WaterSMART: Water and Energy Efficiency Grants for FY2017
Funding Opportunity Announcement No. BOR-DO-17-F012
Funding Group I

City of Big Bear Lake

Department of Water & Power

Division Well Field Solar Project

Applicant Information: **City of Big Bear Lake**
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TECHNICAL PROPOSAL

Section 1. Executive Summary

Date	January 18, 2017
Applicant	City of Big Bear Lake Department of Water and Power
City, County, State	Big Bear Lake, San Bernardino, California
	Division Well Field Solar Project
Project Length	2 years
Estimated Completion Date	December 31, 2018

The executive summary should include:

The date, applicant name, city, county, and state (complete above)

A one paragraph project summary that specifies the work proposed, including how project funds will be used to accomplish specific project activities and briefly identifies how the proposed project contributes to accomplishing the goals of this FOA (see Section C.3.1. Eligible Projects)

State the length of time and estimated completion date for the proposed project

Whether or not the project is located on a Federal facility (complete below)

The City of Big Bear Lake Department of Water and Power (the DWP, DWP, or the Department), is applying for funding by the United States Bureau of Reclamation's (USBR) WaterSMART: Water and Energy Efficiency Grants for FY 2017 Funding Opportunity Announcement No. BOR-DO-17-F012. The DWP is applying for $300,000 in federal funding assistance for Federal Funding Group I, to construct the Division Well Field Solar Project (the Project, the Solar Project). Currently there are five Division Well Pumping Plants that provide a significant portion of BBLDWP's domestic water supply. The annual power cost for these five Well Pumping Plants is $125,000, which funds approximately 400,000 KWh per year. BBLDWP is proposing to design and construct solar panels to provide renewable energy to offset the annual energy required to power these five pumping plants. The proposed facilities will include approximately 700 solar panels, minor site grading, site fencing, and net-metering facilities connected to Bear Valley Electric Service's facilities.

The Project is not located on a Federal Facility.

Section 2. Background Data

Provide a map of the area showing the geographic location (include the state, county, and direction from nearest town) of the proposed project.

As applicable, describe the source of water supply, the water rights involved, current water uses (e.g., agricultural, municipal, domestic, or industrial), the number of water users served, and the current and projected water demand. Also, identify potential shortfalls in water supply. If water is primarily used for irrigation, describe major crops and total acres served.

In addition, describe the applicant's water delivery system as appropriate. For agricultural systems, please include the miles of canals, miles of laterals, and existing irrigation improvements (e.g., type, miles, and acres). For municipal systems, please include the number of connections and/or number of water users served and any other relevant information describing the system.

2.1 Location

The DWP's water service area is located within Bear Valley, as depicted in Figure 1. These areas are located in the San Bernardino Mountains in San Bernardino County, California. The DWP's service area is located primarily along the south shore of Big Bear Lake. Fawnskin lies to the north of the lake, and the Sugarloaf-Erwin Lake and Lake William systems are located east of Big Bear Lake. In total, the DWP's service areas encompass approximately 13 square miles.

