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Project Title:	McLaren Backup Generating Facility
TN #:	223769
Document Title:	Vantage Data Center's Revised N02 Modeling Report for McLaren Backup Generating Facility
Description:	McLaren Data Center: Air Dispersion Modeling Report for One-Hour N02 CAAQS and NAAQS
Filer:	Marie Fleming
Organization:	DayZen LLC
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California Energy Commission

Date
~~**May**~~ **June 2018**

MCLAREN DATA CENTER: AIR DISPERSION MODELING REPORT FOR ONE-HOUR NO2 CAAQS AND NAAQS

RAMBOLL

CONTENTS

TABLES

ATTACHMENT

1. INTRODUCTION

Vantage Data Centers (the applicant) has proposed to develop a data center in Santa Clara, California. The data center will install up to fifty (50) generators (forty seven (47) 2.75 MW backup emergency diesel generators and three (3) 600 kW safety generators) over the course of 10 years.

The applicant is submitting this air dispersion modeling report to the California Energy Commission (CEC) in support of its application for a Small Power Plant Exemption (SPPE). The SPPE application provides a detailed facility description, the quantification of emissions from facility sources, a review of applicability of federal and state air regulations, and the manufacturer's specification sheets for the proposed emergency generators. There are no stationary combustion sources at the facility other than the emergency standby generators.

A list of generator models at the facility and the generator ID numbers for the proposed generators at the applicant's facility are included in **Attachment B, Table B-1**.

2. AIR QUALITY ANALYSIS APPROACH

An air dispersion modeling analysis was completed to reflect the normal operating conditions of the facility and analyze potential air quality impacts in relation to the 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (NAAQS) and the California Ambient Air Quality Standard (CAAQS). The analyses were conducted consistent with the following federal and state guidance documents:

- U.S. EPA's Guideline on Air Quality Models 40 CFR 51, Appendix W (Revised, January 17, 2017), herein referred to as Appendix W;
- U.S. EPA's AERMOD Implementation Guide (Revised, August 3, 2015);
- California Air Pollution Control Officers Association (CAPCOA) Guidance Document "Modeling Compliance of the Federal 1-Hour NO2 NAAQS" (Dated October 27, 2011)

The applicable values for the NO_2 NAAQS and CAAQS for the 1-hour averaging period are provided in **Table 1**.

Table 1. Applicable NAAQS and CAAQS

Pollutant	Averaging Period	NAAQS (µg/m³)	CAAQS (µg/m³)
NO_2	1-Hour	188 [a]	339 [b]
Notes: **(a) Standard of 100 ppb converted to µg/m3. 98th percentile of 1-hour daily maximum concentrations, averaged over three years.** **(c) Standard of 180 ppb converted to µg/m3. Maximum 1-hour.**			

2.1 NAAQS and CAAQS Analysis

The NAAQS and CAAQS modeling evaluation incorporates all proposed sources at the project site (all 50 generators). A seasonal-by-hour representative background concentration from concurrent historical NO_2 monitoring data near the site was then added to the modeled concentrations on an hour-by-hour basis for comparison against the applicable NAAQS concentration to represent the contribution of sources not explicitly modeled. For the CAAQS analysis, the concurrent 1-hour NO_2 concentrations from the 5 years of monitoring data were added to the modelled concentration and compared to the standard. The model outputs that were used for assessing compliance with the NAAQS and CAAQS are summarized in **Table 2**.

Table 2. Modeling Output for NAAQS & CAAQS Compliance Demonstration

Pollutant and Averaging Period	Model Output
1-Hour NAAQS NO_2	Daily maximum 1-hour average of the 8th high across 5 years, on a receptor-by-receptor basis
1-Hour CAAQS NO_2	Single maximum 1-hour concentration across 5 years on a receptor-by-receptor basis

2.1.1 Background Concentrations

NO_2 background data for the 1-hour NO_2 NAAQS and CAAQS analyses were obtained from the AQS Monitoring Station in San Jose (Jackson, 06-085-0005), the nearest station to the facility. These data, spanning the period from January 2013 through December 2017, ranged in value from 0.0 to 67.5 ppb. Missing values for one or two consecutive hours were replaced by the larger value of the preceding or following hour. When 3 or more consecutive hours were missing, the monthly-by-hour maximum for the 5-year period was used to substitute for the missing hours. For the NAAQS analysis, these data were then used to calculate the seasonal-by-hour background using the five year average of the 3rd highest value of the available monitoring data, determined by accounting for both season and hour-of-day. The 3rd, 2nd, or 1st highest season by hour-of-day value for each year was used to average over the five years depending on the completeness of the seasonal data for that year (3rd highest with more than 60 valid days per season, 2nd highest with between 30 and 60 days, and 1st highest with more than 15 days). For the CAAQS model, the 5-year dataset was used to generate hourly files concurrent with the meteorological data, which were added to the concentration on an hour-by-hour basis.

3. MODELING METHODOLOGY, SETTINGS, AND INPUTS

This section outlines the technical approach used in the NO_2 modeling evaluations. Figures and tables supporting this modeling evaluation and outlining the model inputs are provided in **Attachment A** and **Attachment B**, respectively. Manufacturer performance data sheets are included in **Attachment C**. A CD-ROM with the electronic modeling files is included in **Attachment D,** and files will also be shared with Staff via direct upload.

3.1 Model Selection and Settings

To estimate off-property ambient concentrations of NO_2, the applicant used ~~the latest~~ version (16216r) of the AERMOD modeling system.[1] AERMOD is U.S. EPA's recommended air dispersion model for near-field (within 50 kilometers [km]) modeling analyses. AERMOD is appropriate for use in estimating ground-level, short-term ambient air concentrations resulting from non-reactive buoyant emissions from sources located in simple and complex terrain. This analysis was conducted using AERMOD's regulatory default settings, except for the NO_2/NO_X in stack ratio (discussed in Section 3.1.1).

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

3.1.1 NO_2 Modeling Approach

The applicant used the Tier 3 Plume Volume Molar Ratio Method (PVMRM) for the NO_2 Significance Analyses and to demonstrate compliance with the NO_2 NAAQS and PSD Increment standards. As part of the recent Appendix W updates, U.S. EPA incorporated the PVMRM as a regulatory default method for NO_2 modeling.

The applicant used a NO_2/NO_X in stack ratio of 0.10 for the facility's proposed backup emergency generators. This value was selected based on data from onsite generators of the same make and model as the proposed generators, and from U.S. EPA's In-Stack Ratio Database for diesel/kerosene-fired reciprocating internal combustion engines (RICE).[2] The U.S. EPA database has data for 57 diesel-fired RICE that indicate a median, mean, and even a second-high value, that are less than a 0.10 NO_2/NO_X ratio. Further, stack testing results from two of the facility's existing emergency generators showed a NO_2/NO_X ratio of less than 0.10.

Hourly ozone data from the San Jose AQS Monitoring Station were used (Jackson, 06-085-0005) with missing data substituted in two stages. If one or two consecutive hours were missing, the values were replaced by the larger value of the preceding or following hour. If three or more consecutive hours were missing, those values were replaced by the maximum values of the month-by-hour data set (i.e., the highest monitored value of the five years of data categorized by month of year and hour of day).

[1] A newer version of AERMOD was released on March 22, 2018 (version 18081), after most analyses had been completed for this project. To remain consistent with previous analyses, the same version of AERMOD was used for the updated modelling presented in this report (version 16216r).

[2] https://www3.epa.gov/scram001/no2_isr_database.htm

3.2 Modeled Sources and Release Parameters

The NAAQS and CAAQS analyses included cumulative assessments of the NO_2 impacts from the applicant's facility sources and the impacts from nearby NO_2-emitting sources (background). The following sections describe the release parameters that were used in the model.

3.2.1 Proposed Facility Sources

This included an assessment of 1-hour NO_2 impacts from the facility's proposed sources (**Attachment A, Figure 1**). The emissions from the generators at the site exhaust through vertical stacks with barometric rain covers. The generator stacks have flapper-style rain caps that open with the exhaust flow such that they do not obstruct the exhaust from the release point. The site's emission sources were modeled as point sources using manufacturer-provided stack parameters (**Attachment B, Table B-2**).

For the 1-hour NO_2 NAAQS and CAAQS analyses for the 2.75 MW emergency back-up generators, a typical operating scenario was modeled that includes one 4-hour load banking test that is conducted for one generator at a time, once annually, for maintenance and readiness testing.[3] During this 4-hour test, the generator is ramped up in load. The first hour of testing is at 50% load, the second hour is at 75% load, and the last two hours are at 100% load. Generators are also tested monthly for 5 minutes at 0% load, but this scenario was not modeled since the annual 4-hour test is the more conservative scenario. For comparison with the NAAQS and CAAQS, the most conservative hourly emission rate was used in both models, assuming one hour of testing at 100% load.

The typical operating scenario for the 600 kW life safety generators includes a 90 minute testing period with the generators operating during the first 30 minutes at a 50% load, followed by an hour of testing at a 75% load. The most conservative hourly emission rate in this scenario corresponds to an hour of operation at 75% load. The emission rate corresponding to the hour of testing at 75% was used in the model and compared to the NAAQS and CAAQS standards for the safety generators.

Though not utilized in this analysis, an example of another representative emission rate would be an average hourly emission rate from the 4-hour test. The average hourly emission rate would calculated by taking the average emission rate over the 4-hour test using load-specific emission rates from the manufacturer's specification sheet in **Attachment C**.

A detailed derivation of the modeled hourly NO_X emission rates used in the models is provided in **Attachment B, Table B-3**.

3.3 Building Downwash

The AERMOD model incorporates Plume Rise Modeling Enhancements (PRIME) to account for downwash. The direction-specific building downwash dimensions used as inputs were determined by the latest version (04274) of the Building Profile Input Program, PRIME (BPIP PRIME). BPIP PRIME uses building downwash algorithms incorporated into AERMOD to account for the plume dispersion effects of the aerodynamic wakes and eddies produced by buildings and structures.

The applicant evaluated onsite buildings at the facility for downwash effects on each modeled point source, as well as nearby offsite buildings. Each generator is located inside its own

[3] Emergency operation is not included.

weather-proof enclosure, with the generator stack extending from the top of the enclosure. Each generator enclosure was included as a building in the model. Three onsite buildings were included and 16 offsite buildings were included. The modeled parameters for the buildings and the weather-proof enclosures for the generators are provided in **Attachment B, Table B-4**.

3.4 Good Engineering Practice Stack Height Analysis

U.S. EPA has promulgated regulations that limit the maximum stack height one may use in a modeling analysis to no more than the Good Engineering Practice (GEP) stack height. The purpose of this requirement is to prevent the use of excessively tall stacks to reduce the modeled concentrations of a pollutant. GEP stack height is impacted by the heights of nearby structures. In general, the maximum value for GEP stack height is 65 meters. The stack heights for the facility's generator stacks do not exceed the GEP stack height.

