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4.1 Air Quality

4.1.1 Introduction

This section presents the methodology and results of an analysis performed to assess potential impacts of airborne emissions from the construction and operation of the Compass Energy Storage Project (project) and the project's compliance with applicable air quality requirements. The analysis was prepared following the South Coast Air Quality Management District's (SCAQMD) California Environmental Quality Act (CEQA) Air Quality Handbook (SCAQMD 1993).

Section 4.1.1 presents the introduction to the project. Section 4.1.2 presents the regulatory items affecting new source review. Section 4.1.3 presents data on the emissions of criteria and air toxic pollutants from the project. Section 4.1.4 discusses the best available control technology (BACT) evaluations for the project. Section 4.1.5 presents the air quality impact analysis for the project. Section 4.1.6 discusses the meteorological data selection process required to analyze the impacts of the project. Section 4.1.7 presents applicable laws, ordinances, regulations, and standards. Section 4.1.8 contains references cited or consulted in preparing this section. Appendices 4.1A through 4.1C contain the emissions calculations, air quality impact analysis for construction and operation phases, air dispersion modeling information, list of receptors, and regional emissions inventory data.

4.1.2 Regulatory Items Affecting New Source Review

Regulated air emissions from project operations will not exceed federal major source thresholds under nonattainment New Source Review (NSR) or Prevention of Significant Deterioration (PSD) and, therefore, federal NSR will not apply to this project. Because nonattainment NSR does not apply, emission offsets are not required. The project site is located in an area that is considered extreme nonattainment (National Ambient Air Quality Standards [NAAQS] and California Ambient Air Quality Standards [CAAQS]) for 8-hour ozone (1997, 2008, and 2015), extreme nonattainment (NAAQS and CAAQS) for 1-hour ozone (1979), nonattainment for CAAQS particulate matter less than 10 microns (PM_{10}), and serious nonattainment (NAAQS and CAAQS) for particulate matter less than 2.5 microns ($PM_{2.5}$) (2006 and 2012) (SCAQMD 2016).

SCAQMD has an NSR process that is organized into under Regulation XIII – New Source Review, Rules 1300 through 1325. The NSR process requires the following considerations:

- Emission units must meet Best Available Control Technology (BACT). BACT will be met by purchasing engines that conform to the United States Environmental Protection Agency (EPA) Tier 4 emission standards and combust diesel fuel that contains no more than 15 parts per million ppm sulfur.

The project will generate emissions of criteria air pollutants during construction and operation. NSR is concerned with the operational emissions associated with the project. The proposed project would not include any permitted sources such as an emergency generator or other emissions unit. Therefore, BACT requirements would not apply to the proposed project.

The direct construction and operation emissions impacts associated with the project are analyzed according to SCAQMD and California Energy Commission (CEC) modeling requirements. An air quality analysis was conducted to demonstrate that impacts from nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter (PM_{10} and $PM_{2.5}$) will comply with the CAAQS and NAAQS for the applicable averaging periods. Impacts from

nearby sources are not anticipated to be significant but will be assessed for criteria pollutants under separate cover if requested by SCAQMD or the CEC. The need for a cumulative source analysis will be assessed after the CEC data adequacy review. A search of the California Air Resources Board (CARB) Pollution Mapping Tool shows that the closest tracked source is an inactive electrical generating facility located approximately 4.5 miles to the southeast of the project. There are no active generating units inside of the CEC's suggested radius of 6 miles to consider nearby sources, therefore, no cumulative air quality modeling protocol is provided in this study.

Worst-case annual emissions for operation are summarized in Table 4.1-1.

Table 4.1-1. Facility Potential to Emit Summary and Major Source/Attainment Status for Operation

Pollutant	Project PTE (tpy)	Federal Attainment	State Attainment	Federal NSR Major Source Threshold (tpy)	Federal PSD Major Source Threshold (tpy)
NO ₂	0.004	Y	Y	10	250
CO	0.01	Y	Y	50	250
VOC	0.01	N/A	N/A	10	250
SO ₂	0.00003	Y	Y	70	250
PM ₁₀	0.002	Y	N	70	250
PM _{2.5}	0.001	N-serious	N	70	250
GHG (CO ₂ e)	327	N/A	N/A	N/A	75,000
Ozone	N/A	N-extreme	N	N/A	N/A

Notes: tpy = tons per year; N/A = not applicable; NSR = new source review; PSD = prevention of significant deterioration; NO₂ = nitrogen dioxide; CO = carbon monoxide; VOC = volatile organic compounds; SO₂ = sulfur dioxide; PM₁₀ = particulate matter less than 10 microns; PM_{2.5} = particulate matter less than 2.5 microns; GHG = greenhouse gases; CO₂e = carbon dioxide equivalent. Greenhouse gas (GHG) can only be a major source under PSD if another regulated pollutant is a major source for PSD. **Source:** EPA 2023a.

4.1.3 Emissions Evaluation

4.1.3.1 Facility Emissions

As shown in Table 4.1-1, the proposed project would not result in emissions that exceed the major source screening threshold of 250 tons per year. Therefore, the proposed project would be considered a NSR minor source for all criteria air pollutants under federal regulations. As such, the project will not be required to implement the requirements of the federal PSD program. The SCAQMD's NSR rules requires that all emission units meet BACT standards. BACT requires utilizing engines that conform to the EPA Tier 4 emission standards and combust diesel fuel that contains no more than 15 parts per million (ppm) sulfur. The proposed project would not include any permitted sources such as an emergency generator or boiler. Therefore, BACT requirements would not apply to the proposed project. However, off-road equipment during construction would meet the Tier Final 4 emissions standard although not it is not required by SCAQMD's NSR rules. Criteria air pollutant emissions from the project are discussed in the following sections. Emissions related to hazardous air pollutants (HAPs) are discussed in Section 4.9, Public Health, of this application. Detailed emissions calculations for all air criteria pollutants are provided in Appendix 4.1A. Peak hourly, daily, and annual emissions of criteria air pollutants are based on the anticipated construction schedule and hours of use for the off-road equipment.

4.1.3.2 Normal Operations

Construction and operation of the proposed project would include activities that would require the use of off-road diesel-fueled equipment. Use of the off-road equipment during construction activities would result in criteria air pollutant and toxic air pollutant emissions to the South Coast Air Basin (SCAB). Specifically, criteria air pollutant emissions would include emissions of volatile organic compounds (VOCs), NO_x, CO, sulfur oxides (SO_x), PM₁₀, PM_{2.5}, carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Air Toxic pollutants would consist of a combination of HAPs and other compound which are commonly generated from the combustion of diesel fuel. Table 4.1-2 lists the pollutants that may potentially be emitted by the project during regular maintenance activities. There are no other significant sources of criteria air pollutant or HAPs resulting from the operation of the project. Commissioning of the project is not anticipated to require significant time or result in emissions that are beyond the scope of normal operation captured in this analysis. As such, no air emission testing is anticipated for commissioning of the project.

Table 4.1-2. Air Pollutants Emitted by the Project

Criteria Air Pollutants	Greenhouse Gases	Toxic Air Contaminants
Volatile Organic Compounds	Carbon Dioxide	Diesel Particulate Matter
Nitrogen Oxides	Methane	—
Carbon Monoxide	Nitrous Oxide	
Particulate Matter Less than 10 microns	—	
Particulate Matter Less than 2.5 microns		

4.1.3.3 Criteria Pollutant Emissions

Criteria air pollutant emissions would be released from the use of diesel fueled off-road equipment during construction and from periodic maintenance during operation. Table 4.1-3 shows the maximum short term (pounds per hour [lb/hr]) and annual criteria pollutant emissions for the worst-case scenario during operation. See Appendix 4.1A for detailed calculations for criteria air pollutant emissions.

