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Appendix 5.1C
PSD Protocol

APPENDIX 5.1C

Modeling Protocol

The protocol which follows presents the methods and assumptions to be used in the VCAPCD NSR and CEC modeling impacts analysis. The MREC project is **not** expected to trigger the requirements of the PSD program for any pollutant. Therefore, a PSD modeling analysis is not required at this time.

Attachment 5.1C-1
Modeling Protocol

Air Quality Modeling Protocol

Mission Rock Energy Center

Santa Paula, California

Submitted to

Ventura County Air Pollution Control District
California Energy Commission

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INTRODUCTION AND FACILITY DESCRIPTION

The Mission Rock Energy Center (MREC) is proposing to construct and operate a 276 MW (nominal rated-ISO) natural gas-fired simple-cycle power plant. The project is planning to operate as a peaking power plant and is proposed to operate up to approximately 2,500 hours per year, with an expected facility capacity factor of up to 29% percent.

The project will consist of the following:

- Installation of five (5) LM6000 PG Sprint gas turbines which will be operated in simple-cycle mode
- A CARB certified Tier 3 diesel fueled fire pump
- Necessary support systems and processes.

The Project design will incorporate the air pollution emission controls designed to meet the Ventura County Air Pollution Control District (VCAPCD) Best Available Control Technology/Lowest Achievable Emission Rate (BACT/LAER) determinations. These controls will include water injection in the turbine combustors to limit nitrogen oxide (NO_x) production, Selective Catalytic Reduction (SCR) with aqueous ammonia for additional NO_x control along with an oxidation catalyst to control carbon monoxide (CO) and reactive organic compounds (ROC) emissions. The fuels to be used will include pipeline quality natural gas in the turbines and California ultra-low sulfur diesel fuel in the fire pump engine. The ammonia slip from the SCR system will be limited to 5 parts per million (ppm).

The project is expected to result in emissions that will exceed the VCAPCD Rule 26.2 Major Facility significance thresholds for NO_x only. No major source thresholds for PM10/2.5, SO_x, or CO are stated in the VCAPCD NSR rules. BACT will be required for NO_x, ROC, SO_x, and PM10/2.5. Although not required by VCAPCD rules, BACT for CO will also be determined and implemented.

The project will trigger VCAPCD and CEC modeling requirements. The air quality analysis will be conducted to demonstrate that impacts from NO_x, CO, SO_x, PM10 and PM2.5 will comply with the California and National Ambient Air Quality Standards (CAAQS/NAAQS) for the applicable averaging periods. Impacts from nearby sources (cumulative impacts) are also assessed for criteria pollutants at a later date after consultation with the appropriate agencies.

The project will not trigger the Prevention of Significant Deterioration (PSD) permitting requirements, which would be required for simple cycle design with a facility wide emissions equaling or exceeding 250 tons per year (tpy) for any criteria pollutant.

The MREC will be located in Ventura County within the South Central Coast Air Basin. The project site is situated approximately 3 miles southwest of downtown Santa Paula, between Mission Rock Road and Shell Road. The site lies south of Hwy 126 (Santa Paula Highway) and approximately 2.5 miles northeast of the junction of Hwy 126 and Hwy 118. The Santa Paula airport lies approximately 3 miles to the northeast and the Ventura County jail facility lies approximately 900 ft. due west of the site.

The approximately 9.8-acre site is currently used as a vehicle salvage/dismantling yard. There are no current air pollution sources on the proposed site (except for motor vehicles), and there are no facilities on the current site that are permitted by the VCAPCD.

PROPOSED AIR QUALITY DISPERSION MODELS

The primary United States Environmental Protection Agency (USEPA) dispersion model proposed for use is the AERMOD modeling system (AERMOD version 15181) with the associated meteorological and receptor processing programs AERSURFACE (version 13016), AERMET version (version 15181), and AERMAP (version 11103). AERMOD will be used to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations, and will be used for modeling most facility operational and construction impacts in both simple and complex terrain. In addition, the Building Profile Input Program for PRIME (BPIP-PRIME version 04274) will be used for determining building dimensions for downwash calculations in AERMOD and the USEPA-model AERSCREEN (version 15181) is proposed for use to determine inversion-breakup fumigation impacts. The California Health Risk Assessment models/protocols, which include the HARP On-Ramp program, will be used for determining toxic impacts. These models, along with options for their use and how they are used, are discussed below. These models will be used for the following:

- Comparison of operational and construction impacts to significant impact levels (SILs), California and National Ambient Air Quality Standards (AAQS, also referred to separately as CAAQS and NAAQS), ;
- Cumulative impacts analyses in accordance with VCAPCD/state/ USEPA/CEC requirements (to be completed at a later date after consultation with the appropriate agencies);
- Toxics analyses using ARB algorithms as incorporated into CAPCOA and VCAPCD requirements; and
- Assessment of secondary impacts to soil and vegetation.

Regulatory agencies have traditionally applied "significant impact levels" ("SILs") as a *de minimis* value, which represents the offsite concentration predicted to result from a source's emissions that does not warrant additional analysis or mitigation.

If a source's modeled impact at any offsite location exceeds the relevant SIL, the source owner may need to assess multi-source or cumulative air quality analysis to determine whether or not the source's emissions will cause or contribute to a violation of the relevant NAAQS or CAAQS.

EXISTING METEOROLOGICAL AND AIR QUALITY DATA

Available Meteorological Data: Hourly observations of certain meteorological parameters are used to define the area's dispersion characteristics. These data are used in approved air dispersion models for defining a project's impact on air quality. These data must meet certain criteria established by the USEPA and the following discussion details the proposed data and its applicability to this project.

The proposed project is located in the southwestern portion of the Santa Clara River Valley, near the mouth of the Valley. The Valley is also known as Heritage Valley. The Santa Clara River Valley has a predominant northeast and southwest orientation, with terrain rising up to over 2000 feet on each side of the valley. Based on the project location near the entrance to the valley, the selection of surface meteorology will be an important consideration for use in assessing the projects impacts on regional air quality. Because the project location is influenced in large part by the valley orientation, surface meteorological data was reviewed to determine which data set would be considered representative of the project area.

The nearest representative surface meteorological data set in the general area of the proposed Project is the El Rio Monitoring Station, operated by the Ventura County Air Pollution Control District (VCAPCD), located approximately 7.1 kilometers (km) south-southwest of the project site, as shown on Figure 1. This surface meteorological data set was provided by the VCAPCD for a recent five-year period, 2009-2013, and consists of hourly-averaged measurements of wind speed, wind direction, the standard deviation of the wind direction (called sigma-theta), temperature, and relative humidity (all measured at a height of 10 meters above ground level), and solar radiation. These surface data, when processed with AERMET with the data described below, result in data recovery greater than 90 percent for every quarter in the five-year period as shown in Table 1.

Table 1
Meteorological Missing Data and Data Recovery Rates

Year	Missing Hours (# hours) Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total
2009	131	1	23	48	203
2010	58	14	10	191	273
2011	110	86	66	112	374
2012	46	73	37	18	174
2013	53	46	46	84	229
Period	n/a	n/a	n/a	n/a	1253
Year	**Data Recovery Rate (percent) Qtr 1**	**Qtr 2**	**Qtr 3**	**Qtr 4**	**Total**
2009	93.94%	99.95%	98.96%	97.83%	97.68%
2010	97.31%	99.36%	99.55%	91.35%	96.88%
2011	94.91%	96.06%	97.01%	94.93%	95.73%
2012	97.89%	96.66%	98.32%	99.18%	98.02%
2013	97.55%	97.89%	97.92%	96.20%	97.39%
Period	n/a	n/a	n/a	n/a	97.14%

The El Rio monitoring data will be supplement with concurrent Automatic Surface Observing System (ASOS) hourly measurements taken at the Camarillo Airport, located about 11 km south of the project site, downloaded from the National Climatic Data Center (NCDC) websites. The Camarillo ASOS data are expected to be more representative of the inland project location than ASOS measurements taken at Oxnard Airport, which is in closer proximity to the coastline and therefore, more influenced by the coastal marine layer. There are no other ASOS stations in the immediate project vicinity. Camarillo ASOS measurements of cloud cover, barometric pressure and precipitation will be used by AERMET to supplement the El Rio monitoring data when creating the meteorological datasets used as AERMOD inputs. The AERMET option to substitute ASOS wind and temperature data for missing El Rio measurements will not be used as the data sets already exceeded the quarterly 90 percent data recovery requirements for use in regulatory modeling assessments. As no Camarillo ASOS derived wind speed and wind direction data will be used, the use of USEPA-program AERMINUTE (version 14237) is not required. .

