Appendix A Air Quality Assessment

CORONADO DATA CENTER 3032 CORONADO DRIVE SANTA CLARA, CALIFORNIA

AIR QUALITY ASSESSMENT

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Project 13-148

INTRODUCTION

This report provides the results of an assessment of potential air quality impacts from the proposed Coronado Data Center (data center) located at 3032 Coronado Drive in Santa Clara, California. The project site is approximately 4.0 acres and is located at 3000/3016/3032 Coronado Drive between Stender Way and Central Expressway. The project would involve the demolition of two existing one-story industrial park office buildings located at the site and constructing of a new 207,224 square foot three-story data center on a 2.7-acre lot. As part of the project ten diesel- fueled emergency backup generators would be installed.

The project site is located on the western side of Coronado Drive, about 270 feet north of Central Expressway. The 207,224 square foot three-story building would be about 56.6 feet in height. Ten (10) 2,500 kilowatt (kW) diesel-fueled emergency backup generators would be housed within the data center in the northwest corner of the first floor. The locations of the new generators are shown in Figure 1. Exhaust from each generator would be ducted through the adjacent northwest data center wall to exhaust stacks that would extend vertically up beyond the building roof and discharge to the atmosphere at a height of about 60 feet above ground level.

The diesel-fueled emergency backup generators would be used to provide for an uninterrupted power supply. The generators would provide back-up power to the data center when equipment failure or other conditions result in an interruption to the electric power provided by Silicon Valley Power. Diesel fuel for the generators will be stored in 120-gallon aboveground tanks under each generator and in a 40,000-gallon aboveground tank located outside of the building.

The project site is in an office/commercial area of the City of Santa Clara. The proposed data center is part of a larger data center campus which will include four other data centers located at 2901 and 3000 Coronado Drive and 2950 and 2972 Stender Way. There are no residential uses in the vicinity of the project site and no schools within 1,000 feet of the project site. The closest residential area is about 2,100 feet south of the project site and the closest school, the Bracher Elementary School, is about 3,000 feet south-southwest of the site. The San Jose International Airport is about 2.5 miles southeast of the project site.

The primary source of emissions from the data center would be from operation of the generator engines during testing and maintenance of emergency generators. During normal facility operation these engines will not be operated other than for periodic testing and maintenance requirements. The 2,500 kW generators would use diesel-fueled engines that meet U.S. EPA Tier 4 interim emission standards, the most recent emission tier level for new diesel engines of this size. The engines will be fueled using ultra low sulfur diesel fuel with a maximum sulfur content of 15 parts per million (ppm).



Figure 1 – Project Site Layout

This analysis evaluates the potential air quality impacts from the installation of ten new backup emergency generators at the new data center. The proposed project would establish new sources of particulate matter and gaseous emissions. Emissions would primarily result from the testing of the emergency backup generators. The air quality impacts were evaluated in terms of operational impacts to air quality with the primary focus on evaluating the effects of future project-related emissions on regional air quality and on local sensitive receptors. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District

(BAAQMD).¹ Note that an Authority to Construct and Permit to Operate permit would be required from the BAAQMD prior to construction and operation of the proposed project equipment, which may require further analysis of air quality impacts.

EXISTING CONDITIONS

National and State Ambient Air Quality Standards

The ambient air quality in a given area depends on the quantities of pollutants emitted within the area, transport of pollutants to and from surrounding areas, local and regional meteorological conditions, as well as the surrounding topography of the air basin. Air quality is described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$).

As required by the Federal Clean Air Act, National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter, including respirable particulate matter (PM₁₀) and fine particulate matter (PM_{2.5}), sulfur oxides, and lead. The State of California has also established the California Ambient Air Quality Standards (CAAQS). Both State and Federal standards are summarized in Table 1. The "primary" standards have been established to protect the public health. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation and other aspects of the general welfare. CAAQS are generally the same or more stringent than NAAQS.

Air Quality Monitoring Data

The significance of an ambient pollutant concentration is determined by comparing it to an appropriate ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population. The San Francisco Bay Area is considered to be one of the cleanest metropolitan areas in the country with respect to air quality. BAAQMD monitors air quality conditions at more than 30 locations throughout the Bay Area. The closest monitoring station to the project site is in San Jose. Summarized air pollutant data for this station are provided in Table 2. This table shows the highest air pollutant concentrations measured at the station over the five year period from 2008 through 2012.

During the past 3 years, ozone concentrations in San Jose exceeded Federal standards on 0 to 3 days and State standards on 1 to 3 days annually. PM_{10} concentrations measured in San Jose exceed State standards about 0 to 1 measurement day per year, while $PM_{2.5}$ concentrations exceed Federal standards on 2 to 3 measurement days annually. Note that PM_{10} and $PM_{2.5}$ are measured every sixth day, so PM_{10} levels are estimated to exceed the standard on 0 to 6 days and $PM_{2.5}$ levels exceeded standards on 12 to 18 days annually. Ambient air quality standards for other air pollutants are not exceeded in San Jose.

¹ Bay Area Air Quality Management District, 2011. *BAAQMD CEQA Air Quality Guidelines*. May.