Table 4.1-3. Facility Maximum Emissions Rate and PTE Summary for Operation

Criteria Air Pollutants	Maximum Emissions Rate (lb/hr)	Potential to Emit (tpy)
NO ₂	0.4422	0.004
CO	0.4131	0.01
VOC	0.0514	0.01
SO ₂	0.0012	0.00003
PM ₁₀	0.0253	0.002
PM _{2.5}	0.0183	0.001
CO _{2e}	315.75	327

Source: Appendix 4.1A.

Notes: lb/hr = pounds per hour; tpy = tons per year; NO_x = nitrogen oxides; CO = carbon monoxide; VOC = volatile organic compounds; SO₂ = sulfur dioxide; PM₁₀/PM_{2.5} = particulate matter less than 10 or less than 2.5 microns; CO_{2e} = carbon dioxide equivalent.

Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions have been estimated for both construction and operation of the project. Table 4.1-3 shows the GHG emissions from operation of the project. Appendix 4.1A provides GHG emissions details for all phases of construction.

4.1.3.4 Hazardous Air Pollutants

Section 4.9, Public Health, provides a detailed quantitative analysis on HAPs emissions from operation of the project and a health risk assessment.

4.1.3.5 Construction Emissions

Construction of the proposed project is estimated to require 15 months to complete. Construction activity and the resulting emissions at the project site would be in line with emissions at most construction sites. Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (e.g., off-road construction equipment, soil disturbance, and VOC off-gassing from architectural coatings and asphalt pavement). Specifically, entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in PM₁₀ and PM_{2.5} emissions. Internal combustion engines used by construction equipment, haul trucks, vendor trucks (i.e., delivery trucks), and worker vehicles would result in emissions of VOC, NO_x, CO, PM₁₀, and PM_{2.5}. Construction emissions can vary substantially from day to day depending on the level of activity, the specific type of operation, and, for dust, the prevailing weather conditions. Emissions estimates resulting from construction of the project can be found in Appendix 4.1A.

The proposed project would be required to incorporate reduction measures as required by SCAQMD Rule 403 and Rule 1113. SCAQMD Rule 403, Fugitive Dust, requires the implementation of measures to control the emission of visible fugitive/nuisance dust, such as wetting soils that would be disturbed. It was assumed that the active sites would be watered at least twice daily. Rule 1113, Architectural Coatings, requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

The SCAQMD CEQA Air Quality Significance Thresholds, as revised in March 2023, set forth quantitative emission significance thresholds for criteria air pollutants, which, if exceeded, would indicate the potential for a project to contribute to violations of the NAAQS or CAAQS. Table 4.1-4 lists the revised SCAQMD Air Quality Significance Thresholds (SCAQMD 2023).

Table 4.1-4. South Coast Air Quality Management District Air Quality Significance Thresholds

Criteria Pollutants Mass Daily Thresholds		
Pollutant	Construction (Pounds per Day)	Operation (Pounds per Day)
VOCs	75	55
NO _x	100	55
CO	550	550
SO _x	150	150
PM ₁₀	150	150

Table 4.1-4. South Coast Air Quality Management District Air Quality Significance Thresholds

Criteria Pollutants Mass Daily Thresholds		
Pollutant	Construction (Pounds per Day)	Operation (Pounds per Day)
PM _{2.5}	55	55
Lead ^a	3	3
TACs and Odor Thresholds		
TACs ^b	Maximum incremental cancer risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic and acute hazard index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	

Source: SCAQMD 2023.

Notes: VOCs = volatile organic compounds; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM₁₀ = coarse particulate matter; PM_{2.5} = fine particulate matter; TAC = toxic air contaminant; SCAQMD = South Coast Air Quality Management District.

^a The phase-out of leaded gasoline started in 1976. Since gasoline no longer contains lead, the project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.

^b TACs include carcinogens and noncarcinogens.

Table 4.1-5 shows the estimated maximum daily construction emissions associated with the construction phase of the project.

Table 4.1-5. Estimated Maximum Daily Construction Criteria Air Pollutant Emissions

Year	VOC	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
	Pounds Per Day					
2025	3.96	58.36	181.36	0.38	16.92	6.54
2026	1.03	16.27	46.89	0.09	1.15	0.39
<i>SCAQMD Threshold</i>	<i>75</i>	<i>100</i>	<i>550</i>	<i>150</i>	<i>150</i>	<i>55</i>
Threshold Exceeded?	No	No	No	No	No	No

Source: Appendix 4-1A.

Notes: VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM₁₀ = coarse particulate matter; PM_{2.5} = fine particulate matter; SCAQMD = South Coast Air Quality Management District.

The values shown are the maximum summer or winter daily emissions results from the California Emissions Estimator Model (CalEEMod). These estimates reflect control of fugitive dust required by SCAQMD Rule 403.

As shown in Table 4.1-5 daily construction emissions would not exceed the SCAQMD significance thresholds for VOC, NO_x, CO, SO_x, PM₁₀, or PM_{2.5} during project construction, and short-term construction impacts would be less than significant.

Localized Significance Thresholds Analysis

Construction activities associated with the project would result in temporary sources of on-site fugitive dust and construction equipment emissions. A localized significance threshold (LST) analysis has been prepared to determine potential impacts to nearby sensitive receptors during construction of the project. As indicated in the discussion of the thresholds of significance, SCAQMD recommends the evaluation of localized NO₂, CO, PM₁₀, and PM_{2.5} impacts as a result of construction activities to sensitive receptors in the immediate vicinity of the project site. The impacts were analyzed using methods consistent with those in SCAQMD's Final Localized Significance

Threshold Methodology (2009). According to the Final Localized Significance Threshold Methodology, “off-site mobile emissions from the project should not be included in the emissions compared to the LSTs” (SCAQMD 2009). Trucks and worker trips associated with the project are not expected to cause substantial air quality impacts to sensitive receptors along off-site roadways since emissions would be relatively brief in nature and would cease once the vehicles pass through the main streets. Nonetheless, if effort to conservatively capture potential vehicle activity within the project boundary (i.e., fence line), a small portion (i.e., 1,000 feet [0.19 miles]) of the off-site vehicle travel for worker vehicles, vendor trucks, and haul trucks were conservatively assumed as on-site emissions for the LST analysis. The allowable emission rates depend on the following parameters:

1. Source-Receptor Area (SRA) in which the project is located
2. Size of the project site
3. Distance between the project site and the nearest sensitive receptor (e.g., residences, schools, hospitals)

The project site is located in SRA 21 (Capistrano Valley). LST pollutant screening level concentration data is currently published for 1-, 2-, and 5-acre sites for varying distances (25, 50, 100, 200, and 500 meters). The SCAQMD “Fact Sheet for Applying CalEEMod to Localized Significance Thresholds” (SCAQMD 2011) provides estimated acres per 8-hour day for crawler tractors, graders, rubber-tired dozers, and scrapers to assist in estimating the maximum number of acres disturbed on the peak day. Because these earth-moving pieces of equipment are anticipated to be used, the estimated maximum acres per day using this approach would be 2 acres. Therefore 2-acre site was assumed for the look-up tables. The nearest sensitive-receptor land use is located approximately 280 feet east of the project site across Interstate 5. Accordingly, the distance in the LST look-up table of 200 meters is assumed to conduct a conservative analysis. The estimated maximum daily on-site construction emissions generated by the project are presented in Table 4.1-6 and compared to the applicable SCAQMD LSTs.

