APPENDIX M – NOISE

Noise Analysis for the Westside Canal Battery Storage Project

Noise Analysis for the Westside Canal Battery Storage Project Imperial County, California

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Acronyms and Abbreviations

APN	Assessor Parcel Numbers
Caltrans	California Department of Transportation
CNEL	community noise equivalent level
County	County of Imperial
dB	decibel
dB(A)	A-weighted decibel
FHWA	Federal Highway Administration
HVAC	heating, ventilation, and air conditioning
I-8	Interstate 8
IID	Imperial Irrigation District
IV Substation	Imperial Valley Substation
kV	kilovolt
L_{eq}	equivalent noise level
$L_{eq(8h)}$	8-hour equivalent noise level
L_{pw}	sound power
MW	megawatt
O&M	Operations & Maintenance
Project	Westside Canal Battery Storage Project
Project Proponent	Westside Canal Battery Storage, LLC
PV	photovoltaic
SoundPLAN	SoundPlan Essential
SR-98	State Route 98

Executive Summary

This report provides the results of the noise analysis performed for the proposed Westside Canal Battery Storage Project (Project) in Imperial County, California. The Project site consists of approximately 148 acres of agriculturally-zoned land located in the unincorporated Mount Signal area of the County, approximately 8.0 miles southwest of the city of El Centro (Assessor Parcel Numbers [APNs] 051-350-010 and 051-350-011). The Project site is located approximately one-third mile north of the Imperial Valley Substation (IV Substation) and directly south of the intersection of Liebert Road and the Imperial Irrigation District's (IID) Westside Main Canal. The Project site is bounded by the Westside Main Canal to the north, Bureau of Land Management (BLM) lands to the south and west, and vacant private land to the east. The Campo Verde solar generation facility is located north of the Project site, across the Westside Main Canal.

The two Project parcels are proposed for development as a utility-scale energy storage complex. The Project would also utilize portions of two parcels located north of the Westside Main Canal (APN 051-350-019 owned by IID and APN 051-350-018 owned by a private landowner) for site access and as a temporary construction staging area. The Project would also access a small portion of APN 051-350-009 within an IID easement for connection to the existing IID Campo Verde – Imperial Valley 230 kilovolt radial gen-tie line during the construction of a switching station on the Project site.

Construction Noise

Noise associated with the site preparation and facility installation would potentially result in short-term impacts to surrounding properties. Construction would include the use of a variety of noise-generating equipment such as scrapers, excavators, loaders, and water trucks, along with others. Construction of the access road and the bridge over the Westside Main Canal and would last for eight to nine months. The Project would then grade the entire site and construct the utility-scale energy storage complex, which would last for up to 32 months.

The County of Imperial (County) General Plan Noise Element establishes construction time of day restrictions and noise level limits. Construction activities may only occur Monday through Friday between the hours of 7:00 a.m. and 7:00 p.m. or Saturday between the hours of 9:00 a.m. and 5:00 p.m., excluding holidays. Additionally, construction noise may not exceed 75 A-weighted decibel [dB(A)] 8-hour equivalent noise level [$L_{eq(8h)}$] at the nearest sensitive receptor. Noise levels were modeled at six specific receivers located at the nearest residential properties. As calculated in this analysis, maximum construction noise levels would be well less than 75 dB(A) $L_{eq(8h)}$. Additionally, noise levels associated with temporary construction traffic (workers and deliveries) would be well below75 dB(A) $L_{eq(8h)}$. Impacts would be less than significant.

Operational Noise

Stationary sources of noise associated with the operation of the Project would include air cooling units, inverters, transformers, a substation, and transmission gen-tie lines. The Operations & Maintenance (O&M) building would also include a heating, ventilation, and air conditioning (HVAC) unit(s). The County Code of Ordinances establishes property line noise standards for residential, commercial, light industrial, and general industrial zoning districts. The Project site and all surrounding properties are in agricultural zoning districts. The Project proposes a General Plan Amendment and Rezone to change land use designation and zoning for the Project site Agriculture (A3) to Industrial. The applicable noise level limit for the adjacent agricultural uses is 70 dB(A) L_{eq} at the receiving property line. As calculated in this analysis, noise associated with Project operation would not exceed the applicable property line noise level limit of 70 dB(A) L_{eq} at the adjacent properties. Additionally, noise levels would be less than the most restrictive noise limit of 45 dB(A) L_{eq} for low-density residential uses at the nearest residential receivers. Impacts due to on-site generated noise would be less than significant.

Traffic Noise

During operations, Project-generated traffic would increase volumes on local roadways and thereby increase traffic noise levels in the Project area. Project trip generation would be extremely limited–up to 40 trips per day. Operational ambient noise level increases attributable to Project-generated traffic are anticipated to be less than 3 dB(A) and thus would be less than barely perceptible. Impacts would be less than significant.

1.0 Introduction

1.1 Purpose of the Report

This report evaluates the significance of potential noise impacts associated with the Westside Canal Battery Storage Project (Project) in comparison to noise limits established by Imperial County.

1.2 Project Description

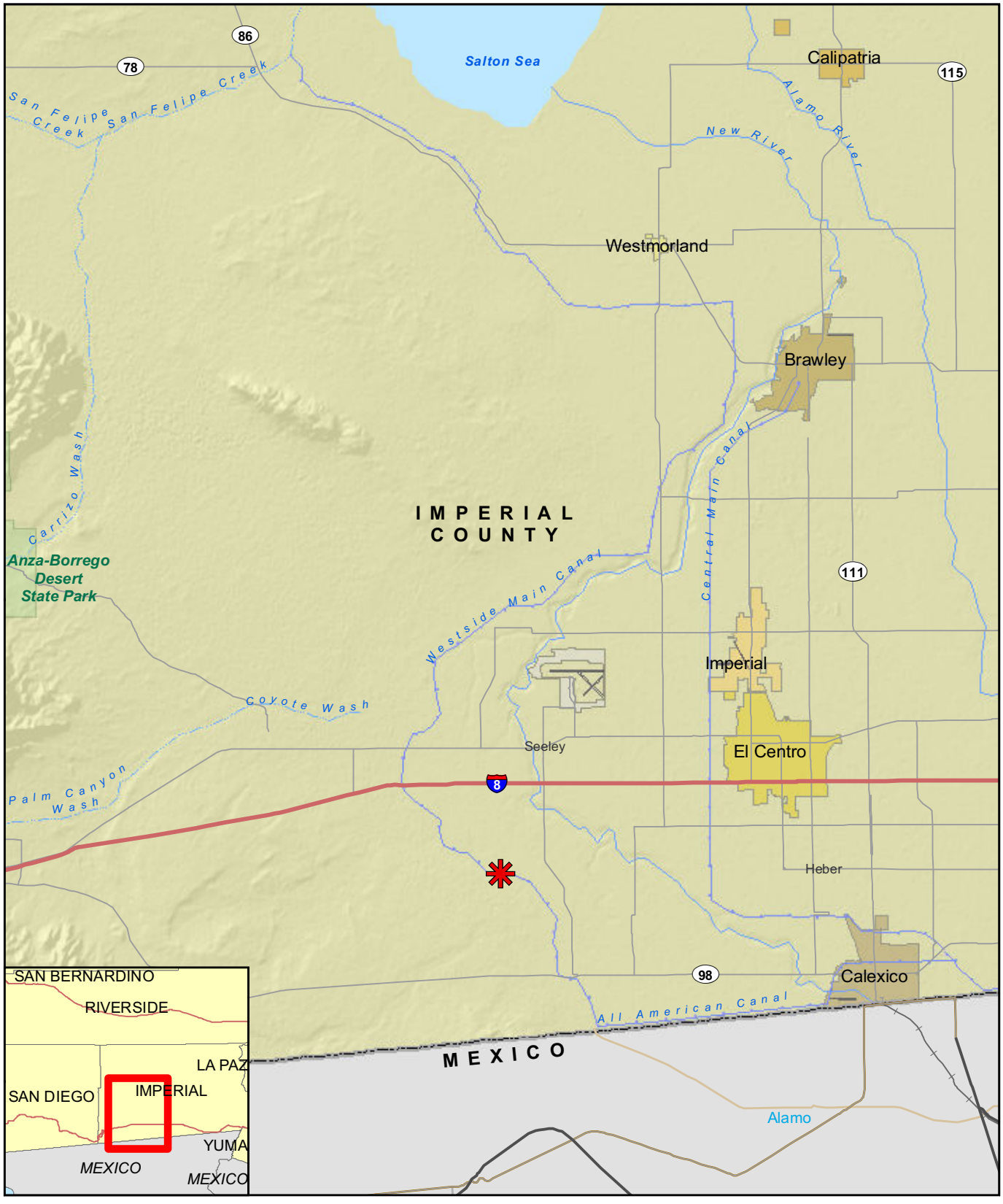
Westside Canal Battery Storage, LLC (Project Proponent), a subsidiary of Con Edison Clean Energy Businesses, is proposing to develop, design, construct, own, operate, and maintain the Westside Canal Battery Storage Project (Project), a utility-scale energy storage complex with a capacity of up to 2,000 megawatts (MW). The Project would store energy generation from the electrical grid, and optimally discharge that energy back into the grid as firm, reliable generation and/or grid services.

The Project would be comprised of lithium-ion battery and/or flow battery energy storage facilities, a behind-the-meter solar energy facility, a new on-site 230 kilovolt (kV) loop-in switching station, a 34.5 kV to 230 kV substation, underground electrical cables, and permanent vehicular access to and from the site over a proposed bridge spanning Imperial Irrigation District's (IID's) Westside Main Canal. The proposed loop-in switching station would connect the Project to the existing IID Campo Verde – Imperial Valley 230 kV radial gen-tie line, which connects to the Imperial Valley Substation (IV Substation) and the California Independent System Operator (CAISO), approximately one-third mile south of the Project site. The Project Proponent has submitted the necessary Interconnection Request Applications to the CAISO and IID.

The Project would complement both the existing operational renewable energy facilities, as well as those planned for future development in Imperial County (County), and would support the broader southern California bulk electric transmission system by serving as a firm, dispatchable resource.

The Project is pursuing the following objectives:

- To receive grid energy during beneficial market and operational periods and store that energy for dispatch when the customer (i.e., a load-serving entity) deems it to be more valuable.
- To be a valuable resource in allowing the customer and system operators to manage the effect of intermittent renewable generation on the grid and create reliable, dispatchable generation upon demand.
- To utilize available land that has not been used for agricultural production for more than 15 years, and enhance the site location by providing for permanent vehicular access.



Project Location

FIGURE 1
Regional Location

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1.2.1 Project Location

The Project would be located in the unincorporated Mount Signal area of the County, approximately 8.0 miles southwest of the city of El Centro and approximately 5.3 miles north of the U.S.-Mexico border. Figure 1 shows the regional location of the Project. The Project site is comprised of two parcels owned by the Project Proponent, Assessor Parcel Number (APN) 051-350-010 and APN 051-350-011, totaling approximately 148 acres. These parcels have limited access corridors for vehicular traffic and are considered less desirable for agricultural production, as reflected by the last 15 years during which no farming activity has occurred. The Project site is approximately one-third mile north of the IV Substation and directly south of the intersection of Liebert Road and the IID's Westside Main Canal. The Project site is bounded by the Westside Main Canal to the north, Bureau of Land Management (BLM) lands to the south and west, and vacant private land to the east. The Campo Verde solar generation facility is located north of the Project site, across the Westside Main Canal. Figure 2 shows an aerial photograph of the Project site and the above-mentioned nearby facilities.

The two Project parcels are proposed for development as a utility-scale energy storage complex. The Project would also utilize portions of two parcels located north of the Westside Main Canal (APN 051-350-019 owned by IID and APN 051-350-018 owned by a private landowner) for site access and as a temporary construction staging area. The Project would also access a small portion of APN 051-350-009 within an IID easement for connection to the existing IID Campo Verde – Imperial Valley 230 kV radial gen-tie line during the construction of a substation on the Project site. The total proposed Project development footprint, encompassing both temporary and permanent impacts, would be approximately 163 acres.

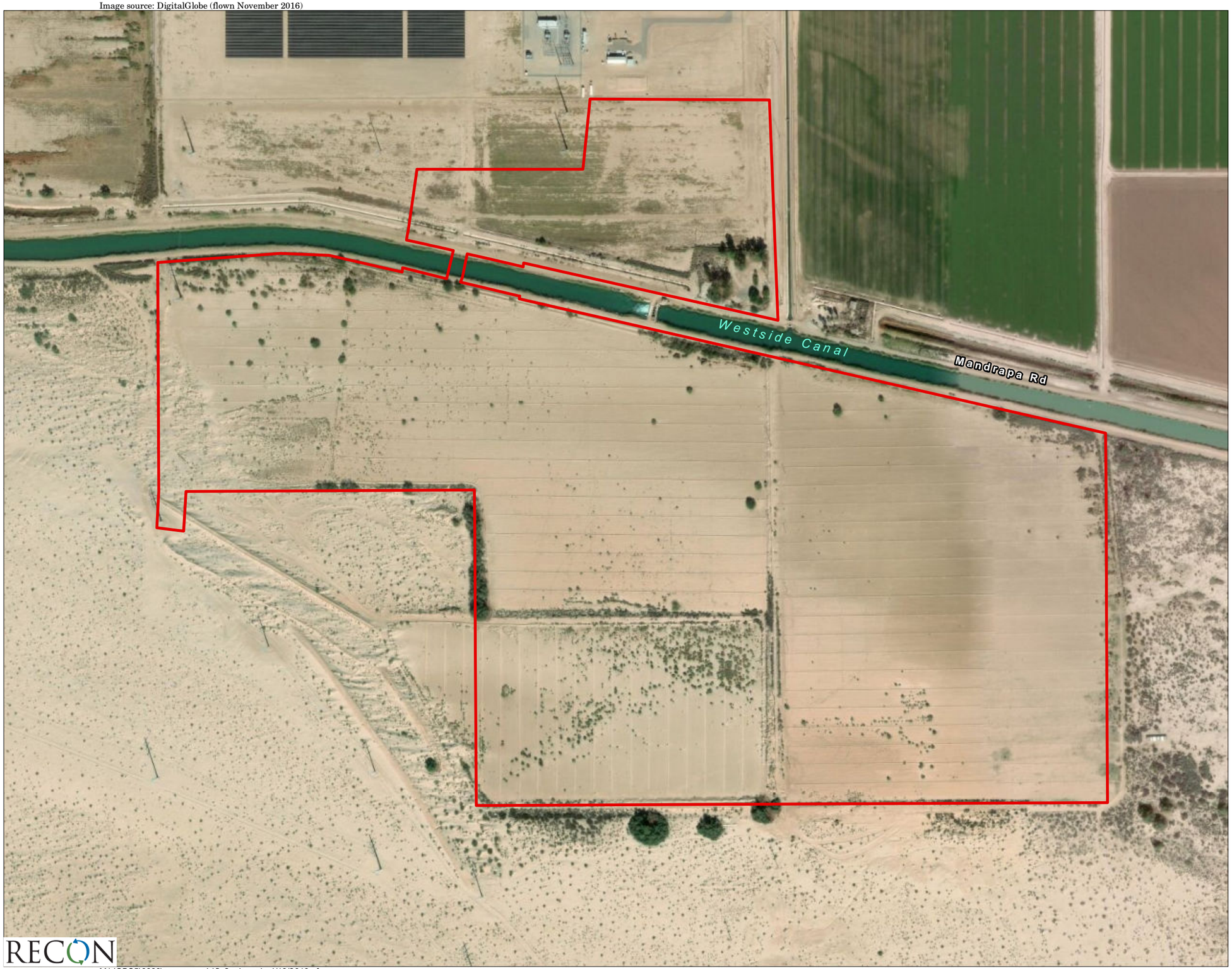
1.2.2 Project Components

Figure 3a shows the conceptual site plan for the Project with a representation of the various energy storage technologies, behind-the-meter ground- and roof-mounted solar, common facilities within the Project site, and permanent vehicular access to the Project site. The actual configuration of the Project would depend on the size of individual phases and the type of battery technology deployed. Specific Project components are described below.

1.2.2.1 Phasing and Schedule

The Project would be constructed in three to five phases over a 10-year period, with each phase ranging from approximately 25 MW up to 400 MW per phase. Depending on the size of the battery system for a given phase, construction and commissioning (approval to operate) is anticipated to take approximately 6 to 12 months. For the purposes of this analysis, the applicant has assumed that construction activities would last for approximately 32 months to complete the full Project build-out.