			National Sta	indards ^(a)
Pollutant	Averaging Time	California Standards	Primary ^(b,c)	Secondary ^(b,d)
	8-hour	0.070 ppm (137 µg/m ³)	0.075 ppm (147 µg/m ³)	Same as primary
Ozone (O ₃)	1-hour	0.09 ppm (180 µg/m ³)	e	Same as primary
Carbon Monoxide	8-hour	9.0 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	
(CO)	O) 1-hour 20 ppm (23 mg/m³)		35 ppm (40 mg/m ³)	
Nitrogen Dioxide	Annual	0.030 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as primary
(NO ₂)	D2) 1-hour 0.18 ppm (339 μg/m ³)		$0.100 \text{ ppm}^{f} (188 \mu g/m^{3})$	
	Annual	—	g	
Sulfur Dioxide	24-hour	0.04 ppm (105 µg/m ³)	g	
(SO ₂)	3-hour	—		0.5 ppm (1300 µg/m ³)
1-hour 0.25 pp		0.25 ppm (655 μg/m ³)	$0.075 \text{ ppm}^{g} (196 \mu g/m^{3})$	
DM	Annual	20 µg/m ³		Same as primary
PM10	24-hour	50 µg/m ³	$150 \mu g/m^3$	Same as primary
DM	Annual 12 µg/m ³		$12 \ \mu g/m^3$	
PM2.5	24-hour No Separate State Standard		$35 \ \mu g/m^3$	
Lead	Calendar quarter	_	$1.5 \ \mu g/m^3$	Same as primary
	30-day average	1.5 µg/m ³	_	_

Table 1 Ambient Air Quality Standards

Notes: ppm = parts per million

 $\mu g/m^3 =$ micrograms per cubic meter

 $mg/m^3 = milligrams$ per cubic meter

- (a) California standards for ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter (PM_{10} , $PM_{2.5}$, and visibility reducing particles), are not to be exceeded. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10} , the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
- (b) Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.
- (c) Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.
- (d) Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- (e) The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005. A new 8-hour standard was established in May 2008.
- (f) The form of the 1-hour NO_2 standard is the 3-year average of the 98^{th} percentile of the daily maximum 1-hour average concentration.
- (g) On June 2, 2010 the U.S. EPA established a new 1-hour SO₂ standard, effective August 23, 2010, which is based on the 3-year average of the annual 99^{th} percentile of the 1-hour daily maximum. The EPA also revoked both the existing 24-hour and annual average SO₂ standards.

	A	Measured Air Pollutant Levels						
Pollutant Averag		2008	2009	2010	2011	2012		
San Jose								
	1-Hour	0.118 ppm	0.088 ppm	0.126 ppm	0.098 ppm	0.101 ppm		
$Ozone (O_3)$	8-Hour	0.080 ppm	0.068 ppm	0.086 ppm	0.067 ppm	0.062 ppm		
	1-Hour	3.3 ppm	3.4 ppm	2.8 ppm	2.5 ppm	2.6 ppm		
Carbon Monoxide (CO)	8-Hour	2.5 ppm	2.5 ppm	2.2 ppm	2.3 ppm	1.9 ppm		
Nitro con Diovido (NO.) ^a	1-Hour	0.080 ppm	0.069 ppm	0.064 ppm	0.061 ppm	0.067 ppm		
	Annual	0.017 ppm	0.015 ppm	0.014 ppm	0.015 ppm	0.013 ppm		
Respirable Particulate Matter	24-Hour	57 ug/m ³	43 ug/m ³	47 ug/m ³	44 ug/m ³	60 ug/m ³		
(PM_{10})	Annual	23.4 ug/m ³	20.4 ug/m ³	19.5 ug/m ³	19.2 ug/m ³	18.8 ug/m ³		
Fine Derticulate Matter (DM	24-Hour	41.9 ug/m ³	35.0 ug/m ³	41.5 ug/m ³	50.5 ug/m ³	38.4 ug/m ³		
Fine Particulate Matter (PM _{2.5})	Annual	11.5 ug/m ³	10.1 ug/m ³	8.8 ug/m ³	9.9 ug/m ³	9.1 ug/m ³		

 Table 2 Highest Measured Air Pollutant Concentrations in San Jose

Source: BAAQMD Air Pollution Summaries for 2008 through 2012 see http://www.baaqmd.gov/Divisions/Communicationsand-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx.

Note: ppm = parts per million and ug/m³ = micrograms per cubic meter Values reported in bold exceed the ambient air quality standard

Attainment Status

Areas with air quality that exceed adopted air quality standards are designated as "nonattainment" areas for the relevant air pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe, and extreme for ozone, and moderate and serious for carbon monoxide and PM_{10}) or status ("nonattainment-transitional"). Areas that comply with air quality standards are designated as "attainment" areas for the relevant air pollutants. "Unclassified" areas are those with insufficient air quality monitoring data to support a designation of attainment or nonattainment, but are generally presumed to comply with the ambient air quality standard. State Implementation Plans must be prepared by States for areas designated as federal nonattainment areas to demonstrate how the area will be brought into attainment of the exceeded federal ambient air quality standard.

The Bay Area as a whole is considered by U.S. EPA as nonattainment for the ozone and $PM_{2.5}$ NAAQS. The area is attainment or unclassified for all other pollutants under the NAAQS, including carbon monoxide and PM_{10} . At the State level, the region is designated as nonattainment for ozone, PM_{10} and $PM_{2.5}$. The region is attainment for all other pollutants regulated under the CAAQS.

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the

elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. As discussed above, the closest sensitive receptors to the project site are in a residential area located about 2,100 feet south of the site. There are no schools within 1,000 feet of the project site. The closest school is about 3,000 feet south-southwest of the project site.