Table 4.1-6. Localized Significance Thresholds Analysis for Project Construction

Maximum On-Site Emissions	NO ₂	CO	PM ₁₀	PM _{2.5}
	Pounds per Day			
Summer				
2025	30.49	96.52	0.30	0.29
2026	N/A	N/A	N/A	N/A
Maximum Daily Emissions	30.49	96.52	0.30	0.29
Winter				
2025	34.46	160.43	8.30	4.09
2026	14.98	44.20	0.13	0.13
Maximum Daily Emissions	34.46	160.43	8.30	4.09
<i>SCAQMD LST</i>	<i>165</i>	<i>2,615</i>	<i>55</i>	<i>22</i>
LST Exceeded?	No	No	No	No

Source: SCAQMD 2008.

Notes: NO₂ = nitrogen dioxide; CO = carbon monoxide; PM₁₀ = coarse particulate matter; PM_{2.5} = fine particulate matter; N/A = not applicable or available; SCAQMD = South Coast Air Quality Management District; LST = localized significance threshold.

Localized significance thresholds are shown for a 2-acre project site corresponding to a distance to a sensitive receptor of 200 meters.

As shown in Table 4.1-6, proposed construction activities would not generate emissions in excess of site-specific LSTs for NO_x, CO, PM₁₀, and PM_{2.5}.

4.1.3.6 Operational Emissions

Operation of the proposed project would generate VOC, NO_x, CO, SO_x, PM₁₀, and PM_{2.5} emissions from area sources, energy sources and mobile sources, which are discussed below. Emissions from these sources were estimated based on California Emissions Estimator Model (CalEEMod) default assumptions for operations of the proposed project land uses. It was assumed that the project would be operational following the completion of construction, which would occur in 2026.

Area Sources

The area source category calculates direct sources of air pollutant emissions located at the project site, including consumer product use and landscape maintenance equipment. CalEEMod defaults were used to estimate emissions from area sources during operation of the project.

Consumer products are various solvents used in non-industrial applications that emit VOCs during their product use, including detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products. Consumer product VOC emissions are estimated in CalEEMod based on the floor area of buildings and on the default factor of pounds of VOC per building square foot per day. The CalEEMod default utilization rates and emission factors were assumed.

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chainsaws, and hedge trimmers, as well as air compressors, generators, and pumps. The emissions associated from landscape equipment use were estimated using CalEEMod. The emission factors are multiplied by the number of summer days that represent the number of operational days.

Energy Sources

As represented in CalEEMod, energy sources include emissions associated with building electricity. Electricity use would contribute indirectly to criteria air pollutant emissions; however, the emissions from electricity use are only quantified for GHGs in CalEEMod, since criteria pollutant emissions occur at the site of the power plant, which is typically off site. The project does not include the use of natural gas during operation. Therefore, no emissions associated with energy sources were quantified for the air quality analysis. The estimated annual electricity consumption from the project was provided by the applicant and assumed to be 10,950 megawatt-hours per year.

Mobile Sources

Following the completion of construction activities, the project would generate criteria pollutant emissions from mobile sources (vehicular traffic) as a result of the periodic maintenance of the project. The project was assumed to require up to 2 employees visiting the BESS facility sites 1 day a week for maintenance. The estimated trip lengths and trip modes were based on data provided by the project applicant. CalEEMod was used to estimate emissions from proposed vehicular sources (refer to Appendix 4.1A). CalEEMod default data, including temperature, trip characteristics, variable start information, and emissions factors, were conservatively used for the model inputs. Project-related traffic was assumed to include a mixture of vehicles in accordance with the associated use, as modeled within CalEEMod, which is based on the CARB EMFAC2021 model. Emission factors representing the vehicle mix and emissions for 2026 were used to estimate emissions associated with vehicular sources.

Off-Road Sources

During irregular maintenance, the project may require the movement or replacement of battery enclosures during the lifetime of the project. As such, the use of one crane was assumed to assist the lifting and movement of the BESS containers. CalEEMod was used to estimate criteria air pollutant emissions of the crane assuming 8 hours of operation on 1 day every year.

Table 4.1-7 presents the unmitigated maximum daily emissions associated with the operation of the project in 2026 after all phases of construction have been completed. Complete details of the emissions calculations are provided in Appendix 4.1A. Emissions represent maximum of summer and winter. “Summer” emissions are representative of the conditions that may occur during the ozone (O₃) season (May 1 to October 31), and “winter” emissions are representative of the conditions that may occur during the balance of the year (November 1 to April 30).

Table 4.1-7. Estimated Maximum Daily Operational Criteria Air Pollutant Emissions

Source	VOC	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
	Pounds per Day					
Summer						
Mobile	0.01	0.09	0.19	<0.01	0.06	0.02
Area	0.03	<0.01	0.04	<0.01	<0.01	<0.01
Energy	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.37	3.45	3.07	<0.01	0.14	0.13
Total	0.41	3.54	3.30	0.01	0.20	0.15
Winter						
Mobile	0.01	0.09	0.17	<0.01	0.06	0.02
Area	0.02	N/A	N/A	N/A	N/A	N/A
Energy	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.37	3.45	3.07	0.01	0.14	0.13
Total	0.40	3.54	3.24	0.01	0.20	0.15
Maximum Daily Emissions						
Maximum	0.41	3.54	3.30	0.01	0.20	0.15
<i>SCAQMD threshold</i>	55	55	550	150	150	55
Threshold exceeded?	No	No	No	No	No	No

Notes: VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM₁₀ = coarse particulate matter; PM_{2.5} = fine particulate matter; N/A = not applicable or available; SCAQMD = South Coast Air Quality Management District. <0.01 = reported value is less than 0.01.

See Appendix 4.1A for complete results.

The values shown are the maximum summer or winter daily emissions results from CalEEMod. Columns may not add due to rounding.

As shown in Table 4.1-7, daily operational emissions for the project would not exceed SCAQMD’s significance thresholds for any criteria air pollutant. Therefore, the project would result in a **less-than-significant impact** related to emissions of criteria air pollutant emissions during operation.

4.1.4 Best Available Control Technology Evaluation

4.1.4.1 Current Control Technologies

BACT will be met by purchasing engines certified to meet EPA Tier 4 emissions for the applicable size and type of engine. Based on the proposed engines for project operation, Table 4.1-8 shows emission limits must be met per SCAQMD BACT Guidelines for Non-Major Polluting Facilities.

Table 4.1-8. SCAQMD BACT Guidelines for Non-major Polluting Facilities - Portable Engines^a

Subcategory	Rating Size (horsepower)	Criteria Air Pollutants (g/kW-hr)					
		VOCs	NO _x	NO _x + NMHC ^b	SO _x	CO	PM ^c
Compression Ignition ^d	50 <HP>75	NA	NA	4.7	Sulfur content no greater than 0.0015% by weight	5.0	0.03
	75<HP>175		0.40	0.19		5.0	0.02
	175<HP>750 ^e		0.4	0.19		3.5	0.02
	>750 HP		3.5	0.4		3.5	0.10
Spark Ignition	All	1.5	1.5	NA	NA	.20	NA

Source: SCAQMD 2022b.

