WaterSMART Grants
Water and Energy Efficiency Grants

Division Well Field Solar Project

Final Project Report

Agreement # R17AP00124
City of Big Bear Lake
Department of Water and Power
41972 Garstin Drive / P.O. Box 1929
Big Bear Lake, CA 92315-1929
September 27, 2019

1. Recipient Information:	
Recipient Name: (Name, contact person, address and phone number)	City of Big Bear Lake Department of Water and Power (DWP) Reginald A. Lamson, General Manager (909) 866-5050 ext. 201 41972 Garstin Drive / P.O. Box 1929 Big Bear Lake, CA 92315-1929
Project Name:	Division Well Field Solar Project
Assistance Agreement No:	R17AP00124
Date of Award: (Month, Year)	September 22, 2017
Estimated Completion Date (Month, Year)	June 30, 2019
Actual Completion Date: (Month, Year)	June 25, 2019

2. Final Funding Information	**Funding Amount**
Non-Federal Entities	$719,834.00
1.	
2.	
3.	
Non-Federal Subtotal:	$719,834.00
Other Federal Entities	
1.	
2.	
3.	
Other Federal Subtotal:	
Requested Reclamation Funding:	$293,431.00
Total Project Funding:	$1,013,265.00

3. One Paragraph Project Summary:

The DWP used the grant funds to design and construct the Division Well Field Solar Project (Project) which provides power to five Division Well Pumping Plants through the construction and installation of 682 ground mounted solar modules. The five Division Well Pumping Plants provide a significant portion of DWP's water supply. The annual energy cost incurred to power the five Well Pumping Plants is approximately $136,000, which funds approximately 450,000 KWh per year. The Project provides renewable energy to offset the annual energy required to power the five Well Pumping Plants.

4. Final Project Description: *Briefly describe components of the project and the work completed, including each element of the scope of work and the work completed at each stage of the project. Please include maps, sketches, and/or drawing of the features of the completed*

project, as appropriate. In addition, please describe any changes in the project scope.

The final completed project included the following: site survey, solar panel layout, solar panel foundation design, designed net metering service for five well pumping plants and one booster pumping plant, completed engineering, site grading, procurement of all materials, installed fencing in compliance with the City of Big Bear Lake's Planning Commission recommendations, installed I-beam posts and constructed solar panel racks, installed electrical conduits and conductors, constructed pile foundation, installed 800 AMP net meter electrical service and installed 682 ground mounted solar modules per the design.

5. Accomplishment of Project Goals: *Describe the goals and objectives of the project and whether each of these was met. Where appropriate, state the reasons why goals and objectives were not met, and describe any problems or delays encountered in completing the project. Please include whether or not the project was completed within cost.*

The goals and objectives of the Division Well Field Solar Project are the following:
(1) Produce renewable energy to offset annual energy used
(2) Reduce DWP's annual operating energy cost
(3) Operate the Division Well Pumping Plants more efficiently
(4) Benefit the ratepayers
(5) Assist the Bear Valley Electric Services (BVES) meet the California state-mandate to provide renewable energy to their customers
(6) Assist BVES defer costly electrical system facilities upgrades by removing a significant electrical load from their system

All of the above goals were met, the project was completed on time and under budget.

6. Discussion of Amount of Water Conserved, Marketed or Better Managed: *In responding to the questions set forth below, Recipients should rely on the best data or information available. Actual field measurements should be used whenever possible (e.g., baseline data or post-project data derived from measuring devices, diversion records, seepage tests, etc.) Where actual field measurements are not available, water savings (or amounts marketed or better managed) may be estimated based on studies, other similar improvement projects, or anecdotal evidence.*

A. Recipient's total water supply (average, annual, available water supply in acre-feet

per year):

Well Sites	Average AFY Produced (2015-2018)
Division #2 & #5 Wells	47.68 AFY
Division #6 Well	203.34 AFY
Division #7 & #8 Wells	180.04 AFY

B. Amount of water conserved, marketed or better managed as a result of the project (in acre-feet per year): The water better managed as a result of this Project is 431.06 AFY. DWP's annual average water production is 2,100 AF. The main benefit of this Project is it reduces DWP's power consumption from the grid by over 20% or 450,000 kWh per year. Many of the power plants that provide power to the grid are cooled with cooling water. The project reduces power demand from the grid, therefore reducing cooling water demand. The quantity of water saved is difficult to quantify because of power variables but we know, there is a reduced cooling water demand as a result of the project.

C. Describe how the amounts stated in response to 6.B were calculated or estimated:
In responding to this question, please address (1) – (3) below.

(1) Describe the information/data being relied on to calculate/estimate the project benefits. State how that data/information was obtained, if appropriate. Provide any other information necessary to explain how the final calculation/estimate of project benefits was made.

According to the Energy Audit prepared by Water Systems Consulting, Inc., a 275 kW solar PV system is expected to provide sufficient electrical generation to meet the desired 459,000 kWh annually. Based on the first two months of solar power production, the solar project is on pace to exceed the estimated power production by 10%.

(2) As appropriate, please include an explanation of any concerns or factors affecting the reliability of the data/information relied on.

No concerns regarding the reliability of the data or information relied on.

(3) Attach any relevant data, reports or other support relied on in the calculation/estimate of project benefits, if available. Please briefly describe the data/information attached, if any.

Energy Audit and Feasibility Study - Attachment A

D. Use of Conserved Water: *Please explain where the water saved, marketed, or better managed, as a result of the project is going (e.g. used by the recipient, in stream flows, available to junior water users, etc.)*

Many of the power plants that supply power to California's power grid receive cooling water directly or indirectly from the State Water Project. Reducing power demand on the grid with this solar project, reduces cooling water demand on the State Water Project.

E. Future tracking of project benefits: *Please state whether and how the recipient plans to track the benefits of the project (water saved, marketed or better managed) in the future. If no actual field measurements are currently available to support the estimate of project benefits in 6.B., please state whether actual field measurements will become available in the future. If so, please state whether the Recipient is willing to provide such data to Reclamation on a voluntary basis once it is available.*

As of September 27, 2019, the due date for the final report on the Project, the Project has only been operational for three months. Based on the solar energy output and energy necessary to power the five Well Pumping Plants at the Division Field, the Project is expected to produce the results stated in the Energy Audit. Actual field measurements will become available in the future and the DWP is more than willing to provide the data to the USBR once available.

7. Discussion of Amount of Renewable Energy Added: *If your project included the installation of a renewable energy component, please describe the amount of energy the system is generating annually. Please provide any data/reports in support of this calculation.*

Based upon the Feasibility Study prepared in November 2017 and the Energy Audit prepared in November 2018 for the Project, the DWP desired the solar PV system electricity output to be 459,000 kWh which is the approximate annual energy usage to run the five water production wells at the Division Well Field. The Energy Audit stated that a 275-kW solar PV system would provide sufficient electrical generation to meet the desired 459,000 kWh annually.

The power production during the first two months of operation exceed expectations by 10%. The solar project is on pace to produce about 500,000 kWh annually.

8. Describe how the project demonstrates collaboration, stakeholder involvement or the formation of partnerships, if applicable: *Please describe the collaboration involved in the project, and the role of any cost-share or other types of partners. If there were any additional entities that provided support (financial or otherwise), please list them.*

In addition to the grant funding received from the USBR, the DWP worked with the California Energy Commission (CEC) to obtain a low-interest rate loan to fund the balance of the Project. According to Loan Agreement 003-17-ECD, the CEC agreed to loan the DWP up to $1,141,000 at 1% interest for the installation of a 275 kW PV solar system at city owned existing groundwater wells field. The actual CEC loan amount is $771,879.61. The estimated annual energy cost savings is $136,000 and the simple payback is about six (6) years.

Also, the DWP worked with and negotiated a net metering service agreement with the BVES to most efficiently offset the energy produced by the Project against the energy used to run the five Well Pumping Plants. Moreover, the BVES benefits from the Project in two ways: (1) the California state mandate to provide renewable energy to their customers; and (2) deferred costly electrical system facilities upgrades by removing a significant electrical load from the BVES system.

9. Describe any other pertinent issues regarding the project:

There were a couple of unexpected issues to address during construction of the Project. Additional archaeological and cultural monitors were required to ensure that if any artifacts were discovered during the installation of the electrical conduits, the artifacts were properly handled. The archaeological and cultural monitors were on-site during conduit installation (when excavations exceed three (3) feet in dept) and one was item was found. It was properly documented.

10. Feedback to Reclamation regarding the WaterSMART Program: *Please let us know if there is anything we can do to improve the WaterSMART program in general, including the process for applying for or completing a WaterSMART project. Your feedback is important to us.*

Our experience in applying for WaterSMART grants is that the Funding Opportunity Announcements provide clear and detailed description of the grant opportunities including example eligible projects and specific application requirements. When we have had the need to ask questions, the USBR contacts provided in the Announcements have been timely responsive and helpful.

11. Attachments: *Please attach the following*

- **Any available data or information relied on in responding to paragraph 7, above;** See Attachment A - Energy Audit and Feasibility Study
- **A map or illustration showing the location of the recipient's facilities (see paragraph 4, above);** See Attachment B - Location Map
- **Maps, sketches, and/or drawings of the features of the completed project, as appropriate (see paragraph 5, above);** See Attachment C - Drawings
- **Representative before and after photographs, if available;** See Attachment D - Photos
- **A table showing the total expenditures for the completed project (please see Sample Final Project Costs Table, below).** See Attachment E - Final Cost Table

NOTE: This Final Report Format is a suggested format only; the recipient may use its own form or format. A report in this form will satisfy the requirements of 43 CFR 12.80 or 12.951, as applicable. Failure to submit timely and acceptable progress reports places a recipient in noncompliance with the terms and conditions of the assistance agreement. Noncompliance can result in the withholding of assistance payments, suspension or termination of the assistance award and may delay further awards.

Technical Memorandum

WSC
WATER SYSTEMS CONSULTING, INC.