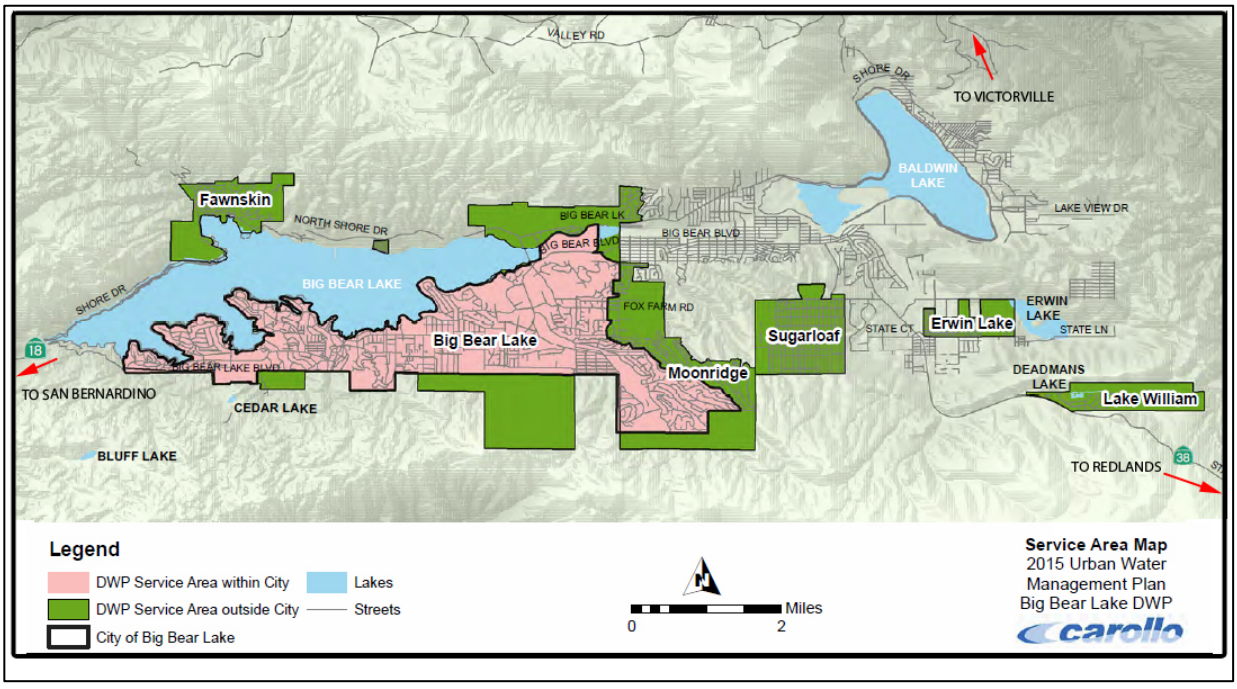

Figure 1 Water Service Area

2.2 Source of Water Supply

The DWP produces potable water from a combination of horizontal wells (gravity) and vertical wells (pumped) in the Bear Valley Groundwater Basin (DWR designation 8-9). The Bear Valley Groundwater Basin is un-adjudicated, however the DWP works closely with the other public water provider, the Big Bear City Community Services District (BBCCSD), to ensure the basin is not over drafted. The perennial yield of the entire Bear Valley Groundwater Basin is estimated at 5,500 acre-feet per year (afy) while the safe yield within the DWP's service area is 3,100 afy. The DWP's current demands are below the perennial yield of its service area and the DWP has adequate pumping facilities to meet those demands. Table No. 1, below, demonstrates that the average annual demand is within the safe yield for the DWP service area. The DWP does not use surface or imported water to meet its water demand as importing water into the Bear Valley would be extremely costly and is not a viable option.

Table No. 1 Current and Projected Supply/Demand

Supply Source	Annual Pumping (afy)					
	2015	2020	2025	2030	2035	2040
Groundwater/ Total	2,095	2,169	2,246	2,326	2,408	2,494

Note: The calculations used for the demands are based on a 0.7% growth in demand each year, beginning in 2015. Supplies are assumed to equal Demand, up to 3,100 AFY (DWP's share of the operating safe yield of the Bear Valley Groundwater Basin). These quantities meet all state water conservation requirements.

2.3 Water Delivery System

The DWP distributes its potable water supply through a distribution system consisting of five water systems with 15 separate pressure zones, 180 miles of pipeline, 33 vertical wells, 22 slant wells, 16 reservoirs, 12 booster stations, 41 pressure reducing valves, 26 chlorination stations, and 22 sample stations. Table No.2 is a summary of DWP's current and projected number of connections by customer class. Based on the data collected in the 2015 Urban Water Management Plan, the average annual population in the DWP service area in 2015 was estimated at 25,601 (including full time and temporary populations). The 2015 UWMP assumed a growth rate of 0.7 percent for subsequent years.

Table No. 2 Summary of the Current and Projected Water Use by Customer Class

Customer Class	2020	2025	2030
	Population 26,510	Population 27,451	Population 28,425
	Demand (afy)	Demand (afy)	Demand (afy)
Residential	1,443	1,495	1,548
Commercial	474	491	509
System Losses	220	227	235
Unbilled Consumption	32	33	34
Total	**2,169**	**2,246**	**2,326**

2.4 Current Water Uses

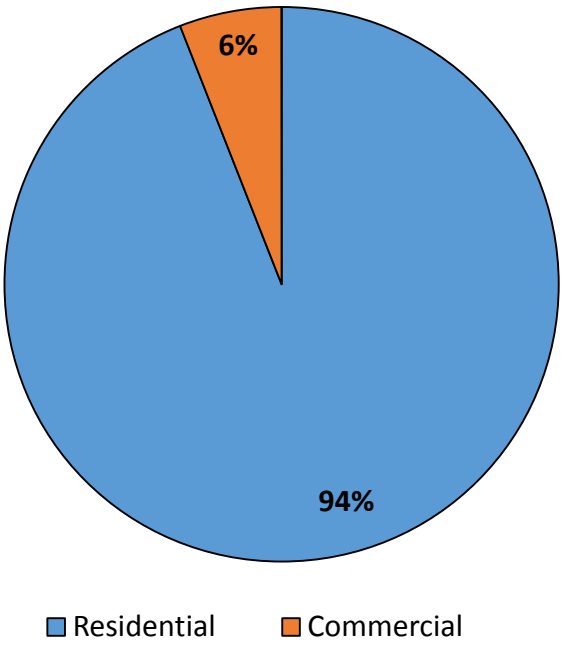

Figure 2 Percentage of Accounts by Customer Class

As of 2016, the DWP maintains 15,612 water meters, in which 14,675 are residential and 937 are commercial. Multi-family residential accounts are grouped in commercial accounts. Thus, about 94% percent of the accounts are residential (Figure 2).

