**Intersection Capacity Utilization**	**62.7%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 NB Off Ra	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus Project
Date and Time of Data:	AM Peak	**Project:**	Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	294	0	420	0	1399	130	0	1417	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	294.0	0.0	420.0	0.0	1399.0	130.0	0.0	1417.0	0.0
14	Volume Separate Left	0.0	0.0		294.0	0.0		0.0	1399.0		0.0	1417.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	19.5	0.0	17.6	0.0	32.4	9.7	0.0	32.9	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	22.5	0.0	20.6	0.0	35.9	13.5	0.0	36.4	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		294	0		0	466		0	472	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		293.2	0.0		0.0	32.4		0.0	32.9	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			27.5			NA			NA		
34	Reference Time		0.0			27.5			32.4			32.9	
35	Adjusted Reference Time		0.0			27.5			35.9			36.4	
	Split Timing												
36	Ref Time Combined		0.0			0.0			32.4			32.9	
37	Ref Time By Movement	0.0	0.0		19.5	0.0		0.0	32.4		0.0	32.9	
38	Reference Time		0.0			19.5			32.4			32.9	
39	Adjusted Reference Time	0.0	0.0		19.5	19.5		35.9	35.9		36.4	36.4	

	Summary	**East West**	**North South**
40	Protected Option	22.5	36.4
41	Permitted Option	27.5	36.4
42	Split Option	19.5	72.3
43	Minimum	19.5	36.4
44	Combined	55.9	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	0.0	20.6	13.5	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	35.9	36.4	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	19.5	0.0	0.0	0.0
50	Combined	55.5	57.0	13.5	0.0

51	**Intersection Capacity Utilization**	**47.5%**
52	**Level Of Service**	**A**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 NB Off Ra
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Existing Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	436	0	594	0	1475	188	0	1099	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	436.0	0.0	594.0	0.0	1475.0	188.0	0.0	1099.0	0.0
14	Volume Separate Left	0.0	0.0		436.0	0.0		0.0	1475.0		0.0	1099.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	29.0	0.0	24.9	0.0	34.2	14.0	0.0	25.5	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	32.0	0.0	27.9	0.0	37.7	17.5	0.0	29.0	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		436	0		0	492		0	366	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		434.8	0.0		0.0	34.2		0.0	25.5	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			37.0			NA			NA		
34	Reference Time		0.0			37.0			34.2			25.5	
35	Adjusted Reference Time		0.0			37.0			37.7			29.0	
	Split Timing												
36	Ref Time Combined		0.0			0.0			34.2			25.5	
37	Ref Time By Movement	0.0	0.0		29.0	0.0		0.0	34.2		0.0	25.5	
38	Reference Time		0.0			29.0			34.2			25.5	
39	Adjusted Reference Time	0.0	0.0		29.0	29.0		37.7	37.7		29.0	29.0	

	Summary	East West	North South
40	Protected Option	32.0	37.7
41	Permitted Option	37.0	37.7
42	Split Option	29.0	66.7
43	Minimum	29.0	37.7
44	Combined	66.7	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	0.0	27.9	17.5	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	37.7	29.0	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	29.0	0.0	0.0	0.0
50	Combined	66.7	56.9	17.5	0.0

51	**Intersection Capacity Utilization**	**55.6%**
52	**Level Of Service**	**B**

Revision 2003.0

EXISTING PLUS APPROVED/PENDING WORKSHEETS

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Lewis Road
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing Plus Approved/Pending
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	215	616	18	414	367	222	50	290	260	131	686	243
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	215.0	616.0	18.0	414.0	367.0	222.0	50.0	290.0	260.0	131.0	686.0	243.0
14	Volume Separate Left	215.0	616.0		414.0	367.0		50.0	290.0		131.0	686.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	7.4	20.4	1.3	14.2	12.2	16.5	3.3	9.6	19.3	8.7	22.8	18.1
23	Adjusted Reference Time	10.4	24.4	14.0	17.2	17.5	20.5	7.0	19.1	23.3	11.7	28.0	22.1
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	107.5	308		207	184		50	145		131	343	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	110.4	20.4		212.6	12.2		49.9	9.6		8.7	22.8	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		110.4			212.6			49.9			22.8	
35	Adjusted Reference Time		114.4			216.6			53.9			28.0	
	Split Timing												
36	Ref Time Combined		20.4			12.2			9.6			22.8	
37	Ref Time By Movement	7.4	20.4		14.2	12.2		3.3	9.6		8.7	22.8	
38	Reference Time		20.4			14.2			9.6			22.8	
39	Adjusted Reference Time	24.4	24.4		19.0	19.0		19.1	19.1		28.0	28.0	

#	**Summary**	**East West**	**North South**
40	Protected Option	41.6	35.0
41	Permitted Option	216.6	53.9
42	Split Option	43.4	47.1
43	Minimum	41.6	35.0
44	Combined	76.6	

#	**Right Turns**	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	14.0	20.5	23.3	22.1
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	19.1	28.0	17.5	24.4
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	17.2	10.4	11.7	7.0
50	Combined	50.3	58.8	52.6	53.5

#		
51	**Intersection Capacity Utilization**	**63.8%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Lewis Road
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Existing Plus Approved/Pending
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	237	417	17	338	803	269	89	559	456	121	426	287
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	237.0	417.0	17.0	338.0	803.0	269.0	89.0	559.0	456.0	121.0	426.0	287.0
14	Volume Separate Left	237.0	417.0		338.0	803.0		89.0	559.0		121.0	426.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	8.1	13.8	1.3	11.6	26.6	20.0	5.9	18.5	33.9	8.0	14.1	21.3
23	Adjusted Reference Time	11.1	19.6	14.0	14.6	30.6	24.0	8.9	25.2	37.9	11.0	21.8	25.3
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	118.5	209		169	402		89	280		121	213	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	121.7	13.8		173.6	26.6		88.8	18.5		8.0	14.1	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		121.7			173.6			88.8			14.1	
35	Adjusted Reference Time		125.7			177.6			92.8			21.8	
	Split Timing												
36	Ref Time Combined		13.8			26.6			18.5			14.1	
37	Ref Time By Movement	8.1	13.8		11.6	26.6		5.9	18.5		8.0	14.1	
38	Reference Time		13.8			26.6			18.5			14.1	
39	Adjusted Reference Time	19.6	19.6		30.6	30.6		25.2	25.2		21.8	21.8	

	Summary	East West	North South
40	Protected Option	41.7	36.3
41	Permitted Option	177.6	92.8
42	Split Option	50.2	47.0
43	Minimum	41.7	36.3
44	Combined	78.0	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	14.0	24.0	37.9	25.3
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	25.2	21.8	30.6	19.6
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	14.6	11.1	11.0	8.9
50	Combined	53.8	56.9	79.6	53.8

51	**Intersection Capacity Utilization**	**66.3%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing Plus Approved/Pending
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	11	933	157	306	692	10	87	2	84	26	2	48
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	11.0	1090.0	0.0	306.0	702.0	0.0	0.0	89.0	84.0	26.0	50.0	0.0
14	Volume Separate Left	11.0	1090.0		306.0	702.0		87.0	2.0		26.0	50.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.978	0.850	0.950	0.998	0.850	0.950	0.951	0.850	0.950	0.856	0.850
17	Saturated Flow Combined	1805.0	3539.4	0.0	3505.3	3609.9	0.0	0.0	3614.3	1615.0	1805.0	1626.4	0.0
18	Saturated Flow Separate	1805.0	3539.4		3505.3	3609.9		3610.0	1900.0		1805.0	1626.4	
19	Pedestrian Interference Time		0.2	1.2		0.0	1.2		0.0	1.2		1.2	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	0.7	37.1	0.0	10.5	23.4	0.0	NA	NA	6.2	NA	NA	0.0
23	Adjusted Reference Time	5.0	41.1	9.0	13.5	27.4	9.0	NA	NA	9.2	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.98		1	0.00	
25	Volume Left Lane	11	545		153	351		0	89		26	50	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.98		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.1		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1769.7		116.8	1804.9		0.0	244.5		1925.3	1626.4	
30	Reference Time A	11.0	37.1		157.1	23.4		0.0	43.7		1.7	4.9	
31	Adjusted Saturation B		3539.4			3609.9			0.0			1626.4	
32	Reference Time B		NA			NA			11.0			4.9	
33	Reference Time Lefts	NA			NA			10.9			9.7		
34	Reference Time		37.1			157.1			11.0			4.9	
35	Adjusted Reference Time		41.1			161.1			17.4			8.0	
	Split Timing												
36	Ref Time Combined		37.1			23.4			3.0			4.9	
37	Ref Time By Movement	0.7	37.1		10.5	23.4		2.9	0.1		1.7	4.9	
38	Reference Time		37.1			23.4			3.0			4.9	
39	Adjusted Reference Time	41.1	41.1		27.4	27.4		13.1	13.1		8.0	8.0	

#	Summary	East West	North South
40	Protected Option	54.6	NA
41	Permitted Option	161.1	17.4
42	Split Option	68.5	21.1
43	Minimum	54.6	17.4
44	Combined	72.0	

#	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	9.0	9.0	9.2	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	13.1	8.0	27.4	41.1
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	13.5	5.0	8.0	13.1
50	Combined	35.6	22.0	44.6	62.2

#		
51	**Intersection Capacity Utilization**	**60.0%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Existing Plus Approved/Pending
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	26	831	83	74	885	24	447	4	391	10	4	28
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	26.0	914.0	0.0	74.0	909.0	0.0	0.0	451.0	391.0	10.0	32.0	0.0
14	Volume Separate Left	26.0	914.0		74.0	909.0		447.0	4.0		10.0	32.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.986	0.850	0.950	0.996	0.850	0.950	0.950	0.850	0.950	0.869	0.850
17	Saturated Flow Combined	1805.0	3568.3	0.0	3505.3	3603.3	0.0	0.0	3611.7	1615.0	1805.0	1650.6	0.0
18	Saturated Flow Separate	1805.0	3568.3		3505.3	3603.3		3610.0	1900.0		1805.0	1650.6	
19	Pedestrian Interference Time		0.1	1.2		0.0	1.2		0.0	1.2		1.1	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	1.7	30.8	0.0	2.5	30.3	0.0	NA	NA	29.1	NA	NA	0.0
23	Adjusted Reference Time	5.0	34.8	9.0	5.5	34.3	9.0	NA	NA	32.1	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.99		1	0.00	
25	Volume Left Lane	26	457		37	455		0	451		10	32	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.99		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1784.2		116.8	1801.6		0.0	242.1		1925.3	1650.6	
30	Reference Time A	25.9	30.8		38.0	30.3		0.0	223.5		0.7	3.4	
31	Adjusted Saturation B		3568.3			3603.3			0.0			1650.6	
32	Reference Time B		NA			NA			23.0			3.4	
33	Reference Time Lefts	NA			NA			22.9			8.7		
34	Reference Time		30.8			38.0			23.0			3.4	
35	Adjusted Reference Time		34.8			42.0			26.0			8.0	
	Split Timing												
36	Ref Time Combined		30.8			30.3			15.0			3.4	
37	Ref Time By Movement	1.7	30.8		2.5	30.3		14.9	0.3		0.7	3.4	
38	Reference Time		30.8			30.3			15.0			3.4	
39	Adjusted Reference Time	34.8	34.8		34.3	34.3		20.3	20.3		8.0	8.0	

#	**Summary**	East West	North South
40	Protected Option	40.4	NA
41	Permitted Option	42.0	26.0
42	Split Option	69.2	28.3
43	Minimum	40.4	26.0
44	Combined	66.4	

#	**Right Turns**	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	9.0	9.0	32.1	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	20.3	8.0	34.3	34.8
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	5.5	5.0	8.0	20.3
50	Combined	34.8	22.0	74.4	63.1

51	**Intersection Capacity Utilization**	**62.0%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 SB Ramps
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing Plus Approved/Pending
Project: Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	935	4	179	3	0	8	0	1193	5	17	896	889
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	939.0	179.0	3.0	8.0	0.0	0.0	1198.0	0.0	17.0	896.0	889.0
14	Volume Separate Left	935.0	4.0		3.0	8.0		0.0	1198.0		17.0	896.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	0.999	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.8	1615.0	1805.0	1615.0	0.0	0.0	5172.4	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5172.4		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	13.3	NA	NA	0.0	0.0	27.8	0.0	1.1	29.7	66.1
23	Adjusted Reference Time	NA	NA	16.3	NA	NA	7.0	0.0	31.3	13.5	7.0	33.2	69.6
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	939		3	8		0	399		17	448	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.4		120.3	1615.0		0.0	1724.1		1925.3	1808.8	
30	Reference Time A	0.0	466.8		3.0	1.8		0.0	27.8		1.1	29.7	
31	Adjusted Saturation B		0.0			1615.0			5172.4			3617.6	
32	Reference Time B		39.2			1.8			NA			NA	
33	Reference Time Lefts	39.1			8.2			NA			NA		
34	Reference Time		39.2			3.0			27.8			29.7	
35	Adjusted Reference Time		42.2			7.0			31.3			33.2	
	Split Timing												
36	Ref Time Combined		31.2			1.8			27.8			29.7	
37	Ref Time By Movement	31.1	0.3		0.2	1.8		0.0	27.8		1.1	29.7	
38	Reference Time		31.2			1.8			27.8			29.7	
39	Adjusted Reference Time	34.2	34.2		7.0	7.0		31.3	31.3		33.2	33.2	

	Summary	East West	North South
40	Protected Option	NA	38.3
41	Permitted Option	42.2	33.2
42	Split Option	41.2	64.5
43	Minimum	41.2	33.2
44	Combined	74.4	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	16.3	7.0	13.5	69.6
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	31.3	33.2	7.0	34.2
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	34.2	7.0	0.0
50	Combined	54.6	74.4	27.5	103.8