3.5 Terrain Data and Land Use

Per U.S. EPA guidance, terrain elevations were incorporated into the model using ~~the most recent version (11103)~~ of AERMAP (version 11103), AERMOD's terrain preprocessor. Terrain elevation data for the entire modeling domain was extracted from 1/3 arc-second National Elevation Data (NED) files with a resolution of approximately 10 meters. The NED files were obtained from the United States Geological Survey (USGS) Multi-Resolution Land Characteristics Consortium (MRLC).[4] AERMAP was configured to assign elevations for the sources, buildings, property line receptors, and discrete gridded receptors in the modeling domain.

Land use classification determines the type of area to be modeled. The different classifications, urban or rural, incorporate distinct pollutant dispersion characteristics and affect the estimation of downwind concentrations when used in the model. Based on the land use around the facility, the urban boundary layer option in the model was selected. The population for the urban mode was based on the population of the San Jose Urban Area (1,664,496).

3.6 Meteorological Data

AERMOD requires a meteorological input file to characterize the transport and dispersion of pollutants in the atmosphere. Surface and upper air meteorological data inputs, as well as surface parameter data describing the land use and surface characteristics near the site, are processed using AERMET, the meteorological preprocessor to AERMOD. The output file generated by AERMET is the meteorological input file required by AERMOD.

A representative meteorological data set was developed using a combination of surface data from the National Weather Service (NWS) station at the San Jose Airport (KSJC, located approximately 2 km west of the facility) and NWS upper air data from the Oakland Airport (KOAK, located approximately 50 km northwest of the facility).

Per Appendix W, five years of representative meteorological data are considered adequate for dispersion modeling applications. Hourly and 1-minute wind speed and wind direction data from January 2013 through December 2017 were processed using ~~the latest version of~~ AERMINUTE (version 15272) and AERMET (version 16216). The meteorological data was processed using the ADJ_U* option that reduces overprediction of modeled concentrations

[4] http://www.mrlc.gov

that occur in stable conditions with low wind speeds due to underprediction of the surface friction velocity (u*). Underprediction of u* results in an underestimation of the mechanical mixing height and thus overprediction of ambient concentrations. The ADJ_U* option is now considered a regulatory default option with the recent update to Appendix W.

Additional meteorological variables and geophysical parameters are required for use in the AERMOD dispersion modeling analysis to estimate the surface energy fluxes and construct boundary layer profiles. Surface characteristics including albedo, Bowen ratio, and surface roughness length were determined for the area surrounding the San Jose Airport meteorological station using the AERMET surface characteristic preprocessor, AERSURFACE (13016), and the USGS 1992 National Land Cover (NLCD92) land use data set. The NLCD92 data set used in the analysis has a 30 meter resolution and 21 land use categories. Monthly surface parameters were determined using AERSURFACE according to U.S. EPA's guidance.

Monthly albedo and Bowen ratio values were based on averaging over a 10-km by 10-km region centered on the San Jose Airport meteorological site. Monthly surface roughness values were calculated for twelve 30 degree sectors within 1 km of the San Jose Airport meteorological station.

3.7 Receptor Grid

Ground-level concentrations were calculated at receptors placed along the facility fence line and on a circular, Cartesian grid. For this analysis, receptors extending up to 1 km from the fence line, as needed, were modeled using the following resolutions (**Attachment A, Figure 2**):

- 25 meter resolution for fence line receptors;
- 25 meter resolution extending from the fence line to 500 meters;
- 50 meter resolution extending from 500 meters to 1 km.

4. SUMMARY OF MODELING RESULTS

The following sections summarize the results of the NO_2 dispersion modeling analyses and demonstrate that the proposed project will not will not cause or contribute to a violation of the NAAQS or CAAQS.

4.1 NAAQS and CAAQS Analyses

Modeling was conducted to demonstrate compliance with the 1-hour and NO_2 NAAQS and CAAQS. The results of these analyses are presented in **Table 3** and demonstrate that there are no predicted violations of the NO_2 NAAQS or CAAQS.

Table 3. NO_2 NAAQS and CAAQS Results

Standard	Year	UTM East (m)	UTM North (m)	Total Ambient Conc.[(a,b)] (µg/m³)	Threshold (µg/m³)	Above Threshold?
1-Hour NAAQS	5Y AVG	593350.00	4135700.00	~~158.61~~163.91	188	No
1-Hour CAAQS	H1H	593162.89	4135854.26	~~211.41~~231.14	339	No

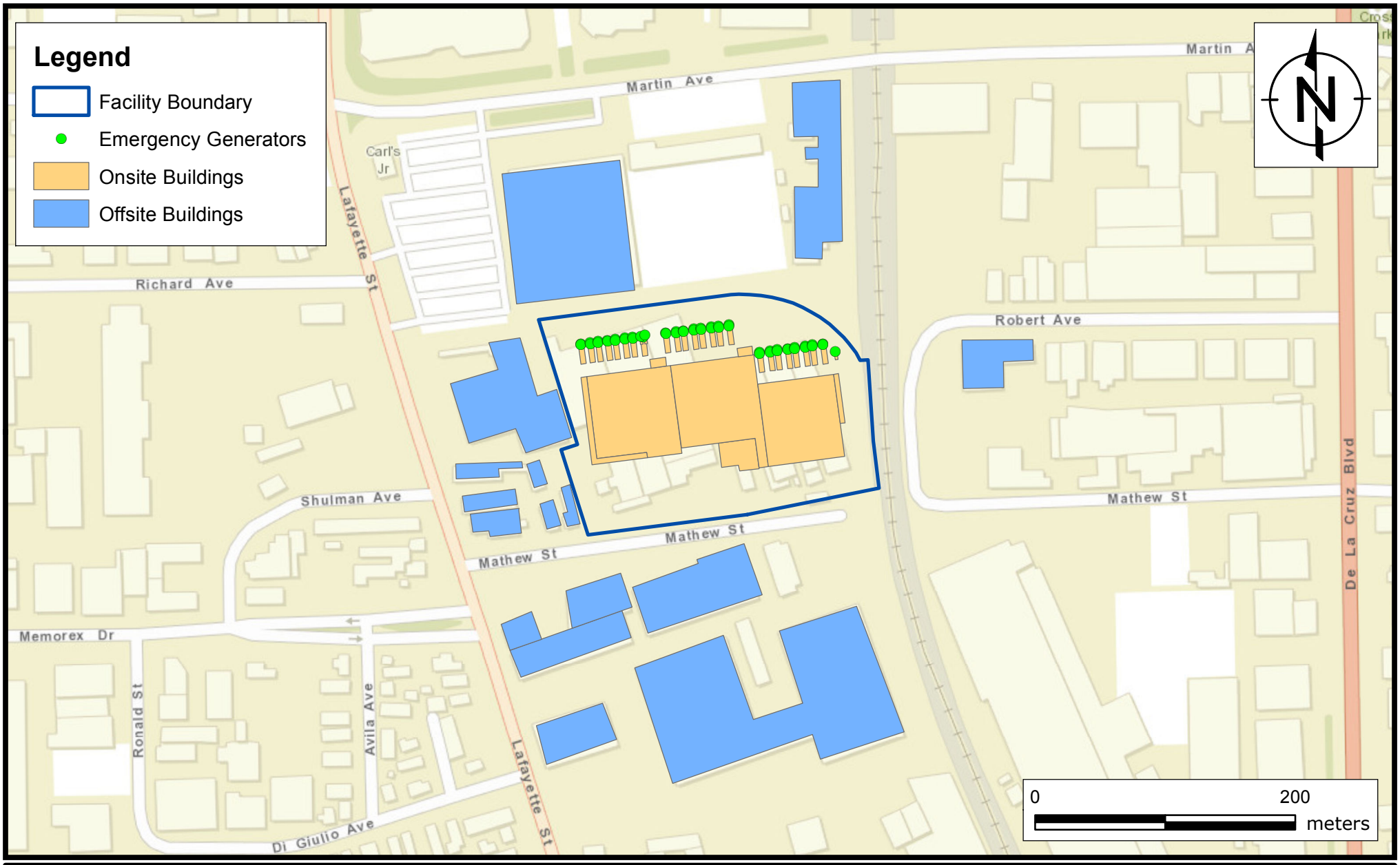
Notes:

(a) The value shown is the maximum from any of the emergency generators being tested for 1-hour at 100% load. The safety generators were tested at 75% load according to NFPA110 recommendations. .

(b) Total ambient concentration represents the modeled concentration plus the background concentration. An hour-by-hour background file, concurrent with the meteorological data, was included in the CAAQS model so the model output represents the total ambient concentration at each receptor. Season-by-hour background were used for the NAAQS model, so this model output also represents the total ambient concentration at each receptor.

The maximum ambient concentration for the 1-hour NO_2 NAAQS analysis and the contributing generator are presented in **Attachment A, Figure 3**. The maximum ambient concentration for the 1-hour NO_2 CAAQS analysis and the contributing generator are presented in **Attachment A, Figure 4**. The modeled 1-hour NO_2 concentrations shown in **Table 3** are representative of the maximum value from all of the modeled generators. A full summary of the model results for the 1-hour NO_2 NAAQS and CAAQS analyses are provided in **Attachment B, Table B-5 and B-6,** respectively.