2.5 Working Relationship with the Bureau of Reclamation

Identify any past working relationships with Reclamation. This should include the date(s), description of prior relationships with Reclamation, and a description of the project(s)

In July 2016, the DWP entered into two assistance agreements with the USBR. Assistance Agreement #R16AP0113 was executed on July 31, 2016 to provide up to $300,000 in grant funding for the AMI Program Phase II. Phase II of the AMI program was for the purchase and installation of 5,000 AMI meters and necessary components. Phase II is still in progress and is ahead of schedule with an expected completion date of March 1, 2017.

Assistance Agreement #R16AP0116 was the second agreement entered into with the USBR and it was executed on July 31, 2016 to provide up to $300,000 in grant funding for the replacement of approximately 4,000 feet of riveted steel pipeline in Big Bear Boulevard. The 4,000 feet of water distribution main pipeline has been installed and the contractor is currently working diligently to make the final service and lateral connections. The project commencement was delayed one month due to other contractors working on projects in the same right of way. Winter weather conditions caused additional construction delays. The USBR granted the DWP an extension until June 30, 2017 to complete this project.

2.6 Renewable Energy

During fiscal year 2014/2015 BBLDWP installed solar panels on its office building, as shown in Figure 3. The solar panels provide about 74% of the office and warehouse building's power demand. The office solar panels have reduced BBLDWP's power costs by approximately $30,000 per year and produce about 100,000 KWh of renewable energy per year.

BBLDWP's proposed Division Well Field Solar project will use similar technology as its Office Solar project except the panels will be mounted on ground mounted stands and generate an estimated 400,000 KWh of renewable energy per year.

Figure 3 BBLDWP Office Solar Panels

Section 3. Project Description

The project description should describe the work in detail, including project milestones and specific activities that will be accomplished as a result of this project. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal.

3.1 The Proposed Project

The Project will provide power to the DWP's Division Well Pumping Plants through the construction and installation of approximately 700 solar panels. These panels will produce approximately 400,000 KWh of power per year, reducing BBLDWP's electrical power operating costs by approximately 25%.

The Project site is located between the Big Bear Airport and Baker Pond (Figure 4). 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 will be designed and constructed to be in compliance with the environmental documents that were approved the City of Big Bear Lake, Department of Water and Power Board of Commissioners (the Board) and recorded on July 29, 2016. Upon execution of the contract with the USBR, BBLDWP will prepare and distribute a Request for Proposal for design and construction management engineering services. 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.

Selected Technology:

The Division Well Field Solar 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 proposed solar project with airport personnel and they had no objections. The proposed solar panels will be constructed of a non-reflective type material as shown in Figure 3 and will be placed on ground-mounted stands approximately three feet above finished grade.

The angle of the panels will be relatively steep. 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 once in a two-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 Bear Valley Electrical Service (BVES) via one master meter. BVES has an existing electrical substation on the Division Well Field site, so connection to the BVES system will be easy 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 five

Division Well Pumping Plants. The power generated by the Project will be credited towards this new account.

There are very few residential homes in the vicinity of this project. However, as previously mentioned, the proposed Project will be fenced will 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 Pumping Plants.

Figure 4 Project Location

3.2 Solar Project Benefits

The proposed Project will reduce the DWP's operating costs an estimated $125,000 per year, allowing the BBLDWP to operate more efficiently and ultimately benefit the ratepayers. The proposed renewable energy project will also help BVES meet the California state-mandate to provide renewable energy to their customers. The estimated 400,000 KWh generated by the proposed solar field may help BVES defer costly electrical system facilities upgrades by removing a significant electrical load from their system.

Section 4. Evaluation Criteria

The evaluation criteria portion of your application should thoroughly address each of the following criteria and subcriteria in the order presented to assist in the complete and accurate evaluation of your proposal. If a particular criterion does not apply to your project, please indicate which criteria are inapplicable as part of your application. (Note: it is suggested that applicants copy and paste the below criteria and subcriteria into their applications to ensure that all necessary information is adequately addressed). **Applications will be evaluated against the evaluation criteria (listed below), which comprise 100 points of the total evaluation weight**. Please note that projects may be prioritized to ensure balance among the program Task Areas and to ensure that the projects address the goals of the WaterSMART program.