Image source: DigitalGlobe (flown November 2016)



Project Boundary

0 Feet 400

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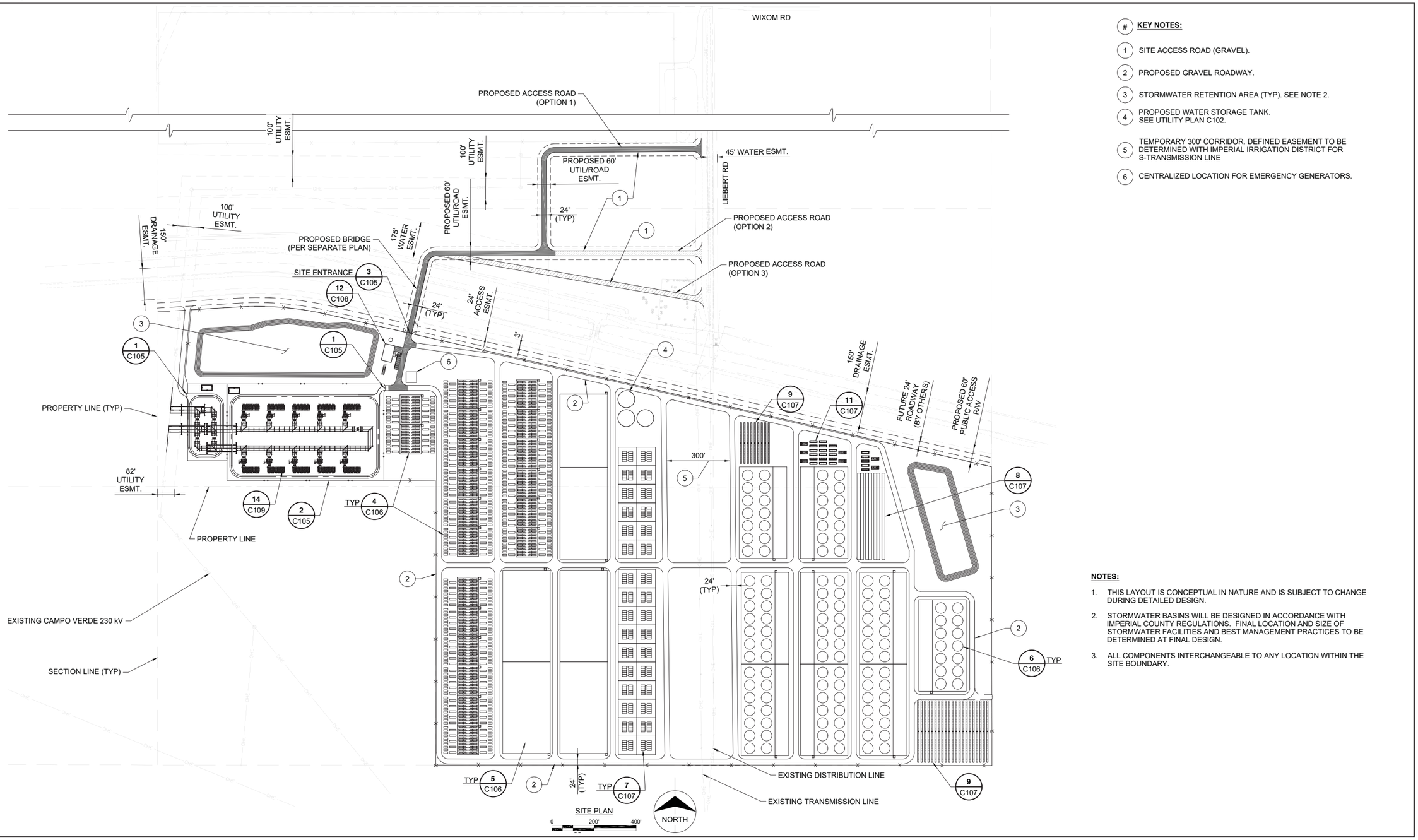
FIGURE 2
Project Location on
Aerial Photograph

Map Source: Burns McDonnell



KEY NOTES:

1. SITE ACCESS ROAD (GRAVEL).
2. PROPOSED GRAVEL ROADWAY.
3. STORMWATER RETENTION AREA (TYP). SEE NOTE 2.
4. PROPOSED WATER STORAGE TANK. SEE UTILITY PLAN C102.
5. TEMPORARY 300' CORRIDOR. DEFINED EASEMENT TO BE DETERMINED WITH IMPERIAL IRRIGATION DISTRICT FOR S-TRANSMISSION LINE
6. CENTRALIZED LOCATION FOR EMERGENCY GENERATORS.

NOTES:

1. THIS LAYOUT IS CONCEPTUAL IN NATURE AND IS SUBJECT TO CHANGE DURING DETAILED DESIGN.
2. STORMWATER BASINS WILL BE DESIGNED IN ACCORDANCE WITH IMPERIAL COUNTY REGULATIONS. FINAL LOCATION AND SIZE OF STORMWATER FACILITIES AND BEST MANAGEMENT PRACTICES TO BE DETERMINED AT FINAL DESIGN.
3. ALL COMPONENTS INTERCHANGEABLE TO ANY LOCATION WITHIN THE SITE BOUNDARY.

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FIGURE 3a
Site Plan

Construction of the 100- to 200-MW first phase would include roads, a permanent clear-span bridge across the Westside Main Canal, the Operations and Maintenance (O&M) facilities, water connections and water-mains, storm water retention, switching station and Project substation, legal permanent vehicle access, as well as the first energy storage facility. To access the Project site, construction workers would travel along Interstate 8 (I-8) and head 4.6 miles south to the Project site, and would utilize the IID Fern Check Bridge as a temporary pedestrian bridge until the permanent bridge is constructed. During peak construction activities, approximately 200 workers and approximately 30 daily deliveries would be required. If approved, it is anticipated that construction of the first phase would begin in 2021.

It is anticipated that each subsequent phase would be constructed within one to two years of each other, with the timing and size of each phase dependent on market conditions and the applicant's ability to secure commercial contracts with prospective customers. With the Project being built in phases, the necessary infrastructure, such as water mains, retention ponds, and access roads, would be built out to serve the Project phases from west to east and expanded over time to serve each phase. These subsequent phases would require improvements such as additional substation equipment, water main and site road extension, but would not require construction of additional common facilities which would be completed during the first phase. The total nameplate (or rated capacity) capacity of the Project at full build-out (all phases completed) would be approximately 2,000 MW.

- Construction activities during all project phases would only occur Monday through Friday, between the hours of 7:00 a.m. and 7:00 p.m. or Saturday between the hours of 9:00 a.m. and 5:00 p.m., excluding holidays, per County Ordinance.

1.2.2.2 Common Components

As shown on the site plan (see Figure 3a), the northwest area of the Project serves as the location for the common facilities, which include the switching station and Project substation and the O&M facilities. A summary of the common facilities is presented below:

- 230 kV loop-in switching station
  - Connection to Campo Verde – Imperial Valley 230 kV radial transmission line
  - Located on applicant property
- Project substation
- O&M facilities
- Project parking
- Storm water retention basins
- Fencing and gates
- Interior access roads

Industrial buildings, warehouses, engineered containers, and/or electrolyte storage tanks would be the primary structures needed to house the main Project components. Other components to be located on the Project site and adjacent to the proposed buildings, warehouses, containers, and tanks include the following:

- Inverters, transformers, power distribution panels
- Underground water-main loop for Project operation and fire prevention
- Underground cable to connect to Project substation
- Project site access roads (unpaved/crushed rock)
- Fire water storage tanks
- Above ground water storage tanks
- Heating, Ventilation, and Air Conditioning (HVAC) units
- Ground-mounted or roof-mounted photovoltaic (PV) arrays
- Emergency backup generator(s)

a. O&M Facilities

The O&M facilities are expected to be the only manned facility on the site. It would include up to approximately 20 full-time employees depending upon the number of phases and type of energy storage facility constructed. O&M employees would work typical weekday hours but may work extended hours, including weekends and 24 hours a day, depending upon the operations and maintenance needs. No offices or staffed control centers would be located within the storage-specific warehouses/buildings. For sanitary waste, the Project would include a septic leach field to be located near the O&M facilities. The proposed O&M facilities would also require an HVAC unit.

b. Permanent Vehicle Access

There are no circulation element roadways in the immediate vicinity of the Project site. The nearest freeways are I-8, located 4.6 miles north of the Project site, and State Route 98 (SR-98), located 5.2 miles south of the Project site. Drew Road, a two-lane collector, is located 1.3 miles east of the Project site. All other roadways in the immediate vicinity of the Project site are rural roadways. All roadways that would be used to access the Project site from I-8 are currently paved, except for the portion of Liebert Road south of Wixom Road. However, this segment would be paved or graveled prior to Project operation.

The Project is surrounded by private landowners to the east, BLM land to the south and west, and IID maintenance roads and Westside Main Canal to the north. Due to the Project site having no direct vehicular access routes, the applicant is proposing to construct roads on both the north and south sides of the Westside Main Canal on private land, and a new clear-span Imperial County-specified bridge over the Westside Main Canal.

The permanent new clear-span County-specified bridge would span the Westside Main Canal to connect to a proposed access road easement on the north side of the Westside Main Canal. The north side proposed access road would ultimately connect the Project to county road (CR) Liebert Road.

Construction of the permanent clear-span bridge spanning the IID's Westside Main Canal requires the Project Proponent to have access to both the north side and the south of the Canal to perform the necessary construction activities. In addition to being necessary to facilitate construction of the new permanent clear-span bridge, access from the south side of the Canal would allow the Project Proponent to commence construction on the first phase of the Project simultaneously, thereby shortening the duration of construction and potentially minimizing the associated impacts. The Project Proponent is evaluating various options for temporary construction access, including accessing the Project site from the south side of the Westside Main Canal off SR-98, as well as options involving access from the north side of the Westside Main Canal from I-8.

Option 1 would use the existing SDG&E maintenance road off Highway 98, which extends approximately 4.4 miles to the IV Substation. Option 1 would then continue along an existing 1.2-mile-long dirt access road that leads north, then east, outside the western and northern boundaries of the substation. Option 1 then continues northwest along an existing dirt access road that parallels two power lines until the access road connects with the western edge of the Project. The existing dirt road was constructed for the construction and maintenance of the existing Campo Verde – Imperial Valley gen-tie line. Option 2 would use the existing IID Westside Main Canal access road. The selected temporary access option would be used until construction of the permanent bridge is completed. Both temporary construction access routes are presented in Figure 3b.

1.2.2.3 Battery Storage Components

The first phase of site construction would consist of either a lithium-ion battery storage facility or a flow battery storage facility. This first phase would be dependent on the first commercial contract awarded to the applicant by a customer. Large industrial buildings, warehouses, and/or containers to house the storage equipment, including battery cells, modules, racks, and controls for lithium-ion technologies, would be needed. For flow battery technologies, cell stack modules, pumps, and controls may be installed inside industrial buildings or pre-engineered outdoor enclosures. Electrolyte storage tanks and associated piping may be located indoors or outdoors, depending on the technology.

a. Battery Modules Technology

Energy Storage

Energy storage is the capture of energy produced at one time for use at a later time. A device that stores energy is generally called an accumulator or battery. Energy storage involves converting energy from forms that are difficult to store to more conveniently or economically storable forms. For the purpose of grid connected energy storage, electrical energy will be stored in the form of chemical energy in lithium-ion and/or flow batteries. Energy storage technology may be centralized or may be distributed throughout the plant. Due to requirements for energy storage, the Project components such as the switching station, substation, transformers, and inverters would be energized at all times with the potential to charge or discharge.

Map Source: conEdison Development

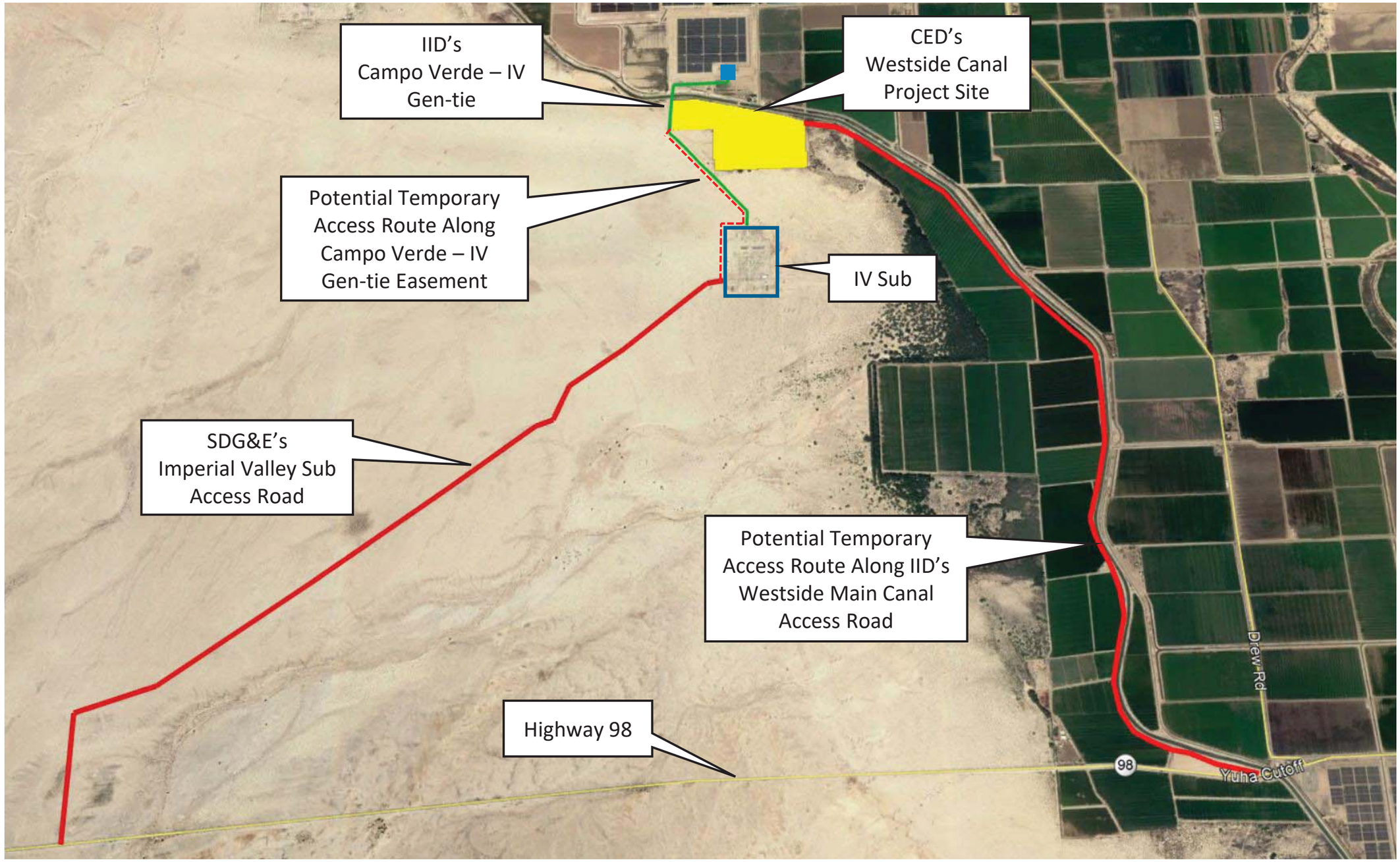

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FIGURE 3b
Temporary Construction Access Routes

Lithium-Ion Battery

A lithium-ion battery is a type of rechargeable battery in which lithium ions move from the negative electrode through an electrolyte to the positive electrode during discharge, and back when charging. Lithium-ion batteries use an intercalated lithium compound as the material at the positive electrode and typically graphite at the negative electrode. The batteries have a high energy density, no memory effect and low self-discharge.

Flow Battery

A flow battery is a rechargeable fuel cell in which an electrolyte containing one or more dissolved electroactive elements flows through an electrochemical cell that reversibly converts chemical energy directly to electricity. Additional electrolyte is stored externally, generally in tanks, and is usually pumped through the cell (or cells) of the reactor, although gravity feed systems are also known to be used. Flow batteries can be rapidly "recharged" by replacing the electrolyte liquid while simultaneously recovering the spent material for re-energization. Many flow batteries use carbon felt electrodes due to its low cost and adequate electrical conductivity.

b. Backup Generators

The Project would include emergency backup generator(s) to supply auxiliary power to the facility during rare events in which the entire facility or portions of the facility are disconnected from the electrical grid. The Project would use a hybrid approach to emergency backup power supply. Rather than relying exclusively on backup generators, the hybrid approach involves dedicating a portion of the batter storage system capacity as a source of emergency backup power. The reserved batter storage capacity would be approximately 3 to 4 percent of the size of the constructed battery storage system. This hybrid approach would also rely on the use of on-site, behind-the-meter solar power generation to supplement the facility's backup power supply needs. Additionally, propane-fueled generators would augment the backup battery storage capacity and the behind-the-meter solar power generation.

The generators would be sized to accommodate control systems and HVAC loads for equipment protection. Approximately 1.25 MW of backup power generation would be needed for every 100 MW of installed battery storage capacity. Each propane-fueled generator would have a capacity of 150 kW or larger. The purpose of the generators would be to provide system safety for events in which the transmission interconnection and the on-site solar generation system are not available, by supplying the battery HVAC system to maintain battery safety and warranty temperature parameters.

The propone-fueled generators would be installed in a central location near the common facilities or distributed among individual buildings or containers. The generators would be periodically tested (monthly) to maintain backup capability in the event of a grid outage. All generators would be subject to Imperial County Air Pollution Control District review and permitting requirements.

1.2.2.4 Solar Facility Components

Photovoltaic solar cells, also called PV cells, convert sunlight directly into electricity. PV gets its name from the process of converting light (photons) to electricity (voltage), which is called the PV effect. The panels are mounted at a fixed angle facing south, or they can be mounted on a tracking device that follows the sun, allowing them to capture the most sunlight. Many solar panels combined together to create one system is called a solar array. On-site, behind the meter, PV solar generation would serve as station auxiliary power and be deployed throughout the Project site.

