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Laurelwood Data Center
(19-SPPE-01)

Updated Project Description

Submitted to
California Energy Commission

Prepared by
MECP1 Santa Clara 1, LLC

with technical assistance from

JACOBS

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2. Project Description

MECP1 Santa Clara 1, LLC (Applicant) proposes to construct and operate the Laurelwood Data Center (LDC or project) in Santa Clara, California. The LDC will consist of two multi-storied data center buildings. The maximum electrical load of the LDC is 99 megawatts (MW), inclusive of tenant-installed information technology (IT) equipment in the LDC and cooling and ancillary electrical and telecommunications equipment operating to support IT equipment. For the purposes of the CEC and City of Santa Clara's environmental review process, this SPPE application also describes the removal of existing foundations, asphalt, and underground utilities from the site, which will be completed by the former owner of the site. To ensure reliability in the unlikely event of loss of electrical service from the local electric utility provider, Silicon Valley Power (SVP), the LDC will include 56 3.0-MW standby diesel generators to provide electrical power during utility outages or certain onsite electrical equipment interruption or failure. These generators will be deployed in redundant configurations (that is, all 56 generators will never be operating at the same time) to ensure uninterrupted power, up to the maximum of 99 MW, to the LDC. Equipment will be placed at SVP's grid-to-onsite interconnection point, ensuring these backup generators cannot and will not create electricity for offsite distribution and consumption. The backup generators will be restricted to providing power exclusively for onsite consumption to support customer loads when SVP power is unavailable. The Applicant's agreements with SVP contractually limit the amount of electricity available from SVP's system to a maximum of 99 MW. Therefore, the demand for the backup generation system will not exceed 99 MW because the maximum building load will not exceed 99 MW.

2.1 Project Overview

The LDC consists of two buildings. Building 1 is an approximately 250,560-square-foot, three-story structure with supporting amenities including elevators, restrooms, lobby, staging, and storage. Building 2 is an approximately 283,392-square-foot, four-story structure with supporting amenities including elevators, restrooms, lobby, staging, and storage. Both buildings include loading docks, backup generator yards, stormwater bio-swales, paved surface parking lots, and landscaping features. The LDC also includes an onsite 60-kilovolt (kV) substation with an electrical supply line that will connect to an SVP distribution line located 0.1 miles west of the LDC. The approximately 12-acre LDC site is zoned planned industrial with an Assessor's Parcel Number of 104-39-023. Figure 1-1 shows the regional location of the LDC and Figure 1-2 identifies the project location.

The standby generation system for the LDC consists of 56 3.0-MW diesel-fired generators, each with a peak output capacity of 3.0 MW and a continuous steady state output capacity of 2.725 MW to support the need for the LDC to provide an uninterruptible power supply. Additional project features include electrical switchgear and distribution lines between the substation and buildings, as well as from the backup generator yards and each respective building.

The approximately 31,150-square-foot substation will be located in the southwest corner of the project site, adjacent to a public easement located along the southern edge of the project parcel. The approximately 600-foot-long electrical supply line will be located within this public easement and head west from the LDC to tie into SVP's existing 60-kV distribution line located on the western side of the San Tomas Aquino Creek. This distribution line will consist of three distribution poles located within the existing easement. A site plan is provided as Figure 2-1R.

The backup generation system will be located in equipment yards along the outside of each building. Each building will include 28 standby generators. One generator will provide continuous power to the essential systems (fire monitoring and other emergency operations) for both buildings during electrical outages. At no time will the total LDC electrical demand exceed 99 MWs. Therefore, at no time will the standby generators generate more than 99 MWs of electricity for onsite consumption.

Each backup generator is a fully independent package system with dedicated fuel tanks located on a skid below the generator. The generators will be supported in a stacked configuration. Each backup generation yard will be electrically interconnected to the building it serves through a combination of underground and aboveground conduit/cabling to a location within the building that houses electrical distribution equipment.

