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SUPPLEMENTAL RESPONSES TO CEC STAFF DATA REQUEST SET 2 (4-8, 10, AND 12-20)

CA3 Backup Generating Facility (21-SPPE-01)

SUBMITTED TO: CALIFORNIA ENERGY COMMISSION
SUBMITTED BY: **Vantage Data Centers**

August 19, 2021

DAYZEN LLC

INTRODUCTION

Attached are Vantage Data Centers (VDC) Supplemental Responses to California Energy Commission (CEC) Staff Data Request Set No. 2 (4-8, 10, and 12-20) for the CA3 Backup Generation Facility (CA3BGF) Application for Small Power Plant Exemption (SPPE) (21-SPPE-01). Staff issued Data Request Set No. 2 on June 28, 2021. VDC provided Initial Responses on July 21, 2021. However, after Staff issued Data Request Set No. 2, the City of Santa Clara identified during its Project Clearance Committee (PCC) review that the perimeter roadway on the eastern side of the project encroached on a 15-foot landscape setback requirement. Therefore, as described in VDC's Initial Responses to Data Request Set 2, the generator yard was reconfigured by relocating 8 generators to allow the perimeter road to avoid encroachment on the landscape setback. Therefore, VDC instructed its consultants to revise the air quality modeling to account for the slight modification of the generator locations and to incorporate the information requested in the Air Quality Data Requests in Set 2.

Therefore, these Supplemental Data Responses address the original Air Quality Data Requests for Set 2 and account for the modifications to the locations of the 8 generators within the modified generator yard.

For context, the text of the Background and Data Request precede each Data Response. Also, the tables referred to in the Data Responses are included at the end of the written responses.

AIR QUALITY AND GREENHOUSE GAS EMISSIONS

BACKGROUND

The Project Description (p.2-7) states that manufacturer specification sheets for the proposed generators and ratings-related evidence would be provided in SPPE Application Appendix A-1. Staff cannot locate this information in Appendix A-1, the NOx Modeling Report [TN# 237423]. Engine manufacturer and emissions control device specifications sheets should be provided.

BACKGROUND

Staff needs additional information to clarify the Potential To Emit (PTE) of the project in the context of the District's June 3, 2019 policy for emergency backup power generators.

DATA REQUEST

4. Please provide emission calculations to disclose the PTE for the project, considering the 2019 District policy to include emissions resulting from emergency operation of 100 hours per year per standby generator, in addition to the proposed levels of permitted emissions for readiness testing and maintenance.

RESPONSE TO DATA REQUEST 4

The table below presents the annual emissions for the project assuming 35 hours of operation for testing and maintenance purposes, plus an additional 100 hours of emergency operation, consistent with BAAQMD's June 3, 2019 policy for emergency backup power generators. Consistent with BAAQMD permitting methods, for the purposes of emissions estimation the generators are assumed to run at 100% load. Because the applicant is proposing Tier IV generators with a Selective Catalytic Reduction (SCR) control device, the NOx annual emission estimate assumes that the first 15 minutes of operation of any run is uncontrolled while the SCR system is starting up. For the purpose of estimating emissions from testing and maintenance, the applicant assumed annual operation would consist of 35 individual 1-hour runs, each consisting of 15 minutes of uncontrolled emissions and 45 minutes of controlled emissions at 100% load. Practically, the bulk of the testing consists of monthly testing of 15 minutes at zero load. For emergency operations, the applicant assumed 15 minutes of uncontrolled emissions and 2 hours and 45 minutes of controlled emissions

for every three hours of operation. Information on the derivation of the emission factors in the table below can be found in Table 7 and Section 2.2.1 of Appendix A-2 of the SPPE Application.

Engine Horsepower	Quantity of Engines	Operational Hours per Engine per Year	Emissions by Pollutant			
			Pollutant	Uncontrolled Emission Factor (g/hp-hr)	Controlled Emission Factor (g/hp-hr)	Annual Emissions (tons/year)
4,043	44	135	NOx	5.1	0.5	28.7
			ROG	0.11	0.064	1.7
			CO	0.64	0.64	16.9
			PM10	0.07	0.02	0.5
			PM2.5	0.07	0.02	0.5
			CO2e	528	528	12,679[a]
Notes: [a] Value for CO2e presented in units of MT/year						

Background: Ambient Air Quality Impact Analysis For Construction

The applicant estimated construction-phase emissions (p.4-25 and in Appendix A-2 of the SPPE Application) and concluded the discussion of construction-phase impacts without quantifying criteria pollutant ambient air quality impacts. The evaluation indicates that construction sources are represented as a single area source (p.9 of Appendix A-2); however, the analysis does not include supporting calculations to show how the project construction emissions were translated into the single area source nor does the analysis show the concentrations of criteria air pollutants resulting from the analysis of the area source.

DATA REQUESTS

5. Please provide an ambient air quality impact analysis that confirms whether the construction-phase criteria pollutant emissions would comply with the California Ambient Air Quality Standards (CAAQS) and the National Ambient Air Quality Standards (NAAQS).

RESPONSE TO DATA REQUEST 5

The proposed project is in the jurisdiction of the BAAQMD for air permitting. The BAAQMD has published CEQA Guidelines[1] that provide suggested thresholds of significance for impacts from projects. These thresholds are based on regionwide modeling for attainment and levels that are considered to not affect the region's attainment status. The BAAQMD's thresholds for construction impacts are average daily emission rates for pollutants. Projects with average daily construction emissions below these levels are not expected to cause significant impacts. These emissions standards are relied upon by lead agencies throughout the Bay Area to determine significance. Comparison with these thresholds alone should be enough to determine significance of construction criteria air pollutant emissions, and an explicit analysis to show compliance with the NAAQS and CAAQS should not be necessary. However, we have performed this analysis to be responsive to this request.

An air dispersion modeling analysis was completed to analyze potential air quality impacts from construction activities for the project. To estimate off-property ambient concentrations, version (21112) of the AERMOD modeling system was used.[2] AERMOD is U.S. EPA's recommended air dispersion model for near-field (within 50 kilometers [km]) modeling analyses. AERMOD is appropriate for use in estimating ground-level, short-term ambient air concentrations resulting from non-reactive buoyant emissions from sources located in simple and complex terrain. This analysis was conducted using AERMOD's regulatory default settings.

Ambient concentrations were estimated using AERMOD in conjunction with information about the site, the locations of the emitting stacks, representative meteorological data, and nearby receptors. The North American Datum of 1983 (NAD83) of the Universal Transverse Mercator (UTM) Coordinate System (Zone 10) was used, which provides a constant distance relationship anywhere on the map or domain. The units of the coordinates are in meters.

The construction emissions used in this analysis include the exhaust emissions from the project's on-site off-road equipment, as well as the exhaust emissions from the project's off-site on-road sources up to 2,000 feet from the project boundary (see Table 5-1). These emissions were estimated in CalEEMod, following the methodology described in Section 2 of Appendix A-2 of the SPPE Application. This analysis does not include fugitive dust emissions. The BAAQMD CEQA Guidelines call for the use of its BMPs to reduce fugitive dust emissions to consider impacts from fugitive dust emissions less than significant. BAAQMD does not provide numerical thresholds for fugitive dust

[1] BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and- research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed: August 2021.

[2] The one exception to this is that the runs involving Plume Volume Molar Ratio Method (PVMRM) required the use of the prior version of AERMOD (19191), to avoid a glitch in version 21112 in which the background concentration is incorrectly doubled. Personal communication between Darren Wilton (Ramboll) and James Thurman (US EPA, OAQPS), dated July 28, 2021.

generated during construction. The construction of the proposed project would implement the BMPs consistent with the BAAQMD recommended BMPs to reduce fugitive dust emissions. Therefore, the BMPs would cause the construction to avoid the potential for generating substantial pollutant concentrations due to fugitive dust.

Maximum hourly emission rates were calculated by identifying the subphase with the maximum daily emissions from CalEEMod and dividing by 8 hours per day (see Table 5-2). The 24-hour emission rates were calculated by identifying the subphase with the maximum daily emissions from CalEEMod and dividing by 11 hours per day to account for the full construction workday (see Table 5-3). Annual emission rates were calculated using the maximum annual emissions and dividing by 4,015 hours per year (365 days per year x 11 hours per day) (see Table 5-4). The EMISFACT option in AERMOD was utilized to indicate that construction activities would occur between the hours of 7 AM and 6 PM.

The construction emissions were represented as a single area source covering the project site. The area source for Phase 1 of construction was placed over the entire site, while the area source for Phase 2 of construction was placed over only the eastern side of the site. Given that the two construction phases will not overlap in time, each were modeled individually to determine which phase would result in the maximum ambient air quality impacts. The source parameters for the area sources are presented in Table 15 of Appendix A-2 of the SPPE Application.

Terrain elevations, land use assumptions, and meteorological data were incorporated into the analysis consistent with the descriptions in Appendix A-2 of the SPPE Application.

Concentrations were calculated at receptors placed along the facility fence line and on a Cartesian grid. For this analysis, receptors extending up to 500 meters from the fence line were modeled using the following resolutions:

- 10-meter resolution for fence line receptors; and
- 20-meter resolution extending from the fence line to 500 meters.

Tier 3 Plume Volume Molar Ratio Method (PVMRM) was used to demonstrate compliance with the 1-hour NO_2 NAAQS and CAAQS. As part of the recent Appendix W updates,[3] U.S. EPA incorporated the PVMRM as a regulatory default method for NO_2 modeling.

Hourly NO_2 data from 2018-2020 from the San Jose AQS Monitoring Station (Jackson, 06-085-0005) was used for background data, with missing data substituted in two stages. If one or two consecutive hours were missing, the values were replaced by the larger value of the preceding or following hour. If three or more consecutive hours were

[3] Available at: https://www.epa.gov/scram/2017-appendix-w-final-rule.

missing, the three-year (i.e., 2018-2020) 98th percentile value was used to substitute for the missing hours.

For all other pollutants, a more conservative approach was used to compare the modeled concentrations against the applicable air quality standards. For the other NAAQS, the average three-year (2018-2020) design value background concentration from the San Jose AQS Monitoring Station was added to the maximum modeled concentration and compared against the applicable standard. For the other CAAQS, the maximum 2018-2020 background concentration was added to the maximum modeled concentration and compared against the applicable standard. The background data used in this analysis is summarized in Table 5-5.

For all pollutants except 1-hour NO_2, concentrations were modeled using the X/Q ("chi over q") method, such that each phase has unit emission rates (i.e., 1 gram per second per area [$g/s/m^2$]), and the model estimates dispersion factors with units of [$\mu g/m^3$]/[g/s]. Emission rates for the appropriate averaging period were combined with the corresponding dispersion factors.

Tables 5-6 and 5-7 summarize the modeling results and comparison against the NAAQS and CAAQS. Maximum modeled ambient concentrations, when combined with background concentrations are less than the NAAQS and CAAQS for all pollutants, except the 24-hour $PM_{2.5}$ NAAQS, the annual $PM_{2.5}$ CAAQS, and the 24-hour and annual PM_{10} CAAQS. In these cases, the PM_{10} and $PM_{2.5}$ background concentrations exceed the standards on their own. Therefore, the project concentrations were compared against the respective significant impact levels (SILs). As shown in Table 5-8, the project concentrations are below the SILs and thus would not be considered significant. As a result, emissions from construction of this project would not cause or contribute to an exceedance of these standards.

Modeling files have been uploaded to the Air Quality Data Response Sharepoint site provided by CEC Staff.

6. Please support the analysis of construction-phase criteria pollutant impacts by demonstrating how the construction sources are represented in the dispersion model and how concentrations of criteria air pollutants during different averaging times are derived. This information should demonstrate how daytime-only construction activities are represented in the consideration of 1-hour and daily impacts.

RESPONSE TO DATA REQUEST 6

Please see Response to Data Request 5.

Background: Ambient Air Quality Impact Analysis Scope

The applicant provides a one-page summary of the Air Quality Impact Analysis for normal operations and dispersion modeling results (p.4-30 and in Table 4.3-9 of the SPPE Application). The applicant only presents potential impacts for 1-hour NO_2 concentrations. Modeling and ambient air quality impact analyses for other criteria pollutants (e.g., namely CO, PM10, PM2.5 and SO_2) and annual-average NO_2 impacts are also needed to show compliance with all the CAAQS and NAAQS.

DATA REQUEST

7. Please provide an ambient air quality impact analysis for CO, PM10, PM2.5 and SO_2, and for annual average NO_2 impacts during typical readiness and maintenance testing to demonstrate compliance with the CAAQS and the NAAQS.

RESPONSE TO DATA REQUEST 7

An air dispersion modeling analysis was completed to analyze potential air quality impacts from CO, PM_{10}, $PM_{2.5}$, SO_2, and annual NO_2 during typical readiness and maintenance testing. In addition, the prior 1-hour NO_2 modeling was updated to reflect a change in the emission source configuration and to use the most recent three years of background data (2018-2020).

For this analysis, two readiness and maintenance testing scenarios were evaluated. The first scenario represents the proposed project's monthly generator testing. During these tests, up to four generators will be operated concurrently at 0% load[4] for up to 15 minutes. These tests will solely be conducted at 0% load; therefore, no other load scenarios were evaluated. The second scenario represents the proposed project's annual generator testing. These tests are conducted on individual generators once per year at a series of stepped loads up to 100% load. All discrete loads levels for which emissions data is available (i.e., 10%, 25%, 50%, 75%, and 100%) were analyzed to identify the potential worst-case ambient air quality impacts.

The modeling approach used in this analysis is consistent with the methods described in Appendix A-1 of the SPPE Application with the following exceptions:

- The emission source configuration has changed as a result of a comment received by the City of Santa Clara on [DATE]. A revised figure with the new source locations and naming convention is provided as Figure 7-1.

[4] 0% load emission factors are unavailable; therefore, emissions were estimated using 10% load emission factors as a surrogate.