1.2.3 Site Security

A six-foot-tall fence (e.g., chain-link) topped with one-foot-tall barbed wire would be installed around the entire Project site for safety and in order to control access. The switching station and each substation proposed on the site plan would also have fences installed around its perimeter. A camera-equipped call button would be installed at the front entry gate to the site which would be monitored from the Project's O&M facilities. Throughout the site at various points, security cameras may be installed to monitor other areas of the Project site. During the construction of each Project phase, the applicant would have on-site security personnel between dusk and dawn and during hours of non-active construction.

1.2.4 Interconnection Options

The proposed point of interconnection for the Project is the IV Substation 230 kilovolt (kV) bus. As reflected in the conceptual site plan, to achieve this, the applicant plans to build a new loop-in switching station on the Project site and connect to the existing IID Campo Verde – Imperial Valley 230 kV radial gen-tie line. This existing gen-tie line ultimately connects to the IV Substation one-third mile south of the Project site. This location would serve as the Project's point of interconnection to the CAISO grid. The applicant has submitted the necessary Interconnection Request Applications to the CAISO.

1.2.5 Existing and Proposed Utility Easements

a. Existing Easements

The Project site (APNs 051-350-10 and 051-350-011) has three major easements lying across the site. The first is for overhead collector transmission circuits and utility facilities, as well as access. This is for the IID Campo Verde – Imperial Valley 230 kV transmission line easement, which lies inside and along the west property line and runs north/south.

The second major easement is a prescriptive easement for an overhead transmission circuit and a utility distribution line that runs north and south and lies directly in the center of the Project site. The IID transmission line within this prescriptive easement is known as the S-Transmission line (S-Line). The third major easement lies along the north property line. This easement was granted to IID for the purposes of the existing Westside Main Canal and

appropriate infrastructure and operation and maintenance roads adjacent to the Westside Main Canal.

b. Proposed Easements

The applicant and IID are in the process of determining the width of this S-Line easement to create a non-exclusive easement. This easement would also include the existing distribution line that lies within the easement. Until this new easement agreement is in place, the applicant has planned for a 300-foot temporary corridor on the Project site plan (centerline of 300-foot corridor is the S-Line) to allow the IID energy engineering team to design and implement an appropriate new easement. Once the width and location of the new easement is determined, all other areas not part of the new S-Line easement lying within the 300-foot corridor will become part of the Project site.

1.2.6 Project Operation

Operation of the Project would require routine maintenance and security. It is anticipated that the Project would employ a plant manager and an O&M manager, as well as the addition of a facility manager once the complex deploys approximately 500 MW of generation. The complex will also employ staff technicians, with at least one additional technician for every approximately 250 MW of capacity.

Operation of the Project at full build-out would require up to approximately 20 full-time employees depending upon the number of phases and type of energy storage facility constructed. The Project may require fewer full-time equivalent employees, but 20 were assumed to provide a conservative estimate. O&M employees would work typical weekday hours but may work extended hours, including weekends and 24 hours a day, depending upon the operations and maintenance needs. Assuming two one-way trips per employee, the Project would be anticipated to generate up to 40 trips per day from all maintenance and security personnel.

Figure 3a shows the conceptual site plan for the Project with a representation of lithium-ion buildings and containers as well as flow buildings and containers. The components that make up the energy storage systems and common facilities require various preventative maintenance and at times corrective maintenance. The O&M staff would maintain the Project in accordance with manufacturer and industry best practice maintenance schedules and requirements. Depending on the technology selected for the energy storage component, the substation and transmission lines as well as the behind-the-meter solar inverters and transformers would be energized at all times.

1.2.7 Discretionary Actions

1.2.7.1 General Plan Amendment and Rezone

The Project proposes a General Plan Amendment and Rezone to change the land use designation and zoning for the Project site from Agriculture (A3) to Industrial. The Industrial zoning would be limited to Energy Production/Use.

1.2.7.2 Development Agreement

The applicant may pursue a development agreement with the County of Imperial for this project.

1.3 Fundamentals of Noise

Noise is defined as a loud or unpleasant sound that causes disturbance. Sound levels are described in units called the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease.

In technical terms, sound levels are described as either a "sound power level" or a "sound pressure level," which while commonly confused are two distinct characteristics of sound. Sound pressure levels are a measured or modeled noise level at a certain distance from the noise source, while sound power levels are the rate at which sound energy is emitted, reflected, transmitted, or received, per unit time, and is not dependent on distance from the noise source. Both share the same unit of measure, the dB. However, sound power, expressed as L_{pw}, is the energy converted into sound by the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers such as an eardrum or microphone, the sound pressure level. Sound measurement instruments only measure sound pressure, and limits used in standards are generally sound pressure levels.

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-scale, which approximates the frequency response of the average young ear when listening to most ordinary everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale levels of those sounds. Therefore, the "A-weighted" noise scale is used for measurements and standards involving the human perception of noise.

Noise levels using A-weighted measurements are designated with the notation dB(A). Changes in noise levels are generally perceived by the average human ear as follows: 3 dB(A) is barely perceptible, 5 dB(A) is readily perceptible, and 10 dB(A) is perceived as a doubling or halving of noise (Caltrans 2013).

1.3.1 Descriptors

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important. In addition, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors has been developed. Consistent with the County's General Plan Noise Element, the noise descriptors used for this study are the equivalent noise level (L_{eq}) and the community noise equivalent level (CNEL). The L_{eq} is the equivalent steady-state noise level in a stated period of time that is calculated by averaging the sound energy over a time period; when no period is specified, a 1-hour period is assumed. The CNEL is a 24-hour equivalent sound level.

The CNEL calculation applies an additional 5 A-weighted decibels dB(A) penalty to noise occurring during evening hours, between 7:00 p.m. and 10:00 p.m., and a 10 dB(A) penalty is added to noise occurring during the night, between 10:00 p.m. and 7:00 a.m. These increases for certain times are intended to account for the added sensitivity of humans to noise during the evening and night.

1.3.2 Propagation

Sound from a small, localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern, known as geometric spreading. The sound level decreases or drops off at a rate (drop-off rate) of 6 dB(A) for each doubling of the distance.

Traffic noise is not a single, stationary point source of sound. The movement of vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. The drop off rate for a line source is 3 dB(A) for each doubling of distance.

The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site (such as parking lots or smooth bodies of water) receives no additional ground attenuation, and the changes in noise levels with distance are simply the geometric spreading from the source, which equates to 6 dB(A) per doubling distance. A soft site (such as soft dirt, grass, or scattered bushes and trees) provides an additional ground attenuation value of 1.5 dB(A) per doubling of distance. Thus, a point source over a soft site would drop off at 7.5 dB(A) per doubling of distance.

2.0 Existing Conditions

2.1 Land Use Environment

The Project site was previously graded and used as farmland and has been fallow for more than 15 years. The General Plan land use designation and zoning for the Project site and all surrounding parcels to the north and east is Agriculture (A3). The General Plan land use designation for parcels to the south and west are designated open space/recreation areas;

zoning does not apply to these BLM lands. The Campo Verde solar generation facility is located north of the Project site and agricultural uses are located northeast of the Project site. Parcels farther north of the Project site also include a mix of agricultural uses and solar generation facilities. The parcel immediately east of the Project site is undeveloped. BLM land south and west of the Project site is generally undeveloped, relatively flat, and barren. The IV Substation is located approximately one-third mile south of the southern property line of the site.

2.2 Ambient Noise Environment

Existing noise levels at the Project site are typical of any rural agricultural environment, and are generally quiet. Existing noise levels at the Project site were measured on May 2, 2019 using one Larson-Davis LxT Sound Expert Sound Level Meter, serial number 3894. The following parameters were used:

Filter:	A-weighted
Response:	Slow
Time History Period:	5 seconds

The meter was calibrated before each measurement. The meter was set 5 feet above the ground level for each measurement. Noise measurements were taken to obtain typical ambient noise levels at the Project site and in the vicinity. The weather was warm and sunny. Two 30-minute measurements were taken, as described below. The measurement locations are shown on Figure 4, and detailed data is contained in Attachment 1.

Measurement 1 was located at the northern Project boundary, north of the Westside Canal and southeast of Campo Verde substation. The main source of noise at this location was the substation. Other sources of noise included occasional airplane and helicopter flyovers. The average measured noise level was 50.5 dB(A) L_{eq}.

Measurement 2 was located near the center of the Project site. The main source of noise at this location was humming from the existing power line. Other sources of noise included occasional airplane and helicopter flyovers. The average measured noise level was 45.9 dB(A) L_{eq}.

Image source: DigitalGlobe (flown November 2017)

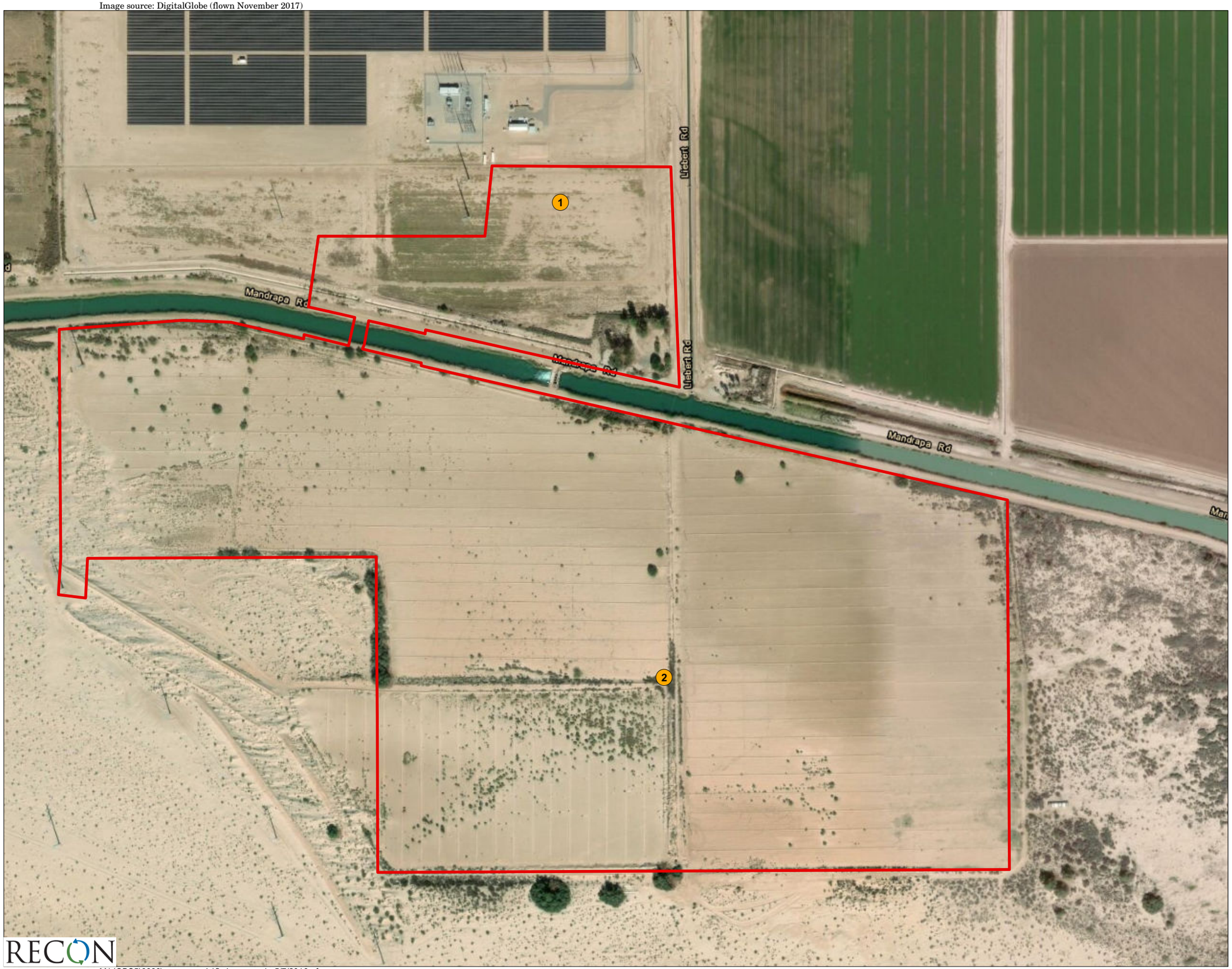

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FIGURE 4

Noise Measurement Location

3.0 Applicable Standards

3.1 Imperial County General Plan Noise Element

3.1.1 Property Line Noise Level Limits

The County General Plan Noise Element (Imperial County 2015) identifies property line noise level limits that apply to noise generation from one property to an adjacent property (excluding construction noise). As stated in the Noise Element, the property line noise level limits imply the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. The property line noise standards are codified in the County Code or Ordinances and thus are enumerated in the subsequent section (see Section 3.2).

3.1.2 Construction Noise Standards

County General Plan Noise Element Section IV.C.3 addresses noise generated by construction activities. It states:

- Construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB L_{eq}, when averaged over an eight (8) hour period, and measured at the nearest sensitive receptor. This standard assumes a construction period, relative to an individual sensitive receptor of days or weeks. In cases of extended length construction times, the standard may be tightened so as not to exceed 75 dB L_{eq} when averaged over a one (1) hour period.
- Construction equipment operation shall be limited to the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. Saturday. No commercial construction operations are permitted on Sunday or holidays. In cases of a person constructing or modifying a residence for himself/herself, and if the work is not being performed as a business, construction equipment operations may be performed on Sundays and holidays between the hours of 9 a.m. and 5 p.m. Such non-commercial construction activities may be further restricted where disturbing, excessive, or offensive noise causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

Based on these standards, the applicable limit for Project construction activities is 75 dB(A) L_{eq} at the nearest sensitive receptor.

3.2 Imperial County Noise Abatement and Control

County Code of Ordinances Title 9, Division 7: Noise Abatement and Control, specifies noise level limits. Noise level limits are summarized in Table 1. Noise level limits do not apply to construction equipment.

Table 1
Imperial County Property Line Noise Limits

Zone	Time	One-Hour Average Sound Level [dB(A) L_{eq}]
Low-Density Residential Zones	7:00 a.m. to 10:00 p.m.	50
	10:00 p.m. to 7:00 a.m.	45
Medium to High-Density Residential Zones	7:00 a.m. to 10:00 p.m.	55
	10:00 p.m. to 7:00 a.m.	50
Commercial Zones	7:00 a.m. to 10:00 p.m.	60
	10:00 p.m. to 7:00 a.m.	55
Manufacturing/Light Industrial/ Industrial Park Zones including agriculture	(anytime)	70
General Industrial Zones	(anytime)	75
SOURCE: Imperial County Noise Abatement and Control Ordinance, Tit. 9, Div. 7, § 90702.00(A).		

The Project would be zoned Medium Industrial (M2), which would be considered a General Industrial Zone, and all the surrounding properties are zoned Agriculture (A-3). When the noise-generating property and the receiving property have different uses, the more restrictive standards apply. Therefore, for Project operation, the property line noise level limit of 70 dB(A) L_{eq} for agricultural uses applies.

4.0 Analysis Methodology

Noise level predictions and contour mapping were developed using noise modeling software, SoundPlan Essential, version 4.1 (SoundPLAN; Navcon Engineering 2018). SoundPLAN calculates noise propagation based on the International Organization for Standardization method (ISO 9613-2–Acoustics, Attenuation of Sound during Propagation Outdoors). The model calculates noise levels at selected receiver locations using input parameter estimates such as total noise generated by each noise source; distances between sources, barriers, and receivers; and shielding provided by intervening terrain, barriers, and structures. The model outputs can be developed as noise level contour maps or noise levels at specific receivers. In all cases, receivers were modeled at 5 feet above ground elevation, which represents the average height of the human ear.

4.1 Construction Noise

As described in Section 1.2.2.1, the Project would be constructed in three to five phases over a 10-year period, with each phase ranging from approximately 25 MW up to 400 MW per phase. Depending on the size of the battery system for a given phase, construction and commissioning (approval to operate) is anticipated to take approximately 6 to 12 months. For the purposes of this analysis, the applicant has assumed that construction activities would last for approximately 32 months to complete the full Project build-out.

Construction of the 100 to 200 MW first phase would include roads, a permanent clear-span bridge across the Westside Main Canal, the Operations and Maintenance (O&M) facilities, water connections and water-mains, storm water retention, switching station and Project substation, legal permanent vehicle access, as well as the first energy storage facility. To access the Project site, construction workers would travel along Interstate 8 (I-8) and head 4.6 miles south to the Project site, and would utilize the IID Fern Check Bridge as a pedestrian bridge until the permanent bridge is constructed. During peak construction activities, approximately 200 workers and approximately 30 daily deliveries would be required. If approved, it is anticipated that construction of the first phase would begin in 2021. Construction staff and equipment will be determined based on the size and design specifications of each phase.

The equipment anticipated to be used in Project construction was provided by the applicant and is shown below in Table 2.