51	**Intersection Capacity Utilization**	**86.5%**
52	**Level Of Service**	**E**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 SB Ramps
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Existing Plus Approved/Pending
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	928	4	106	11	0	11	0	1272	4	10	1020	623
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	932.0	106.0	11.0	11.0	0.0	0.0	1276.0	0.0	10.0	1020.0	623.0
14	Volume Separate Left	928.0	4.0		11.0	11.0		0.0	1276.0		10.0	1020.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.8	1615.0	1805.0	1615.0	0.0	0.0	5173.2	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5173.2		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	7.9	NA	NA	0.0	0.0	29.6	0.0	0.7	33.8	46.3
23	Adjusted Reference Time	NA	NA	10.9	NA	NA	7.0	0.0	33.1	13.5	7.0	37.3	49.8
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	932		11	11		0	425		10	510	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.4		120.3	1615.0		0.0	1724.4		1925.3	1808.8	
30	Reference Time A	0.0	463.3		11.0	2.1		0.0	29.6		0.7	33.8	
31	Adjusted Saturation B		0.0			1615.0			5173.2			3617.6	
32	Reference Time B		39.0			2.1			NA			NA	
33	Reference Time Lefts	38.8			8.7			NA			NA		
34	Reference Time		39.0			8.7			29.6			33.8	
35	Adjusted Reference Time		42.0			11.7			33.1			37.3	
	Split Timing												
36	Ref Time Combined		31.0			2.1			29.6			33.8	
37	Ref Time By Movement	30.8	0.3		0.7	2.1		0.0	29.6		0.7	33.8	
38	Reference Time		31.0			2.1			29.6			33.8	
39	Adjusted Reference Time	34.0	34.0		7.0	7.0		33.1	33.1		37.3	37.3	

	Summary	East West	North South
40	Protected Option	NA	40.1
41	Permitted Option	42.0	37.3
42	Split Option	41.0	70.4
43	Minimum	41.0	37.3
44	Combined	78.3	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	10.9	7.0	13.5	49.8
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	33.1	37.3	7.0	34.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	34.0	7.0	0.0
50	Combined	51.0	78.3	27.5	83.8

51	**Intersection Capacity Utilization**	**69.8%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 NB Off Ra **City:** Ventura County
Analyzed by: VRPA Technologies, Inc **Alternative:** Existing Plus Approved/Pending
Date and Time of Data: AM Peak **Project:** Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	244	0	513	0	1525	122	0	1546	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	244.0	0.0	513.0	0.0	1525.0	122.0	0.0	1546.0	0.0
14	Volume Separate Left	0.0	0.0		244.0	0.0		0.0	1525.0		0.0	1546.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	16.2	0.0	21.5	0.0	35.4	9.1	0.0	35.8	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	19.2	0.0	24.5	0.0	38.9	13.5	0.0	39.3	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		244	0		0	508		0	515	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		243.3	0.0		0.0	35.4		0.0	35.8	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			24.2			NA			NA		
34	Reference Time		0.0			24.2			35.4			35.8	
35	Adjusted Reference Time		0.0			24.2			38.9			39.3	
	Split Timing												
36	Ref Time Combined		0.0			0.0			35.4			35.8	
37	Ref Time By Movement	0.0	0.0		16.2	0.0		0.0	35.4		0.0	35.8	
38	Reference Time		0.0			16.2			35.4			35.8	
39	Adjusted Reference Time	0.0	0.0		16.2	16.2		38.9	38.9		39.3	39.3	

	Summary	East West	North South
40	Protected Option	19.2	39.3
41	Permitted Option	24.2	39.3
42	Split Option	16.2	78.2
43	Minimum	16.2	39.3
44	Combined	55.6	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	0.0	24.5	13.5	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	38.9	39.3	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	16.2	0.0	0.0	0.0
50	Combined	55.1	63.9	13.5	0.0

51	**Intersection Capacity Utilization**	**53.2%**
52	**Level Of Service**	**A**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 NB Off Ra	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus Approved/Pending
Date and Time of Data:	PM Peak	**Project:**	Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	419	0	677	0	1577	183	0	1235	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	419.0	0.0	677.0	0.0	1577.0	183.0	0.0	1235.0	0.0
14	Volume Separate Left	0.0	0.0		419.0	0.0		0.0	1577.0		0.0	1235.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	27.9	0.0	28.4	0.0	36.6	13.6	0.0	28.6	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	30.9	0.0	31.4	0.0	40.1	17.1	0.0	32.1	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		419	0		0	526		0	412	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		417.8	0.0		0.0	36.6		0.0	28.6	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			35.9			NA			NA		
34	Reference Time		0.0			35.9			36.6			28.6	
35	Adjusted Reference Time		0.0			35.9			40.1			32.1	
	Split Timing												
36	Ref Time Combined		0.0			0.0			36.6			28.6	
37	Ref Time By Movement	0.0	0.0		27.9	0.0		0.0	36.6		0.0	28.6	
38	Reference Time		0.0			27.9			36.6			28.6	
39	Adjusted Reference Time	0.0	0.0		27.9	27.9		40.1	40.1		32.1	32.1	

	Summary	**East West**	**North South**
40	Protected Option	30.9	40.1
41	Permitted Option	35.9	40.1
42	Split Option	27.9	72.2
43	Minimum	27.9	40.1
44	Combined	67.9	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	0.0	31.4	17.1	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	40.1	32.1	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	27.9	0.0	0.0	0.0
50	Combined	67.9	63.6	17.1	0.0

51	**Intersection Capacity Utilization**	**56.6%**
52	**Level Of Service**	**B**

Revision 2003.0

EXISTING PLUS APPROVED/PENDING PLUS PROJECT WORKSHEETS

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / Lewis Road	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus App/Pen Plus Project
Date and Time of Data:	AM Peak	**Project:**	Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	215	625	18	418	371	226	50	290	264	135	686	243
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	215.0	625.0	18.0	418.0	371.0	226.0	50.0	290.0	264.0	135.0	686.0	243.0
14	Volume Separate Left	215.0	625.0		418.0	371.0		50.0	290.0		135.0	686.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	7.4	20.7	1.3	14.3	12.3	16.8	3.3	9.6	19.6	9.0	22.8	18.1
23	Adjusted Reference Time	10.4	24.7	14.0	17.3	17.6	20.8	7.0	19.1	23.6	12.0	28.0	22.1
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	107.5	313		209	186		50	145		135	343	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	110.4	20.7		214.6	12.3		49.9	9.6		9.0	22.8	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		110.4			214.6			49.9			22.8	
35	Adjusted Reference Time		114.4			218.6			53.9			28.0	
	Split Timing												
36	Ref Time Combined		20.7			12.3			9.6			22.8	
37	Ref Time By Movement	7.4	20.7		14.3	12.3		3.3	9.6		9.0	22.8	
38	Reference Time		20.7			14.3			9.6			22.8	
39	Adjusted Reference Time	24.7	24.7		19.1	19.1		19.1	19.1		28.0	28.0	

	Summary	**East West**	**North South**
40	Protected Option	42.0	35.0
41	Permitted Option	218.6	53.9
42	Split Option	43.8	47.1
43	Minimum	42.0	35.0
44	Combined	77.0	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	14.0	20.8	23.6	22.1
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	19.1	28.0	17.6	24.7
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	17.3	10.4	12.0	7.0
50	Combined	50.4	59.1	53.2	53.8

51	**Intersection Capacity Utilization**	**64.2%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / Lewis Road	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus App/Pen Plus Project
Date and Time of Data:	PM Peak	**Project:**	Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	237	419	17	340	810	271	89	559	458	123	426	287
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	237.0	419.0	17.0	340.0	810.0	271.0	89.0	559.0	458.0	123.0	426.0	287.0
14	Volume Separate Left	237.0	419.0		340.0	810.0		89.0	559.0		123.0	426.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	8.1	13.9	1.3	11.6	26.9	20.1	5.9	18.5	34.0	8.2	14.1	21.3
23	Adjusted Reference Time	11.1	19.6	14.0	14.6	30.9	24.1	8.9	25.2	38.0	11.2	21.8	25.3
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	118.5	210		170	405		89	280		123	213	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	121.7	13.9		174.6	26.9		88.8	18.5		8.2	14.1	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		121.7			174.6			88.8			14.1	
35	Adjusted Reference Time		125.7			178.6			92.8			21.8	
	Split Timing												
36	Ref Time Combined		13.9			26.9			18.5			14.1	
37	Ref Time By Movement	8.1	13.9		11.6	26.9		5.9	18.5		8.2	14.1	
38	Reference Time		13.9			26.9			18.5			14.1	
39	Adjusted Reference Time	19.6	19.6		30.9	30.9		25.2	25.2		21.8	21.8	

#	Summary	East West	North South
40	Protected Option	42.0	36.4
41	Permitted Option	178.6	92.8
42	Split Option	50.5	47.0
43	Minimum	42.0	36.4
44	Combined	78.4	

#	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	14.0	24.1	38.0	25.3
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	25.2	21.8	30.9	19.6
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	14.6	11.1	11.2	8.9
50	Combined	53.9	57.0	80.1	53.9

#		
51	**Intersection Capacity Utilization**	**66.7%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing Plus App/Pen Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	11	933	173	377	692	10	98	2	148	26	2	48
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	11.0	1106.0	0.0	377.0	702.0	0.0	0.0	100.0	148.0	26.0	50.0	0.0
14	Volume Separate Left	11.0	1106.0		377.0	702.0		98.0	2.0		26.0	50.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.977	0.850	0.950	0.998	0.850	0.950	0.951	0.850	0.950	0.856	0.850
17	Saturated Flow Combined	1805.0	3532.7	0.0	3505.3	3609.9	0.0	0.0	3613.8	1615.0	1805.0	1626.4	0.0
18	Saturated Flow Separate	1805.0	3532.7		3505.3	3609.9		3610.0	1900.0		1805.0	1626.4	
19	Pedestrian Interference Time		0.2	1.2		0.0	1.2		0.0	1.2		1.2	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	0.7	37.8	0.0	12.9	23.4	0.0	NA	NA	11.0	NA	NA	0.0
23	Adjusted Reference Time	5.0	41.8	9.0	15.9	27.4	9.0	NA	NA	14.0	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.98		1	0.00	
25	Volume Left Lane	11	553		188.5	351		0	100		26	50	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.98		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.1		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1766.4		116.8	1804.9		0.0	244.1		1925.3	1626.4	
30	Reference Time A	11.0	37.8		193.6	23.4		0.0	49.2		1.7	4.9	
31	Adjusted Saturation B		3532.7			3609.9			0.0			1626.4	
32	Reference Time B		NA			NA			11.3			4.9	
33	Reference Time Lefts	NA			NA			11.3			9.7		
34	Reference Time		37.8			193.6			11.3			4.9	
35	Adjusted Reference Time		41.8			197.6			17.6			8.0	
	Split Timing												
36	Ref Time Combined		37.8			23.4			3.3			4.9	
37	Ref Time By Movement	0.7	37.8		12.9	23.4		3.3	0.1		1.7	4.9	
38	Reference Time		37.8			23.4			3.3			4.9	
39	Adjusted Reference Time	41.8	41.8		27.4	27.4		13.1	13.1		8.0	8.0	

	Summary	East West	North South
40	Protected Option	57.7	NA
41	Permitted Option	197.6	17.6
42	Split Option	69.1	21.1
43	Minimum	57.7	17.6
44	Combined	75.3	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	9.0	9.0	14.0	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	13.1	8.0	27.4	41.8
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	15.9	5.0	8.0	13.1
50	Combined	38.0	22.0	49.4	62.9

51	**Intersection Capacity Utilization**	**62.8%**
52	**Level Of Service**	**B**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak

City: Ventura County
Alternative: Existing Plus App/Pen Plus Project
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	26	831	89	106	885	24	458	4	430	10	4	28
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	26.0	920.0	0.0	106.0	909.0	0.0	0.0	462.0	430.0	10.0	32.0	0.0
14	Volume Separate Left	26.0	920.0		106.0	909.0		458.0	4.0		10.0	32.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.985	0.850	0.950	0.996	0.850	0.950	0.950	0.850	0.950	0.869	0.850
17	Saturated Flow Combined	1805.0	3565.1	0.0	3505.3	3603.3	0.0	0.0	3611.6	1615.0	1805.0	1650.6	0.0
18	Saturated Flow Separate	1805.0	3565.1		3505.3	3603.3		3610.0	1900.0		1805.0	1650.6	
19	Pedestrian Interference Time		0.1	1.2		0.0	1.2		0.0	1.2		1.1	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	1.7	31.1	0.0	3.6	30.3	0.0	NA	NA	32.0	NA	NA	0.0
23	Adjusted Reference Time	5.0	35.1	9.0	6.6	34.3	9.0	NA	NA	35.0	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.99		1	0.00	
25	Volume Left Lane	26	460		53	455		0	462		10	32	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.99		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1782.6		116.8	1801.6		0.0	242.1		1925.3	1650.6	
30	Reference Time A	25.9	31.1		54.4	30.3		0.0	229.0		0.7	3.4	
31	Adjusted Saturation B		3565.1			3603.3			0.0			1650.6	
32	Reference Time B		NA			NA			23.4			3.4	
33	Reference Time Lefts	NA			NA			23.2			8.7		
34	Reference Time		31.1			54.4			23.4			3.4	
35	Adjusted Reference Time		35.1			58.4			26.4			8.0	
	Split Timing												
36	Ref Time Combined		31.1			30.3			15.4			3.4	
37	Ref Time By Movement	1.7	31.1		3.6	30.3		15.2	0.3		0.7	3.4	
38	Reference Time		31.1			30.3			15.4			3.4	
39	Adjusted Reference Time	35.1	35.1		34.3	34.3		20.5	20.5		8.0	8.0	

#	**Summary**	East West	North South
40	Protected Option	41.7	NA
41	Permitted Option	58.4	26.4
42	Split Option	69.4	28.5
43	Minimum	41.7	26.4
44	Combined	68.1	

#	**Right Turns**	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	9.0	9.0	35.0	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	20.5	8.0	34.3	35.1
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	6.6	5.0	8.0	20.5
50	Combined	36.1	22.0	77.3	63.6