*Please note, if the work described in your application is a phase of a larger project, please **only** discuss the benefits that will result directly from the work discussed in your application and that is reflected in the budget and exclude discussion of benefits expected from the overall project.*

Evaluation Criterion A: Quantifiable Water Savings

Describe the amount of water saved. For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Please be sure to consider the questions associated with your project type (listed below) when determining the estimated water savings, along with the necessary support needed for a full review of your proposal (please note, the following is not an exclusive list of eligible project types. If your proposed project does not align with any of the projects listed below, please be sure to provide support for the estimated project benefits, including all supporting calculations and assumptions made). *In addition, please note that the use of visual observations alone to calculate water savings, without additional documentation/ data, are not sufficient to receive credit under this section.*

The proposed Division Well Field Solar Project will provide renewable power to five Division Well Field Pumping Plants. These well plants provide over 20% of DWP's annual water supply, however, quantifying water conservation from the project has proven difficult. The five wells currently receive their power from Bear Valley Electric Service (BVES), which purchases power from Southern California Edison (SCE). Resources show that since the deregulation of California's electricity market in the late 1990s SCE sold many of its power plants and retained only its hydroelectric plants. Hydroelectric power plants use water that turns turbines, which in turn operate an electric generator.

According to the research paper, "Water Dependency of Energy Production and Power Generation Systems" from the Virginia Water Resources Research Center (located at the Virginia Polytechnic Institute and State University), hydroelectric power generation uses as much as 20 gallons of water per MBTU (One Million British Thermal Unit) of electricity produced (at the low range of efficiency)[1]. Based on this source, by replacing the 400,000 KWh of BVES power with renewable solar power, DWP deduces a water savings equivalent maximum of 272,800,000 gallons or 837 acre feet (One MBTU = 0.293 KWh, or one KWh = 3.41 MBTU; 3.41 * 20 = 68.2 gallons of water per KWh; 68.2* 400,000 = 272,800,000 = 837 acre feet). No high range efficiency range was provided in the report however, a 2003 report titled, "Consumptive Water Use for U.S. Power Production," (from the National Renewable Energy Laboratory) states that "Hydroelectric plants evaporate an average of 18 gal (68 L) of fresh water per kWh used by the consumer." Using that number, the reduction in traditional power consumption could result in a water savings of approximately 22 acre-feet per year (18 * 400,000 = 7,200,000 gallons = 22 acre feet).

Lastly, an article in the scientific journal, "Environmental Research Letters[2]" includes a comprehensive table of water consumption factors for renewable technologies. According to this study hydroelectric power has a median consumption of 4,491 gallons per MWH (megawatt hour), minimum 1,425 gallons per MWH and maximum 18,000 gallons per MWH . One megawatt hour is equal to 1,000 KWh. Based on this source DWP energy savings of 400,000 KWh is equivalent to a median savings of 5.51 acre feet of water (400,000 KWh = 400 MWH; 400 MWH * 4,491 gallons= 1,796,400 gallons or 5.51 acre feet); a minimum of 1.75 afy or a maximum 22 afy.

Considering such a large possible range (1.75-837 afy), and absent a definitive number from SCE or BVES, the DWP declines to state a specific water savings resulting from the Project.

In addition, all applicants should be sure to address the following:

- Where is the water that will be conserved currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?

Hydroelectric power plants are extremely efficient, but do lose some water to evaporation.

Please include a specific quantifiable water savings estimate; do not include a range of potential water savings.

The percentage of power generated from SCE power plants is not readily available from BVES, so a quantifiable water savings quantity was not computed.

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[1] This data was compiled from three sources: a 2006 "Report to Congress on the Interdependency of Energy and Water" from the United States Department of Energy, "Water and Energy" in Annual Reviews by P.H. Gleick (1994) and " Annual Energy Review 2007" by the Energy Information Administration (2008)

[2] http://iopscience.iop.org/1748-9326/7/4/045802

Please address the following questions according to the type of project you propose for funding.

Other Project Types Not Listed Above: Projects to provide water savings for irrigation and municipal water systems other than those listed above will be considered and evaluated based on the amount of estimated water savings and the adequacy of the description of how the savings are estimated. Applicants proposing these types of projects should address the following items:

(a)How have average annual water savings estimates been determined? This should include a detailed description of the rationale and methodologies used to develop the estimates. Please provide all relevant calculations, assumptions, and supporting data. Reference relevant studies or past project documentation that support the water saving estimates.

Based on the available research and literature water savings range from 1.75-837 afy. Absent a definitive number from SCE or BVES, the DWP declines to state a specific water savings resulting from the Project.

(b)If new technologies or devices are proposed, how will the savings occur? Please provide detailed descriptions that will enable the reviewer to understand function and how savings occur.

Accurate annual water savings are not available for the proposed Division Well Field Solar Project.