- The building structure assumptions used for modeling downwash effects were updated to reflect the new emission source configuration and are provided in Table 7-1.
- Background concentrations were obtained from the AQS Monitoring Station in San Jose (Jackson, 06-085-0005), the nearest station to the facility, and updated to use values from the most recent three-years of data available (i.e., 2018-2020) (see Table 5-5).
- Emission rates and stack parameters for the monthly testing scenario were developed using values derived from the manufacturer spec sheet and are presented in Tables 7-2, 7-3, and 7-4.
- Emission rates and stack parameters for the annual testing scenario were similarly developed and are presented in Tables 7-5, 7-6, and 7-7.
- Receptors were modeled in a Cartesian grid extending out to 500 meters from the facility fence line using the following resolutions:
    - 10-meter resolution for fence line receptors; and
    - 20-meter resolution extending from the fence line to 500 meters.
- For the annual testing scenario, the Tier 3 PVMRM approach was used to demonstrate compliance with the 1-hour NO_2 NAAQS and CAAQS.
- For the monthly testing scenario, where groups of engines were evaluated as operating simultaneously, the Tier 3 Ozone Limiting Method (OLM) Group option was used for addressing source groups with multiple emission sources.
- The source groups for the monthly testing scenario, are summarized as follows:

Source Group	Source IDs
LIFESAFE	R2EG04, R2EG09, R3EG06, R3EG12
GROUPX01	R1EG01, R1EG02, R1EG03, R2EG01
GROUPX02	R2EG02, R2EG03, R2EG05, R2EG06
GROUPX03	R2EG07, R2EG08, R2EG10, R2EG11
GROUPX04	R2EG12, R2EG13, R2EG14, R2EG15
GROUPX05	R3EG01, R3EG02, R3EG03, R3EG04
GROUPX06	R3EG05, R3EG07, R3EG08, R3EG09
GROUPX07	R3EG10, R3EG11, R3EG13, R3EG14
GROUPX08	R3EG15, R3EG16, R3EG17, R3EG18
GROUPX09	R3EG19, R3EG20, R3EG21, R3EG22
GROUPX10	R3EG23, R3EG24, R3EG25, R3EG26

For all pollutants except 1-hour NO_2, concentrations were modeled using the X/Q method, such that each source has unit emission rates (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors with units of [µg/m^3]/[g/s]. Emission rates for the appropriate averaging period were combined with the corresponding dispersion factors and background data.

Tables 7-8 and 7-9 summarize the modeling results and comparison against the NAAQS and CAAQS. Maximum modeled ambient concentrations, when combined with background concentrations are less than the NAAQS and CAAQS for all pollutants, except the 24-hour $PM_{2.5}$ NAAQS, the annual $PM_{2.5}$ CAAQS, and the 24-hour and annual PM_{10} CAAQS. These PM_{10} and $PM_{2.5}$ background concentrations exceed the standards on their own. Therefore, the project concentrations were compared against the respective Significant Impact Levels (SILs). As shown in Table 7-10, the project concentrations are below the SILs and thus would not be considered significant. As a result, emissions from operation of this project would not cause or contribute to an exceedance of these standards.

Modeling files have been uploaded to the Air Quality Data Response Sharepoint site provided by CEC Staff.

BACKGROUND

The SPPE application shows certain assumptions for air quality impact analyses of the typical readiness and maintenance testing emissions (p.4-30) that need to be verified. Assumptions in the analysis appear to include having no more than a specific group of eight generator-engines in use at any one time, during any given hour of testing, and no more than 35 hours per year per engine for testing (p.4-26). The modeling assumes engines would be tested at 0% load. The modeling also presumes that routine readiness testing would be limited to occur within certain hours of the day, although this is not explicit in the application. Additionally, for impacts to be consistent with those predicted by the modeling files, the stacks should not have horizontal releases or rain-caps. Staff would like to verify that these project features and/or analytical assumptions can be made enforceable.

DATA REQUESTS

8. Please confirm that the applicant would request the District to require an enforceable limit on concurrent operation of standby engines during all readiness and maintenance testing scenarios so that no more than the prescribed groups of eight generators would operate for maintenance and testing at any given time.

RESPONSE TO DATA REQUEST 8

The revised modeling assumptions have been revised to one generator at a time for annual testing and 4 generators at a time for monthly testing. VDC agrees to request the District to include a permit condition to reflect these modeling assumptions.

10. Please confirm that the applicant would request the District to require an enforceable limit that would allow testing of standby engines only between the hours of 7 AM to 6 PM daily.

RESPONSE TO DATA REQUEST 10

The revised air quality modeling assumptions have been modified to allow testing of engines only between 7 AM and 5 PM daily. VDC agrees to request the District to include a permit condition to reflect this modeling assumption.

BACKGROUND

The impact analysis for NO_2 (in Table 4.3-9 of the SPPE Application; and in Appendix A-1) appears to address only one operational mode at 0% load (zero-load settings) for typical readiness and maintenance testing of the diesel backup generators. The proposed average daily NOx emissions of 193 lb/day (in Table 4.3-6) would be equivalent to 8 lb/hr NOx. However, the NO_2 modeling files appear to assume only 3.44 lb/hr of NOx per engine, at stack conditions that reflect lower-temperature and lower-velocity releases than assumed in health risk modeling files. As such, the NO_2 modeling may not reflect maximum potential hourly emissions or worst-case stack conditions.

The applicant does not provide evidence to demonstrate that a "zero-load" scenario of engine use would cause the highest concentrations of NO_2 or other pollutants because the NO_2 impact analysis is not supported by any screening analysis for other scenarios or modes of engine use at different load levels. The application does not tabulate the range of potential hourly emission rates per engine or the different stack temperature and velocity conditions needed to assess the impacts of the full range of expected engine loads.

To screen for worst-case hourly NO_2 impacts due to a full range of engine loads, NOx emissions from each of the engines at different loads and stack conditions would require evaluation using the ozone limiting method (OLM) to account for the contribution of background ozone and NO_2 levels that vary depending upon the hour of the impact.

DATA REQUESTS

12. Please tabulate the potential hourly emission rates per engine for each pollutant and tabulate the different stack conditions anticipated to occur at different engine loads representing a full range of engine loads up to 100%.

RESPONSE TO DATA REQUEST 12

Please see Tables 7-2 through 7-7 included with the Response to Data Request 7.

13. Please provide a screening evaluation of the ambient air quality impacts to identify the worst-case engine load-settings and tabulate the results of the screening results for each pollutant during use of the engines at a range of reasonably foreseeable load levels, including 100% load.

RESPONSE TO DATA REQUEST 13

Please see Tables 7-8 through 7-10 included with the Response to Data Request 7.

14. Please screen all engines and different load levels of engine use for worst-case hourly NO_2 impacts using OLM.

RESPONSE TO DATA REQUEST 14

As described in the Response to Data Request 7, for the monthly testing scenario, the OLM Group option was used to evaluate hourly NO_2 impacts. For the annual testing scenario, PVMRM, another Tier 3 approach that accounts for ozone-NO_2 interactions, was used to evaluate for worst-case hourly impacts for different load levels of engine use.

15. Please provide the results of the screening evaluation in a manner that lists the modeled source or source-groups, and the modeled years, that correspond with the worst-case modeled concentrations for each pollutant and each load-setting

RESPONSE TO DATA REQUEST 15

Please see Tables 7-8 through 7-10 included with the Response to Data Request 7.

BACKGROUND

The applicant's modeling files indicate that the evaluation the project's compliance with the 1-hour NO_2 CAAQS uses a default federal processing procedure for 1-hour NO_2 concentrations, which is automatically enabled in

AERMOD through the setting "POLLUTID NO2." Staff is concerned that this setting that is for federal NO_2 processing may have underestimated the highest 1-hour NO_2 concentrations in the evaluation of exceedances against the 1-hour NO_2 CAAQS. The background concentrations of NO_2 in the evaluation of the 1-hour NO_2 CAAQS should capture the maximum single-hour background concentration or the maximum seasonal hour-of-day values (SEASHR) for the most recent three years available.

DATA REQUESTS

16. Please confirm that use of the setting "POLLUTID NO2", as in the applicant's refined 1-hour NO_2 CAAQS analysis, provides a conservative result that matches or exceeds the result that would otherwise be obtained by setting "POLLUTID NO2 H1H." If not, please reevaluate 1-hour NO_2 impacts using "POLLUTID NO2 H1H."

RESPONSE TO DATA REQUEST 16

Although the model runs indicate that the "Pollutant NO2" setting was used for the 1-hour NO_2 modeling, VDC's consultant has confirmed that a post-processing script was used to obtain the appropriate modeling result for the 1-hour NO2 CAAQS analysis.

17. Please ensure that the screening and refined evaluation of 1-hour NO2 impacts in relation to the CAAQS captures either the maximum single-hour background concentration or the maximum seasonal hour-of-day values for the most recent three years available.

RESPONSE TO DATA REQUEST 17

In this recent revised round of modeling provided, the maximum single-hour background concentration during the hours in which the generators will be tested (i.e., 7 AM to 5 PM) was used to evaluate 1-hour NO_2 impacts in relation to the CAAQS. For evaluations of 1-hour NO_2 impacts against the NAAQS, seasonal hour-of-day background values were used.

18. Please support the selection of background NO_2 concentration values by submitting a copy of historical NO_2 monitoring data and the worksheet used in developing the seasonal hour-of-day values.

RESPONSE TO DATA REQUEST 18

A copy of the worksheet used to develop the seasonal hour-of-day values has been posted to the Air Quality Data Response Sharepoint site set u[p by CEC Staff (see file

named CA3 Data Requests Set 2 - DR18 - AQS.06-085-0005.20210727.NO2.xlsx). In that workbook, background NO_2 data can be found on the "AQS.06-085-0005.NO2" tab. The "S-by-H B" tab was processed using a python script where the seasonal-by-hour background values were determined. The output of the python script was used in the 1-hour NO_2 AERMOD input files.

BACKGROUND: ELECTRONIC FILES Inconsistencies

The SPPE application includes two technical reports related to air quality in Appendix A-1 (NOx Modeling Report [TN# 237423]) and Appendix A-2 (Technical Report AQIA [TN# 237381]). Both air quality reports were dated "March 2021" and prepared by Ramboll US Consulting, Inc. Portions of these reports appear to have been prepared before the final dispersion modeling results were completed. Electronic modeling output files submitted to staff by the applicant indicate that AERMOD runs were executed on and timestamped 4/27/21.

Staff is concerned that modeling output files produced by AERMOD seem to be missing or transferred incorrectly into Ramboll's "March 2021" reports.

- ***The technical report in Appendix A-2 claims that for CA3BGF operation, generators were modeled as if they could operate at any hour of the day (p.9), but the output files produced by AERMOD show testing limited to between 7 AM and 6 PM. The applicant's proposed hours of testing should be clarified.***
- ***Inconsistent building structure assumptions appear in the consideration of downwash effects, and these may lead to incompatible results among the different modeling runs. Operational phase modeling for health risks indicate 179 buildings were processed for downwash effects (BPIP.SUM file dated 2/16/2021); however, operational phase modeling for NO_2 indicates 223 buildings were processed for downwash effects (in BPIP.SUM file dated 3/15/2021). All operational phase modeling should reflect the same built environment.***
- ***Emergency generator stack parameters (exit temperatures, exit velocities) appear to be inconsistent between the modeling of NO_2 (Appendix A-1, Table B-2) and health risks (Appendix A-2, Table 15). The rationale for assuming different stack parameters is not clear.***

- ***The output file for 1-hour NO_2 impacts in folder "aermod.monthly.no2.8eg" shows the highest result related to the NAAQS for source-group "GROUP2AB," but the March 2021 NOx Modeling Report does not identify this source-group. The report should identify the source-group causing the maximum impact.***
- ***The output file for 1-hour NO_2 impacts in folder "aermod.monthly.no2.LSG" shows a result for source-group "G1LSG_BG" that doesn't appear in the March 2021 NOx Modeling Report, where the result for "GROUPLSG" related to the NAAQS is 186.35 µg/m^3 (Table B-5 of Appendix A-1, SPPE application). In contrast, "GROUPLSG" does not exist in the output file. The report should summarize the impacts of the modeled source-groups.***
- ***The 1-hour NO_2 impact of 175.84 µg/m^3 for "GROUPLSG" related to the CAAQS (Table B-6 of Appendix A-1, SPPE application) is presented with a background concentration of 161.87 µg/m^3. However, according to Table 3 of Appendix A-1 the CAAQS analysis includes the maximum 1-hour concentration plus the maximum hourly background concentration (168.87 µg/m^3). With the higher background, the sum of modeled result plus background would exceed the CAAQS of 339 µg/m^3. The report should provide a consistent presentation of 1-hour NO_2 modeled concentrations plus background concentrations for consideration against the CAAQS.***

To resolve each of these discrepancies, a close reevaluation and revision of the "March 2021" reports is recommended because staff cannot efficiently evaluate the project without relying on the information in the application, and we expect the application and supporting technical reports to accurately reflect the modeling details within the electronic files.

DATA REQUEST

19. Please verify that the air quality technical reports reflect the most up-to-date dispersion modeling results and revise the dispersion modeling and technical reports as necessary to resolve the discrepancies noted above and to reflect responses to these data requests.

RESPONSE TO DATA REQUEST 19

In this latest round of modeling provided, these discrepancies have been corrected as follows:

- The generators for the proposed project will only be tested from 7 AM to 5 PM. This schedule is reflected in the operational CAAQS/NAAQS modeling provided

in Response to Data Request 7 and the updated operational HRA modeling provided in Response to Data Request 20.

- Updated building structure assumptions reflecting the new emission source configuration are now consistent between the CAAQS/NAAQS modeling and the updated operational HRA modeling.
- Generator stack parameters are now consistent between the CAAQS/NAAQS modeling and the updated operational HRA modeling, and can be summarized as follows.

Load (%)	Stack Temperature (K)	Exhaust Volumetric Flow Rate (ft^3/min)	Release Height (m)	Stack Diameter (m)	Stack Velocity (m/s)
100	751.54	21938.8	10.09	0.559	42.22
75	725.32	17602.5			33.87
50	720.71	13692.5			26.35
25	685.37	8167.9			15.72
10	566.93	4910.8			9.45

- The source groups identified as resulting in the maximum air quality impacts in Tables 7-8 to 7-10 should be consistent with those shown in the modeling files posted to the Air Quality Data Response Sharepoint site provided by CEC Staff.

BACKGROUND: Health Risk Impacts

The application and supporting electronic files of modeling do not provide complete documentation of health risk results. This makes it difficult to determine whether the health risk results can be supported by substantial evidence. The application shows that during construction, annual average PM2.5 impacts (0.27 µg/m^3) would approach the threshold (0.3 µg/m^3), and during routine operation, the project could cause 9.48 excess cancer cases per million for residential receptors, compared to a threshold of 10 (in Tables 4.3-10 and 4.3-11, and in Appendix A-2). Staff needs supporting information to ensure transparency of the impacts as presented in the application. The following tables appear to be missing from the application: Appendix A-2, Table 20: Construction Health Risk Impacts, and Table 21: Operational Health Risk Impacts.

For staff to validate the results, staff needs to review how the modeled concentrations were used in estimating each chemical dose and the subsequent estimates of risk factors. The applicant may provide spreadsheet files showing live, embedded calculations to complete the review.

DATA REQUESTS

20. Please provide tables or spreadsheets with the embedded calculations live and intact showing the maximum modeled concentrations of the speciated chemicals that contribute to health risks at each of the maximally exposed receptors. To substantiate the chemical intake or dose, please tabulate for each maximally exposed receptor type: the concentration ($\mu g/m^3$) of each chemical contributing to cancer risk; the concentration and chronic hazard quotient for each chemical contributing to chronic hazard index, and the concentration and acute hazard quotient for each chemical contributing to acute hazard index.