Date: 11/12/2018

To: Mr. Reggie Lamson, PE, PLS
General Manager
City of Big Bear Lake Department of Water and Power
P.O. Box 1929
Big Bear Lake, CA 92315

Phone: (909) 866-5050

Prepared by: Lianne Westberg, P.E.

Reviewed by: Dylan Wade, P.E.

Project: Division Well Field Design-Build Solar Project

SUBJECT: **ENERGY AUDIT**

The City of Big Bear Lake Department of Water and Power (BBLDWP) intends to procure a design-builder to design and construct a solar photovoltaic (PV) system to offset the energy use of the Division Well Field. The purpose of this memorandum is to provide a brief overview of the existing energy use of the Division Well Field and present an economic analysis of the proposed solar project.

1 Introduction

The Division Well Field consists of five (5) water production wells, however only four (4) of the wells are in regular use: Division Well #2, Division Well #6, Division Well #7 and Division Well #8. BBLDWP seeks to offset annual energy costs of operating these four wells through implementation of a 275 kW ground-mounted solar PV.

The Division Well Field Solar Project Feasibility Study (provided as Attachment A and hereafter referred to as Feasibility Study) was prepared in November 2017, to support BBLDWP's loan application to the California Energy Commission (CEC). The Feasibility Study summarizes existing energy usage, energy savings, and project costs, and is referenced throughout this memorandum.

2 Basis of Design

Per the Feasibility Study, BBLDWP desires the solar PV system electricity output to be 459,000 kWh during the first year. This estimate of the anticipated energy usage of the Division Well Field is conservative from an operational standpoint. The desired PV system design output of 459,000 kWh is about 7% more than the 2015 energy usage for the four wells which will allow for variation in water system operations. The 2015 energy use of the four wells and the design PV output are shown in Table 1. A 275 kW solar PV system is expected to provide sufficient electrical generation to meet the desired 459,000 kWh annually (Feasibility Study, 2017).

Table 1. 2015 Energy Usage and Basis of Design

	2015 Electricity Usage (kWh/year)
Division Well #2	45,492
Division Well #6	183,625
Division Well #7	88,287
Division Well #8	111,633
Total Electricity Usage	429,037
Basis of Design – Desired Solar PV Output	459,000

Electricity for the Division Well Field is provided by Bear Valley Electric Service (BVES). Each well has a separate electric meter and each well is currently on BVES rate schedule A-2 (General Service – Medium). The average cost of electricity is $0.30 per kWh based on 2015 data (Feasibility Study, 2017).

BBLDWP has been in close coordination with BVES regarding this project and intends to utilize a net energy metering (NEM) agreement to connect each well to its respective solar PV system. BVES has indicated that BBLDWP should plan for monthly bill true-ups (as opposed to annual bill true-ups) under the NEM agreement:

- If BBLDWP uses more electricity in a month than the solar PV system produces, then BBLDWP will pay approximately $0.30 per kWh for electricity used in excess of what is produced by the solar PV system;
- If BBLDWP's solar PV system produces more electricity than is consumed in a month, then BVES will pay BBLDWP $0.07 per kWh of excess electricity generated.

Figure 1 below shows 2015 monthly energy usage data, as well as the desired solar PV output on a monthly basis (7% more than 2015 usage). Note that BVES is seeking approval to allow annual bill true-ups for BBLDWP's project (which is financially preferable to monthly true-ups); however monthly bill true-ups are used for the economics analysis in order to be conservative.

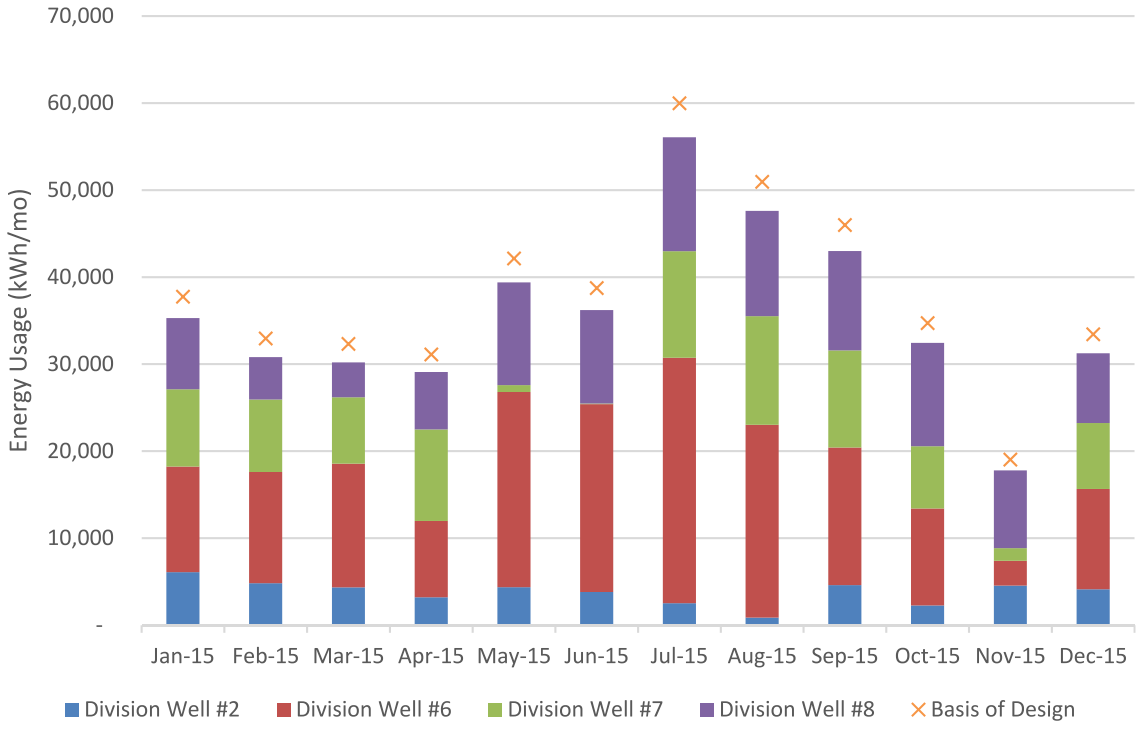


Figure 1. 2015 Energy Usage and Basis of Design – By Month

3 Solar PV Generation

The 275 kW solar PV system is estimated to generate approximately 459,000 kWh in the first year (Feasibility Study, 2017). Understanding monthly solar production is important since BBLDWP needs to plan for monthly bill true-ups under NEM. Estimates from the National Renewable Energy Laboratory's PVWatts Calculator were used to apportion electricity generation to each month throughout the year. PVWatts uses criteria including PV system size, tilt, and location to estimate monthly electricity generation based on typical-year weather. The assumed solar PV electricity generation on a monthly basis for the first year of operation is summarized in Table 2 and Figure 2.

Table 2. Solar PV System Electricity Generation – By Month

Month	Percentage of Annual Energy Generation	Assumed Solar PV Generation (kWh/mo)
Jan	7%	33,701
Feb	7%	32,335
Mar	9%	41,192
Apr	9%	42,476
May	10%	44,683
Jun	9%	42,081
Jul	8%	38,476
Aug	9%	39,349
Sep	8%	38,594
Oct	9%	41,035
Nov	7%	33,874
Dec	7%	31,204
Total	100%	459,000

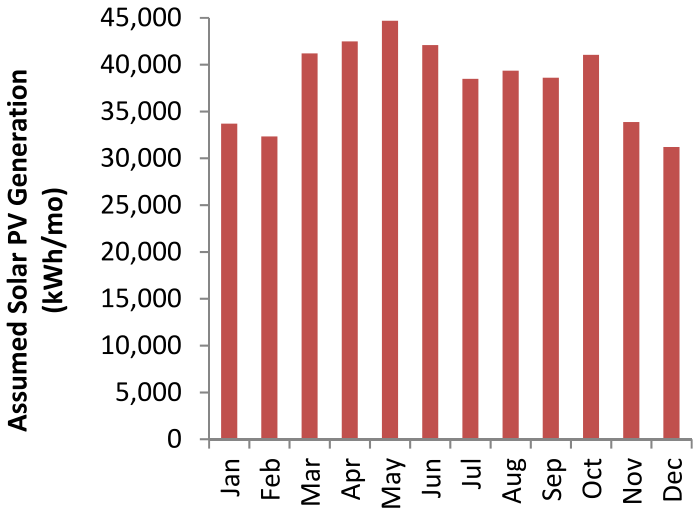


Figure 2. Assumed Solar PV System Electricity Generation During Year 1

4 Economic Analysis

The total project cost is estimated to be $1,441,000, which includes the solar PV system, interconnection, fencing, site work, and engineering (Feasibility Study, 2017). The project is being funded with a United States Bureau of Reclamation (USBR) grant ($300,000 grant) and a low-interest CEC loan ($1,141,000 loan). The project economics were evaluated by calculating net present value (NPV) using the following assumptions:

1. BVES will apply monthly bill true-ups under NEM:
    a. When BBLDWP uses more energy than the solar PV system produces in a month, BBLDWP will pay $0.30 per kWh for the electricity used in excess of what is produced by the solar PV system;
    b. When BBLDWP's solar PV system produces more electricity than is consumed in a month, then BVES will pay BBLDWP $0.07 per kWh of excess electricity generated.
2. BVES electricity rates for purchased electricity ($0.30/kWh) are assumed to escalate at 3% annually.
3. BVES credits for excess electricity generated ($0.07/kWh) are assumed to be fixed (not escalated).
4. Annual solar PV energy degradation rate is assumed be 0.5% of the first year production.
5. Annual operation and maintenance costs (O&M) are assumed to be $18 per kW during the first year and escalate at 3% per year.
6. The inverters are assumed to be replaced at year 15 and to have a cost of $0.20/W at Year 1; cost at Year 15 is calculated assuming 3% per year escalation.
7. CEC loan annual payment is assumed to be $120,164.80 for 10 years based on the CEC loan agreement.
8. The PV system life is assumed to be 25 years. At 25 years, the PV system is assumed to reach the end of its useful life and have zero salvage value.
9. The discount rate is assumed to be 5%.