2.1.1 Data Center Design

Buildings 1 and 2 will be constructed of steel structural components with metal-framed and insulated exterior walls with stucco or metal panel façade containing accent fields and reveals. The entries will include curtain wall glazing and an aluminum canopy. Heating/ventilation and air-conditioning equipment, including chiller units, will be located on the roof of each building and screened using perforated corrugated steel panels. Figures 2-2a to 2-2c provide conceptual floor layout for the data center buildings. Elevation drawings are presented on Figures 2-3aR to 2-3bR. The exterior of the building will conform to City of Santa Clara (City) design standards. Figure 2-4 provides a rendering of the project from Juliette Lane.

2.2 Electrical System Engineering

The standby generator system includes a 5-to-make-4 design topology, meaning that for every four standby generators that would support load in the event of a utility failure, there is one standby generator (i.e. the fifth generator in that lineup would begin operating only if one of the four generators running in the event of a utility service disruption were to fail). This means that of the 56 standby generators, a maximum of 33 generators operating at 100 percent of their maximum rated output are required to support the operation of LDC under peak summer-time ambient conditions (99 MW of backup generator output). Each building's standby generators will be supported by an Uninterruptible Power Supply (UPS) system consisting of batteries, an inverter, and switches to facilitate the uninterrupted transfer of electrical power supply from the SVP substation to the onsite standby generators in the event of an undefined number of potential events that could impact SVP's service (resulting in a loss of power or degradation in power quality) which triggers the starting of the standby generators. The UPS system includes valve-regulated battery banks, with each bank capable of providing up to 10 minutes of backup at 100 percent load. The UPS system has a rectifier and inverter to condition electricity and is sized to deliver power to support 100 percent of the server bay demand for up to 10 minutes. However, when the electrical service is outside of pre-determined tolerances (+10% or -15% of AC nominal voltages or a frequency range of 60 hertz +/- 5%), The UPS will transfer over to bypass to deliver generator produced power. The UPS transfer load from SVP to UPS battery power occurs within 0.1 seconds, which triggers the start of the generators. Load then transfers from the UPS battery system to the standby generators within 90 seconds of generator start. The UPS directs standby generator load based on the building load demand. The UPS system provides "clean" utility power for critical loads (fire/security and building management systems, and some small 120-volt circuits). The major mechanical systems, lighting, and general receptacles are not powered from the UPS sources.

The SVP distribution line is connected to SVP's Northwest Loop, which includes 115 kV receiving stations that connect to SVP's electrical system. The LDC distribution line will include a 715 double-bundle ACCR conductor with a current carrying capacity of 310 MVS. The receiving stations step voltage down to 60 kV for distribution along the Northwest Loop, which can then provide electricity to facilities interconnected to the loop from either end, making electrical service reliable. SVP has indicated they expect a zero-outage frequency on the 60 kV Northwest Loop. There has been one system-wide outage on the SRS-Central 60 kV system within the past 5 years due to a bird coming in contact with the 60 kV line. The duration of the outage was approximately 40 minutes due to SVP maintenance staff inspecting the line in order to locate the fault and determine whether it was safe to re-energize the line. However, because SVP's grid is a looped system and not a radial system, no customers lost power during this outage.

A single electrical system consists of a 12.47-kV to 480-volt substation transformer feeding the 480-volt critical bus that feeds two independent (UPS modules. The UPS modules are electrically independent of one another for the purposes of loading. The critical bus is supported by its own standby generator and each standby generator operates independent of one another. A utility main breaker and a generator main breaker are included in the critical bus 480-volt switchgear, which are controlled by an automatic transfer controller that transfers the electricity generated by the dedicated standby generator in the event of a power outage.

The SVP distribution line supplying electricity to the onsite substation will be located within an existing 30-foot public easement along the southern portion of the project parcel. This distribution line will interconnect to SVP's existing 60-kV distribution line located on the west side of the San Tomas Aquino Creek. Three power poles will be installed within the existing public easement for the distribution line. No power poles will be located within the bed or banks of the San Tomas Aquino Creek (Figures 1-2, 1-3, and 1-4).