Notes: g/kW-hr = grams per kilowatt hour; VOCs = volatile organic compounds; NO_x = oxides of nitrogen; NMHC = non-methane hydrocarbons; SO_x = sulfur oxides; CO = carbon monoxide; PM = particulate matter; HP = horsepower; NA = not applicable.

- ^a BACT for portable engines is determined by deemed complete date of permit application, not date of manufacture or installation.
- ^b NMHC + NO_x means the sum of non-methane hydrocarbons and oxides of nitrogen emissions, unless specified as “NMHC only,” which only includes NMHC emissions.
- ^c The PM limits in the table only apply to filterable PM. ^dThe engine must be certified by EPA or CARB to meet the Tier 4 emissions requirements of 40 CFR part 89 – Control of Emissions from New and In-use Nonroad Compression-Ignition Engines shown in the table or otherwise demonstrate that it meets the Tier 4 emissions limits. If, because of the averaging, banking, and trading program, there is no new engine from any manufacturer that meets the above standards, then the engine must meet the family emissions limits established by the manufacturer and approved by the EPA. Based on the model year, the CARB Airborne Toxic Control Measure for portable diesel engines requires in-use portable diesel engines to be certified to Tier 1, 2, 3, or 4 by their respective deadlines, all of which have passed.
- ^e CARB has extended the Tier 4 Final requirements deadline “until further notice” for Portable, Compression-Ignition Engines for HP > 750.

4.1.4.2 Proposed Best Available Control Technology

No permitted stationary or portable emission sources are proposed as part of the project operation. Therefore, BACT requirements are not applicable to the operation of the project.

4.1.5 Air Quality Impact Analysis

This section discusses the methodology and analysis results. The spatial extent and magnitude of ground-level emissions concentrations resulting from construction of the project. The maximum-modeled concentrations were added to the maximum background concentrations to assess against the applicable thresholds. Dispersion

modeling methods follow the EPA approved methods established in 40CFR Part 51 Appendix W and SCAQMD Modeling Guidance for AERMOD (SCAQMD n.d.).

4.1.5.1 Climate and Meteorology

The SCAB is characterized as having a Mediterranean climate (typified as semiarid with mild winters, warm summers, and moderate rainfall). The general region lies in the semi-permanent high-pressure zone of the eastern Pacific; as a result, the climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

Moderate temperatures, comfortable humidity, and limited precipitation characterize the climate in the SCAB. The average annual temperature varies little throughout the SCAB, averaging 75°F. However, with a less-pronounced oceanic influence, the eastern inland portions of the SCAB show greater variability in annual minimum and maximum temperatures. All portions of the SCAB have recorded temperatures over 100°F in recent years. Although the SCAB has a semiarid climate, the air near the surface is moist because of the presence of a shallow marine layer. Except for infrequent periods when dry air is brought into the SCAB by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as “high fog,” are a characteristic climate feature. Annual average relative humidity is 70% at the coast and 57% in the eastern part of the SCAB. Precipitation in the SCAB is typically 9 to 14 inches annually and is rarely in the form of snow or hail because of typically warm weather. Most of the rainfall in Southern California occurs between late fall and early spring, with most rain typically occurring in the months of January and February (SCAQMD 2017).

4.1.5.2 Dispersion Modeling Methodology

Construction Modeling Scenario

See Section 4.1.3.5 for a discussion of the construction modeling scenario.

Operational Modeling Scenario

The project will include the development of an approximately 250 MW BESS and associated infrastructure. A BESS is a stationary equipment that receives electrical energy and then utilizes batteries to store that energy to supply electrical energy at a future time. Power released or captured by the proposed project will be transferred to and from the SDG&E Trabuco to Capistrano 138 kV transmission line via a loop-in generation transmission line that will interconnect to an SDG&E switchyard to be constructed within the project site. The project will consist of lithium-ion batteries, installed in racks and contained inside non-habitable enclosures; inverters; MV transformers; an SDG&E switchyard; a project substation; and other associated equipment. The project site would be monitored remotely and would only require periodic maintenance. Therefore, the proposed project would not result in regular on-site emissions during normal operation, and emission concentrations are anticipated to be less than those from construction. Therefore, no operational modeling was conducted.

Emissions Inventory

As discussed in Section 4.1.3.5, construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (e.g., off-road construction equipment, soil disturbance, and VOC off-gassing from architectural coatings and asphalt pavement). Specifically, entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in PM₁₀ and PM_{2.5} emissions.

Internal combustion engines used by construction equipment, haul trucks, vendor trucks (i.e., delivery trucks), and worker vehicles would result in emissions of VOC, NO_x, CO, PM₁₀, and PM_{2.5}. CalEEMod Version 2022.1 was used to estimate emissions from construction of the proposed project. Detailed emissions assumptions can be found in Appendix 4.1 A.

4.1.5.3 Additional Model Selection

Additional models/programs described below were used to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations.

- CalEEMod is a statewide computer model developed in cooperation with air districts throughout the state to quantify criteria air pollutant and GHG emissions associated with construction activities and operation of a variety of land use projects, such as residential, commercial, and industrial facilities. CalEEMod input parameters, including the land use type used to represent the project and its size, construction schedule, and anticipated use of construction equipment, were based on information provided by the applicant or default model assumptions if project specifics were unavailable.
- HARP Air Dispersion Modeling and Risk Tool (version 21081) was used to estimate human health risks related to cancer, chronic non-cancer, and acute health effects. More discussion about HARP is provided in Section 4.9, Public Health.

4.1.5.4 Modeling Parameters

The dispersion modeling was performed using the American Meteorological Society/EPA Regulatory Model (AERMOD), which is the model SCAQMD requires for atmospheric dispersion of emissions. AERMOD is a steady-state Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of surface and elevated sources, building downwash, and simple and complex terrain (EPA 2023b). Principal parameters of this modeling are presented in Table 4.1-9.

Table 4.1-9. AERMOD Principal Parameters

Parameter	Details
Meteorological Data	The latest 3-year meteorological data (2011–2014 and 2016) for the Mission Viejo Station were obtained from SCAQMD as the recommended meteorological station and input to AERMOD.
Urban versus Rural Option	Urban areas typically have more surface roughness, as well as structures and low-albedo surfaces that absorb more sunlight—and thus more heat—relative to rural areas. Per the SCAQMD guidelines, the land use procedure from 4.4.1 of the OEHA Guidance Manual indicated that urban dispersion was appropriate for the project site.
Terrain Characteristics	The elevation of the modeled site is 67 meters above sea level. Digital elevation model files were imported into AERMOD so that complex terrain features were evaluated as appropriate.
Elevation Data	Digital elevation data were imported into AERMOD, and elevations were assigned to the emission sources and receptors. Digital elevation data were obtained through AERMOD View in the U.S. Geological Survey’s National Elevation Dataset format with a 30-meter resolution.
Emission Sources and Release Parameters	Air dispersion modeling from construction equipment was conducted using emissions estimated using CalEEMod, assuming emissions would occur 8 hours per day, 5 days per week. Vehicle trips were modified to account only for emissions occurring within

Table 4.1-9. AERMOD Principal Parameters

Parameter	Details
	0.25 miles of the project site (SJVAPCD 2018). The proposed project area was modeled as a series of adjacent line-volume sources.
Source Release Characterizations	The modeled line of volume sources was placed to cover the site for exhaust emissions. A plume height dimension of 10 meters, a plume width dimension of 10 meters, and a release height of 5 meters was assumed for off-road equipment and diesel trucks (SCAQMD 2008).
Receptors	A cartesian plant boundary with 25-meter spacing was placed around the project site. A uniform cartesian grid of 50-meter spacing was placed out to 500 meters from the project site, and a uniform cartesian grid of 100-meter spacing was placed out to 1,000 meters from the project site (SCAQMD n.d.).
Variable Emissions	The variable emissions scenario was used to limit the emissions from construction in accordance with the noise ordinance of the City of San Juan Capistrano Municipal Code, Title 9, Chapter 3, Article 5, which limits construction from 6:00 p.m. to 7:00 a.m. on Monday through Friday, or from 4:30 p.m. to 8:30 a.m. on Saturday.