In addition to the surface datasets, concurrent radiosonde upper air data from Vandenberg Air Force Base will be input into AERMET to calculate wind and temperature profile data using the 12 Zulu (Z) sounding data (4 AM local standard time). These data were downloaded from the National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL) website. The AERMET option to expand the 12 Z sounding window by more than one hour will not be used as the data set already exceeded the quarterly 90 percent data recovery requirements for use in regulatory modeling assessments.

AERMET also requires input summaries of the surface characteristics for the area surrounding the El Rio meteorological monitoring site. These surface characteristics will be calculated with the USEPA-program AERSURFACE (version 13016) based on USEPA guidance. AERSURFACE uses 1992 National Land Cover Data (NLCD) from the United States Geological Survey (USGS) to determine land use based on standardized land cover categories. For this analysis, the southern California NLCD file from the USGS website referenced in the AERSURFACE User's Manual:

(http://edcftp.cr.usgs.gov/pub/data/landcover/states/)

will be used. A review of historical Google Earth images shows little change in nearby land uses from the time of the 1992 NLCD to the present time.

AERSURFACE will be executed in accordance with the USEPA guidance documents "*AERMOD Implementation Guide,*" March 19, 2009, and "*AERSURFACE User's Guide*," EPA-454/B-08-001, revised January 16, 2013. AERSURFACE determines the midday albedo, daytime Bowen ratio, and surface roughness length representative of the surface meteorological station. ***Bowen ratio*** is based on a simple unweighted geometric mean while ***albedo*** is based on a simple unweighted arithmetic mean for the 10x10 km square area centered on the selected location (i.e., no direction or distance dependence for either parameter). ***Surface roughness length*** is based on an inverse distance-weighted geometric mean for upwind distances up to one (1) km from the selected location. The circular surface roughness length area (1-km radius) can be divided into any number of sectors as appropriate (USEPA guidance recommends that no sector be less than 30^o in width).

Two sectors are proposed for calculating roughness lengths based on the USEPA-recommended radius of 1 km: one sector for directions from 302° to 336° northwest of the El Rio monitoring site based on the concentrated residential and commercial development in this area; and a second sector for all other directions (from 336° through north then south to 302°) based on the predominate agricultural land uses in this area. These sectors are shown on Figure 2. Months were assigned to the four seasons based on the seasonal assignments given by USEPA for the 1-hour NO_2 NAAQS assessment for the Los Angeles area (EPA-452/P-08-001, April 2008) – namely April to June for transitional spring with short annuals, July to September for midsummer with lush vegetation, and October through March for autumn with un-harvested cropland. The USEPA seasonal assignments do not include late autumn after frost or winter with or without snow. Other AERSURFACE options will be selected as Airport=NO, continuous snow cover = NO, and arid = NO based on the El Rio monitoring site location and the local climatology. A summary of the AERSURFACE inputs and results are shown in Table 2.

Table 2
AERSURFACE Input and Results

AERSURFACE RESULTS	Spring (Apr-Jun)	Summer (Jul-Sep)	Autumn (Oct-Mar)	Winter (none)
Surface Roughness (meters)				
Sector 1 (302°-336°)	0.309	0.253	0.313	N/A
Sector 2 (336°-302°)	0.220	0.046	0.220	N/A
Noontime Albedo	0.19	0.16	0.19	N/A
Bowen Ratio (Average)	0.88	0.48	0.67	N/A
Bowen Ratio (Wet)	0.52	0.33	0.42	N/A
Bowen Ratio (Dry)	2.21	1.36	1.78	N/A
AERSURFACE INPUTS				
Latitude	34.252		Snow Cover	NO
Longitude	-119.143		Arid Region	NO
Datum	NAD83		Airport Location	NO
Surface Roughness Radius (km)	1.0		Number of Sectors	2

Finally, the moisture used to calculate the albedo for AERMET processing will be based on 30-years of precipitation climatology in accordance with USEPA recommendations. For this assessment, the nearest regional cooperative monitoring location with relatively complete data for the 30-year climatological period (with complete data for the 5-year modeling period) was the Ojai cooperative monitoring site. The past 30 years of monthly precipitation amounts are sorted (1984 through 2013) and compared to the monthly precipitation amounts for the five years modeled (2009-2013). The modeled months (2009-2013) with precipitation amounts in the range of the driest 9 years by month for the 30-year climatology are given the albedo for DRY conditions. The modeled months (2009-2013) with precipitations amounts in the range of the wettest 9 years by month for the 30-year climatology are given the albedo for WET conditions. The remainder of the modeled months (2009-2013) represents the middle 22 years by month in the 30-year precipitation climatology and these months are given the albedo for AVG (average) conditions. The 30-year precipitation climatology and moisture conditions for each month of the modeling period are shown in Table 3 (the monthly albedos input to AERMET are shown in the previous table).

Table 3
30-year Precipitation Climatology Summary
and Moisture Assigned to the Months in the Modeling Period

SORT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.52
2	0.05	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.58
3	0.55	0.15	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	7.67
4	0.55	0.19	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.03	7.82
5	0.63	0.34	0.22	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.25	8.17
6	0.63	0.92	0.37	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.32	9.21
7	0.86	1.25	0.48	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.38	10.62
8	0.89	1.33	0.55	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.57	11.57
9	1.17	1.88	0.68	0.09	0.00	0.00	0.00	0.00	0.00	0.04	0.35	0.94	12.51
10	1.19	1.93	0.82	0.10	0.00	0.00	0.00	0.00	0.00	0.10	0.40	0.96	12.56
11	1.21	2.10	1.22	0.14	0.02	0.00	0.00	0.00	0.00	0.15	0.67	1.10	12.94
12	1.25	2.75	1.33	0.16	0.02	0.00	0.00	0.00	0.00	0.23	0.71	1.29	13.71
13	1.40	2.93	1.39	0.16	0.03	0.00	0.00	0.00	0.00	0.25	1.01	1.47	14.07
14	1.77	3.12	2.19	0.17	0.13	0.00	0.00	0.00	0.00	0.26	1.02	1.63	15.53
15	1.93	3.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	1.02	1.80	15.96
16	2.12	4.09	2.23	0.37	0.13	0.00	0.00	0.00	0.00	0.32	1.12	2.00	15.97
17	2.39	4.16	2.71	0.42	0.16	0.00	0.00	0.00	0.00	0.32	1.19	2.14	16.92
18	3.11	4.47	2.75	0.46	0.21	0.00	0.00	0.00	0.00	0.51	1.26	2.17	18.16
19	3.22	4.47	3.08	0.67	0.23	0.02	0.00	0.00	0.01	0.76	1.50	2.21	18.64
20	3.41	4.97	3.09	0.82	0.27	0.02	0.00	0.00	0.01	0.87	1.67	3.63	21.66
21	3.74	6.36	3.46	1.10	0.34	0.04	0.00	0.00	0.03	0.93	1.78	3.85	22.41
22	3.91	7.29	4.30	1.80	0.44	0.07	0.00	0.00	0.03	1.16	2.36	4.04	23.85
23	5.48	7.30	4.40	1.94	0.48	0.13	0.01	0.00	0.08	1.18	2.37	4.11	24.27
24	6.72	8.73	4.48	2.33	0.49	0.13	0.01	0.00	0.26	1.88	2.43	4.43	26.56
25	6.90	9.50	4.79	2.38	0.82	0.13	0.02	0.00	0.37	1.99	2.45	5.84	28.28
26	7.44	10.06	4.84	2.48	0.97	0.19	0.03	0.00	0.40	2.15	3.02	6.04	30.66
27	9.11	10.30	5.76	2.87	1.11	0.24	0.03	0.01	0.61	2.46	3.21	6.29	36.35
28	16.58	10.63	6.32	2.92	1.20	0.34	0.05	0.02	0.64	3.32	3.54	6.89	37.05
29	17.57	12.50	10.50	3.59	2.06	0.36	0.12	0.10	0.85	3.70	3.88	8.63	40.97
30	24.53	23.76	14.01	5.39	4.07	1.60	0.78	0.16	1.25	5.76	6.61	9.36	41.79
2009	0.89	4.97	0.55	0.16	0.02	0.13	0.00	0.00	0.00	3.70	0.02	3.63	14.07
2010	6.72	4.47	0.37	2.38	0.16	0.00	0.01	0.00	0.00	2.15	1.67	8.63	26.56
2011	0.55	4.09	6.32	0.16	0.97	0.24	0.00	0.00	0.01	1.16	1.78	0.25	15.53
2012	1.19	0.11	3.46	2.33	0.03	0.00	0.00	0.00	0.00	0.87	2.43	2.14	12.56
2013	1.40	0.19	1.33	0.06	0.23	0.00	0.01	0.00	0.00	0.25	0.67	0.38	4.52
2009	DRY	AVG	DRY	AVG	AVG	WET	AVG	AVG	AVG	WET	DRY	AVG	N/A
2010	WET	AVG	DRY	WET	AVG	AVG	WET	AVG	AVG	WET	AVG	WET	N/A
2011	DRY	AVG	WET	AVG	WET	WET	AVG	AVG	AVG	WET	AVG	DRY	N/A
2012	AVG	DRY	AVG	WET	AVG	AVG	AVG	AVG	AVG	AVG	WET	AVG	N/A
2013	AVG	DRY	AVG	DRY	AVG	AVG	WET	AVG	AVG	AVG	AVG	DRY	N/A