2.2.1 Electrical Generation Equipment

Each of the 56 standby generators will be an Environmental Protection Agency (EPA) Tier-2 diesel fired generator equipped with diesel particulate filters (DPF). The generators will be Caterpillar Model C175-16 with a maximum generating capacity of 3.0 MW and a continuous generating capacity of 2.725 MW.

Each standby generator includes an engine, alternator, and sound-attenuated enclosure. Each generator can be independently operated based on signals from the UPS system programable logic controllers. The standby generators are optimized for rapid start, with redundant starters, redundant batteries, redundant battery chargers, and a best battery selector switch. The standby generators are designed to minimize space requirements by stacking one generator on top of another generator. Building 1 will have 16 stacked generators and 12 unstacked generators. Building 2 will have 28 stacked generators and no unstacked generators. Each generator is approximately 9.5 feet wide, 26 feet long, and 14 feet tall. The stacked generators will be approximately 36 feet tall when installed and the unstacked generators will be approximately 14 feet tall. The backup generator yards will include an approximately 19-foot-high sound-attenuated screen wall to minimize visual and noise impacts from the equipment. Each standby generator will include a separate exhaust stack with stacked generator stacks being enclosed in a plenum to enhance the appearance of these industrial components. The exhaust stacks will be approximately 40 feet above grade for the stacked generators and 18 feet above grade for the unstacked generators.

Based on building demand estimates at full capacity, approximately 21 generators for each building are expected to operate at approximately 78 percent load to support the full building load demand, including roof top mechanical systems and house loads (21 units at 78 percent of 3 MWs is approximately 49 MWs per building). Prospective tenants must be able to entrust their mission critical operations to the LDC and rely on the LDC to perform in a first-class manner for a mission critical facility irrespective of potential mitigation strategies at the tenant's disposal in the event of a loss of utility power. Depending on the business model of the prospective tenant, additional measures are sometimes employed to further improve resiliency and redundancy, such as use of "mirrored sites". While "mirrored sites" allow a customer to move operations off-site in the event of an outage, use of such sites are an extraordinary expense given the economic investment necessary to deploy the IT infrastructure. The ability to move operations off-site is merely another level of redundancy, but is not one utilized by all tenants, and thus not a feasible alternative to backup generation. As a result, all prospective tenants expect any data center to provide sufficient backup generation to ensure uninterrupted electrical service to the facility.

2-1 Site Plan (Design will remain same as in TN 228748)

2-2a 1st Floor Plan (Basic design will remain same as initial SPPE Application)

2-2b 2nd, 3rd, and 4th Floor Plan (Basic design will remain same as initial SPPE Application)

2-2c Roof Plan (Basic design will remain same as initial SPPE Application)

2-3a Elevation Drawings (Design will remain same as in TN 228748)

2-3b Elevation Drawings Laurelwood Data Center (Design will remain same as in TN 228748)

2-4 Rendering (See Figure 2-3aR and 2-3b)

2.2.2 Fuel System

Each standby generator includes an approximately 10,300-gallon diesel fuel tank with polishing filtration. The tank will be located underneath each standby generator and provides sufficient fuel storage to operate the generator at steady state continuous load for at least 48 hours.

The LDC will contract with multiple fuel suppliers to provide delivery within 48 hours of a request to ensure fuel availability.

2.2.3 Cooling System

Each generator will be self-contained within an enclosure with its own radiator for cooling.

2.2.4 Water Supply and Use

Potable water will be provided to LDC by the City. If recycled water is available, it will be used onsite for landscaping purposes. The standby generators will require water during the initial filling of the closed-loop radiator system and periodically during maintenance events. After the initial fill, no further consumption of water by the standby generators will be required.

Building cooling will be accomplished using cooling towers with adiabatic cooling technology installed. The adiabatic cooling technology uses a radiator-style cooling system with wetted pre-cooling pads installed upstream of the cooling tube bundle. During lower ambient conditions, the tower operates without using water on the wetted pads. However, during higher ambient temperatures, the pre-cooling pads are wetted to reduce the incoming air temperature, resulting in greater heat rejection. The expected project water demand drops significantly to approximately 5.4 million gallons per year, excluding negligible landscaping and other maintenance uses.