RESPONSE TO DATA REQUEST 20

The operational HRA analysis for the proposed project was updated in response to the comments received under Data Requests 13 and 19, and to accommodate a change in the emission source configuration. The approach used in this analysis is consistent with the methods described in Appendix A-2 of the SPPE Application with the following exceptions:

- The emission source configuration has changed as a result of a comment received by the City of Santa Clara during the PCC review. A revised figure with the new source locations and naming convention is provided as Figure 7-1.
- The assumed operating hours for the generators have been changed from 24-hour per day to 10 hours per day (7 AM to 5 PM), consistent with the CAAQS/NAAQS modeling provided in Response to Data Request 7.
- All discrete loads levels for which emissions data is available (i.e., 10%, 25%, 50%, 75%, and 100%) were analyzed to identify the potential worst-case $PM_{2.5}$ annual average concentrations which correspond to the worst-base health risk impacts. That analysis is found in Table 7-8, where the greatest impact is at 100% load, with the second greatest impact at 25% load. Since it is impossible to run the generators at 100% load for the entire maximum run time, the HRA was run at 25% load for all engines for all hours. Even that is an overestimate of the impacts, as much of the run time will be at 0% load, which is characterized by the parameters for 10% load. The new modeled emission rates are provided in Table 20-1.

The procedures used for characterizing the risk impacts are consistent with those presented in Section 4 of Appendix A-2 of the SPPE Application. These include the Exposure Parameters, Speciation Values, and Toxicity Values provided in Tables 17, 18, and 19 of that report. Due to the amount of data involved in the analysis, the health risk calculations were performed in a python tool that incorporates regulatory calculations consistent with OEHHA 2015 Guidelines. The output from that tool is provided in a spreadsheet posted to the Air Quality Data Response Sharepoint site provide by CEC Staff (see file named CA3 Data Requests Set 2 – DR20 – HRA_Results.xlsx).

21. Please tabulate the construction and operational health risk results by listing the coordinates for each maximally exposed receptor type (residential, worker, school, daycare, and recreational).

RESPONSE TO DATA REQUEST 21

The results from the updated operational HRA and the prior construction HRA are provided in Tables 20-2 and 20-3, respectively. Note, because the applicant does not intend to operate the generators at a single load for the entire duration of the year, and a fair portion of operational hours will be at 0% load, cancer risk impacts are expected to be well below 10 in a million.

BACKGROUND: Sensitive receptors

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Sensitive individuals, such as infants, the aged, and people with specific illnesses or diseases, are the subpopulations which are more sensitive to the effects of toxic substance exposure.

BAAQMD recommends that any proposed project including the siting of a new TAC emissions source assess associated community risks and hazards impacts within 1,000 feet of the proposed project, and take into account both individual and nearby cumulative sources (that is, proposed project plus existing and foreseeable future projects). However, the applicant did not provide a list of sensitive receptors near the project site.

22. Please provide the list of all the sensitive receptors within 1,000 feet of the proposed project, including their names, types, and addresses.

RESPONSE TO DATA REQUEST 22

Section 3.3 of Appendix A-2 of the SPPE Application describes the types of sensitive receptor populations identified within a 1,000-meter (3,280-foot) radius of the CA3 Project site for the applicant's operational and construction health risk analyses. These include residents and a park directly south of the CA3 Project site. In addition, a search for nearby schools and daycare facilities was conducted and sensitive receptors were modeled at these locations. Figure 2 of Appendix A-2 presents the locations of these modeled off-site receptors, including residential sensitive receptors. The table below presents a list of the non-residential sensitive receptors within or just beyond a 1,000-foot radius of the CA3 Project site.

Receptor No.	Name	Type	Address	Latitude	Longitude
1	Bracher Elementary	School	2700 Chromite Drive	37.367444	-121.974815
2	Bracher Park	Recreation	2560 Alhambra Drive	37.369406	-121.976061
3	Kidoz Family Daycare	Daycare	2527 Pilot Knob Drive	37.367943	-121.977351
4	Patroni, Maria Eliana	Daycare	2568 Pebble Beach Drive	37.368406	-121.978485

23. Please also provide their coordinate or UTMs.

RESPONSE TO DATA REQUEST 23

Please see Response to Data Request 22.

24. Please also provide a map of these sensitive receptors.

RESPONSE TO DATA REQUEST 24

A map of the sensitive receptors within or just beyond a 1,000-foot radius of the CA3 Project site is presented at the end of these responses.

BACKGROUND: CUMULATIVE Health Risk Assessment

The BAAQMD CEQA Guidelines for assessing cumulative health risk impacts recommend investigating all sources of toxic air contaminants (TACs) within 1,000 feet of a proposed project. The SPPE Application only analyzed the health risk impacts related to the project itself. Staff needs the cumulative health risks evaluation to complete the environmental document. Because of the nearby railroad (CalTrain) and surrounding industrial stationary sources that could present elevated existing levels of TAC, staff requests information on TAC sources within 2,000 feet of the project fence-line.

DATA REQUESTS

25. Please contact the BAAQMD for information on the potential cumulative TAC health risks for all sources of TACs including railroad, highway, and stationary sources within 2,000 feet of the proposed project boundary.

RESPONSE TO DATA REQUEST 25

Stationary sources contributing health risks and hazard impacts within a 2,000 ft radius of the project site were determined using BAAQMD's updated CEQA Tool "Permitted Stationary Sources Risk and Hazards Map," [5] a GIS map which provides locations of stationary sources permitted by the District. A subsequent stationary source data request was submitted to the District to ensure the most recent health risk and hazard data had been identified. Appropriate distance multipliers provided by the BAAQMD CEQA Tool "Health Risk Calculator with Distance Multipliers" were applied to represent adjusted risk and hazard impacts that can be expected with farther distances from the sources of emissions. Mobile impacts were determined using BAAQMD's raster tools which provide impacts from major streets, highways, and railroads.[6] The tools developed by the District incorporate risk assessment procedures from the 2015 OEHHA Air Toxics Hot Spots Program Guidance.

[5] Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65. Accessed: August 2021.
[6] Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/2020_02_20-methodology-risk-and-hazards-screening-tool-pdf.pdf?la=en. Accessed: August 2021.

26. Please analyze the project's contribution to cumulative health risk impacts in conjunction with the impacts of the nearby sources reported by BAAQMD.

RESPONSE TO DATA REQUEST 26

Based on the stationary sources data available from the BAAQMD's CEQA tool and the mobile impacts available from BAAQMD's raster tools, Table 26-1 provides a summary of cumulative health risk impacts at the Maximally Exposed Individual Sensitive Receptor (MEISR) as part of the Project.

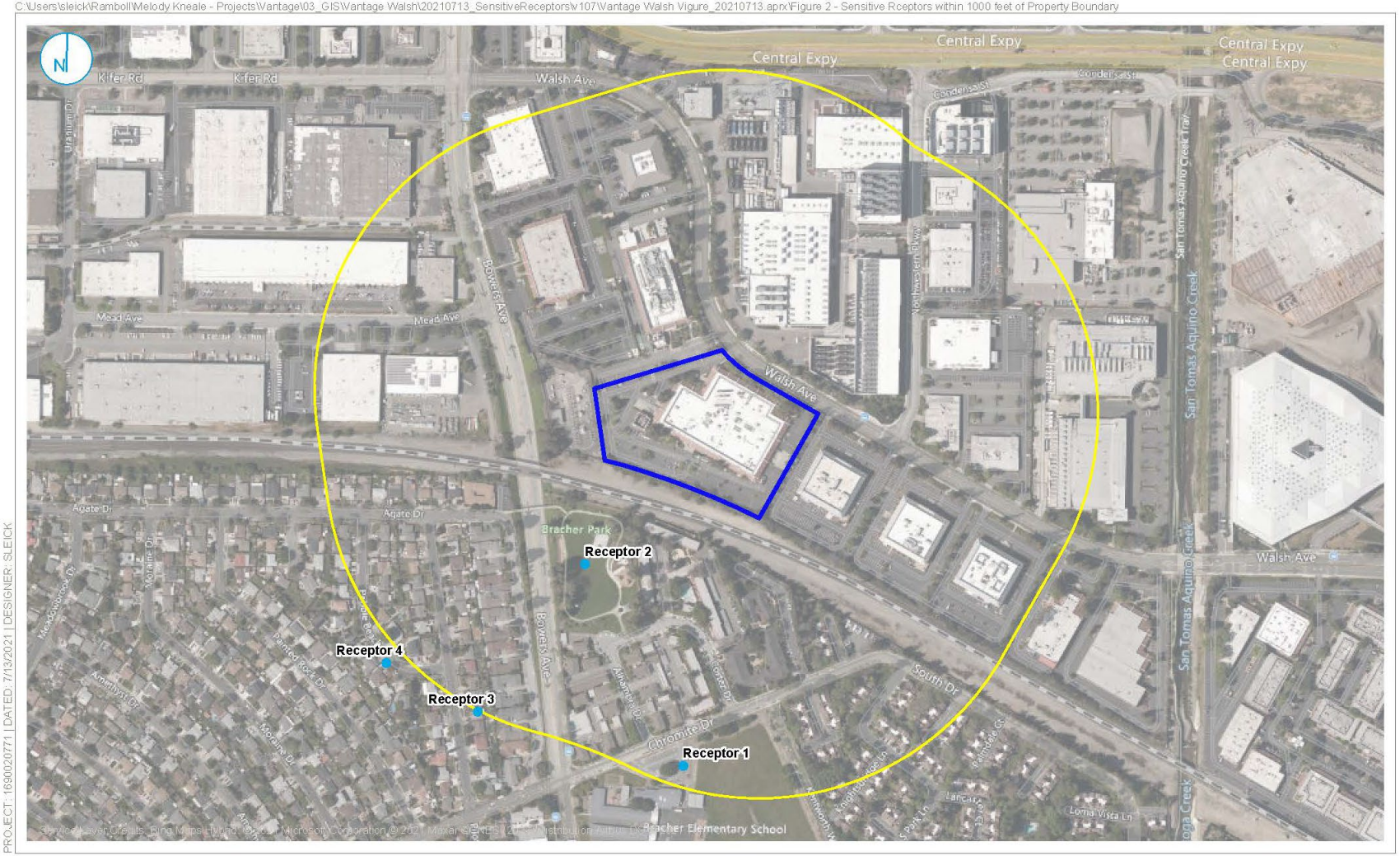
The cumulative health risk impact of the proposed project in combination with stationary and mobile sources within 2,000 ft of the project boundary account for an increased cancer risk of 133 in a million, chronic hazard index of 0.15, acute hazard index of 0.027, and annual $PM_{2.5}$ concentration of 1.3 ug/m^3. The cumulative cancer risk and $PM_{2.5}$ concentration are above the BAAQMD thresholds of 100 in a million and 0.8 ug/m^3, respectively. This exceedance is driven largely by the proximity of the MEISR to the nearby railroad (CalTrain). The exceedance is also impacted by the conservative nature of the cumulative analysis. BAAQMD CEQA guidelines and tools were developed to analyze the impacts from all stationary sources within 1,000 ft of the project site, rather than the 2,000 ft distance requested by the CEC. As a result, the distance multipliers do not account for the incrementally decreasing risk and hazard impacts from sources that are further than 1,000 ft from the MEISR, and are overestimates of the impact. Therefore, the total cumulative risk is overestimated.

27. Please provide a cumulative TAC health risks analysis to include all sources of TACs within 2,000 feet of the proposed project.

RESPONSE TO DATA REQUEST 27

Please see Response to Data Request 26.

C:\Users\sleick\Ramboll\Melody Kneale - Projects\Vantage\03_GIS\Vantage Walsh\20210713_SensitiveReceptors\v107\Vantage Walsh Vigure_20210713.aprx\Figure 2 - Sensitive Receptors within 1000 feet of Property Boundary



PROJECT: 1690020771 | DATED: 7/13/2021 | DESIGNER: SLEICK

LEGEND

- Facility Boundary
- 1,000-foot Facility Boundary Buffer
- Sensitive Receptors within Approximately 1,000 feet of Facility Boundary

0 235 470 Feet

SENSITIVE RECEPTORS WITHIN 1,000 FEET OF PROPERTY BOUNDARY VANTAGE CA3 CAMPUS

Vantage CA3
2590 Walsh Avenue
Santa Clara, California

FIGURE 1

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690020771 | DATED: 8/6/2021 | DESIGNER: DCW

- Facility Boundary
- Buildings & Structures
- Emergency Generators
- Emergency Generator Stacks
- Life Safety Generator Stacks

0 20 40 Feet

EMISSION SOURCE LAYOUT
VANTAGE CA3 CAMPUS

Vantage CA3
2590 Walsh Avenue
Santa Clara, California

FIGURE 7-1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Table 5-1
Project Construction Emissions - CAAQS/NAAQS Modeling
Vantage CA3 Project
Santa Clara, California

Construction and Emissions by Year and Phase

Phase	Subphase	Emissions Year	Source	Total Construction Emissions[1]					
				ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
				lb/yr					
Phase 1	Demolition	2022	On-Site Exhaust	9.2	40	466	0.78	1.2	1.2
			Off-Site Mobile Exhaust[2]	0.10	2.45	0.79	0.0083	0.0079	0.0075
			Fugitive Dust[2,3]	--	--	--	--	51	7.8
	Site Preparation	2022	On-Site Exhaust	2.3	10	104	0.20	0.32	0.32
			Off-Site Mobile Exhaust[2]	0.18	5.8	1.4	0.018	0.017	0.016
			Fugitive Dust[2]	--	--	--	--	42	23
	Grading	2022	On-Site Exhaust	2.9	13	142	0.24	0.38	0.38
			Off-Site Mobile Exhaust[2]	0.012	0.0077	0.088	0.0	0.0	0.0
			Fugitive Dust[2]	--	--	--	--	24	12
	Building Construction	2022	On-Site Exhaust	74	507	3,963	6.1	9.3	9.3
			Off-Site Mobile Exhaust[2]	5	69	42	0.3	0.2	0.2
			Fugitive Dust[2]	--	--	--	--	14	4
		2023	On-Site Exhaust	1.0	6.7	52	0.080	0.12	0.12
			Off-Site Mobile Exhaust[2]	0.062	0.69	0.51	0.0028	0.0017	0.0017
			Fugitive Dust[2]	--	--	--	--	0.18	0.050
	Paving	2023	On-Site Exhaust	3.9	17	244	0.34	0.52	0.52
			Off-Site Mobile Exhaust[2]	0.034	0.022	0.24	0.00070	0.00070	0.00070
			Fugitive Dust[2]	--	--	--	--	0.10	0.027
			Paving Emissions	4.0	--	--	--	--	--
	Architectural Coating	2023	On-Site Exhaust	0.54	2.3	33	0.060	0.080	0.080
			Off-Site Mobile Exhaust[2]	0.049	0.032	0.35	0.0014	0.00070	0.00070
			Fugitive Dust[2]	--	--	--	--	0.15	0.039
			Architectural Coating	2,614	--	--	--	--	--
Phase 2	Building Construction	2024	On-Site Exhaust	59	742	2,625	4.4	6.1	6.1
			Off-Site Mobile Exhaust[2]	2.5	29	20	0.14	0.06	0.06
			Fugitive Dust[2]	--	--	--	--	7.5	2.1
	Paving	2024	On-Site Exhaust	1.6	6.9	99	0.14	0.22	0.22
			Off-Site Mobile Exhaust[2]	0.01	0.01	0.1	0.0	0.0	0.0
			Fugitive Dust[2]	--	--	--	--	0.036	0.010
			Paving Emissions	--	--	--	--	--	--
	Architectural Coating	2024	On-Site Exhaust	0.30	1.3	18	0.020	0.040	0.040
			Off-Site Mobile Exhaust[2]	0.016	0.010	0.11	0.0007	0.0	0.0
			Fugitive Dust[2]	--	--	--	--	0.050	0.013
			Architectural Coating	2,326	--	--	--	--	--

Notes:

1. Construction emissions were estimated using CalEEMod® 2016.3.2.
2. Off-site on-road mobile exhaust and fugitive dust emissions have been limited to those within 2,000 feet of the project boundary.
3. Fugitive dust from demolition are based on CalEEMod® 2016.3.2 default emissions which include emissions from site removal of debris and onsite truck traffic on paved/unpaved roads. Consistent with BAAQMD guidelines, sources of fugitive dust emissions include construction related activities such as soil disturbance, grading, and material hauling emissions.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CO - carbon monoxide
ROG - reactive organic gases
NO_x - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
SO_2 - sulfur dioxide

Reference:

CAPCOA. 2017. California Emissions Estimator Model. Available at: http://www.caleemod.com.