#		
51	**Intersection Capacity Utilization**	**64.4%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 SB Ramps
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Existing Plus App/Pen Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	935	4	196	3	0	8	0	1257	5	17	950	889
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	939.0	196.0	3.0	8.0	0.0	0.0	1262.0	0.0	17.0	950.0	889.0
14	Volume Separate Left	935.0	4.0		3.0	8.0		0.0	1262.0		17.0	950.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	0.999	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.8	1615.0	1805.0	1615.0	0.0	0.0	5172.5	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5172.5		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	14.6	NA	NA	0.0	0.0	29.3	0.0	1.1	31.5	66.1
23	Adjusted Reference Time	NA	NA	17.6	NA	NA	7.0	0.0	32.8	13.5	7.0	35.0	69.6
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	939		3	8		0	421		17	475	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.4		120.3	1615.0		0.0	1724.2		1925.3	1808.8	
30	Reference Time A	0.0	466.8		3.0	1.8		0.0	29.3		1.1	31.5	
31	Adjusted Saturation B		0.0			1615.0			5172.5			3617.6	
32	Reference Time B		39.2			1.8			NA			NA	
33	Reference Time Lefts	39.1			8.2			NA			NA		
34	Reference Time		39.2			3.0			29.3			31.5	
35	Adjusted Reference Time		42.2			7.0			32.8			35.0	
	Split Timing												
36	Ref Time Combined		31.2			1.8			29.3			31.5	
37	Ref Time By Movement	31.1	0.3		0.2	1.8		0.0	29.3		1.1	31.5	
38	Reference Time		31.2			1.8			29.3			31.5	
39	Adjusted Reference Time	34.2	34.2		7.0	7.0		32.8	32.8		35.0	35.0	

	Summary	**East West**	**North South**
40	Protected Option	NA	39.8
41	Permitted Option	42.2	35.0
42	Split Option	41.2	67.8
43	Minimum	41.2	35.0
44	Combined	76.2	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	17.6	7.0	13.5	69.6
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	32.8	35.0	7.0	34.2
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	34.2	7.0	0.0
50	Combined	57.3	76.2	27.5	103.8

51	**Intersection Capacity Utilization**	**86.5%**
52	**Level Of Service**	**E**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 SB Ramps
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Existing Plus App/Pen Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	928	4	114	11	0	11	0	1311	4	10	1045	623
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	932.0	114.0	11.0	11.0	0.0	0.0	1315.0	0.0	10.0	1045.0	623.0
14	Volume Separate Left	928.0	4.0		11.0	11.0		0.0	1315.0		10.0	1045.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.8	1615.0	1805.0	1615.0	0.0	0.0	5173.2	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5173.2		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	8.5	NA	NA	0.0	0.0	30.5	0.0	0.7	34.7	46.3
23	Adjusted Reference Time	NA	NA	11.5	NA	NA	7.0	0.0	34.0	13.5	7.0	38.2	49.8
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	932		11	11		0	438		10	523	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.4		120.3	1615.0		0.0	1724.4		1925.3	1808.8	
30	Reference Time A	0.0	463.3		11.0	2.1		0.0	30.5		0.7	34.7	
31	Adjusted Saturation B		0.0			1615.0			5173.2			3617.6	
32	Reference Time B		39.0			2.1			NA			NA	
33	Reference Time Lefts	38.8			8.7			NA			NA		
34	Reference Time		39.0			8.7			30.5			34.7	
35	Adjusted Reference Time		42.0			11.7			34.0			38.2	
	Split Timing												
36	Ref Time Combined		31.0			2.1			30.5			34.7	
37	Ref Time By Movement	30.8	0.3		0.7	2.1		0.0	30.5		0.7	34.7	
38	Reference Time		31.0			2.1			30.5			34.7	
39	Adjusted Reference Time	34.0	34.0		7.0	7.0		34.0	34.0		38.2	38.2	

	Summary	**East West**	**North South**
40	Protected Option	NA	41.0
41	Permitted Option	42.0	38.2
42	Split Option	41.0	72.2
43	Minimum	41.0	38.2
44	Combined	79.1	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	11.5	7.0	13.5	49.8
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	34.0	38.2	7.0	34.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	34.0	7.0	0.0
50	Combined	52.5	79.1	27.5	83.8

51	**Intersection Capacity Utilization**	**69.8%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 NB Off Ra	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus App/Pen Plus Project
Date and Time of Data:	AM Peak	**Project:**	Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	296	0	513	0	1525	137	0	1548	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	296.0	0.0	513.0	0.0	1525.0	137.0	0.0	1548.0	0.0
14	Volume Separate Left	0.0	0.0		296.0	0.0		0.0	1525.0		0.0	1548.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	19.7	0.0	21.5	0.0	35.4	10.2	0.0	35.9	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	22.7	0.0	24.5	0.0	38.9	13.7	0.0	39.4	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		296	0		0	508		0	516	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		295.2	0.0		0.0	35.4		0.0	35.9	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			27.7			NA			NA		
34	Reference Time		0.0			27.7			35.4			35.9	
35	Adjusted Reference Time		0.0			27.7			38.9			39.4	
	Split Timing												
36	Ref Time Combined		0.0			0.0			35.4			35.9	
37	Ref Time By Movement	0.0	0.0		19.7	0.0		0.0	35.4		0.0	35.9	
38	Reference Time		0.0			19.7			35.4			35.9	
39	Adjusted Reference Time	0.0	0.0		19.7	19.7		38.9	38.9		39.4	39.4	

#	**Summary**	East West	North South
40	Protected Option	22.7	39.4
41	Permitted Option	27.7	39.4
42	Split Option	19.7	78.2
43	Minimum	19.7	39.4
44	Combined	59.1	

#	**Right Turns**	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	0.0	24.5	13.7	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	38.9	39.4	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	19.7	0.0	0.0	0.0
50	Combined	58.5	63.9	13.7	0.0

#		
51	**Intersection Capacity Utilization**	**53.3%**
52	**Level Of Service**	**A**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 NB Off Ra	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Existing Plus App/Pen Plus Project
Date and Time of Data:	PM Peak	**Project:**	Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	444	0	677	0	1577	193	0	1235	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	444.0	0.0	677.0	0.0	1577.0	193.0	0.0	1235.0	0.0
14	Volume Separate Left	0.0	0.0		444.0	0.0		0.0	1577.0		0.0	1235.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	29.5	0.0	28.4	0.0	36.6	14.3	0.0	28.6	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	32.5	0.0	31.4	0.0	40.1	17.8	0.0	32.1	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		444	0		0	526		0	412	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		442.8	0.0		0.0	36.6		0.0	28.6	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			37.5			NA			NA		
34	Reference Time		0.0			37.5			36.6			28.6	
35	Adjusted Reference Time		0.0			37.5			40.1			32.1	
	Split Timing												
36	Ref Time Combined		0.0			0.0			36.6			28.6	
37	Ref Time By Movement	0.0	0.0		29.5	0.0		0.0	36.6		0.0	28.6	
38	Reference Time		0.0			29.5			36.6			28.6	
39	Adjusted Reference Time	0.0	0.0		29.5	29.5		40.1	40.1		32.1	32.1	

	Summary	**East West**	**North South**
40	Protected Option	32.5	40.1
41	Permitted Option	37.5	40.1
42	Split Option	29.5	72.2
43	Minimum	29.5	40.1
44	Combined	69.6	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	0.0	31.4	17.8	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	40.1	32.1	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	29.5	0.0	0.0	0.0
50	Combined	69.6	63.6	17.8	0.0

51	**Intersection Capacity Utilization**	**58.0%**
52	**Level Of Service**	**B**

Revision 2003.0

CUMULATIVE YEAR 2030
WORKSHEETS

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Lewis Road
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Cumulative Year 2030 W/out Projec
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	236	636	30	638	401	244	64	298	363	221	974	250
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	236.0	636.0	30.0	638.0	401.0	244.0	64.0	298.0	363.0	221.0	974.0	250.0
14	Volume Separate Left	236.0	636.0		638.0	401.0		64.0	298.0		221.0	974.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	8.1	21.1	2.2	21.8	13.3	18.1	4.3	9.9	27.0	14.7	32.3	18.6
23	Adjusted Reference Time	11.1	25.1	14.0	24.8	18.4	22.1	7.3	19.1	31.0	17.7	36.3	22.6
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	118	318		319	201		64	149		221	487	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	121.2	21.1		327.6	13.3		63.8	9.9		14.7	32.3	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		121.2			327.6			63.8			32.3	
35	Adjusted Reference Time		125.2			331.6			67.8			36.3	
	Split Timing												
36	Ref Time Combined		21.1			13.3			9.9			32.3	
37	Ref Time By Movement	8.1	21.1		21.8	13.3		4.3	9.9		14.7	32.3	
38	Reference Time		21.1			21.8			9.9			32.3	
39	Adjusted Reference Time	25.1	25.1		25.8	25.8		19.1	19.1		36.3	36.3	

#	Summary	East West	North South
40	Protected Option	49.9	43.6
41	Permitted Option	331.6	67.8
42	Split Option	50.9	55.4
43	Minimum	49.9	43.6
44	Combined	93.5	

#	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	14.0	22.1	31.0	22.6
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	19.1	36.3	18.4	25.1
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	24.8	11.1	17.7	7.3
50	Combined	57.9	69.5	67.0	54.9

#		
51	**Intersection Capacity Utilization**	**77.9%**
52	**Level Of Service**	**D**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Lewis Road
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Cumulative Year 2030 W/out Projec
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	258	457	31	370	851	296	107	746	648	133	468	314
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	258.0	457.0	31.0	370.0	851.0	296.0	107.0	746.0	648.0	133.0	468.0	314.0
14	Volume Separate Left	258.0	457.0		370.0	851.0		107.0	746.0		133.0	468.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	8.8	15.2	2.3	12.7	28.2	22.0	7.1	24.7	48.1	8.8	15.5	23.3
23	Adjusted Reference Time	11.8	20.5	14.0	15.7	32.2	26.0	10.1	29.7	52.1	11.8	22.8	27.3
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	129	229		185	426		107	373		133	234	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	132.5	15.2		190.0	28.2		106.7	24.7		8.8	15.5	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		132.5			190.0			106.7			15.5	
35	Adjusted Reference Time		136.5			194.0			110.7			22.8	
	Split Timing												
36	Ref Time Combined		15.2			28.2			24.7			15.5	
37	Ref Time By Movement	8.8	15.2		12.7	28.2		7.1	24.7		8.8	15.5	
38	Reference Time		15.2			28.2			24.7			15.5	
39	Adjusted Reference Time	20.5	20.5		32.2	32.2		29.7	29.7		22.8	22.8	

	Summary	**East West**	**North South**
40	Protected Option	44.1	41.5
41	Permitted Option	194.0	110.7
42	Split Option	52.8	52.4
43	Minimum	44.1	41.5
44	Combined	85.6	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	14.0	26.0	52.1	27.3
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	29.7	22.8	32.2	20.5
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	15.7	11.8	11.8	10.1
50	Combined	59.3	60.6	96.2	58.0

51	**Intersection Capacity Utilization**	**80.2%**
52	**Level Of Service**	**D**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / Pancho	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Cumulative Year 2030 W/out Projec
Date and Time of Data:	AM Peak	**Project:**	Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	17	1018	278	388	831	11	132	2	116	32	2	53
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	17.0	1296.0	0.0	388.0	842.0	0.0	0.0	134.0	116.0	32.0	55.0	0.0
14	Volume Separate Left	17.0	1296.0		388.0	842.0		132.0	2.0		32.0	55.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.968	0.850	0.950	0.998	0.850	0.950	0.951	0.850	0.950	0.855	0.850
17	Saturated Flow Combined	1805.0	3501.2	0.0	3505.3	3610.5	0.0	0.0	3612.8	1615.0	1805.0	1625.4	0.0
18	Saturated Flow Separate	1805.0	3501.2		3505.3	3610.5		3610.0	1900.0		1805.0	1625.4	
19	Pedestrian Interference Time		0.3	1.2		0.0	1.2		0.0	1.2		1.2	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	1.1	44.7	0.0	13.3	28.0	0.0	NA	NA	8.6	NA	NA	0.0
23	Adjusted Reference Time	5.0	48.7	9.0	16.3	32.0	9.0	NA	NA	11.6	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.99		1	0.00	
25	Volume Left Lane	17	648		194	421		0	134		32	55	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.99		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.1		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1750.6		116.8	1805.3		0.0	243.2		1925.3	1625.4	
30	Reference Time A	17.0	44.7		199.2	28.0		0.0	66.1		2.1	5.3	
31	Adjusted Saturation B		3501.2			3610.5			0.0			1625.4	
32	Reference Time B		NA			NA			12.5			5.3	
33	Reference Time Lefts	NA			NA			12.4			10.1		
34	Reference Time		44.7			199.2			12.5			5.3	
35	Adjusted Reference Time		48.7			203.2			18.4			8.3	
	Split Timing												
36	Ref Time Combined		44.7			28.0			4.5			5.3	
37	Ref Time By Movement	1.1	44.7		13.3	28.0		4.4	0.1		2.1	5.3	
38	Reference Time		44.7			28.0			4.5			5.3	
39	Adjusted Reference Time	48.7	48.7		32.0	32.0		13.1	13.1		8.3	8.3	

	Summary	**East West**	**North South**
40	Protected Option	65.0	NA
41	Permitted Option	203.2	18.4
42	Split Option	80.7	21.4
43	Minimum	65.0	18.4
44	Combined	83.4	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	9.0	9.0	11.6	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	13.1	8.3	32.0	48.7
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	16.3	5.0	8.3	13.1
50	Combined	38.4	22.3	51.9	69.8