2.2.5 Waste Management

Construction/demolition-related wastes, similar to construction/demolition for comparable projects, will be generated, managed, and disposed of consistent with applicable law, as described in Section 3.9. No significant waste materials will be generated during operation of LDC.

2.2.6 Hazardous Materials Management

Each standby generator will include a double-walled fuel tank to minimize the potential of an accidental fuel release. As diesel fuel is not highly volatile, vapor controls are not required. The space between the walls of the fuel tank will be monitored for the presence of liquids. This monitoring system is monitored by the onsite operations staff who will receive automated alerts in the event of fuel leak or release. The diesel fuel and potentially battery electrolyte (sulfuric acid) represents the only hazardous materials stored onsite in reportable quantities.

Fuel deliveries will occur as needed via a tanker truck. The tanker truck will park at the gated entrances to the backup generator yard for refueling. Fueling will occur within a spill catch basin located under each generator fill connection. The drain to the spill catch basin will be closed prior to the start of fueling. Spill control equipment will be stored within the backup generation yard to allow immediate responses in the event of an accident.

As a safety measure, to the extent feasible, fueling operations will be scheduled at times when storm events are improbable to avoid potential impacts to water resources.

The LDC will install warning signs at the fuel unloading areas to minimize the potential of refueling accidents occurring due to tanker trucks departing prior to disconnecting the transfer hose. Also, an emergency pump shut-off will be utilized if a pump hose breaks while fueling the tanks. Tanker truck loading and unloading procedures will be posted at the fuel unloading areas.

2.3 Existing Site Condition

The LDC site is located at 2201 Laurelwood Road in Santa Clara, California (Figure 1-2). The approximately 12-acre site is bounded to the south by U.S. 101, to the west by a covered parking lot, to the east by Juliette Lane and commercial/industrial uses, and to the north by commercial/industrial uses. The site includes a 30-foot public easement along the southern edge of the parcel that also includes parking and landscaping (Figure 1-4). There are two existing access gates off Laurelwood Road.

The site is a single parcel previously used for electrical component manufacturing and office space with mature landscaping including trees and shrubs. Existing aboveground structures have been removed by the former owner as a condition of sale, pursuant to the demolition requirements of the City. . Existing perimeter trees and shrubs will be retained to the extent feasible. An arborist report is included in Appendix 2-A documenting the types and conditions of the landscaping and identifying trees that will be retained.

The nearest airport, the Norman Y. Mineta San Jose International Airport, is located approximately 1.4 miles to the southeast.

2.4 Project Construction

The Applicant will commence construction of the LDC after the existing foundations/asphalt has been removed from the project site. No offsite staging or laydown areas are proposed and all construction will occur within the project site boundaries or within the 75-foot distribution line construction corridor. All aboveground existing buildings and structures have been removed by the previous owner and foundations/asphalt will be removed after receipt of the necessary approvals by the City of Santa Clara. Building 1 will be a three-story, approximately 250,560-square-foot structure. Building 1 will include a loading dock, parking lot/spaces (approximately 133 total parking spaces at full buildout), a 26-foot-wide perimeter road, bioswales, a backup generator yard, landscaping, and an approximately 31,150-square-foot substation with the distribution supply power line. The main entrance will be off Laurelwood Road, with a secondary entrance off Juliette Lane. All entrances will include security gates with controlled access. Building 2 will be a four-story, approximately 283,392-square-foot building. Building 2 will include a loading dock, parking lot/spaces, the remainder of a 26-foot-wide perimeter road, bioswales, a backup generator yard, and landscaping.

In addition, Class I bicycle lockers and Class II bicycle racks will be provided on site.

Demolition of the existing foundations, asphalt, and underground utilities is expected to take approximately 3 months. Construction of the LDC is expected to take approximately 14 months. Construction and demolition are scheduled to commence in the 4th quarter of 2019 and completed in the 2nd quarter of 2021, approximately 17 months. Construction is expected to require a maximum of 129 workers (craft and supervisory) per month and an average of 60 workers per month. Table 2-1 presents the construction/demolition workforce by month and classification with Months 1 to 3 being demolition.