AIR QUALITY IMPACTS AND MITIGATIONS

Thresholds of Significance

The CEQA Guidelines prepared by the California Natural Resources Agency include the following significance criteria to evaluate project air quality and greenhouse gas emission impacts:

- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people;
- Conflict with or obstruct implementation of the applicable air quality plan;
- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The BAAQMD provides guidance in assessing impacts to lead agencies in the Bay Area. In May 2011, BAAQMD adopted new CEQA Air Quality Guidelines that included thresholds of significance to assist in the review of projects under CEQA. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's website and included in the Air District's updated CEQA Guidelines². The BAAQMD's adoption of the thresholds was called into question by an order issued March 5, 2012, in California Building Industry Association v. BAAQMD (Alameda Superior Court Case No. RG10548693). The order required the BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. However, the Superior Court's ruling was reversed on August 13, 2013, by the California Court of Appeal, First Appellate District. The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 3.

² Bay Area Air Quality Management District, 2011. BAAQMD CEQA Air Quality Guidelines. May.

	Operationa	ional Thresholds		
Pollutant	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)	
Criteria Air Pollutants		· · · · · ·	· · · ·	
ROG	54	54	10	
NOx	54	54	10	
PM ₁₀ Exhaust	82	82	15	
PM _{2.5} Exhaust	54	54	10	
СО	Not Applicable	9.0 ppm (8-hr avg) c	or 20.0 ppm (1-hr avg)	
Fugitive Dust – PM ₁₀ and PM _{2.5}	Construction Best Management Practices	Not Ap	oplicable	
Health Risks and Hazards for New Se New Sources of Emissions	ensitive Receptors (from Single Sou	irces within 1,000 foot z	one of influence) and	
Excess Cancer Risk	10 in one million	million 10 in one million		
Chronic or Acute Hazard Index	1.0	1.0		
Incremental annual average PM _{2.5}	$0.3 \mu g/m^3$	0.3	µg/m ³	
Health Risks and Hazards for Sensiti and Cumulative Thresholds for New	ve Receptors (Cumulative from all Sources	sources within 1,000 for	ot zone of influence)	
Excess Cancer Risk	1	00 in one million		
Chronic Hazard Index		10.0		
Annual Average PM _{2.5}		0.8 µg/m ³		
Odors				
Complaints	5 confirmed compla	aints per year averaged ov	ver 3 years	
Greenhouse Gas Emissions				
GHG Annual Emissions	1,100 metric to	ns or 4.6 metric tons per	capita	
Note: ROG = reactive organic gases, N aerodynamic diameter of 10 micrometer diameter of 2.5 μ m or less; and GHG =	$Ox = nitrogen oxides, PM_{10} = course$ rs (µm) or less, $PM_{2.5} = fine particulagreenhouse gas.$	e particulate matter or particulate matter or particulates v	ticulates with an with an aerodynamic	

Table 3 Air Quality Significance Thresholds

Impact 1: Conflict with or obstruct implementation of the applicable air quality plan? *Less than significant*

The most recent clean air plan is the *Bay Area 2010 Clean Air Plan* that was adopted by BAAQMD in September 2010. This plan addresses air quality impacts with respect to obtaining ambient air quality standards for non-attainment pollutants (i.e., ozone and particulate matter or PM₁₀ and PM_{2.5}), reducing exposure of sensitive receptors to toxic air contaminants (TACs), and reducing greenhouse gas (GHG) emissions such that the region can meet AB 32 goals of reducing emissions to 1990 levels by 2020.

Emissions of non-attainment air pollutants from the proposed project are addressed under *Impact 2 and 3*. Exposure of sensitive receptors associated with the proposed project is addressed under *Impact 4*.

The proposed project would not affect population or vehicle miles traveled forecasts used for Clean Air Plan projections, and, as discussed below, emissions and health risks from the project would be below applicable BAAQMD significance thresholds. Thus, this would be a *less than significant* impact.

Impact 2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? Less than significant with mitigation

The Bay Area is considered a nonattainment area for ground-level ozone and $PM_{2.5}$ under both the federal Clean Air Act and the California Clean Air Act. The area is also considered nonattainment for PM_{10} under the California Clean Air Act, but not the federal Act. The area has attained both State and federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for ozone, PM_{10} and $PM_{2.5}$, BAAQMD has established thresholds of significance for air pollutants. These thresholds are for ozone precursor pollutants (ROG and NOx), PM_{10} and $PM_{2.5}$ and apply to both construction period and operational period impacts.

Construction Period Emissions

The overall project site area is approximately 4.0 acres and would involve the demolition of two existing one-story industrial park office buildings located at the site and construction of a new 207,224 square foot three-story data center on a 2.7-acre lot.

Construction Fugitive Dust

During grading and construction activities, dust would be generated. Most of the dust would result during grading activities. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed at any given time, amount of activity, soil conditions and meteorological conditions. Nearby areas could be adversely affected by dust generated during construction activities. Nearby land uses are primarily commercial and office uses that are separated by roadways or open areas. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are employed to reduce these emissions. This impact is considered significant unless appropriate measures are implemented to reduce fugitive dust generated by the project. *Implementation of Mitigation Measure AQ-1 would reduce this impact to a level of less-than-significant*.

Construction Exhaust Emissions

The project would not involve construction of more than 277,000 square feet of buildings, the BAAQMD screening size to determine if quantified analysis of construction emissions is necessary. Since the construction project is below the BAAQMD size for screening construction projects, construction period emissions would be below the BAAQMD construction period emission thresholds. Therefore, these emissions are considered *less-than-significant*.

Mitigation Measure AQ-1: Include basic measures to control dust and exhaust during construction.