ATTACHMENT A
FIGURES



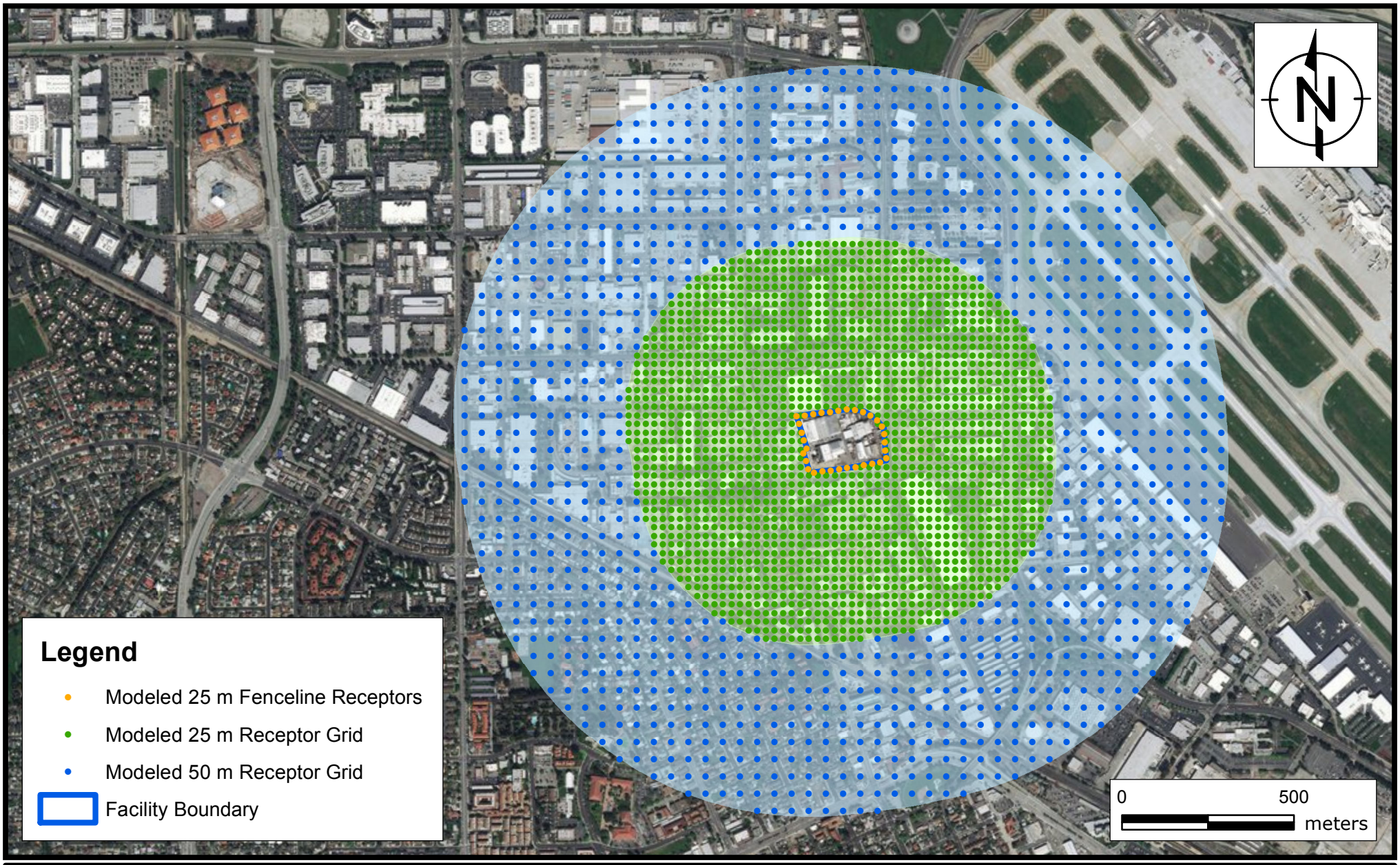
RAMBOLL ENVIRON

Project Location and Facility Layout
Vantage McLaren Campus
Santa Clara, California

FIGURE
1

DRAFTED BY: DCW | DATE: 4/25/2018

1690007689



RAMBOLL ENVIRON

Modelled Receptor Location
Vantage McLaren Campus
Santa Clara, California

FIGURE
2

DRAFTED BY: DCW | DATE: 4/25/2018

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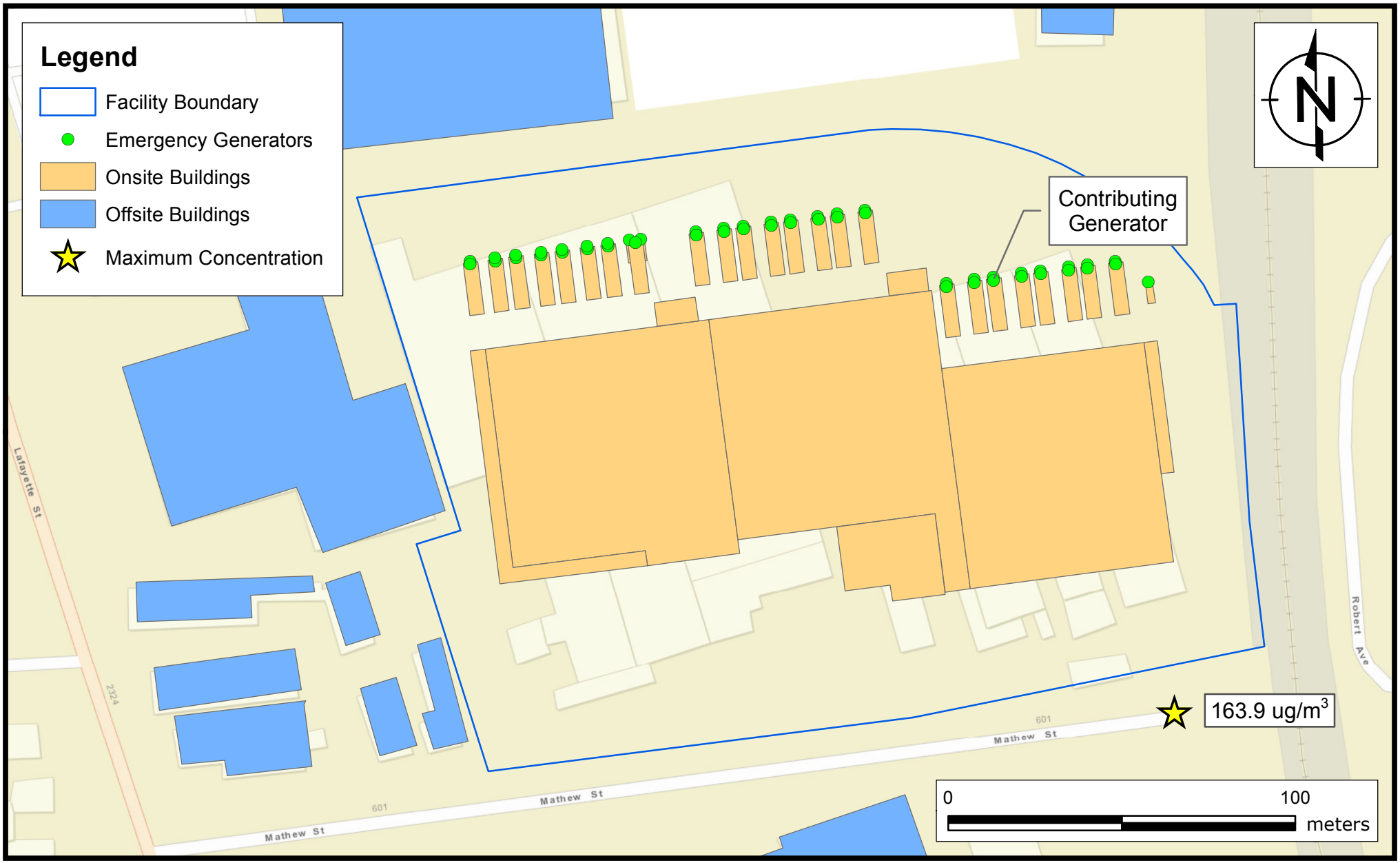

RAMBOLL ENVIRON

Maximum 1-Hour NO2 Concentration (NAAQS) and Contributing Generator
Vantage McLaren Campus
Santa Clara, California

FIGURE
3

DRAFTED BY: DCW | DATE: 6/5/2018

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RAMBOLL ENVIRON

Maximum 1-Hour NO2 Concentration (CAAQS) and Contributing Generator
Vantage McLaren Campus
Santa Clara, California

FIGURE
4

DRAFTED BY: DCW | DATE: 6/5/2018

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ATTACHMENT B
TABLES

Table B-1. Source Descriptions for the Mclaren Facility Sources

Model ID	Description	Specifications				
		Make	Model	USEPA Tier	Rated Power Output (kW)	Rated Power Output (HP)
EGEN_11A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_11B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_12A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_12B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_13A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_13B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_14A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_14B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_15A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_15B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_16A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_16B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_17A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_17B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_18A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_21A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_21B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_22A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_22B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_23A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_23B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_24A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_24B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_25A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_25B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_26A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_26B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043

Table B-1. Source Descriptions for the Mclaren Facility Sources

Model ID	Description	Specifications				
		Make	Model	USEPA Tier	Rated Power Output (kW)	Rated Power Output (HP)
EGEN_27A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_27B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_28A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_28B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_31A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_31B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_32A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_32B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_33A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_33B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_34A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_34B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_35A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_35B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_36A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_36B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_37A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_37B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_38A	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_38B	2.75 MW CAT 3516E Generator	Caterpillar	3516E	2	2,750	4,043
EGEN_ST1	600 kW CAT C18 Generator	Caterpillar	C18	2	600	900
EGEN_ST2	600 kW CAT C18 Generator	Caterpillar	C18	2	600	900
EGEN_ST3	600 kW CAT C18 Generator	Caterpillar	C18	2	600	900