Demolition of the existing foundations, underground utilities, and asphalt is expected to generate approximately 12,000 tons of concrete waste and 6,100 tons of asphalt waste. All of the concrete waste and approximately 4,900 tons of the asphalt waste will remain onsite for reuse. The balance of the asphalt waste (approximately 1,200 tons) consists of Petromat that will be hauled to the landfill for disposal.

Table 2-2 presents the expected construction equipment on a monthly basis. The first two months of construction (Months 4 and 5) will require the most construction equipment with 22 and 20 pieces of equipment onsite, respectively. By month 6 the construction equipment numbers drop by half with 11 pieces of equipment required onsite. Construction will require a number of vehicle trips to the site. These trips include workers, material, and equipment deliveries. Table 2-3 presents the number of morning and evening vehicle trips to the site. The offsite disposal of the asphalt generated during demolition is expected to require a total of approximately 30 truck trips over the demolition period, which is less than the number of daily delivery/haul trips presented in Table 2-3.

Based on the geotechnical investigation, the soils under the project site include approximately 2.5 feet of undocumented fill consisting of hard fat clay with gravel. Beneath the undocumented fill is a 2.5 to 7 feet of stiff to hard fat clay with varying amounts of sand. Beneath the hard fat clay, boring encountered medium stiff to very stiff lean clays with varying amounts of sand and silt with interbedded layers of loose to very dense sands with varying amounts of clay and silt to the extent of the geotechnical investigation (at 80 feet below grade). The geotechnical investigation determined that the potential exists for liquefaction-induced settlement, lateral spreading, shallow groundwater (6.5 to 13 feet below grade), and expansive soils common in this region.

The geotechnical investigation suggests the use of spread footings for building foundations and densification techniques to address the liquefaction/lateral spreading and expansive soils. The densification technique involves the vertical/horizontal compaction of soils beneath the foundations to reduce the total settlement to acceptable levels.

Table 2-1. Construction Workforce by Month and Classification

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Labor Classification																	
Carpenters	0	0	0	1	5	1	3	5	5	8	15	15	16	16	16	10	2
Laborers	2	2	2	1	5	5	5	5	5	8	15	15	16	16	16	10	2
Teamsters	0	0	0	0	1	0	0	1	0	0	5	5	2	2	3	3	0
Electricians	0	0	0	1	2	3	3	5	8	8	13	13	17	18	18	17	2
Iron Workers	0	0	0	0	2	1	0	1	1	8	6	6	7	7	7	0	0
Millwrights	0	0	0	0	0	0	0	0	0	0	0	0	2	2	3	3	0
Boilermakers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plumbers	0	0	0	0	3	1	2	5	1	2	7	7	12	13	13	10	2
Pipefitters	0	0	0	0	0	0	2	5	1	2	7	7	12	13	13	10	2
Insulation Workers	0	0	0	0	0	0	0	0	0	0	3	4	6	6	6	6	2
Operating Engineers	3	3	3	4	9	5	6	6	3	5	15	15	7	7	5	4	0
Oilers / Mechanics	0	0	0	0	1	0	0	0	0	0	4	4	8	8	6	6	0
Cement Finishers	0	0	0	0	0	5	5	6	8	5	5	3	3	1	1	0	0
Roofers	0	0	0	0	0	0	0	0	0	0	7	7	1	1	0	3	0
Sheetmetal Workers	0	0	0	0	0	0	0	3	1	1	4	4	6	7	5	5	0
Sprinkler Fitters	0	0	0	0	0	0	0	0	2	2	2	2	1	1	0	0	0
Painters	0	0	0	0	0	0	0	0	0	0	0	2	2	3	1	4	2
Total Craft Labor	5	5	5	7	28	21	26	42	35	49	108	109	118	121	113	91	14
Total Supervision	1	1	1	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Total Staffing	6	6	6	15	36	29	34	50	43	57	116	117	126	129	121	99	22