During any construction ground disturbance, implement measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less than significant. The contractors shall implement the following Best Management Practices that are required of all construction projects:

- 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- 4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
- 5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- 6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- 7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- 8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Project Emissions

Emission sources associated with the proposed project would include ten diesel-fueled emergency backup generators with 120-gallon diesel tanks, and one 40,000-gallon diesel fuel storage tank. Emissions from these sources are described below. More detailed emissions information is provided in *Attachment 1*.

Emergency Generator Emissions

The proposed project would install ten 2,500 kW emergency generators with Cummins dieselfueled engines. During normal facility operation these engines would not be operated other than for periodic testing and maintenance requirements. The generator engines would be fueled using ultra low sulfur diesel fuel with a maximum sulfur content of 15 ppm. The engines would meet U.S. EPA Tier 4 interim emission standards. These generators would be located within the data center in the northwest corner of the first floor (see Figure 1). The generator equipment and operating specifications for the proposed generators are provided in Table 4.

Testing of the generators would generally be preformed once per month to make sure that they are ready to come online when needed in the event of a power failure. The testing is proposed to normally take place between the hours of 9:00 AM to 5:00 PM. During normal generator testing, the engines would be operated one at a time for 10 minutes with and engine load of less than 20 percent. In addition to the normal engine testing and operation for maintenance purposes, each engine would undergo generator load testing for up to four hours per year with an engine load of up to 50 percent. Total generator engine operation under normal conditions is expected to be about 6 hours per year, per engine. However, engine operation may occur more frequently due to increased testing or maintenance requirements. For purposes of estimating emissions and potential air quality impacts from the engines, it was assumed that weekly operation for testing and maintenance the engines would occur and the engines would be run for up to 30 minutes at 50 percent load. At a maximum the total annual hours of operation of each engine would be 26 hours for testing and maintenance and 4 hours for generator load testing, for a total of 30 hours per year.

The estimated emissions from the engines under maximum operating conditions (30 hours per year per engine) are shown in Table 5.

Description	Value
10 Cummins 2500DQLG Generators	QSK78-14 engines (Tier 4 interim engines)
Generator Output (at 100% load)	2,500 kW
Engine Output (Standby)	
at 100% Load	3,705 horsepower
at 50% Load	1,853 horsepower
Diesel Fuel Consumption	
at 100% Load	170.7 gallons/hour
at 50% Load	98.7 gallons/hour
Diesel Fuel Sulfur Content	0.0015% (15 ppm)
Exhaust Flow Rate	
at 100% Load	18,908 actual cubic feet/minute
at 50% Load	12,512actual cubic feet/minute
Stack Height (above ground level)	60 feet
Stack Inside Diameter	18 inches
Exhaust gas Temperature	
at 100% Load	853 °F
at 50% Load	809 °F

 Table 4 Engine Generator Systems Equipment and Operating Information

 Table 5 Maximum Daily and Annual Emissions from Emergency Generators

	Hourly Emissions ^a per Unit at 50% Load	Maximum Daily Emissions All Ten Units ^b	Total Annual Emission 30 Hours Operation per Unit	
Pollutant	(lb/hour)	(lb/day)	(lb/year)	(ton/year) ^d
NOx	1.35	13.48	404.4	0.20
ROG	0.04	0.41	12.3	0.01
CO	3.06	30.64	919.2	0.46
PM ₁₀	0.29	2.86	85.8	0.04
PM _{2.5}	0.27	2.68	80.4	0.04
SO ₂	0.02	0.21	6.3	0.00

^a Based on 60 minutes of operation at 50% engine load.

^b Maximum daily emissions occur when all 10 engines are operated for 1 hour during generator load testing

at 50% engine load or 10 hours total engine operation.

^c Assumes operation at 50% engine load for 30 hours/year per engine.

^d Short tons (2,000 lbs per ton).

Diesel Fuel Storage Emissions

Diesel fuel for the emergency generators would be stored in sub-base tanks of the generators and in a 40,000 gallon storage tank. Diesel fuel has a very low volatility and emissions of ROG from fuel storage are expected to be negligible.

Area and Mobile Source Emissions

Development of the project would increase the number of vehicle trips generated from the site (i.e., employees/tenants and vendor delivery trips), which would lead to increased air pollutant emissions. There would also be area source emissions associated with normal facility operation and maintenance. Since the data center is replacing two existing buildings at the site it is not expected that there would be a substantial increase in area source and related emissions. However, because there would be an increase in vehicle trips with the data center, project related mobile source emissions were calculated for the worker and customer trips using emission factors based on the CABR EMFAC2011 mobile source emissions model and average trip lengths from the CalEEMod emissions model. For the project it is expected that there would be about three (3) employees, ten (10) tenants, and three (3) visitors coming to the data center daily.

Total Project Emissions

Total daily and annual emissions from the emergency generators and mobile sources are summarized in Tables 6 and 7, respectively.