Table B-2. Point Source Parameters for the Mclaren Facility Sources

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	NO_X Emission Rate (1-Hour Max.) (g/s)	Stack Height (m)	Stack Temp. (K)	Stack Velocity (m/s)	Stack Diameter (m)
		X	Y						
EGEN_11A	2.75 MW CAT 3516E Generator	593,147.09	4,135,829.61	14.88	5.703	14.55	753.71	29.932	0.66
EGEN_11B	2.75 MW CAT 3516E Generator	593,147.20	4,135,828.78	14.88	5.703	14.55	753.71	29.932	0.66
EGEN_12A	2.75 MW CAT 3516E Generator	593,154.26	4,135,830.52	14.92	5.703	14.55	753.71	29.932	0.66
EGEN_12B	2.75 MW CAT 3516E Generator	593,154.38	4,135,829.69	14.92	5.703	14.55	753.71	29.932	0.66
EGEN_13A	2.75 MW CAT 3516E Generator	593,160.24	4,135,831.33	14.94	5.703	14.55	753.71	29.932	0.66
EGEN_13B	2.75 MW CAT 3516E Generator	593,160.36	4,135,830.50	14.94	5.703	14.55	753.71	29.932	0.66
EGEN_14A	2.75 MW CAT 3516E Generator	593,167.53	4,135,832.25	14.94	5.703	14.55	753.71	29.932	0.66
EGEN_14B	2.75 MW CAT 3516E Generator	593,167.64	4,135,831.42	14.94	5.703	14.55	753.71	29.932	0.66
EGEN_15A	2.75 MW CAT 3516E Generator	593,173.51	4,135,833.02	14.94	5.703	14.55	753.71	29.932	0.66
EGEN_15B	2.75 MW CAT 3516E Generator	593,173.62	4,135,832.19	14.94	5.703	14.55	753.71	29.932	0.66
EGEN_16A	2.75 MW CAT 3516E Generator	593,180.79	4,135,834.01	14.92	5.703	14.55	753.71	29.932	0.66
EGEN_16B	2.75 MW CAT 3516E Generator	593,180.90	4,135,833.18	14.92	5.703	14.55	753.71	29.932	0.66
EGEN_17A	2.75 MW CAT 3516E Generator	593,186.79	4,135,834.78	14.90	5.703	14.55	753.71	29.932	0.66
EGEN_17B	2.75 MW CAT 3516E Generator	593,186.90	4,135,833.95	14.90	5.703	14.55	753.71	29.932	0.66
EGEN_18A	2.75 MW CAT 3516E Generator	593,194.71	4,135,834.92	14.86	5.703	14.55	753.71	29.932	0.66
EGEN_21A	2.75 MW CAT 3516E Generator	593,212.19	4,135,838.04	14.80	5.703	14.55	753.71	29.932	0.66
EGEN_21B	2.75 MW CAT 3516E Generator	593,212.34	4,135,837.12	14.80	5.703	14.55	753.71	29.932	0.66
EGEN_22A	2.75 MW CAT 3516E Generator	593,220.18	4,135,839.03	14.77	5.703	14.55	753.71	29.932	0.66
EGEN_22B	2.75 MW CAT 3516E Generator	593,220.32	4,135,838.10	14.77	5.703	14.55	753.71	29.932	0.66
EGEN_23A	2.75 MW CAT 3516E Generator	593,225.70	4,135,839.73	14.74	5.703	14.55	753.71	29.932	0.66
EGEN_23B	2.75 MW CAT 3516E Generator	593,225.85	4,135,838.81	14.74	5.703	14.55	753.71	29.932	0.66
EGEN_24A	2.75 MW CAT 3516E Generator	593,233.72	4,135,840.79	14.64	5.703	14.55	753.71	29.932	0.66
EGEN_24B	2.75 MW CAT 3516E Generator	593,233.87	4,135,839.86	14.64	5.703	14.55	753.71	29.932	0.66
EGEN_25A	2.75 MW CAT 3516E Generator	593,239.35	4,135,841.53	14.56	5.703	14.55	753.71	29.932	0.66
EGEN_25B	2.75 MW CAT 3516E Generator	593,239.50	4,135,840.60	14.56	5.703	14.55	753.71	29.932	0.66
EGEN_26A	2.75 MW CAT 3516E Generator	593,247.27	4,135,842.51	14.42	5.703	14.55	753.71	29.932	0.66
EGEN_26B	2.75 MW CAT 3516E Generator	593,247.41	4,135,841.59	14.42	5.703	14.55	753.71	29.932	0.66
EGEN_27A	2.75 MW CAT 3516E Generator	593,252.79	4,135,843.25	14.30	5.703	14.55	753.71	29.932	0.66
EGEN_27B	2.75 MW CAT 3516E Generator	593,252.94	4,135,842.32	14.30	5.703	14.55	753.71	29.932	0.66
EGEN_28A	2.75 MW CAT 3516E Generator	593,260.81	4,135,844.31	14.23	5.703	14.55	753.71	29.932	0.66

Table B-2. Point Source Parameters for the Mclaren Facility Sources

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	NO_X Emission Rate (1-Hour Max.) (g/s)	Stack Height (m)	Stack Temp. (K)	Stack Velocity (m/s)	Stack Diameter (m)
		X	Y						
EGEN_28B	2.75 MW CAT 3516E Generator	593,260.96	4,135,843.38	14.23	5.703	14.55	753.71	29.932	0.66
EGEN_31A	2.75 MW CAT 3516E Generator	593,284.27	4,135,823.26	14.24	5.703	14.55	753.71	29.932	0.66
EGEN_31B	2.75 MW CAT 3516E Generator	593,284.36	4,135,822.34	14.24	5.703	14.55	753.71	29.932	0.66
EGEN_32A	2.75 MW CAT 3516E Generator	593,292.26	4,135,824.31	14.29	5.703	14.55	753.71	29.932	0.66
EGEN_32B	2.75 MW CAT 3516E Generator	593,292.34	4,135,823.40	14.29	5.703	14.55	753.71	29.932	0.66
EGEN_33A	2.75 MW CAT 3516E Generator	593,297.75	4,135,824.96	14.32	5.703	14.55	753.71	29.932	0.66
EGEN_33B	2.75 MW CAT 3516E Generator	593,297.83	4,135,824.05	14.32	5.703	14.55	753.71	29.932	0.66
EGEN_34A	2.75 MW CAT 3516E Generator	593,305.88	4,135,826.11	14.37	5.703	14.55	753.71	29.932	0.66
EGEN_34B	2.75 MW CAT 3516E Generator	593,305.96	4,135,825.19	14.37	5.703	14.55	753.71	29.932	0.66
EGEN_35A	2.75 MW CAT 3516E Generator	593,311.37	4,135,826.85	14.40	5.703	14.55	753.71	29.932	0.66
EGEN_35B	2.75 MW CAT 3516E Generator	593,311.45	4,135,825.93	14.40	5.703	14.55	753.71	29.932	0.66
EGEN_36A	2.75 MW CAT 3516E Generator	593,319.42	4,135,827.90	14.47	5.703	14.55	753.71	29.932	0.66
EGEN_36B	2.75 MW CAT 3516E Generator	593,319.50	4,135,826.99	14.47	5.703	14.55	753.71	29.932	0.66
EGEN_37A	2.75 MW CAT 3516E Generator	593,324.88	4,135,828.60	14.51	5.703	14.55	753.71	29.932	0.66
EGEN_37B	2.75 MW CAT 3516E Generator	593,324.96	4,135,827.69	14.51	5.703	14.55	753.71	29.932	0.66
EGEN_38A	2.75 MW CAT 3516E Generator	593,332.93	4,135,829.66	14.38	5.703	14.55	753.71	29.932	0.66
EGEN_38B	2.75 MW CAT 3516E Generator	593,333.01	4,135,828.75	14.38	5.703	14.55	753.71	29.932	0.66
EGEN_ST1	600 kW CAT C18 Generator	593,192.97	4,135,835.59	14.86	0.627	14.55	764.82	20.125	0.36
EGEN_ST2	600 kW CAT C18 Generator	593,196.32	4,135,836.04	14.86	0.627	14.55	764.82	20.125	0.36
EGEN_ST3	600 kW CAT C18 Generator	593,342.50	4,135,823.75	14.17	0.627	14.55	764.82	20.125	0.36

Table B-3. Modeled NO_X Emission Rates for Mclaren Facility Sources

Generator Model	Number of Generators	Load-Specific Emission Rates (g/s/gen)			NAAQS	CAAQS
		50%	75%	100%	Hourly NO_X Emissions per Generator[1] (g/s/gen)	Hourly NO_X Emissions per Generator[2] (g/s/gen)
2.75 MW CAT 3516E Generator	47	1.793	3.553	5.7025	5.7025	5.7025
600 kW CAT C18 Generator	3	0.3519	0.6269	1.424	0.6269	0.6269

Notes:

1. Hourly NOx emission rates for the NAAQS analysis for the 2.75 MW CAT gens assumed the worst case scenario of operating at 100% load for the full hour. Hourly NOx emissions rate for the 600 kW CAT gen assumed the worst case scenario of operating at 75% load for the full hour.
2. Hourly NOx emission rates for the CAAQS analysis for the 2.75 MW CAT gens assumed the worst case scenario of operating at 100% load for the full hour. Hourly NOx emissions rate for the 600 kW CAT gen assumed the worst case scenario of operating at 75% load for the full hour.
3. Generators are tested one at a time.

Table B-4. Modeled Buildings for the Vantage McLaren Facility

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
ADMIN	Onsite Building	593268.98	4135744.47	14.90	6.35
BLDG01A	Onsite Data Center Building	593188.40	4135776.17	14.93	30.65
BLDG01B	Onsite Building	593162.78	4135759.95	14.93	6.35
BLDG01C	Onsite Building	593206.46	4135815.04	14.85	6.35
BLDG02A	Onsite Data Center Building	593253.38	4135783.78	14.70	30.65
BLDG02B	Onsite Building	593273.11	4135823.59	14.25	6.35
BLDG03A	Onsite Data Center Building	593316.19	4135770.79	14.72	30.65
BLDG03B	Onsite Building	593345.56	4135787.63	14.72	6.35
GENSET11	Generator Enclosure	593148.12	4135821.71	14.88	12.70
GENSET12	Generator Enclosure	593155.30	4135822.62	14.92	12.70
GENSET13	Generator Enclosure	593161.28	4135823.43	14.94	12.70
GENSET14	Generator Enclosure	593168.57	4135824.35	14.94	12.70
GENSET15	Generator Enclosure	593174.55	4135825.12	14.94	12.70
GENSET16	Generator Enclosure	593181.83	4135826.11	14.92	12.70
GENSET17	Generator Enclosure	593187.83	4135826.88	14.90	12.70
GENSET18	Generator Enclosure	593195.60	4135827.75	14.86	12.70
GENSET21	Generator Enclosure	593213.21	4135830.19	14.80	12.70
GENSET22	Generator Enclosure	593221.20	4135831.17	14.77	12.70
GENSET23	Generator Enclosure	593226.72	4135831.88	14.74	12.70
GENSET24	Generator Enclosure	593234.74	4135832.93	14.64	12.70
GENSET25	Generator Enclosure	593240.37	4135833.67	14.56	12.70
GENSET26	Generator Enclosure	593248.29	4135834.66	14.42	12.70
GENSET27	Generator Enclosure	593253.81	4135835.39	14.30	12.70
GENSET28	Generator Enclosure	593261.84	4135836.45	14.23	12.70
GENSET31	Generator Enclosure	593285.34	4135815.30	14.24	12.70
GENSET32	Generator Enclosure	593293.32	4135816.36	14.29	12.70
GENSET33	Generator Enclosure	593298.85	4135817.05	14.32	12.70
GENSET34	Generator Enclosure	593306.94	4135818.15	14.37	12.70
GENSET35	Generator Enclosure	593312.43	4135818.89	14.40	12.70