Sorted Data - The 30-years of climatology were SORTED to determine DRY/AVG/WET months. Generally, the driest and wettest 9 years were used to delineate DRY/WET (AVG was anything in-between). The one exception was JUNE-SEPTEMBER where no precipitation was considered AVERAGE. Orange cells represent months with more than 5-6 missing days of precipitation data, which were assigned to the middle of the sorted period if the missing data placed them in the driest half of the sorted order.

The area surrounding the project site, within three (3) km, can be characterized as rural, made up mostly of agricultural uses (grasslands, pasture, and crops totally 65.5%) and undeveloped rural areas (shrublands, grasslands, forest, and wetlands totally 26.2%). Urban areas (high intensity residential and commercial and industrial uses) are only 2.3% of the area within three kilometers based on review of land use/land cover data as well as recent aerial photographic data. Some industrial land use is located immediately adjacent to the project site, however, based on a the radial range of three kilometers, the area surrounding the project site is rural In accordance with the Auer land use classification methodology (USEPA's "*Guideline on Air Quality Models*"), since the land use within the area circumscribed by a three km radius around the facility is greater than 50 percent rural, the urban dispersion option in AERMOD will not be used in the modeling analyses supporting the permitting of the facility.

Meteorological Data Representativeness: The proposed use of the five (5) years of VCAPCD supplied surface meteorological data collected at the El Rio monitoring location would satisfy the definition of on-site data. USEPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates from the Clean Air Act in Section 165(e)(1), which requires an analysis "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility." This requirement and USEPA's guidance on the use of on-site monitoring data are also outlined in the On-Site Meteorological Program Guidance for Regulatory Modeling Applications (USEPA, 1987). The representativeness of meteorological data is dependent upon: (a) the proximity of the meteorological monitoring site to the area under consideration; (b) the complexity of the topography of the area; (c) the exposure of the meteorological sensors; and (d) the period of time during which the data are collected.

First, the El Rio meteorological monitoring site and proposed project location are in close proximity to each other (the El Rio monitoring site is 7.1 km SSW of the project site), are at similar elevations (117′ and 185′ above mean sea level), and are both located near the Santa Clara River. The El Rio monitoring site and proposed project location are located more than 10 km and 15 km, respectively, from the Pacific Ocean. Therefore, the strong westerly wind data that is evident at the Oxnard and Camarillo airports are not identified on the El Rio data sets. Rather, the El Rio monitoring appears to be influenced by the Santa Clara River Valley site is located near the entrance to the Santa Clara River valley in which the project will be located. Thus, both locations will experience similar up-valley and down-valley flows under certain synoptic conditions. Third, the surface characteristics of land uses, roughness lengths, Bowen ratios, and albedos are very similar for the two locations as shown in Table 4. Most of the land use in the general region consists of agricultural classifications.

Table 4
Surface Characteristics for Monitoring Site and Proposed Project Location

Standardized Land Use Category (for area within a 1km radius)	El Rio Mon. Site	Project Location
Open Water:	0.1%	-
Low Intensity Residential:	5.0%	2.8%
High Intensity Residential:	1.0%	-
Commercial/Industrial/Transp:	6.9%	3.9%
Bare Rock/Sand/Clay:	1.6%	7.9%
Deciduous Forest:	0.2%	0.2%
Evergreen Forest:	0.5%	1.1%
Mixed Forest:	1.0%	1.6%
Shrubland:	1.7%	10.9%
Orchards/Vineyard/Other:	0.5%	0.9%
Grasslands/Herbaceous:	1.8%	12.1%
Pasture/Hay:	7.5%	14.2%
Row Crops:	69.1%	37.9%
Small Grains:	2.2%	5.6%
Urban/Recreational Grasses:	0.9%	0.2%
Woody Wetlands:	-	0.5%
Emergent Herbaceous Wetlands:	-	0.2%
Surface Spring (Apr-Jun)	0.227	0.196
Roughness Summer (Jul-Sep)	0.054	0.061
(meters) Autumn (Oct-Mar)	0.228	0.196
Noontime Spring (Apr-Jun)	0.19	0.19
Albedo Summer (Jul-Sep)	0.15	0.16
Autumn (Oct-Mar)	0.19	0.19
Bowen Ratio Spring (Apr-Jun)	0.88	0.92
Average Summer (Jul-Sep)	0.48	0.48
Moisture Autumn (Oct-Mar)	0.67	0.67

AERSURFACE was ran for both the meteorological monitoring and proposed site locations using the seasons and model options described earlier for one single sector, average moisture conditions, and a surface roughness area circumscribed by a one (1) kilometer radius. Land use categories at the two site locations are similar with agriculture and grasslands/shrublands both comprising over 80% of the total land use types. The ratio of urban uses between the two sites are similar with the monitoring site location having a six (6) percent greater ratio of residential and commercial use. There were some small variations in roughness lengths between the two locations based on a one (1) kilometer radius, but based on roughness length, both areas are predominately rural and agricultural. These runs also produced almost identical results for both Bowen ratio and Albedo for the two locations, based on the 10 kilometer area around each location.

Representativeness is defined in the document "Workshop on the Representativeness of Meteorological Observations" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Judgments of representativeness should be made only when sites are climatologically similar, as is the case with the meteorological monitoring site and the proposed project location. In determining the representativeness of the meteorological data set for use in the dispersion models at the project site, the consideration of the correlation of terrain features to prevailing meteorological conditions, as discussed earlier, is similar at both locations since the orientation and aspect of main terrain feature(s) at the project location in the Santa Clara River Valley is maintained with the prevailing wind fields as measured by and contained in the meteorological dataset for the monitoring site located at the mouth of the same valley along the Santa Clara River. In other words, the same mesoscale and localized geographic and topographic features that influence wind flow patterns at the meteorological monitoring site also influence the wind flow patterns at the proposed project site.

For these reasons, the El Rio meteorological data selected for use on the proposed project are expected to satisfy the definition of representative meteorological data. Thus, it is our assessment that this meteorological data are similar to the dispersion conditions at the project site and to the regional area.

Existing Baseline Air Quality Data: The nearest criteria pollutant air quality monitoring sites to the proposed project site is the VCAPCD El Rio monitoring station, the same location as the meteorological data proposed for the air quality modeling. This site, which measures all criteria pollutants except CO and SO_2, was selected as being representative of baseline air quality data for the proposed project location. The El Rio monitoring station's objective is for measuring background air quality to support compliance with the Ambient Air Quality Standards. The spatial scale of the monitoring station is urban for the photo reactive pollutants of ozone and NO_2 and neighborhood scale for particulate matter (PM10 and PM2.5). Based on these two spatial scales, the overall objective of the monitoring station is population oriented.