Table 5-2
Construction 1-hr, 3-hr, and 8-hr CAAQS/NAAQS Model Emission Rates
Vantage CA3 Project
Santa Clara, California

Phase	Subphase	Emission Rate[1] [lb/hr]			Emission Rate[1] [g/s]		
		NO_x	CO	SO_2	NO_x	CO	SO_2
Phase 1	Demolition	2.65E-01	2.91E+00	4.93E-03	3.34E-02	3.67E-01	6.21E-04
	Site Preparation	3.98E-01	2.65E+00	5.45E-03	5.01E-02	3.33E-01	6.87E-04
	Grading	1.97E-01	2.22E+00	3.75E-03	2.48E-02	2.80E-01	4.72E-04
	Building Construction (2022)	3.17E-01	2.21E+00	3.52E-03	3.99E-02	2.78E-01	4.43E-04
	Building Construction (2023)	3.08E-01	2.20E+00	3.45E-03	3.88E-02	2.78E-01	4.35E-04
	Paving	1.19E-01	1.69E+00	2.37E-03	1.50E-02	2.13E-01	2.98E-04
	Architectural Coating	1.63E-02	2.32E-01	4.26E-04	2.06E-03	2.92E-02	5.37E-05
Phase 2	Building Construction	4.82E-01	1.65E+00	2.85E-03	6.07E-02	2.08E-01	3.59E-04
	Paving	8.66E-02	1.23E+00	1.75E-03	1.09E-02	1.55E-01	2.20E-04
	Architectural Coating	1.61E-02	2.30E-01	2.59E-04	2.03E-03	2.90E-02	3.26E-05
Phase 1 Maximum		**0.40**	**2.91**	**0.0055**	**0.050**	**0.37**	**0.00069**
Phase 2 Maximum		**0.48**	**1.65**	**0.0028**	**0.061**	**0.21**	**0.00036**
Phase 1 Modeled Emission Rate[2] ($g/s/m^2$)					1.86E-06		
Phase 2 Modeled Emission Rate[2] ($g/s/m^2$)					5.23E-06		

Notes:

[1.] Emission rates calculated using CalEEMod® emission outputs in pounds/year, divided by 365 days of construction per year, and 8 hours of assumed construction operation per day.

[2.] The 1-hour NO_2 runs were conducted with actual emissions which require units of $g/s/m^2$. The other pollutants were evaluated using X/Q runs, where the emission rate in g/s is applied outside of the model.

Abbreviations:

CO - carbon monoxide
g - gram
hr - hour
lb - pound
m^2 - meter squared
NO_x - nitrogen oxides
SO_2 - sulfur dioxide
s - second

Table 5-3
Construction 24-hr CAAQS/NAAQS Model Emission Rates
Vantage CA3 Project
Santa Clara, California

Phase	Subphase	Emission Rate[1] [lb/hr]			Emission Rate[1] [g/s]		
		SO_2	Exhaust PM_{10}	Exhaust $PM_{2.5}$	SO_2	Exhaust PM_{10}	Exhaust $PM_{2.5}$
Phase 1	Demolition	3.58E-03	5.67E-03	5.67E-03	4.51E-04	7.15E-04	7.14E-04
	Site Preparation	3.97E-03	6.13E-03	6.11E-03	5.00E-04	7.72E-04	7.70E-04
	Grading	2.73E-03	4.32E-03	4.32E-03	3.44E-04	5.44E-04	5.44E-04
	Building Construction (2022)	2.56E-03	3.79E-03	3.78E-03	3.22E-04	4.77E-04	4.76E-04
	Building Construction (2023)	2.51E-03	3.69E-03	3.69E-03	3.16E-04	4.65E-04	4.65E-04
	Paving	1.72E-03	2.63E-03	2.63E-03	2.17E-04	3.31E-04	3.31E-04
	Architectural Coating	3.10E-04	4.08E-04	4.08E-04	3.91E-05	5.14E-05	5.14E-05
Phase 2	Building Construction	2.07E-03	2.78E-03	2.78E-03	2.61E-04	3.51E-04	3.50E-04
	Paving	1.27E-03	2.00E-03	2.00E-03	1.60E-04	2.52E-04	2.52E-04
	Architectural Coating	1.88E-04	3.64E-04	3.64E-04	2.37E-05	4.58E-05	4.58E-05
Phase 1 Maximum		**0.0040**	**0.0061**	**0.0061**	**0.00050**	**0.00077**	**0.00077**
Phase 2 Maximum		**0.0021**	**0.0028**	**0.0028**	**0.00026**	**0.00035**	**0.00035**

Notes:
[1.] Emission rates calculated using CalEEMod® emission outputs in pounds/year, divided by 365 days of construction per year, and 11 hours of assumed construction operation per day.

Abbreviations:
g - gram
hr - hour
lb - pound
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
SO_2 - sulfur dioxide
s - second

Table 5-4
Construction Annual CAAQS/NAAQS Model Emission Rates
Vantage CA3 Project
Santa Clara, California

Phase	Subphase	Emissions[1] [lb/yr]		
		NO_x	PM_{10}	$PM_{2.5}$
Phase 1	Demolition	4.25E+01	5.25E+01	9.04E+00
	Site Preparation	1.59E+01	4.20E+01	2.29E+01
	Grading	1.26E+01	2.40E+01	1.25E+01
	Building Construction (2022)	5.76E+02	2.32E+01	1.32E+01
	Building Construction (2023)	7.39E+00	3.03E-01	1.72E-01
	Paving	1.71E+01	6.21E-01	5.47E-01
	Architectural Coating	2.35E+00	2.26E-01	1.19E-01
Phase 2	Building Construction	7.71E+02	1.37E+01	8.18E+00
	Paving	6.93E+00	2.56E-01	2.30E-01
	Architectural Coating	1.29E+00	8.98E-02	5.33E-02
	Phase 1 2022 Emissions	**647**	**142**	**58**
	Phase 1 2023 Emissions	**27**	**1.1**	**0.84**
	Phase 1 Max Annual Emissions	**647**	**142**	**58**
	Phase 2 Max Annual Emissions	**780**	**14**	**8.5**
	Phase 1 Average Daily Emissions (lb/hour)	**0.16**	**0.035**	**0.014**
	Phase 1 Average Daily Emissions (g/s)	**0.020**	**0.0044**	**0.0018**
	Phase 2 Average Daily Emissions (lb/hour)	**0.19**	**0.003**	**0.002**
	Phase 2 Average Daily Emissions (g/s)	**0.024**	**0.00044**	**0.00027**
	Phase 1 Modeled Emission Rate[2] ($g/s/m^2$)	7.53E-07		
	Phase 2 Modeled Emission Rate[2] ($g/s/m^2$)	2.11E-06		

Notes:

1. Emission rates calculated using CalEEMod® emission outputs in pounds/year, divided by 365 days of construction per year, and 11 hours of assumed construction operation per day.

2. The annual NO_2 runs were conducted with actual emissions which require units of $g/s/m^2$. The other pollutants were evaluated using X/Q runs, where the emission rate in g/s is applied outside of the model.

Abbreviations:

g - gram
hr - hour
lb - pound
m^2 - meter squared
NO_x - nitrogen oxides
PM_{10} - particulate matter less than 10 micro
$PM_{2.5}$ - particulate matter less than 2.5 micr
s - second

Table 5-5
Summary of Background Ambient Air Concentrations
Vantage CA3 Project
Santa Clara, California

Pollutant	Averaging Period	Units	Background Ambient Air Concentrations[1]			3-Year Average (2018-2020)	3-Year Maximum (2018-2020)
			2018	2019	2020		
NO_2	1-Hour (maximum)	ppb	86	60	52	66	86
	1-Hour (98th percentile)	ppb	59	52	45	52	59
	Annual Mean	ppb	12.04	10.63	9.65	10.77	12.04
CO	1-Hour	ppm	2.5	1.7	1.8	2.0	2.5
	8-Hour	ppm	2.1	1.3	1.5	1.6	2.1
SO_2 [2]	1-Hour	ppb	6.9	14.5	2.9	8.1	14.5
	1-Hour (99th percentile)	ppb	3.0	2.0	2.0	2.3	3.0
	3-Hour	ppb	6.9	14.5	2.9	8.1	14.5
	24-Hour	ppb	1.1	1.5	0.8	1.1	1.5
	Annual Mean	ppb	0.21	0.14	0.17	0.17	0.21
PM_{10}	24-Hour (maximum)	$\mu g/m^3$	115	75	134	108	134
	Annual Mean	$\mu g/m^3$	22.0	18.3	23.6	21.3	23.6
$PM_{2.5}$	24-Hour (98th Percentile)	$\mu g/m^3$	73	21	56	50	73
	Annual Mean	$\mu g/m^3$	12.9	9.1	11.5	11.2	12.9

Notes:

1. Background values were collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by US EPA.
2. The 1-hour maximum SO_2 background was conservatively used as the background value for the 3-hour SO_2 averaging period.

Abbreviations:

CO - carbon monoxide
NO_2 - nitrogen dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ppb - parts per billion
ppm - parts per million
SO_2 - sulfur dioxide
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 5-6
Modeled Construction Concentrations and NAAQS
Vantage CA3 Project
Santa Clara, California

Pollutant	Averaging Period	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor ($\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentration ($\mu g/m^3$)	3-Year Average Background Concentrations ($\mu g/m^3$)[2,3]	Total Concentrations	NAAQS ($\mu g/m^3$)	Above NAAQS?
			X	Y							
NO_2[1]	5-year average of 1-Hour Yearly 98th%	P1	590,880	4,136,420	--	--	91	--	91	188	No
		P2	590,833	4,136,559	--	--	111	--	111	188	No
	Annual	P1	590,876	4,136,440	--	--	0.90	20	21	100	No
		P2	590,900	4,136,460	--	--	1.68	20	22	100	No
CO	1-Hour	P1	590,680	4,136,540	775	0.37	285	2,290	2,575	40,000	No
		P2	590,825	4,136,412	1,579	0.21	329	2,290	2,619	40,000	No
	8-Hour	P1	590,825	4,136,565	271	0.37	100	1,870	1,970	10,000	No
		P2	590,867	4,136,540	468	0.21	98	1,870	1,968	10,000	No
SO_2	5-year average of 1-Hour Yearly 99th%	P1	590,680	4,136,540	775	0.00069	0.53	6.1	6.6	196	No
		P2	590,825	4,136,412	1,579	0.00036	0.57	6.1	6.7	196	No
	3-Hour	P1	590,880	4,136,440	464	0.00069	0.32	21	22	1,300	No
		P2	590,913	4,136,510	808	0.00036	0.29	21	22	1,300	No
PM_{10}	24-Hour 6th highest over 5 years	P1	590,780	4,136,580	110	0.0008	0.085	108	108	150	No
		P2	590,841	4,136,554	199	0.00035	0.070	108	108	150	No
$PM_{2.5}$	3-year average of annual concentrations	P1	590,881	4,136,449	44	0.0018	0.080	11	11	12	No
		P2	590,900	4,136,460	69	0.0003	0.018	11	11	12	No

Notes:

1. Direct emissions rates for NO_2 were used in the dispersion modeling to obtain NO_2 concentrations directly. Since unit emission rates were not used, there are no values for NO2 emission rates in this table.
2. The 3-year average background concentrations were calculated using 2018-2020 data collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by US EPA.
3. For the 1-hour NO_2 runs, seasonal hour-of-day NO_2 background values were incorporated using AERMOD and are already included in the modeled concentrations presented.

Abbreviations:

CO - carbon monoxide
g - grams
NAAQS - National Ambient Air Quality Standard
NO_2 - nitrogen dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
SO_2 - sulfur dioxide
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 5-7
Modeled Construction Concentrations and CAAQS
Vantage CA3 Project
Santa Clara, California

Pollutant	Averaging Period	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor ($\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentration ($\mu g/m^3$)	Maximum Background Concentrations ($\mu g/m^3$)[2,3]	Total Concentrations	CAAQS ($\mu g/m^3$)	Above CAAQS?
			X	Y							
NO_2[1]	1-Hour Maximum	P1	590,680	4,136,540	--	--	35	162	197	339	No
		P2	590,825	4,136,412	--	--	86	162	248	339	No
	Annual Maximum	P1	590,876	4,136,440	--	--	0.90	23	24	57	No
		P2	590,900	4,136,460	--	--	1.68	23	24	57	No
CO	1-Hour Maximum	P1	590,680	4,136,540	775	0.37	285	2,863	3148	23,000	No
		P2	590,825	4,136,412	1,579	0.21	329	2,863	3192	23,000	No
	8-Hour Maximum	P1	590,825	4,136,565	271	0.37	100	2,405	2505	10,000	No
		P2	590,867	4,136,540	468	0.21	98	2,405	2502	10,000	No
SO_2	1-Hour Maximum	P1	590,680	4,136,540	775	0.00069	0.53	38	39	655	No
		P2	590,825	4,136,412	1,579	0.00036	0.57	38	39	655	No
	24-Hour Maximum	P1	590,780	4,136,580	110	0.00050	0.055	3.9	4.0	105	No
		P2	590,841	4,136,554	199	0.00026	0.052	3.9	4.0	105	No

Notes:

[1.] Direct emissions rates for NO_2 were used in the dispersion modeling to obtain NO_2 concentrations directly. Since unit emission rates were not used, there are no values for NO2 emission rates in this table.

[2] The 3-year maximum background concentrations were calculated using 2018-2020 data collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by US EPA.