Table B-4. Modeled Buildings for the Vantage McLaren Facility

Model ID	Description	UTM Zone 10 Coordinates (m)		Elevation (m)	Height (m)
		X	Y		
GENSET36	Generator Enclosure	593320.49	4135819.95	14.47	12.70
GENSET37	Generator Enclosure	593325.94	4135820.65	14.51	12.70
GENSET38	Generator Enclosure	593334.00	4135821.71	14.38	12.70
GENSETS1	Safety Generator Enclosure	593193.42	4135832.13	14.86	3.18
GENSETS2	Safety Generator Enclosure	593196.67	4135832.56	14.86	3.18
GENSETS3	Safety Generator Enclosure	593343.01	4135820.37	14.17	3.18
HOMEDEPOT	Offsite Building	593137.34	4135915.47	14.71	9.70
B01	Offsite Building	593092.76	4135784.80	14.83	6.44
B02	Offsite Building	593138.79	4135703.82	15.36	2.70
B03	Offsite Building	593123.58	4135698.42	15.18	4.00
B04	Offsite Building	593113.36	4135729.54	15.04	3.90
B05	Offsite Building	593072.28	4135732.90	15.18	3.90
B06	Offsite Building	593077.07	4135709.25	15.25	4.90
B07	Offsite Building	593082.90	4135692.22	15.30	4.40
B08	Offsite Building	593329.84	4135965.42	13.29	6.40
B09	Offsite Building	593462.44	4135816.68	14.24	3.50
B10	Offsite Building	593237.02	4135640.99	15.57	6.40
B11	Offsite Building	593139.22	4135598.86	15.91	7.00
B12	Offsite Building	593101.20	4135608.64	15.71	4.90
B13	Offsite Building	593291.96	4135556.92	16.37	15.60
B14	Offsite Building	593142.83	4135530.12	16.75	7.40
B15	Offsite Building	593159.86	4135632.55	15.89	5.00

Table B-5. 1-hour NO_2 NAAQS Results

Averaging Period	Source ID	UTM Zone 10 Coordinates (m)		5Y Average H8H Modeled Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Above NAAQS?
		X	Y			
1-Hour	EGEN_11A	593237.80	4135693.59	154.38	188	No
	EGEN_11B	593237.80	4135693.59	155.24		No
	EGEN_12A	593237.80	4135693.59	158.02		No
	EGEN_12B	593237.80	4135693.59	158.64		No
	EGEN_13A	593237.80	4135693.59	159.27		No
	EGEN_13B	593237.80	4135693.59	159.52		No
	EGEN_14A	593237.80	4135693.59	158.58		No
	EGEN_14B	593237.80	4135693.59	158.86		No
	EGEN_15A	593237.80	4135693.59	158.12		No
	EGEN_15B	593237.80	4135693.59	158.17		No
	EGEN_16A	593237.80	4135693.59	153.99		No
	EGEN_16B	593237.80	4135693.59	153.60		No
	EGEN_17A	593213.60	4135690.53	150.97		No
	EGEN_17B	593213.60	4135690.53	151.81		No
	EGEN_18A	593138.70	4135851.08	150.79		No
	EGEN_21A	593121.77	4135824.61	146.15		No
	EGEN_21B	593262.01	4135696.66	145.67		No
	EGEN_22A	593325.00	4135675.00	148.62		No
	EGEN_22B	593325.00	4135675.00	148.95		No
	EGEN_23A	593325.00	4135675.00	149.38		No
	EGEN_23B	593325.00	4135675.00	149.24		No
	EGEN_24A	593325.00	4135675.00	147.45		No
	EGEN_24B	593325.00	4135675.00	147.35		No
	EGEN_25A	593325.00	4135675.00	145.48		No
	EGEN_25B	593325.00	4135675.00	145.20		No
	EGEN_26A	593325.00	4135675.00	141.47		No
	EGEN_26B	593325.00	4135675.00	141.04		No
	EGEN_27A	593325.00	4135675.00	138.29		No
	EGEN_27B	593325.00	4135675.00	137.84		No
	EGEN_28A	593211.27	4135860.63	143.80		No
	EGEN_28B	593211.27	4135860.63	142.11		No
	EGEN_31A	592300.00	4135500.00	135.27		No
	EGEN_31B	592350.00	4135500.00	135.41		No
	EGEN_32A	593325.00	4135675.00	139.85		No
	EGEN_32B	593325.00	4135675.00	138.96		No
	EGEN_33A	593357.83	4135714.99	162.26		No
	EGEN_33B	593350.00	4135700.00	163.91		No
	EGEN_34A	593350.00	4135700.00	161.69		No
	EGEN_34B	593350.00	4135700.00	162.02		No
	EGEN_35A	593350.00	4135700.00	157.67		No
	EGEN_35B	593350.00	4135700.00	158.17		No
	EGEN_36A	593375.00	4135800.00	163.51		No
	EGEN_36B	593375.00	4135800.00	162.90		No
	EGEN_37A	593375.00	4135800.00	163.86		No
	EGEN_37B	593375.00	4135800.00	161.60		No
	EGEN_38A	593400.00	4135775.00	156.20		No
	EGEN_38B	593400.00	4135750.00	156.27		No
	EGEN_ST1	593187.08	4135857.44	149.45		No
	EGEN_ST2	593162.89	4135854.26	150.73		No
	EGEN_ST3	593400.00	4135775.00	141.66		No
	Maximum NAAQS	593350.00	4135700.00	163.91		No

Table B-6. 1-hour NO_2 CAAQS Results

Averaging Period	Source ID	UTM Zone 10 Coordinates (m)		5Y Single Maximum H1H Modeled Conc. ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)	Above CAAQS?
		X	Y			
1-Hour	EGEN_11A	593162.89	4135854.26	210.30	339	No
	EGEN_11B	593162.89	4135854.26	205.04		No
	EGEN_12A	593162.89	4135854.26	214.98		No
	EGEN_12B	593162.89	4135854.26	212.29		No
	EGEN_13A	593162.89	4135854.26	214.41		No
	EGEN_13B	593162.89	4135854.26	211.79		No
	EGEN_14A	593162.89	4135854.26	212.96		No
	EGEN_14B	593162.89	4135854.26	210.94		No
	EGEN_15A	593162.89	4135854.26	212.31		No
	EGEN_15B	593162.89	4135854.26	210.26		No
	EGEN_16A	593162.89	4135854.26	211.72		No
	EGEN_16B	593162.89	4135854.26	209.58		No
	EGEN_17A	593162.89	4135854.26	211.06		No
	EGEN_17B	593162.89	4135854.26	208.24		No
	EGEN_18A	593162.89	4135854.26	207.29		No
	EGEN_21A	593187.08	4135857.44	189.02		No
	EGEN_21B	593187.08	4135857.44	186.60		No
	EGEN_22A	593187.08	4135857.44	190.99		No
	EGEN_22B	593187.08	4135857.44	188.84		No
	EGEN_23A	593350.00	4135700.00	178.19		No
	EGEN_23B	593350.00	4135700.00	179.04		No
	EGEN_24A	593350.00	4135700.00	175.74		No
	EGEN_24B	593350.00	4135700.00	176.07		No
	EGEN_25A	593350.00	4135700.00	172.97		No
	EGEN_25B	593350.00	4135700.00	173.27		No
	EGEN_26A	593350.00	4135700.00	168.23		No
	EGEN_26B	593350.00	4135700.00	168.61		No
	EGEN_27A	593350.00	4135700.00	164.39		No
	EGEN_27B	593350.00	4135700.00	164.51		No
	EGEN_28A	593348.19	4135835.04	186.33		No
	EGEN_28B	593348.19	4135835.04	179.43		No
	EGEN_31A	592350.00	4135450.00	182.48		No
	EGEN_31B	592300.00	4135450.00	182.18		No
	EGEN_32A	592350.00	4135450.00	185.76		No
	EGEN_32B	592350.00	4135450.00	186.46		No
	EGEN_33A	592500.00	4135000.00	216.65		No
	EGEN_33B	592500.00	4135000.00	216.82		No
	EGEN_34A	592500.00	4135000.00	213.08		No
	EGEN_34B	593307.75	4135861.50	217.04		No
	EGEN_35A	592500.00	4135000.00	209.76		No
	EGEN_35B	593307.75	4135861.50	222.04		No
	EGEN_36A	593307.75	4135861.50	216.78		No
	EGEN_36B	593307.75	4135861.50	229.55		No
	EGEN_37A	593307.75	4135861.50	222.34		No
	EGEN_37B	593307.75	4135861.50	231.14		No
	EGEN_38A	593307.75	4135861.50	198.79		No
	EGEN_38B	592500.00	4135000.00	196.49		No
	EGEN_ST1	593162.89	4135854.26	176.23		No
	EGEN_ST2	593162.89	4135854.26	176.10		No
	EGEN_ST3	593400.00	4135750.00	168.30		No
	Maximum CAAQS	593307.75	4135861.50	231.14		No

ATTACHMENT C
MANUFACTUER PERFORMANCE DATA SHEETS

Cat® 3516E
Diesel Generator Sets

Image shown may not reflect actual configuration

Bore – mm (in)	170 (6.69)
Stroke – mm (in)	215 (8.47)
Displacement – L (in^3)	78.1 (4766)
Compression Ratio	14.7:1
Aspiration	TA
Fuel System	EUI
Governor Type	ADEM™ A5

Standby 60 Hz ekW (kVA)	Mission Critical 60 Hz ekW (kVA)	Performance Strategy
2750 (3437)	2750 (3437)	U.S. EPA Certified for Emergency Stationary Applications (Tier 2)

Standard Features

Cat® Diesel Engine
- Meets U.S. EPA Stationary Emergency Use Only (Tier 2) emission standards
- Reliable performance proven in thousands of applications worldwide

Generator Set Package
- Accepts 100% block load in one step and meets other NFPA 110 loading requirements
- Conforms to ISO 8528-5 G3 load acceptance requirements
- Reliability verified through torsional vibration, fuel consumption, oil consumption, transient performance, and endurance testing

Alternators
- Superior motor starting capability minimizes need for oversizing generator
- Designed to match performance and output characteristics of Cat diesel engines

Cooling System
- Cooling systems available to operate in ambient temperatures up to 50°C (122°F)
- Tested to ensure proper generator set cooling

EMCP 4 Control Panels
- User-friendly interface and navigation
- Scalable system to meet a wide range of installation requirements
- Expansion modules and site specific programming for specific customer requirements

Warranty
- 24 months/1000-hour warranty for standby and mission critical ratings
- 12 months/unlimited hour warranty for prime and continuous ratings
- Extended service protection is available to provide extended coverage options

Worldwide Product Support
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- Your local Cat dealer provides extensive post-sale support, including maintenance and repair agreements

Financing
- Caterpillar offers an array of financial products to help you succeed through financial service excellence
- Options include loans, finance lease, operating lease, working capital, and revolving line of credit
- Contact your local Cat dealer for availability in your region

Optional Equipment

Engine

Air Cleaner
- ❑ Single element

Muffler
- ❑ Industrial grade (15 dB)
- ❑ Critical grade (25 dB)
- ❑ Hospital grade (35 dB)

Starting
- ❑ Standard batteries
- ❑ Oversized batteries
- ❑ Heavy duty electric starter(s)
- ❑ Air starter(s)
- ❑ Jacket water heater

Alternator

Output voltage
- ❑ 416V ❑ 12470V
- ❑ 480V ❑ 13200V
- ❑ 600V ❑ 13800V
- ❑ 4160V

Temperature Rise (over 40°C ambient)
- ❑ 150°C
- ❑ 125°C/130°C
- ❑ 105°C
- ❑ 80°C