Since CO and SO_2 are not currently monitored in Ventura County, the nearest representative monitoring site in Santa Barbara County was selected as a conservative representation of baseline air quality in the project vicinity. Ambient monitoring data for these sites for the most recent three-year period (2011-2013) are summarized in Table 5. Data from these sites is estimated to present a reasonable representation of background air quality for the project site and impact area.

Table 5
Existing Baseline Air Quality Data for
the Proposed Project Location

Pollutant	Site	Avg. Time	2012	2013	2014
Ozone, ppm	El Rio	1-Hr Max	0.082	0.067	0.112
	El Rio	8-Hr Max*	0.065	0.063	0.077
PM10, $\mu g/m^3$	El Rio	24-Hr Max*	57	47	51
	El Rio	Ann. Mean	21.0	24.3	N/A
PM2.5, $\mu g/m^3$	El Rio	24-Hr 98^{th}%	17	18	18
	El Rio	Ann. Mean	8.7	9.4	9.3
NO_2, ppm	El Rio	1-Hr Max	0.057	0.040	0.039
	El Rio	1-Hr 98^{th}%	0.033	0.033	0.030
	El Rio	Ann. Mean	0.007	0.007	0.006
CO, ppm	Santa Barbara	1-Hr Max*	2.1	2.5	4.0
	Santa Barbara	8-Hr Max*	0.9	1.1	1.1
SO_2, ppm	Santa Barbara	1-Hr Max	0.002	0.002	0.004
	Santa Barbara	1-Hr 99^{th}%	0.002	0.002	0.001
	Santa Barbara	24-Hr Max	0.0013	0.0020	0.0003

*For 1-hour and 8-hour ozone and CO and 24-hour PM10, the maximum measured background concentration required for the CAAQS assessment was also conservatively used for the NAAQS assessment. Normally, the NAAQS assessments are based on lesser concentrations such as the second-highest measured concentration each year for 24-hour PM10 and 1-hour and 8-hour CO, and the fourth-highest daily maximum 8-hour concentration averaged over three years for the ozone NAAQS.

Based on the data presented in Table 5, background values were selected as appropriate for the standard as shown in Table 6. Generally, the highest baseline concentration for any of the most recent three years is used for comparison to any of the CAAQS and many of the NAAQS. Some of the NAAQS are based on 3-year averages of the values shown in Table 5, and are noted as such below in Table 6.

Table 6
Estimated Background Air Quality Values

Pollutant and Averaging Time	Background Value	California AAQS	National AAQS
Ozone – 1-Hour	0.112 ppm (219.9 µg/m^3)	0.09 ppm (180 µg/m^3)	-
Ozone – 8-Hour	0.077 ppm (151.2 µg/m^3)	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)
PM10 – 24-Hour	57 µg/m^3	50 µg/m^3	150 µg/m^3
PM10 – Annual	24.3 µg/m^3	20 µg/m^3	-
PM2.5 – 24-Hour 3-year Average 98th%	18 µg/m^3	-	35 µg/m^3
PM2.5 – Annual CAAQS	9.4 µg/m^3	12 µg/m^3	-
PM2.5 – Annual NAAQS 3-year Average	9.1 µg/m^3	-	12.0 µg/m^3
NO_2 – 1-Hour CAAQS	0.057 ppm (107.2 µg/m^3)*	0.18 ppm (339 µg/m^3)	-
NO_2 – 1-Hour NAAQS 3-year Average 98th%	0.032 ppm (60.2 µg/m^3)*	-	0.100 ppm (188 µg/m^3)
NO_2 – Annual	0.007 ppm (13.2 µg/m^3)	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
CO – 1-Hour	4.0 ppm (4,581 µg/m^3)	20 ppm (23,000 µg/m^3)	35 ppm (40,000 µg/m^3)
CO – 8-Hour	1.1 ppm (1,260 µg/m^3)	9.0 ppm (10,000 µg/m^3)	9 ppm (10,000 µg/m^3)
SO_2 – 1-Hour CAAQS	0.004 ppm (10.5 µg/m^3)	0.25 ppm (655 µg/m^3)	-
SO_2 – 1-Hour NAAQS 3-year Average 99th%	0.002 ppm (5.2 µg/m^3)	-	0.075 ppm (196 µg/m^3)
SO_2 – 3Hour Set Equal to 1-Hour Max	0.004 ppm (10.5 µg/m^3)	-	0.5 ppm (1300 µg/m^3)
SO_2 – 24-Hour	0.002 ppm (5.2 µg/m^3)	0.04 ppm (105 µg/m^3)	-

For conversion from the ppm measurements to µg/m^3 concentrations typically required for the modeling analyses, used:
µg/m^3 = ppm x 40.9 x MW where MW = 48, 28, 46, and 64 for ozone, CO, NO_2, and SO_2, respectively.

The attainment status of the proposed project site is designated for the NAAQS and CAAQS as follows:

Table 7
NAAQS/CAAQS Attainment Status Listing

Pollutant	NAAQS Status	CAAQS Status
8-Hour Ozone	Serious Nonattainment	Nonattainment
PM10	Unclassified (Attainment)	Nonattainment
PM2.5	Unclassified/Attainment	Nonattainment
NO_2	Unclassified/Attainment	Attainment
CO	Unclassified/Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Unclassified/Attainment	Attainment

Air Quality Modeling Procedures With AERMOD/AERSCREEN

Several dispersion models are proposed for use to quantify pollutant impacts on the surrounding environment based on the emission sources and operating parameters.

AERMOD will be used to determine facility impacts on Class II areas in the immediate Project vicinity in simple, intermediate, and complex terrain areas during both Project operations and during construction of the Project. The AERMOD model will be used for comparison of impacts to SILs and compliance with NAAQS and CAAQS.

Screening Modeling: A variety of facility operating conditions (e.g., minimum, maximum, and average ambient temperatures) and a range of source loads will be analyzed to identify which operating condition causes worst-case ambient air impacts. The modeling will be performed for stack characteristics and emissions for all applicable short-term averaging times (pollutants and averaging times with AAQS) using the entire meteorological dataset (described above). The worst-case short-term operating condition(s) so identified will be used in the refined modeling described below. Source characteristics for annual average impacts will be based on average operating conditions (i.e., average annual temperature, average operating load and worst-case annual emissions based on permitted hours of operation for both normal and startup and shutdown conditions).

Refined Modeling: The purpose of the refined modeling analysis will be to demonstrate that air emissions from the Project will not cause or contribute to a NAAQS/CAAQS violation and will not cause a significant health risk impact. For modeling the project's operational impacts under normal and startup, shutdown, or malfunction conditions due to emissions from the proposed sources (as well as temporary project construction impacts) on nearby simple and complex terrain, the AERMOD model will be used with the entire hourly meteorological data (described above).

AERMOD Model/Options: AERMOD is a steady-state plume dispersion model that simulates transport and dispersion from multiple point, area, or volume sources based on updated characterizations of the atmospheric boundary layer. AERMOD uses Gaussian distributions in the vertical and horizontal for stable conditions, and in the horizontal for convective conditions; the vertical distribution for convective conditions is based on a bi-Gaussian probability density function of the vertical velocity. For elevated terrain AERMOD incorporates the concept of the critical dividing streamline height, in which flow below this height remains horizontal, and flow above this height tends to rise up and over terrain. AERMOD also uses the advanced PRIME algorithm to account for building wake effects. AERMOD input data options are listed below based on the use of the default (DFAULT) setting and following USEPA modeling guidance documents.

- Stack tip downwash
- Calm and missing meteorological data processing
- Elevated terrain effects
- No exponential decay, no gas/particle deposition, and no dry/wet depletion

- Rural dispersion

When modeling NO_2 with the Ozone Limiting Method (OLM) or Plume Volume Molar Ratio Method (PVMRM), the DFAULT setting cannot be used but the model will be allowed to default to all of the other settings above.

Flagpole receptors are not proposed to be used (ground level concentrations will be calculated). AERMAP will be used to calculate receptor elevations and hill height scales for all receptors from the National Elevation Dataset (NED) in accordance with USEPA guidance. Selection of the receptor grids is discussed below.