Notes: AERMOD = American Meteorological Society/EPA Regulatory Model; SCAQMD = South Coast Air Quality Management District; CalEEMod = California Emissions Estimator Model.
See Appendix 4.1B for additional information.

All NO₂ concentrations were estimated using the Ambient Ratio Method Version 2 (ARM2), which is a regulatory default option and commonly used in practice. The default minimum NO₂/NO_x conversion ratio of 0.5 and maximum conversion ratio of 0.9 were used for both 1-hour and annual averaging periods. There are no point sources associated with construction or operation of the project. Therefore, stack height analysis is not applicable. All pollutants were modeled in accordance with their respective ambient air quality standards (AAQS) averaging times.

Monitoring data for the SCAB were obtained via the SCAQMD's Historical Data by Year for comparison to applicable AAQs. Modeled maximum 24-hour and annual concentrations of PM₁₀ and PM_{2.5} were compared directly to the significant change thresholds of 2.5 and 1.0 micrograms/cubic meter, respectively.

The most recent 3 years of available monitoring data were used to develop background concentration values. For all CAAQS and most NAAQS pollutants, the maximum value from the most recent 3 years were used except for the NAAQS pollutants with special design values including the 1-hour NO₂ (3-year average of the 98th percentile of the daily maximum 1-hour average) and 1-hour SO₂ (3-year average of the 99th percentile of the daily maximum 1-hour average) (SCAQMD n.d.).

4.1.5.5 Background Air Quality

Ambient Air Quality Standards

Criteria air pollutants are defined as pollutants for which the federal and state governments have established AAQS, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include O₃, NO₂, CO, SO₂, PM₁₀, PM_{2.5}, and lead. The federal government and state government have established NAAQS and CAAQS, respectively, for each of these pollutants. The CAAQS are generally more restrictive than the NAAQS. The NAAQS and CAAQS are presented in Table 4.1-10, Ambient Air Quality Standards.

Table 4.1-10. Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards ^a	National Standards ^b	
		Concentration ^c	Primary ^{c,d}	Secondary ^{c,e}
Ozone (O ₃)	1 hour	0.09 ppm (180 µg/m ³)	—	Same as Primary Standard ^f
	8 hours	0.070 ppm (137 µg/m ³)	0.070 ppm (137 µg/m ³) ^f	
Nitrogen dioxide (NO ₂) ^g	1 hour	0.18 ppm (339 µg/m ³)	0.100 ppm (188 µg/m ³)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	
Carbon monoxide (CO)	1 hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	None
	8 hours	9.0 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	
Sulfur dioxide (SO ₂) ^h	1 hour	0.25 ppm (655 µg/m ³)	0.075 ppm (196 µg/m ³)	—
	3 hours	—	—	0.5 ppm (1,300 µg/m ³)
	24 hours	0.04 ppm (105 µg/m ³)	0.14 ppm (for certain areas) ^g	—
	Annual	—	0.030 ppm (for certain areas) ^g	—
Course Particulate Matter (PM ₁₀) ⁱ	24 hours	50 µg/m ³	150 µg/m ³	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m ³	—	
Fine Particulate Matter (PM _{2.5}) ⁱ	24 hours	—	35 µg/m ³	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m ³	12.0 µg/m ³	15.0 µg/m ³
Lead ^{j,k}	30-day Average	1.5 µg/m ³	—	—
	Calendar Quarter	—	1.5 µg/m ³ (for certain areas) ^k	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 µg/m ³	
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m ³)	—	—
Vinyl chloride ^j	24 hours	0.01 ppm (26 µg/m ³)	—	—
Sulfates	24 hours	25 µg/m ³	—	—
Visibility-reducing particles	8 hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%	—	—

Source: CARB 2016.

Notes: ppm = parts per million by volume; µg/m³ = micrograms per cubic meter; mg/m³= milligrams per cubic meter; PST = Pacific Standard Time.

- a California standards for O₃, CO, SO₂ (1-hour and 24-hour), NO₂, suspended particulate matter—PM₁₀, PM_{2.5}, and visibility-reducing particles—are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
- b National standards (other than O₃, NO₂, SO₂, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O₃ standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM_{2.5}, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.
- c Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 °C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25 °C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
- d National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
- e National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- f On October 1, 2015, the primary and secondary NAAQS for O₃ were lowered from 0.075 ppm to 0.070 ppm.
- g To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
- h On June 2, 2010, a new 1-hour SO₂ standard was established, and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO₂ national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
- i On December 14, 2012, the national annual PM_{2.5} primary standard was lowered from 15 µg/m³ to 12.0 µg/m³. The existing national 24-hour PM_{2.5} standards (primary and secondary) were retained at 35 µg/m³, as was the annual secondary standard of 15 µg/m³. The existing 24-hour PM₁₀ standards (primary and secondary) of 150 µg/m³ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
- j CARB has identified lead and vinyl chloride as toxic air contaminants (TACs) with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
- k The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

Criteria Air Pollutant Health Effects

Criteria air pollutants and their health effects are discussed in the following paragraphs.¹

Ozone. O₃ is a strong-smelling, pale blue, reactive, toxic chemical gas consisting of three oxygen atoms. It is a secondary pollutant formed in the atmosphere by a photochemical process involving the sun's energy and O₃ precursors. These precursors are mainly NO_x and VOCs. The maximum effects of precursor emissions on O₃ concentrations usually occur several hours after they are emitted and many miles from the source. Meteorology and terrain play major roles in O₃ formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. O₃ exists in the upper atmosphere O₃ layer (stratospheric O₃) and at the Earth's surface in the troposphere (ground-level O₃).² The O₃ that EPA and CARB regulate as a criteria air pollutant is produced close to the ground level, where people live, exercise, and breathe. Ground-level O₃ is a harmful air pollutant that causes numerous adverse health effects and is thus considered "bad" O₃. Stratospheric, or "good," O₃ occurs naturally in the upper atmosphere, where it reduces the

¹ The descriptions of the criteria air pollutants and associated health effects are based on EPA's "Criteria Air Pollutants" (EPA 2023c), as well as CARB's "Glossary" (CARB 2023a).

² The troposphere is the layer of the Earth's atmosphere nearest to the surface of the Earth. The troposphere extends outward about 5 miles at the poles and about 10 miles at the equator.

amount of ultraviolet light (i.e., solar radiation) entering the Earth's atmosphere. Without the protection of the beneficial stratospheric O₃ layer, plant and animal life would be seriously harmed.

O₃ in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) to O₃ at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes (EPA 2013).