Winding type
- ❑ Form wound

Excitation
- ❑ Permanent magnet (PM)

Attachments
- ❑ Anti-condensation heater
- ❑ Stator and bearing temperature monitoring and protection

Power Termination

Type
- ❑ Bus bar
- ❑ Circuit breaker
- ❑ 1600A ❑ 2000A
- ❑ 2500A ❑ 3000A
- ❑ 3200A ❑ 4000A
- ❑ 5000A
- ❑ IEC ❑ UL
- ❑ 3-pole ❑ 4-pole
- ❑ Manually operated
- ❑ Electrically operated

Trip Unit
- ❑ LSI ❑ LSI-G
- ❑ LSI-P ❑ LSIG-P

Control System

Controller
- ❑ EMCP 4.2B
- ❑ EMCP 4.3
- ❑ EMCP 4.4

Attachments
- ❑ Local annunciator module
- ❑ Remote annunciator module
- ❑ Expansion I/O module
- ❑ Remote monitoring software

Charging

- ❑ Battery charger – 10A
- ❑ Battery charger – 20A
- ❑ Battery charger – 35A

Vibration Isolators

- ❑ Spring
- ❑ Seismic rated

Cat Connect

Connectivity
- ❑ Ethernet
- ❑ Cellular
- ❑ Satellite

Extended Service Options

Terms
- ❑ 2 year (prime)
- ❑ 3 year
- ❑ 5 year
- ❑ 10 year

Coverage
- ❑ Silver
- ❑ Gold
- ❑ Platinum
- ❑ Platinum Plus

Ancillary Equipment

- ❑ Automatic transfer switch (ATS)
- ❑ Uninterruptible power supply (UPS)
- ❑ Paralleling switchgear
- ❑ Paralleling controls

Certifications

- ❑ UL2200
- ❑ CSA
- ❑ IBC seismic certification
- ❑ OSHPD pre-approval
- ❑ EEC Declaration of Conformity
- ❑ EU Declaraton of Incorporation
- ❑ Eurasian Conformity (EAC) Mark

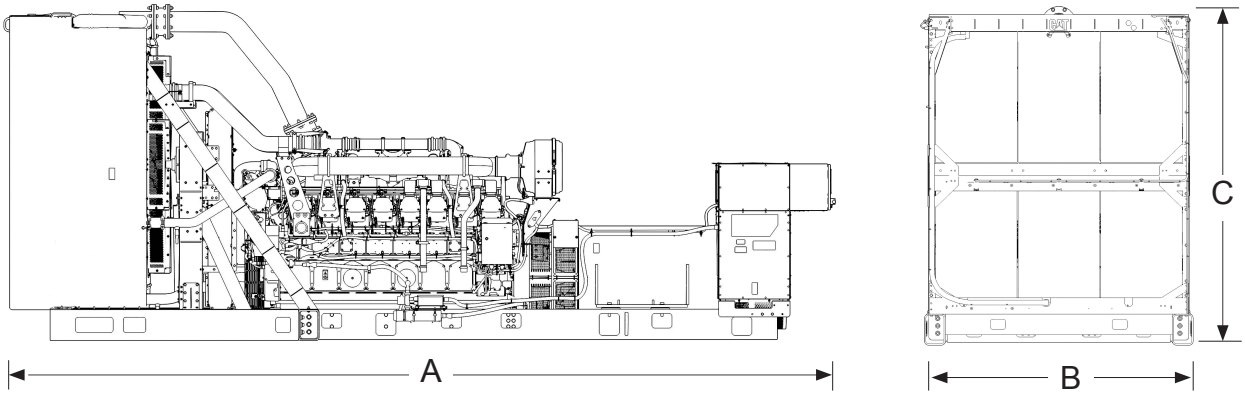
Note: *Some options may not be available on all models. Certifications may not be available with all model configurations. Consult factory for availability.*

Package Performance

Performance	Standby		Mission Critical	
Frequency	60 Hz		60 Hz	
Genset Power rating with fan	2750 ekW		2750 ekW	
Genset Power rating with fan @ 0.8 Power Factor	3437 kVA		3437 kVA	
Emissions	EPA ESE (Tier 2)		EPA ESE (Tier 2)	
Performance Number	EM2026-00		EM2116-00	
Fuel Consumption				
100% load with fan - L/hr (gal/hr)	735.6	(194.3)	735.6	(194.3)
75% load with fan - L/hr (gal/hr)	559.9	(147.9)	559.9	(147.9)
50% load with fan - L/hr (gal/hr)	406.7	(107.4)	406.7	(107.4)
25% load with fan - L/hr (gal/hr)	236.8	(62.6)	236.8	(62.6)
Cooling System				
Radiator Air flow restriction (system) - kPa (in. water)	0.12	(0.5)	0.12	(0.5)
kPa (in. water) Radiator airflow - m3/min (cfm)	3026	(106862)	3026	(106862)
Engine coolant capacity - L (gal)	233	(61.6)	233	(61.6)
Radiator coolant capacity - L (gal)	202	(53.3)	202	(53.3)
Total coolant capacity; L (gal)	435	(114.9)	435	(114.9)
Inlet Air				
Combustion air inlet flow rate; m^3/min (cfm)	235.4	(8313.0)	235.4	(8313.0)
Exhaust System				
Exhaust stack gas temperature - °C (°F)	480.6	(897)	480.6	(897)
Exhaust gas flow rate - m^3/min (cfm)	615.2	(21724.6)	615.2	(21724.6)
Exhaust system backpressure (maximum allowable) -	6.7	(27.0)	6.7	(27.0)
Heat Rejection				
Heat rejection to jacket water - kW (Btu/min)	898	(51083)	898	(51083)
Heat rejection to exhaust (total) - kW (Btu/min)	2867	(163046)	2867	(163046)
Heat rejection to aftercooler - kW (Btu/min)	874	(49686)	874	(49686)
Heat rejection to atmosphere from engine - kW (Btu/min)	160	(9085)	160	(9085)
Heat rejection from alternator - kW (Btu/min)	126	(7172)	126	(7172)

3516E Diesel Generator Sets
Electric Power

Weights and Dimensions



Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
8238 (324)	2640 (104)	3342 (132)	18 480 (40,750)

Note: *For reference only. Do not use for installation design. Contact your local Cat dealer for precise weights and dimensions.*

Ratings Definitions

Standby
Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Mission Critical
Output available with varying load for the duration of the interruption of the normal source power. Average power output is 85% of the mission critical power rating. Typical peak demand up to 100% of rated power for up to 5% of the operating time. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Applicable Codes and Standards
AS1359, CSA C22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 2014/35/EU, 2006/42/EC, 2014/30/EU.

Note: Codes may not be available in all model configurations. Please consult your local Cat dealer for availability.

Data Center Applications
Tier III/Tier IV compliant per Uptime Institute requirements. ANSI/TIA-942 compliant for Rated-1 through Rated-4 data centers.

Fuel Rates
Fuel rates are based on fuel oil of 35º API [16°C (60ºF)] gravity having an LHV of 42,780 kJ/kg (18,390 Btu/lb) when used at 29ºC (85ºF) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.)

3516 PGFL
LEHE1351-02 (8-17)

MANUFACTURER'S EMISSIONS DATA

CERTIFICATION YEAR: 2017 CERT AGENCY: EPA
EPA ENGINE FAMILY NAME: HCPXL78.1NZS

MODEL: 3516E
GENSET RATING (W/ FAN): 2750.0 EKW STANDBY 60 HERTZ @ 1800 RPM
ENGINE DISCPLACEMENT: 4766 CU IN
EMISSIONS POWER CATEGORY: >560 BKW
ENGINE TYPE: 4 Stroke Compression Ignition (Diesel)

GENERAL PERFORMANCE DATA

GEN W/F	ENG PWR	FUEL RATE	FUEL RATE	EXHAUST STACK TEMP	EXHAUST GAS FLOW
EKW	BHP	LB/BHP-HR	GPH	°F	CFM
2750.0	4043	0.337	194.3	897.0	21724.6

DATA REF NO.: EM2116-00

EPA D2 CYCLE CERTIFICATION

	UNITS	CO	HC	NOX	NOX + HC	PM
CERTIFICATION TEST LEVELS	GM/BHP-HR	0.67	0.19	3.78	3.95	0.09
	GM/BKW-HR	.9	0.26	5.07	5.3	0.12
EPA Tier 2 Max limits*	GM/BHP-HR	2.6	-	-	4.7	0.15
	GM/BKW-HR	3.5	-	-	6.4	0.2

DATA REF: https://www3.epa.gov/otaq/documents/eng-cert/nrci-cert-ghg-2017.xls
REF DATE: 01/20/2017

Gaseous emissions data measurements are consistent with those described in EPA 40 CFR PART 89 SUBPART D and ISO 8178 for measuring HC, CO, PM, and NOx.

***Gaseous emissions values are WEIGHTED CYCLE AVERAGES and are in compliance with the EPA non-road regulations.**

DESIGN PARAMETERS

The following conditions were used to design the CRT® Particulate Filter System:

Table 1. Design parameters at 100% load

Engine	**Caterpillar**
Model Number	**3516C-E**
Application	Generator
kW Rating	2750
Operating Hours per Year	TBD
Number of Systems	36
Type of Fuel	ULSD
Design Exhaust Flow Rate, ACFM	21724
Design Exhaust Temperature, °F	897
Recommended Size Load Bank/kW for Regeneration using CRTdM™	1250
Maximum Allowable Engine Back Pressure	26.9 " H_2O
Typical (full load) Clean Back Pressure*	16.7 " H_2O
Typical (full load) Operational Back Pressure*	23 " H_2O
*Across the JM Product (Scope of Supply)	

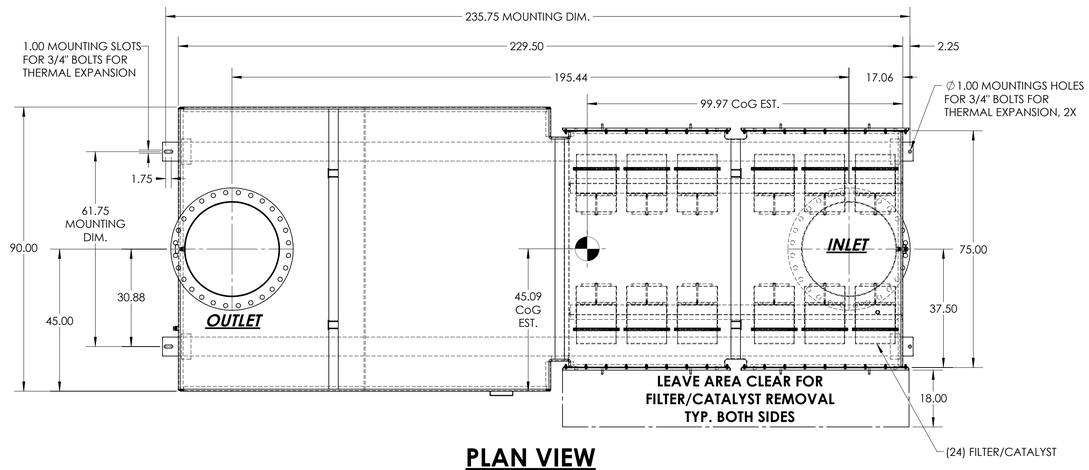
Table 2. Emissions Data (all values in gms/Bhp-hr at 100% load)