The resulting NPV of the project over 25 years is approximately $1,258,000. The cash flow diagram is shown in Figure 3.

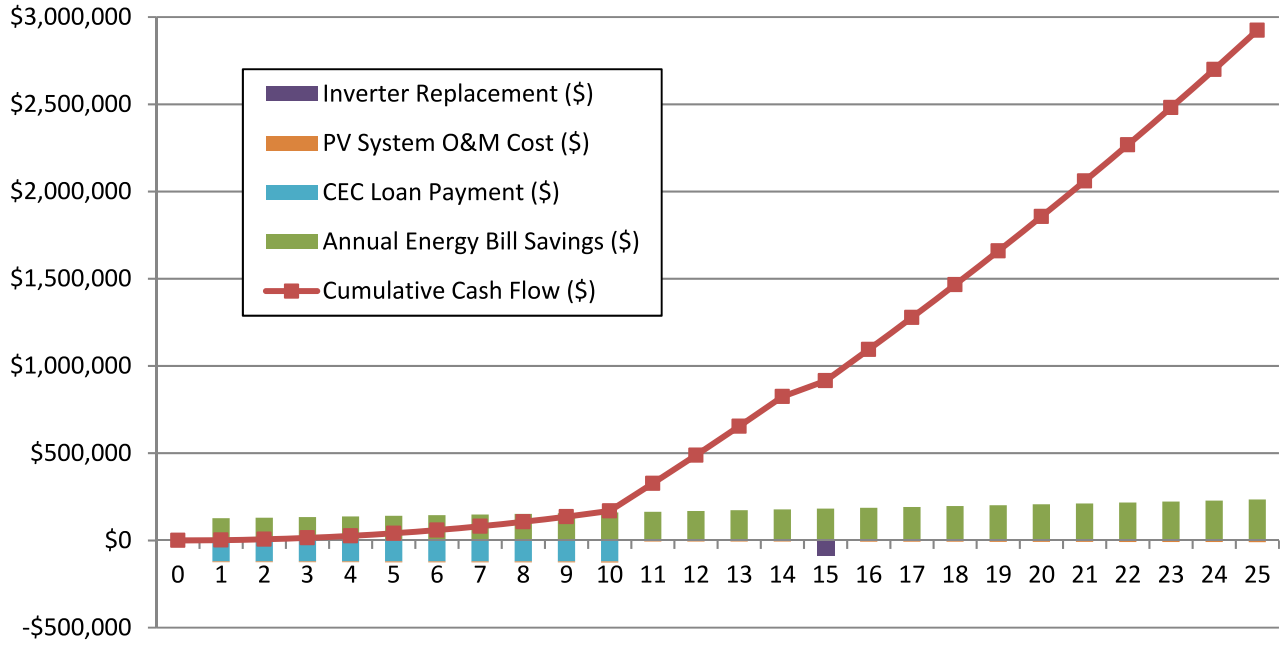


Figure 3. Cumulative Cash Flow

5 Conclusion

The proposed Division Well Field Solar Project has a strong positive NPV and is forecasted to have positive cash flow over the life of the project. These results indicate the project is a cost-effective approach to reducing electricity costs associated with operating the Division Well Field. Additional optimization to align well operation with solar energy production on a monthly basis will further help BBLDWP maximize value of the solar PV project and minimize energy bills.

Date: 11/17/2017

To: Mr. Reggie Lamson, PE, PLS
General Manager
City of Big Bear Lake Department of Water and Power
PO Box 1929
Big Bear Lake, CA 92315

Prepared by: Spencer Waterman

Reviewed by: Christy Stevens, P.E., Lianne Westberg, P.E.

Project: California Energy Commission Loan Preparation Services

SUBJECT: **REVISED DIVISION WELL FIELD SOLAR PROJECT FEASIBILITY STUDY**

The purpose of this Technical Memorandum (TM) is to present the results of the Big Bear Lake Department of Water and Power's (DWP's) Division Well Field Solar Project (Project) Feasibility Study. The Project will install a 275 kilowatt (kW) solar system to offset the electricity usage of DWP's Division Well Field, which is comprised of five groundwater wells. The following memorandum provides the project description, summarizes baseline energy usage and proposed energy savings, and outlines project cost, payback and schedule.

1 Project Description

The Project includes the installation of solar panels and facilities to power the DWP's five Division Well Pumping Plants (Division Well Field) located west of Division Drive between the Convention Center, Big Bear Airport and Baker Pond (Figure 1-1). The Division Well Field (wells 2, 5, 6, 7 and 8) provides a significant portion of DWP's domestic water supply. DWP purchases power from Bear Valley Electric Service (BVES) to operate the Division Well Field. Based on 2015 data, the projected annual electricity demand of the Division Well Field is approximately 459,000 kilowatt hours (kWh), which costs DWP about $136,600. The five wells' electrical service will remain the same and the solar system will tie in with its own meter near the BVES substation.

DWP is proposing to design and construct solar panels to provide renewable solar energy to offset the annual energy required to power the Division Well Field. The proposed facilities include a 275 kilowatt (kW) system, minor site grading, site fencing, and net-metering facilities connected to BVES' facilities. The site will be securely enclosed with a 6-foot high chain link fence with slats to minimize the visual impact of the facility and the solar panels will be set approximately three feet above finish grade. The proposed Project is located on a site that is suitable for solar development with minimal impacts. The Project will be designed and constructed to be in compliance with the environmental documents that were approved by the DWP Board of Commissioners (DWP Board) and filed on July 29, 2016. The DWP Board adopted a categorical exemption on July 26, 2016 and filed a Notice of Exemption on July 29, 2016 for the proposed Project (Appendix A). There are no required permits anticipated for this Project.

The DWP Board believes that by reducing costs and creating a long-term sustainable energy alternative this will be a beneficial project for the community. With additional funding from the California Energy Commission (CEC), in addition to a $300,000 grant from the US Bureau of Reclamation (USBR), DWP is ready to proceed with the Project.

Figure 1-1. Project Location

The Project is located adjacent to the Big Bear Airport so it is important to use non-reflective material to eliminate glare from the panels that could distract pilots when entering or exiting the airport. BBLDWP has reviewed the Project with airport personnel and they had no objections. The proposed solar panels will be constructed of a non-reflective type material and will be placed on ground-mounted stands approximately three feet above finished grade.

The angle of the panels will be relatively steep at approximately 30 degrees. Through past experience with solar installations in the Bear Valley, DWP has learned that when steeply angled panels get covered with snow they are essentially self-cleaning; as the sun hits the panels the snow slides off due to gravity. The DWP's existing solar panels usually self-clean within a day or two after a snowstorm. Winter storms and summer thunder storms essentially eliminate the need to manually clean the solar panels, saving staff-time, money, and water. The existing solar panels, installed on the BBLDWP main office, have only been cleaned twice in a three-year period.

Solar panels at the Division Well Field will be connected to inverters that will convert the generated direct current power into alternating current power. This will then be delivered to BVES via one master meter. BVES has an existing electrical substation connected to the Division Well Field site, so connection to the BVES system will be straightforward and have minimum impact on the environment. BVES and BBLDWP are in the process of developing a net metering type agreement in which BVES will create an account that includes the Division Well Field. The power generated by the Project will be credited towards this new account.

There are very few residential homes in the vicinity of the Project. However, as previously mentioned, the Project will be fenced with a six-foot high chain link fence with green slants to minimize the visual impact of the project to the public. The fencing will also reduce potential vandalism that may occur to the solar panels and Division Well Field.

2 Baseline Energy Use

As mentioned previously, it is projected that it would cost $136,600 to purchase power from BVES for the Division Well Field based on 2015 data, which corresponds to approximately 459,000 KWh per year of energy usage. Figure 2-1 shows the historical monthly energy usage and costs for the Division Well Field for 2015 and 2016. The average electricity rate based on 2015 data is $0.30/kWh. Tables of monthly energy usage and cost for 36 months are available in Appendix B.