<u>NO_2 Modeling Analyses:</u> Annual NO_2 concentrations will be calculated using the Ambient Ratio Method (ARM), adopted in Supplement C to the *Guideline on Air Quality Models* (USEPA, 1994). The Guideline allows a nationwide default conversion rate of 75% for annual NO_2/NO_x ratios. It is expected that 1-hour NO_2 concentrations will be evaluated with the ARM and a default conversion factor of 80% for 1-hour NO_2/NO_x ratios.

However, if necessary to assess 1-hour NO_2 concentrations for comparison with the CAAQS and NAAQS, either the ozone limiting method (OLM) or plume volume molar ratio method (PVRMR) will be used along with the temporal pairing of modeled NOx concentrations with concurrent hourly background ozone from the El Rio monitoring site. The ozone data will be based on the same years as the AERMOD meteorology data. The ozone data will first be processed to remove missing data.

In addition to the above methodologies, compliance with the 1-hour NO_2 CAAQS and NAAQS will also include the following methods in accordance with USEPA and CAPCOA guidance documents:

- The five-year average of maximum annual NO_2 impacts (without background) will be used for assessing SILs for the 1-hour NAAQS.
- In-stack NO_2/NO_x ratios will be based on the maximum USEPA default value of 0.50, or alternately equipment-specific data, the data contained in the CAPCOA document, or the most recent updated data provided on the USEPA SCRAM modeling website.
- AERMOD-default ambient equilibrium NO_2/NO_x ratio of 0.9 will be used.
- If OLM is used, the option OLMGROUP ALL will be used.

As summarized in the CAPCOA Guidelines as well as through USEPA Policy Memorandum, OLM/PVMRM is proposed based on five selected criteria:

1. **The model has received a scientific peer review:**

As noted in the USEPA's June 2010 guidance document, because AERMOD is the preferred model for dispersion for a wide range of applications, the alternative model demonstration for use of the OLM/PVMRM options within AERMOD focuses on the treatment of NOX chemistry within the model, and does not need to address basic dispersion algorithms within AERMOD. The chemistry for OLM/PVMRM has been peer-reviewed, as noted by the documents posted on the USEPA's Support Center for Regulatory Air Modeling web site. The posted documents include *Sensitivity Analysis of PVMRM and OLM in AERMOD* (MACTEC, 2004) and *Evaluation of Bias in AERMOD-PVMRM* (MACTEC, 2005). Both documents indicate that the models appear to perform as expected.

2. **The model can be demonstrated to be applicable to the problem on a theoretical basis:**

As noted in the document entitled "Sensitivity Analysis of PVMRM and OLM In AERMOD" prepared by Roger W. Brode "This report presents results of a sensitivity analysis of the PVMRM and OLM options for NO_x to NO_2 conversion in the AERMOD dispersion model. Several single source scenarios were examined as well as a multiple-source scenario. The average conversion ratios of NO_2/NO_x for the PVMRM option tend to be lower than for the OLM option and for the Tier 2 option or the Ambient Ratio Method which has a default value of 0.75 for the annual average. The sensitivity of the PVMRM and OLM options to emission rate, source parameters and modeling options appear to be reasonable and are as expected based on the formulations of the two methods. For a given NO_x emission rate and ambient ozone concentration, the NO_2/NO_x conversion ratio for PVMRM is primarily controlled by the volume of the plume, whereas the conversion ratio for OLM is primarily controlled by the ground-level NO_x concentration.

Overall the PVMRM option appears to provide a more realistic treatment of the conversion of NO_x to NO_2 as a function of distance downwind from the source than OLM or the other NO_2 screening options (Hanrahan, 1999a; Hanrahan, 1999b). No anomalous behavior of the PVMRM or OLM options was identified as a result of these sensitivity tests."

Based on this report for both OLM/PVMRM appear to be applicable to the problem of NO_2 formation and as noted by the author provides a better estimation of NO_2 impacts compared to other screening options (Tier 1 and 2).

3. **The databases which are necessary to perform the analysis are available and adequate:**

The data needed to conduct an OLM/PVMRM run with hourly (either concurrent or seasonal) background NO_2 data are hourly meteorological data, hourly ozone data, hourly NO_2 data, and in-stack NO_2/NO_x ratios. The hourly ozone and meteorological data exist for the same time period at the same monitoring site operated by the VCAPCD.

The EL Rio monitoring site is located relatively close to the proposed project location and would be expected to be representative with respect to ambient concentrations and meteorology. The site collects and records NO_x/NO_2, ozone, PM10 and PM2.5 along with surface meteorology which includes wind speed, wind direction, temperature, relative humidity, and solar radiation. Both the proposed project location and monitoring site are located in predominately agricultural/rural areas at some distance from the Pacific Ocean. F or these reasons, the monitoring site is representative of the modeling area where reactive photochemistry will occur most extensively.

4. **Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates:**

   As noted in *Evaluation of Bias in AERMOD-PVMRM* (MACTEC, 2005), which was prepared by Roger W. Brode, PVMRM has been judged to provide unbiased estimates based on criteria that are comparable to, or more rigorous than, evaluations performed for other dispersion models. At the present time no assessment of bias has been conducted for the OLM algorithm. It has been shown in the sensitivity analysis that OLM provides similar, but slightly more conservative, results than PVMRM. Therefore it is assumed that OLM would also provide an unbiased estimate of the modeled concentrations.

5. **A protocol on methods and procedures to be followed has been established.**
   The methods and procedures outlined in this protocol are proposed for implementation.

<u>Fumigation Modeling:</u> The AERSCREEN model will be used to evaluate inversion breakup fumigation impacts for all short-term averaging periods (24 hours or less). The methodology outlined in EPA-454/R-92-019 (Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised) will generally be followed for this analysis.

Impacts due to inversion breakup fumigation will be determined using AERSCREEN with all meteorological conditions and ignoring terrain at the distance of the maximum fumigation concentration. The fumigation concentration will be compared to the maximum AERSCREEN concentration under normal dispersion for all meteorological conditions for flat terrain for all short-term averaging times. The maximum AERSCREEN fumigation impact will also be compared to the maximum AERMOD impact results for the refined analyses. If fumigation impacts are less than either the flat terrain AERSCREEN maxima under normal dispersion or the AERMOD refined modeling results, no further analysis is required based on Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019).

If fumigation impacts exceed AERSCREEN/AERMOD maxima, then fumigation impacts will be used for the evaluation of impacts as compared to the NAAQS and CAAQS.

GEP Stack Height and Downwash: Stack locations and heights and building locations and dimensions will be input to BPIP-PRIME. The first part of BPIP-PRIME determines and reports on whether a stack is being subjected to wake effects from a structure or structures. The second part calculates direction-dependent "equivalent building dimensions" if a stack is being influenced by structure wake effects. The BPIP-PRIME output is formatted for use in AERMOD input files.

Receptor Selection: Receptor and source base elevations will be determined from United States Geological Survey (USGS) National Elevation Dataset (NED) The DEM data will be processed with the USEPA-model AERMAP for the receptor locations selected. All coordinates (both sources and receptors) will be referenced to UTM North American Datum 1983 (NAD83, Zone 11).

Receptor grids with less than 100-meter spacing between adjacent receptors will use 1/3-arcsecond (~10 meter) NED data. Receptor grids with spacing between adjacent receptors of 100 meters or greater may utilize 1-arcsecond (~30 meter) NED data. The NED files will extend beyond the receptor grid boundaries being evaluated as appropriate for the hill slope factors.

Cartesian coordinate receptor grids will be used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. For the full impact analyses, a nested grid will be developed to fully represent the initial location and extent of significance area(s) and maximum impact area(s). The nested grid will be comprised of the following and are presented in Figures 3 (coarse grids) and 4 (fine grids):

- Receptors will be placed along the proposed project fenceline with a spacing of about 10 meters or less between adjacent receptors.
- The downwash receptor grid with a receptor spacing of 20 meters will extend from the project fence line out to 500 meters from the project.
- An intermediate receptor grid with 100-meter receptor spacing will extend from the downwash receptor grid out to 1000 meters from the project.
- The first coarse receptor grid with 200 meter receptor spacing will extend from the intermediate receptor grid outwards to five (5) kilometers (km) from the project in all directions.
- The second coarse grid with 500 meter receptor spacing will extend out ten (10) km from the project in all directions.
- When maximum impacts occur in areas outside the 20 meter spaced receptor grid, additional refined receptor grids with 20 meter resolution will be placed around the maximum impacts and extended as necessary to determine maximum impacts.