Emission Source	Nitrogen Oxides (NOx)	Reactive Organic Gases (ROG)	Respirable Particulates (PM ₁₀)	Fine Particulates (PM _{2.5})
Emergency Generators	13.5	0.4	2.9	2.7
Mobile Sources	0.3	0.2	0.2	0.1
Total	13.8	0.6	3.1	2.8
BAAQMD Threshold	54	54	82	54

 Table 6 Summary of Daily Emissions (lb/day) from Project Operation

Table 7 Summary of Annual Emissions (ton/year) from Project Operation

	Nitrogen Oxides	Reactive Organic Gases	Respirable Particulates	Fine Particulates
Emission Source	(NOx)	(ROG)	(PM ₁₀)	(PM _{2.5})
Emergency Generators	0.20	0.01	0.04	0.04
Mobile Sources	0.05	0.04	0.04	0.02
Total	0.3	0.1	0.1	0.1
BAAQMD Threshold	10	10	15	10

Total increased average daily and annual emissions from operation of the project are estimated to be below the significance thresholds established by the BAAQMD for project operation. Since the average daily and annual emissions from the project would be less than the emission thresholds for all pollutants this would be considered a *less than significant impact*

Impact 3: Violate any air quality standard or contribute substantially to an existing or projected air quality violation? *Less than significant*

Air Quality Standards for Regional Air Pollutants

Due to the limited number of hours that each emergency generator would be operated for testing and maintenance purposes emissions from these units are relatively low. Emissions of nonattainment pollutants and their precursors that affect air quality standards at the regional level were evaluated under Impact 2. Since project emissions of ozone precursor pollutants and particulate matter (i.e., PM_{10} and $PM_{2.5}$) were found to be less than BAAQMD significance thresholds, they would not cause or contribute to violations of an ambient air quality standard for those pollutants.

Air Quality Standards for Local Air Pollutants (Carbon Monoxide from Project Traffic)

Increased intersection congestion can lead to increased localized CO concentrations (hot spots) in the vicinity of the intersection. Typically there needs to be a substantial increase in the number of vehicles accessing an intersection and a decrease in the intersection level of service (LOS) in order for there to be elevated CO concentrations of concern. Since the number of vehicles associated with the project would be minimal, the proposed project would not cause or contribute to a violation of an ambient air quality standard and the impact is considered *less than significant*

Impact 4: Expose sensitive receptors to substantial pollutant concentrations? *Less than significant*

The proposed project would be a source of air pollutant emissions from operation of emergency generators for testing and maintenance purposes. These generators are diesel-fueled, so they emit diesel particulate matter (DPM), which is a toxic air contaminant (TAC). The generators are also a source of $PM_{2.5}$, which has known adverse health effects

The BAAQMD CEQA Air Quality Guidelines considers exposure of sensitive receptors to air pollutant levels that result in an unacceptable cancer risk or hazard to be significant. For cancer risk the BAAQMD considers an increased risk of contracting cancer that is 10 in one million chances or greater to be significant for a single source. For cumulative exposure to TACs from existing sources affecting a sensitive receptor, in addition to a proposed new source, the BAAQMD considers an increased risk of contracting cancer that is 100 in one million chances or greater to be significant. The BAAQMD CEQA Guidelines also consider exposure to annual PM_{2.5} concentrations that exceed 0.3 micrograms per cubic meter (μ g/m³) from a single source to be significant and an annual PM_{2.5} concentration that exceeds 0.8 μ g/m³ from cumulative sources to be significant.

Community Risk – Health Risk and Hazards From TAC Exposure From the Proposed Project

The California Air Resources Board has designated particulate matter emissions from dieselfueled engines as a TAC. Although there are no sensitive receptors within 1,000 feet of the project site, BAAQMD guidelines³ indicate that for stationary sources potential health risks be evaluated at the nearest residential receptor, regardless of distance. As such, an analysis was performed to assess what ambient diesel particulate matter concentrations would result from generator operation and to quantify potential health risks at the nearest residential receptors, which are more than 2,100 feet from the project site.

Potential health risks from operation of the project's generators for testing and maintenance purposes were evaluated using air quality dispersion modeling and following the BAAQMD health risk screening analysis guidelines. Potential cancer risks from operation of the generators were evaluated at the closest sensitive receptors in the residential area located about 2,100 feet south of the project site. Additionally, cancer risks were evaluated at the Bracher Elementary School which is about 3,000 feet south-southwest of the project site. The maximum annual average DPM concentrations were used to calculate potential increased cancer risks from the project. These concentrations were used as being representative of long-term (70-year) exposures for calculation of cancer risks.

Air quality modeling of annual average DPM concentrations was conducted using the EPA's AERMOD dispersion model. The AERMOD model is a steady-state, multiple-source, dispersion model designed to calculate pollutant concentrations from single or multiple sources. The model is recommended by BAAQMD for predicting air pollutant/contaminant concentrations associated with various emissions sources. The AERMOD model predicts pollutant concentrations at receptors located in areas of flat or complex terrain from a variety of emission source types including point, area, volume and line sources. Since there are minimal elevation differences in the topography in the vicinity of the project site, flat terrain was assumed. The land use classification of the area was assumed to be urban.

Hourly meteorological data are required by AERMOD in order to determine the direction and degree of dispersion of emissions in the atmosphere and resulting pollutant concentrations. The BAAQMD has prepared a meteorological data set using 2004 data from the San Jose International airport that can be used for the project with AERMOD. The data set includes hourly values of wind speed and direction, air temperature, surface roughness, albedo, Bowen Ratio, and vertical temperature structure of the lower atmosphere. The airport is located about 2.5 miles southeast of the project site. There is no significant intervening terrain between the site and the airport, and these meteorological data are considered representative of project site conditions.

Annual average DPM and PM_{2.5} concentrations were modeled assuming that generator testing would occur between the hours of 9:00 AM and 5:00 PM and all generators were operated for 30 hours per year. The emission source parameters for the generators are listed in Table 4. A receptor grid with 25 meter spacing was placed in the residential area to the south of the project site, as shown in Figure 2. The maximum modeled annual DPM concentration in the residential area to the south of the project site and was 0.00089 μ g/m³. The maximum modeled annual DPM concentration at the Bracher Elementary School was 0.00020 μ g/m³. The location of the maximum modeled DPM concentration is shown on Figure 2.