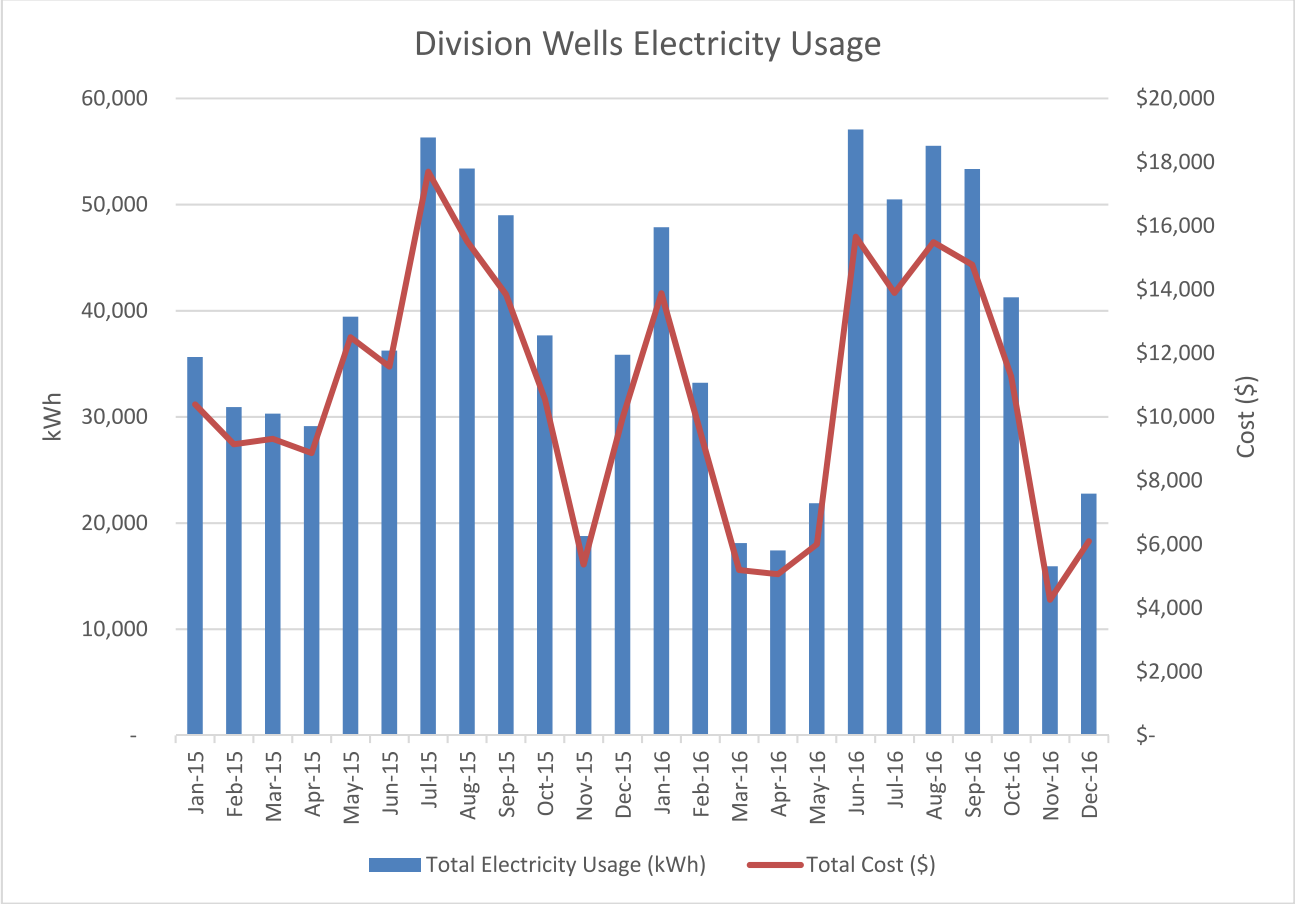


Figure 2-1. Historical Energy Usage

3 Anticipated Energy Usage and Savings

DWP has a 51.85 kW, 170 panel solar system at its main office that produces approximately 86,700 kWh per year, 1,672 kWh/kW installed, or 510 kWh per panel. Each of the panels in the system has a peak output capacity of 305 watts (W). Assuming this Project would use the same solar panels with the same output per panel, it is estimated that the proposed Project will require an approximately 275 kW system (900 solar panels) to produce the 459,000 kWh per year needed for the Project, reducing DWP's electrical usage by 100% at the Division Well Field. The system sizing will be optimized and refined, including optimizing economics based on BVES' electric rate schedule, once an agreement is finalized with BVES and bid packages are solicited from contractors.

4 Project Costs and Budget

DWP's estimate to complete the Project is provided Table 4-1.

Table 4-1. Project Costs

Budget Item Description	$/Unit	Quantity	Quantity	Total Cost
Labor and Fringe Benefits				$0
Travel				$0
Equipment				$0
Supplies and Materials				$0
Contractual/Construction				
Panels including inverter	$1,174	900	Panels	$1,056,825
BVES connection			Lump Sum	$10,000
Fencing	-	1,200 LF	Lump Sum	$35,000
Grading and Paving	-	3,381 SY	Lump Sum	$150,000
Engineering	-	-	Lump Sum	$65,000
Other Costs				
Construction Contingency (10%)	-	-	Lump Sum	$124,183
Total Direct Costs				**$1,441,008**
Other Funding Sources				
USBR Grant	-	-		-$300,000
Total Loan Amount				**$1,141,008**

As shown in Table 4-2, assuming the Project saves $136,600 per year due to reduced energy usage, the simple payback would be approximately 8 years. The solar panels are guaranteed for twenty years, making the project a financially and environmentally sound investment that benefits the ratepayers by reducing operating costs from $0.30/kWh to $0.16/kWh. Note that the estimates presented here are conservative as they do not include escalation of electricity costs. In reality, the project payback will be less than 8 years given anticipated electricity rate increases.

Table 4-2. Simple Payback Estimate

Project Loan Amount	$1,141,008
Annual cost savings from Project	$136,600
Years to Project payoff	8
Project Total $/kWh	$0.16

5 Project Schedule

DWP estimates that the Project will take 12-18 months to complete.

Appendix A. Notice of Exemption

CLERK OF THE
BOARD OF SUPERVISORS
2016 JUL 29 AM 9:40
COUNTY OF SAN BERNARDINO
CALIFORNIA

Notice of Exemption
Big Bear Lake Department of Water and Power

To: ☐ Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

☒ San Bernardino County
Clerk of the Board
385 North Arrowhead Avenue
San Bernardino, CA 92415

From: City of Big Bear Lake
Department of Water and Power
41972 Garstin Drive
Big Bear Lake, CA 92315

Project Title: Big Bear Department of Water And Power Solar Field Development at Division Well Field

Project Location - Specific: (address of Division well site)

Project Location - City: City of Big Bear Lake

Project Location - County: San Bernardino

Description of Nature, Purpose, and Beneficiaries of Project The DPW plans to install approximately 0.6 acre of solar power on its existing 3.5 acre well field site as supplemental power to the existing pumping facilities.

Name of Public Agency Approving Project: Big Bear Department of Water and Power

Name of Person or Agency Carrying Out Project: Big Bear Department of Water and Power

Exempt Status: (check one)
- ☐ Ministerial (Sections 21080(b)(1); 15268)
- ☐ Declared Emergency (Sections 21080(b)(3); 15269(a))
- ☐ Emergency Project (Sections 21080(b)(4); 15269(b))
- ☒ Categorical Exemption (Sections 21080(b)(9); 21084; 15301)
- ☐ Statutory Exemption (Sections 21080(b)(10); 15275(a))

Reasons why project is exempt: The proposed project qualifies as a Class 1 Exemption as contained in Guidelines Section 15301, "Existing Facilities" in that it will modify the existing electrical power source to service the well field by connecting the electrical power to a series of solar panels.The Project has no impacts and does not trigger an exception. See attached analysis.

Lead Agency Contact Person: Reggie Lamson
Area Code/ Telephone/Ext: (909) 866-5050

Signature: Reggie A. Lamson
Title: General Manager

Date: 7-28-16

Date received for filing at OPR: _____

DATE FILED & POSTED
Posted On: 7/29/16
Removed On: 9/10/16
Receipt No: 36-072916-4666

State of California - Department of Fish and Wildlife

2016 ENVIRONMENTAL FILING FEE CASH RECEIPT

DFW 753.5a (Rev. 12/15/15) Previously DFG 753.5a

Print | StartOver | Finalize&Email

RECEIPT NUMBER:
36 — 07/29/16 — 486

STATE CLEARINGHOUSE NUMBER (If applicable)
N/A

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY.

LEAD AGENCY	LEAD AGENCY EMAIL	DATE
City of Big Bear Lake	N/A	07/29/16

COUNTY/STATE AGENCY OF FILING	DOCUMENT NUMBER
San Bernardino	N/A

PROJECT TITLE
Big Bear Department of Water and Power Solar Field Development at Division Well Field

PROJECT APPLICANT NAME	PROJECT APPLICANT EMAIL	PHONE NUMBER
Big Bear Department of Water and Power	N/A	(909) 866-5050

PROJECT APPLICANT ADDRESS	CITY	STATE	ZIP CODE
41972 Garstin Drive	Big Bear Lake	CA	92315

PROJECT APPLICANT (Check appropriate box)
☐ Local Public Agency ☐ School District ☑ Other Special District ☐ State Agency ☐ Private Entity

CHECK APPLICABLE FEES:

☐ Environmental Impact Report (EIR)	$3,070.00	$	0.00
☐ Mitigated/Negative Declaration (MND)(ND)	$2,210.25	$	0.00
☐ Certified Regulatory Program document (CRP)	$1,043.75	$	0.00

☑ Exempt from fee
- ☑ Notice of Exemption (attach)
- ☐ CDFW No Effect Determination (attach)

☐ Fee previously paid (attach previously issued cash receipt copy)

☐ Water Right Application or Petition Fee (State Water Resources Control Board only)	$850.00	$	0.00
☑ County documentary handling fee		$	50.00
☐ Other		$	

PAYMENT METHOD:
☑ Cash ☐ Credit ☐ Check ☐ Other TOTAL RECEIVED $ 50.00

SIGNATURE	AGENCY OF FILING PRINTED NAME AND TITLE
x Melissa Crowell	Melissa Crowell, Deputy Clerk

ORIGINAL - PROJECT APPLICANT | COPY - CDFW/ASB | COPY - LEAD AGENCY | COPY - COUNTY CLERK | DFW 753.5a (Rev. 12/15/15)

Appendix B. BVES Electricity Billing Data

	FY 14/15											
	July	August	September	October	November	December	January	February	March	April	May	June
DIV#6 WELL DIV/AEROPLANE	$ 5,830.08	$ 6,641.29	$ 6,399.23	$ 5,811.35	$ 1,405.24	$ 1,697.23	$ 3,589.69	$ 3,842.87	$ 4,468.08	$ 2,637.33	$ 7,173.58	$ 6,951.12
DIV #5 W/DIVISION/AEROP	79.55	79.79	84.92	77.00	83.33	136.50	170.46	109.24	96.59	82.45	96.52	76.89
DIVISION WELL #2	3,790.35	2,421.20	3,714.38	2,567.67	1,630.90	1,950.74	1,734.88	1,398.09	1,291.02	978.43	1,320.05	1,149.12
NO SHORE/DIVISION #7	3,729.03	4,582.32	3,356.92	2,902.02	1,485.65	1,703.02	2,562.65	2,379.70	2,257.15	3,219.97	308.36	86.27
DIVISION #8	3,324.73	3,131.20	3,411.77	3,039.16	2,890.01	1,726.75	2,335.39	1,412.33	1,199.20	1,945.17	3,601.46	3,313.42
TOTAL	$ 16,753.74	$ 16,855.80	$ 16,967.22	$ 14,397.20	$ 7,495.13	$ 7,214.24	$ 10,393.07	$ 9,142.23	$ 9,312.04	$ 8,863.35	$ 12,499.97	$ 11,576.82