51	**Intersection Capacity Utilization**	**69.5%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
City: Ventura County
Analyzed by: VRPA Technologies, Inc
Alternative: Cumulative Year 2030 W/out Projec
Date and Time of Data: PM Peak
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	34	891	173	91	970	26	472	6	430	14	4	31
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	34.0	1064.0	0.0	91.0	996.0	0.0	0.0	478.0	430.0	14.0	35.0	0.0
14	Volume Separate Left	34.0	1064.0		91.0	996.0		472.0	6.0		14.0	35.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.976	0.850	0.950	0.996	0.850	0.950	0.951	0.850	0.950	0.867	0.850
17	Saturated Flow Combined	1805.0	3529.4	0.0	3505.3	3603.4	0.0	0.0	3612.4	1615.0	1805.0	1647.6	0.0
18	Saturated Flow Separate	1805.0	3529.4		3505.3	3603.4		3610.0	1900.0		1805.0	1647.6	
19	Pedestrian Interference Time		0.2	1.2		0.0	1.2		0.0	1.2		1.1	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	2.3	36.4	0.0	3.1	33.2	0.0	NA	NA	32.0	NA	NA	0.0
23	Adjusted Reference Time	5.3	40.4	9.0	6.1	37.2	9.0	NA	NA	35.0	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.99		1	0.00	
25	Volume Left Lane	34	532		45.5	498		0	478		14	35	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.99		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.1		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1764.7		116.8	1801.7		0.0	242.8		1925.3	1647.6	
30	Reference Time A	33.9	36.4		46.7	33.2		0.0	236.3		0.9	3.6	
31	Adjusted Saturation B		3529.4			3603.4			0.0			1647.6	
32	Reference Time B		NA			NA			23.9			3.6	
33	Reference Time Lefts	NA			NA			23.7			8.9		
34	Reference Time		36.4			46.7			23.9			3.6	
35	Adjusted Reference Time		40.4			50.7			26.9			8.0	
	Split Timing												
36	Ref Time Combined		36.4			33.2			15.9			3.6	
37	Ref Time By Movement	2.3	36.4		3.1	33.2		15.7	0.4		0.9	3.6	
38	Reference Time		36.4			33.2			15.9			3.6	
39	Adjusted Reference Time	40.4	40.4		37.2	37.2		20.9	20.9		8.0	8.0	

	Summary	**East West**	**North South**
40	Protected Option	46.5	NA
41	Permitted Option	50.7	26.9
42	Split Option	77.6	28.9
43	Minimum	46.5	26.9
44	Combined	73.4	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	9.0	9.0	35.0	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	20.9	8.0	37.2	40.4
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	6.1	5.3	8.0	20.9
50	Combined	36.0	22.3	80.2	69.3

51	**Intersection Capacity Utilization**	**66.8%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 SB Ramps
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Cumulative Year 2030 W/out Projec
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	1092	4	213	3	0	9	0	1261	5	21	1033	1083
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	1096.0	213.0	3.0	9.0	0.0	0.0	1266.0	0.0	21.0	1033.0	1083.0
14	Volume Separate Left	1092.0	4.0		3.0	9.0		0.0	1266.0		21.0	1033.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	0.999	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.7	1615.0	1805.0	1615.0	0.0	0.0	5172.5	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5172.5		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	15.8	NA	NA	0.0	0.0	29.4	0.0	1.4	34.3	80.5
23	Adjusted Reference Time	NA	NA	18.8	NA	NA	7.0	0.0	32.9	13.5	7.0	37.8	84.0
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	1096		3	9		0	422		21	517	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.3		120.3	1615.0		0.0	1724.2		1925.3	1808.8	
30	Reference Time A	0.0	545.1		3.0	1.9		0.0	29.4		1.4	34.3	
31	Adjusted Saturation B		0.0			1615.0			5172.5			3617.6	
32	Reference Time B		44.4			1.9			NA			NA	
33	Reference Time Lefts	44.3			8.2			NA			NA		
34	Reference Time		44.4			3.0			29.4			34.3	
35	Adjusted Reference Time		47.4			7.0			32.9			37.8	
	Split Timing												
36	Ref Time Combined		36.4			1.9			29.4			34.3	
37	Ref Time By Movement	36.3	0.3		0.2	1.9		0.0	29.4		1.4	34.3	
38	Reference Time		36.4			1.9			29.4			34.3	
39	Adjusted Reference Time	39.4	39.4		7.0	7.0		32.9	32.9		37.8	37.8	

	Summary	East West	North South
40	Protected Option	NA	39.9
41	Permitted Option	47.4	37.8
42	Split Option	46.4	70.6
43	Minimum	46.4	37.8
44	Combined	84.2	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	18.8	7.0	13.5	84.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	32.9	37.8	7.0	39.4
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	39.4	7.0	0.0
50	Combined	58.7	84.2	27.5	123.4

51	**Intersection Capacity Utilization**	**102.8%**
52	**Level Of Service**	**G**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 SB Ramps	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Cumulative Year 2030 W/out Projec
Date and Time of Data:	PM Peak	**Project:**	Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	1228	4	116	12	0	12	0	1372	5	25	1117	945
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	1232.0	116.0	12.0	12.0	0.0	0.0	1377.0	0.0	25.0	1117.0	945.0
14	Volume Separate Left	1228.0	4.0		12.0	12.0		0.0	1377.0		25.0	1117.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	0.999	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.6	1615.0	1805.0	1615.0	0.0	0.0	5172.8	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5172.8		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	8.6	NA	NA	0.0	0.0	31.9	0.0	1.7	37.1	70.2
23	Adjusted Reference Time	NA	NA	11.6	NA	NA	7.0	0.0	35.4	13.5	7.0	40.6	73.7
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	1232		12	12		0	459		25	559	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.2		120.3	1615.0		0.0	1724.3		1925.3	1808.8	
30	Reference Time A	0.0	612.9		12.0	2.1		0.0	31.9		1.7	37.1	
31	Adjusted Saturation B		0.0			1615.0			5172.8			3617.6	
32	Reference Time B		48.9			2.1			NA			NA	
33	Reference Time Lefts	48.8			8.8			NA			NA		
34	Reference Time		48.9			8.8			31.9			37.1	
35	Adjusted Reference Time		51.9			11.8			35.4			40.6	
	Split Timing												
36	Ref Time Combined		40.9			2.1			31.9			37.1	
37	Ref Time By Movement	40.8	0.3		0.8	2.1		0.0	31.9		1.7	37.1	
38	Reference Time		40.9			2.1			31.9			37.1	
39	Adjusted Reference Time	43.9	43.9		7.0	7.0		35.4	35.4		40.6	40.6	

#	**Summary**	**East West**	**North South**
40	Protected Option	NA	42.4
41	Permitted Option	51.9	40.6
42	Split Option	50.9	76.0
43	Minimum	50.9	40.6
44	Combined	91.5	

#	**Right Turns**	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	11.6	7.0	13.5	73.7
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	35.4	40.6	7.0	43.9
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	43.9	7.0	0.0
50	Combined	54.1	91.5	27.5	117.7

#		
51	**Intersection Capacity Utilization**	**98.1%**
52	**Level Of Service**	**F**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 NB Off Ra
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Cumulative Year 2030 W/out Projec
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	385	0	708	0	1604	151	0	2028	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	385.0	0.0	708.0	0.0	1604.0	151.0	0.0	2028.0	0.0
14	Volume Separate Left	0.0	0.0		385.0	0.0		0.0	1604.0		0.0	2028.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	25.6	0.0	29.7	0.0	37.2	11.2	0.0	47.0	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	28.6	0.0	32.7	0.0	40.7	14.7	0.0	50.5	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		385	0		0	535		0	676	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		383.9	0.0		0.0	37.2		0.0	47.0	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			33.6			NA			NA		
34	Reference Time		0.0			33.6			37.2			47.0	
35	Adjusted Reference Time		0.0			33.6			40.7			50.5	
	Split Timing												
36	Ref Time Combined		0.0			0.0			37.2			47.0	
37	Ref Time By Movement	0.0	0.0		25.6	0.0		0.0	37.2		0.0	47.0	
38	Reference Time		0.0			25.6			37.2			47.0	
39	Adjusted Reference Time	0.0	0.0		25.6	25.6		40.7	40.7		50.5	50.5	

#	**Summary**	East West	North South
40	Protected Option	28.6	50.5
41	Permitted Option	33.6	50.5
42	Split Option	25.6	91.2
43	Minimum	25.6	50.5
44	Combined	76.1	

#	**Right Turns**	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	0.0	32.7	14.7	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	40.7	50.5	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	25.6	0.0	0.0	0.0
50	Combined	66.3	83.2	14.7	0.0

#		
51	**Intersection Capacity Utilization**	**69.4%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 NB Off Ra
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Cumulative Year 2030 W/out Projec
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	460	0	757	0	1855	245	0	1946	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	460.0	0.0	757.0	0.0	1855.0	245.0	0.0	1946.0	0.0
14	Volume Separate Left	0.0	0.0		460.0	0.0		0.0	1855.0		0.0	1946.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	30.6	0.0	31.8	0.0	43.0	18.2	0.0	45.1	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	33.6	0.0	34.8	0.0	46.5	21.7	0.0	48.6	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		460	0		0	618		0	649	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		458.7	0.0		0.0	43.0		0.0	45.1	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			38.6			NA			NA		
34	Reference Time		0.0			38.6			43.0			45.1	
35	Adjusted Reference Time		0.0			38.6			46.5			48.6	
	Split Timing												
36	Ref Time Combined		0.0			0.0			43.0			45.1	
37	Ref Time By Movement	0.0	0.0		30.6	0.0		0.0	43.0		0.0	45.1	
38	Reference Time		0.0			30.6			43.0			45.1	
39	Adjusted Reference Time	0.0	0.0		30.6	30.6		46.5	46.5		48.6	48.6	

	Summary	**East West**	**North South**
40	Protected Option	33.6	48.6
41	Permitted Option	38.6	48.6
42	Split Option	30.6	95.1
43	Minimum	30.6	48.6
44	Combined	79.2	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	0.0	34.8	21.7	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	46.5	48.6	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	30.6	0.0	0.0	0.0
50	Combined	77.1	83.4	21.7	0.0

51	**Intersection Capacity Utilization**	**69.5%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Lewis Road **City:** Ventura County
Analyzed by: VRPA Technologies, Inc **Alternative:** Cumulative Year 2030 Plus Project
Date and Time of Data: AM Peak **Project:** Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	236	645	30	642	405	248	64	298	367	225	974	250
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	236.0	645.0	30.0	642.0	405.0	248.0	64.0	298.0	367.0	225.0	974.0	250.0
14	Volume Separate Left	236.0	645.0		642.0	405.0		64.0	298.0		225.0	974.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	8.1	21.4	2.2	22.0	13.4	18.4	4.3	9.9	27.3	15.0	32.3	18.6
23	Adjusted Reference Time	11.1	25.4	14.0	25.0	18.4	22.4	7.3	19.1	31.3	18.0	36.3	22.6
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	118	323		321	203		64	149		225	487	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	121.2	21.4		329.7	13.4		63.8	9.9		15.0	32.3	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		121.2			329.7			63.8			32.3	
35	Adjusted Reference Time		125.2			333.7			67.8			36.3	
	Split Timing												
36	Ref Time Combined		21.4			13.4			9.9			32.3	
37	Ref Time By Movement	8.1	21.4		22.0	13.4		4.3	9.9		15.0	32.3	
38	Reference Time		21.4			22.0			9.9			32.3	
39	Adjusted Reference Time	25.4	25.4		26.0	26.0		19.1	19.1		36.3	36.3	

	Summary	East West	North South
40	Protected Option	50.4	43.6
41	Permitted Option	333.7	67.8
42	Split Option	51.4	55.4
43	Minimum	50.4	43.6
44	Combined	93.9	

	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	14.0	22.4	31.3	22.6
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	19.1	36.3	18.4	25.4
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	25.0	11.1	18.0	7.3
50	Combined	58.1	69.8	67.7	55.2

51	**Intersection Capacity Utilization**	**78.3%**
52	**Level Of Service**	**D**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Lewis Road
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Cumulative Year 2030 Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	2	2	1	2	2	1	1	2	1	1	2	1
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	258	459	31	372	858	298	107	746	650	135	468	314
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		20			17			28			27	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	3	4	4	3	4	4
11	Minimum Green	4	10	10	4	10	10	4	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	258.0	459.0	31.0	372.0	858.0	298.0	107.0	746.0	650.0	135.0	468.0	314.0
14	Volume Separate Left	258.0	459.0		372.0	858.0		107.0	746.0		135.0	468.0	
15	Lane Utilization Factor	0.971	0.952	1.000	0.971	0.952	1.000	1.000	0.952	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	3505.3	3617.6	1615.0	3505.3	3617.6	1615.0	1805.0	3617.6	1615.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3505.3	3617.6		3505.3	3617.6		1805.0	3617.6		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		0.0	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			28.3%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	8.8	15.2	2.3	12.7	28.5	22.1	7.1	24.7	48.3	9.0	15.5	23.3
23	Adjusted Reference Time	11.8	20.6	14.0	15.7	32.5	26.1	10.1	29.7	52.3	12.0	22.8	27.3
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	129	230		186	429		107	373		135	234	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	116.8	1808.8		116.8	1808.8		120.3	1808.8		1925.3	1808.8	
30	Reference Time A	132.5	15.2		191.0	28.5		106.7	24.7		9.0	15.5	
31	Adjusted Saturation B		3617.6			3617.6			3617.6			3617.6	
32	Reference Time B		NA			NA			NA			NA	
33	Reference Time Lefts	NA			NA			NA			NA		
34	Reference Time		132.5			191.0			106.7			15.5	
35	Adjusted Reference Time		136.5			195.0			110.7			22.8	
	Split Timing												
36	Ref Time Combined		15.2			28.5			24.7			15.5	
37	Ref Time By Movement	8.8	15.2		12.7	28.5		7.1	24.7		9.0	15.5	
38	Reference Time		15.2			28.5			24.7			15.5	
39	Adjusted Reference Time	20.6	20.6		32.5	32.5		29.7	29.7		22.8	22.8	

#	**Summary**	**East West**	**North South**
40	Protected Option	44.3	41.6
41	Permitted Option	195.0	110.7
42	Split Option	53.0	52.4
43	Minimum	44.3	41.6
44	Combined	85.9	

#	**Right Turns**	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	14.0	26.1	52.3	27.3
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	29.7	22.8	32.5	20.6
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	15.7	11.8	12.0	10.1
50	Combined	59.4	60.8	96.7	58.0

51	**Intersection Capacity Utilization**	**80.6%**
52	**Level Of Service**	**D**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / Pancho	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Cumulative Year 2030 Plus Project
Date and Time of Data:	AM Peak	**Project:**	Pacific Rock