Abbreviations:

CAAQS - California Ambient Air Quality Standard
CO - carbon monoxide
g - grams
SO_2 - sulfur dioxide
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 5-8
Comparison of Modeled Construction PM10 and PM2.5 Results to Significance Impact Levels
Vantage CA3 Project
Santa Clara, California

Pollutant	Averaging Period	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor ($\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentration ($\mu g/m^3$)	SIL ($\mu g/m^3$)[1]	Above SIL?
			X	Y					
$PM_{2.5}$	24-Hour Maximum	P1	590,780	4,136,580	110	0.00077	0.085	1.2	No
		P2	590,841	4,136,554	199	0.00035	0.070	1.2	No
$PM_{2.5}$	Annual Maximum	P1	590,881	4,136,449	44	0.0018	0.080	0.2	No
		P2	590,900	4,136,460	69	0.00027	0.018	0.2	No
PM_{10}	24-Hour Maximum	P1	590,780	4,136,580	110	0.00077	0.08	5.0	No
		P2	590,841	4,136,554	199	0.00035	0.070	5.0	No
PM_{10}	Annual Maximum	P1	590,881	4,136,449	44	0.0044	0.20	1.0	No
		P2	590,900	4,136,460	69	0.00044	0.030	1.0	No

Notes:

1. Significance Impact Level (SIL) values taken from the EPA's "Guidance on Significance Impact Levels for Ozone and Fine Particles in the Prevention of Significance Deterioration Permitting Program" Memorandum dated April 17, 2018.

Abbreviations:

g - grams
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
SIL - Significance Impact Level
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 7-1
Modeled Buildings for Vantage CA3 Facility
Vantage CA3 Project
Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
ADMN_BLDG	Administration Building	590,749.37	4,136,528.74	14.33	27.05
LOAD_DOCK	Loading Dock	590,872.38	4,136,473.95	14.33	6.76
MAIN_BLDG	Main Data Building	590,803.81	4,136,479.61	14.33	27.05
R1GE01A	Accessory Structure	590,797.56	4,136,558.67	14.33	9.1
R1GE01B	Exhaust Plenum	590,791.35	4,136,561.96	14.33	8.81
R1GE01C	Exhaust Plenum	590,790.67	4,136,560.03	14.33	8.81
R1GE01D	SCR/DPF	590,793.18	4,136,560.22	14.33	10.09
R1GE01X	Generator Enclosure	590,794.46	4,136,559.77	14.33	5.77
R1GE02A	Accessory Structure	590,807.60	4,136,555.10	14.33	9.1
R1GE02B	Exhaust Plenum	590,801.38	4,136,558.38	14.33	8.81
R1GE02C	Exhaust Plenum	590,800.70	4,136,556.46	14.33	8.81
R1GE02D	SCR/DPF	590,803.22	4,136,556.65	14.33	10.09
R1GE02X	Generator Enclosure	590,804.49	4,136,556.20	14.33	5.77
R1GE03A	Accessory Structure	590,817.61	4,136,551.56	14.33	9.1
R1GE03B	Exhaust Plenum	590,793.81	4,136,548.06	14.33	8.81
R1GE03B	Exhaust Plenum	590,811.40	4,136,554.85	14.33	8.81
R1GE03C	Exhaust Plenum	590,810.72	4,136,552.92	14.33	8.81
R1GE03D	SCR/DPF	590,813.23	4,136,553.11	14.33	10.09
R1GE03X	Generator Enclosure	590,814.51	4,136,552.66	14.33	5.77
R1GE04B	Exhaust Plenum	590,798.11	4,136,546.54	14.33	8.81
R2GE01A	Accessory Structure	590,788.49	4,136,557.31	14.33	9.1
R2GE01B	Exhaust Plenum	590,785.21	4,136,551.10	14.33	8.81
R2GE01C	Exhaust Plenum	590,787.13	4,136,550.42	14.33	8.81
R2GE01D	SCR/DPF	590,786.94	4,136,552.93	14.33	10.09
R2GE01X	Generator Enclosure	590,787.39	4,136,554.21	14.33	5.77
R2GE02A	Accessory Structure	590,792.79	4,136,555.79	14.33	9.1
R2GE02B	Exhaust Plenum	590,789.51	4,136,549.58	14.33	8.81
R2GE02C	Exhaust Plenum	590,791.43	4,136,548.90	14.33	8.81
R2GE02D	SCR/DPF	590,791.24	4,136,551.41	14.33	10.09
R2GE02X	Generator Enclosure	590,791.69	4,136,552.69	14.33	5.77
R2GE03A	Accessory Structure	590,797.09	4,136,554.27	14.33	9.1
R2GE03C	Exhaust Plenum	590,795.73	4,136,547.38	14.33	8.81
R2GE03D	SCR/DPF	590,795.54	4,136,549.89	14.33	10.09
R2GE03X	Generator Enclosure	590,795.99	4,136,551.17	14.33	5.77
R2GE04A	Accessory Structure	590,801.39	4,136,552.75	14.33	9.1
R2GE04C	Exhaust Plenum	590,800.03	4,136,545.86	14.33	8.81

Table 7-1
Modeled Buildings for Vantage CA3 Facility
Vantage CA3 Project
Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
R2GE04D	SCR/DPF	590,799.84	4,136,548.37	14.33	10.09
R2GE04X	Generator Enclosure	590,800.29	4,136,549.65	14.33	5.77
R2GE05A	Accessory Structure	590,805.69	4,136,551.23	14.33	9.1
R2GE05B	Exhaust Plenum	590,802.41	4,136,545.02	14.33	8.81
R2GE05C	Exhaust Plenum	590,804.33	4,136,544.34	14.33	8.81
R2GE05D	SCR/DPF	590,804.14	4,136,546.85	14.33	10.09
R2GE05X	Generator Enclosure	590,804.59	4,136,548.13	14.33	5.77
R2GE06A	Accessory Structure	590,809.99	4,136,549.71	14.33	9.1
R2GE06B	Exhaust Plenum	590,806.71	4,136,543.50	14.33	8.81
R2GE06C	Exhaust Plenum	590,808.63	4,136,542.82	14.33	8.81
R2GE06D	SCR/DPF	590,808.44	4,136,545.33	14.33	10.09
R2GE06X	Generator Enclosure	590,808.89	4,136,546.61	14.33	5.77
R2GE07A	Accessory Structure	590,814.29	4,136,548.19	14.33	9.1
R2GE07B	Exhaust Plenum	590,811.01	4,136,541.98	14.33	8.81
R2GE07C	Exhaust Plenum	590,812.93	4,136,541.30	14.33	8.81
R2GE07D	SCR/DPF	590,812.74	4,136,543.81	14.33	10.09
R2GE07X	Generator Enclosure	590,813.19	4,136,545.09	14.33	5.77
R2GE08A	Accessory Structure	590,818.59	4,136,546.67	14.33	9.1
R2GE08B	Exhaust Plenum	590,815.30	4,136,540.46	14.33	8.81
R2GE08C	Exhaust Plenum	590,817.23	4,136,539.78	14.33	8.81
R2GE08D	SCR/DPF	590,817.04	4,136,542.29	14.33	10.09
R2GE08X	Generator Enclosure	590,817.49	4,136,543.57	14.33	5.77
R2GE09A	Accessory Structure	590,822.89	4,136,545.15	14.33	9.1
R2GE09B	Exhaust Plenum	590,819.60	4,136,538.94	14.33	8.81
R2GE09C	Exhaust Plenum	590,821.53	4,136,538.26	14.33	8.81
R2GE09D	SCR/DPF	590,821.34	4,136,540.77	14.33	10.09
R2GE09X	Generator Enclosure	590,821.79	4,136,542.05	14.33	5.77
R2GE10A	Accessory Structure	590,827.19	4,136,543.63	14.33	9.1
R2GE10B	Exhaust Plenum	590,823.90	4,136,537.42	14.33	8.81
R2GE10C	Exhaust Plenum	590,825.83	4,136,536.74	14.33	8.81
R2GE10D	SCR/DPF	590,825.64	4,136,539.25	14.33	10.09
R2GE10X	Generator Enclosure	590,826.09	4,136,540.53	14.33	5.77
R2GE11A	Accessory Structure	590,836.84	4,136,538.33	14.33	9.1
R2GE11B	Exhaust Plenum	590,830.62	4,136,541.61	14.33	8.81
R2GE11C	Exhaust Plenum	590,829.94	4,136,539.68	14.33	8.81
R2GE11D	SCR/DPF	590,832.45	4,136,539.87	14.33	10.09

Table 7-1
Modeled Buildings for Vantage CA3 Facility
Vantage CA3 Project
Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
R2GE11X	Generator Enclosure	590,833.73	4,136,539.42	14.33	5.77
R2GE12A	Accessory Structure	590,835.32	4,136,534.00	14.33	9.1
R2GE12B	Exhaust Plenum	590,829.10	4,136,537.28	14.33	8.81
R2GE12C	Exhaust Plenum	590,828.42	4,136,535.35	14.33	8.81
R2GE12D	SCR/DPF	590,830.94	4,136,535.54	14.33	10.09
R2GE12X	Generator Enclosure	590,832.22	4,136,535.09	14.33	5.77
R2GE13A	Accessory Structure	590,845.38	4,136,530.46	14.33	9.1
R2GE13B	Exhaust Plenum	590,839.16	4,136,533.74	14.33	8.81
R2GE13C	Exhaust Plenum	590,838.48	4,136,531.81	14.33	8.81
R2GE13D	SCR/DPF	590,841.00	4,136,532.01	14.33	10.09
R2GE13X	Generator Enclosure	590,842.28	4,136,531.56	14.33	5.77
R2GE14A	Accessory Structure	590,855.47	4,136,526.87	14.33	9.1
R2GE14B	Exhaust Plenum	590,849.25	4,136,530.15	14.33	8.81
R2GE14C	Exhaust Plenum	590,848.57	4,136,528.22	14.33	8.81
R2GE14D	SCR/DPF	590,851.08	4,136,528.42	14.33	10.09
R2GE14X	Generator Enclosure	590,852.36	4,136,527.96	14.33	5.77
R2GE15A	Accessory Structure	590,865.45	4,136,523.39	14.33	9.1
R2GE15B	Exhaust Plenum	590,859.23	4,136,526.67	14.33	8.81
R2GE15C	Exhaust Plenum	590,858.55	4,136,524.75	14.33	8.81
R2GE15D	SCR/DPF	590,861.07	4,136,524.94	14.33	10.09
R2GE15X	Generator Enclosure	590,862.35	4,136,524.49	14.33	5.77
R3GE01A	Accessory Structure	590,778.14	4,136,548.56	14.33	9.1
R3GE01B	Exhaust Plenum	590,774.86	4,136,542.34	14.33	8.81
R3GE01C	Exhaust Plenum	590,776.78	4,136,541.66	14.33	8.81
R3GE01D	SCR/DPF	590,776.59	4,136,544.17	14.33	10.09
R3GE01X	Generator Enclosure	590,777.04	4,136,545.45	14.33	5.77
R3GE02A	Accessory Structure	590,782.44	4,136,547.04	14.33	9.1
R3GE02B	Exhaust Plenum	590,779.16	4,136,540.82	14.33	8.81
R3GE02C	Exhaust Plenum	590,781.08	4,136,540.14	14.33	8.81
R3GE02D	SCR/DPF	590,780.89	4,136,542.65	14.33	10.09
R3GE02X	Generator Enclosure	590,781.34	4,136,543.93	14.33	5.77
R3GE03A	Accessory Structure	590,786.74	4,136,545.52	14.33	9.1
R3GE03B	Exhaust Plenum	590,783.46	4,136,539.30	14.33	8.81
R3GE03C	Exhaust Plenum	590,785.38	4,136,538.62	14.33	8.81
R3GE03D	SCR/DPF	590,785.19	4,136,541.13	14.33	10.09
R3GE03X	Generator Enclosure	590,785.64	4,136,542.41	14.33	5.77

Table 7-1
Modeled Buildings for Vantage CA3 Facility
Vantage CA3 Project
Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
R3GE04A	Accessory Structure	590,791.04	4,136,544.00	14.33	9.1
R3GE04B	Exhaust Plenum	590,787.75	4,136,537.78	14.33	8.81
R3GE04C	Exhaust Plenum	590,789.68	4,136,537.10	14.33	8.81
R3GE04D	SCR/DPF	590,789.49	4,136,539.61	14.33	10.09
R3GE04X	Generator Enclosure	590,789.94	4,136,540.89	14.33	5.77
R3GE05A	Accessory Structure	590,795.34	4,136,542.48	14.33	9.1
R3GE05B	Exhaust Plenum	590,792.05	4,136,536.26	14.33	8.81
R3GE05C	Exhaust Plenum	590,793.98	4,136,535.58	14.33	8.81
R3GE05D	SCR/DPF	590,793.79	4,136,538.09	14.33	10.09
R3GE05X	Generator Enclosure	590,794.24	4,136,539.37	14.33	5.77
R3GE06A	Accessory Structure	590,799.64	4,136,540.96	14.33	9.1
R3GE06B	Exhaust Plenum	590,796.35	4,136,534.74	14.33	8.81
R3GE06C	Exhaust Plenum	590,798.28	4,136,534.06	14.33	8.81
R3GE06D	SCR/DPF	590,798.09	4,136,536.57	14.33	10.09
R3GE06X	Generator Enclosure	590,798.54	4,136,537.85	14.33	5.77
R3GE07A	Accessory Structure	590,803.94	4,136,539.44	14.33	9.1
R3GE07B	Exhaust Plenum	590,800.65	4,136,533.22	14.33	8.81
R3GE07C	Exhaust Plenum	590,802.58	4,136,532.54	14.33	8.81
R3GE07D	SCR/DPF	590,802.39	4,136,535.05	14.33	10.09
R3GE07X	Generator Enclosure	590,802.84	4,136,536.33	14.33	5.77
R3GE08A	Accessory Structure	590,808.24	4,136,537.92	14.33	9.1
R3GE08B	Exhaust Plenum	590,804.95	4,136,531.70	14.33	8.81
R3GE08C	Exhaust Plenum	590,806.88	4,136,531.02	14.33	8.81
R3GE08D	SCR/DPF	590,806.69	4,136,533.53	14.33	10.09
R3GE08X	Generator Enclosure	590,807.14	4,136,534.81	14.33	5.77
R3GE09A	Accessory Structure	590,812.54	4,136,536.40	14.33	9.1
R3GE09B	Exhaust Plenum	590,809.25	4,136,530.18	14.33	8.81
R3GE09C	Exhaust Plenum	590,811.18	4,136,529.50	14.33	8.81
R3GE09D	SCR/DPF	590,810.99	4,136,532.01	14.33	10.09
R3GE09X	Generator Enclosure	590,811.44	4,136,533.29	14.33	5.77
R3GE10A	Accessory Structure	590,816.83	4,136,534.88	14.33	9.1
R3GE10B	Exhaust Plenum	590,813.55	4,136,528.66	14.33	8.81
R3GE10C	Exhaust Plenum	590,815.48	4,136,527.98	14.33	8.81
R3GE10D	SCR/DPF	590,815.29	4,136,530.49	14.33	10.09
R3GE10X	Generator Enclosure	590,815.74	4,136,531.77	14.33	5.77
R3GE11A	Accessory Structure	590,821.13	4,136,533.36	14.33	9.1