Table 2-2. Construction Equipment by Month

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
Description																	
Excavators	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0
Backhoe	0	0	0	1	2	2	1	1	1	1	0	0	0	0	0	0	0
10 Wheel Dump Truck	2	2	2	8	3	2	1	1	0	0	0	0	0	0	0	0	0
Concrete Crusher	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydraulic Hammer	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Front End Loader	0	0	0	2	3	3	1	1	0	0	0	0	0	0	0	0	0
75 Ton Hydraulic Crane	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0
35 Ton Hydraulic Crane	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0
Fork Lift	0	0	0	1	2	2	2	2	3	3	3	3	3	2	2	1	1
Grader	0	0	0	2	2	2	2	1	1	0	0	0	0	0	0	0	0
Compactor	0	0	0	2	2	1	1	1	1	1	1	0	0	0	0	0	0
Water Truck	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1
Pick-up Truck	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Light Towers	0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0
Heavy Lift Lattice Boom Main Crane	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0

Table 2-3. Construction Trip Generation

Trip Type	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Delivery/Haul Trucks	20	20	40	30	30	60
Workers	200	0	200	0	200	200
Total Construction Traffic	220	20	240	30	230	260

2.5 Project Design Measures

The Applicant has incorporated numerous measures in the project design that are intended to avoid and reduce potential impacts from the project.

Prior to the commencement of construction, the Applicant will secure the services of a qualified biologist, and archaeological, Native American, and paleontological specialists. These specialists will prepare a Worker Environmental Awareness Training program (program) to instruct construction workers of the obligation to protect and preserve valuable biological, archaeological, Native American, and paleontological resources for review by the City Director of Community Development. This program will be provided to all construction workers via a recorded presentation and will include a discussion of applicable laws and penalties under the laws; samples or visual aids of resources that could be encountered in the project vicinity; instructions regarding the need to halt work in the vicinity of any potential biological, archaeological, Native American, and paleontological resources encountered, and measures to notify their supervisor, the Applicant, and the specialists.

These project design measures are consistent with best practices and existing regulatory requirements. They include the following by environmental discipline:

2.5.1 Air and Water Quality

- Minimizing fugitive dust generation by watering exposed soils two time per day or as needed.
- Covering truck loads when transporting soil, sand, or other loose materials to or from the site.
- Performing street sweeping to remove all visible mud or dirt track-out onto adjacent public roads at least once per day. The use of dry power sweeping is prohibited.
- Limiting onsite vehicle speeds on unpaved surfaces to 15 miles per hour (mph).
- Paving onsite roads/driveways, and sidewalks as soon as possible in the construction schedule. Pouring foundations for building pads as soon as possible after grading.
- Limiting construction equipment idling times to a maximum 5 minutes or shut equipment down when not in use.
- Maintaining and tuning construction equipment in accordance with manufacturer‘s specifications.
- Employing a certified visible emission evaluator to verify construction equipment is functioning properly.
- Posting a publicly visible sign with the telephone number and name of the person to contact regarding dust complaints and the Bay Area Air Quality Management District (BAAQMD) telephone number. The contact person will implement corrective measures, as needed, within 48 hours and the BAAQMD will be informed of any legitimate complaints received to ensure compliance with applicable regulations.

2.5.2 Biological Resources

- Preconstruction surveys will be performed for biological resources by a qualified biologist. The surveys will identify any active nests that could be disturbed during construction. Surveys will be completed no more than 7 days prior to the initiation of ground disturbance. During this survey, the biologist shall inspect vegetation along the perimeter of the project site.
- A no-work buffer will be established around any active nests with an appropriate buffer for the nesting species. The buffer widths will be developed by a qualified biologist, based on species' sensitivity to disturbance, planned construction activities, and baseline level of human activity.
- The biologist will draft a technical memorandum documenting the result of the survey and any designated buffer zones, which may be submitted to the Director of Community Development prior to the start of ground disturbance activities.