Ambient concentrations within the facility fence line will not be calculated.

Ambient Air Quality Impact Analyses: In evaluating the impacts of the proposed project on ambient air quality, ADI will model the ambient impacts of the project, add those impacts to background concentrations, and compare the results to the state and national ambient standards for SO_2, NO_2, PM_{10}, $PM_{2.5}$, and CO. The project impacts will also be compared to the USEPA modeling significance levels.

In accordance with USEPA guidance (40 CFR part 51, Appendix W, Sections 11.2.3.2 and 11.2.3.3), the highest modeled concentration will be used for comparison with the SILs and includes short-term CO and PM10 NAAQS and most annual NAAQS. Based on the statistical form of the standards, 1-hour NO_2, 1-hour SO_2, 24-hour PM2.5, and annual PM2.5 where the five-year average of the maximum short-term or the average annual impacts can be used for comparison to the SILs.

The highest modeled concentration will be used to demonstrate compliance with all short-term and annual CAAQS and the applicable NAAQS. Compliance with all short-term and long-term NAAQS will be assessed in a form consistent with the statistical nature of the NAAQS (see 40 CFR 50).

All NO_2 impacts will likely be calculated using ARM (0.80 and 0.75 for 1-hour and annual impacts) or OLM/PVMRM (for 1-hour impacts if required) for purposes of comparison to SILs and AAQS.

Cumulative Impact Assessment: To demonstrate that the emissions from the proposed projects will not cause or contribute to a violation of any AAQS, a multi-source cumulative modeling analysis will be conducted in accordance with VCAPCD and CEC requirements for all applicable pollutants and averaging times. This analysis will consider both the existing background concentrations, as established by the applicable ambient monitoring data, and the contribution from additional sources which have recently been permitted and which might not be reflected by the existing monitoring data.

The cumulative modeling analysis will be performed at a later date after consultation with the applicable agencies to determine the sources to be modeled and the modeling methodologies to be employed.

Screening Health Risk Assessment: A screening health risk assessment will be conducted to evaluate air toxics. The latest version of the Health Risk Assessment Program (HARP version 2.03) and the HARP On-Ramp will be used to characterize risks from the proposed facility. These models, along with options for their use and how they are used, are discussed below. The screening health risk assessment will be conducted in accordance with the procedures developed by the California Air Resources Board and the Office of Environmental Health Hazard Analysis.

The HARP program is a tool that assists with the programmatic requirements of the Air Toxics Hot Spots Program, and it can be used for preparing health risk assessments for other related programs such as air toxic control measure development or facility permitting applications. HARP is a computer based risk assessment program, which combines the tools of emission inventory database, facility prioritization, air dispersion modeling, and risk assessment analysis. Use of HARP promotes statewide consistency in the area of risk assessment, increases the efficiency of evaluating potential health impacts, and provides a cost effective tool for developing facility health risk assessments. HARP may be used on single sources, facilities with multiple sources, or multiple facilities in close proximity to each other.

The HARP On-Ramp program will be used to convert the AERMOD output files into a form that can be used by HARP. The HARP On-Ramp program is basically a post-processor that will take ASCII post files from AERMOD and process these files to calculate acute, chronic, and cancer impacts, identical to the methods used in the current version of HARP.

The screening health risk assessment will be carried out in three steps. First, emissions of toxic air pollutants from the project will be calculated. Next, the HARP On-Ramp subroutine will be used to convert the maximum AERMOD concentration at each receptor due to the operation of the proposed project. A separate analysis will be conducted for construction generated PM_{10}, as per CEC requirements. The high-resolution receptor grids as derived from the facility AERMOD modeling will then be used in HARP. Finally, the HARP will be used to evaluate acute, chronic and cancer risks through inhalation and non-inhalation pathways based upon the maximum predicted concentration at each receptor. Some of the assumptions used in running the HARP program will be set as follows:

- Emission rates for non-criteria pollutants will be based upon the expected fuel use of the sources.
- Number of residents affected will be based upon the updated 2010 population data for those census tracts or portions of census tracts, which lie within the maximum impact receptor radius of the proposed facility.
- Number of workers affected will be based upon the county average percentage of non-farm workers as compared to the total county population in 2010. This average will be applied to all affected census tracts.
- Deposition velocity is taken to be 0.02 m/s, as recommended by ARB for controlled sources.

The receptor grids used for the HARP risk analyses are similar to those used for the refined modeling, with the addition of sensitive receptors such as schools, day care centers, hospitals, and care facilities. In addition, the point of maximum impact (PMI), maximally exposed individual resident (MEIR), and the maximally exposed individual worker (MEIW) will be shown. A complete list of the discrete sensitive receptors within 1 mile of the facility will be included in the application as well as census tract population data, census tract maps and affected tracts within 6 miles of the facility.

The HARP program results for acute and chronic inhalation and chronic non-inhalation exposures, cancer burden and individual cancer risk (workplace and residential) for the combustion sources will be summarized. Separate calculations will be shown for each type of exposure and risk.

CEC Construction Impacts Analysis: The potential ambient impacts from air pollutant emissions during the construction of the project will be evaluated by air quality modeling that will account for the construction site location and the surrounding topography; the sources of emissions during construction, including vehicle and equipment exhaust emissions; and fugitive dust. Fugitive dust emissions from the construction of the project result from dust entrained during excavation and grading at the construction site; dust entrained during onsite travel on paved and unpaved roads and across the unpaved construction site; and wind erosion of areas disturbed during construction activities. Heavy equipment exhaust combustion emissions result from (1) exhaust from the heavy equipment used for excavation, grading, and construction of onsite structures; exhaust from diesel welding machines, gasoline-powered generators, air compressors, and water pumps; and exhaust from diesel and gasoline-powered trucks used onsite.

Emissions from the various construction phases will be modeled as appropriate to determine the worst-case emissions and impacts. The same USEPA-approved model (AERMOD), receptor grids, modeling options (with the exception of the FASTALL keyword to reduce model run time), and meteorological data as described earlier for Project operations will be used to estimate ambient impacts from construction emissions. The construction site in the modeling analysis will be represented as either area or volume sources for fugitive dust emissions and as area or point sources for combustion emissions.

FINAL MODELING SUBMITTAL

As part of the final modeling analyses, the VCAPCD and CEC will be supplied with the following materials:

- Figure of the local site area taken from nearby US Geological Survey (USGS) 7½′ (1:24,000) map(s) or aerial photos showing the facility, property fenceline, and nearby receptors;
- Figure of the regional area taken from USGS maps showing the outline of receptor grids modeled;

- All modeling outputs (including BPIP and meteorological files) on CD-ROM disc; and
- Figure showing the building identifiers in the BPIP run(s) and a plot plan.