Table 7-1
Modeled Buildings for Vantage CA3 Facility
Vantage CA3 Project
Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
R3GE11B	Exhaust Plenum	590,817.85	4,136,527.14	14.33	8.81
R3GE11C	Exhaust Plenum	590,819.78	4,136,526.46	14.33	8.81
R3GE11D	SCR/DPF	590,819.59	4,136,528.97	14.33	10.09
R3GE11X	Generator Enclosure	590,820.04	4,136,530.25	14.33	5.77
R3GE12A	Accessory Structure	590,825.43	4,136,531.84	14.33	9.1
R3GE12B	Exhaust Plenum	590,822.15	4,136,525.62	14.33	8.81
R3GE12C	Exhaust Plenum	590,824.08	4,136,524.94	14.33	8.81
R3GE12D	SCR/DPF	590,823.89	4,136,527.45	14.33	10.09
R3GE12X	Generator Enclosure	590,824.34	4,136,528.73	14.33	5.77
R3GE13A	Accessory Structure	590,829.73	4,136,530.32	14.33	9.1
R3GE13B	Exhaust Plenum	590,826.45	4,136,524.10	14.33	8.81
R3GE13C	Exhaust Plenum	590,828.38	4,136,523.42	14.33	8.81
R3GE13D	SCR/DPF	590,828.19	4,136,525.93	14.33	10.09
R3GE13X	Generator Enclosure	590,828.64	4,136,527.21	14.33	5.77
R3GE14A	Accessory Structure	590,834.03	4,136,528.80	14.33	9.1
R3GE14B	Exhaust Plenum	590,830.75	4,136,522.58	14.33	8.81
R3GE14C	Exhaust Plenum	590,832.68	4,136,521.90	14.33	8.81
R3GE14D	SCR/DPF	590,832.49	4,136,524.41	14.33	10.09
R3GE14X	Generator Enclosure	590,832.94	4,136,525.69	14.33	5.77
R3GE15A	Accessory Structure	590,838.33	4,136,527.28	14.33	9.1
R3GE15B	Exhaust Plenum	590,835.05	4,136,521.06	14.33	8.81
R3GE15C	Exhaust Plenum	590,836.98	4,136,520.38	14.33	8.81
R3GE15D	SCR/DPF	590,836.79	4,136,522.90	14.33	10.09
R3GE15X	Generator Enclosure	590,837.24	4,136,524.17	14.33	5.77
R3GE16A	Accessory Structure	590,842.63	4,136,525.76	14.33	9.1
R3GE16B	Exhaust Plenum	590,839.35	4,136,519.54	14.33	8.81
R3GE16C	Exhaust Plenum	590,841.28	4,136,518.86	14.33	8.81
R3GE16D	SCR/DPF	590,841.09	4,136,521.38	14.33	10.09
R3GE16X	Generator Enclosure	590,841.54	4,136,522.65	14.33	5.77
R3GE17A	Accessory Structure	590,846.93	4,136,524.24	14.33	9.1
R3GE17B	Exhaust Plenum	590,843.65	4,136,518.02	14.33	8.81
R3GE17C	Exhaust Plenum	590,845.58	4,136,517.34	14.33	8.81
R3GE17D	SCR/DPF	590,845.38	4,136,519.86	14.33	10.09
R3GE17X	Generator Enclosure	590,845.84	4,136,521.13	14.33	5.77
R3GE18A	Accessory Structure	590,851.23	4,136,522.72	14.33	9.1
R3GE18B	Exhaust Plenum	590,847.95	4,136,516.50	14.33	8.81

Table 7-1
Modeled Buildings for Vantage CA3 Facility
Vantage CA3 Project
Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
R3GE18C	Exhaust Plenum	590,849.88	4,136,515.82	14.33	8.81
R3GE18D	SCR/DPF	590,849.68	4,136,518.34	14.33	10.09
R3GE18X	Generator Enclosure	590,850.14	4,136,519.61	14.33	5.77
R3GE19A	Accessory Structure	590,855.53	4,136,521.20	14.33	9.1
R3GE19B	Exhaust Plenum	590,852.25	4,136,514.98	14.33	8.81
R3GE19C	Exhaust Plenum	590,854.18	4,136,514.30	14.33	8.81
R3GE19D	SCR/DPF	590,853.98	4,136,516.82	14.33	10.09
R3GE19X	Generator Enclosure	590,854.44	4,136,518.09	14.33	5.77
R3GE20A	Accessory Structure	590,859.83	4,136,519.68	14.33	9.1
R3GE20B	Exhaust Plenum	590,856.55	4,136,513.46	14.33	8.81
R3GE20C	Exhaust Plenum	590,858.48	4,136,512.78	14.33	8.81
R3GE20D	SCR/DPF	590,858.28	4,136,515.30	14.33	10.09
R3GE20X	Generator Enclosure	590,858.74	4,136,516.57	14.33	5.77
R3GE21A	Accessory Structure	590,864.13	4,136,518.16	14.33	9.1
R3GE21B	Exhaust Plenum	590,860.85	4,136,511.94	14.33	8.81
R3GE21C	Exhaust Plenum	590,862.78	4,136,511.26	14.33	8.81
R3GE21D	SCR/DPF	590,862.58	4,136,513.78	14.33	10.09
R3GE21X	Generator Enclosure	590,863.04	4,136,515.05	14.33	5.77
R3GE22A	Accessory Structure	590,868.43	4,136,516.64	14.33	9.1
R3GE22B	Exhaust Plenum	590,865.15	4,136,510.42	14.33	8.81
R3GE22C	Exhaust Plenum	590,867.08	4,136,509.74	14.33	8.81
R3GE22D	SCR/DPF	590,866.88	4,136,512.26	14.33	10.09
R3GE22X	Generator Enclosure	590,867.34	4,136,513.53	14.33	5.77
R3GE23A	Accessory Structure	590,872.73	4,136,515.12	14.33	9.1
R3GE23B	Exhaust Plenum	590,869.45	4,136,508.90	14.33	8.81
R3GE23C	Exhaust Plenum	590,871.38	4,136,508.22	14.33	8.81
R3GE23D	SCR/DPF	590,871.18	4,136,510.74	14.33	10.09
R3GE23X	Generator Enclosure	590,871.64	4,136,512.01	14.33	5.77
R3GE24A	Accessory Structure	590,877.03	4,136,513.60	14.33	9.1
R3GE24B	Exhaust Plenum	590,873.75	4,136,507.38	14.33	8.81
R3GE24C	Exhaust Plenum	590,875.68	4,136,506.70	14.33	8.81
R3GE24D	SCR/DPF	590,875.48	4,136,509.22	14.33	10.09
R3GE24X	Generator Enclosure	590,875.94	4,136,510.50	14.33	5.77
R3GE25A	Accessory Structure	590,881.33	4,136,512.08	14.33	9.1
R3GE25B	Exhaust Plenum	590,878.05	4,136,505.86	14.33	8.81
R3GE25C	Exhaust Plenum	590,879.98	4,136,505.18	14.33	8.81

Table 7-1
Modeled Buildings for Vantage CA3 Facility
Vantage CA3 Project
Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
R3GE25D	SCR/DPF	590,879.78	4,136,507.70	14.33	10.09
R3GE25X	Generator Enclosure	590,880.24	4,136,508.98	14.33	5.77
R3GE26A	Accessory Structure	590,885.63	4,136,510.56	14.33	9.1
R3GE26B	Exhaust Plenum	590,882.35	4,136,504.34	14.33	8.81
R3GE26C	Exhaust Plenum	590,884.28	4,136,503.66	14.33	8.81
R3GE26D	SCR/DPF	590,884.08	4,136,506.18	14.33	10.09
R3GE26X	Generator Enclosure	590,884.54	4,136,507.46	14.33	5.77
ROOF_DECK	Rooftop Deck	590,736.37	4,136,530.27	14.33	18.4

Table 7-2
Operational 1-hr, 3-hr, and 8-hr CAAQS/NAAQS Model Emission Rates - Monthly Testing
Vantage CA3 Project
Santa Clara, California

Load (%)	Load-Specific Emission Rates[1,2] (g/hr)			Hourly Emission Rate per Generator[3] (g/s)			Stack Temperature[4] (K)	Exhaust Volumetric Flow Rate (ft^3/min)[4]	Stack Velocity (m/s)
	NO_X	CO	SO_2	NO_X	CO	SO_2			
10	6,246	1,508	2.81	4.34E-01	1.05E-01	1.95E-04	566.93	4910.8	9.45

Notes:

1. Emission rates from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.
2. The Selective Catalytic Reduction (SCR) device takes 15 minutes to warm up. Therefore, the NO_X emission rates reflect uncontrolled conditions. The SO_2 emission rate uses load-specific fuel consumption and assumes 15 ppm fuel sulfur content.
3. Based on 15 minutes per hour of operation.
4. From Caterpillar 3516E Diesel Generator Specification Sheet.

Abbreviations:

CO - carbon monoxide
ft^3 - cubic feet
g - grams
hr - hour
K - Kelvin
m - meter
min - minute
s - second
SO_2 - sulfur dioxide
NO_x - nitrogen oxides
ppm - parts per million

Table 7-3
Operational 24-hr CAAQS/NAAQS Model Emission Rates - Monthly Testing
Vantage CA3 Project
Santa Clara, California

Load (%)	Load-Specific Emission Rates[1,2] (g/hr)			24-Hour Emission Rate per Generator[3] (g/s)			Stack Temperature[4] (K)	Exhaust Volumetric Flow Rate (ft^3/min)[4]	Stack Velocity (m/s)
	SO_2	$PM_{2.5}$	PM_{10}	SO_2	$PM_{2.5}$	PM_{10}			
10	2.81	23.7	23.7	1.95E-05	1.64E-04	1.64E-04	566.93	4910.8	9.45

Notes:

1. Emission rates from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.
2. Emission rates for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission rate. The SO_2 emission rate uses load-specific
3. Based on 15 minutes per day of operation and a 10-hour operating day (i.e., 7 AM to 5 PM).
4. From Caterpillar 3516E Diesel Generator Specification Sheet.

Abbreviations:

ft^3 - cubic feet
g - grams
hr - hour
K - Kelvin
m - meter
min - minute
s - second
SO_2 - sulfur dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ppm - parts per million

Table 7-4
Operational Annual CAAQS/NAAQS Model Emission Rates - Monthly Testing
Vantage CA3 Project
Santa Clara, California

Load (%)	Load-Specific Emission Rates[1,2] (g/hr)			Annual Emission Rate per Generator[3] (g/s)			Stack Temperature[4] (K)	Exhaust Volumetric Flow Rate (ft^3/min)[4]	Stack Velocity (m/s)
	NO_X	$PM_{2.5}$	PM_{10}	NO_X	$PM_{2.5}$	PM_{10}			
10	6,246	23.7	23.7	1.66E-02	6.31E-05	6.31E-05	566.93	4910.8	9.45

Notes:

1. Emission rates from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.
2. The Selective Catalytic Reduction (SCR) device takes 15 minutes to warm up. Therefore, the NO_X emission rates reflect uncontrolled conditions. Emission rates for PM10 and PM2.5 are conservatively assumed to be equal to the PM emission rate.
3. Based on 35 hours of operation per year and a 10-hour operating day (i.e., 7 AM - 5 PM).
4. From Caterpillar 3516E Diesel Generator Specification Sheet.

Abbreviations:

ft^3 - cubic feet
g - grams
hr - hour
K - Kelvin
m - meter
min - minute
NO_x - nitrogen oxides
s - second
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

Table 7-5
Operational 1-hr, 3-hr, and 8-hr CAAQS/NAAQS Model Emission Rates - Annual Testing
Vantage CA3 Project
Santa Clara, California

Load (%)	Load-Specific Emission Rate[1,2,3] (g/hr)				Hourly Emission Rate per Generator[4,5] (g/s)			Stack Temperature[6] (K)	Exhaust Volumetric Flow Rate (ft^3/min)[6]	Stack Velocity (m/s)
	NO_X (Uncontrolled)	NO_X	CO	SO_2	NO_X	CO	SO_2			
100	20,700	2,022	2,588	18.58	1.86E+00	7.19E-01	5.16E-03	751.54	21938.8	42.22
75	14,241	1,391	1,658	13.99	1.28E+00	4.61E-01	3.88E-03	725.32	17602.5	33.87
50	7,160	699	1,162	10.01	6.43E-01	3.23E-01	2.78E-03	720.71	13692.5	26.35
25	3,813	372	2,015	5.51	3.42E-01	5.60E-01	1.53E-03	685.37	8167.9	15.72
10	6,246	610	1,508	2.81	5.61E-01	4.19E-01	7.80E-04	566.93	4910.8	9.45

Notes:

1. Emission rates for 100% load from Peterson Power Systems ecoCUBE design criteria emission performance.
2. Emission rates for 10-75% load from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.
3. The SO_2 emission rate uses load-specific fuel consumption and assumes 15 ppm fuel sulfur content.
4. Based on 1 hour of operation.
5. The Selective Catalytic Reduction (SCR) device takes 15 minutes to warm up. NO_x emissions assume 15 minutes of uncontrolled (Tier 2) emissions and 45 minutes of controlled (Tier 4) emissions.
6. From Caterpillar 3516E Diesel Generator Specification Sheet.

Abbreviations:

CO - carbon monoxide
ft^3 - cubic feet
g - grams
hr - hour
K - Kelvin
m - meter
min - minute
s - second
SO_2 - sulfur dioxide
NO_x - nitrogen oxides
ppm - parts per million

Table 7-6
Operational 24-hr CAAQS/NAAQS Model Emission Rates - Annual Testing
Vantage CA3 Project
Santa Clara, California

Load (%)	Load-Specific Emission Rate[1,2,3] (g/hr)			24-Hour Emission Rate per Generator[4] (g/s)			Stack Temperature[5] (K)	Exhaust Volumetric Flow Rate (ft^3/min)[5]	Stack Velocity (m/s)
	SO_2	$PM_{2.5}$	PM_{10}	SO_2	$PM_{2.5}$	PM_{10}			
100	18.58	80.9	80.9	5.16E-04	2.25E-03	2.25E-03	751.54	21938.8	42.22
75	13.99	45.4	45.4	3.88E-04	1.26E-03	1.26E-03	725.32	17602.5	33.87
50	10.01	44.6	44.6	2.78E-04	1.24E-03	1.24E-03	720.71	13692.5	26.35
25	5.51	46.9	46.9	1.53E-04	1.30E-03	1.30E-03	685.37	8167.9	15.72
10	2.81	23.7	23.7	7.80E-05	6.58E-04	6.58E-04	566.93	4910.8	9.45

Notes:

1. Emission rates for 100% load from Peterson Power Systems ecoCUBE design criteria emission performance.
2. Emission rates for 10-75% load from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.
3. Emission rates for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission rate. The SO_2 emission rate uses load-specific fuel consumption and assumes 15 ppm fuel sulfur content.
4. Based on 1 hour per day of operation and a 10-hour operating day (i.e., 7 AM to 5 PM).
5. From Caterpillar 3516E Diesel Generator Specification Sheet.