³ BAAQMD. 2012. <u>Recommended Methods for Screening and Modeling Local Risks and Hazards</u>. May 2012.

Potential increased cancer risk at the locations of the maximum residential and school child DPM concentration were calculated using standard risk assessment methodology as recommended by the BAAQMD. Cancer risks were evaluated following BAAQMD risk guidance, which assumes that residential exposures are continuous for 24 hours per day, 350 days per year, for a 70-year period at a breathing rate of 302 liters per day per kilogram of body weight (L/kg-day). School children are assumed to be exposed for 10 hours per day for 180 days per year, over a 9-year period at a breathing rate of 581 L/kg-day.

Cancer risks are computed by multiplying the modeled concentration, in micrograms per cubic meter, by the inhalation dose, a TAC-specific cancer potency factor, and a cancer risk adjustment factor of $1.7.^4$ The cancer risk adjustment factor accounts for age-specific sensitivity to carcinogens. Based on the maximum annual DPM concentration of 0.00089 μ g/m³ at a residential receptor the maximum increased cancer risk for a residential exposure is 0.48 in one million. Potential increased cancer risks to children at the elementary school were calculated as 0.01 in one million based on the maximum modeled DPM concentrations at the school site of 0.00020 μ g/m³. These increased cancer risks are well below the BAAQMD significance threshold level of 10 in one million.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. The chronic inhalation reference exposure level (REL) for DPM is 5 μ g/m³. The maximum predicted annual DPM concentration was 0.00089 μ g/m³, which is much lower than the REL. The Hazard Index (HI), which is the ratio of the annual DPM concentration to the REL, is less than 0.0. The HI for the Bracher School site would also be 0.0. These HIs are much lower than the BAAQMD significance criterion of a HI greater than 1.0.

In addition to evaluating the health risks from DPM, potential impacts of $PM_{2.5}$ from the generators were evaluated. $PM_{2.5}$ concentrations from the generators would be the same as the DPM concentrations. Therefore, the maximum $PM_{2.5}$ concentrations from the proposed project would be 0.00089 µg/m³ for a residential receptor and 0.00020 µg/m³ at the Bracher School site. To evaluate potential non-cancer health effects at sensitive receptors due to $PM_{2.5}$ a significance threshold of an annual average $PM_{2.5}$ concentration greater than 0.3 µg/m³ was used The maximum-modeled project concentration is considerably lower than the $PM_{2.5}$ threshold of greater than 0.3 µg/m³.

Details of the cancer risk calculations for the proposed project are included in *Attachment 1*.

Since the increased cancer risks from exposure to DPM emissions from the proposed project would be much less than 10 in one million and annual $PM_{2.5}$ concentrations at sensitive receptors are less than 0.3 µg/m³ (BAAQMD thresholds of significance), the proposed project would not result in a significant cancer risk and would be a *less than significant impact*.

⁴ BAAQMD Air Toxics NSR Program Health Risk Screening (HRSG) Guidelines, January 2010.



Figure 2 Sensitive Receptor Locations

Community Risk – Cumulative Health Risks and Hazards

Due to the distance of the closest sensitive receptors from the project site, the residential area more than 2,100 feet south of the project site, and since the increased cancer risk and $PM_{2.5}$ concentration from the proposed project at the maximally impacted sensitive receptor would be less than one in one million and 0.0 μ g/m³, respectively, cumulative health impacts were not evaluated since the proposed project would not significantly contribute to cumulative health impacts at the maximally impacted sensitive receptor.

Temporary Construction Emissions

Construction of the project would expose sensitive receptors in the project area to DPM from construction related activities. The closest existing sensitive receptors are residences located south of the project site over 2,100 feet away. BAAQMD provides guidance for assessing community health risk from proposed construction activity.⁵ For a commercial development project of this size, BAAQMD screening tables indicate that significant cancer risk at sensitive receptors would extend to approximately 656 feet. Because the nearest sensitive receptors (residences) are located over 2,100 feet away, this impact is considered to be *less than significant*.

⁵ BAAQMD, 2010. Screening Tables for Air Toxics Evaluation During Construction. May.

ATTACHMENT 1

Table 1a Coronado Drive Data Center - Emergency Backup Generators Emissions From Periodic Engine Testing - 10 Engines

Periodic Testing at Low Load*			-					
Manufacturer/Model	Cummins	ļ	1					
Generator Set	2500DQLG		1					
Engine	QSK78-G14	Tier 4i Engine	1					
Total No. Units	10)	1					
Engine Operating Load	50%	ļ	1					
Generator Output (kW)	-)	1					
Load During Testing	50%	ļ	1					
Engine Output (hp)	1,853)	1					
Fuel Use (gal/hr) at Load	98.7)	1					
Fuel Sulfur Content (%)	0.0015		ł					
Emission Testing Information]	1					
	Maximum	Maximum**	1					
	Daily	Annual	1					
	Testing	Testing	1					
No. Units Tested. =	10	10	1					
Test Duration/Unit (min) =	30	30	1					
Tests per Period/Unit =	1	52	1					
Operation./Unit (hours) =	0.5	26	1					
Total Operation (hours) =	5	260						
	1		1	Operational	/	Operatio	onal - Total Er	nissions ²
	Emission ¹	Emission	Maxim	um Emissions p	er Unit	Daily	An	nual
	Factor	Rate per Unit	Daily	Annual	Annual	Maximum	Max	imum
Pollutant	(g/hp-hr)	(lb/hr)	(lb/day)	(lb/yr)	(ton/yr)	(lb/day)	(lb/yr)	(ton/yr)
NOx ^{1a}	0.33	1.35	0.67	35.05	0.02	6.74	350.5	0.18
HC ^{1a}	0.01	0.04	0.02	1.06	0.00	0.20	10.6	0.01
CO^{1a}	0.75	3.06	1.53	79.66	0.04	15.32	796.6	0.40
PM10 ^{1a}	0.07	0.29	0.143	7.44	0.0037	1.43	74.4	0.037
PM2.5 ³	0.07	0.27	0.134	6.97	0.0035	1.34	69.7	0.035
SOx ^{1b}	- 1	0.021	0.010	0.54	0.0003	0.104	5.4	0.003
co lc	22.28 lb/acl	2 200	1 104	57 423	28.7	11.043	574 231	287