Figure 1

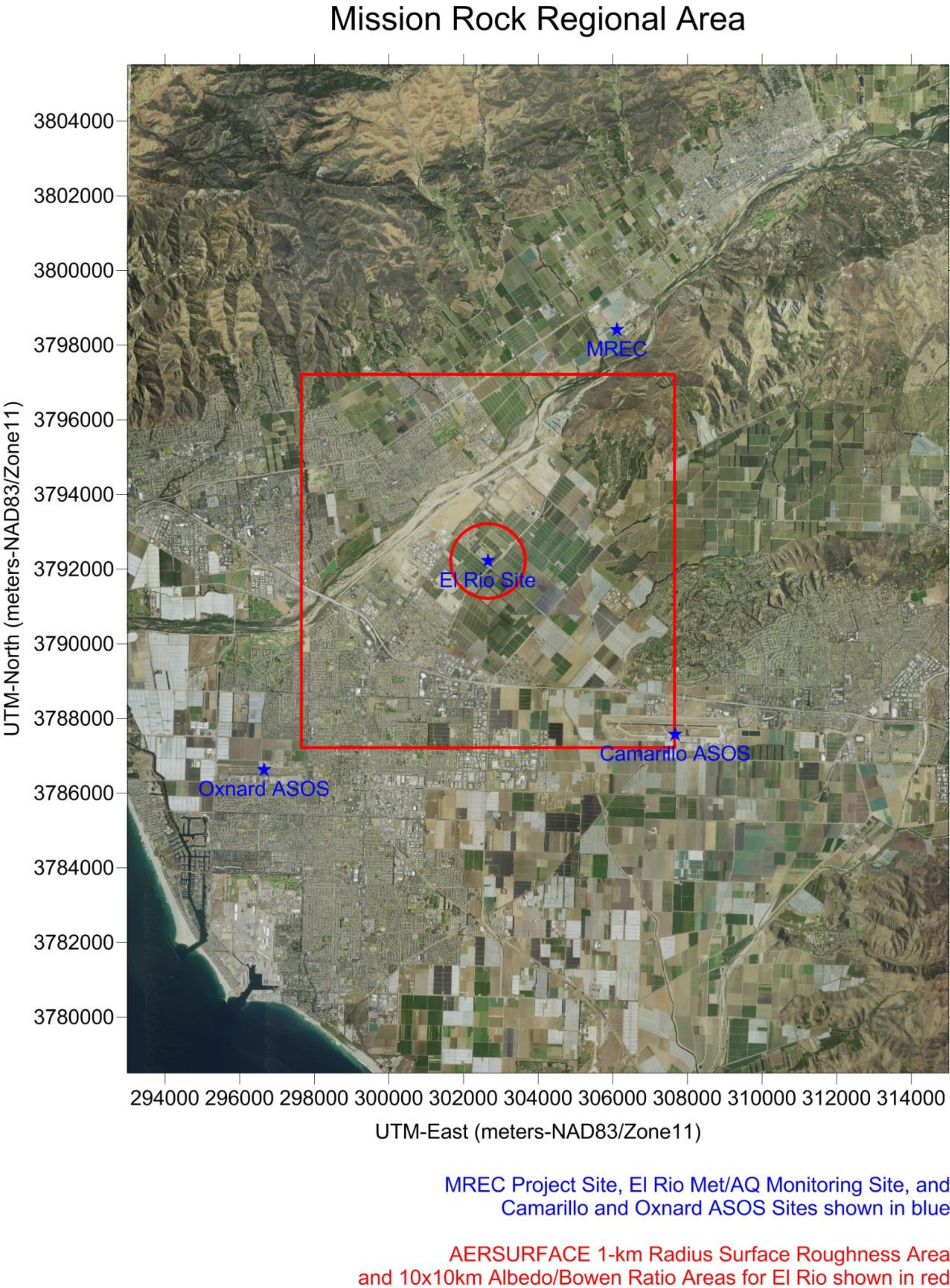

Mission Rock Regional Area
3804000
3802000
3800000
3798000
3796000
3794000
3792000
3790000
3788000
3786000
3784000
3782000
3780000
UTM-North (meters-NAD83/Zone11)
MREC
El Rio Site
Camarillo ASOS
Oxnard ASOS
294000 296000 298000 300000 302000 304000 306000 308000 310000 312000 314000
UTM-East (meters-NAD83/Zone11)
MREC Project Site, El Rio Met/AQ Monitoring Site, and
Camarillo and Oxnard ASOS Sites shown in blue
AERSURFACE 1-km Radius Surface Roughness Area
and 10x10km Albedo/Bowen Ratio Areas for El Rio shown in red

Figure 2

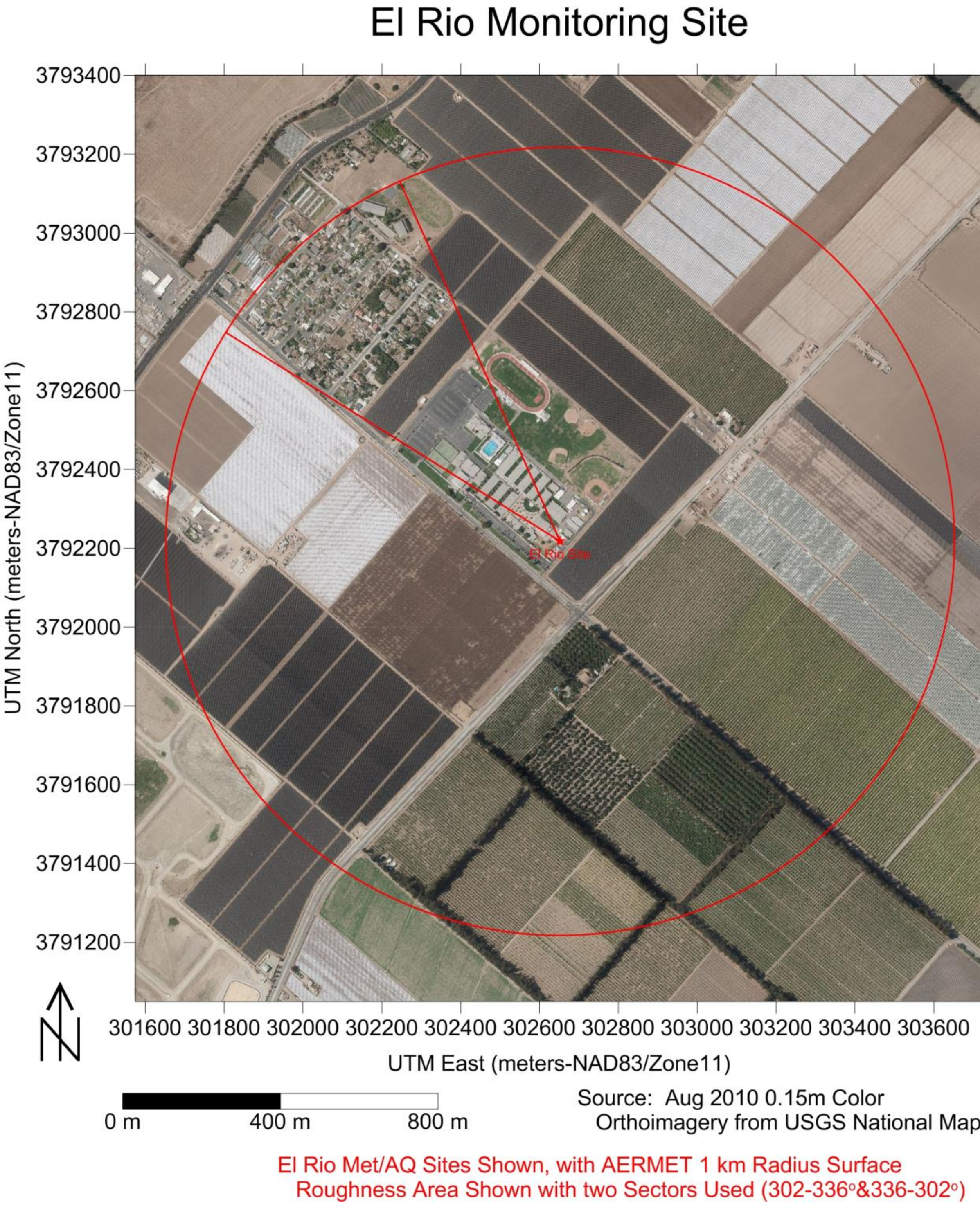

El Rio Monitoring Site
3793400
3793200
3793000
3792800
3792600
3792400
3792200
3792000
3791800
3791600
3791400
3791200
UTM North (meters-NAD83/Zone11)
El Rio Site
301600 301800 302000 302200 302400 302600 302800 303000 303200 303400 303600
UTM East (meters-NAD83/Zone11)
0 m
400 m
800 m
Source: Aug 2010 0.15m Color Orthoimagery from USGS National Map
El Rio Met/AQ Sites Shown, with AERMET 1 km Radius Surface Roughness Area Shown with two Sectors Used (302-336°&336-302°)