Inhalation of O₃ causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms. Exposure to O₃ can reduce the volume of air that the lungs breathe in, thereby causing shortness of breath. O₃ in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. The occurrence and severity of health effects from O₃ exposure vary widely among individuals, even when the dose and the duration of exposure are the same. Research shows adults and children who spend more time outdoors participating in vigorous physical activities are at greater risk from the harmful health effects of O₃ exposure. While there are relatively few studies on the effects of O₃ on children, the available studies show that children are no more or less likely to suffer harmful effects than adults. However, there are a number of reasons why children may be more susceptible to O₃ and other pollutants. Children and teens spend nearly twice as much time outdoors and engaged in vigorous activities as adults. Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults. Also, children are less likely than adults to notice their own symptoms and avoid harmful exposures. Further research may be able to better distinguish between health effects in children and adults. Children, adolescents, and adults who exercise or work outdoors, where O₃ concentrations are the highest, are at the greatest risk of harm from this pollutant (CARB 2023b).

Nitrogen Dioxide. NO₂ is a brownish, highly reactive gas that is present in all urban atmospheres. The major mechanism for the formation of NO₂ in the atmosphere is the oxidation of the primary air pollutant nitric oxide, which is a colorless, odorless gas. NO_x plays a major role, together with VOCs, in the atmospheric reactions that produce O₃. NO_x is formed from fuel combustion under high temperature or pressure. In addition, NO_x is an important precursor to acid rain and may affect both terrestrial and aquatic ecosystems. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers.

A large body of health science literature indicates that exposure to NO₂ can induce adverse health effects. The strongest health evidence, and the health basis for the ambient air quality standards for NO₂, results from controlled human exposure studies that show that NO₂ exposure can intensify responses to allergens in allergic asthmatics. In addition, a number of epidemiological studies have demonstrated associations between NO₂ exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses. Infants and children are particularly at risk because they have disproportionately higher exposure to NO₂ than adults due to their greater breathing rate for their body weight and their typically greater outdoor exposure duration. Several studies have shown that long-term NO₂ exposure during childhood, the period of rapid lung growth, can lead to smaller lungs at maturity in children with higher levels of exposure compared to children with lower exposure levels. In addition, children with asthma have a greater degree of airway responsiveness compared with adult asthmatics. In adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease (CARB 2023c).

Carbon Monoxide. CO is a colorless, odorless gas formed by the incomplete combustion of hydrocarbon, or fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the project location, automobile exhaust accounts for the majority of CO emissions. CO

is a nonreactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, which is a typical situation at dusk in urban areas from November to February. The highest levels of CO typically occur during the colder months of the year, when inversion conditions are more frequent.

CO is harmful because it binds to hemoglobin in the blood, reducing the ability of blood to carry oxygen. This interferes with oxygen delivery to the body's organs. The most common effects of CO exposure are fatigue, headaches, confusion and reduced mental alertness, light-headedness, and dizziness due to inadequate oxygen delivery to the brain. For people with cardiovascular disease, short-term CO exposure can further reduce their body's already compromised ability to respond to the increased oxygen demands of exercise, exertion, or stress. Inadequate oxygen delivery to the heart muscle leads to chest pain and decreased exercise tolerance. Unborn babies whose mothers experience high levels of CO exposure during pregnancy are at risk of adverse developmental effects. Unborn babies, infants, elderly people, and people with anemia or with a history of heart or respiratory disease are most likely to experience health effects with exposure to elevated levels of CO (CARB 2023d).

Sulfur Dioxide. SO₂ is a colorless, pungent gas formed primarily from incomplete combustion of sulfur-containing fossil fuels. The main sources of SO₂ are coal and oil used in power plants and industries; as such, the highest levels of SO₂ are generally found near large industrial complexes. In recent years, SO₂ concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO₂ and limits on the sulfur content of fuels.

Controlled human exposure and epidemiological studies show that children and adults with asthma are more likely to experience adverse responses with SO₂ exposure, compared with the non-asthmatic population. Effects at levels near the 1-hour standard are those of asthma exacerbation, including bronchoconstriction accompanied by symptoms of respiratory irritation such as wheezing, shortness of breath, and chest tightness, especially during exercise or physical activity. Also, exposure at elevated levels of SO₂ (above 1 part ppm) results in increased incidence of pulmonary symptoms and disease, decreased pulmonary function, and increased risk of mortality. Older people and people with cardiovascular disease or chronic lung disease (such as bronchitis or emphysema) are most likely to experience these adverse effects (CARB 2023e).

SO₂ is of concern both because it is a direct respiratory irritant and because it contributes to the formation of sulfate and sulfuric acid in particulate matter (NRC 2005). People with asthma are of particular concern, both because they have increased baseline airflow resistance and because their SO₂-induced increase in airflow resistance is greater than in healthy people, and it increases with the severity of their asthma (NRC 2005). SO₂ is thought to induce airway constriction via neural reflexes involving irritant receptors in the airways (NRC 2005).

Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. PM_{2.5} and PM₁₀ represent fractions of particulate matter. Major sources of PM₁₀ include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. PM_{2.5} results from fuel combustion (e.g., from motor vehicles and power generation and industrial facilities), residential fireplaces, and woodstoves. In addition, PM_{2.5} can be formed in the atmosphere from gases such as SO_x, NO_x, and VOCs.

PM_{2.5} and PM₁₀ pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. PM_{2.5} and PM₁₀ can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the bloodstream, causing damage elsewhere in the body. Additionally, these substances can transport adsorbed gases such as chlorides or ammonium into the lungs, also causing injury. Whereas PM₁₀ tends to collect in the upper portion of the respiratory system, PM_{2.5} is so tiny that it can penetrate deeper into the lungs and damage lung tissue. Suspended particulates also damage and discolor surfaces on which they settle and produce haze and reduce regional visibility.

A number of adverse health effects have been associated with exposure to both PM_{2.5} and PM₁₀. For PM_{2.5}, short-term exposures (up to 24-hour duration) have been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. These adverse health effects have been reported primarily in infants, children, and older adults with preexisting heart or lung diseases. In addition, of all of the common air pollutants, PM_{2.5} is associated with the greatest proportion of adverse health effects related to air pollution, both in the United States and worldwide based on the World Health Organization's Global Burden of Disease Project. Short-term exposures to PM₁₀ have been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits (CARB 2017).

Long-term exposure (months to years) to PM_{2.5} has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children. The effects of long-term exposure to PM₁₀ are less clear, although several studies suggest a link between long-term PM₁₀ exposure and respiratory mortality. The International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer (CARB 2017).

Lead. Lead in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline; the manufacturing of batteries, paints, ink, ceramics, and ammunition; and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phaseout of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phaseout of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emissions sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient (IQ) performance, psychomotor performance, reaction time, and growth. Children are highly susceptible to the effects of lead.

Ambient Air Quality Monitoring Data

The SCAQMD operates a network of ambient air monitoring stations throughout the SCAB, which measure ambient concentrations of pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The Mission Viejo monitoring station represents the closest monitoring station to the project for O₃, CO, PM₁₀, and PM_{2.5}. The Anaheim monitoring station represents the closest monitoring station to the project for NO₂; and the

Los Angeles monitoring station represents the closest station to the project for SO₂. Ambient concentrations of pollutants from 2020 through 2022 are presented in Table 4.1-11.