	FY 15/16											
	July	August	September	October	November	December	January	February	March	April	May	June
DIV#6 WELL DIV/AEROPLANE	$ 9,023.55	$ 6,585.50	$ 4,573.37	$ 3,167.68	$ 815.17	$ 3,260.80	$ 5,169.12	$ 2,897.17	$ 1,345.63	$ 794.94	$ 2,303.95	$ 7,908.79
DIV #5 W/DIVISION/AEROP	151.83	1,577.45	1,626.48	1,429.74	331.85	1,289.57	1,845.46	1,024.52	470.56	321.17	568.53	1,017.27
DIVISION WELL #2	787.25	294.47	1,262.87	658.25	1,258.38	1,159.56	1,098.73	821.22	476.68	782.69	294.48	601.50
NO SHORE/DIVISION #7	3,728.42	3,586.55	3,150.03	1,928.15	451.36	2,067.22	2,971.86	1,644.88	770.05	737.14	584.98	2,830.97
DIVISION #8	4,008.69	3,466.28	3,231.84	3,376.32	2,507.53	2,182.02	2,800.08	3,140.91	2,128.17	2,424.46	2,247.58	3,297.09
TOTAL	$ 17,699.74	$ 15,510.25	$ 13,844.59	$ 10,560.14	$ 5,364.29	$ 9,959.17	$ 13,885.25	$ 9,528.70	$ 5,191.09	$ 5,060.40	$ 5,999.52	$ 15,655.62

	FY 16/17											
	July	August	September	October	November	December	January	February	March	April	May	June
DIV#6 WELL DIV/AEROPLANE	$ 4,386.77	$ 7,808.68	$ 7,620.23	$ 5,726.06	$ 1,574.29	$ 3,027.44	$ 5,025.07	$ 3,524.84	$ 2,446.32	$ 1,521.14	$ 3,261.10	$ 5,475.91
DIV #5 W/DIVISION/AEROP	90.54	76.80	82.49	93.90	87.95	143.08	108.16	151.52	122.06	243.73	77.23	92.35
DIVISION WELL #2	1,322.05	815.31	782.97	251.69	477.94	694.74	831.78	599.51	520.22	282.88	167.84	1,185.47
NO SHORE/DIVISION #7	3,983.67	3,186.97	2,926.04	2,224.04	732.82	1,040.83	1,637.47	1,484.68	681.73	618.78	2,522.08	3,930.43
DIVISION #8	4,111.39	3,600.26	3,365.26	2,979.30	1,385.46	1,191.57	2,299.45	2,106.31	997.36	1,182.41	2,570.18	2,071.19
TOTAL	$ 13,894.42	$ 15,488.02	$ 14,776.99	$ 11,274.99	$ 4,258.46	$ 6,097.66	$ 9,901.93	$ 7,866.86	$ 4,767.69	$ 3,848.94	$ 8,598.43	$ 12,755.35

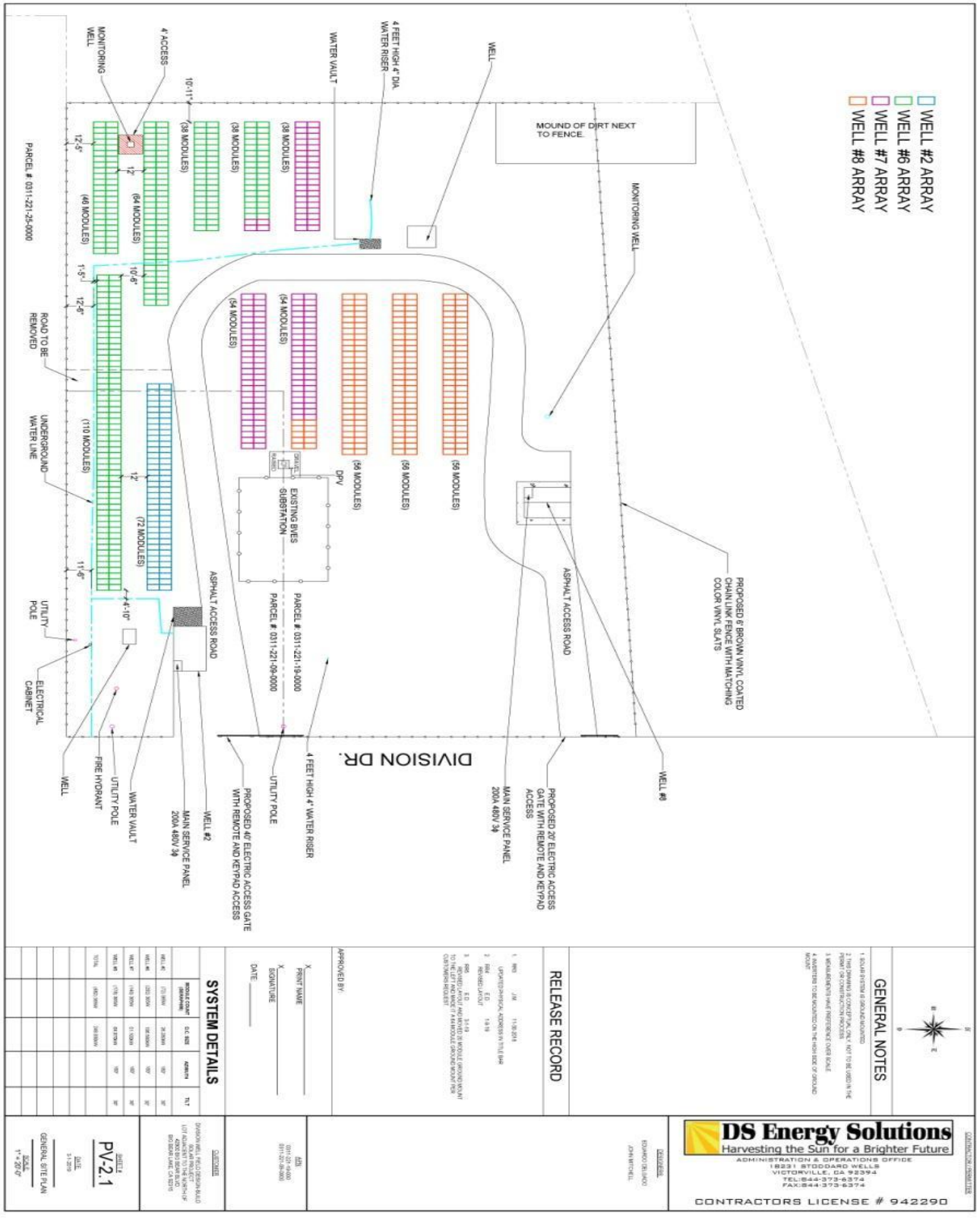
kWh Usage	FY 14/15											
	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15
DIV#6 WELL DIV/AEROPLANE	19,917	22,616	21,764	19,823	5,351	6,176	12,137	12,767	14,226	8,779	22,432	21,586
DIV #5 W/DIVISION/AEROP	41	42	44	40	57	245	356	123	108	41	49	38
DIVISION WELL #2	13,298	8,855	13,118	9,297	6,216	7,203	6,081	4,826	4,336	3,192	4,352	3,809
NO SHORE/DIVISION #7	13,099	15,868	11,958	10,382	5,638	6,253	8,880	8,327	7,626	10,517	794	71
DIVISION #8	11,787	11,159	12,136	10,827	10,582	6,344	8,179	4,878	4,011	6,592	11,807	10,735
Total Electricity Usage (kWh)	58,142	58,540	59,020	50,369	27,844	26,221	35,633	30,921	30,307	29,121	39,434	36,239

kWh Usage	FY 15/16											
	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16
DIV#6 WELL DIV/AEROPLANE	28,208	22,156	15,811	11,149	2,849	11,525	17,235	10,060	4,793	2,691	8,574	28,060
DIV #5 W/DIVISION/AEROP	263	5,779	6,007	5,226	1,005	4,614	6,680	3,588	1,509	913	1,978	3,895
DIVISION WELL #2	2,523	858	4,603	2,254	4,540	4,118	3,873	2,825	1,532	2,645	894	2,184
NO SHORE/DIVISION #7	12,241	12,491	11,152	7,146	1,461	7,581	10,310	5,916	2,633	2,474	2,043	10,673
DIVISION #8	13,085	12,105	11,416	11,892	8,923	8,010	9,768	10,828	7,637	8,699	8,373	12,259
Total Electricity Usage (kWh)	56,320	53,389	48,989	37,667	18,778	35,848	47,866	33,217	18,104	17,422	21,862	57,071