(c)How will actual water savings be verified upon completion of the project? Please explain the calculations and the analyses for this verification.

Accurate annual water savings are not available for the Project.

Evaluation Criterion B: Water Sustainability Benefits Expected to Result from the Project

Maximum consideration under this criterion will be given to projects that will commit conserved water to instream flows for the benefit of federally listed threatened or endangered species, designated critical habitat, or other fish and wildlife benefits. Consideration will also be given to projects expected to result in water sustainability benefits in other ways, such as making water available to alleviate water supply shortages or to address other specific water management concerns in the region.

Annual water savings were not computed for the proposed Project.

Some projects may address water supply sustainability in ways other than committing water for instream flows. If the questions listed above are not applicable to your project, please address the following to explain how the water savings from the project are expected to result in a public benefit:

- Is there a specific water supply sustainability concern in the region? What factors are contributing to the concern? Please include a description of the impacted geographic area and stakeholders, the partners that are collaborating to resolve the concern, and any other applicable information.

From 2000 to 2002 the DWP experienced three extremely dry years, with average precipitation of only 20.84 inches per year (in comparison to a 130 year average of 35.83 annual inches). In 2002 the DWP declared a Water Shortage Emergency. While conservation regulations existed before this time, that year was a "watershed" moment in DWP conservation. The Water Shortage Emergency lasted over a decade, resulting in a building moratorium for one DWP water system and vastly expanded rules and regulations related to conservation.

Twice annually the DWP holds a Technical Review Team (TRT) committee meeting to review and evaluate the status, condition, and availability of the DWP's ground water supplies. The Committee makes recommendations and advises the Board concerning conservation and other significant resource management constraints, including any possible declarations of a Water Shortage Emergency.

At the November 17, 2016 TRT Committee meeting the DWP discussed the fact that precipitation at the dam from July 1, 2015 through June 30, 2016 was 30.80 inches, nearly 86% of the 132-year annual precipitation average. The annual rainfall, measured at the Big Bear Dam, has been below average for the last five years. Therefore, despite improved precipitation, the Bear Valley is still beginning its sixth year of severe drought and relies strictly on naturally charged ground water for its source of supply.

Past and present investments have added critical flexibility in how the DWP can exercise different sub-basins within the Bear Valley. New sources and additional storage, improved pump efficiency, better water transfer systems and improved monitoring capabilities have improved the DWP's drought resiliency. While some aquifer sub-units' levels are in decline, other aquifer sub-units' have increased. Recent calculations show that even with some wells offline and continued drought projections, the water supply is sufficient for more than three years. Nevertheless, DWP staff continue to closely monitor the basin and water agencies across the Bear Valley are working together to create and promote comprehensive and consistent conservation policies based on prior experience.

- How will the proposed project help to address that concern? Will water conserved through the project result in reduced diversions or be made available to help alleviate water supply shortages due to drought, climate variation, or over-allocation?

Accurate annual water savings are not available for this Project.

- Will the project make additional water available to Indian tribes, and/or rural or economically disadvantaged communities)? If so, please explain.

No, accurate annual water savings are not available for this Project.

- Will water conserved through the project help to address water supply sustainability in a way not listed above?

Accurate annual water savings are not available for this Project.

Note: Maximum consideration under this criterion is also available to projects that result in habitat improvements that benefit federally listed threatened or endangered species, designated critical habitat, or other fish and wildlife (i.e., Task C activities).

For Task C activities with benefits unrelated to water savings (e.g., habitat improvements, or installation of fish bypasses or fish screens), describe the activities and associated benefits in detail. Please address the following: Will the project benefit federally-recognized candidate species? Will the project directly accelerate the recovery of, threatened or endangered species or address designated critical habitat? Is the project expected to have other fish and wildlife benefits?

The Division Well Field Solar Project will not directly benefit an endangered species.

Evaluation Criterion C: Energy-Water Nexus

For projects that include construction or installation of renewable energy components, please respond to Subcriterion No. C.1: Implementing Renewable Energy Projects Related to Water Management and Delivery. If the project does not implement a renewable energy project but will increase energy efficiency, please respond to Subcriterion No. C.2. Increasing Energy Efficiency in Water Management. If the project has separate components that will result in both implementing a renewable energy project and increasing energy efficiency, an applicant may respond to both. However, an applicant may receive no more than 18 points total under both Subcriteria No. C.1 and C.2.

Subcriterion No. C.1: Implementing Renewable Energy Projects Related to Water Management and Delivery

*Up to **18 points** may be awarded for projects that include construction or installation of renewable energy components (e.g., hydroelectric units, solar- electric facilities, wind energy systems, or facilities that otherwise enable the use of renewable energy). Projects such as small-scale solar resulting in minimal energy savings or production will be considered under Subcriterion No. C.2 below.*

Describe the amount of energy capacity. For projects that implement renewable energy systems, state the estimated amount of capacity (in kilowatts) of the system. Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.