Table 4.1-11. Local Ambient Air Quality Data

Monitoring Station	Unit	Averaging Time	Agency/Method	AAQS	Measured Concentration by Year			Exceedances by Year		
					2020	2021	2022	2020	2021	2022
Ozone (O₃)										
Mission Viejo	ppm	Maximum 1-hour concentration	State	0.09	0.171	0.105	0.110	20	2	1
	ppm	Maximum 8-hour concentration	State	0.070	0.123	0.082	0.089	34	8	6
Federal			0.070	0.122	0.081	0.088	32	8	5	
Nitrogen Dioxide (NO₂)										
Anaheim	ppm	Maximum 1-hour concentration	State	0.18	0.069	0.072	0.062	0	0	0
			Federal	0.100	0.069	0.072	0.062	0	0	0
	ppm	Annual concentration	State	0.030	0.018	0.019	0.018	N/A	N/A	N/A
			Federal	0.053	0.019	0.019	0.019	N/A	N/A	N/A
Carbon Monoxide (CO)										
Mission Viejo	ppm	Maximum 1-hour concentration	State	20	1.7	1	1	0	0	0
			Federal	35	1.7	1	1	0	0	0
	ppm	Maximum 8-hour concentration	State	9.0	0.8	0.8	1	N/A	N/A	N/A
			Federal	9	0.8	1.8	1	N/A	N/A	N/A
Sulfur Dioxide (SO₂)										
Los Angeles	ppm	Maximum 1-hour concentration	Federal	0.075	0.006	0.007	0.006	0	0	0
	ppm	Maximum 24-hour concentration	State	0.04	0.009	0.001	0.001	0	0	0
			Federal	0.140	0.009	0.001	0.001	0	0	0
ppm	Annual concentration	Federal	0.030	0.001	0.001	0.0004	N/A	N/A	N/A	
Coarse Particulate Matter (PM₁₀)^a										
Mission Viejo	µg/m ³	Maximum 24-hour concentration	State	50	55.1	34.6	30.4	2	0	ND
			Federal	150	56.2	35.2	31.0	ND	0	ND
	µg/m ³	Annual concentration	State	20	ND	15.8	ND	N/A	N/A	N/A
Fine Particulate Matter (PM_{2.5})^a										
Mission Viejo	µg/m ³	Maximum 24-hour concentration	Federal	35	46.6	32.6	22.6	3	0	0

Table 4.1-11. Local Ambient Air Quality Data

Monitoring Station	Unit	Averaging Time	Agency/ Method	AAQS	Measured Concentration by Year			Exceedances by Year		
					2020	2021	2022	2020	2021	2022
	µg/m ³	Annual concentration	State	12	ND	ND	ND	N/A	N/A	N/A
Federal			12.0	9.3	9.7	9.0	N/A	N/A	N/A	

Sources: CARB 2023f, EPA 2023d.

Notes: ppm = parts per million; N/A = not available or applicable; µg/m³ = micrograms per cubic meter; ND = insufficient data available to determine the value.

Data taken from CARB iADAM (<http://www.arb.ca.gov/adam>) and EPA AirData (<http://www.epa.gov/airdata/>) represent the highest concentrations experienced over a given year.

Exceedances of federal and state standards are only shown for O₃ and particulate matter. Daily exceedances for particulate matter are estimated days because PM₁₀ and PM_{2.5} are not monitored daily. All other criteria pollutants did not exceed federal or state standards during the years shown. There is no federal standard for 1-hour O₃, annual PM₁₀, or 24-hour SO₂, nor is there a state 24-hour standard for PM_{2.5}.

The Mission Viejo monitoring station is located 26081 Via Pera, Mission Viejo, California 92691.

The Anaheim monitoring station is located at 812 W. Vermont Street, Anaheim, California 92802.

The Los Angeles monitoring station is located at 7201 W. Westchester Parkway, Los Angeles, California 90045.

^a Measurements of PM₁₀ and PM_{2.5} are usually collected every 6 days and every 1 to 3 days, respectively. Number of days exceeding the standards is a mathematical estimate of the number of days concentrations would have been greater than the level of the standard had each day been monitored.

4.1.6 Air Quality Analyses

The following sections present the analyses for determining the changes to ambient air quality concentrations in the region of the proposed project. These analyses are comprised of a screening assessment to determine the worst-case emissions from construction of the proposed project (the most intensive period of air pollutant emissions). Cumulative multisource modeling assessments, which are used to analyze the proposed project plus nearby existing sources, is not proposed because the only air emission sources present are intended from construction.

4.1.6.1 Construction Impact Analysis

The screening analysis consists of evaluating modeled project emissions against the significant impact levels (SILs) established by the EPA to determine if a project's criteria air pollutant emissions are considered inconsequential in comparison to the NAAQS. If the SILs are not exceeded, then a project's impacts would be considered insignificant, and no further analysis would be required. For completeness, this analysis also evaluates project emissions to the CAAQS and NAAQS. Modeled concentrations are compared to the SILs in Table 4.1-12. All maximum facility impacts occurred at the ambient boundary, and the estimated concentrations are all below the applicable SILs.

Table 4.1-12. Air Quality Impact Results - Significant Impact levels

Pollutant	Averaging Time	Maximum Concentration (mg/m ³)	Class II SIL (mg/m ³)
Nitrogen dioxide (NO ₂)	1 hour	80.03	7.5
	Annual	7.05	1
Carbon monoxide (CO)	1 hour	425.40	2,000
	8 hours	119.01	500
Sulfur dioxide (SO ₂)	1 hour	0.47	7.86
	3 hours	0.38	25
	24 hours	0.10	5

Table 4.1-12. Air Quality Impact Results - Significant Impact levels

Pollutant	Averaging Time	Maximum Concentration (mg/m ³)	Class II SIL (mg/m ³)
Course Particulate Matter (PM ₁₀)	24 hours	0.44	5
	Annual	0.19	1
Fine Particulate Matter (PM _{2.5})	24 hours	0.25	1.2
	Annual	0.12	0.3

Notes: CAAQS are not listed because the SIL does not apply to CAAQS. µg/m³ = micrograms per cubic meter; SIL = Significant Impact Level.

As shown in Table 4.1-12, the maximum concentrations related by the project would not exceed the SILs established by the EPA for CO, SO₂, PM₁₀, and PM_{2.5}. However, the SIL for NO_x would exceed during construction for both the 1-hour and annual averaging. Because the SIL was exceeded for NO_x, maximum combined concentrations (modeled + background) are evaluated in Table 4.1-13.

Table 4.1-13. Air Quality Impact Results - Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Concentration (µg/m ³)	Background Concentration (µg/m ³)	Total Concentration (µg/m ³)	Ambient Air Quality Standard (µg/m ³)	
					CAAQS	NAAQS
Nitrogen dioxide (NO ₂)	1 hour	80.03	95.94	175.97	339	N/A
	1 hour	80.03	95.94	175.97	N/A	188
	Annual	7.05	25.00	32.05	57	100
Carbon monoxide (CO)	1 hour	425.40	2,760	3,185.40	23,000	40,000
	8 hours	119.01	1,955	2,074.01	10,000	10,000
Sulfur dioxide (SO ₂) ^a	1 hour	0.47	20.61	21.08	655	N/A
	24 hours	0.10	3.14	3.24	105	N/A
Course Particulate Matter (PM ₁₀)	24 hours	0.44	120.00	120.44	50	N/A
	Annual	0.19	23.90	24.09	20	N/A
Fine Particulate Matter (PM _{2.5})	24 hours	0.25	54.40	54.65	-	35
	Annual	0.12	11.44	11.56	12	12
Sulfate	24 hour	0.10	5.10	5.20	25	N/A
Lead	Rolling 3-month average	0.002	0.012	0.014	N/A	0.15
	30-day average	0.002	0.016	0.018	1.5	N/A

Notes: µg/m³ = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standards; NAAQS = National Ambient Air Quality Standards; PM₁₀ = particulate matter less than 10 microns; PM_{2.5} = particulate matter less than 2.5 microns; N/A = not applicable or available.