Figure 3

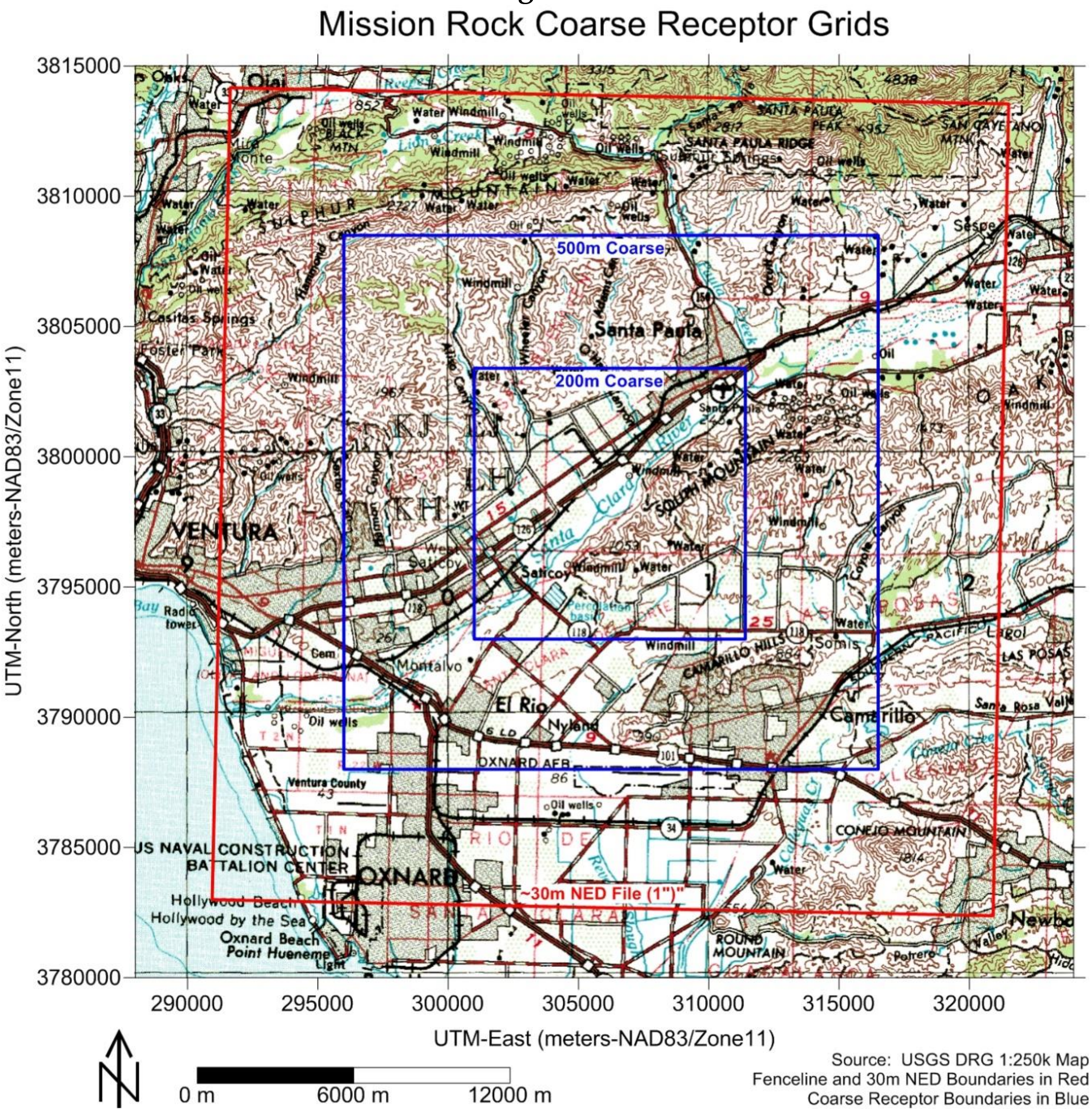
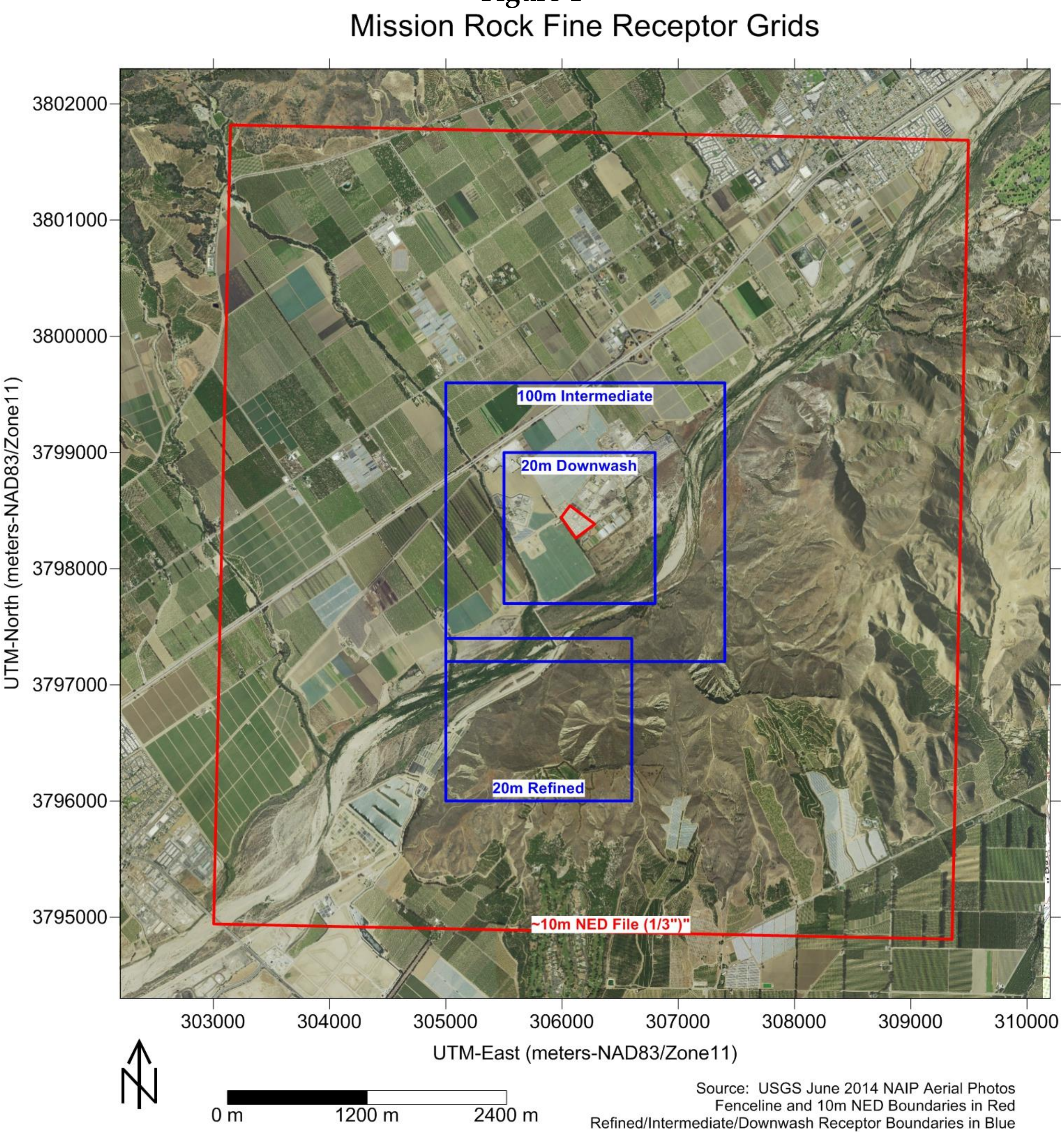

Mission Rock Coarse Receptor Grids
500m Coarse
200m Coarse
~30m NED File (1")"
UTM-North (meters-NAD83/Zone11)
UTM-East (meters-NAD83/Zone11)
3815000
3810000
3805000
3800000
3795000
3790000
3785000
3780000
290000
295000
300000
305000
310000
315000
320000
0 m
6000 m
12000 m
Source: USGS DRG 1:250k Map
Fenceline and 30m NED Boundaries in Red
Coarse Receptor Boundaries in Blue

Figure 4


Mission Rock Fine Receptor Grids
100m Intermediate
20m Downwash
20m Refined
~10m NED File (1/3")"
UTM-North (meters-NAD83/Zone11)
UTM-East (meters-NAD83/Zone11)
3802000
3801000
3800000
3799000
3798000
3797000
3796000
3795000
303000
304000
305000
306000
307000
308000
309000
310000
N
0 m
1200 m
2400 m
Source: USGS June 2014 NAIP Aerial Photos
Fenceline and 10m NED Boundaries in Red
Refined/Intermediate/Downwash Receptor Boundaries in Blue