Table 2
Anticipated Construction Schedule and Equipment

Construction Activity/ Equipment Type	Phase 1 (12 months)		Phases 2–5 (20 months)	Noise Level at 50 Feet [dB(A) L_{eq}]	Typical Duty Cycle
	Common Facilities	Battery Storage	Battery Storage		
Air Compressor	1	2	2	80	40%
Backhoe	2	2	2	80	40%
Concrete Pump	1	1	1	82	20%
Crane	3	1	1	85	20%
Dozer	2	--	--	85	40%
Drill Rig	1	--	--	85	20%
Excavator	1	1	1	85	40%
Forklift[1]	2	2	2	68	--
Generator	2	3	3	82	50%
Grader	2	--	--	85	40%
Paver	1	--	--	85	50%
Roller	3	2	2	74	40%
Scraper	1	1	1	85	40%
Water Truck[2]	2	1	1	73	--
Wheeled Loader	1	1	1	80	40%
Wheeled Tractor	1	--	--	84	40%

Sources: Federal Highway Administration [FHWA] 2006, Federal Transit Administration 2006.
[1]The FHWA source does not provide forklift noise levels. Average noise level for a forklift was obtained from the SoundPLAN database (Navcon Engineering 2018).
[2]The FHWA source does not provide water truck noise levels. Average noise level for a water truck was obtained from the City of Los Angeles (City of Los Angeles 2012).

Construction equipment is not a fixed, stationary source of noise because equipment would move throughout the Project site. Sources the emit noise over a specified area, such as construction equipment over a Project site, are considered area sources. Construction noise levels were modeled as an area source over the anticipated construction area with the simultaneous operation of all required equipment listed in Table 2. It is unlikely that all equipment would operate at the same time. This is therefore a conservative analysis of maximum average hourly noise levels.

The Project site and the area surrounding all off-site roadway extensions are relatively flat. This analysis conservatively assumes no attenuation from barriers and topography.

Ground conditions typically change during construction due to fugitive dust control practices such as soil stabilization through site watering and best management practices such as subgrade compaction. This analysis conservatively models ground conditions as acoustically hard. Thus, construction noise would be characterized by hard site attenuation rate of 6 dB(A) per doubling of distance.

4.2 Operational Noise

Stationary sources of noise associated with the operation of the Project would include air cooling units, inverters, transformers, a substation, and transmission gen-tie lines. The O&M building would also include an HVAC unit.

Figure 5 shows the floor plan for each lithium-ion 50 MW building. As shown, each building would include 10 air cooling units (5 on each side of the building) and 20 transformers and inverters (10 on each side of the building). The current site plan includes 20 of these buildings, and more would be constructed during subsequent phases as the market demands.

The main source of noise on the Project site would be generated by the air cooling units. The Project would include Carrier AC Chillers Model 30XV450 (Attachment 2) or equivalent. Based on manufacturer specifications, these units generate a sound power level of 106 dB(A) when operating at full capacity. This sound power level is equivalent to a sound pressure level of 74.4 dB(A) L_{eq} at 50 feet. As shown in Figure 5, these units would be located within a container enclosure. Based on standard attenuation rates, it is estimated that metal insulated containers could achieve an interior to exterior noise reduction of at least 15 dB(A). However, as a conservative analysis, no noise reduction was modeled. All air cooling units were modeled at full capacity during the daytime and nighttime hours.

As the solar generation facility would only generate electricity between sunrise and sunset, noise from solar field inverters and transformers would likely be limited to daylight hours. After daylight hours energy storage facilities may continue to contribute energy to the grid.

A single technology or provider has not been selected for the energy storage component of the Project. Energy storage technology may be centralized or may be distributed throughout the plant. Depending on the technology selected for the energy storage component, the substation and transmission lines as well as the solar field inverters and transformers may be active during both daylight and nighttime hours.

Map Source: Burns McDonnell

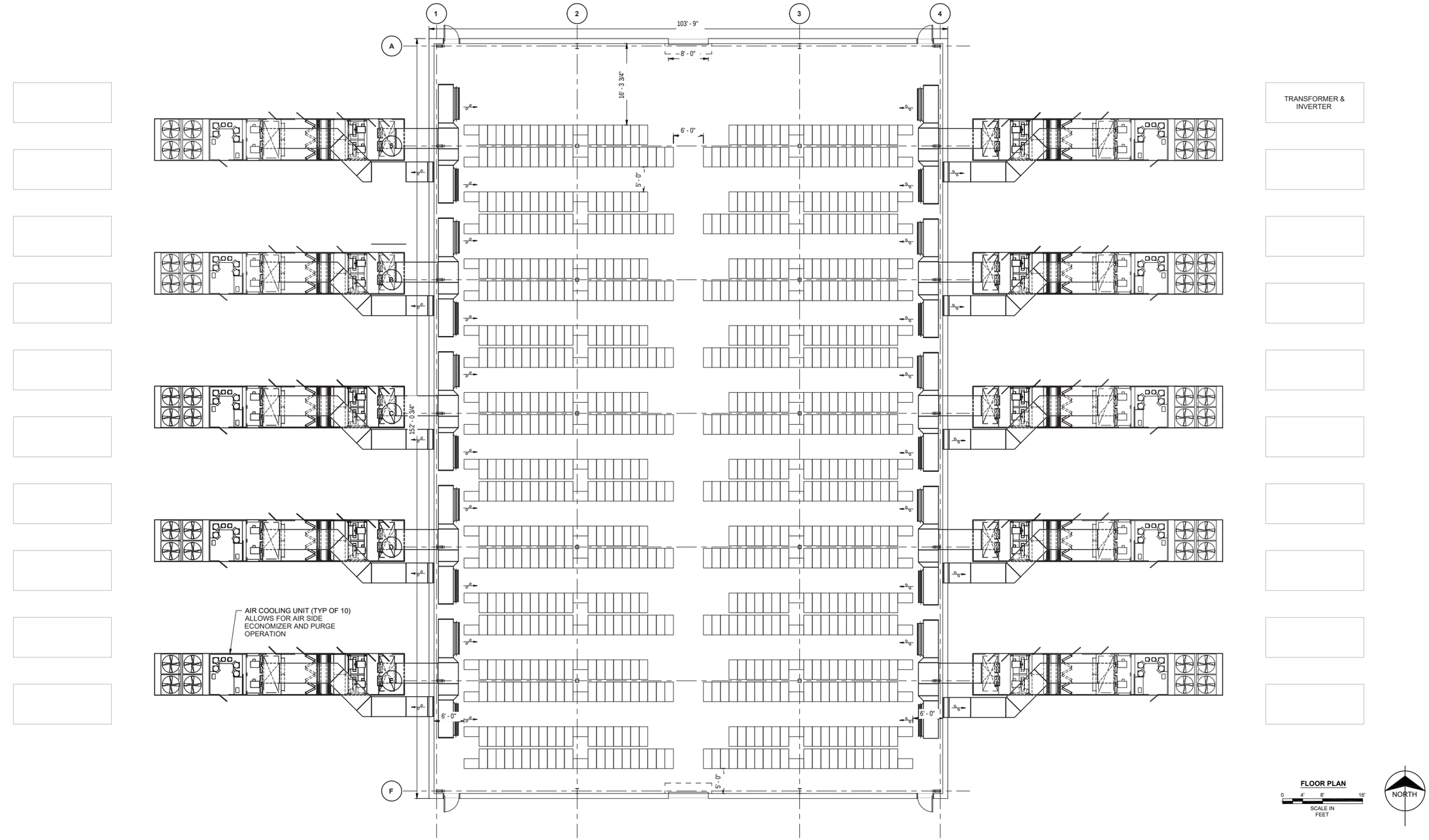

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FIGURE 5
Lithium Ion Building Floor Plan

Each lithium-ion building would also include 20 transformers and inverters. Based on information provided by the Project engineer, transformers generate a noise level of 85 dB(A) Leq at 3 feet, which is equivalent to a sound power level of 92.2 dB(A), and inverters generate a noise level of 80 dB(A) Leq at 3 feet, which is equivalent to a sound power level of 87.2 dB(A).

The Project would include the construction of a substation located at the western Project boundary. The substation would include equipment such as switches, circuit breakers, and transformers. Switches and circuit breakers do not typically generate substantial noise. The power rating for substation transformers would be several times higher than the power rating for transformers distributed throughout the facility at each solar array block. Based on National Electrical Manufacturers Association standards for oil-immersed transformers, a sound level of 67 dB(A) at 5 feet would be representative of the substation (National Electrical Manufacturers Association 2013). This equates to a sound power level of 97 dB(A).

The Project would also include transmission lines to connect the facility to neighboring substations. Corona discharge results from the partial breakdown of the electrical insulating properties of the air surrounding the conductors; energy discharged from the line may form small local pressure changes that result in audible hissing or crackling noises. The intensity of corona noise varies depending on the atmospheric conditions such as atmospheric moisture and pressure (which is related to altitude). The noise generated by similar transmission lines (i.e., approximately 230 kV) has previously been analyzed to be 25 dB(A) at 50 feet. This equates to a sound power level per length of 45 dB(A) per meter.

The proposed O&M building would also require an HVAC unit. Based on review of various manufacturer specifications, a representative sound power level of 79 dB(A) for a 10-ton unit was selected for analysis (Attachment 3). This HVAC unit was modeled at full capacity during the daytime and nighttime hours.

Based on these noise levels and the floor plan and the number of air cooling units, inverters, and transformers proposed for each lithium-ion building shown in Figure 5, and total composite noise level for each building was calculated. Table 3 summarizes noise levels for each noise source, and the total composite noise level for each lithium-ion building.

Table 3
Project Equipment Modeling Parameters

Equipment	Exterior Sound Power Level
Lithium-ion Buildings	
Air Cooling Units	*106.0*
Inverter	*87.2*
Transformer	*92.2*
Total Composite Sound Power Level per Building	95.4
Substation	97.0
Gen-Tie Line	45 dB(A) per meter
O&M HVAC	79

4.3 Traffic Noise

Vehicle traffic would be generated during operation of the Project. It has been assumed that operation of the Project would require up to 20 employees. Assuming two one-way trips per employee, Project operation would be anticipated to generate up to 40 trips per day. Off-site traffic noise was modeled using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model algorithms and reference levels.

5.0 Impact Analysis and Noise Environment

The following is a discussion of impacts associated with construction noise, operational noise, and off-site vehicle traffic noise. Impacts were evaluated using the following standards:

- Construction Noise: Construction noise may not exceed 75 dB(A) $L_{eq(8h)}$ at the nearest sensitive receptor (County General Plan Noise Element Section IV.C.3)
- Operational Noise: Noise due to operation of the project shall not exceed 70 dB(A) L_{eq} at the property line (Imperial County Noise Abatement and Control Ordinance, Tit. 9, Div. 7, § 90702.00(A))
- Off-Site Traffic Noise: A permanent increase in ambient noise levels that is less than 3 dB(A) would be less than significant.

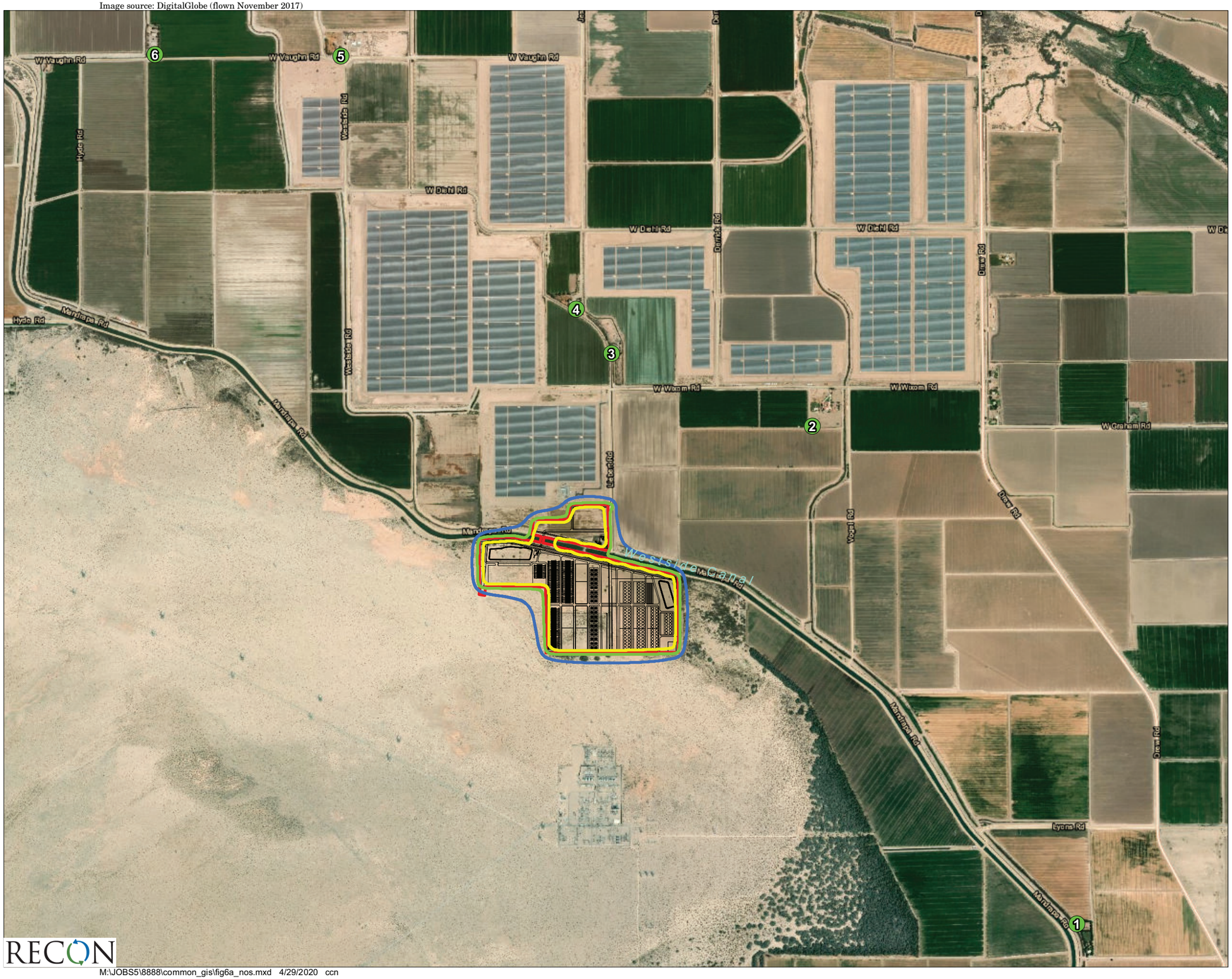
5.1 Construction Noise

Noise associated with the site preparation and facility installation would potentially result in short-term impacts to surrounding properties. As discussed in Section 4.1, noise levels were modeled as an area source over the anticipated construction area with the simultaneous operation of all required equipment listed in Table 1.

As discussed in Section 3.1, the County General Plan Noise Element establishes construction time of day restrictions and noise level limits. Construction activities may only occur Monday through Friday between the hours of 7:00 a.m. and 7:00 p.m. or Saturday between the hours of 9:00 a.m. and 5:00 p.m., excluding holidays. Additionally, construction noise may not exceed 75 dB(A) $L_{eq(8h)}$ at the nearest sensitive receptor. Noise levels were modeled at six specific receivers located at the nearest residential properties.

Table 4 summarizes the maximum noise levels due to each construction activity. Construction noise contours are shown in Figures 6a and 6b. SoundPLAN data is provided in Attachment 4.