Notes: * Emissions at 50% engine load for 30 minutes per test with no generator load attached assumed for testing engines

** Maximum annual testing based on 26 hours for periodic testing per unit per year.

1) Based on manufacturer's data at 50% load.

1a) Cummins 2500DQLG Exhuast Emissin Data Sheet [eds-1150a] at 50% load

1b) Calculated based on fuel sulfur content and fuel use.

1c) CO2 emission factor from California Climate Action Registry, General Reporting Protocol, Version 3.1, January 2009

2) Based on the number of units operating for the specified time period

3) Based on CARB CEIDERS PM profile for diesel IC engines, PM2.5 fraction of PM = 0.937

Table 1b Coronado Drive Data Center - Emergency Backup Generators Emissions From Periodic Generator Load Testing - 10 Engines

Periodic Generator Load Testing	g*	
Manufacturer/Model	2500DQLG	
Generator Set	3512C	
Engine	QSK78-G14	Tier 4i Engine
Total No. Units	10	
Engine Operating Load	50%	
Generator Output (kW)	1,250	
Load During Testing	50%	
Max Engine Output (hp)	1,853	
Fuel Use (gal/hr) at Load	98.7	
Fuel Sulfur Content (%)	0.0015	
Emission Testing Information		
	Max.	Maximum
	Daily	Annual
	Testing	Testing
No. Units Tested. =	10	10
Test Duration/Unit (min) =	60	60
Tests per Period/Unit =	-	4
Operation./Unit (hours) =	1	4
Total Operation (hours) =	10	40

			Operational			Operational - Total Emissions²		
	Emission ¹	Emission	Maxim	um Emissions p	er Unit	Daily		
	Factor	Rate per Unit	Daily	Annual	Annual	Maximum	An	nual
Pollutant	(g/hp-hr)	(lb/hr)	(lb/day)	(lb/yr)	(ton/yr)	(lb/day)	(lb/yr)	(ton/yr)
NOx ^{1a}	0.33	1.35	1.35	5.4	0.00	13.48	53.9	0.03
HC ^{1a}	0.01	0.04	0.04	0.2	0.00	0.41	1.6	0.00
CO^{1a}	0.75	3.06	3.06	12.3	0.01	30.64	122.6	0.06
PM10 ^{1a}	0.07	0.29	0.29	1.1	0.0006	2.86	11.4	0.006
PM2.5 ³	0.07	0.27	0.27	1.1	0.0005	2.68	10.7	0.005
SOx ^{1c}	-	0.021	0.021	0.1	0.0000	0.21	0.8	0.0004
CO ₂ ^{1d}	22.38 lb/gal	2,209	2,209	8,834	4.4	22,086	88,343	44

Notes: * Emissions at 50% engine load with generator load attached for 1 hour, up to 4 times per year.

** Maximum annual generator load testing based on 4 hours of generator load testing per unit per year.

1) Based on manufacturer's data at 50% load.

1a) Cummins 2500DQLG Exhuast Emissin Data Sheet [eds-1150a] at 50% load

1b) Calculated based on fuel sulfur content and fuel use.

1c) CO2 emission factor from California Climate Action Registry, General Reporting Protocol, Version 3.1, January 2009

2) Based on the number of units operating for the specified time period

3) Based on CARB CEIDERS PM profile for diesel IC engines, PM2.5 fraction of PM = 0.937

Table 2Coronado Data Center - Employee and Customer Vehicle Emissions2014 Air Pollutant and GHG Emissions

	Daily*	Vehicle Emissions per Day (pounds/day)					
Site ID	Trips	ROG	NOx	PM10	PM2.5	CO2	
Coronado Data Center							
Employee Traffic	52	0.22	0.26	0.23	0.07	462	
Vendor/Equipment Trips	6	0.02	0.02	0.02	0.00	34	
Total	58	0.2	0.3	0.2	0.1	497	

* Assumes 13 employees and tenants at 2 round trips/day and 3 customer round trips per day

Vehicle & Trip Information

Description	Trip Length**	% LDA	%LDT	%MDT	%HDT	%HHDT
Employee Vehicles	12.4	75%	25%			
Customer Trips	7.3	50%	50%			
Heavy Duty Trucks	0			25%	75%	
Heavy-Heavy Duty Trucks	0					100%

** Trip length is one way distance in miles based on CalEEMod

Composite Running Emission Factors, gm/mi

	Vehicle Emission Factors					Entrained Dust	
Description	ROG	NOx	PM10	PM2.5	CO2	PM10	PM2.5
Employee Vehicles	0.134	0.165	0.047	0.020	319.83	0.116	0.029
Vendor/Equipment Trips	0.158	0.199	0.047	0.020	346.68	0.116	0.029
Heavy Duty Trucks	0.326	5.638	0.209	0.143	1266.34	0.116	0.029
Heavy-Heavy Duty Trucks	0.350	8.578	0.253	0.180	1715.33	0.116	0.029