The proposed solar Project will produce approximately 400,000 KWh per year of renewable energy. DWP has a similar 170 panel solar facility that produces approximately 100,000 KWh per year. DWP estimates the proposed Project will require approximately 700 solar panels to produce an estimated 400,000 KWh per year, equivalent to the current consumption of the Division Well Field.

Describe the amount of energy generated. For projects that implement renewable energy systems, state the estimated amount of energy that the system will generate (in kilowatt hours per year). Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.

The proposed Project will produce approximately 400,000 KWh per year of renewable energy. DWP has a similar 170 panel solar facility that produces approximately 100,000 KWh per year. DWP estimates the proposed Solar Project will have approximately 700 solar panels that will produce the estimated 400,000 KWh per year.

Describe any other benefits of the renewable energy project. Please describe and provide sufficient detail on any additional benefits expected to result from the renewable energy project, including:

•Expected environmental benefits of the renewable energy system

The proposed Solar Project may defer capital improvements to BVES's electrical distribution system, which benefits the environment. According to the U.S. Energy Information Administration, "Hydropower has historically been the dominant renewable energy source, but capacity in wind, solar, and other non-hydro renewable sources has increased so much in recent years that non-hydro renewable electricity generation exceeded hydropower generation for the second straight year in 2015. Lower-than-normal levels of rain and snow have also contributed to lower hydropower generation in recent years." By reducing the reliance on hydropower in California, solar power may offset negative hydropower impacts resulting from the ongoing drought.

•Any expected reduction in the use of energy currently supplied through a Reclamation project

The proposed Solar Project will reduce the amount of energy supplied by BVES, which will reduce the amount of energy that SCE supplies BVES. If SCE receives power from a Reclamation project, then the proposed Solar Project reduces the amount of energy currently supplied by a reclamation project.

•Anticipated beneficiaries, other than the applicant, of the renewable energy system

The Project will reduce the amount of energy required from hydroelectric power plants. Hydroelectric power interrupts the natural flow of water, which can have a detrimental effect on the environment and imbalance in the ecosystem. The animal species reliant on that environment, usually fish, may suffer as a result.

•Expected water needs of the renewable energy system

DWP's existing solar facility has been in operation for over two years and the solar panels have been manually washed once, due to a prolonged period of time without precipitation. Big Bear experiences frequent winter storms and summer thunderstorms, which are typically sufficient to keep the solar panels clean. DWP does not anticipate significant water needs for the proposed Project.

Subcriterion No. C.2: Increasing Energy Efficiency in Water Management

Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project (e.g., reduced pumping).

- Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.

Based on the available research and literature, water savings range from 1.75-837 afy. Absent a definitive number from SCE or BVES, the DWP declines to state a specific water savings resulting from the Project.

- Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements?

The proposed Project will not impact current pumping requirements.

- Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.

The energy savings estimate originates from the point of diversion.

- Does the calculation include the energy required to treat the water?

Yes, the calculation includes energy required to treat the water.

- Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations. Describe any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).

The proposed Project will not result in reduced vehicle miles driven.

Evaluation Criterion D: Addressing Adaptation Strategies in a WaterSMART Basin Study

Proposals that provide a detailed description of how a project is addressing an adaptation strategy specifically identified in a completed Basin Study (e.g., a strategy to mitigate the impacts of water shortages resulting from climate change, drought, increased demands, or other causes) may receive maximum points under this criterion. Applicants should provide as much detail as possible about the relationship of the proposed project to the adaptation strategy identified in the Basin Study, including, but not limited to, the following:

- Identify the specific WaterSMART Basin Study where this adaptation strategy was

developed. Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project and how the proposed WaterSMART Grant project would help implement the adaptation strategy.

The Santa Ana Watershed Basin Study looks at the Santa Ana River Watershed (SARW), including the service area of Big Bear Lake near the headwaters of the Santa Ana River. The Santa Ana Watershed Project Authority (SAWPA) is a water resources planning agency tasked with protecting the water quality of the watershed. The Santa Ana Watershed Basin Study promotes alternative energy use and recommends implementation actions for stakeholders, including installation of solar capabilities. The specific adaptation strategy addressed by this proposal is to improve operational efficiency: "Promote systems reoperations, water transfers, and improved local and regional water conveyance. Optimize operational efficiency, promote water transfers, and develop regional water projects." In addition, using solar projects for water conveyance systems is a "low regret strategy."

- Describe how the adaptation strategy and proposed WaterSMART Grant project will address the imbalance between water supply and demand identified by the Basin Study.