Abbreviations:

ft^3 - cubic feet
g - grams
hr - hour
K - Kelvin
m - meter
min - minute
s - second
SO_2 - sulfur dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ppm - parts per million

Table 7-7
Operational Annual CAAQS/NAAQS Model Emission Rates - Annual Testing
Vantage CA3 Project
Santa Clara, California

Load (%)	Load-Specific Emission Rate[1,2,3] (g/hr)				Annual Emission Rate per Generator[4,5] (g/s)			Stack Temperature[6] (K)	Exhaust Volumetric Flow Rate (ft^3/min)[6]	Stack Velocity (m/s)
	NO_X (Uncontrolled)	NO_X	$PM_{2.5}$	PM_{10}	NO_X	$PM_{2.5}$	PM_{10}			
100	20,700	2,022	80.9	80.9	1.78E-02	2.15E-04	2.15E-04	751.54	21938.8	42.22
75	14,241	1,391	45.4	45.4	1.23E-02	1.21E-04	1.21E-04	725.32	17602.5	33.87
50	7,160	699	44.6	44.6	6.16E-03	1.19E-04	1.19E-04	720.71	13692.5	26.35
25	3,813	372	46.9	46.9	3.28E-03	1.25E-04	1.25E-04	685.37	8167.9	15.72
10	6,246	610	23.7	23.7	5.38E-03	6.31E-05	6.31E-05	566.93	4910.8	9.45

Notes:

1. Emission rates for 100% load from Peterson Power Systems ecoCUBE design criteria emission performance.
2. Emission rates for 10-75% load from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.
3. Emission rates for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission rate.
4. Based on 35 hours of operation per year and a 10-hour operating day (i.e., 7 AM - 5 PM).
5. The Selective Catalytic Reduction (SCR) device takes 15 minutes to warm up. Annual NO_x emissions assumes annual operation will consist of 35 individual 1-hour operating periods, each consisting of 15 minutes of uncontrolled (Tier 2) emissions and 45 minutes of controlled (Tier 4) emissions.
6. From Caterpillar 3516E Diesel Generator Specification Sheet.

Abbreviations:

ft^3 - cubic feet
g - grams
hr - hour
K - Kelvin
m - meter
min - minute
NO_x - nitrogen oxides
s - second
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

Table 7-8
Modeled Operational Concentrations and NAAQS
Vantage CA3 Project
Santa Clara, California

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor ($\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentrations ($\mu g/m^3$)	3-Year Average Background Concentrations ($\mu g/m^3$) [2,3]	Total Concentrations	NAAQS ($\mu g/m^3$)	Above NAAQS?
					X	Y							
NO_2 [1]	5-year average of 1-Hour Yearly 98th%	100	Annual	R3EG01_N	590,727	4,136,554	--	--	145	N/A	145	188	No
		75	Annual	R3EG01_N	590,727	4,136,554	--	--	143		143		
		50	Annual	R3EG01_N	590,727	4,136,554	--	--	131		131		
		25	Annual	R3EG01_N	590,727	4,136,554	--	--	118		118		
		10	Annual	R1EG02_N	590,850	4,136,549	--	--	165		165		
		10	Monthly	GROUPX05	590,881	4,136,449	--	--	179		179		
	Annual	100	Annual	ALL	590,867	4,136,423	249	0.018	4.4	20	25	100	No
		75	Annual	ALL	590,867	4,136,423	272	0.012	3.3		24		
		50	Annual	ALL	590,867	4,136,423	297	0.0062	1.8		22		
		25	Annual	ALL	590,867	4,136,423	363	0.0033	1.19		21		
		10	Annual	ALL	590,867	4,136,423	516	0.0054	2.8		23		
		10	Monthly	ALL	590,867	4,136,423	516	0.017	8.6		29		
CO	1-Hour	100	Annual	R2EG08	590,765	4,136,566	163	0.72	117	2,290	2,408	40,000	No
		75	Annual	R2EG08	590,765	4,136,566	187	0.46	86		2,376		
		50	Annual	R1EG02	590,755	4,136,563	211	0.32	68		2,359		
		25	Annual	R3EG03	590,825	4,136,565	307	0.56	172		2,462		
		10	Annual	R3EG03	590,833	4,136,559	391	0.42	164		2,454		
		10	Monthly	GROUPX05	590,833	4,136,559	1,296	0.10	136		2,426		
	8-Hour	100	Annual	R3EG01	590,709	4,136,548	147	0.72	106	1,870	1,977	10,000	No
		75	Annual	R3EG01	590,709	4,136,548	165	0.46	76		1,946		
		50	Annual	R3EG01	590,709	4,136,548	179	0.32	58		1,928		
		25	Annual	R3EG01	590,709	4,136,548	206	0.56	115		1,986		
		10	Annual	R2EG08	590,765	4,136,566	250	0.42	105		1,975		
		10	Monthly	GROUPX05	590,699	4,136,545	900	0.10	94		1,965		
SO_2	3-year average of 1-Hour Yearly 99th%	100	Annual	R2EG08	590,765	4,136,566	163	0.0052	0.84	6.1	7.0	196	No
		75	Annual	R2EG08	590,765	4,136,566	187	0.0039	0.73		6.8		
		50	Annual	R1EG02	590,755	4,136,563	211	0.0028	0.59		6.7		
		25	Annual	R3EG03	590,825	4,136,565	307	0.0015	0.47		6.6		
		10	Annual	R3EG03	590,833	4,136,559	391	0.00078	0.30		6.4		
		10	Monthly	GROUPX05	590,833	4,136,559	1,296	0.00020	0.25		6.4		
	3-Hour	100	Annual	R3EG01	590,709	4,136,548	154	0.0052	0.80	21	22	1,300	No
		75	Annual	R3EG01	590,709	4,136,548	170	0.0039	0.66		22		
		50	Annual	R3EG01	590,709	4,136,548	187	0.0028	0.52		22		
		25	Annual	R3EG03	590,825	4,136,565	273	0.0015	0.42		22		
		10	Annual	R1EG02	590,850	4,136,549	312	0.00078	0.24		21		
		10	Monthly	GROUPX05	590,699	4,136,545	1,029	0.00020	0.20		21		

Table 7-8
Modeled Operational Concentrations and NAAQS
Vantage CA3 Project
Santa Clara, California

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor ($\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentrations ($\mu g/m^3$)	3-Year Average Background Concentrations ($\mu g/m^3$) [2,3]	Total Concentrations	NAAQS ($\mu g/m^3$)	Above NAAQS?
					X	Y							
PM_{10}	24-Hour 6th highest over 5 years	100	Annual	R3EG01	590,709	4,136,548	58	0.0022	0.13	108	108	150	No
		75	Annual	R3EG01	590,709	4,136,548	65	0.0013	0.082		108		
		50	Annual	R3EG01	590,709	4,136,548	71	0.0012	0.088		108		
		25	Annual	R3EG01	590,718	4,136,551	83	0.0013	0.11		108		
		10	Annual	R3EG01	590,718	4,136,551	95	0.00066	0.063		108		
		10	Monthly	GROUPX05	590,699	4,136,545	336	0.00016	0.055		108		
$PM_{2.5}$	3-year average of annual concentrations	100	Annual	ALL	590,867	4,136,423	249	0.00022	0.054	11	11	12	No
		75	Annual	ALL	590,867	4,136,423	272	0.00012	0.033		11		
		50	Annual	ALL	590,867	4,136,423	297	0.00012	0.035		11		
		25	Annual	ALL	590,867	4,136,423	363	0.00013	0.045		11		
		10	Annual	ALL	590,867	4,136,423	516	0.000063	0.033		11		
		10	Monthly	ALL	590,867	4,136,423	516	0.000063	0.033		11		

Notes:

1. Direct emissions rates for 1-hour NO_2 were used in the dispersion modeling to obtain 1-hour NO_2 concentrations directly. Since unit emission rates were not used, there are no values for NO_2 emission rates in this table.
2. The 3-year average background concentrations were calculated using 2018-2020 data collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by US EPA.
3. For the 1-hour NO_2 runs, seasonal hour-of-day NO_2 background values were incorporated using AERMOD and are already included in the modeled concentrations presented.

Abbreviations:

CO - carbon monoxide
g - grams
NAAQS - National Ambient Air Quality Standard
NO_2 - nitrogen dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
SO_2 - sulfur dioxide
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 7-9
Modeled Operational Concentrations and CAAQS
Vantage CA3 Project
Santa Clara, California

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor ($\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentrations ($\mu g/m^3$)	Maximum Background Concentrations ($\mu g/m^3$) [2,3]	Total Concentrations	CAAQS ($\mu g/m^3$)	Above CAAQS?
					X	Y							
NO_2 [1]	1-Hour Maximum	100	Annual	R3EG01_C	590,850	4,136,549	--	--	327	N/A	327	339	No
		75	Annual	R3EG01_C	590,850	4,136,549	--	--	305		305		
		50	Annual	R3EG01_C	590,755	4,136,563	--	--	236		236		
		25	Annual	R3EG01_C	590,833	4,136,559	--	--	206		206		
		10	Annual	R3EG01_C	590,818	4,136,572	--	--	307		307		
		10	Monthly	GROUPX05	590,881	4,136,449	--	--	319		319		
	Annual Maximum	100	Annual	ALL	590,867	4,136,423	249	0.018	4.4	23	27	57	No
		75	Annual	ALL	590,867	4,136,423	272	0.012	3.3		26		
		50	Annual	ALL	590,867	4,136,423	297	0.0062	1.8		24		
		25	Annual	ALL	590,867	4,136,423	363	0.0033	1.19		24		
		10	Annual	ALL	590,867	4,136,423	516	0.0054	2.8		25		
		10	Monthly	ALL	590,867	4,136,423	516	0.017	8.6		31		
CO	1-Hour Maximum	100	Annual	R2EG08	590,765	4,136,566	163	0.72	117	2,863	2,980	23,000	No
		75	Annual	R2EG08	590,765	4,136,566	187	0.46	86		2,949		
		50	Annual	R1EG02	590,755	4,136,563	211	0.32	68		2,931		
		25	Annual	R3EG03	590,825	4,136,565	307	0.56	172		3,035		
		10	Annual	R3EG03	590,833	4,136,559	391	0.42	164		3,027		
		10	Monthly	GROUPX05	590,833	4,136,559	1,296	0.10	136		2,999		
	8-Hour Maximum	100	Annual	R3EG01	590,709	4,136,548	147	0.72	106	2,405	2,511	10,000	No
		75	Annual	R3EG01	590,709	4,136,548	165	0.46	76		2,481		
		50	Annual	R3EG01	590,709	4,136,548	179	0.32	58		2,463		
		25	Annual	R3EG01	590,709	4,136,548	206	0.56	115		2,520		
		10	Annual	R2EG08	590,765	4,136,566	250	0.42	105		2,510		
		10	Monthly	GROUPX05	590,699	4,136,545	900	0.10	94		2,499		
SO_2	1-Hour Maximum	100	Annual	R2EG08	590,765	4,136,566	163	0.0052	0.84	38.0	38.8	655	No
		75	Annual	R2EG08	590,765	4,136,566	187	0.0039	0.73		38.7		
		50	Annual	R1EG02	590,755	4,136,563	211	0.0028	0.59		38.6		
		25	Annual	R3EG03	590,825	4,136,565	307	0.0015	0.47		38.4		
		10	Annual	R3EG03	590,833	4,136,559	391	0.00078	0.30		38.3		
		10	Monthly	GROUPX05	590,833	4,136,559	1,296	0.00020	0.25		38.2		
	24-Hour Maximum	100	Annual	R3EG01	590,709	4,136,548	58	0.00052	0.03	3.9	4.0	105	No
		75	Annual	R3EG01	590,709	4,136,548	65	0.00039	0.03		4.0		
		50	Annual	R3EG01	590,709	4,136,548	71	0.00028	0.02		3.9		
		25	Annual	R3EG01	590,718	4,136,551	83	0.00015	0.01		3.9		
		10	Annual	R3EG01	590,718	4,136,551	95	0.000078	0.01		3.9		
		10	Monthly	GROUPX05	590,699	4,136,545	336	0.0022	0.76		4.7		

Notes:

[1.] Direct emissions rates for 1-hour NO_2 were used in the dispersion modeling to obtain 1-hour NO_2 concentrations directly. Since unit emission rates were not used, there are no values for NO_2 emission rates in this table.

[2.] For the 1-hour NO_2 runs, the maximum single-hour background concentration during the hours in which the generators will be tested (i.e., 7 AM to 5 PM) was incorporated using AERMOD and is already included in

[3.] The 3-year maximum background concentrations were calculated using 2018-2020 data collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by US EPA.

Abbreviations:

CAAQS - California Ambient Air Quality Standard
CO - carbon monoxide
g - grams
NO_2 - nitrogen dioxide
SO_2 - sulfur dioxide
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 7-10
Comparison of Modeled Operational PM10 and PM2.5 Results to Significance Impact Levels
Vantage CA3 Project
Santa Clara, California

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor $(\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentrations $(\mu g/m^3)$	SIL $(\mu g/m^3)^2$	Above SIL?
					X	Y					
$PM_{2.5}$	24-Hour Maximum	100	Annual	R3EG01	590,709	4,136,548	58	0.0022	0.13	1.2	No
		75	Annual	R3EG01	590,709	4,136,548	65	0.0013	0.082		
		50	Annual	R3EG01	590,709	4,136,548	71	0.0012	0.088		
		25	Annual	R3EG01	590,718	4,136,551	83	0.0013	0.11		
		10	Annual	R3EG01	590,718	4,136,551	95	0.00066	0.063		
		10	Monthly	GROUPX05	590,699	4,136,545	336	0.00016	0.055		
	Annual Maximum	100	Annual	ALL	590,867	4,136,423	249	0.00022	0.054	0.2	No
		75	Annual	ALL	590,867	4,136,423	272	0.00012	0.033		
		50	Annual	ALL	590,867	4,136,423	297	0.00012	0.035		
		25	Annual	ALL	590,867	4,136,423	363	0.00013	0.045		
		10	Annual	ALL	590,867	4,136,423	516	0.00006	0.033		
		10	Monthly	ALL	590,867	4,136,423	516	0.00006	0.033		
PM_{10}	24-Hour Maximum	100	Annual	R3EG01	590,709	4,136,548	58	0.0022	0.13	5	No
		75	Annual	R3EG01	590,709	4,136,548	65	0.0013	0.082		
		50	Annual	R3EG01	590,709	4,136,548	71	0.0012	0.088		
		25	Annual	R3EG01	590,718	4,136,551	83	0.0013	0.11		
		10	Annual	R3EG01	590,718	4,136,551	95	0.00066	0.063		
		10	Monthly	GROUPX05	590,699	4,136,545	336	0.00016	0.055		
	Annual Maximum	100	Annual	ALL	590,867	4,136,423	249	0.00022	0.054	1	No
		75	Annual	ALL	590,867	4,136,423	272	0.00012	0.033		
		50	Annual	ALL	590,867	4,136,423	297	0.00012	0.035		
		25	Annual	ALL	590,867	4,136,423	363	0.00013	0.045		
		10	Annual	ALL	590,867	4,136,423	516	0.000063	0.033		
		10	Monthly	ALL	590,867	4,136,423	516	0.000063	0.033		

Notes:

1. Significance Impact Level (SIL) value taken from the EPA's "Guidance on Significance Impact Levels for Ozone and Fine Particles in the Prevention of Significance Deterioration Permitting Program" Memorandum dated April 17, 2018.