Emission factors for vrhicle exhaust based on EMFAC2011

Trip Emissions, gm/trip

Description	ROG	NOx	PM10	PM2.5	CO2
Employee Vehicles	0.279	0.245	0.003	0.003	72.11
Vendor/Equipment Trips	0.310	0.291	0.003	0.003	77.97
Heavy Duty Trucks	0.251	0.323	0.001	0.001	28.66
Heavy-Heavy Duty Trucks	0.069	0.073	0.000	0.000	1.31

Emission factors based on EMFAC2011

Entrained Roadway Dust (gm/mi)

Vehicle	PM10	PM2.5	
All	0.116	0.029	
EPA AP-42 Section 13.2.1 E = $k(cl.)^{0.91} \times (W)^{1.02}$			-
Where:			
k (PM2.5) =	0.25		
k (PM10) =	1.00		
sL =	0.035	g/m ² for ma	ajor & collector road
W =	2.4	tons	

 Table 3

 Coronado Data Center, 3032 Coronado Drive, San jose, CA - Health Risks From Emergency Generators

 AERMOD Risk Modeling Parameters and Maximum DPM Cancer Risk in Project Area

283
1.5 m
25 m grid spacing

Meteorological Conditions

San Jose Airport Hourly Met Data	2004
Land Use Classification	Urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = $C_{air} x DBR x A x EF x ED x 10^{-6} / AT$

Where: $C_{air} = concentration in air (\mu g/m^3)$

DBR = daily breathing rate (L/kg body weight-day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time period over which exposure is averaged.

 10^{-6} = Conversion factor

Inhalation Dose Factors

		Value ¹						
	DBR	Α	Exposure	Exposure	Exposure	EF	ED	AT
Exposure Type	(L/kg BW-day)	(-)	(hr/day)	(days/week)	(week/year)	(days/yr)	(Years)	(days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550
Student (9-Year)	581	1	10	5	36	180	9	25,550

¹ Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6

= URF x Cair

Where: $CPF = Cancer potency factor (mg/kg-day)^{-1}$

CRAF = Cancer Risk Adjustment Factor

URF =Unit risk factor (cancer risk per $\mu g/m^3$)

Diesel Particulate Matter Unit Risk Factors

	CPF	CRAF	URF
Exposure Type	(mg/kg-day) ⁻¹	(-)	(Risk/million/µg/m ³)
Residential (70-Yr Exposure)	1.10E+00	1.7	541.5
Student (9-Year)	1.10E+00	3	50.7

MEI Cancer Risk Calculations During Project Operation

	Maximum DPM/PM _{2.5} Concentration (μg/m ³)			
Meteorological				
Data Year	Residential	Student		
2004	0.00089	0.00020		
Maximum Cancer Risk (per million)	0.48	0.01		

Notes: Receptor Height = 1.5 m



Exhaust Emission Data Sheet 2500DQLG 60 Hz Diesel Generator Set EPA Emission

Engine Inforn	nation:				
Model:	Cummins In	ic. QSK78-G14	Bore:	6.69 in. (170 mm)	
Type:	4 Cycle, 60°	°V, 18 Cylinder Diesel	Stroke:	7.48 in. (190 mm)	
Aspiration: Turbocharged and Low Temperature Aftercooled			Displacement:	4735 cu. in. (77.6 liters)	
Compression Ratio: 15.5:1					
Emission Control	Emission Control Device: Electronic Control.				
Emission Level : Stationary Non-Emergency, T4 Interim (without DPF)					

	1/4	<u>1/2</u>	3/4	<u>Full</u>	Full	Full	
PERFORMANCE DATA	Standby	Standby	Standby	Standby	Prime	Continuous	
BHP @ 1800 RPM (60 Hz)	926	1853	2779	3705	3355	2945	
Fuel Consumption (gal/Hr)	55.2	98.7	134.9	170.7	157.2	141.5	
Exhaust Gas Flow (CFM)	7873	12512	16072	18908	17864	16621	
Exhaust Gas Temperature (°F)	746	809	820	853	839	824	
EXHAUST EMISSION DATA							
HC (Total Unburned Hydrocarbons)	0.02	0.01	0.01	0.01	0.01	0.01	
NOx (Oxides of Nitrogen as NO2)	0.53	0.33	0.39	0.55	0.48	0.41	
CO (carbon Monoxide)	1.38	0.75	0.63	0.95	0.76	0.62	
PM (Particular Matter)	0.12	0.07	0.06	0.06	0.06	0.06	
SO2 (Sulfur Dioxide)	0.00	0.00	0.00	0.00	0.00	0.00	
Smoke (Bosch)	0.5	0.3	0.3	0.2	0.3	0.3	
All Values are Grams/HP-Hour, Smoke is Bosch #							

TEST CONDITIONS

Data is representative of steady-state engine speed (± 25 RPM) at designated genset loads. Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:ASTM D975 No. 2-D diesel fuel with ULSD , and 40-48 cetane number...Fuel Temperature:99 ± 9 °F (at fuel pump inlet)Intake Air Temperature:77 ± 9 °FBarometric Pressure:29.6 ± 1 in. HgHumidity:NOx measurement corrected to 75 grains H2O/lb dry airReference Standard:ISO 8178

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

Cummins Power Generation

Data and Specifications Subject to Change Without Notice

eds-1150a