Image source: DigitalGlobe (flown November 2017)



Project Boundary

Site Plan

Receivers

Noise Contours

60 dB(A) Leq

65 dB(A) Leq

70 dB(A) Leq

0 Feet 2,000

FIGURE 6a
Construction Noise Contours – Common Facilities

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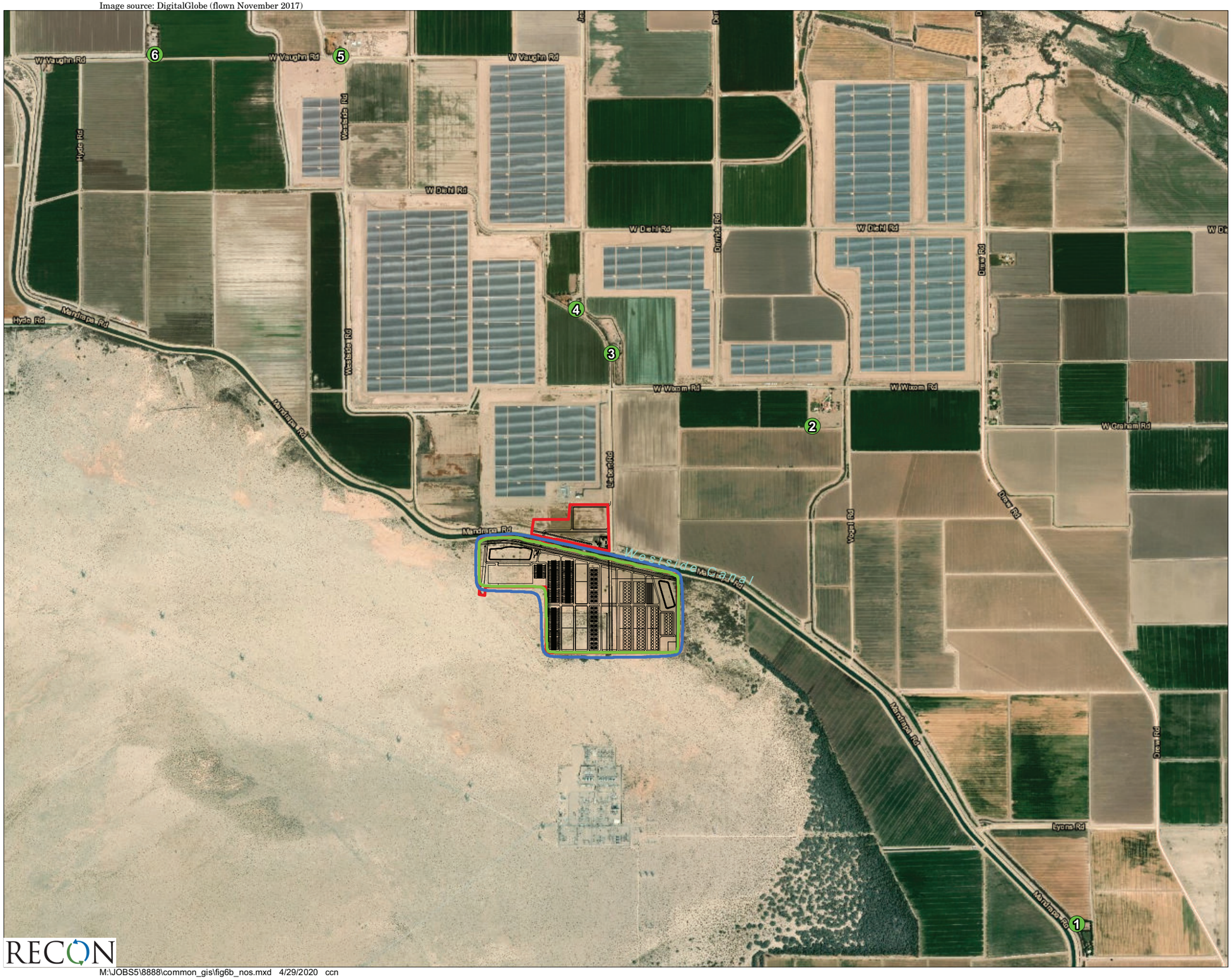
Image source: DigitalGlobe (flown November 2017)



Project Boundary

Site Plan

Receivers

Noise Contours

60 dB(A) Leq

65 dB(A) Leq

0 Feet 2,000

FIGURE 6b
Construction Noise Contours – Battery Storage

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Table 4 Construction Noise Levels [dB(A) L_{eq}]			
	Phase 1		Phase 2-5
Receiver	Common Facilities	Battery Storage	Battery Storage
1	33	30	30
2	44	40	40
3	46	42	42
4	44	40	40
5	33	30	30
6	31	28	28

As shown, maximum construction noise levels would be well less than 75 dB(A) $L_{eq(8h)}$. Because these noise levels account for the simultaneous operation of all required equipment for each construction activity, actual noise levels would be less than those shown in Table 4. Therefore, impacts would be less than significant.

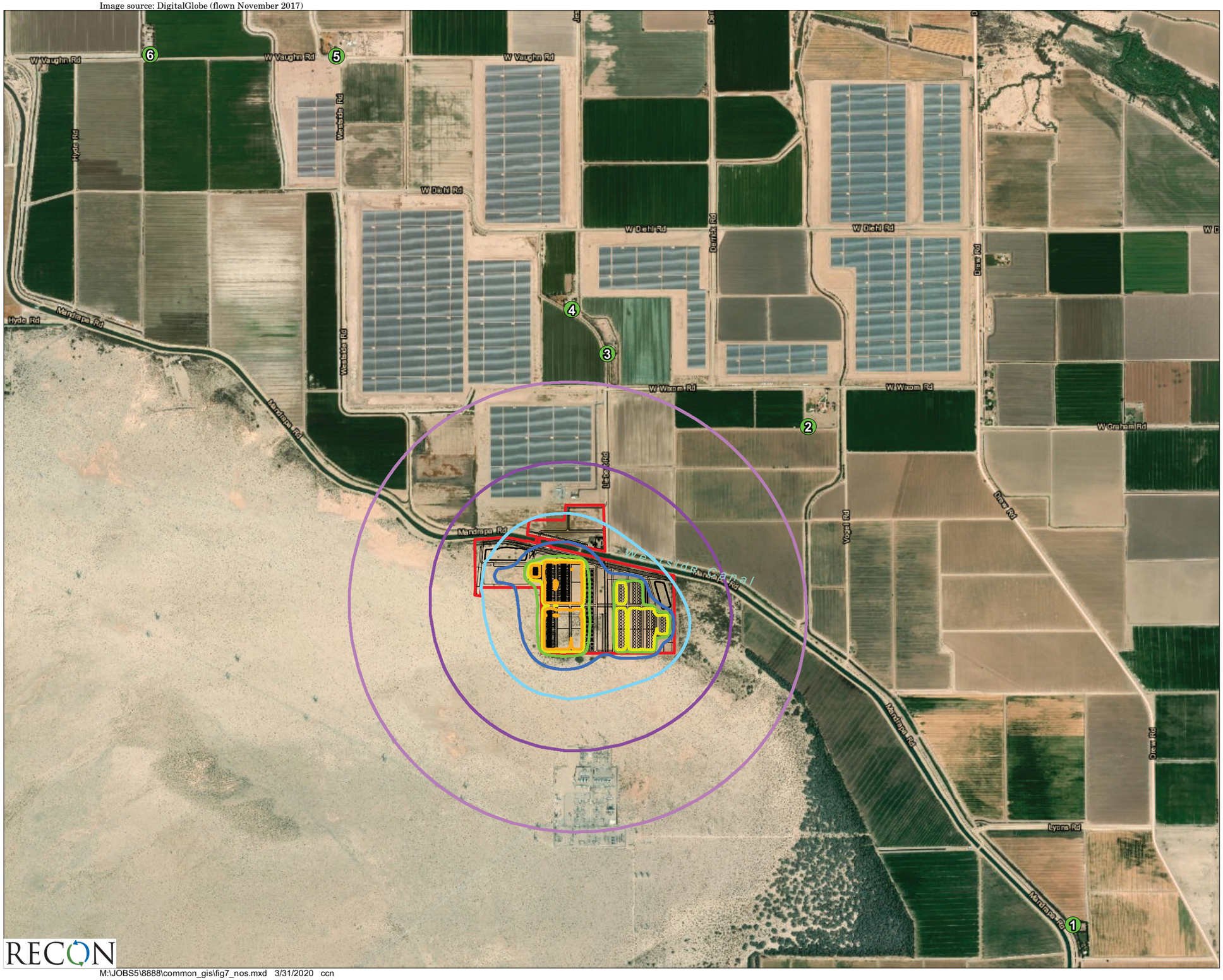
During peak construction activities, approximately 200 workers and approximately 30 daily deliveries would be required. There are residential uses located adjacent to the northern access route that would be used by construction workers during the entire construction phase and would be used by delivery trucks once the bridge construction is complete. Based on FHWA Traffic Noise Prediction Model, trips associated with 200 worker trips over a 1-hour period would generate a maximum noise level of 49 dB(A) L_{eq} at 50 feet from the roadway. Additionally, the delivery trucks, when distributed throughout the daytime hours, would generate a noise level of 50 dB(A) L_{eq} at 50 feet from the roadway. All residential uses are located more than 50 feet from the roadways. Noise levels associated with these trips would not exceed 75 dB(A) L_{eq}, and would be less than significant.

5.2 Operational Noise

Following the methodology discussed in Section 4.2, Operations Analysis, ground-floor noise level contours were modeled. Noise levels were also calculated at the six specific receivers located at the nearest residential properties. Noise contours are shown on Figure 7. SoundPLAN data for on-site generated noise modeling are contained in Attachment 5.

As discussed in Section 3.2, the County Code of Ordinances establishes property line noise standards for residential, commercial, light industrial, and general industrial zoning districts. The Project site and all surrounding properties are in agricultural zoning districts. The Project proposes a General Plan Amendment and Rezone to change land use designation and zoning for the Project site Agriculture (A3) to Industrial. The applicable noise level limit for the adjacent agricultural uses is 70 dB(A) L_{eq}.

Image source: DigitalGlobe (flown November 2017)



Project Boundary
Site Plan
Receivers

Noise Contours

45 dB(A) Leq
50 dB(A) Leq
55 dB(A) Leq
60 dB(A) Leq
65 dB(A) Leq
70 dB(A) Leq
75 dB(A) Leq

0 Feet 2,000

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FIGURE 7
Operational Noise Contours

As shown in Figure 7, noise associated with Project operation would not exceed the applicable limit of 70 dB(A) L_{eq} at the property line. Additionally, Table 5 summarizes the noise levels at the nearest residential properties. As shown, due to the distance between the Project site and these residential properties, noise levels would be less than the most restrictive noise limit of 45 dB(A) L_{eq} for low-density residential uses. Therefore, impacts related to on-site generated noise would be less than significant.

Table 5
Operational Noise Levels
[dB(A) L_{eq}]

Receiver	Noise Level
1	32
2	42
3	44
4	42
5	32
6	30

5.3 Traffic Noise

Vehicle traffic would be generated during construction and operation of the Project. As discussed in Sections 1.2, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB(A) and would generally be perceived by the average human ear as barely perceptible. For the purposes of this analysis, a permanent increase in the ambient noise levels that is less than 3 dB(A) would be less than significant.

During operations, the Project would require up to approximately 20 full-time equivalent employees, which would generate up to 40 trips per day. As Project trip generation would be extremely limited, the Project is not anticipated to result in a doubling of traffic along any well-traveled roadway. Based on FHWA Traffic Noise Prediction Model, roadways with traffic volumes of 20 average daily traffic and a speed limit of 25 miles per hour would result in a noise level of 33 dB(A) L_{eq} at 50 feet from the centerline of the roadway. For roadways where existing traffic volumes are equal to or less than 20 average daily traffic, Project-generated traffic may result in a 3 dB(A) traffic noise increase, however resulting traffic noise levels would remain less than generally ambient noise levels attributable to other sources. Ambient noise level increases attributable to Project-generated traffic are anticipated to be less than 3 dB(A). Therefore, impacts would be less than significant.

6.0 Conclusions

6.1 Construction Noise

Noise associated with the site preparation and facility installation would potentially result in short-term impacts to surrounding properties. Construction would include use of a variety of noise-generating equipment such as scrapers, excavators, loaders, and water trucks, along with others. Construction of the access road and the bridge over the IID canal and would last

for eight to nine months. Construction activities for the utility-scale energy storage complex would last for up to 32 months. The County General Plan Noise Element establishes construction time of day restrictions and noise level limits. Construction activities may only occur Monday through Friday between the hours of 7:00 a.m. and 7:00 p.m. or Saturday between the hours of 9:00 a.m. and 5:00 p.m., excluding holidays. Additionally, construction noise may not exceed 75 dB(A) $L_{eq(8h)}$ at the nearest sensitive receptor.

Noise levels were modeled at six specific receivers located at the nearest residential properties. As shown in Table 4, maximum construction noise levels would be well below 75 dB(A) $L_{eq(8h)}$. Additionally, noise levels associated with temporary construction traffic (workers and deliveries) would be well below75 dB(A) $L_{eq(8h)}$. Therefore, impacts would be less than significant.

6.2 Operational Noise

Stationary sources of noise associated with the operation of the Project would include air cooling units, inverters, transformers, a substation, and transmission gen-tie lines. The O&M building would also include an HVAC unit. Noise associated with Project operation would not exceed the applicable property line noise level limit of 70 dB(A) L_{eq} at the adjacent properties. Additionally, as shown in Table 5, noise levels would be below the most restrictive noise limit of 45 dB(A) L_{eq} for low-density residential uses at the nearest residential receivers. Therefore, impacts related to on-site generated noise would be less than significant.

6.3 Traffic Noise

During operations, Project-generated traffic would increase volumes on local roadways and thereby increase traffic noise levels in the Project area. Project trip generation would be extremely limited–up to 40 trips per day. Ambient noise level increases attributable to Project-generated traffic are anticipated to be less than 3 dB(A) along all roadways. Therefore, impacts associated with traffic noise would be less than significant.

7.0 References Cited

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2013 NEMA TR 1-2013 Transformers, Step Voltage Regulators and Reactors.

Navcon Engineering, Inc.
2018 SoundPLAN Essential version 4.1. November.

ATTACHMENTS

ATTACHMENT 1

Noise Measurement Data

Summary				
Filename	LxT_Data.032			
Serial Number	3894			
Model	SoundTrack LxT®			
Firmware Version	2.301			
User	Carmen			
Location	Westside Canal Energy Center			
Job Description	8888.0			
Note				
Measurement Description				
Start	2019/05/02 10:42:41			
Stop	2019/05/02 11:15:46			
Duration	0:33:04.4			
Run Time	0:30:28.2			
Pause	0:02:36.2			
Pre Calibration	2019/05/02 10:40:58			
Post Calibration	None			
Calibration Deviation	---			
Overall Settings				
RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1			
Microphone Correction	Off			
Integration Method	Linear			
Overload	144.9 dB			
	A		**C**	**Z**
Under Range Peak	**101.2**		98.2	103.2 dB
Under Range Limit	**37.6**		35.6	43.6 dB
Noise Floor	24.8		25.3	32.8 dB
Results				
LAeq	50.5 dB			
LAE	83.1 dB			
EA	22.875 µPa²h			
EA8	360.357 µPa²h			
EA40	1.802 mPa²h			
LApeak (max)	2019/05/02 10:42:56		103.9 dB	
LASmax	2019/05/02 10:42:56		79.6 dB	
LASmin	2019/05/02 11:06:32		33.6 dB	
SEA	-99.9 dB			
LAS > 60.0 dB (Exceedence Counts / Duration)	4		7.1 s	
LAS > 70.0 dB (Exceedence Counts / Duration)	1		1.9 s	
LApeak > 135.0 dB (Exceedence Counts / Duration)	0		0.0 s	
LApeak > 137.0 dB (Exceedence Counts / Duration)	0		0.0 s	
LApeak > 140.0 dB (Exceedence Counts / Duration)	0		0.0 s	
LCeq	66.4 dB			
LAeq	50.5 dB			
LCeq - LAeq	15.9 dB			
LAleq	59.8 dB			
LAeq	50.5 dB			
LAleq - LAeq	9.2 dB			
# Overloads	0			
Overload Duration	0.0 s			
Dose Settings				
Dose Name	OSHA-1		OSHA-2	
Exch. Rate	5		5 dB	
Threshold	90		80 dB	
Criterion Level	90		90 dB	
Criterion Duration	8		8 h	
Results				
Dose	-99.9		-99.9 %	
Projected Dose	-99.9		-99.9 %	
TWA (Projected)	-99.9		-99.9 dB	
TWA (t)	-99.9		-99.9 dB	
Lep (t)	38.5		38.5 dB	
Statistics				
LAS5.00	53.2 dB			
LAS10.00	49.2 dB			
LAS33.30	40.6 dB			
LAS50.00	38.3 dB			
LAS66.60	36.4 dB			
LAS90.00	35.0 dB			

8888 Westside Canal Energy Center
Noise Measurement Data

Summary				
Filename	LxT_Data.035			
Serial Number	3894			
Model	SoundTrack LxT®			
Firmware Version	2.301			
User	Carmen			
Location	Westside Canal Energy Center			
Job Description	8888.0			
Note				
Measurement Description				
Start	2019/05/02 12:57:47			
Stop	2019/05/02 13:28:48			
Duration	0:31:01.6			
Run Time	0:31:01.6			
Pause	0:00:00.0			
Pre Calibration	2019/05/02 10:40:41			
Post Calibration	None			
Calibration Deviation	---			
Overall Settings				
RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1			
Microphone Correction	Off			
Integration Method	Linear			
Overload	144.9 dB			
	A		**C**	**Z**
Under Range Peak	**101.2**		98.2	103.2 dB
Under Range Limit	**37.6**		35.6	43.6 dB
Noise Floor	24.8		25.3	32.8 dB
Results				
LAeq	45.9 dB			
LAE	78.6 dB			
EA	8.081 µPa²h			
EA8	125.022 µPa²h			
EA40	625.110 µPa²h			
LApeak (max)	2019/05/02 12:57:56		110.5 dB	
LASmax	2019/05/02 12:57:56		72.8 dB	
LASmin	2019/05/02 13:12:51		32.1 dB	
SEA	-99.9 dB			
LAS > 60.0 dB (Exceedence Counts / Duration)	2		20.6 s	
LAS > 70.0 dB (Exceedence Counts / Duration)	1		1.3 s	
LApeak > 135.0 dB (Exceedence Counts / Duration)	0		0.0 s	
LApeak > 137.0 dB (Exceedence Counts / Duration)	0		0.0 s	
LApeak > 140.0 dB (Exceedence Counts / Duration)	0		0.0 s	
LCeq	58.7 dB			
LAeq	45.9 dB			
LCeq - LAeq	12.8 dB			
LAleq	56.7 dB			
LAeq	45.9 dB			
LAleq - LAeq	10.8 dB			
# Overloads	0			
Overload Duration	0.0 s			
Dose Settings				
Dose Name	OSHA-1	OSHA-2		
Exch. Rate	5	5 dB		
Threshold	90	80 dB		
Criterion Level	90	90 dB		
Criterion Duration	8	8 h		
Results				
Dose	-99.9	-99.9 %		
Projected Dose	-99.9	-99.9 %		
TWA (Projected)	-99.9	-99.9 dB		
TWA (t)	-99.9	-99.9 dB		
Lep (t)	34.0	34.0 dB		
Statistics				
LAS5.00	49.1 dB			
LAS10.00	44.6 dB			
LAS33.30	36.3 dB			
LAS50.00	34.7 dB			
LAS66.60	34.0 dB			
LAS90.00	33.1 dB			