Abbreviations:

g - grams
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
SIL - Significance Impact Level
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 20-1
Operational HRA Model Emission Rates
Vantage CA3 Project
Santa Clara, California

Load (%)	Load-Specific Emission Rate[1,2,3] (g/hr)				Emission Rate per Generator[4] (g/s)				Stack Temperature[5] (K)	Exhaust Volumetric Flow Rate (ft^3/min)[5]	Stack Velocity (m/s)
					Annual			Hourly			
	HC	TOG	DPM	$PM_{2.5}$	TOG	DPM	$PM_{2.5}$	TOG			
25	199.2	213.1	46.9	46.9	5.68E-04	1.25E-04	1.25E-04	5.92E-02	685.37	8167.9	15.72

Notes:

1. Emission rates for HC, DPM, and $PM_{2.5}$ at 25% load from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.
2. TOG emission rate calculated from HC emission rate using conversion factors from EPA. 2004. Conversion Factors for Hydrocarbon Emission Components. April. US EPA 420-P-04-001.
3. Emission rates for DPM and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission rate.
4. Based on 35 hours of operation per year and a 10-hour operating day (i.e., 7 AM - 5 PM).
5. From Caterpillar 3516E Diesel Generator Specification Sheet.

Abbreviations:

DPM - diesel particulate matter
ft^3 - cubic feet
g - grams
HC - hydrocarbon
hr - hour
K - Kelvin
m - meter
min - minute
s - second
TOG - total organic gases
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns

Table 20-2
Project-Related Operational Health Impacts Summary
Vantage CA3 Project
Santa Clara, California

Load Scenario			Receptor Type					PMI
			Residential	Worker	School	Daycare	Recreational	
Cancer Risk (in a million)	25%	Risk	8.73	8.99	1.35	4.38	0.31	8.99
		UTMx	590,840	590,880	590,900	591,240	590,720	590,880
		UTMy	4,136,360	4,136,440	4,136,160	4,136,040	4,136,400	4,136,440
		RecType	--	--	--	--	--	Worker
Chronic Risk (unitless)	25%	Risk	0.0037	0.0108	0.0008	0.0010	0.0010	0.0108
		UTMx	590,840	590,880	590,900	591,240	590,720	590,880
		UTMy	4,136,360	4,136,440	4,136,160	4,136,040	4,136,400	4,136,440
		RecType	--	--	--	--	--	Worker
Acute Risk (unitless)	25%	Risk	0.027	0.053	0.016	0.015	0.029	0.053
		UTMx	590,760	590,740	590,660	590,560	590,940	590,740
		UTMy	4,136,360	4,136,560	4,136,100	4,136,180	4,136,380	4,136,560
		Worst-Case Generator	R2EG15	R1EG02	R2EG12	R1EG03	R3EG01	R1EG02
		RecType	--	--	--	--	--	Worker
$PM_{2.5}$ Concentration ($\mu g/m^3$)	25%	Risk	0.012	0.035	0.003	0.003	0.003	0.035
		UTMx	590,840	590,880	590,900	591,240	590,720	590,880
		UTMy	4,136,360	4,136,440	4,136,160	4,136,040	4,136,400	4,136,440
		RecType	--	--	--	--	--	Worker

Notes:

1 Worker exposure is assumed at any non-resident and non-school, -daycare, and -recreational receptor, including fenceline and sidewalk receptors adjacent to the Project Site. Given this assumption, the PMI and MEIW are in the same location.

Abbreviations:

MEIW - Maximally Exposed Individual Worker
PMI - Point of Maximum Impact
HI - Hazard Index
$PM_{2.5}$ - fine particulate matter less than 2.5 microns
UTM - Universal Transverse Mercator coordinate system
$\mu g/m^3$ - micrograms per cubic meter

Table 20-3
Construction Health Risk Impacts
Vantage CA3 Project
Santa Clara, California

Receptor Type[1,2]		Cancer Risk[3] (in a million)	Chronic Hazard Index (unitless)	$PM_{2.5}$ Concentration[6] ($\mu g/m^3$)
Residential	**Total Risk**	**1.5**	**0.0017**	**0.09**
	UTMx	590,840	590,840	590,840
	UTMy	4,136,360	4,136,360	4,136,360
Worker[4]	**Total Risk**	**0.45**	**0.0050**	**0.27**
	UTMx	590,880	590,740	590,740
	UTMy	4,136,440	4,136,560	4,136,560
Daycare[5]	**Total Risk**	**0.80**	**2.6E-04**	**0.014**
	UTMx	591,240	591,240	591,240
	UTMy	4,136,040	4,136,040	4,136,040
School[5]	**Total Risk**	**0.17**	**3.9E-04**	**0.021**
	UTMx	590,880	590,880	590,880
	UTMy	4,136,180	4,136,180	4,136,180
Recreational	**Total Risk**	**0.10**	**8.2E-04**	**0.044**
	UTMx	590,720	590,720	590,720
	UTMy	4,136,400	4,136,400	4,136,400
BAAQMD Significance Threshold		10	1	0.3

Notes

1. Construction emissions and associated health impacts are based on the assumption that all construction offroad equipment meets Tier 4 final engine standard.
2. There are no acute risks associated with offroad diesel construction equipment since only DPM emissions from off-road construction equipment and on-road vehicles are analyzed.
3. The cancer risk impacts presented in this table are based on exposure of each receptor type to all emissions associated with project construction over a period of 3 years.
4. Worker exposure is assumed at any non-resident and non-school, non-daycare or non-recreational receptor, including fenceline and sidewalk receptors adjacent to the Project Site. Risks at the worker receptors include a Worker Adjustment Factor of 4.2 (7/5*24/8) to account for the hours a worker is present at a site.
5. Risks at the daycare and school receptors include a modeling adjustment factor of 4.2 (7/5*24/8) to account for the hours when a child is present at the site.
6. Note that $PM_{2.5}$ concentration is the annual average concentration at that location, regardless of exposure duration.

Abbreviations

μg - micrograms
m - meter
PM - particulate matter
UTMx - universal transverse Mercator x-coordinate
UTMy - universal transverse Mercator y-coordinate

References:

BAAQMD. 2017. CEQA Air Quality Guidelines. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Table 26-1
Summary of Cumulative Health Risk Impacts to the MEISR
Vantage CA3 Project
Santa Clara, California

Emission Source	Cancer Risk Impact (in one million)[1]	Chronic Non-Cancer Hazard Index[1]	Acute Non-Cancer Hazard Index[1]	Annual $PM_{2.5}$ Concentration (ug/m^3)[1]
Project Operational Generators (100% Load)	9.9	0.0037	0.027	0.013
Subtotal, Project Impacts	**9.9**	**0.0037**	**0.03**	**0.013**
Existing Stationary Sources[2]				
Intel Corporation (Facility #633)	7.8	0.11	NA	0.22
Applied Materials (Facility #1427)	5.3	0.01	NA	0.061
Microsemi Inc (Facility #8517)	0	2.0E-04	NA	1.0E-04
Toppan Photomasks, Inc (Facility #17003)	2.2E-03	1.9E-04	NA	0.42
Miasole Hi-Tech (Facility #17993)	0	4.4E-05	NA	0
ON Semiconductor Inc (Facility #19856)	0.013	3.5E-06	NA	1.6E-05
Hanwha Solar America (HSA) (Facility #20946)	0.12	0.00	NA	0.01
Apple, Inc (Facility #22075)	0.10	3.0E-04	NA	1.2E-04
A100 US LLC (Facility #22375)	2.1	2.2E-03	NA	2.6E-03
Cyxtera Communications LLC SC4-5 (Facility #15199-1)	0.57	1.5E-04	NA	7.2E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-10)	0.60	1.6E-04	NA	7.5E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-11)	0.46	1.2E-04	NA	5.8E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-12)	0.55	1.5E-04	NA	6.9E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-13)	0.46	1.2E-04	NA	5.8E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-14)	0.46	1.2E-04	NA	5.8E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-15)	0.46	1.2E-04	NA	5.8E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-2)	0.50	1.4E-04	NA	6.3E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-3)	0.58	1.5E-04	NA	7.2E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-4)	0.89	2.4E-04	NA	1.1E-03
Cyxtera Communications LLC SC4-5 (Facility #15199-5)	0.65	1.7E-04	NA	8.1E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-6)	0.70	1.9E-04	NA	1.8E-03
Cyxtera Communications LLC SC4-5 (Facility #15199-7)	0.88	2.4E-04	NA	2.2E-03
Cyxtera Communications LLC SC4-5 (Facility #15199-8)	0.39	1.0E-04	NA	4.9E-04
Cyxtera Communications LLC SC4-5 (Facility #15199-9)	0.40	1.1E-04	NA	5.1E-04
CoreSite (Facility #19539-1)	0.41	1.1E-03	NA	5.1E-04
CoreSite (Facility #19539-2)	0.41	1.1E-03	NA	5.1E-04
CoreSite (Facility #19539-3)	0.41	1.1E-03	NA	5.1E-04
CoreSite (Facility #19539-4)	0.41	1.1E-03	NA	5.1E-04
CoreSite (Facility #19539-5)	0.31	1.1E-03	NA	3.8E-04
CoreSite (Facility #19539-6)	0.24	6.7E-04	NA	3.0E-04
CoreSite (Facility #19539-7)	0.24	6.7E-04	NA	3.0E-04
CoreSite (Facility #19539-8)	0.24	6.7E-04	NA	3.0E-04
CoreSite (Facility #19539-9)	0.24	6.7E-04	NA	3.0E-04
CoreSite (Facility #19539-REM)	2.96	8.4E-03	NA	3.7E-03
Vantage Data Centers Management (Facility #20295-17)	0.25	5.2E-04	NA	3.2E-04
Vantage Data Centers Management (Facility #20295-18)	0.25	5.2E-04	NA	3.2E-04
Vantage Data Centers Management (Facility #20295-19)	0.25	5.2E-04	NA	3.2E-04
Vantage Data Centers Management (Facility #20295-21)	0.014	2.9E-05	NA	1.8E-05
Vantage Data Centers Management (Facility #20295-22)	0.014	2.9E-05	NA	1.8E-05
Vantage Data Centers Management (Facility #20295-23)	0.015	3.2E-05	NA	1.8E-05
Vantage Data Centers Management (Facility #20295-24)	0.040	7.3E-05	NA	4.9E-05
Vantage Data Centers Management (Facility #20295-25)	0.024	4.5E-05	NA	3.0E-05
Vantage Data Centers Management (Facility #20295-26)	0.047	8.7E-05	NA	5.8E-05
Vantage Data Centers Management (Facility #20295-27)	0.047	8.7E-05	NA	5.8E-05
Vantage Data Centers Management (Facility #20295-33)	0.083	1.2E-04	NA	1.1E-04
Vantage Data Centers Management (Facility #20295-34)	0.10	1.4E-04	NA	1.2E-04
Vantage Data Centers Management (Facility #20295-35)	0.11	1.6E-04	NA	1.4E-04
Vantage Data Centers Management (Facility #20295-36)	0.097	1.4E-04	NA	1.2E-04
Vantage Data Centers Management (Facility #20295-37)	0.10	1.4E-04	NA	1.2E-04
Vantage Data Centers Management (Facility #20295-38)	0.13	1.8E-04	NA	1.6E-04
Vantage Data Centers Management (Facility #20295-39)	0.021	4.1E-05	NA	2.7E-05
Vantage Data Centers Management (Facility #20295-40)	0.021	4.1E-05	NA	2.7E-05
Vantage Data Centers Management (Facility #20295-41)	0.018	3.5E-05	NA	2.4E-05
Vantage Data Centers Management (Facility #20295-42)	0.021	4.1E-05	NA	2.7E-05
Vantage Data Centers Management (Facility #20295-43)	0.018	3.5E-05	NA	2.4E-05
Vantage Data Centers Management (Facility #20295-REM)	0.46	1.1E-03	NA	5.6E-04
Subtotal, Background Sources	**32**	**0.15**	**0**	**0.73**

Table 26-1
Summary of Cumulative Health Risk Impacts to the MEISR
Vantage CA3 Project
Santa Clara, California

Emission Source	Cancer Risk Impact (in one million)[1]	Chronic Non-Cancer Hazard Index[1]	Acute Non-Cancer Hazard Index[1]	Annual $PM_{2.5}$ Concentration (ug/m^3)[1]
Existing Rail and Roadway Sources[3]				
Railroad	72	NA	NA	0.16
Major Roadways	13	NA	NA	0.29
Highways	5.2	NA	NA	0.12
Subtotal, Mobile Sources	**91**	**0**	**0**	**0.57**
Subtotal, Background and Mobile Sources	**123**	**0.15**	**0**	**1.3**
Total Cumulative Impact	**133**	**0.15**	**0.027**	**1.3**
BAAQMD Significance Threshold	100	10	10	0.80
Exceed?	Yes	No	No	Yes
MEIR Type	Residential	Residential	Residential	Residential
MEIR Location (UTMx)	590,840	590,840	590,760	590,840
MEIR Location (UTMy)	4,136,360	4,136,360	4,136,360	4,136,360

Notes:

1. Receptors for Cancer Risk Impact, Chronic Non-Cancer Hazard Index, Acute Non-Cancer Hazard Index, and Annual $PM_{2.5}$ Concentration were chosen based on the highest overall Project impact for each risk category.
2. Stationary source emissions within 2,000 ft of the project facility boundary were obtained from the Permitted Stationary Source Risks and Hazards Screening Tool. A Stationary Source Inquiry Form was submitted to BAAQMD in July 2021. Sources with cancer risk impacts, chronic non-hazard indices, and annual $PM_{2.5}$ concentrations of zero are not included in this table.
3. Health impacts from existing railroads are estimated using BAAQMD rail source raster files for cancer risks and $PM_{2.5}$. Impacts were determined based on the maximum impact of a raster cell located at the MEISRs. The BAAQMD's screening tools do not estimate chronic or acute hazards since the screening levels were found to be extremely low, and thus there are no chronic or acute hazard values associated with railways.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - health index
MEISR - Maximally Exposed Individual Sensitive Receptor
NA - not applicable
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
ug/m^3 - micrograms per cubic meter
UTM - Universal Transverse Mercator coordinate system