2.5.3 Cultural Resources

- The Applicant will secure the services of a Secretary of the Interior-qualified archaeologist and a Native American monitor to be on-call during construction. in the event a historic or prehistoric resource is encountered. If prehistoric and/or historic resources are encountered during construction, all activity within a 50-foot radius of the find will be stopped and the archaeologist/Native American monitor will examine the find and record the site, including field notes, measurements, and photography for a Department of Parks and Recreation 523 Primary Record form. The archaeologist will provide recommendations regarding eligibility for the California Register of Historical Resources, data recovery, curation, or other appropriate mitigation. Ground disturbance within the 50-foot radius can resume once these steps are taken and the City Director of Community Development has concurred with the recommendations.
- If human remains are discovered during construction, a 50-foot radius exclusion zone will be established to protect the find and the Santa Clara County Coroner will be notified to make a determination as to whether the remains are of Native American origin or whether an investigation into the cause of death is required. If the remains are determined to be Native American, the Coroner will notify the Native American Heritage Commission. All actions taken under this mitigation measure will comply with Health and Human Safety Code Section 7050.5(b).
- Within 30 days of the completion of construction or archaeological/Native American monitoring is terminated, the Applicant will have the archaeologist/Native American monitor prepare a report of findings. The report will document the archaeological/Native American resource finds, if any, recommendations, data recovery efforts, and other pertinent information gleaned during construction. The report may be submitted to the City of Santa Clara's Director of Community Development for review and approval. The Applicant will submit the final report to the Northwest Information Center at Sonoma State University.

2.5.4 Paleontological Resources

- The Applicant will secure the services of a qualified professional paleontologist, as defined by the Society of Vertebrate Paleontology, to be on-call prior to the commencement of construction. The paleontologist will be experienced in teaching non-specialists to recognize fossil materials and how to notify in the event of encountering a suspected fossil. If suspected fossils are encountered during construction, the construction workers will halt construction within 50 feet of any potential fossil find and notify the paleontologist, who will evaluate its significance.
- If a fossil is encountered and determined to be significant and avoidance is not feasible, the paleontologist will develop and implement an excavation and salvage plan in accordance with Society of Vertebrate Paleontology standards. Construction work in the immediate area will be halted or diverted to allow recovery of fossil remains in a timely manner. Fossil remains collected will be cleaned, repaired, sorted, and cataloged, along with copies of all pertinent field notes, photos, and maps.
- The paleontologist will prepare a paleontological resource monitoring report that outlines the results of the monitoring program and any encountered fossils. The report may be submitted to the Director

of Community Development for review and approval. The report and any fossil remains collected will be submitted to a scientific institution with paleontological collections.

2.6 Facility Operation

The standby generators will be run primarily for testing and maintenance purposes, and otherwise will not operate unless there is an interruption of the electrical supply. The California Air Resources Board's Airborne Toxic Control Measures (ATCM) limits each engine to no more than 50 hours of operation annually for reliability purposes (i.e., testing and maintenance). Table 2-4 presents the expected testing and maintenance operations for each engine on a monthly, quarterly, and annual basis. The monthly and quarterly tests will last approximately 25 minutes per standby generator, with up to five generators tested per day. The annual generation tests will be performed on up to four generators per day. The 3-Year Medium Voltage Breaker/Transformer Testing will be performed once every 3 years, with up to 2 generators tested per day. The contingency testing was included to provide standby generator operations to support unscheduled maintenance/testing requirements and will be performed using the monthly testing methodology.

Table 2-4 Standby Generator Expected Testing and Maintenance Events (per Standby Generator)

	Duration			Annual Operations
Maintenance Event	Frequency	Hours	Load Factor	Hours/Year
Monthly Generation[1]	8	0.42	50%	3.4
Quarterly Generation[2]	3	0.42	100%	1.3
Annual Generation	1	2	100%	2
3-Year Medium Voltage Breaker/Transformer Testing	1	4	100%	4
Contingency Testing[3]	-	1.6	100%	1.6
Total	NA	NA	NA	12.3

[1] Quarterly and annual testing is counted as monthly testing.

[2] Annual testing counts as quarterly testing.

[3] The contingency testing was included to provide standby generator operations to support unscheduled maintenance/testing requirements.