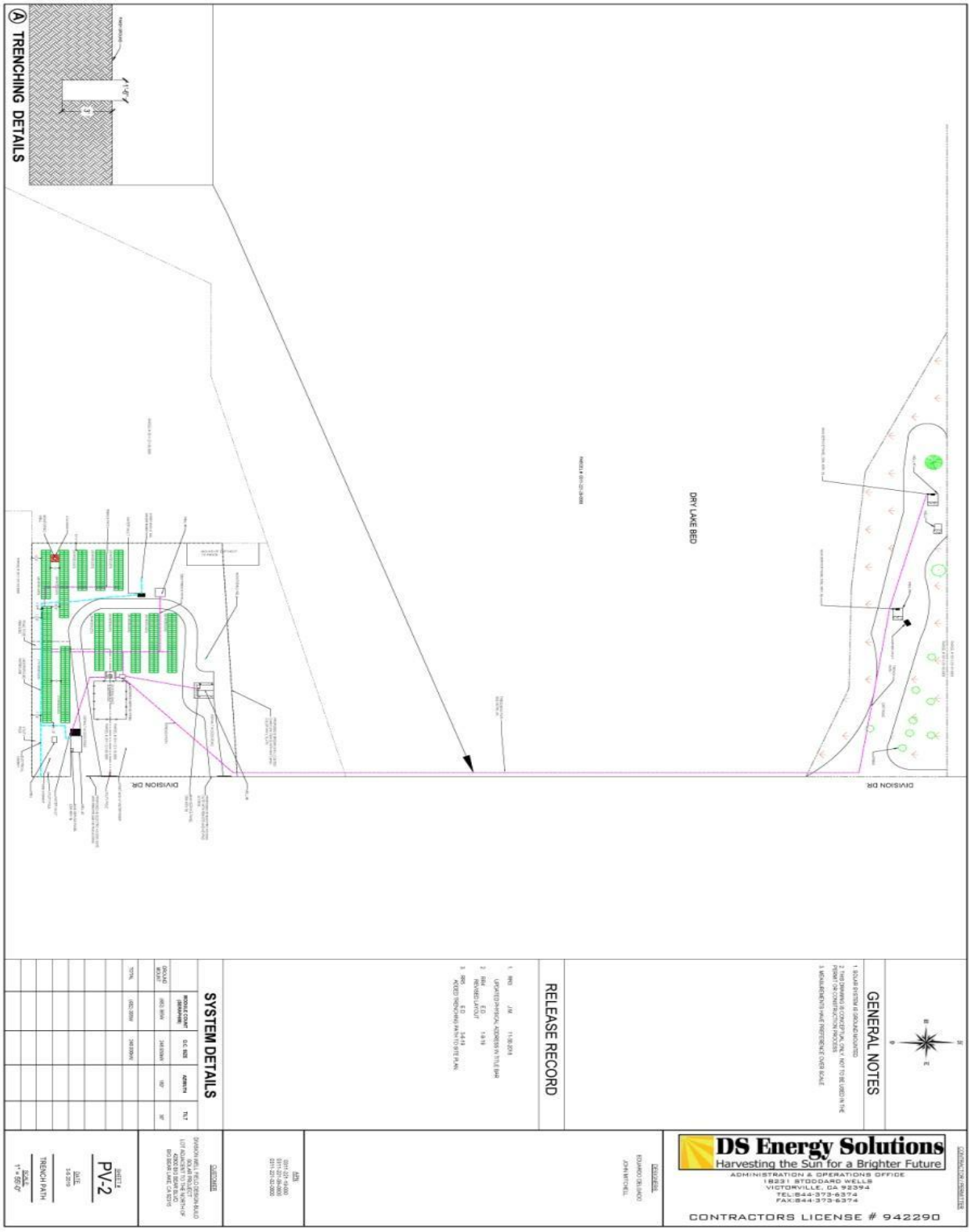
kWh Usage	FY 16/17											
	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
DIV#6 WELL DIV/AEROPLANE	15,528	27,457	26,956	20,496	6,155	11,307	18,315	13,456	9,545	6,104	12,309	20,173
DIV #5 W/DIVISION/AEROP	52	44	48	56	51	306	168	313	236	729	47	61
DIVISION WELL #2	5,112	3,072	2,920	703	1,650	2,568	3,228	2,217	1,915	894	429	4,669
NO SHORE/DIVISION #7	14,680	11,779	10,963	8,720	2,695	3,987	6,635	5,979	2,596	2,310	9,744	14,809
DIVISION #8	15,114	13,181	12,453	11,282	5,371	4,605	9,030	8,535	3,927	4,686	9,911	8,356
Total Electricity Usage (kWh)	50,486	55,533	53,340	41,257	15,922	22,773	37,376	30,500	18,219	14,723	32,440	48,068

Project Location

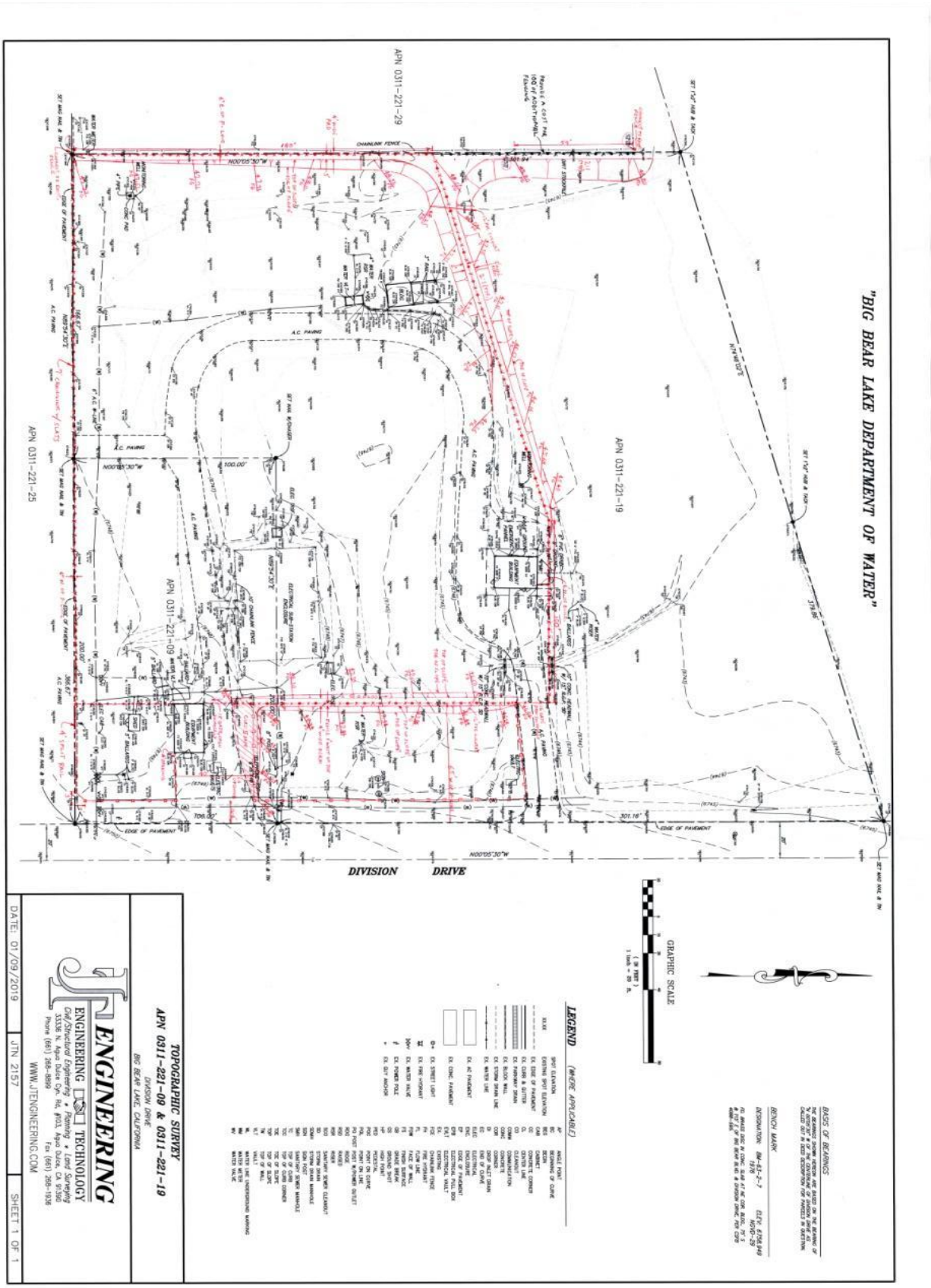
Division Well Field Solar Project Drawings



Site Plan – Panel Layout



Site Trench Plan



Fencing Plan

POWER LEGEND AND SYMBOLS

SYMBOL	DESCRIPTION
OR	BRANCH PANELBOARD, WALL MOUNTED, SEE PLANS AND SCHEDULE. (SURFACE MOUNTED)
	BRANCH PANELBOARD, WALL MOUNTED, SEE PLANS AND SCHEDULE. (RECESSED MOUNTED)
	MAIN SWITCHBOARD, POWER OR LIGHT, FLOOR STANDING ENCLOSURE, (SEE SINGLE LINE DIAGRAM AND LOAD SUMMARY)
	DISCONNECT SWITCH H.P. RATED 600 VOLTS RATED. "F" INDICATES FUSE TYPE. FUSES PER APPROVED MANUFACTURERS SHOP DRAWINGS.
#2	MAGNETIC MOTOR STARTER H.P. RATED (NUMBER INDICATES NEMA SIZE)
+96" OR 7'-6" AFF	MOUNTING HEIGHT FROM FINISHED FLOOR TO BOTTOM LINE OF OUTLET OR EQUIPMENT. FOR LIGHT FIXTURES, IT IS TO BOTTOM OF FIXTURE.
	CONDUIT TURNED DOWN
	CONDUIT TURNED UP
	CONDUIT STUBBED AND CAPPED
	RACEWAY CONCEALED IN WALLS OR ABOVE CEILING
	CONDUIT CONCEALED IN OR UNDER FLOOR: OR UNDERGROUND (CONFIRM DEPTH, GRADE TO DRAIN INTO PULL BOXES)
DETAIL No. SHEET No.	DETAIL REFERENCE
EQUIPMENT ID. No.	EQUIPMENT REFERENCE
(E)	EXISTING CONDUIT AND WIRING TO REMAIN
(R)	PULL-OUT WIRES AND ABANDON CONDUIT. CUT AND CAPPED FLUSH WALL OR SLAB.
E	EXISTING CONDUIT TO REMAIN
R	EXISTING CONDUIT AND WIRE TO BE REMOVED
PR	ELECTRICAL UTILITY PRIMARY

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GENERAL NOTES

1. REFER TO 'GENERAL NOTES' ON ELECTRICAL LEGENDS AND NOTES SHEET FOR WIRING METHODS, MATERIALS, AND REQUIREMENTS.
2. PROVIDE ARC FLASH WARNING SIGNAGE AS PER NEC 110.16.
3. PROVIDE SIGNS AT THE MAIN PV DISCONNECT SWITCH, INVERTERS, AND DISCONNECTS AS PER NEC 690.14, 690.17, 690.54, AND 705.10.
4. ALL CONDUITS WITH DC CONDUCTORS ARE TO HAVE A #12 GROUNDING CONDUCTOR IN THE CONDUIT.
5. ALL UTILITY SERVICES SHALL BE INSTALLED PER THE UTILITY COMPANY REQUIREMENTS.