	Pollutant	Inlet Level	Outlet Level	% Reduction
	CO	1.16	80% Reduction	80
	PM	.09	85% reduction	85
	NO_x	6.14	NA	NA
	HC	.14	70% Reduction	70

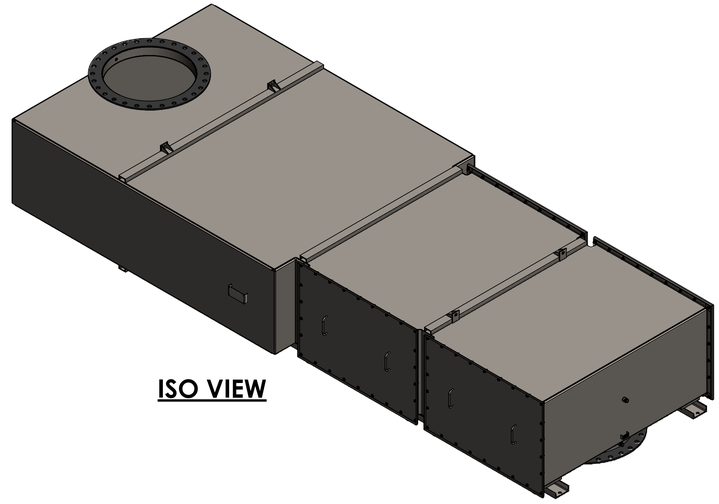
Johnson Matthey has calculated the appropriate catalyst volume and equipment required based on the above design parameters supplied. If actual operating conditions vary from above conditions, then more catalyst or filters may be required for the system to achieve desired destruction efficiencies. For this reason, all operating conditions must be closely reviewed, as different conditions will void the warranty.

In addition, CRTdM alarms must be responded to in the recommended manner, and sufficient engine load must be used to regenerate the CRT(+) unit, when necessary.

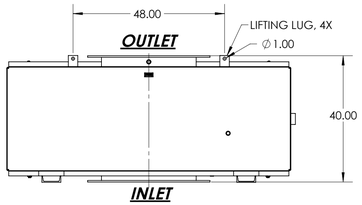
REVISIONS					
REV.	DATE	DESCRIPTION	BY	ENG	APPROVED
0	10/18/16	INITIAL RELEASE	M.D.C.		EJB 8/28/17



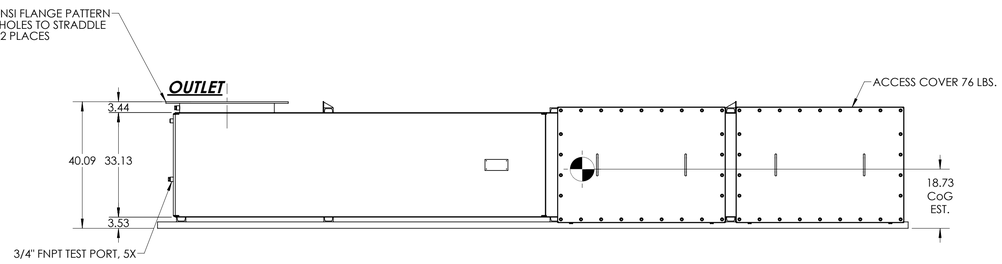
PLAN VIEW



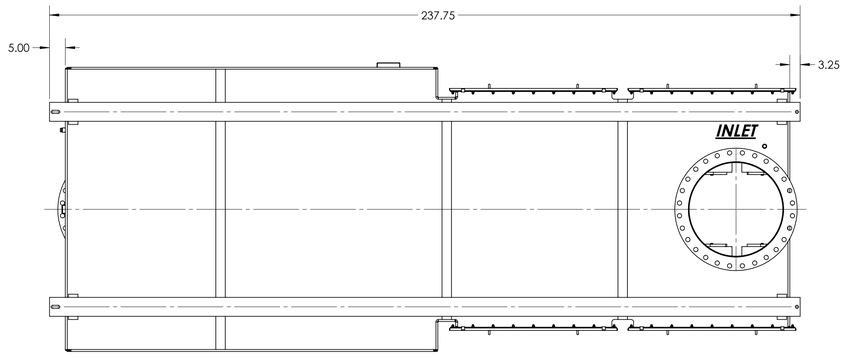
ISO VIEW



SIDE VIEW



ELEVATION VIEW



BOTTOM VIEW

FLANGE CONFIGURATION AND PART NUMBER		
FLANGE SIZE "A"	CS PART NO.	SS PART NO.
26	190157	190831
28	190158	190832
30	190159	190833

* BOLD FLANGE SIZE SHOWN

NOTES:

1. WEIGHT IS ESTIMATED AND IS BASED UPON THE SHOWN CONFIGURATION.
2. SILENCER: HOSPITAL GRADE 30-35 dBA.
3. ALL WELDING TO BE IN ACCORDANCE WITH WELDING GUIDELINES, SEE DRAWING 609826.
4. MATERIAL (MS): 7 GA. ASTM A36 CARBON STEEL or 304 STAINLESS STEEL.
5. FINISH: HIGH TEMPERATURE BLACK PAINT TO HOUSING AND FLANGES (CARBON STEEL ONLY). PER JM PAINT SPEC SEC-EN-P-026.
6. PIPE DIAMETER OF CUSTOMER'S EXHAUST LINE(S) SHALL BE NO LESS THAN THE FLOW AREA OF THE INLET CONNECTION(S) PROVIDED BY JOHNSON MATTHEY.
7. JM BACKPRESSURE GUARANTEE EXTENDS FROM THE CRT INLET CONNECTION TO THE CRT OUTLET CONNECTION ONLY. CUSTOMER IS RESPONSIBLE FOR BACKPRESSURE OR PRESSURE DROP OF ALL OTHER COMPONENTS IN THE ENGINE EXHAUST SYSTEM.

STANDARD TOLERANCES UNLESS SPECIFIED OTHERWISE
[ ] ALTERNATE DIMENSION UNITS ARE FOR REFERENCE ONLY.

MACHINING				GENERAL FABRICATION	
0.0	±0.0300"	FRACTIONS	±1/32"	< 36"	±1/32"
0.00	±0.0100	ANGLES	±0.2 °	> 36"	±1/16"
0.000	±0.0050	SURFACE FINISH	125 µ"AA	ANGLES	±0.5 °

FILLETS SHOWN SHARP = .03"R MAX.

BREAK CORNERS .03" X 45° CHAMFER

TAPPED HOLES - MIN. DEPTH FOR FULL THREADS = 1.8 X DIAMETER
CHAMFER ALL TAPPED HOLES TO ROOT OF FIRST THREAD

ALL DIMENSIONS ARE INCHES UNLESS SPECIFIED OTHERWISE

Shipping Dims		
Length L"	Width W"	Height H"
Material		
Finish		
Weight (lbs) 6104	Model Rev.	

Johnson Matthey
STATIONARY EMISSION CONTROL LLC
900 FORGE AVE
AUDUBON, PA 19403-2305

CRT(+) 24-H-MS-BITO-A/A-RT GENERAL ARRANGEMENT

DRAWN BY	CHECKED	DATE	WHERE USED	DISCIP.	PROJECTION: THIRD ANGLE	SHEET NO.	SIZE
MDC	EJB	10-18-16				1 OF 7	D
ENGINEER	APPROVED	SCALE	EWR NO.	SO NO.	DRAWING NO.	SHT.	REV.
	BAT	1:24			609893 -1-		0

C:\JM\Environmental\SEC_America\Audubon\Standard Products\609xxx - CRT & SDPF\ CRT, SDPF, GEN 2\ Engineering\Fabrication Drawing\609893 (CRT 16 THRU 24 BITO RT) Friday, September 01, 2017 12:47:19 PM

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER DE-08-009-09

Pursuant to the authority vested in the California Air Resources Board (CARB) by Health and Safety Code, Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code section 39515 and 39516 and Executive Order G-14-012;

This action relates to Verification under sections 2700 through 2711 of title 13 of the California Code of Regulations

Johnson Matthey Inc.
CRT(+) Diesel Particulate Filter

CARB has reviewed the request by Johnson Matthey Inc. for verification of the CRT(+) diesel particulate filter (DPF). Based on an evaluation of the data provided, and pursuant to the terms and conditions specified below, the Executive Officer of the CARB hereby finds that the CRT(+) DPF reduces emissions of diesel particulate matter (PM) consistent with a Level 3 device (greater than or equal to 85 percent reductions) (California Code of Regulations (CCR), title 13, sections 2702 (f) and section 2708) and complies with the CARB January 1, 2009, nitrogen dioxide (NO_2) limit (CCR, title 13, section 2702 (f) and section 2706 (a)). Accordingly, the Executive Officer determines that the system merits verification and, subject to the terms and conditions specified below, classifies the CRT(+) DPF as a Level 3 Plus system, for use with stationary emergency standby and prime generators using engine families listed in Attachment 1.

This verification is subject to the following terms and conditions:

- The engine must be used in a stationary application associated with emergency standby or prime generators.
- The engines are model years 1996 or newer having the engine family names listed in Attachment 1.
- The engine must be a Tier 1, Tier 2, Tier 3, Tier 4i with a rated horse power between 50 and 75 or over 750, or Tier 4 Alt 20% NOx and PM certified off-road engine meeting 0.2 grams per brake horsepower hour (g/bhp-hr) diesel particulate matter (PM) or less based on certification or in-use emissions testing (as tested on an appropriate steady-state certification cycle outlined in the CARB off-road regulations – similar to ISO 8178 D2).
- The engine must be in its original certified configuration.
- The engine must not employ exhaust gas recirculation.
- The engine must not have a pre-existing selective catalytic reduction system.
- The engine must not have a pre-existing oxidation catalyst.
- The engine must not have a pre-existing diesel particulate filter.
- The engine must be four-stroke.
- The engine can be turbocharged or naturally-aspirated.
- The engine must be certified in California.