While this project does not specifically address the imbalance of water supply and demand, it does address energy imbalance and the need for DWP to create a sustainable future. The basin study states, "Using solar power as part of a renewable energy portfolio helps water districts control variable costs as well as decrease carbon emissions."

- Identify the applicant's level of involvement in the Basin Study (e.g., cost-share partner, participating stakeholder, etc.).

While the DWP does work with SAWPA on the Integrated Regional Water Management Plan it did not play a vital role in the Basin study.

- Describe whether the project will result in further collaboration among Basin Study partners.

The DWP is eager to share results with other SAWPA member agencies and contributors.

Evaluation Criterion E: Expediting Future On-Farm Irrigation Improvements

This project does not include future on-farm irrigation improvements.

Evaluation Criterion F: Implementation and Results

Subcriterion No. F.1: Project Planning

Does the project have a Water Conservation Plan and/or System Optimization Review (SOR) in place. Please self-certify, or provide copies of these plans where appropriate to verify that such a plan is in place.

Provide the following information regarding project planning:

1. Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, or other planning efforts done to determine the priority of this project in relation to other potential projects.

In July of 2014 the City of Big Bear Lake (the City) was installing solar panels at City Hall and the Public Works Yard as part of a design/build solar contract funded partially by U.S. Department of Energy grant funding. The DWP project came as a last-minute amendment. The original solar projects proposed by the City came in under budget, so the City asked DWP if the Department would be interested in utilizing the remaining federal grant funds to offset the cost of solar panels for DWP's office and yard facilities by 50%. Once it was determined that the solar project would be feasible the DWP's Board approved using reserves to fund the proposed project and by November of 2014, DWP's office solar project was operational.

The average annual electricity bill for the office building is $38,000, and the solar project is estimated to offset it by about $26,000, which makes the payback period about six 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. Since installation, the DWP office solar panels have produced 178 MWH of energy. Energy production for the BBLDWP building is updated in real time and is available online at http://www.solrenview.com/SolrenView/mainFr.php?siteId=3178. Since implementation of that project the DWP has looked for other opportunities to utilize renewable energy resources.

The proposed Division Well Field Solar Project will be located between the Convention Center, Big Bear Airport, and Baker pond. It is a perfect site with minimal impacts. The five existing wells located at the Division Well field have an annual electrical demand of over 400,000 KWh's per year. The DWP Board approved the environmental work for the proposed Project on July 26, 2016. With additional funding, the DWP is ready to proceed will the project.

2. Describe how the project conforms to and meets the goals of any applicable planning efforts, and identify any aspect of the project that implements a feature of an existing water plan(s).

The proposed Project will reduce operating costs. The money saved can be used to replace undersized steel water mains, which will reduce DWP's unaccounted for water.

Subcriterion No. F.2: Support and Collaboration

Describe the extent to which the project garners support and promotes collaboration.

Does the project promote and encourage collaboration among parties? Consider the following:

- Is there widespread support for the project?

Yes, see attached letters of support.

- What is the significance of the collaboration/support?

The City of Big Bear Lake's two other solar projects (Public Works and City Hall) and DWP's office solar project are constructed with different orientations and slopes. The DWP has worked with the City of Big Bear Lake and found the orientation of DWP's office solar panels is producing more power than the other two facilities. Also, the steeper slope of the DWP's office solar panels facilitates quicker self-cleaning snow removal than the other two locations. The City of Big Bear Lake and DWP will use this information on future solar installations.

The proposed Solar Project will produce an estimated 400,000 KWh's per year, which may allow Bear Valley Electric Service to defer capital improvements to their electrical supply facilities.

- Will the project help to prevent a water-related crisis or conflict?

Possibly, the proposed Solar Project will provide 400,000 KWh per year of renewable energy for the Bear Valley.

- Is there frequently tension or litigation over water in the basin?

No, all agencies in the Bear Valley work together to maintain the sustainability of the basin. In 2015/2016, the Big Bear Area Regional Wastewater Agency, Big Bear Municipal Water District, Big Bear City Community Services District and the City of Big Bear Lake, Department of Water and Power each contributed $40,000 to fund the Bear Valley Water Sustainability Plan. This plan evaluated various strategies to use reclaimed water throughout the Bear Valley. While ultimately deemed not financially feasible, the project is demonstrative of the Valley's agencies supporting one another in various projects to conserve and manage the water in the basin collaboratively.

- Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?

The proposed Solar Project will not enhance future water conservation by other water users.

Subcriterion No. F.3: Performance Measures

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved or better managed, energy generated or saved). For more information calculating performance measure, see Section *D.2.2.5 Performance Measures*.