1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	17	1018	294	459	831	11	143	2	180	32	2	53
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	17.0	1312.0	0.0	459.0	842.0	0.0	0.0	145.0	180.0	32.0	55.0	0.0
14	Volume Separate Left	17.0	1312.0		459.0	842.0		143.0	2.0		32.0	55.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.966	0.850	0.950	0.998	0.850	0.950	0.951	0.850	0.950	0.855	0.850
17	Saturated Flow Combined	1805.0	3496.0	0.0	3505.3	3610.5	0.0	0.0	3612.6	1615.0	1805.0	1625.4	0.0
18	Saturated Flow Separate	1805.0	3496.0		3505.3	3610.5		3610.0	1900.0		1805.0	1625.4	
19	Pedestrian Interference Time		0.3	1.2		0.0	1.2		0.0	1.2		1.2	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	1.1	45.3	0.0	15.7	28.0	0.0	NA	NA	13.4	NA	NA	0.0
23	Adjusted Reference Time	5.0	49.3	9.0	18.7	32.0	9.0	NA	NA	16.4	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.99		1	0.00	
25	Volume Left Lane	17	656		229.5	421		0	145		32	55	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.99		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.1		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1748.0		116.8	1805.3		0.0	243.0		1925.3	1625.4	
30	Reference Time A	17.0	45.3		235.7	28.0		0.0	71.6		2.1	5.3	
31	Adjusted Saturation B		3496.0			3610.5			0.0			1625.4	
32	Reference Time B		NA			NA			12.8			5.3	
33	Reference Time Lefts	NA			NA			12.8			10.1		
34	Reference Time		45.3			235.7			12.8			5.3	
35	Adjusted Reference Time		49.3			239.7			18.7			8.3	
	Split Timing												
36	Ref Time Combined		45.3			28.0			4.8			5.3	
37	Ref Time By Movement	1.1	45.3		15.7	28.0		4.8	0.1		2.1	5.3	
38	Reference Time		45.3			28.0			4.8			5.3	
39	Adjusted Reference Time	49.3	49.3		32.0	32.0		13.1	13.1		8.3	8.3	

	Summary	**East West**	**North South**
40	Protected Option	68.0	NA
41	Permitted Option	239.7	18.7
42	Split Option	81.3	21.4
43	Minimum	68.0	18.7
44	Combined	86.7	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	9.0	9.0	16.4	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	13.1	8.3	32.0	49.3
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	18.7	5.0	8.3	13.1
50	Combined	40.8	22.3	56.6	70.4

51	**Intersection Capacity Utilization**	**72.3%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / Pancho
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: PM Peak
City: Ventura County
Alternative: Cumulative Year 2030 Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	2	0	2	2	0	1	1	1	1	1	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☑ Yes			☐ Yes		
4	Volume	34	891	179	123	970	26	483	6	469	14	4	31
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☑ Yes			☑ Yes			☐ Yes	
7	Pedestrian Timing Required		17			17			23			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	4	4	3	4	4	2	3	3	2	3	3
11	Minimum Green	2	5	5	2	5	5	3	5	5	3	5	5
12	Reference Cycle Length	120											
13	Volume Combined	34.0	1070.0	0.0	123.0	996.0	0.0	0.0	489.0	469.0	14.0	35.0	0.0
14	Volume Separate Left	34.0	1070.0		123.0	996.0		483.0	6.0		14.0	35.0	
15	Lane Utilization Factor	1.000	0.952	1.000	0.971	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000
16	Turning Factor Adjust	0.950	0.975	0.850	0.950	0.996	0.850	0.950	0.951	0.850	0.950	0.867	0.850
17	Saturated Flow Combined	1805.0	3526.8	0.0	3505.3	3603.4	0.0	0.0	3612.3	1615.0	1805.0	1647.6	0.0
18	Saturated Flow Separate	1805.0	3526.8		3505.3	3603.4		3610.0	1900.0		1805.0	1647.6	
19	Pedestrian Interference Time		0.2	1.2		0.0	1.2		0.0	1.2		1.1	1.2
20	Pedestrian Frequency		28.3%			28.3%			28.3%			100.0%	
21	**Protected Option Allowed**		TRUE			TRUE			FALSE			FALSE	
22	Reference Time	2.3	36.6	0.0	4.2	33.2	0.0	NA	NA	34.8	NA	NA	0.0
23	Adjusted Reference Time	5.3	40.6	9.0	7.2	37.2	9.0	NA	NA	37.8	NA	NA	8.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.99		1	0.00	
25	Volume Left Lane	34	535		61.5	498		0	489		14	35	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.99		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.1		0.9	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	0.07		1.07	1.00	
29	Permitted Sat Flow	120.3	1763.4		116.8	1801.7		0.0	242.7		1925.3	1647.6	
30	Reference Time A	33.9	36.6		63.2	33.2		0.0	241.8		0.9	3.6	
31	Adjusted Saturation B		3526.8			3603.4			0.0			1647.6	
32	Reference Time B		NA			NA			24.2			3.6	
33	Reference Time Lefts	NA			NA			24.1			8.9		
34	Reference Time		36.6			63.2			24.2			3.6	
35	Adjusted Reference Time		40.6			67.2			27.2			8.0	
	Split Timing												
36	Ref Time Combined		36.6			33.2			16.2			3.6	
37	Ref Time By Movement	2.3	36.6		4.2	33.2		16.1	0.4		0.9	3.6	
38	Reference Time		36.6			33.2			16.2			3.6	
39	Adjusted Reference Time	40.6	40.6		37.2	37.2		21.2	21.2		8.0	8.0	

	Summary	**East West**	**North South**
40	Protected Option	47.8	NA
41	Permitted Option	67.2	27.2
42	Split Option	77.8	29.2
43	Minimum	47.8	27.2
44	Combined	75.1	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	9.0	9.0	37.8	8.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	21.2	8.0	37.2	40.6
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.2	5.3	8.0	21.2
50	Combined	37.4	22.3	83.0	69.8

51	**Intersection Capacity Utilization**	**69.2%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 SB Ramps
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Cumulative Year 2030 Plus Project
Project: Pacific Rock

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	**Movement**	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	1092	4	230	3	0	9	0	1325	5	21	1087	1083
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	1096.0	230.0	3.0	9.0	0.0	0.0	1330.0	0.0	21.0	1087.0	1083.0
14	Volume Separate Left	1092.0	4.0		3.0	9.0		0.0	1330.0		21.0	1087.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	0.999	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.7	1615.0	1805.0	1615.0	0.0	0.0	5172.7	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5172.7		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	17.1	NA	NA	0.0	0.0	30.9	0.0	1.4	36.1	80.5
23	Adjusted Reference Time	NA	NA	20.1	NA	NA	7.0	0.0	34.4	13.5	7.0	39.6	84.0
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	1096		3	9		0	443		21	544	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.3		120.3	1615.0		0.0	1724.2		1925.3	1808.8	
30	Reference Time A	0.0	545.1		3.0	1.9		0.0	30.9		1.4	36.1	
31	Adjusted Saturation B		0.0			1615.0			5172.7			3617.6	
32	Reference Time B		44.4			1.9			NA			NA	
33	Reference Time Lefts	44.3			8.2			NA			NA		
34	Reference Time		44.4			3.0			30.9			36.1	
35	Adjusted Reference Time		47.4			7.0			34.4			39.6	
	Split Timing												
36	Ref Time Combined		36.4			1.9			30.9			36.1	
37	Ref Time By Movement	36.3	0.3		0.2	1.9		0.0	30.9		1.4	36.1	
38	Reference Time		36.4			1.9			30.9			36.1	
39	Adjusted Reference Time	39.4	39.4		7.0	7.0		34.4	34.4		39.6	39.6	

	Summary	**East West**	**North South**
40	Protected Option	NA	41.4
41	Permitted Option	47.4	39.6
42	Split Option	46.4	73.9
43	Minimum	46.4	39.6
44	Combined	86.0	

	Right Turns	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	20.1	7.0	13.5	84.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	34.4	39.6	7.0	39.4
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	39.4	7.0	0.0
50	Combined	61.4	86.0	27.5	123.4

51	**Intersection Capacity Utilization**	**102.8%**
52	**Level Of Service**	**G**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 SB Ramps	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Cumulative Year 2030 Plus Project
Date and Time of Data:	PM Peak	**Project:**	Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	1	1	1	1	1	0	0	3	0	1	2	1
3	Shared LT Lane (y/n)	☑ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	1228	4	124	12	0	12	0	1411	5	25	1142	945
5	Pedestrians			10			10			10			10
6	Ped Button (y/n)		☑ Yes			☐ Yes			☑ Yes			☑ Yes	
7	Pedestrian Timing Required		14			0			14			14	
8	Free Right (y/n)			☐ Yes			☐ Yes			☐ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	3	3	3	3	3	3	0	3.5	3.5	3	3.5	3.5
11	Minimum Green	4	4	4	4	4	4	0	10	10	4	10	10
12	Reference Cycle Length	120											
13	Volume Combined	0.0	1232.0	124.0	12.0	12.0	0.0	0.0	1416.0	0.0	25.0	1142.0	945.0
14	Volume Separate Left	1228.0	4.0		12.0	12.0		0.0	1416.0		25.0	1142.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.908	1.000	1.000	0.952	1.000
16	Turning Factor Adjust	0.950	0.950	0.850	0.950	0.850	0.850	0.950	0.999	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	3610.6	1615.0	1805.0	1615.0	0.0	0.0	5172.9	0.0	1805.0	3617.6	1615.0
18	Saturated Flow Separate	3610.0	1900.0		1805.0	1615.0		0.0	5172.9		1805.0	3617.6	
19	Pedestrian Interference Time		0.0	1.2		1.2	1.2		0.0	1.2		0.0	1.2
20	Pedestrian Frequency		28.3%			100.0%			28.3%			28.3%	
21	**Protected Option Allowed**		FALSE			FALSE			TRUE			TRUE	
22	Reference Time	NA	NA	9.2	NA	NA	0.0	0.0	32.9	0.0	1.7	37.9	70.2
23	Adjusted Reference Time	NA	NA	12.2	NA	NA	7.0	0.0	36.4	13.5	7.0	41.4	73.7
	Permitted Option												
24	Proportion Lefts	1	1.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	1232		12	12		0	472		25	571	
26	Proportion Lefts Left	1	1.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		0.9	15.0	
28	Left turn Factor	0.07	0.07		0.07	1.00		0.07	1.00		1.07	1.00	
29	Permitted Sat Flow	0.0	241.2		120.3	1615.0		0.0	1724.3		1925.3	1808.8	
30	Reference Time A	0.0	612.9		12.0	2.1		0.0	32.9		1.7	37.9	
31	Adjusted Saturation B		0.0			1615.0			5172.9			3617.6	
32	Reference Time B		48.9			2.1			NA			NA	
33	Reference Time Lefts	48.8			8.8			NA			NA		
34	Reference Time		48.9			8.8			32.9			37.9	
35	Adjusted Reference Time		51.9			11.8			36.4			41.4	
	Split Timing												
36	Ref Time Combined		40.9			2.1			32.9			37.9	
37	Ref Time By Movement	40.8	0.3		0.8	2.1		0.0	32.9		1.7	37.9	
38	Reference Time		40.9			2.1			32.9			37.9	
39	Adjusted Reference Time	43.9	43.9		7.0	7.0		36.4	36.4		41.4	41.4	

#	**Summary**	**East West**	**North South**
40	Protected Option	NA	43.4
41	Permitted Option	51.9	41.4
42	Split Option	50.9	77.7
43	Minimum	50.9	41.4
44	Combined	92.3	

#	**Right Turns**	**EBR**	**WBR**	**NBR**	**SBR**
45	Adjusted Reference Time	12.2	7.0	13.5	73.7
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	36.4	41.4	7.0	43.9
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	7.0	43.9	7.0	0.0
50	Combined	55.6	92.3	27.5	117.7

#		
51	**Intersection Capacity Utilization**	**98.1%**
52	**Level Of Service**	**F**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location: Pleasant Valley / US 101 NB Off Ra
Analyzed by: VRPA Technologies, Inc
Date and Time of Data: AM Peak
City: Ventura County
Alternative: Cumulative Year 2030 Plus Project
Project: Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	437	0	708	0	1604	166	0	2030	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	437.0	0.0	708.0	0.0	1604.0	166.0	0.0	2030.0	0.0
14	Volume Separate Left	0.0	0.0		437.0	0.0		0.0	1604.0		0.0	2030.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	29.1	0.0	29.7	0.0	37.2	12.3	0.0	47.1	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	32.1	0.0	32.7	0.0	40.7	15.8	0.0	50.6	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		437	0		0	535		0	677	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		435.8	0.0		0.0	37.2		0.0	47.1	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			37.1			NA			NA		
34	Reference Time		0.0			37.1			37.2			47.1	
35	Adjusted Reference Time		0.0			37.1			40.7			50.6	
	Split Timing												
36	Ref Time Combined		0.0			0.0			37.2			47.1	
37	Ref Time By Movement	0.0	0.0		29.1	0.0		0.0	37.2		0.0	47.1	
38	Reference Time		0.0			29.1			37.2			47.1	
39	Adjusted Reference Time	0.0	0.0		29.1	29.1		40.7	40.7		50.6	50.6	

#	Summary	East West	North South
40	Protected Option	32.1	50.6
41	Permitted Option	37.1	50.6
42	Split Option	29.1	91.3
43	Minimum	29.1	50.6
44	Combined	79.6	

#	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	0.0	32.7	15.8	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	40.7	50.6	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	29.1	0.0	0.0	0.0
50	Combined	69.7	83.3	15.8	0.0

#		
51	**Intersection Capacity Utilization**	**69.4%**
52	**Level Of Service**	**C**

Revision 2003.0

Intersection Capacity Utilization Worksheet

Intersection Location:	Pleasant Valley / US 101 NB Off Ra	**City:**	Ventura County
Analyzed by:	VRPA Technologies, Inc	**Alternative:**	Cumulative Year 2030 Plus Project
Date and Time of Data:	PM Peak	**Project:**	Pacific Rock