- Johnson Matthey Inc. must review actual operating conditions (duty cycle, baseline emissions, exhaust temperature profiles, and engine backpressure) prior to retrofitting an engine with the CRT(+) DPF to ensure compatibility.
- The engine should be well maintained and not consume lubricating oil at a rate greater than that specified by the engine manufacturer.
- The engine must not be operated with fuel additives, as defined in section 2701 of title 13, of the CCR, unless explicitly verified for use with fuel additive(s).
- The other terms and conditions specified in Table 1.

Table 1: Conditions for the CRT(+) DPF

Parameter	Value
Application	Stationary Emergency Standby and Prime Power Generation
Engine Type	Diesel, with or without turbocharger, without exhaust gas recirculation (EGR), mechanically or electronically controlled, Tier 1, Tier 2, Tier 3, Tier 4i with a rated horse power between 50 and 75 or over 750, or Tier 4 Alt 20% NOx and PM certified off-road engines meeting 0.2 g/bhp-hr diesel PM or less based on certification or in-use emissions testing.
Minimum Exhaust Temperature for Filter Regeneration	The engine must operate at the load level required to achieve 240 degrees Celsius (°C) for a minimum of 40 percent of the engine's operating time and an oxides of nitrogen (NOx)/PM ratio of 15 @ ≥ 300°C and 20 @ ≤ 300°C. Operation at lower temperatures is allowed, but only for a limited duration as specified below.
Maximum Consecutive Minutes Operating Below Passive Regeneration Temperature	720 Minutes
NOx/PM Ratio Requirements	NOx/PM ratio of at least 8 with a preference for 20 or higher.
Number of Consecutive Cold Starts and 30 Minute Idle Sessions before Regeneration Required	24
Number of Months of Operation Before Cleaning of Filter Required	Filter cleaning is not required till after 150 half-hour cold starts with associated regenerations or 1000 hours of emergency/standby use or 6 to 12 months of prime operation depending on hours of operation, maintenance practice, and oil used. The CRTdm, which monitors engine exhaust back pressure and temperature will determine the actual cleaning interval and provide an alert when filter cleaning is required.
Fuel	California diesel fuel with less than or equal to 15 ppm sulfur or a biodiesel blend provided that the biodiesel portion of the blend complies with ASTM D6751, the diesel portion of the blend complies with title 13 (CCR), sections 2281 and 2282, and the blend contains no more than 20 percent biodiesel by volume. Other alternative diesel fuels such as, but not limited to, ethanol diesel blends and water emulsified diesel fuel are excluded from this Executive Order.
Verification Level	Level 3 Plus Verification: • PM - at least 85% reduction • NO_2 - meets January 2009 limit

The CRT(+) DPF consists of an oxidation catalyst and diesel particulate filter, referred to as a catalyzed passive continuously regenerated diesel particulate filter, and a backpressure monitor and data logger combination, CRTdm. A schematic of the approved label is shown in Attachment 2. Labels attached to the DPF and the engine must be identical.

This Executive Order is valid provided that installation instructions for the CRT(+) DPF do not recommend tuning the engine to specifications different from those of the engine manufacturer. The product must not be used with any other systems or engine modifications without CARB and manufacturer written approval.

Changes made to the design or operating conditions of the CRT(+) DPF, as exempted by CARB, which adversely affect the performance of the engine's pollution control system, shall invalidate this Executive Order. As such, no changes are permitted to the device.

If Johnson Matthey Inc. plans to make changes to the design of CRT(+) DPF, the CARB must be notified in writing of any changes to any part of the CRT(+) DPF. Any changes to the device must be evaluated and approved in writing by CARB. Failure to do so shall invalidate this Executive Order.

Marketing of the CRT(+) DPF using identification other than that shown in this Executive Order or for an application other than that listed in this Executive Order shall be prohibited unless prior approval is obtained from CARB.

As specified in the Diesel Emission Control Strategy Verification Procedure (title 13 CCR section 2706 (g)), the CARB assigns each Diesel Emission Control Strategy a family name. The designated family name for the verification as outlined above is:

CA/JMI/2008/PM3+/N00/ST/DPF01

Additionally, as stated in the Diesel Emission Control Strategy Verification Procedure, Johnson Matthey Inc. is responsible for record keeping requirements (section 2702), honoring the required warranty (section 2707), and conducting in-use compliance testing (section 2709).

Johnson Matthey Inc. must ensure that the installation of the CRT(+) DPF system conforms to all applicable industrial safety requirements.

A copy of this Executive Order must be provided to the ultimate purchaser at the time of sale.

Proper engine maintenance is critical for the proper functioning of the diesel emission control strategy. The owner and/or operator of the engine on which the diesel emission control strategy is installed, is strongly advised to adhere to all good engine maintenance practices. Failure to document proper engine maintenance, including

keeping records of the engine's oil consumption, may be grounds for denial of a warranty claim.

In addition, CARB reserves the right in the future to review this Executive Order and verification provided herein to assure that the verified add-on or modified part continues to meet the standards and procedures of CCR, title 13, section 2222, et seq. and CCR, title 13, sections 2700 through 2711.

Systems verified under this Executive Order shall conform to all applicable California emissions regulations.

This Executive Order does not release Johnson Matthey Inc. from complying with all other applicable regulations.

Violation of any of the above conditions shall be grounds for revocation of this Executive Order.

Executive Order DE-08-009-08 is hereby superseded and is of no further force and effect.

Executed at Sacramento, California, this 5th day of December, 2017.

Richard W. Corey
Executive Officer
by

Cynthia Marvin, Chief
Transportation and Toxics Division

Attachment 1: Johnson Matthey CRT(+) Diesel Particulate Filter Off-Road Certified Engine Family List (0<=0.2 g/hp-hr PM)
Attachment 2: Diesel Emission Control System Label

ELECTRIC POWER - Technical Spec Sheet
STANDARD

C18

600 ekW/ 750 kVA/ 60 Hz/ 1800 rpm/ 480 V/ 0.8 Power Factor

Rating Type: STANDBY

Emissions: U.S. EPA Certified for Stationary Emergency Use Only (Tier 2 Nonroad Equivalent Emission Standards)

Image shown may not reflect actual configuration

C18

600 ekW/ 750 kVA

60 Hz/ 1800 rpm/ 480 V

	Metric	English
Package Performance		
Genset Power Rating with Fan @ 0.8 Power Factor	600 ekW	
Genset Power Rating	750 kVA	
Aftercooler (Separate Circuit)	N/A	N/A
Fuel Consumption		
100% Load with Fan	161.6 L/hr	42.7 gal/hr
75% Load with Fan	129.6 L/hr	34.2 gal/hr
50% Load with Fan	91.7 L/hr	24.2 gal/hr
25% Load with Fan	46.8 L/hr	12.4 gal/hr
Cooling System[1]		
Engine Coolant Capacity	20.8 L	5.5 gal
Inlet Air		
Combustion Air Inlet Flow Rate	47.8 m³/min	1687.8 cfm
Max. Allowable Combustion Air Inlet Temp	49 ° C	120 ° F
Exhaust System		
Exhaust Stack Gas Temperature	534.6 ° C	994.3 ° F
Exhaust Gas Flow Rate	135.5 m³/min	4784.4 cfm
Exhaust System Backpressure (Maximum Allowable)	10.0 kPa	40.0 in. water

Rating Type: STANDBY

Emissions: U.S. EPA Certified for Stationary Emergency Use Only (Tier 2 Nonroad Equivalent Emission Standards)

Heat Rejection		
Heat Rejection to Jacket Water	189 kW	10747 Btu/min
Heat Rejection to Exhaust (Total)	634 kW	36053 Btu/min
Heat Rejection to Aftercooler	153 kW	8700 Btu/min
Heat Rejection to Atmosphere from Engine	86 kW	4902 Btu/min
Heat Rejection to Atmosphere from Generator	41 kW	2332 Btu/min

Alternator[2]	
Motor Starting Capability @ 30% Voltage Dip	1633 skVA
Current	902 amps
Frame Size	LC7024F
Excitation	AR
Temperature Rise	150 ° C

DEFINITIONS AND CONDITIONS

1. For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

2. UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

3. Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

Rating Type: STANDBY

Emissions: U.S. EPA Certified for Stationary Emergency Use Only (Tier 2 Nonroad Equivalent Emission Standards)

Applicable Codes and Standards:
AS1359, CSA C22.2 No100-04, UL142,UL489, UL869, UL2200,
NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528,
NEMA MG1-22,NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.

Note: Codes may not be available in all model configurations. Please consult your local Cat Dealer representative for availability.

STANDBY: Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions

Fuel Rates are based on fuel oil of 35º API [16º C (60º F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29º C (85º F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Cat representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

www.Cat-ElectricPower.com

Performance No.: DM8518-04

Feature Code: C18DE6E

Generator Arrangement: 4183897

Date: 07/26/2017

Source Country: U.S.

MANUFACTURER'S EMISSIONS DATA

CERTIFICATION YEAR: 2018 CERT AGENCY: EPA
EPA ENGINE FAMILY NAME: JCPXL18.1NYS

MODEL: C18
GENSET RATING (W/ FAN): 600.0 EKW STANDBY 60 HERTZ @ 1800 RPM
ENGINE DISCPLACEMENT: 1106.36 CU IN
EMISSIONS POWER CATEGORY: 560<=KW<2237
ENGINE TYPE: 4 Stroke Compression Ignition (Diesel)

GENERAL PERFORMANCE DATA

GEN W/F	ENG PWR	FUEL RATE	FUEL RATE	EXHAUST STACK TEMP	EXHAUST GAS FLOW
EKW	BHP	LB/BHP-HR	GPH	°F	CFM
600.0	900.0	0.332	42.7	994.3	4784.4

DATA REF NO.: DM8518-04

EPA D2 CYCLE CERTIFICATION

	UNITS	CO	HC	NOX	NOX + HC	PM
CERTIFICATION TEST LEVELS	GM/BHP-HR	0.6	0.08	3.80	3.9	0.05
	GM/BKW-HR	0.8	0.11	5.06	5.2	0.07
EPA Tier 2 Max limits*	GM/BHP-HR	2.6	-	-	4.8	0.15
	GM/BKW-HR	3.5	-	-	6.4	0.20

DATA REF: https://www.epa.gov/compliance-and-fuel-economy-data/annual-certification-data-vehicles-engines-and-equipment
REF DATE: 02/2018

Gaseous emissions data measurements are consistent with those described in EPA 40 CFR PART 89 SUBPART D and ISO 8178 for measuring HC, CO, PM, and NOx.

***Gaseous emissions values are WEIGHTED CYCLE AVERAGES and are in compliance with the EPA non-road regulations.**

ATTACHMENT D
CD-ROM OF ELECTRONIC MODELING FILES