^a Results for SO₂ and CO are reported as the H1H even though the NAAQS allows other forms of compliance. Using the H1H is a more conservative approach.

As shown in Table 4.1-13, the proposed project would not exceed the CAAQS for NAAQS after accounting for background concentrations for all criteria air pollutants except for PM₁₀ CAAQS and PM_{2.5} NAAQS. The exceedances for PM₁₀ and PM_{2.5} are due to the high level of background concentrations that already exceed the CAAQS and

NAAQS. As shown in Table 4.1-7, the project would not exceed the SIL for both the 24-hour and annual PM₁₀ concentrations and PM_{2.5} 24-hour concentration. Additionally, these emissions would be temporary and short-term construction-related emissions. Therefore, impacts would be **less than significant**.

4.1.6.2 Operational Impact Analysis

A BESS is a stationary equipment that receives electrical energy and then utilizes batteries to store that energy to supply electrical energy at a future time. Power released or captured by the proposed project will be transferred to and from the SDG&E Trabuco to Capistrano 138 kV transmission line via a loop-in generation transmission line that will interconnect to an SDG&E switchyard to be constructed within the project site. The project will consist of lithium-ion batteries, installed in racks and contained inside non-habitable enclosures; inverters; MV transformers; an SDG&E switchyard; a project substation; and other associated equipment. The project site would be monitored remotely and would only require periodic maintenance. Therefore, the proposed project would not result in regular on-site emissions during normal operation and emission concentrations are anticipated to be less than those from construction. Therefore, no operational modeling was conducted.

4.1.6.3 BESS Commissioning Impact Analysis

Commissioning of the project is not anticipated to have any additional impacts beyond what has been considered for operation or result in greater intensity of activity than construction, so a separate commissioning impact analysis is not provided.

4.1.6.4 Fumigation Analysis

The project is located approximately 4.5 miles (7.2 kilometers) from the nearest large body of water (Pacific Ocean). Shoreline fumigation analysis is not relevant more than 3 kilometers from a large body of water, so shoreline fumigation was not run. Inversion break-up fumigation was considered; however, the AERSCREEN model will only consider fumigation for point sources with release heights 10 meters or more above ground level. Because the project was modeled as volume line sources, an inversion-break up fumigation model cannot be run.

4.1.7 Laws, Ordinances, Regulations, and Statutes

The project applicant would ensure compliance with laws, ordinances, regulations, and statutes of all applicable federal, state, local and administering agencies pertaining to air quality issues.

4.1.7.1 Federal

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The EPA is responsible for implementing most aspects of the Clean Air Act, including setting NAAQS for major air pollutants; setting HAP standards; approving state attainment plans; setting motor vehicle emission standards; issuing stationary source emission standards and permits; and establishing acid rain control measures, stratospheric O₃ protection measures, and enforcement provisions. Under the Clean Air Act, NAAQS are established for the following criteria pollutants: O₃, CO, NO₂, SO₂, PM₁₀, PM_{2.5}, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for O₃, NO₂, SO₂, PM₁₀, PM_{2.5}, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O₃, NO₂, SO₂, PM₁₀, and PM_{2.5} are based on statistical

calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a state implementation plan that demonstrates how those areas will attain the NAAQS within mandated time frames.

4.1.7.2 State

In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established CAAQS, which are generally more restrictive than the NAAQS. As stated previously, an AAQS defines the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without harm to the public's health. For each pollutant, concentrations must be below the relevant CAAQS before a basin can attain the corresponding CAAQS. Air quality is considered "in attainment" if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for O₃, CO, SO₂ (1-hour and 24-hour), NO₂, PM₁₀, and PM_{2.5} and visibility-reducing particles are values that are not to be exceeded.

California Health and Safety Code Section 41700

Section 41700 of the Health and Safety Code states that a person shall not discharge from any source whatsoever quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any of those persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property. This section also applies to sources of objectionable odors.

4.1.7.3 Air Pollution Control District

While CARB is responsible for the regulation of mobile emissions sources within the state, local air quality management districts and air pollution control districts are responsible for enforcing standards and regulating stationary sources. SCAQMD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the SCAB, where the project is located. SCAQMD operates monitoring stations in the SCAB, develops rules and regulations for stationary sources and equipment, prepares emissions inventory and air quality management planning documents, and conducts source testing and inspections. SCAQMD's Air Quality Management Plan (AQMP) includes control measures and strategies to be implemented to attain the CAAQS and NAAQS in the SCAB. SCAQMD then implements these control measures as regulations to control or reduce criteria pollutant emissions from stationary sources or equipment.

The 2022 AQMP was adopted on December 2, 2022, and was developed to address the 2015 national ozone standard. The 2022 AQMP provides the regional path towards improving air quality and meeting federal standards for air pollutants. The 2022 AQMP builds upon measures already in place from previous AQMPs. It also includes a variety of additional strategies such as regulation, accelerated deployment of available cleaner technologies (e.g., zero emissions technologies, when cost-effective and feasible, and low NO_x technologies in other applications), best management practices, co-benefits from existing programs (e.g., climate and energy efficiency), incentives, and other Clean Air Act measures to achieve the 2015 federal ozone standard (SCAQMD 2022a).

Applicable Rules

Emissions that would result from project construction may be subject to SCAQMD rules and regulations, which may include the following.

Rule 401 – Visible Emissions. This rule establishes the limit for visible emissions from stationary sources for a period or periods aggregating more than 3 minutes in any hour. This rule prohibits visible emissions dark or darker than Ringelmann No. 1 for periods greater than 3 minutes in any hour or such opacity which could obscure an observer’s view to a degree equal or greater than does smoke.

Rule 402 – Nuisance. This rule prohibits the discharge of air pollutants from a facility that cause injury, detriment, nuisance, or annoyance to the public or damage to business or property.

Rule 403 – Fugitive Dust. This rule requires fugitive dust sources to implement best available control measures for all sources and prohibits all forms of visible particulate matter from crossing any property line. SCAQMD Rule 403 is intended to reduce PM₁₀ emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust.

Rule 431.2 – Sulfur Content of Liquid Fuels. The purpose of this rule is to limit the sulfur content in diesel and other liquid fuels for the purpose both of reducing the formation of SO_x and particulates during combustion and of enabling the use of add-on control devices for diesel-fueled internal combustion engines. The rule applies to all refiners, importers, and other fuel suppliers such as distributors, marketers, and retailers, as well as to users of diesel, low-sulfur diesel, and other liquid fuels for stationary-source applications in the SCAQMD. The rule also affects diesel fuel supplied for mobile source applications.

Rule 1113 – Architectural Coatings. This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

4.1.7.4 Agency Jurisdiction and Contacts

No agencies were contacted directly to specifically discuss air quality impacts related to the proposed project.

4.1.7.5 Permit Requirements and Schedules

See Section 4.1.2, Regulatory Items Affecting New Source Review for a description of the permitting requirements and schedules.

4.1.8 References

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