#	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
2	Lanes	0	0	0	1	0	2	0	3	1	0	3	0
3	Shared LT Lane (y/n)	☐ Yes			☐ Yes			☐ Yes			☐ Yes		
4	Volume	0	0	0	485	0	757	0	1855	255	0	1946	0
5	Pedestrians			0			0			0			0
6	Ped Button (y/n)		☐ Yes			☐ Yes			☐ Yes			☐ Yes	
7	Pedestrian Timing Required		0			0			0			0	
8	Free Right (y/n)			☐ Yes			☐ Yes			☑ Yes			☐ Yes
9	Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
10	Lost Time	0	0	0	3	0	3	0	3.5	3.5	0	3.5	0
11	Minimum Green	0	0	0	4	0	4	0	10	10	0	10	0
12	Reference Cycle Length	120											
13	Volume Combined	0.0	0.0	0.0	485.0	0.0	757.0	0.0	1855.0	255.0	0.0	1946.0	0.0
14	Volume Separate Left	0.0	0.0		485.0	0.0		0.0	1855.0		0.0	1946.0	
15	Lane Utilization Factor	1.000	1.000	1.000	1.000	1.000	0.885	1.000	0.908	1.000	1.000	0.908	1.000
16	Turning Factor Adjust	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850	0.950	1.000	0.850
17	Saturated Flow Combined	0.0	0.0	0.0	1805.0	0.0	2858.6	0.0	5175.6	1615.0	0.0	5175.6	0.0
18	Saturated Flow Separate	0.0	0.0		1805.0	0.0		0.0	5175.6		0.0	5175.6	
19	Pedestrian Interference Time		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
20	Pedestrian Frequency		0.0%			0.0%			0.0%			0.0%	
21	**Protected Option Allowed**		TRUE			TRUE			TRUE			TRUE	
22	Reference Time	0.0	0.0	0.0	32.2	0.0	31.8	0.0	43.0	18.9	0.0	45.1	0.0
23	Adjusted Reference Time	0.0	0.0	0.0	35.2	0.0	34.8	0.0	46.5	22.4	0.0	48.6	0.0
	Permitted Option												
24	Proportion Lefts	1	0.00		1	0.00		1	0.00		1	0.00	
25	Volume Left Lane	0	0		485	0		0	618		0	649	
26	Proportion Lefts Left	1	0.00		1	0.00		1	0.00		1	0.00	
27	Left turn Equivalents	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	
28	Left turn Factor	0.07	1.00		0.07	1.00		0.07	1.00		0.07	1.00	
29	Permitted Sat Flow	0.0	0.0		120.3	0.0		0.0	1725.2		0.0	1725.2	
30	Reference Time A	0.0	0.0		483.7	0.0		0.0	43.0		0.0	45.1	
31	Adjusted Saturation B		0.0			0.0			5175.6			5175.6	
32	Reference Time B		0.0			0.0			NA			NA	
33	Reference Time Lefts	0.0			40.2			NA			NA		
34	Reference Time		0.0			40.2			43.0			45.1	
35	Adjusted Reference Time		0.0			40.2			46.5			48.6	
	Split Timing												
36	Ref Time Combined		0.0			0.0			43.0			45.1	
37	Ref Time By Movement	0.0	0.0		32.2	0.0		0.0	43.0		0.0	45.1	
38	Reference Time		0.0			32.2			43.0			45.1	
39	Adjusted Reference Time	0.0	0.0		32.2	32.2		46.5	46.5		48.6	48.6	

#	Summary	East West	North South
40	Protected Option	35.2	48.6
41	Permitted Option	40.2	48.6
42	Split Option	32.2	95.1
43	Minimum	32.2	48.6
44	Combined	80.9	

#	Right Turns	EBR	WBR	NBR	SBR
45	Adjusted Reference Time	0.0	34.8	22.4	0.0
46	Cross Through Direction	NBT	SBT	WBT	EBT
47	Cross Through Adj Ref Time	46.5	48.6	0.0	0.0
48	Oncoming Left Direction	WBL	EBL	SBL	NBL
49	Oncoming Left Adj Ref Time	32.2	0.0	0.0	0.0
50	Combined	78.8	83.4	22.4	0.0

#		
51	**Intersection Capacity Utilization**	**69.5%**
52	**Level Of Service**	**C**

Revision 2003.0

APPENDIX F-2

VCAPCD DATA FOR PACIFIC ROCK QUARRY, EXTEC USAGE 2015—2016

VCAPCD Data for Pacific Rock Quarry

EXTEC Usage 2015 - 2016

PACIFIC ROCK EQUIPMENT USAGE LOG - [redacted] 2015

DESCRIPTION OF EQUIPMENT: EXTEC, MODEL S-5, SERIAL NO. 9542, STARFN NO. 278-56-0501 MAXWELL NO. AA0031

STATE PORTABLE EQUIPMENT REGISTRATION NO.: 120144

EQUIPMENT OPERATOR AND CONTROLLER OF LOG SHEET: ______________________

DATE	TIME ON	TIME OFF	BREAKDOWNS	METER	FUEL	TONS PROCESSED	NOTES
7-14-15	9:00	3:00	X		6	270	
7-15-15	7:00	3:00	X		12	540	
7-16-15	7:00	3:00	X		11	560	
7-17-15	7:00	3:00	X		11	555	
7-21-15	7:00	3:00	X		11	520	
7-22-15	8:00	3:00	X		9	470	
7-23-15	7:00	3:00	X		11	550	
7-24-15	7:00	3:00	X		11	570	
7-27-15	7:00	3:00	X		11	555	
7-28-15	7:00	1:00	✓		6	290	6" screen broken
7-30-15	8:00	3:00	X		11	530	
7-31-15	7:00	3:00	X		11	560	
8-3-15	7:00	3:00	X		11	560	
8-4-15	7:00	3:00	X		12	550	
8-5-15	7:00	3:00	X		11	545	
8-6-15	8:00	3:00	X		11	480	Rollers required
8-7-15	7:00	3:00	X		11	530	Major service required
8-10-15	7:00	3:00	X		12	500	check pump (hydraulic)
8-11-15	7:00	3:00	X		11	540	
8-12-15	7:00	3:00	X		13	550	
8-13-15	7:00	11:00	✓		7	260	electrical problem (gen[illegible]
			Screen Top Soil				
9-8-15	8:00	3:00	X		11	560	
9-9-15	7:00	3:00	X		12	540	
9-10-15	7:00	3:00	X		12	560	Finished Change to Sand
9-28-15	7:00	3:00	X		11	440	Material (Sand) too wet
9-29-15	7:00	3:00	X		13	460	
9-30-15	8:00	3:00	X		8	355	

7430

EXTEC S-5

Pacific Rock Equipment Log Year: 2015
Description of Equipment: EXTEC, MODEL S-5, SERIAL NO. 9542, STABEN NO. 778-55-0501, MAXWELL NO. AA0001
State Portable Equipment Registration No.: 130144

Equipment Operator and Controller of Log Sheet:

Date	Time On	Time Off	Breakdowns	Meter	Fuel	Tons Processed	Notes
10-1-15	7:00 AM	3:00 PM	X		12	430	Material still wet slow
10-2-15	7:00 AM	2:00 PM	X		9	370	Move screen ahead on grade
10-5-15	10:00 AM	3:00 PM	X		12#	280	
10-6-15	7:00 AM	3:00 PM	X		11	450	One more day of material
10-7-15	7:00 AM	3:00 PM	X		12	400	No more material
11-6-15	9:30 AM	3:00 PM	X		10	495	Mix this material for tree
11-9-15	7:00 AM	3:00 PM	X		13	520	
11-10-15	7:00 AM	3:00 PM	X		12	515	
11-11-15	7:00 AM	3:00 PM	X		12	520	
11-12-15	7:00 AM	3:00 PM	X		13	520	
11-13-15	7:00 AM	11:00 AM	X		6	260	starter fault
11-18-15	8:00 AM	3:00 PM	X		11	500	
11-19-15	7:00 AM	3:00 PM	X		13	520	Move to basement [illegible]
11-20-15	7:00 AM	12:00 PM	X		8	240	
12-09-15	8:00 AM	3:00 PM	X		10	500	
12-10-15	7:00 AM	3:00 PM	X		13	540	
12-11-15	7:00 AM	3:00 PM	X		12	525	

7585

EXTEC S-5

Pacific Rock Equipment Log Year: 2016
Description of Equipment: EXTEC, MODEL S-5, SERIAL NO. 9542, STABEN NO. 776-55-0501, MAXWELL NO. AA0001
State Portable Equipment Registration No.: 130144

Equipment Opoerator and Controller of Log Sheet:

Date	Time On	Time Off	Breakdowns	Meter	Fuel	Tons Processed	Notes
1-12-16	9:00	3:00	X		11	490	
1-13-16	7:00	3:00	X		13	520	
1-14-16	7:00	3:00	X		13	510	Move to Palm trees
1-28-16	7:00	3:00	X		12	500	
1-29-16	7:00	3:00	X		13	530	Major clean up under st
2-3-16	7:00	3:00	X		12	500	
2-4-16	7:00	3:00	X		13	520	
2-5-16	7:00	3:00	X		12	490	toowet material
2-10-16	9:00	3:00	X		10	400	still wet material leak
2-18-16	7:00	3:00	X		13	520	
2-19-16	7:00	3:00	X		13	500	Callaccheic left top too
2-22-16	7:00	3:00	X		12	520	
2-23-16	7:00	3:00	X		13	520	bearing is gone, shut dow
3-3-16	8:00	3:00	X		12	500	
3-4-16	7:00	3:00	X		13	520	
3-9-16	7:00	3:00	X		12	500	
3-10-16	7:00	3:00	X		12	500	material for 3 dowmace
3-14-16	8:00	3:00	X		12	460	
3-15-16	7:00	3:00	X		12	430	
3-16-16	7:00	1:00	X		10	390	material is gone, move ext
4-20-16	9:00	3:00	Yes		9	340	fold it & clean it, for mov
4-25-16	8:00	3:00	X		10	460	
4-26-16	7:00	3:00	X		13	480	

11150

EXTEC S-5

Pacific Rock Equipment Log Year: 2016
Description of Equipment: EXTEC, MODEL S-5, SERIAL NO. 9542, STABEN NO. 776-55-0501, MAXWELL NO. AA0001
State Portable Equipment Registration No.: 130144

Equipment Opoerator and Controller of Log Sheet:

Date	Time On	Time Off	Breakdowns	Meter	Fuel	Tons Processed	Notes
5-3-16	7:00	3:00	X		12	480	
5-4-16	7:00	3:00	X		12	500	
5-5-16	7:00	3:00	X		13	500	
5-17-16	8:00	3:00	X		13	480	
5-18-16	7:00	3:00	X		13	520	
5-19-16	7:00	3:00	X		13	520	move elec to new pile
5-26-16	7:00	3:00	X		13	520	
5-27-16	7:00	3:00	X		12	520	
5-30-16	7:00	3:00	X		12	500	
5-31-16	7:00	2:00	YES		10	380	electrical problems, h[illegible]
6-8-16	9:00	3:00	X		8	420	
6-10-16	7:00	3:00	X		12	480	
6-21-16	7:00	3:00	X		13	500	
6-22-16	7:00	3:00	X		13	500	
6-23-16	7:00	3:00	X		12	490	
7-5-16	10:00	3:00	X		12	340	
7-7-16	7:00	3:00	X		12	490	
7-8-16	7:00	3:00	X		12	500	Change screens next week
7-19-16	7:00	3:00	X		13	520	
7-20-16	7:00	3:00	X		13	500	
7-21-16	7:00	3:00	X		13	500	
7-22-16	7:00	3:00	X		13	500	
7-28-16	7:00	3:00	X		13	520	

Total: 37,345 Tons 11180

APPENDIX G

WATER QUALITY IMPACT ASSESSMENT, STORAGE AND USE OF BLASTING AGENTS, PACIFIC ROCK QUARRY

SESPE
CONSULTING, INC.

374 Poli Street, Suite 200 • Ventura, California 93001

MEMORANDUM

Date: March 8, 2019

To: Mr. Brian McCarthy, Ventura County Planning Division

From: Mr. Brian Anderson, P.G., Sespe Consulting, Inc.

Cc:

Re: Water Quality Impact Assessment, Storage and Use of Blasting Agents, Pacific Rock Quarry, Camarillo, CA

Background and Objectives

The Pacific Rock Quarry is a hard rock quarry located at the end of Pancho Road in Camarillo, California. The quarry site constitutes a 111 acre property, which slopes towards the west from an elevation of 940 feet above mean sea level (amsl) to 165 feet amsl, along the southwest side of Conejo Mountain. Mining of rock at and in the vicinity of the quarry dates back to the late 1800s, with the current quarry footprint having been initiated sometime during the 1950s.

As part of ongoing and future quarrying operations, the stone mined at the site is initially retrieved and sized using blasting agents. Blasting is a common mining method used at hard rock quarries to access the material and initially size the rock for further processing.

The purpose of this technical memo is to evaluate the relationship between the blasting conducted at the Pacific Rock Quarry and the groundwater quality, using information presented in prior site-specific studies and review of available literature pertaining to the geologic and hydrogeologic setting, and types of blasting agents used at the site.

Geologic Setting

The following description of the Pacific Rock Quarry geology is taken from an engineering geologic report prepared by Gold Coast Geoservices, Inc. (GCG) in 2010, the quarry produces a variety of construction materials rock products from the Canejo Volcanics, specifically a dacitic breccia. The Canejo Volcanics are estimated to be as much as 3,000 meters thick (Yerkes and Campbell, 1979), and consist of three volcanic units: 1) dark extrusive basaltic rocks; 2) light gray to pinkish gray dacitic breccia; and 3) dark intrusive basaltic rocks. The light gray dacitic breccia is reportedly the principal rock type mined at the quarry, which is described as consisting of unsorted angular fragments of hard, fine-grained dacite to andesite within a detrital matrix of the same composition. Intrusive, generally vertically orientated basaltic dikes 10 to 20 feet in width occur in the northeast and southeast areas of the quarry.