ATTACHMENT 2

Air Cooling Unit Specifications

SUBMITTAL

Project

Burns and McDonnell - AC Chillers 091418

Date

Friday, September 14, 2018

General Contractor

Mechanical Contractor

Mechanical Engineer

Table Of Contents

Project: Burns and McDonnell - AC Chillers 091418 10/12/2018
Prepared By: 02:11PM

Unit Report For 30XV450

Project: Burns and McDonnell - AC Chillers 091418 10/12/2018
Prepared By: 02:11PM

Unit Information

Tag Name:	**30XV450**	
Model Number:	**30XV450**	
Condenser Type:	**Air Cooled**	
Compressor Type:	**VFD Screw**	
Nameplate Voltage:	**460-3-60**	V-Ph-Hz
Quantity:	**1**	
Manufacturing Source:	**Charlotte, NC USA**	
Refrigerant:	**R134A**	
Independent Refrigerant Circuits:	**2**	
Capacity Control Steps:	**0**	
Minimum Capacity:	**15.0**	%
Shipping Weight:	**28780**	lb
Operating Weight:	**29477**	lb
Unit Length:	**594**	in
Unit Width:	**88**	in
Unit Height:	**99**	in

Accessories and Installed Options

Isolation Valve(s)
Suction Line Insulation
Control Transformer
Non-Fused Disconnect
Al Fin/Cu Tube
Flooded Evaporator, 2 pass, with heater
Low Sound Kit
BACnet / Modbus Translator
Coil Trim Panels
Low Ambient Head Pressure Control
High Tier

Chiller Warranty Information (Note: for US & Canada only)

First Year - Parts Only (Standard)
Start up, First Unit

Ordering Information

Part Number	Description	Quantity
30XV-4506H-016410	Packaged Chiller	1
	Base Unit	
	Isolation Valve(s)	
	Suction Line Insulation	
	Control Transformer	
	Non-Fused Disconnect	
	Al Fin/Cu Tube	
	Flooded Evaporator, 2 pass, with heater	
	Low Sound Kit	
	BACnet / Modbus Translator	
	Coil Trim Panels	

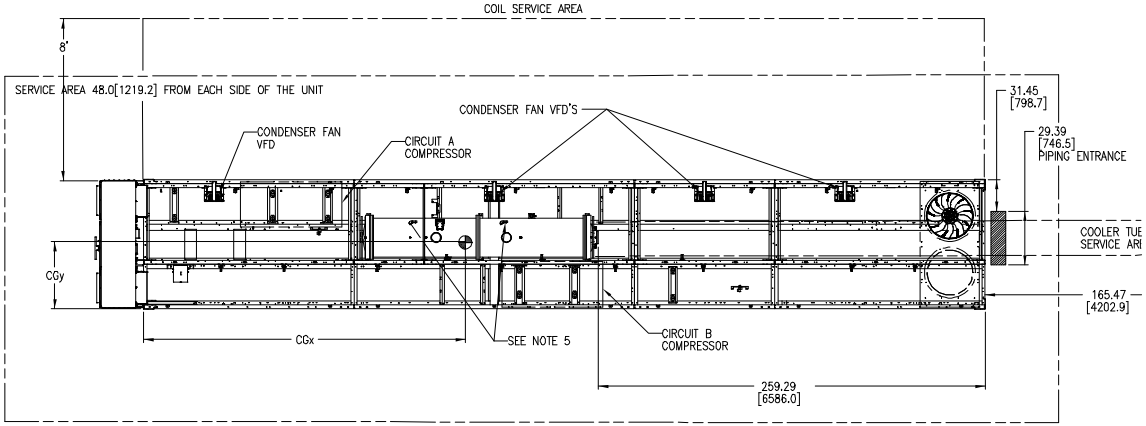
IT MUST HAVE CLEARANCES AS FOLLOWS:
)P– DO NOT RESTRICT.
DES AND END– 6' FROM SOLID SURFACE.
)R AIRFLOW SIDE– 8' REQUIRED FOR COIL SERVICE AREA.
MULTIPLE UNITS ARE INSTALLED AT THE SAME SITE, A MINIMUM SEPARATION OF 10FT (3M)
ETWEEN THE SIDES OF THE MACHINES IS REQUIRED TO MAINTAIN PROPER INFLOW.
CTORY WIRING IS IN ACCORDANCE WITH UL 1995 STANDARDS. FIELD MODIFICATIONS OR
)DITIONS MUST BE IN COMPLIANCE WITH ALL APPLICABLE CODES.
RING FOR MAIN FIELD SUPPLY MUST BE RATED 75C MINIMUM. USE COPPER FOR ALL UNITS.

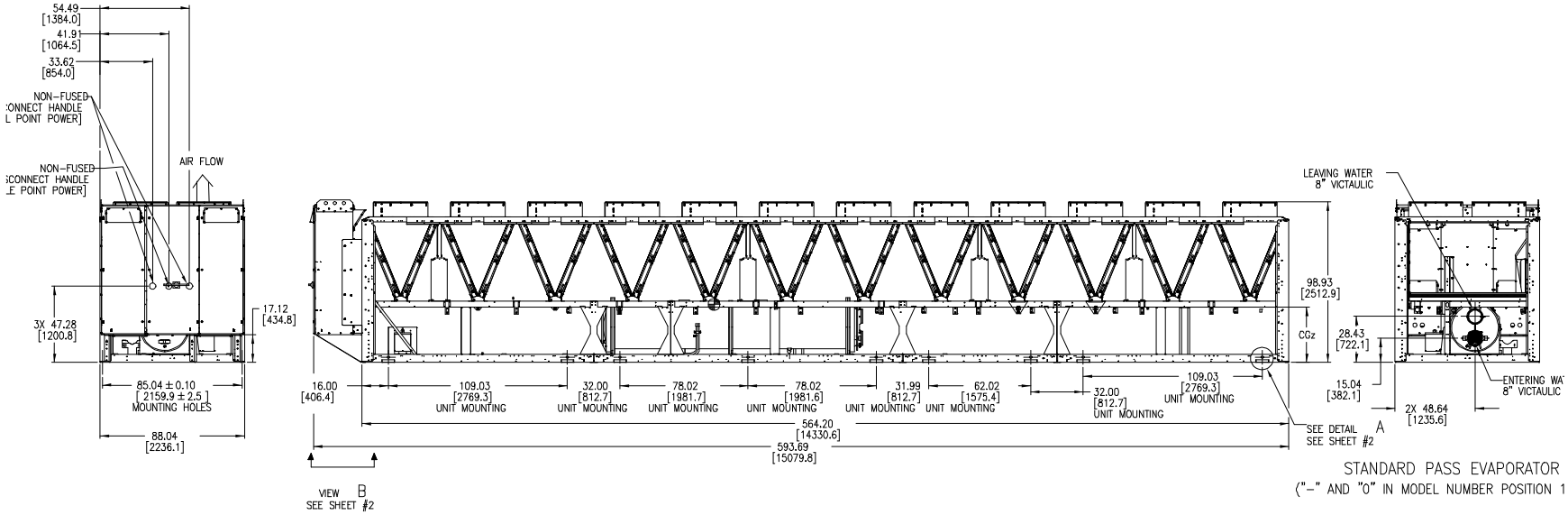
POWER ENTRY OPTION	UNIT SIZE	DISCONNECT OPTION	# COND. PER PHASE	LUG RANGE
SINGLE POINT POWER (460 – 575V)	ALL	NO	4	#2 AWG – 600 KCMIL
SINGLE POINT POWER (380V)	ALL	NO	6	#2 AWG – 600 KCMIL
DUAL POINT POWER (380–575V)	ALL	NO	2	#4 AWG – 500 KCMIL
DUAL POINT POWER (380–575V)	ALL	NFD	3	#3/0 AWG–400 KCMIL
SINGLE POINT POWER (380V)	ALL	NFD	6	#2 AWG – 600 KCMIL
SINGLE POINT POWER (460 – 575V)	ALL	NFD	4	#4/0 AWG – 500 KCMIL

MPERATURE RELIEF DEVICES ARE LOCATED ON LIQUID LINES, AND ECONOMIZER ASSEMBLIES
ID HAVE 1/4" AND 3/8" FLARE CONNECTION.
ESSURE RELIEF DEVICES ARE LOCATED ON THE EVAPORATOR (3/4" NPT MALE CONNECTOR)AND ON
ACH OIL SEPERATOR (3/8" FLARE CONNECTOR).
MENSIONS SHOWN ARE IN INCHES, DIMENSIONS IN [ ] ARE IN MM.

UNIT	CENTER OF GRAVITY									
	CGx						CGy		CGz	
	MCHX		AL/CU		CU/CU					
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
30XV–450 HIGH	216.2	5491	220.4	5599	227.4	5775	46.3	1175	36.3	922
30XV–500 MID	216.2	5492	220.8	5607	227.6	5781	46.3	1175	36.2	919

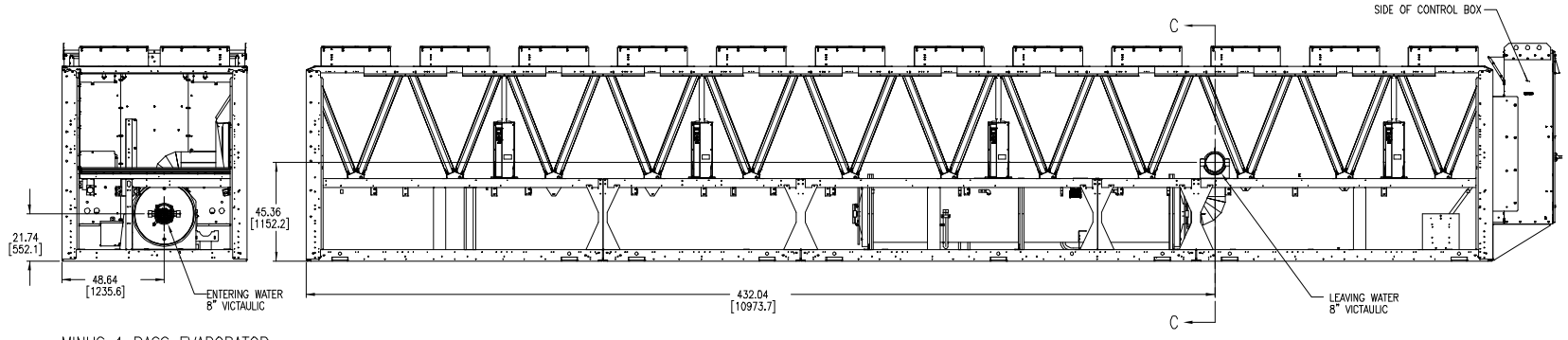
SYMBOL DENOTES CG



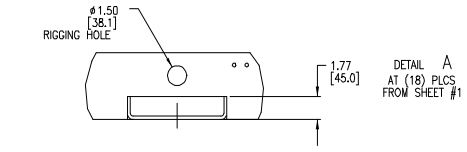


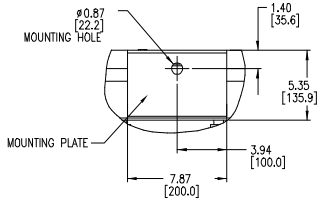
STANDARD PASS EVAPORATOR
("–" AND "0" IN MODEL NUMBER POSITION 1

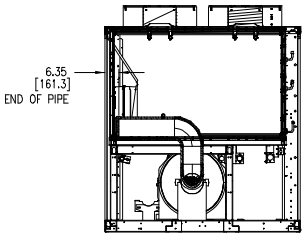
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES	30XV 450 HIGH TIER, 500 MID TIER AIR COOLED CHILLER	30XV60002700
U.S. ECCN:EAR99	1 OF 3	05/12/17	–		



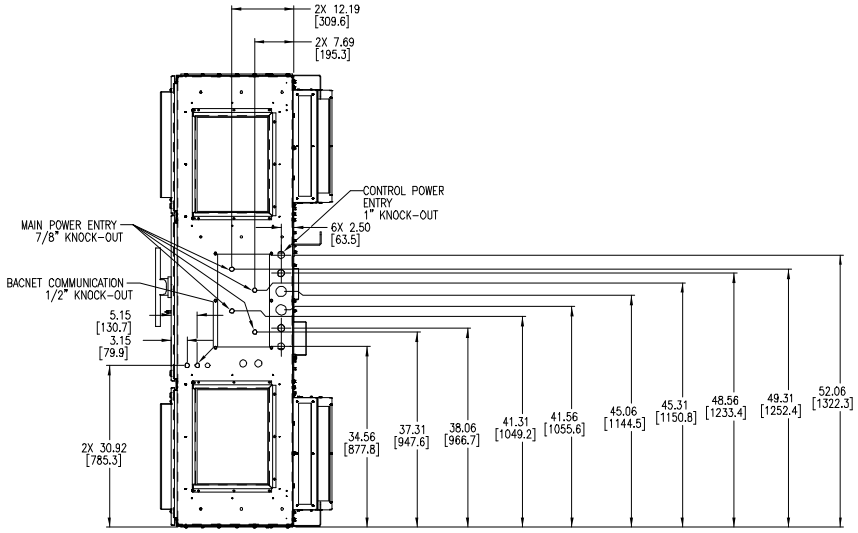
MINUS 1 PASS EVAPORATOR
("1" IN MODEL NUMBER POSITION 12)





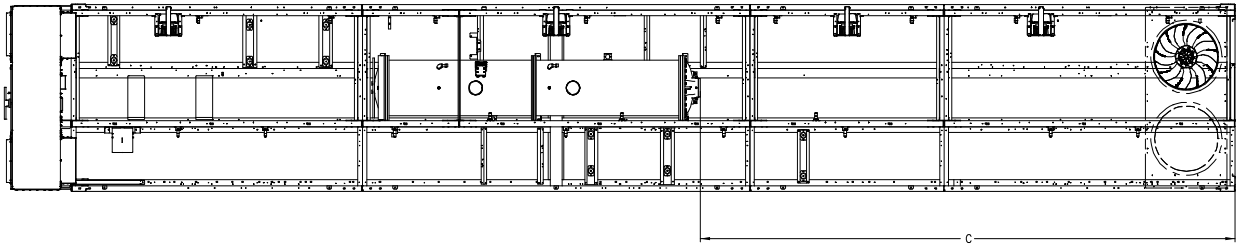


SECTION C–C

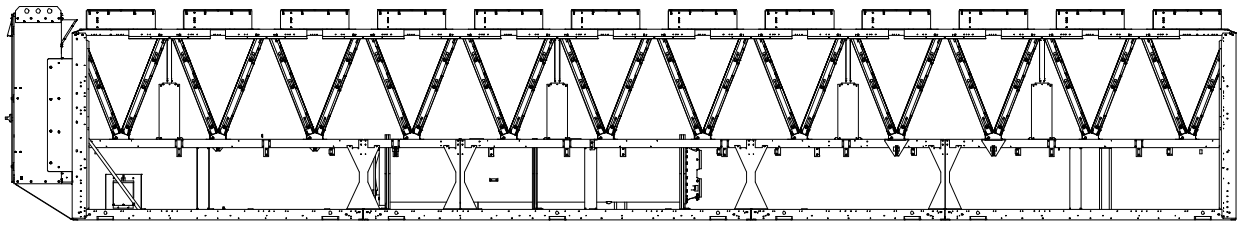


VIEW B
FROM SHEET #1

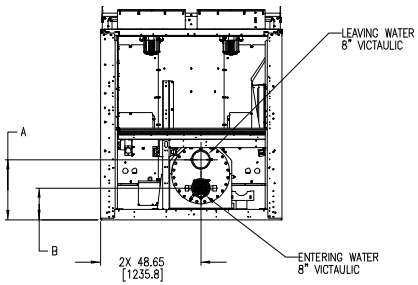
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:EAR99	2 OF 3	05/12/17	–	30XV 450 HIGH TIER, 500 MID TIER AIR COOLED CHILLER	30XV60002700	B



UNIT	A	B	C
45D HIGH	27.44[696.9]	14.05[357.0]	259.92[6601.9]
500 MID	28.43[722.1]	15.05[382.1]	259.19[6583.4]



BRINE COOLER OPTION



BRINE EVAPORATOR

("2" IN MODEL NUMBER POSITION 12)

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:EAR99	3 OF 3	05/12/17	–	30XV 450 HIGH TIER, 500 MID TIER AIR COOLED CHILLER	30XV60002700	B