SOLAR PANEL GROUNDING NOTE

ALL PANELS ARE TO BE BONDED TOGETHER FROM ONE TO ANOTHER AND BE CONNECTED BACK TO MASTER GROUND BAR, SO THAT ALL METAL PARTS ON ALL PANELS ARE AT EQUAL GROUND POTENTIAL.

BUS BAR CALCULATION

NEC 705.12(B)(2)(3)(b):
THE THE SUM OF 125% OF THE INVERTER(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120% OF THE AMPACITY OF THE BUSBAR. IN SYSTEMS WITH PANELBOARDS CONNECTED IN SERIES, THE RATING OF THE FIRST OVERCURRENT DEVICE DIRECTLY CONNECTED TO THE OUTPUT OF A UTILITY INTERACTIVE INVERTER(S) SHALL BE USED IN THE CALCULATIONS FOR ALL BUSBARS AND CONDUCTORS.

SUM OF INVERTER OUTPUT CIRCUIT CURRENT	240 A
+125% OF INVERTER OUTPUT CIRCUIT CURRENT	60 A
UTILITY FED MAIN OVERCURRENT DEVICE	800 A*
TOTAL	1100 A
120% OF 1000 AMP BUS BAR	1200 A

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(TYP.)

MODULES IN SERIES
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1 — 4
1 — 4
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MODULES IN SERIES
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MODULES IN SERIES
3 — 4
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(TYP.)

MODULES IN SERIES
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CONSTRUCTION NOTES

(1) (1)#3/0 CU. BOND TO 3/4" X 8' GROUND ROD.

(2) INVERTER SOLAR EDGE SE33.3KUS (480V) [SI1]

MAX DC INPUT VOLTAGE:	980V
MIN DC INPUT VOLTAGE:	840V
RATED OUTPUT POWER:	33,300W
NOMINAL AC VOLTAGE:	480Y/227V
MAX OUTPUT CURRENT:	40A
MAX NEC CURRENT (125%)	50A
HARMONICS:	<3%
MAX EFFICIENCY:	98.5%
CEC EFFICIENCY:	97.8%
HOUSING RATING:	NEMA 3R

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OTAL DULES	ARRAY Pmax Watts STC	ARRAY Pmax Watts PTC	ARRAY CEC-AC Watts	MODULE Vmp	OPERATING VOLTAGE	MODULE Voc	VOLTAGE CORRECTION FACTOR	MAXIMUM SYSTEM VOLTAGE
36	13140	11955.6	11776	38.5	980	47.1	1.09	980
38	13870	12619.8	12431	38.5	980	47.1	1.09	980
38	13870	12619.8	12431	38.5	980	47.1	1.09	980
112	40880	37195.2	36637					
40	14600	13284	13085	38.5	980	47.1	1.09	980
40	14600	13284	13085	38.5	980	47.1	1.09	980
40	14600	13284	13085	38.5	980	47.1	1.09	980
120	43800	39852	39254					
38	13870	12619.8	12431	38.5	980	47.1	1.09	980
38	13870	12619.8	12431	38.5	980	47.1	1.09	980
38	13870	12619.8	12431	38.5	980	47.1	1.09	980
114	41610	37859.4	37292					
36	13140	11955.6	11776	38.5	980	47.1	1.09	980
36	13140	11955.6	11776	38.5	980	47.1	1.09	980
38	13870	12619.8	12431	38.5	980	47.1	1.09	980
110	40150	36531	35983					
38	13870	12619.8	12431	38.5	980	47.1	1.09	980
38	13870	12619.8	12431	38.5	980	47.1	1.09	980
40	14600	13284	13085	38.5	980	47.1	1.09	980

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T E1.2/1 FOR CONTINUATION

GENERAL NOTES:

1. THE CONTRACTOR SHALL INSPECT AND VERIFY ALL FIELD CONDITIONS PRIOR TO INSTALLATION OF UTILITY SERVICES.
2. COORDINATE TRENCH ROUTING AND EQUIPMENT LOCATIONS WITH EXISTING CONDITIONS AND NEW WORK.
3. ALL SITE BRANCH CIRCUIT WIRING SHALL BE #10 AWG. OR LARGER.
4. ALL SITE UNDERGROUND CONDUIT TO BE 1" MIN. UNLESS OTHERWISE NOTED.
5. CONTRACTOR IS TO TAKE SPECIAL CARE NOT TO DAMAGE PLANTS OR TREE ROOTS WHEN TRENCHING IN BEDDING OR TREE ROOT AREA. ANY DAMAGED PLANTS TO BE REPLACED/REPAIRED AT CONTRACTOR'S EXPENSE.
6. NO PATCHES WILL BE ALLOWED TO EXISTING CONCRETE WALKS. ALL CONCRETE IS TO BE REPLACED FROM JOINT TO JOINT OR A MINIMUM OF 10' SECTIONS. HYDROJETTING IS ALLOWED AT CONTRACTOR'S CHOICE, IF COMPACTED AND REPAIRED TO ORIGINAL CONDITION.

CONSTRUCTION NOTES:

(1) PROVIDE LOCKABLE TYPE FUSED DISCONNECT SWITCH WITH VISIBLE BLADE AS PER SCE RULE 21 REQUIREMENTS. FUSED DISCONNECT SHALL BE LISTED FOR USE AS A SERVICE EQUIPMENT.

(2) PROVIDE AND INSTALL NEW DISTRIBUTION BOARD IN NEMA 3R ENCLOSURE. PROVIDE MINIMUM 3'-0" LEVEL CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT PER NEC 110.26.

(3) PROVIDE AND INSTALL PV INVERTER IN NEMA 4 ENCLOSURE.

(4) CONTRACTOR TO INSTALL PROPOSED GROUND MOUNT SOLAR MODULES PER MANUFACTURER'S INSTRUCTIONS.

(5) PROVIDE MINIMUM 3'-0" LEVEL CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT, PER NEC 110.26.

(6) PROVIDE IN GROUND PULL BOX FOR PHOTOVOLTAIC CIRCUIT WIRING. SEE

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DIVISION DR.

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GENERAL NOTES:

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CONSTRUCTION NOTES:

(1) PROVIDE IN GROUND PULL BOX FOR PHOTOVOLTAIC CIRCUIT WIRING. SEE DETAIL 3/E2.1

(2) PROVIDE (4) #500 KCM, (1) #4 GND. ALUMINUM IN 3-1/2" CONDUIT.

(3) PROVIDE (4) #400 KCM, (1) #6 GND. ALUMINUM IN 3" CONDUIT.

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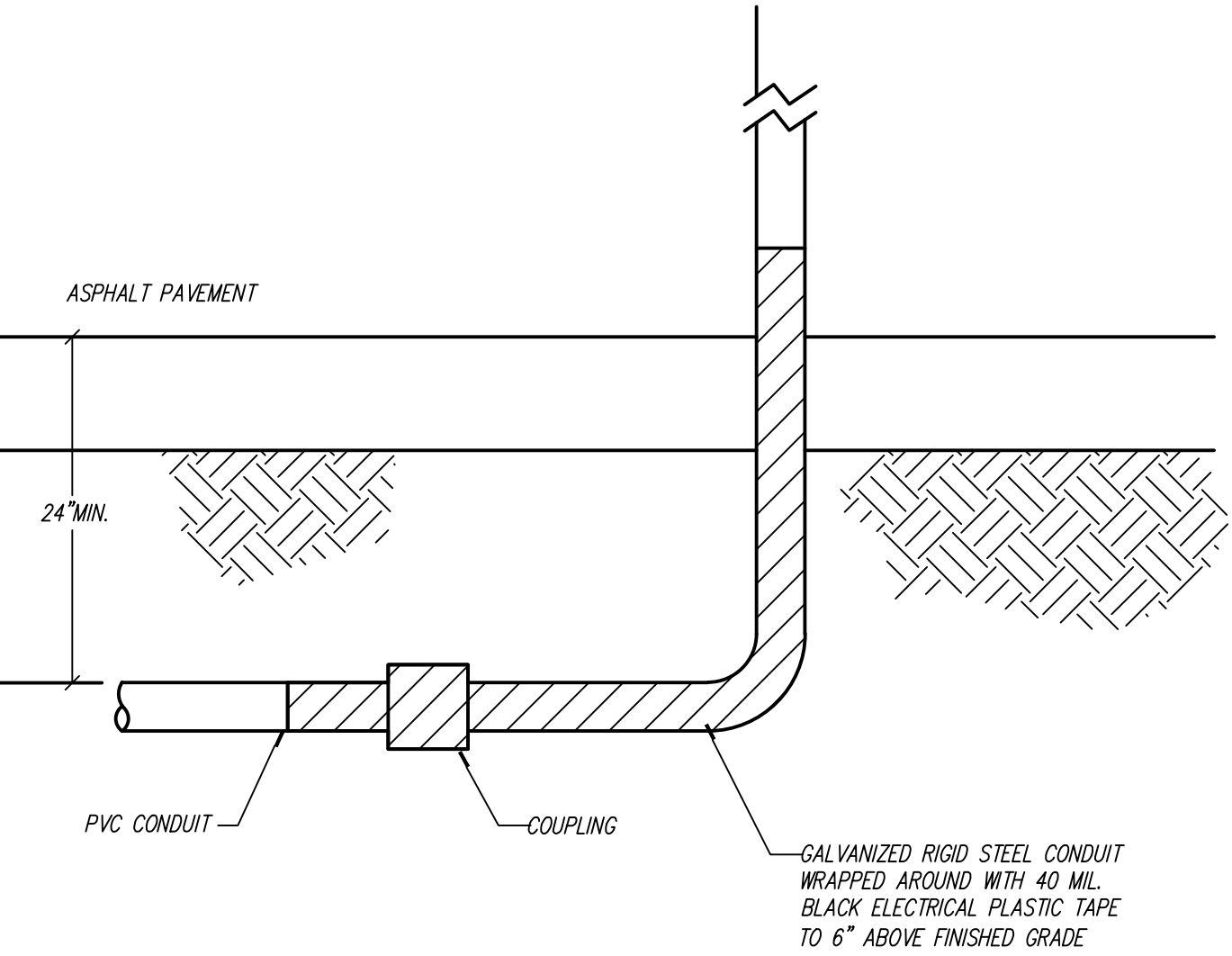

TYPICAL CONDUIT STUB-UP | 1

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solaredge

SolarEdge Power Optimizer

Module Add-On for Commercial Installations for North America P600 / P700 / P730 / P800p / P800s

POWER OPTIMIZER

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ALL WIRES FOR ALL SYSTEMS SHALL BE CONTINUOUS FROM SWITCH TO TERMINAL OR FURTHEST OUTLET. NO JOINTS SHALL BE MADE EXCEPT IN PULL, JUNCTION OR OUTLET BOXES, OR IN PANEL OR SWITCHBOARD GUTTERS.