Based on geologic mapping of quarry exposures completed by GCG (2010), along with map information prepared by Dibblee and Ehrenspeck (1990), the underlying igneous rocks are characterized as massive and unstratified. However, the Canejo Volcanics reportedly exhibit high angle, intersecting joint sets. Gold Coast Geoservices, Inc. (2010) indicates that the joint surfaces strike north 20 to 45 degrees east, dipping at 55 to 85 degrees to the northwest or southeast; and strike north 35 to 70 degrees west, and dip 80 to 90 degrees southwest. The vertical dikes strike approximately north 45 to 60 degrees west. While this structural fabric has been determined by GCG (2010) as having created conditions for wedge failure and shear zones within several areas of the quarry, the pervasiveness of the structural fabric is unknown at depth. However, these features are reportedly limited in extent and are associated with the basaltic dikes (GCG, 2010). Additionally, jointing can tend to be more pronounced at the margins of intrusive rock bodies, as magma emplacement and cooling at the edges (Balk, 1937). Thus, the rock competency is expected to generally increase, with less joint surfaces at depth.

Groundwater Conditions

Given the type and nature of the site geologic setting, groundwater is anticipated to be primarily attributed to a fracture flow system, hosted within the intrusive igneous rocks. A well completion report prepared by Valley well Drilling for a well located onsite indicates that beyond about 15 feet below ground surface (bgs), varying competency rock occurs to a depth of approximately 200 feet bgs. From 200 feet to 278 feet bgs, the driller reported hard to total depth. Based on this log, the surface lithologies are consistent with the interpreted hydrogeologic conditions; that is, the indurated rock would not be considered to produce appreciable qualities of groundwater, and is likely limited to the fracture water at depth. According to a well completion report prepared by Hopkins Groundwater Consultants dated April 2004, following well completion and development, static groundwater was measured at 84.4 feet bgs. Based on a pump test, the well was estimated to produce about 10 gallons per minute (gpm). This relatively low yield is typical of a heterogenous/anisotropic fractured rock, with relatively low permeability and marginal conductivity. Consequently, this type of hydrogeologic regime would not be expected to provide significant recharge capacity, nor readily communicate with other aquifers, except in instances where there are preferential flow paths.

Environmental Characteristics of ANFO

For the Pacific Rock quarry, blasting agents are used to size the rock so that it can be processed using onsite equipment. The primary blasting agent is ammonium nitrate fuel oil (ANFO), which is typically used at mine sites. Other ancillary materials used at the quarry include detonator sensitive emulsion and nitroglycerine based explosives, detonating cord, DC cast boosters (primers), detonators, delays, relays, starters, lead-in-lines, shock tubes.

At mine sites, bulk ANFO is placed into blasting holes, which upon detonation break apart the rock to initially size the material. Compositionally, ANFO products typically consist of ammonium nitrate

(NH^4NO^3) and fuel oil. Environmental risks associated with ANFO are site-specific and are related to characteristics such as the type of soil, the depth of the groundwater, presence of surface water, and the amount and infiltration rates of precipitation (Degnan et al., 2016). With respect to environmental impact, ANFO can pose a significant risk to groundwater. Specifically, in groundwater, ANFO can be a source of nitrogen as ammonium (NH^4) and nitrate ($NO3^-$) contamination. These constituents are the direct products of NH^4NO^3, which constitutes about 90% of commonly used commercial explosives by weight (Degnan et al., 2016). Additionally, the ammonia (NH^4) can also affect groundwater quality.

According to Forsyth et al. (1995), the following mechanisms for the release of nitrates to the environment from blasting agents are:

1) Spillage during transport;

2) Dissolution (leaching) of explosives agents in “wet” blast holes; and

3) Undetonated explosives agents remaining in the rock following the blast.

A study by Defence R&D Canada (2010) found that the detonation of ANFO in saturated conditions is often incomplete. Consequently, due to its high solubility in wet environments ANFO can be lost directly due to dissolution. However, the relative potential risk to water quality can vary based on the type of ANFO product. For example, a study by Revey (1996) evaluated the leachability of several types of ANFO, including gels and emulsions, which found that $NO3^-$ releases from emulsions and gels are considerably lower than ANFO; however even these products will leach over time (Cameron et al., 2007; Golder Associates, 2014), resulting in contamination.

Mitigation Approaches

Considering the hydrogeologic setting at the Pacific Rock quarry and relative depth of groundwater, with the proper storage, handling and use of ANFO, the potential for impacts to groundwater quality can be mitigated. In order to reduce the risk of release to groundwater, the practices and procedures listed below are to be implemented at the Pacific Rock quarry site:

1) Handling of all blasting agents shall be limited to qualified and licensed blasting contractors at all times.
2) All blasting products shall be stored only in approved containers, specifically designed for the sake keeping of explosives.
3) Any spillage of ANFO or other explosives shall be immediately cleaned up, and properly disposed of in strict accordance with applicable state and federal regulations.
4) The type of ANFO agent selected shall be appropriate for the specific environmental conditions.
5) Inspect the blast holes prior to placement of the ANFO to determine water is present. In cases where the boreholes have standing water or are moist, no material shall be placed into the holes until dry conditions are observed.

6) Blast designs and loading controls shall be reviewed to minimize the length of explosive columns, select proper stemming and to ensure to optimize complete detonation.
7) A current inventory of the types and quantities, along with Material Safety Data Sheets, shall be maintained onsite by qualified personnel. Relevant information shall be included in the site's pollution prevention plans, including the Hazardous Materials Business Plan and Stormwater Pollution Prevention Plan.

References

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Cameron, A., Corkey, D., MacDonald, G., Forsyth, B., and Gong, T., 2007. An investigation of ammonium nitrate loss to mine discharge water at Davik Diamond Mines, EXPLO Conference, Wollongong, NSW, pp. 3-4.

Defence R&D Canada, 2010. Assessment of ANFO on the environment, Technical Investigation 09-01, DRDC Valcartier TM-2009-195, 52 p.

Degnan, J. R., Bohlke, J. K., Pelham, K., Langlais, D. M., and Walsh, G. J., 2016. Identification of groundwater nitrate contamination from explosives used in road construction: isotopic, chemical and hydrologic evidence, Environmental Science and Technology, pp. 593-603.

Dibblee, T. W. Jr., and Ehrenspeck, H. E., 1990. Geologic Map of the Camarillo and Newbury Park Quadrangles, Ventura County, California, Dibblee Foundation Map DF-28, scale 1:24000.

Forsyth, W., Cameron, A., and Miller, S., 1995. Explosives and water quality, Sudbury ’95 Proceedings of the Conference on Mining and the Environment, Sudbury, Ontario, vol. 2, pp 795-803.

Gold Coat Geoservices, Inc., 2010. Engineering Geologic Report, Modification to Conditional Use Permit (CUP #3817-3), Pacific Rock Quarry, 185 p.

Golder Associates, 2014., Technical Memorandum, Amulsar gold project: estimate of nitrate and ammonia concentrations in mine water as a product of blasting, 14 p.

Hopkins Groundwater Consultants, Inc., 2004. Summary of operations report, water supply well construction project, Canejo Mountain Memorial Park, Ventura County, California, 14 p.

Revey, G. F., 1996. Practical methods to control explosives losses and reduce ammonia and nitrate levels in mine water, Mining Engineering, vol. 48, p. 61-65.

APPENDIX H

RESPONSE TO PACIFIC ROCK QUARRY:
LU10-0003 UPDATED STATUS OF OUTSTANDING INVOICES AND ENVIRONMENTAL IMPACT REPORT INFORMATION DELAYS DATED MARCH 12, 2019, PACIFIC ROCK QUARRY EXPANSION

SESPE
CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

April 1, 2019

Mr. Brian McCarthy
Mining Program Manager
Ventura County Resource Management Agency
800 South Victoria Avenue
Ventura, California 93009

Re: Response to Pacific Rock Quarry: LU10-0003 Updated Status of Outstanding Invoices and Environmental Impact Report Information Delays dated March 12, 2019, Pacific Rock Quarry Expansion

Dear Mr. McCarthy,

Sespe Consulting, Inc. (Sespe) is pleased to provide this response on behalf of Pacific Rock, Inc. (Pacific Rock) to address the comments received on March 12, 2019 pertaining to the Pacific Rock Quarry Conditional Use Permit (CUP) modification. We have organized this response letter to include the comments in italics, followed by our response. In addition to our responses, we have included a revised Project Description, Reclamation Plan, and select Weight Tickets as attachments.

<u>**Environmental Setting Comments**</u>

Comment 1: Annual Production Environmental Setting
Based on the County's review of the data provided (from the Mining Operation Annual Reports) and scenarios outlined by our EIR Consultant, Benchmark Resources, the annual production baseline environmental setting will be based on an average production over the previous 10 years, 2008 through 2017. Data provided in the Operator Annual Reports show an average annual production of 20,900 tons.

No new information was provided to support the assertion that 2005 production levels as provided in the Project Operating Parameters document submitted February 12, 2019 represents an appropriate baseline under CEQA.

According to the current Air Protection Control District's Permit to Operate (No. 00489), Pacific Rock is authorized to produce up to 500,000 tons per year for combined material throughput. Recent and historical production values have been provided in the revised Project Description dated April 1, 2019. Pacific Rock is proposing maximum annual production of 468,000. Please refer to the revised Project Description for additional details regarding Annual Production.

Comment 2: Daily Production and Traffic Environmental Setting
To establish the daily production and traffic environmental setting, you submitted a series of weigh ticket summaries and weigh tickets, which document daily loads (truck tips). This data shows the maximum daily truck trips achieved was 30 loads (60 one-way truck trips), which occurred on March 31, 2017. As such, 60 one-way truck trips will be used as the daily truck traffic baseline environmental setting.

The assertion that the environmental setting for truck traffic is 120 one-way truck trips (60 truckloads) as provided in the Project Operating Parameters document is not supported by the weight tickets and data that has been submitted.

Pacific Rock has provided job and weight tickets that demonstrate the achievement of 60 loads a day or 120 one way trips a day. Pacific Rock continues to find and review data and we expect to be able to provide additional backup soon. Please refer to the below table for a summation of days and loads.

Daily Loads	
Date	**Number of Loads**
1/13/2005	60
1/16/2005	60
1/21/2005	60
1/22/2005	60
1/25/2005	60
1/27/2005	60
1/29/2005	60
2/19/2005	60
2/20/2005	60
2/21/2005	60
2/22/2005	60
2/25/2005	60
5/20/2005	60
5/23/2005	60
3/10/2016	60

Most recently, Pacific Rock has achieved the maximum 60 loads (120 one-way trips) on March 10, 2016, one year before the Notice of Preparation (NOP) was published on August 23, 2017. Select weight tickets have been attached for reference. The remaining weight tickets can be furnished upon request.

Comment 3: Peak Hour Traffic Environmental Setting

In the Project Operating Parameters document, you've asserted that the environmental setting for truck traffic is 30 loads per hour between 7 AM and 9 AM (total of 60 loads, 120 one-way truck trips), and that 15 loads occurred per hour between 4 PM and 6 PM (total of 30 loads, 60 one-way truck trips). First, the maximum level reached for any one day was 30 loads for the entire day on March 31, 2017. Based on the evidence provided, the AM truck trip volume you are claiming to have achieved could not have been possible. Second, your assertions regarding your existing PM truck traffic generation represent a violation of your Conditional Use Permit conditions of approval, which stipulate a daily 4 PM closing time.

Over the course of this application processing, necessary documentation has not been submitted to support your assertions of a baseline environmental setting. Absent any further evidence, the baseline environmental setting for AM and PM peak hour truck trips are assumed to be zero.

The environmental setting for truck traffic that was proposed in the Project Operating Parameters document reflected the maximum trips that Pacific Rock could generate during the AM peak hours. Pacific Rock has the ability to load 1 truck every 30 seconds and generate 120 loads per hour. They are not currently required to keep records of when the trucks depart the site, however for the purpose of this analysis, the existing and future AM peak hour trips should be 30 loads or 60 one-way trips per hour. In the proposed PM peak hour, Pacific Rock expects to generate 15 loads or 30 one-way trips per hour.

Currently, Pacific Rock does not generate any truck trips during the PM peak hours. However, due to the proposed extended hours of operation, there is potential to increase truck trips during the PM peak hours. The extended hours will be utilized on an as-needed basis and daily operations will continue to cease at 4:00 pm unless there is a demand for “after-hours” or post 4:00 pm shipping.

Pacific Rock is not proposing any changes to the maximum daily number of trips.

Comment 4: Water and Energy
With respect to annual and daily water use, evidence provided on February 12, 2019 does not support your assertion that the usage factors should be calculated based on the single year 2005 production data.

As with the annual production describe above, the Annual Reports show that over the previous 10 years, the existing operation has averaged approximately 20,911 tons annually as the baseline environmental setting.

No evidence has been submitted to inform the EIR baseline environmental setting for electrical use of the existing operation.

<u>Water</u>
Pacific Rock primarily utilizes recycled water from an irrigation pond for onsite operations. The tertiary water is supplied by the Camarillo Sanitary District. Currently, it is estimated that approximately 27.9-acre feet per year (AFY) of recycled water is utilized onsite. The proposed modification and expansion will consume roughly 83.5 AFY of recycled water. The non-potable water is drawn from the irrigation pond and is held in a 12,000-gallon tank. An onsite well is proposed to provide potable water for the 24-hour security trailer and will not provide resources for mining and reclamation operations.

<u>Fuel</u>
Diesel fuel invoices from 2016 have been reviewed and compiled into the below table. Please refer below for details regarding the annual and average daily fuel use.

Energy - Diesel Fuel Consumption		
Date	**Diesel (gal)**	**Monthly Total (gal)**
1/13/2016	3,148.6	4,192.0
1/19/2016	1,043.4	
2/5/2016	4,198.9	4,198.9
3/3/2016	1,000.5	7,425.5
3/4/2016	4,020.8	
3/21/2016	2,404.2	
4/6/2016	4,402.9	14,229.0
4/21/2016	4,915.6	
4/26/2016	4,910.5	
5/18/2016	3,901.3	3,901.3

6/1/2016	5,026.5	7,242.2
6/20/2016	2,215.7	
7/8/2016	3,001.5	7,033.6
7/26/2016	4,032.1	
8/9/2016	4,087.2	4,087.2
9/7/2016	2,959.6	6,917.5
9/22/2016	3,957.9	
10/20/2016	4,661.1	4661.1
11/10/2016	3,035.1	3,035.1
12/7/2016	4,304.6	4,304.6

Total Fuel Consumed (gal)	**71,228**
Average Monthly Use (gal)	**5936**
Average Daily Use (gal)	**228**

In 2016, Pacific Rock consumed 71,228 gallons of fuel or 228 gallons per day (assuming a 312-day operational year). Fuel use is generally proportional to production.