AquaForce™ Air-Cooled Variable Speed Screw Chiller

Unit Information

Tag Name:	**30XV450**	
Model Number:	**30XV450H**	
Quantity:	**1**	
Manufacturing Source:	**Charlotte, NC USA**	
ASHRAE 90.1:	**2013/2016, 2010, 2007**	
Refrigerant:	**R-134a**	
Independent Refrigerant Circuits:	**2**	
Shipping Weight:	**28780**	lb
Operating Weight:	**29477**	lb
Refrigerant Weight (Circuit A):	**456**	lb
Refrigerant Weight (Circuit B):	**456**	lb
Unit Length:	**594**	in
Unit Width:	**88**	in
Unit Height:	**99**	in
Required Pad Length:	**564**	in

Evaporator Information

Fluid Type:	**Propylene Glycol**	
Brine Concentration:	**30.00**	%
Fouling Factor:	**0.000100**	(hr-sqft-F)/BTU
Leaving Temperature:	**50.00**	°F
Entering Temperature:	**60.00**	°F
Fluid Flow:	**1,160.**	gpm
Pressure Drop:	**29.7**	ft H2O

Condenser Information

Altitude:	**0.000**	ft
Number of Fans:	**24**	
Total Condenser Fan Air Flow:	**315,400**	CFM
Entering Air Temperature:	**95.0**	°F

Integrated Pump Information

No Pump Selected

Performance Information

Cooling Capacity:	**462.5**	Tons
Total Compressor Power:	**486.0**	kW
Total Fan Motor Power:	**32.67**	kW
Total Unit Power (without pump):	**527.3**	kW
Efficiency (without pump) (EER):	**10.52**	BTU/Wh
IPLV:.IP:	**19.63**	BTU/Wh

Summary Performance Report For 30XV450

Project: Burns and McDonnell - AC Chillers 091418 10/12/2018
Prepared By: 02:11PM

Accessories and Installed Options

Isolation Valve(s)
Suction Line Insulation
Control Transformer
Non-Fused Disconnect
Al Fin/Cu Tube
Flooded Evaporator, 2 pass, with heater
Low Sound Kit
BACnet / Modbus Translator
Coil Trim Panels
Low Ambient Head Pressure Control
High Tier

Electrical Information

Unit Voltage: **460-3-60** V-Ph-Hz
Connection Type: **Single Point**
Minimum Voltage: **414** Volts
Maximum Voltage: **506** Volts

Amps	Electrical Circuit 1	Electrical Circuit 2
MCA	793.3	---
MOCP	1000.0	---
Rec Fuse Size	1000.0	---

Sound power measured in accordance with ANSI/AHRI Standard 370-2015.

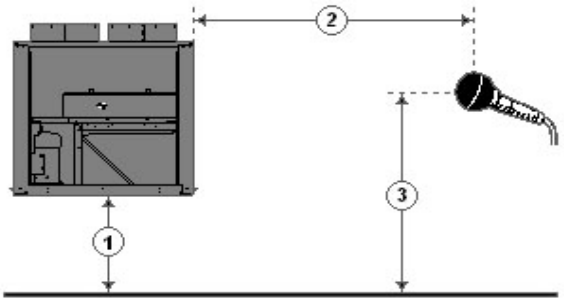
Certified in accordance with the AHRI Air-Cooled Water-Chilling Packages Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org. Unit contains freeze protection fluids in the evaporator with a leaving chilled fluid temperature above 32°F [0°C] is certified when rated per the Standard with water.

Summary Performance Report For 30XV450

Project: Burns and McDonnell - AC Chillers 091418 10/12/2018
Prepared By: 02:11PM

Unit Parameters

Tag Name:	**30XV450**	
Model Number:	**30XV450H**	
Condenser Type:	**Air Cooled**	
Compressor Type:	**VFD Screw**	
Chiller Nameplate Voltage:	**460-3-60**	V-Ph-Hz
Quantity:	**1**	
Manufacturing Source:	**Charlotte, NC USA**	
Refrigerant:	**R-134a**	
Shipping Weight:	**28780**	lb
Operating Weight:	**29477**	lb
Refrigerant Weight (Circuit A):	**456**	lb
Refrigerant Weight (Circuit B):	**456**	lb
Unit Length:	**594**	in
Unit Width:	**88**	in
Unit Height:	**99**	in



1 - Chiller Height Above Ground
2 - Horizontal Distance From Chiller to Receiver
3 - Receiver Height Above Ground
(See Note 3)

Accessories and Installed Options

Isolation Valve(s)	Flooded Evaporator, 2 pass, with heater
Suction Line Insulation	Low Sound Kit
Control Transformer	BACnet / Modbus Translator
Non-Fused Disconnect	Coil Trim Panels
Al Fin/Cu Tube	

Acoustic Information

Table 1. A-Weighted Sound Power Levels (dB re 1 picowatt). See note #1.

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
100% Load	71	83	87	97	101	101	99	87	106
75% Load	68	79	85	97	93	94	87	82	100
50% Load	62	71	85	86	89	86	78	79	93
25% Load	59	67	83	83	86	84	76	76	91

Table 2. A-Weighted Sound Pressure Levels (dB re 20 micropascals) calculated based upon user defined input for dimensions 1, 2 and 3 as shown in above diagram. See note #2 and #3.

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
100% Load	37	49	53	63	67	67	65	53	72
75% Load	34	45	52	63	59	60	54	48	66
50% Load	28	37	51	52	55	52	45	45	59
25% Load	25	33	49	50	52	50	42	42	57

Notes: (1) Measurements performed in accordance with AHRI Standard 370-2015 for air cooled Chillers.
(2) Chiller is assumed to be a point source on a reflecting plane.
(3) Without user defined input, the default dimensions used to construct Table 2 are as follows:
1 - Chiller Height Above Ground = 0.0 ft
2 - Horizontal Distance From Chiller to Receiver = 30.0 ft
3 - Receiver Height Above Ground = 3.0 ft

AquaForce™ Air-Cooled Variable Speed Screw Chiller

Unit Information

Tag Name:	**30XV450**	
Model Number:	**30XV450H**	
Condenser Type:	**Air Cooled**	
Compressor Type:	**VFD Screw**	
Nameplate Voltage:	**460-3-60**	V-Ph-Hz
Quantity:	**1**	
Manufacturing Source:	**Charlotte, NC USA**	
ASHRAE 90.1:	**2013/2016, 2010, 2007**	
Refrigerant:	**R-134a**	
Minimum Capacity:	**15.00**	%
Shipping Weight:	**28780**	lb
Operating Weight:	**29477**	lb
Refrigerant Weight (Circuit A):	**456**	lb
Refrigerant Weight (Circuit B):	**456**	lb
Unit Length:	**594**	in
Unit Width:	**88**	in
Unit Height:	**99**	in
Required Pad Length:	**564**	in
Minimum Outdoor Operating Temp:	**-20.0**	°F

Performance Information

Cooling Capacity:	**462.5**	Tons
Total Compressor Power:	**486.0**	kW
Total Fan Motor Power:	**32.67**	kW
Total Unit Power (without pump):	**527.3**	kW
Efficiency (without pump) (EER):	**10.52**	BTU/Wh

Evaporator Information

Fluid Type:	**Propylene Glycol**	
Brine Concentration:	**30.00**	%
Fouling Factor:	**0.000100**	(hr-sqft-F)/BTU
Leaving Temperature:	**50.00**	°F
Entering Temperature:	**60.00**	°F
Fluid Flow:	**1,160.**	gpm
Fluid Flow Min:	**600.5**	gpm
Fluid Flow Max:	**2,136**	gpm
Pressure Drop:	**29.7**	ft H2O

Condenser Information

Altitude:	**0.000**	ft
Number of Fans:	**24**	
Total Condenser Fan Air Flow:	**315,400**	CFM
Entering Air Temperature:	**95.0**	°F

Detailed Performance Summary For 30XV450

Project: Burns and McDonnell - AC Chillers 091418 10/12/2018
Prepared By: 02:11PM

Integrated Pump Information
No Pump Selected

Accessories and Installed Options
Isolation Valve(s)
Suction Line Insulation
Control Transformer
Non-Fused Disconnect
Al Fin/Cu Tube
Flooded Evaporator, 2 pass, with heater
Low Sound Kit
BACnet / Modbus Translator
Coil Trim Panels
Low Ambient Head Pressure Control
High Tier

Electrical Information
Unit Voltage: **460-3-60** V-Ph-Hz
Connection Type: **Single Point**
Minimum Voltage: **414** Volts
Maximum Voltage: **506** Volts

Amps	Electrical Circuit 1	Electrical Circuit 2
MCA	793.3	---
MOCP	1000.0	---
Rec Fuse Size	1000.0	

Integrated Part Load Value (AHRI)

IPLV.IP: **19.63** BTU/Wh

Unit Performance				
Percent of Full Load Capacity, %	100.00	75.00	50.00	25.00
Percent of Full Load Power, %	100.00	51.92	23.45	9.97
Unloading Sequence	A	A	A	A
Cooling Capacity, Tons	452.1	339.1	226.1	113.0
Total Unit Power, kW	518.8	269.3	121.6	51.74
Efficiency (EER), BTU/Wh	10.46	15.11	22.30	26.22
Evaporator Data				
Fluid Entering Temperature, °F	54.00	51.49	48.99	46.50
Fluid Leaving Temperature, °F	44.00	44.00	44.00	44.00
Fluid Flow Rate, gpm	1,081	1,081	1,081	1,081
Fouling Factor, (hr-sqft-F)/BTU	0.000100	0.000100	0.000100	0.000100
Condenser Data				
Entering Air Temperature, °F	95.0	80.0	65.0	55.0

Sound power measured in accordance with ANSI/AHRI Standard 370-2015.

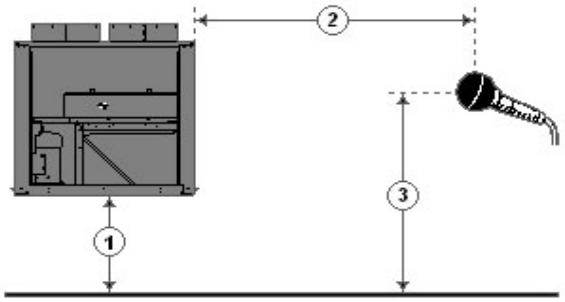
Certified in accordance with the AHRI Air-Cooled Water-Chilling Packages Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org. Unit contains freeze protection fluids in the evaporator with a leaving chilled fluid temperature above 32°F [0°C] is certified when rated per the Standard with water.

Detailed Performance Summary For 30XV450

Project: Burns and McDonnell - AC Chillers 091418 10/12/2018
Prepared By: 02:11PM

Unit Parameters

Tag Name:	**30XV450**	
Model Number:	**30XV450**	
Condenser Type:	**Air Cooled**	
Compressor Type:	**VFD Screw**	
Chiller Nameplate Voltage:	**460-3-60**	V-Ph-Hz
Quantity:	**1**	
Manufacturing Source:	**Charlotte, NC USA**	
Refrigerant:	**R-134a**	
Shipping Weight:	**28780**	lb
Operating Weight:	**29477**	lb
Refrigerant Weight (Circuit A):	**456**	lb
Refrigerant Weight (Circuit B):	**456**	lb
Unit Length:	**594**	in
Unit Width:	**88**	in
Unit Height:	**99**	in
Required Pad Length:	**564**	in



1 - Chiller Height Above Ground
2 - Horizontal Distance From Chiller to Receiver
3 - Receiver Height Above Ground
(See Note 3)

Accessories and Installed Options

Isolation Valve(s)
Suction Line Insulation
Control Transformer
Non-Fused Disconnect
Al Fin/Cu Tube
Flooded Evaporator, 2 pass, with heater
Low Sound Kit
BACnet / Modbus Translator
Coil Trim Panels

Acoustic Information

Table 1. A-Weighted Sound Power Levels (dB re 1 picowatt). See note #1.

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
100% Load	71	83	87	97	101	101	99	87	106
75% Load	68	79	85	97	93	94	87	82	100
50% Load	62	71	85	86	89	86	78	79	93
25% Load	59	67	83	83	86	84	76	76	91

Table 2. A-Weighted Sound Pressure Levels (dB re 20 micropascals) calculated based upon user defined input for dimensions 1, 2 and 3 as shown in above diagram. See note #2 and #3.

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
100% Load	37	49	53	63	67	67	65	53	72
75% Load	34	45	52	63	59	60	54	48	66
50% Load	28	37	51	52	55	52	45	45	59
25% Load	25	33	49	50	52	50	42	42	57

Notes: (1) Measurements performed in accordance with AHRI Standard 370-2015 for air cooled Chillers.
(2) Chiller is assumed to be a point source on a reflecting plane.
(3) Without user defined input, the default dimensions used to construct Table 2 are as follows:
1 - Chiller Height Above Ground = 0.0 ft
2 - Horizontal Distance From Chiller to Receiver = 30.0 ft
3 - Receiver Height Above Ground = 3.0 ft

ATTACHMENT 3

O&M HVAC Unit Specifications

Fan Performance

Table 6. Standard motor & low static drive accessory sheave/fan speed (rpm)

Tons	Unit Model Number	Fan Sheave	6 Turns Open	5 Turns Open	4 Turns Open	3 Turns Open	2 Turns Open	1 Turn Open	Closed
5	WSC060ED	AK44x3/4"	N/A	720	791	861	931	1002	1072
6	WSC072ED	AK56x1"	N/A	558	612	665	718	772	825
7½	WSC090ED	AK57x1"	N/A	688	737	787	837	887	N/A
10	WSC120ED	AK105X1"	N/A	724	776	828	880	932	984

Note: Factory set at 3 turns open.

Table 7. Standard motor & high static drive accessory sheave/fan speed (rpm)

Tons	Unit Model Number	Fan Sheave	6 Turns Open	5 Turns Open	4 Turns Open	3 Turns Open	2 Turns Open	1 Turn Open	Closed
6	WSC072ED	AK56x1"	N/A	968	1018	1068	1118	1169	1219
7½	WSC090ED	AK57x1"	1053	1091	1129	1166	1204	1242	N/A
10	WSC120ED	AK105X1"	1110	1159	1209	1258	1308	1357	N/A

Note: Factory set at 3 turns open.

Table 8. Oversized motor & high static drive accessory sheave/fan speed (rpm)

Tons	Unit Model Number	Fan Sheave	6 Turns Open	5 Turns Open	4 Turns Open	3 Turns Open	2 Turns Open	1 Turn Open	Closed
7½	WSC090ED	AK85x1"	1186	1249	1311	1373	1436	N/A	N/A

Note: Factory set at 3 turns open.

Table 9. Outdoor sound power level—dB (ref. 10—2 W)

Tons	Unit Model Number	Octave Center Frequency								Overall dBA
		63	125	250	500	1000	2000	4000	8000	
5	T/YSC060ED	84	91	79	77	74	71	68	63	80
6	T/YSC072ED	83	90	86	82	79	75	70	63	85
7½	T/YSC090ED	83	90	86	83	80	75	71	64	85
8.5	T/YSC102ED	83	89	84	81	77	72	69	62	83
10	T/YSC120ED	83	86	80	77	73	69	66	60	79

Note: Tests follow ARI270-95.

Table 10. Outdoor sound power level—dB (ref. 10—12 W)

Tons	Unit Model Number	Octave Center Frequency								Overall dBA
		63	125	250	500	1000	2000	4000	8000	
5	WSC060ED	84	91	79	77	74	71	68	63	80
6	WSC072ED	83	90	86	82	79	75	70	63	85
7½	WSC090ED	83	90	86	83	80	75	71	64	85
10	WSC120ED	83	86	80	77	73	69	66	60	79

Note: Tests follow ARI270-95.