2.7 Alternate Standby Generation Technologies

The purpose of the standby generators is to provide LDC's customers with a high degree of electrical reliability, which requires installation of redundant systems (i.e., twice as much generating capability as necessary to operate the facility). Diesel fired electrical generators have a long and successful history of satisfying the needs of emergency electrical needs of critical infrastructure. Even though there will be no significant impacts from the project due to the measures incorporated into the project design, the Applicant considered alternate standby generation technologies. The technologies considered included alternative-fueled generators (propane/gasoline/natural gas), fuel cells, renewable generation, and storage. However, none of the alternatives can meet the basic project objectives in a feasible, cost-effective manner, nor do they lessen any of the already insignificant impacts from the project.

2.7.1 Alternative Fuel Sources

The use of alternative-fueled generators included consideration of the use of propane, gasoline, and natural gas fired standby generators. Each proposed diesel-fired standby generator includes a 10,300-gallon storage tank. Storage of diesel fuel does not require vapor control systems to protect public health/safety and can be stored for indefinite periods of time. Diesel fuel is widely used in automobiles, emergency generators supporting other critical infrastructure (hospitals, police stations, communication systems, etc.), and construction equipment. Diesel fuel accounted for 21 percent of the fuels consumed in the United States transportation sector.[1] Diesel fuel has a lower vapor pressure as compared to other fuels (gasoline, propane, and natural gas), making it inherently safer to use and store as compared to alternative fuel sources. In contrast, natural gas and propane gas fired generators are available in 3.0-MW units, however, designing and installing an onsite natural gas storage system would not be cost effective and would require a significantly larger project site to accommodate the equipment required to pressurize and store the fuel. Natural gas fueled units would also be susceptible to outages from the natural gas supplier in the event of extraordinary natural gas system events (such as line ruptures or supply shortage due to extreme weather events). Propane fired generators requires fuel storage tanks. The amount of propane required to support 99 MWs of standby generation for 48-hours (consistent with the reliability provided by proposed diesel standby generators) would require multiple storage tanks, increasing the risk to public health from accidental releases from transportation and onsite storage.

2.7.2 Alternative Technologies

The Applicant considered whether alternative technologies could provide the same level of reliability and consistency as the standby generators. Fuel cells convert chemical energy, in the form of hydrogen or natural gas, to electricity with water, heat, and carbon dioxide as the possible by-products. Standby fuel cells are configured in “stacks” of units, allowing the fuel cell output to be scalable up to utility scales.[2] The use of fuel cells will either require the installation of a natural gas pipeline, increasing the project’s impacts, or the storage of hydrogen sufficient to generate 99 MWs. The LDC standby generators do not require the installation of a new, significant natural gas pipeline to support the project. Assuming the use of natural gas fuel cell, and a pipeline of sufficient size and capacity were available, 99 MWs of fuel cells will require a substantially greater area than is required for the standby diesel generators. Given the standby diesel generators are expected to operate under 16 hours per year, the environmental impacts associated with installing a natural gas pipeline of sufficient size for fuel cells in an urban area like Santa Clara County will have a greater impact than the use of the proposed standby generators. Hydrogen is a highly flammable material stored under significant pressure and storage is a challenge for stationary and portable applications.[3] Hydrogen is not considered feasible in similar project applications.

Due to the intermittent nature, the use of renewable generation sources (wind/hydroelectric/solar) on their own would not satisfy LDC’s need for reliable standby generation. The space and resource requirements for 99 MWs of renewable power and their intermittent nature make such applications infeasible for this project and site. Renewable generation resources, such as solar or wind, coupled with a battery installation, would require significantly more space than that currently operated by the standby generators, and would not fit on the current project site and would not avoid or minimize any potentially significant impacts.

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[1] https://www.eia.gov/energyexplained/index.php?page=diesel_use

[2] https://www.energy.gov/sites/prod/files/2014/10/f19/ftco_early_mkts_fc_backup_power_fact_sheet.pdf

[3] https://www.energy.gov/eere/fuelcells/hydrogen-storage