ALL RECEPTACLE, CONTROL DEVICE, AND SWITCH MOUNTING HEIGHTS SHALL BE COORDINATED WITH ARCHITECTURAL ELEVATIONS PRIOR TO ROUGH-IN.

6 GROUNDING

ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AS INDICATED ON DRAWINGS AND AS REQUIRED BY THE LATEST EDITION OF APPLICABLE CODES.

FURNISH AND INSTALL ALL GROUNDING CONDUCTORS, CONDUIT AND CLAMPS. THE SIZE OF THE GROUNDING CONDUCTORS SHALL BE NOT LESS THAN THAT SPECIFIED IN THE NEC.

BUILDING GROUNDING SYSTEM RESISTANCE TO GROUND SHALL NOT EXCEED 25 OHMS.

EACH BRANCH CIRCUIT SHALL BE EQUIPPED WITH CODE SIZE GREEN GROUND, EQUIPMENT WIRE (PER NEC 250-95) (NOT INDICATED ON DRAWINGS) WITHIN THE SAME CONDUIT FOR ALL CIRCUITS OF PANELBOARDS.

7 BRANCH CIRCUITS

NO MORE THAN THREE BRANCH CIRCUITS PERMITTED IN ONE CONDUIT UNLESS INDICATED OTHERWISE

8 IDENTIFICATION

THE FOLLOWING ITEMS SHALL BE EQUIPPED WITH NAMEPLATES:

ALL MOTORS, MOTOR STARTERS, CONTROL PANELS, MOTORS CONTROL REMOTE STATIONS.

ALL DISCONNECT AND SAFETY SWITCHES, MAIN DISTRIBUTION PANEL FEEDER OVERCURRENT DEVICES AND SPARES, CIRCUIT EQUIPMENT IN SEPARATE ENCLOSURES.

SPECIAL ELECTRICAL SYSTEMS SHALL BE PROPERLY IDENTIFIED AT JUNCTION AND PULL BOXES

ALL BRANCH CIRCUIT PANEL BOARDS SHALL HAVE IDENTIFYING ENGRAVED PLASTIC NAMEPLATES. ALSO, PROVIDE A TYPED DIRECTORY CARD FOR EACH BRANCH CIRCUIT PANELBOARD. THE CARD IS TO BE PLACED ON THE INTERIOR SIDE OF THE PANELBOARD DOOR BEHIND A CLEAR PLASTIC SHIELD. THE CARD SHALL IDENTIFY EACH CIRCUIT BY NUMBER, LOAD, AND LOCATION.

IN GENERAL, EQUIPMENT SHALL BE IDENTIFIED AS DESIGNATED ON THE ELECTRICAL DRAWINGS. NAMEPLATES FOR PANELBOARDS AND SWITCHBOARDS SHALL INCLUDE THE PANEL DESIGNATION, VOLTAGE AND PHASE OF THE SUPPLY. THE NAME OF THE MACHINE SHALL BE THE SAME AS THE NAME USED ON ALL MOTOR STARTERS, DISCONNECTS, AND P.B STATION NAMEPLATES FOR THAT MACHINE.

NAMEPLATES SHALL BE FABRICATED AS FOLLOWS:

NAMEPLATE MATERIALS SHALL CONSIST OF 3-PLY, 1/16" LAMINATED PLASTIC WITH WHITE CORE FOR LETTERING AND BLACK BACKGROUND.

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Email: cadd@designwesteng.com

ISSUE DATE:

DATE	BY	ISSUE FOR

REVISION:

1			
2			
3			
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G6 FLASH PROTECTION WARNING: PROVIDE EACH SWITCHBOARD, PANELBOARD, SWITCHES, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES AND MOTOR CONTROL CENTERS THAT ARE IN OTHER THAN DWELLING OCCUPANCIES AND ARE LIKELY TO REQUIRE EXAMINATION, ADJUSTMENT, SERVICING OR MAINTENANCE WHILE ENERGIZED SHALL BE FIELD MARKED TO WARN QUALIFIED PERSON OF POTENTIAL ELECTRIC ARC FLASH HAZARD. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING OR MAINTENANCE OF THE EQUIPMENT. (PER NEC 110.16)

G7 ALL EXISTING CIRCUITS NOT INDICATED FOR REMOVAL SHALL BE MAINTAINED. CARE SHALL BE TAKEN SO AS NOT TO INTERRUPT SERVICE TO ANY OF THESE CIRCUITS.

G8 WHERE CUTTING AND TRENCHING ARE REQUIRED, REPAIR AND FINISH THE DISTURBED SURFACE TO MATCH EXISTING. EXERCISE CAUTION TO AVOID DAMAGE TO ANY EXISTING UTILITIES.

G9 THE EXISTING CONDITIONS OF ABOVE GROUND STRUCTURES, SUCH AS BUILDINGS, CONCRETE PAVEMENT AND SLABS, EQUIPMENT SUPPORT PADS, PARKING LOTS, AND ASPHALT PAVING AS SHOWN ON THE PLANS ARE TAKEN FROM EXISTING RECORD DRAWINGS AND VERIFIED BY FIELD OBSERVATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ACCURATELY LOCATE ANY ABOVE GROUND STRUCTURE THAT MAY INTERFERE WITH THE INSTALLATION OF THE WORK.

G10 THE EXISTING CONDITIONS OF BELOW GROUND PIPING AND UTILITIES SUCH AS GAS MAINS, WATER MAINS, SANITARY SEWERS, STORM SEWERS, ELECTRICAL CONDUITS, COMMUNICATION CONDUITS AND OTHER UTILITIES ALONG WITH ASSOCIATED VALVE COMMUNICATION CONDUITS AND OTHER UTILITIES ALONG WITH ASSOCIATED VALVE BOXES, VALVE PITS AND MANHOLES ARE TAKEN FROM EXISTING RECORD DRAWINGS & VERIFIED BY FIELD OBSERVATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE EXACT LOCATION AND DEPTH OF BELOW GROUND PIPING AND UTILITIES IN THE IMMEDIATE VICINITY OF THE WORK, WHETHER SHOWN ON DRAWINGS OR NOT. CONTRACTOR SHALL MARK ALL EXISTING PIPING AND UTILITIES AFFECTED BY THE WORK BY USING UNDERGROUND PIPE LOCATOR TO LOCATE POSITION OF PIPES AND CONDUITS AND BY SPRAY PAINTING LOCATION OF PIPES AND CONDUITS ON THE SURFACE. ANY DAMAGES TO EXISTING UNDERGROUND UTILITIES WHICH MIGHT HAVE RESULTED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES SHALL BE RESPONSIBLE FOR REPAIR TO MATCH EXIST. AT NO ADDITIONAL COST TO DESERT SOLAR.

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Pile Foundations for Racks

Solar Panel Racks

Rack Construction During Snow

Completed Solar Panel Installation

Cantilever Gates

Westerly Solar Array

Finish Grading Near Division Well #8 – Northerly Solar Array

Northerly Solar Array with Main Service Switch Gear

Northerly Solar Array with Two-Foot Clearance for Snow Storage

Completed Demonstration Garden

Front View of Division Well Field Site

Division Well No. 2 Discharge into Demonstration Garden

Southbound Traffic View

Northbound Traffic View

Neighbor’s view of Solar Project on Division Drive

Looking Northerly along Division Drive with Division Wells #6 and #7 in the Background

More Demonstration Garden

Division Well Field Site Looking Towards North Shore Drive

Division Well Field Site Looking Towards Big Bear Boulevard

Final Project Cost Table

Budget Item Description	Computation			
	$/Unit	Quantity	Quantity Type	Total Cost
Labor and Fringe Benefits				
Travel				
Equipment				
Supplies and Materials				
Contractual/Construction				
System Design/Site Walks/Project Management		1	Lump Sum	$ 63,728.25
General Engineering		1	Lump Sum	84,971.00
Mobilization		1	Lump Sum	36,350.00
Grading/Civil		1	Lump Sum	9,700.00
Material Procurement		1	Lump Sum	127,456.50
Material Delivery		1	Lump Sum	212,427.50
Fence Installation		1	Lump Sum	123,529.40
Post (Ramming) Installation		1	Lump Sum	49,230.00
Racking Installation		1	Lump Sum	23,045.00
Module Placement		1	Lump Sum	26,856.00
Trenching, Excavate		1	Lump Sum	32,000.00
Trenching, Pull line		1	Lump Sum	32,000.00
Electrical, AC Wire Inverter Connection		1	Lump Sum	21,000.00
PV System Commissioning		1	Lump Sum	7,416.35
Revise Fence Design		1	Lump Sum	11,104.71
Payment and Performance Bond		1	Lump Sum	33,988.40
Single Metered Switchgear		1	Lump Sum	31,047.00
Additional Red Slurry		1	Lump Sum	4,823.53
Cantilever Gates and Landscaping		1	Lump Sum	82,591.67
Total Contractual/Construction				**$1,013,265.31**
Other				
Total Direct Costs				**$1,013,265.31**
Indirect Costs				
Total Project Cost				**$1,013,265.31**