ATTACHMENT 4

SoundPLAN Data – Construction

8888 Westside Canal Energy Center
SoundPLAN Data - Construction

Source name	Reference	Level	Corrections		
		Leq1	Cwall	CI	CT
		dB(A)	dB(A)	dB(A)	dB(A)
Construction - Common Facilities	Lw/unit	123.9	-	-	-
Construction - Battery Storage 1	Lw/unit	120.8	-	-	-
Construction - Battery Storage 2-5	Lw/unit	120.8	-	-	-

8888 Westside Canal Energy Center
SoundPLAN Data - Construction

No.	Coordinates X	Coordinates Y	Floor	Height	Limit Leq1	Common Facilities Level without Noise Protection Leq1	Battery Storage 1 Level without Noise Protection Leq1	Battery Storage 2-5 Level without Noise Protection Leq1
	in meter			m	dB(A)	dB(A)	dB(A)	dB(A)
1	623318.8	3619986	1.Fl	1.5	75	33.3	30.3	30.3
2	621691.4	3622998	1.Fl	1.5	75	43.6	40.3	40.3
3	620468.1	3623432	1.Fl	1.5	75	45.5	41.7	41.7
4	620250.8	3623697	1.Fl	1.5	75	43.6	39.9	39.9
5	618809.7	3625227	1.Fl	1.5	75	33.4	30.0	30.0
6	617680.6	3625229	1.Fl	1.5	75	30.9	27.6	27.6

Receivers

ATTACHMENT 5

SoundPLAN Data – Operation

8888 Westside Canal Energy Center
SoundPLAN Data - On-Site Generated Noise

Source name	Reference	Level	Corrections		
		Leq1	Cwall	CI	CT
		dB(A)	dB(A)	dB(A)	dB(A)
Lithium Ion 50 MW Building1	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building2	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building3	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building4	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building5	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building6	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building7	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building8	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building9	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building10	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building11	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building12	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building13	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building14	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building15	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building16	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building17	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building18	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building19	Lw/unit	106.2	-	-	-
Lithium Ion 50 MW Building20	Lw/unit	106.2	-	-	-
Substation	Lw/unit	97	-	-	-
Additional Lithium Ion 50 MW Building21	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building22	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building23	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building24	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building25	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building26	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building27	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building28	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building29	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building30	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building31	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building32	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building33	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building34	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building35	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building36	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building37	Lw/unit	106.2	-	-	-
Additional Lithium Ion 50 MW Building38	Lw/unit	106.2	-	-	-
Battery Storage1	Lw/unit	106.2	-	-	-
Battery Storage2	Lw/unit	106.2	-	-	-
Battery Storage3	Lw/unit	106.2	-	-	-
Battery Storage4	Lw/unit	106.2	-	-	-
Battery Storage5	Lw/unit	106.2	-	-	-
Battery Storage6	Lw/unit	106.2	-	-	-
Battery Storage7	Lw/unit	106.2	-	-	-
Battery Storage8	Lw/unit	106.2	-	-	-
Battery Storage9	Lw/unit	106.2	-	-	-
Transmission Line 1	Lw/m,m2	45	-	-	-
Transmission Line 2	Lw/m,m2	45	-	-	-
Transmission Line 3	Lw/m,m2	45	-	-	-
O&M HVAC	Lw/unit	79	-	-	-

8888 Westside Canal Energy Center
SoundPLAN Data - On-Site Generated Noise

No.	Coordinates X	Y	Floor	Height	Limit Leq1	Level without Noise Protection Leq1
	in meter			m	dB(A)	dB(A)
1	623318.8	3619986	1.Fl	1.5	-	32.3
2	621691.4	3622998	1.Fl	1.5	-	41.8
3	620468.1	3623432	1.Fl	1.5	-	43.5
4	620250.8	3623697	1.Fl	1.5	-	41.7
5	618809.7	3625227	1.Fl	1.5	-	32.0
6	617680.6	3625229	1.Fl	1.5	-	29.5

8888 Westside Canal Energy Center
SoundPLAN Data - On-Site Generated Noise

Source name	Level without Noise Protection Leq1 dB(A)
1 1.Fl 32.3 0.0	
Additional Lithium Ion 50 MW Building21	15.5
Additional Lithium Ion 50 MW Building22	15.3
Additional Lithium Ion 50 MW Building23	15.7
Additional Lithium Ion 50 MW Building24	15.6
Additional Lithium Ion 50 MW Building25	15.2
Additional Lithium Ion 50 MW Building26	15.4
Additional Lithium Ion 50 MW Building27	16.0
Additional Lithium Ion 50 MW Building28	15.6
Additional Lithium Ion 50 MW Building29	15.6
Additional Lithium Ion 50 MW Building30	15.9
Additional Lithium Ion 50 MW Building31	15.8
Additional Lithium Ion 50 MW Building32	15.7
Additional Lithium Ion 50 MW Building33	15.3
Additional Lithium Ion 50 MW Building34	15.2
Additional Lithium Ion 50 MW Building35	15.1
Additional Lithium Ion 50 MW Building36	14.9
Additional Lithium Ion 50 MW Building37	15.0
Additional Lithium Ion 50 MW Building38	15.4
Battery Storage1	17.0
Battery Storage2	16.6
Battery Storage3	17.0
Battery Storage4	17.3
Battery Storage5	17.6
Battery Storage6	17.3
Battery Storage7	17.7
Battery Storage8	16.2
Battery Storage9	16.5
Lithium Ion 50 MW Building1	14.3
Lithium Ion 50 MW Building2	14.4
Lithium Ion 50 MW Building3	14.5
Lithium Ion 50 MW Building4	14.6
Lithium Ion 50 MW Building5	14.7
Lithium Ion 50 MW Building6	14.8
Lithium Ion 50 MW Building7	15.1
Lithium Ion 50 MW Building8	15.0
Lithium Ion 50 MW Building9	14.9
Lithium Ion 50 MW Building10	14.8
Lithium Ion 50 MW Building11	14.7
Lithium Ion 50 MW Building12	14.6
Lithium Ion 50 MW Building13	14.0
Lithium Ion 50 MW Building14	14.1
Lithium Ion 50 MW Building15	14.9
Lithium Ion 50 MW Building16	15.0
Lithium Ion 50 MW Building17	15.1
Lithium Ion 50 MW Building18	15.2
Lithium Ion 50 MW Building19	15.3
Lithium Ion 50 MW Building20	15.4
O&M HVAC	-13.5
Substation	4.3
Transmission Line 1	-29.1
Transmission Line 2	-23.5

Contributions

Transmission Line 3				-17.3
2	1.Fl	41.8	0.0	
Additional Lithium Ion 50 MW Building21				23.9
Additional Lithium Ion 50 MW Building22				24.3
Additional Lithium Ion 50 MW Building23				23.6
Additional Lithium Ion 50 MW Building24				23.7
Additional Lithium Ion 50 MW Building25				24.4
Additional Lithium Ion 50 MW Building26				24.1
Additional Lithium Ion 50 MW Building27				23.9
Additional Lithium Ion 50 MW Building28				24.9
Additional Lithium Ion 50 MW Building29				24.7
Additional Lithium Ion 50 MW Building30				24.1
Additional Lithium Ion 50 MW Building31				24.3
Additional Lithium Ion 50 MW Building32				24.5
Additional Lithium Ion 50 MW Building33				25.3
Additional Lithium Ion 50 MW Building34				25.5
Additional Lithium Ion 50 MW Building35				25.7
Additional Lithium Ion 50 MW Building36				26.0
Additional Lithium Ion 50 MW Building37				25.8
Additional Lithium Ion 50 MW Building38				25.2
Battery Storage1				25.4
Battery Storage2				26.1
Battery Storage3				26.5
Battery Storage4				25.8
Battery Storage5				26.2
Battery Storage6				27.0
Battery Storage7				27.1
Battery Storage8				26.9
Battery Storage9				27.4
Lithium Ion 50 MW Building1				25.0
Lithium Ion 50 MW Building2				24.9
Lithium Ion 50 MW Building3				24.7
Lithium Ion 50 MW Building4				24.6
Lithium Ion 50 MW Building5				24.4
Lithium Ion 50 MW Building6				24.3
Lithium Ion 50 MW Building7				24.7
Lithium Ion 50 MW Building8				24.9
Lithium Ion 50 MW Building9				25.1
Lithium Ion 50 MW Building10				25.2
Lithium Ion 50 MW Building11				25.4
Lithium Ion 50 MW Building12				25.5
Lithium Ion 50 MW Building13				24.4
Lithium Ion 50 MW Building14				24.3
Lithium Ion 50 MW Building15				24.0
Lithium Ion 50 MW Building16				23.8
Lithium Ion 50 MW Building17				23.7
Lithium Ion 50 MW Building18				23.5
Lithium Ion 50 MW Building19				23.3
Lithium Ion 50 MW Building20				23.2
O&M HVAC				-2.7
Substation				14.1
Transmission Line 1				-19.5
Transmission Line 2				-13.8
Transmission Line 3				-7.3
3	1.Fl	43.5	0.0	

Additional Lithium Ion 50 MW Building21	25.4
Additional Lithium Ion 50 MW Building22	26.0
Additional Lithium Ion 50 MW Building23	24.9
Additional Lithium Ion 50 MW Building24	25.1
Additional Lithium Ion 50 MW Building25	26.3
Additional Lithium Ion 50 MW Building26	25.7
Additional Lithium Ion 50 MW Building27	24.9
Additional Lithium Ion 50 MW Building28	26.4
Additional Lithium Ion 50 MW Building29	26.1
Additional Lithium Ion 50 MW Building30	25.2
Additional Lithium Ion 50 MW Building31	25.5
Additional Lithium Ion 50 MW Building32	25.8
Additional Lithium Ion 50 MW Building33	27.3
Additional Lithium Ion 50 MW Building34	27.6
Additional Lithium Ion 50 MW Building35	28.0
Additional Lithium Ion 50 MW Building36	28.7
Additional Lithium Ion 50 MW Building37	28.3
Additional Lithium Ion 50 MW Building38	26.9
Battery Storage1	25.3
Battery Storage2	26.2
Battery Storage3	26.2
Battery Storage4	25.2
Battery Storage5	25.2
Battery Storage6	26.1
Battery Storage7	25.7
Battery Storage8	27.4
Battery Storage9	27.3
Lithium Ion 50 MW Building1	28.4
Lithium Ion 50 MW Building2	28.1
Lithium Ion 50 MW Building3	27.7
Lithium Ion 50 MW Building4	27.4
Lithium Ion 50 MW Building5	27.1
Lithium Ion 50 MW Building6	26.8
Lithium Ion 50 MW Building7	26.9
Lithium Ion 50 MW Building8	27.2
Lithium Ion 50 MW Building9	27.6
Lithium Ion 50 MW Building10	27.9
Lithium Ion 50 MW Building11	28.2
Lithium Ion 50 MW Building12	28.6
Lithium Ion 50 MW Building13	28.0
Lithium Ion 50 MW Building14	27.7
Lithium Ion 50 MW Building15	26.2
Lithium Ion 50 MW Building16	25.9
Lithium Ion 50 MW Building17	25.6
Lithium Ion 50 MW Building18	25.3
Lithium Ion 50 MW Building19	25.1
Lithium Ion 50 MW Building20	24.8
O&M HVAC	1.5
Substation	18.0
Transmission Line 1	-15.2
Transmission Line 2	-9.8
Transmission Line 3	-6.3
4 1.Fl 41.7 0.0	
Additional Lithium Ion 50 MW Building21	23.8
Additional Lithium Ion 50 MW Building22	24.3

Additional Lithium Ion 50 MW Building23	23.3
Additional Lithium Ion 50 MW Building24	23.5
Additional Lithium Ion 50 MW Building25	24.6
Additional Lithium Ion 50 MW Building26	24.1
Additional Lithium Ion 50 MW Building27	23.3
Additional Lithium Ion 50 MW Building28	24.6
Additional Lithium Ion 50 MW Building29	24.3
Additional Lithium Ion 50 MW Building30	23.5
Additional Lithium Ion 50 MW Building31	23.8
Additional Lithium Ion 50 MW Building32	24.1
Additional Lithium Ion 50 MW Building33	25.4
Additional Lithium Ion 50 MW Building34	25.7
Additional Lithium Ion 50 MW Building35	26.0
Additional Lithium Ion 50 MW Building36	26.6
Additional Lithium Ion 50 MW Building37	26.3
Additional Lithium Ion 50 MW Building38	25.1
Battery Storage1	23.4
Battery Storage2	24.2
Battery Storage3	24.1
Battery Storage4	23.3
Battery Storage5	23.2
Battery Storage6	24.0
Battery Storage7	23.6
Battery Storage8	25.2
Battery Storage9	25.1
Lithium Ion 50 MW Building1	26.6
Lithium Ion 50 MW Building2	26.3
Lithium Ion 50 MW Building3	26.0
Lithium Ion 50 MW Building4	25.7
Lithium Ion 50 MW Building5	25.4
Lithium Ion 50 MW Building6	25.1
Lithium Ion 50 MW Building7	25.1
Lithium Ion 50 MW Building8	25.4
Lithium Ion 50 MW Building9	25.7
Lithium Ion 50 MW Building10	26.0
Lithium Ion 50 MW Building11	26.3
Lithium Ion 50 MW Building12	26.7
Lithium Ion 50 MW Building13	26.4
Lithium Ion 50 MW Building14	26.1
Lithium Ion 50 MW Building15	24.6
Lithium Ion 50 MW Building16	24.3
Lithium Ion 50 MW Building17	24.0
Lithium Ion 50 MW Building18	23.8
Lithium Ion 50 MW Building19	23.5
Lithium Ion 50 MW Building20	23.2
O&M HVAC	-0.2
Substation	16.6
Transmission Line 1	-16.4
Transmission Line 2	-11.1
Transmission Line 3	-8.4

5	1.Fl	32.0	0.0

Additional Lithium Ion 50 MW Building21	14.7
Additional Lithium Ion 50 MW Building22	15.0
Additional Lithium Ion 50 MW Building23	14.3
Additional Lithium Ion 50 MW Building24	14.5

Additional Lithium Ion 50 MW Building25	15.2
Additional Lithium Ion 50 MW Building26	14.8
Additional Lithium Ion 50 MW Building27	14.2
Additional Lithium Ion 50 MW Building28	15.0
Additional Lithium Ion 50 MW Building29	14.9
Additional Lithium Ion 50 MW Building30	14.4
Additional Lithium Ion 50 MW Building31	14.5
Additional Lithium Ion 50 MW Building32	14.7
Additional Lithium Ion 50 MW Building33	15.5
Additional Lithium Ion 50 MW Building34	15.6
Additional Lithium Ion 50 MW Building35	15.8
Additional Lithium Ion 50 MW Building36	16.2
Additional Lithium Ion 50 MW Building37	16.0
Additional Lithium Ion 50 MW Building38	15.3
Battery Storage1	13.9
Battery Storage2	14.4
Battery Storage3	14.2
Battery Storage4	13.8
Battery Storage5	13.6
Battery Storage6	14.1
Battery Storage7	13.8
Battery Storage8	15.0
Battery Storage9	14.8
Lithium Ion 50 MW Building1	16.5
Lithium Ion 50 MW Building2	16.3
Lithium Ion 50 MW Building3	16.1
Lithium Ion 50 MW Building4	16.0
Lithium Ion 50 MW Building5	15.8
Lithium Ion 50 MW Building6	15.6
Lithium Ion 50 MW Building7	15.5
Lithium Ion 50 MW Building8	15.6
Lithium Ion 50 MW Building9	15.8
Lithium Ion 50 MW Building10	16.0
Lithium Ion 50 MW Building11	16.1
Lithium Ion 50 MW Building12	16.3
Lithium Ion 50 MW Building13	16.5
Lithium Ion 50 MW Building14	16.4
Lithium Ion 50 MW Building15	15.3
Lithium Ion 50 MW Building16	15.1
Lithium Ion 50 MW Building17	15.0
Lithium Ion 50 MW Building18	14.8
Lithium Ion 50 MW Building19	14.6
Lithium Ion 50 MW Building20	14.4
O&M HVAC	-10.2
Substation	7.4
Transmission Line 1	-25.2
Transmission Line 2	-20.2
Transmission Line 3	-18.5
6 1.Fl 29.5 0.0	
Additional Lithium Ion 50 MW Building21	12.4
Additional Lithium Ion 50 MW Building22	12.7
Additional Lithium Ion 50 MW Building23	12.1
Additional Lithium Ion 50 MW Building24	12.3
Additional Lithium Ion 50 MW Building25	12.8
Additional Lithium Ion 50 MW Building26	12.5

Additional Lithium Ion 50 MW Building27	11.9
Additional Lithium Ion 50 MW Building28	12.6
Additional Lithium Ion 50 MW Building29	12.5
Additional Lithium Ion 50 MW Building30	12.1
Additional Lithium Ion 50 MW Building31	12.2
Additional Lithium Ion 50 MW Building32	12.3
Additional Lithium Ion 50 MW Building33	13.0
Additional Lithium Ion 50 MW Building34	13.1
Additional Lithium Ion 50 MW Building35	13.2
Additional Lithium Ion 50 MW Building36	13.5
Additional Lithium Ion 50 MW Building37	13.4
Additional Lithium Ion 50 MW Building38	12.8
Battery Storage1	11.5
Battery Storage2	11.9
Battery Storage3	11.6
Battery Storage4	11.3
Battery Storage5	11.0
Battery Storage6	11.4
Battery Storage7	11.1
Battery Storage8	12.3
Battery Storage9	12.1
Lithium Ion 50 MW Building1	14.0
Lithium Ion 50 MW Building2	13.8
Lithium Ion 50 MW Building3	13.7
Lithium Ion 50 MW Building4	13.5
Lithium Ion 50 MW Building5	13.4
Lithium Ion 50 MW Building6	13.3
Lithium Ion 50 MW Building7	13.0
Lithium Ion 50 MW Building8	13.2
Lithium Ion 50 MW Building9	13.3
Lithium Ion 50 MW Building10	13.5
Lithium Ion 50 MW Building11	13.6
Lithium Ion 50 MW Building12	13.7
Lithium Ion 50 MW Building13	14.1
Lithium Ion 50 MW Building14	14.0
Lithium Ion 50 MW Building15	13.0
Lithium Ion 50 MW Building16	12.9
Lithium Ion 50 MW Building17	12.7
Lithium Ion 50 MW Building18	12.6
Lithium Ion 50 MW Building19	12.5
Lithium Ion 50 MW Building20	12.3
O&M HVAC	-12.7
Substation	5.2
Transmission Line 1	-27.3
Transmission Line 2	-22.4
Transmission Line 3	-21.1