Electricity

Pacific Rock has also provided the electricity usage information from January 2018 to February 2019. The below table provides a monthly breakdown of use and a total kWh annual use. We have provided overall averages for monthly and daily use.

Energy – Electricity Consumption		
Billing Period	**kWh**	**Average daily use during specified period**
1/4/2018 to 2/4/2018	762	24.58
2/2/2018 to 3/6/2018	913	28.53
4/5/2018 to 5/4/2018	875	30.17
5/4/2018 to 6/5/2018	691	21.59
6/5/2018 to 7/5/2018	694	23.13
7/5/2018 to 8/3/2018	688	23.72
8/3/2018 to 9/4/2018	651	20.34
9/4/2018 to 10/3/2018	547	18.86
10/3/2018 to 11/1/2018	583	20.10
11/1/2018 to 12/4/2018	745	22.58
12/4/2018 to 1/4/2019	866	27.94
1/4/2019 to 2/4/2019	494	15.94

Total Year kWh usage	**8509**

Average Monthly kWh usage	**709**

Average Daily kWh usage	**27**

The Noise and Air Quality Analysis have been submitted under separate cover.

Please call me or Helen Eloyan at (805) 275-1515 if you have any questions or if you need additional information.

Respectfully submitted,

John Hecht
President
Sespe Consulting, Inc.

Attachments
1. Project Description, dated 04/01/19
2. Reclamation Plan, dated 04/01/19
3. Select Weight Tickets

Attachment 3 of Sespe 4/1/2019 Memorandum – Select Weight Tickets

Attachments 1 and 2 of Sespe 4/1/2019 memorandum are on file at Ventura County and available for review on request.

STABEN BROS. INC. • License #981942
P.O. BOX 2459 • MOORPARK, CALIFORNIA 93021 • (805) 445-6433

CONTRACTOR / OWNER: Fair Feild Homes
ADDRESS:

DATE PERFORMED: 3-10-16
WEATHER CONDITIONS: Clear
DAY OF WEEK: thur
PHONE: —

JOB NAME / LOCATION: 3M / Camarillo
DESCRIPTION OF WORK: Import $ Stockpile dirt
JOB#: 15B-05A

~~DAY WORK~~
~~CONTRACT~~
~~EXTRA~~

QTY.	DESCRIPTION	PRICE	AMOUNT
1	Labor		
1	Case w/BG 8hrs.		
1	street sweeper 8hr		
60	Loads imported		60
		TOTAL	

The Contractor/Owner identified above agrees as follows:
Equipment and operator are under the exclusive authority and supervision of Contractor/Owner. Contractor/Owner is responsible for all underground services and Contractor/Owner is liable for all damages to persons or property arising from or in any manner connected with the operation of equipment.
The total amount due as set forth above will be billed to Contractor/Owner by separated statement. All invoices are due in full upon receipt. An addition one and one-half percent service charge (or the maximum amount permitted by applicable law) will be charged to all accounts not paid within thirty (30) days after due date and similarly each month thereafter until paid.
In the even it becomes necessary to place this account with an attorney for collection, Contractor/Owner will pay the cost of said attorney, including all related costs of collection, whether or not legal proceedings are commenced. If suit is instituted, then in addition, Contractor/Owner will pay all court costs as allowed by applicable law.

ACCEPTED AS SATISFACTORY BY:________________

JOB INVOICE
№ 05263

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48006

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

~~Watershed~~ Turf

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: Phillo Springs Ventura

WEIGHT IN LBS.	
349280	Gross
176300	Tare
172980	Net
86.49	Tons

LOADS	POUNDS	MARK	COMMODITY
1	65380	15.06	~~[illegible]~~
2	67900	16.32	3/4"
3	73340	18.99	"
4	71320	18.07	"
5	71440	18.09	"

CARRIER: Green Mtn

DRIVER	EQUIPT. NO.
Lee	21

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY [illegible] DEPUTY DATE Mth Day Year 5 / 23 / 5

TARE BY [illegible] DEPUTY DATE Mth Day Year 5 / 23 / 5

Lee Dale

DRIVER ☑ ON GROSS & TARE

MULTIPLE LOAD CERTIFICATE: TARE 35260 X 5 LOADS

FILE COPY

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48007

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

WATER SHED

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: MOOR PARK

WEIGHT IN LBS.	
384150	Gross
173900	Tare
210250	Net
105.13	Tons

LOADS	POUNDS	MARK	COMMODITY
1	72800	19.01	F-7 Tan
2	73500	19.36	"
3	78580	21.40	"
4	79320	22.27	"
5	79950	22.58	"

CARRIER: Jaime

DRIVER: Jaime | EQUIPT. NO.: 2431

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY [signature] DEPUTY DATE Mth 5 Day 23 Year 5

TARE BY [signature] DEPUTY DATE Mth 5 Day 23 Year 5

DRIVER ☐ ON GROSS & TARE

MULTIPLE LOAD CERTIFICATE: TARE 34780 X 5 LOADS 5

FILE COPY

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48008

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo
Water Shed

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: Moorpark

WEIGHT IN LBS.	
367580	Gross
165500	Tare
202080	Net
101.04	Tons

LOADS	POUNDS	MARK	COMMODITY
1	74840	20.42	1-3 Tan
2	70500	18.70	"
3	72560	19.73	"
4	76120	21.51	"
5	73460	20.16	"

CARRIER

DRIVER	EQUIPT. NO.
Roberto	22

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY [signature] Mth. 5 Day 23 Year 5

DEPUTY DATE

TARE BY [signature] DEPUTY DATE Mth 5 Day 23 Year 5

FILE COPY

DRIVER ☐ ON GROSS & TARE
MULTIPLE LOAD CERTIFICATE: TARE 33100 X 5 LOADS Roberto B. Trucking

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48009

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

WATER SHED

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: MOORPARK HITCH

WEIGHT IN LBS.	
277410	Gross
140560	Tare
136850	Net
68.43	Tons

LOADS	POUNDS	MARK	COMMODITY
1	69220	11:11	1-3 TON
2	65320	15.04	"
3	71220	12.04	"
4	71650	15.26	"

CARRIER: TANNER

DRIVER	EQUIPT. NO.
Rich	913

TRUCK	I.D. No
TRAILER	I.D. No.
TRAILER	I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY [illegible] — Mth 5 / Day 23 / Year 5

DEPUTY DATE

TARE BY [illegible] — DEPUTY DATE — Mth 5 / Day 23 / Year 5

FILE COPY

DRIVER ☐ ON GROSS & TARE
MULTIPLE LOAD CERTIFICATE: **TARE** 35140 **X** 4 **LOADS** 4

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48010

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

TERRE [illegible]

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: Thille & Ridge

WEIGHT IN LBS.

262020	Gross
122900	Tare
189120	Net
94.56	Tons

CARRIER: G T Bauer

DRIVER	EQUIPT. NO.
Robbins	36

LOADS	POUNDS	MARK	COMMODITY
1	22220	11.01	3/4
2	22820	11.42	"
3	24160	19.29	"
4	24260	19.34	"
5	23260	19.09	"

PACIFIC ROCK, INC., Weighmaster

GROSS BY: Bill Fisher — Mth 5 / Day 22 / Year 5

TRUCK I.D. No

DEPUTY DATE

TRAILER I.D. No.

TARE BY: Bill Fisher — DEPUTY DATE — Mth 5 / Day 22 / Year 5

TRAILER I.D. No.

DRIVER ☐ ON GROSS & TARE
MULTIPLE LOAD CERTIFICATE: ______ TARE 3[illegible] **X** 5 Bolton **LOADS**

FILE COPY

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48011

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: Phillips & Roads Ventura

WEIGHT IN LBS.	
332530	Gross
173200	Tare
159330	Net
79.67	Tons

LOADS	POUNDS	MARK	COMMODITY
1	65440	15.20	
2	65440	1540	11
3	65120	15.24	"
4	68800	17.08	"
5	68130	16.70	"

CARRIER: Chatter

DRIVER	EQUIPT. NO.
Tony	302

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY — Mth 5 / Day 23 / Year 5

DEPUTY DATE

TARE BY — DEPUTY DATE — Mth 5 / Day 23 / Year 5

DRIVER ☑ ON GROSS & TARE

MULTIPLE LOAD CERTIFICATE: TARE 34640 **X** **LOADS**

FILE COPY

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48012

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo
Reno Vul...

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: VenTRA

WEIGHT IN LBS.	
293020	Gross
128640	Tare
164380	Net
82.19	Tons

LOADS	POUNDS	MARK	COMMODITY
1	71220	19.56	1/2 Ton
2	73620	20.73	"
3	74900	21.34	"
4	73220	20.53	"
	Lew P.		

CARRIER: F. Lipeskan

DRIVER	EQUIPT. NO.
Folipe JR	2A

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY Bill Lehes — Mth 5 / Day 23 / Year 5

DEPUTY DATE

TARE BY Bill Lehes — DEPUTY DATE — Mth 5 / Day 23 / Year 5

FILE COPY

DRIVER ☐ ON GROSS & TARE
MULTIPLE LOAD CERTIFICATE: TARE 32160 X LOADS

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48013

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

Turf Const.

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: Thille & Ringo Ventura

WEIGHT IN LBS.	
351960	Gross
178200	Tare
173760	Net
86.88	Tons

LOADS	POUNDS	MARK	COMMODITY
1	69140	16.75	3/4"
2	69640	12.40	"
3	68200	16.53	"
4	73740	16.75	"
5	71340	17.85	"

CARRIER: Ruiz & Son

DRIVER	EQUIPT. NO.
Fernando	104

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY Bill Fisher — Mth 5 / Day 23 / Year 5

DEPUTY DATE

TARE BY Bill Fisher DEPUTY DATE — Mth 5 / Day 23 / Year 5

DRIVER ☐ ON GROSS & TARE

MULTIPLE LOAD CERTIFICATE: **TARE** 3560 **X** 5 **LOADS**

FILE COPY

WEIGHMASTER CERTIFICATE

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48014

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

PARAGON

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: NEWAY ROAD OXNARD

WEIGHT IN LBS.	
456870	Gross
202440	Tare
254430	Net
127.22	Tons

LOADS	POUNDS	MARK	COMMODITY
1	74228	26.24	6" GRAVEL
2	78340	22.76	"
3	74560	20.41	"
4	76950	21.61	"
5	75640	20.95	"
6	77160	21.71	"

CARRIER: ECR

DRIVER: SEAN | EQUIPT. NO.: 6

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY Bill Lehr — Mth Day Year 5 / 23 / 5

DEPUTY DATE

TARE BY Bill Lehr — DEPUTY DATE — Mth Day Year 5 / 23 / 5

DRIVER ☑ ON GROSS & TARE

MULTIPLE LOAD CERTIFICATE: TARE 33740 X 6 LOADS

FILE COPY

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48016

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo
PARAGON

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

BUYER/ DELIVERED TO: OXNARD

WEIGHT IN LBS.

440880	Gross
190680	Tare
250200	Net
125.10	Tons

LOADS	POUNDS	MARK	COMMODITY
1	73580	24.90	6" minus
2	72280	20.50	"
3	73340	20.78	"
4	70760	19.49	"
5	75120	21.67	"
6	75300	21.76	"

CARRIER: CRUZ

DRIVER	EQUIPT. NO.
Bob	2

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY Bill Lehr — Mth Day Year 5 / 23 / 15

DEPUTY DATE

TARE BY Bill Lehr — DEPUTY DATE — Mth Day Year 5 / 23 / 15

DRIVER ☐ ON GROSS & TARE

MULTIPLE LOAD CERTIFICATE: **TARE** 31780 **X** 6 **LOADS**

FILE COPY

WEIGHMASTER CERTIFICATE

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

48017

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

SELLER/ WEIGHED FOR: **PACIFIC ROCK, INC.**

Demo Unlimited

BUYER/ DELIVERED TO: Ventura

WEIGHT IN LBS.	
297220	Gross
153040	Tare
144180	Net
72.09	Tons

LOADS	POUNDS	MARK	COMMODITY
1	71440	16:44	1/2 Ton
2	73480	17:41	"
3	75680	18:31	"
4	76920	19:23	"

CARRIER: E Son

DRIVER	EQUIPT. NO.
Flores R	3

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY Bill Sikes DEPUTY DATE Mth. 5 / Day 23 / Year 5

TARE BY Bill Sikes DEPUTY DATE Mth 5 / Day 23 / Year 5

DRIVER ☑ ON GROSS & TARE

MULTIPLE LOAD CERTIFICATE: **TARE** 38260 **X** **LOADS**

FILE COPY

WEIGHMASTER CERTIFICATE

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48019

PACIFIC ROCK, INC.
P.O. BOX 257
SOMIS, CA 93066
1(805) 389-0250

WEIGHED AT: 1000 Pancho Road, Camarillo

PARAGON

SELLER/
WEIGHED FOR:
PACIFIC ROCK, INC.

BUYER/
DELIVERED TO: OXNARD

WEIGHT IN LBS.

348420	Gross
195240	Tare
153180	Net
126.59	Tons

LOADS	POUNDS	MARK	COMMODITY
1	75380	2nd	6" minus
2	75460	31.46	"
3	73580	20.82	"
4	72200	19.82	"
5	72200	22.33	"
6	70600	21.03	"

CARRIER
ZAVIN

DRIVER	EQUIPT. NO.
ANDY	10

TRUCK I.D. No

TRAILER I.D. No.

TRAILER I.D. No.

PACIFIC ROCK, INC., Weighmaster

GROSS BY [signature] Mth Day Year 5 / 23 / 5

DEPUTY DATE

TARE BY [signature] DEPUTY DATE Mth Day Year 5 / 23 / 5

DRIVER ☐ ON GROSS & TARE

MULTIPLE LOAD CERTIFICATE: **TARE** 32540 **X** 6 **LOADS**

FILE COPY

BENCHMARK RESOURCES

Sacramento • Oakland