Note: All Water and Energy Efficiency Grant applicants are required to propose a "performance measure" (a method of quantifying the actual benefits of their project once it is completed). A provision will be included in all assistance agreements with Water and Energy Efficiency Grant recipients describing the performance measure, and requiring the recipient to quantify the actual project benefits in their final report to Reclamation upon completion of the project. If information regarding project benefits is not available immediately upon completion of the project, the financial assistance agreement may be modified to remain open until such information is available and until a Final Report is submitted. Quantifying project benefits is an important means to determine the relative effectiveness of various water management efforts,

as well as the overall effectiveness of Water and Energy Efficiency Grants.

The proposed Solar Project will be designed to produce a minimum of 400,000 KWh per year. The project will include computer equipment and software that will record the power produced for the life of the project. This information will be provided to USBR.

Evaluation Criterion G: Additional Non-Federal Funding

*Up to **4 points** may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided using the following calculation:*

Non-Federal Funding: $1,400,000
Total Project Cost $1,700,000

The proposed Solar Project will be funded 82.35% from non-federal sources. The DWP plans to provide 100% of the matching funds under this application from revenues and capital improvement reserves.

Evaluation Criterion H: Connection to Reclamation Project Activities

1. How is the proposed project connected to Reclamation project activities?

The proposed Solar Project will remove an estimated 400,000KWh per year of electrical demand from California's power grid.

2. Does the applicant receive Reclamation project water?

The DWP does not rely on reclamation project water at this time.

3. Is the project on Reclamation project lands or involving Reclamation facilities?

The project is not on Reclamation project lands and does not involve Reclamation facilities.

4. Is the project in the same basin as a Reclamation project or activity?

The proposed Solar Project is not in the same basin as a Reclamation project.

5. Will the proposed work contribute water to a basin where a Reclamation project is located?

The proposed Solar Project will not contribute water to a Reclamation project basin.

6. Will the project help Reclamation meet trust responsibilities to Tribes?

This is not applicable for the proposed Solar Project.

Section 5. Performance Measures

All WaterSMART Grant applicants are required to propose a method (or "performance measure") of quantifying the actual benefits of their project once it is completed. Actual benefits are defined as water actually conserved or better managed, as a direct result of the project. A provision will be included in all assistance agreements with WaterSMART Grant recipients describing the performance measure and requiring the recipient to quantify the actual project benefits in their final report to Reclamation upon completion of the project.

Quantifying project benefits is an important means to determine the relative effectiveness of various water management efforts, as well as the overall effectiveness of WaterSMART Grants.

The following information is intended to provide applicants with examples of some acceptable performance measures that may be used to estimate pre-project benefits and to verify post-project benefits upon completion. **However, the following is not intended to be an exclusive list of acceptable performance measures. Applicants are encouraged to propose alternatives to the measures listed below if another measure is more effective for the particular project.**

Reclamation understands that, in some cases, baseline information may not be available, and that methods other than those suggested below may need to be employed. If an alternative performance measure is suggested, the applicant must provide information supporting the effectiveness of the proposed measure as applied to the proposed project.

Performance Measure No. B: Projects with Quantifiable Energy Savings

Applicants should address the following subsections as part of the performance measures they submit with their applications.

Performance Measure No. B.2: Increasing Energy Efficiency in Water Management

- Explain the methodology for calculating the quantity of energy savings resulting from the water management improvements or water conservation improvements

The proposed Project will be designed to produce a minimum of 400,000KWh per year.

- Explain anticipated cost savings

The proposed Solar Project is expected to save an estimated $120,000 per year.

Performance Measure No. C: Projects that Benefit Endangered Species and/or Critical Habitat

For projects that benefit federally listed species (threatened or endangered), federally recognized candidate species, or designated critical habitat that are affected by a Reclamation facility, the applicant should consider the following:

- The methodology used for determining the recovery rate of the threatened and/or

candidate species

Not applicable to the project.

- How their projects will address designated critical habitats, including acres covered, species present, and how the water savings or transfers are expected to benefit the habitat(s)

Not applicable to the project.

- Unavoidable negative impacts to endangered, threatened, or candidate species and/or the critical habitat(s)

None

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

So that Reclamation can assess the probable environmental and cultural resources impacts and costs associated with each application, all applicants must respond to the following list of questions focusing on the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) requirements. ***Note: Applicants proposing a Funding Group II project must address the environmental and cultural resources compliance questions for their entire project, not just the first 1-year phase.***

Please answer the following questions to the best of your knowledge. If any question is not applicable to the project, please explain why. The application should include the answers to:

Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.

The minor impacts created during construction of the Solar Project will be mitigated with best management practices.

- Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?

None. See Exhibit 1

- Are there wetlands or other surface waters inside the project boundaries that potentially fall under Clean Water Act (CWA) jurisdiction as “Waters of the United States?” If so, please describe and estimate any impacts the proposed project may have.

No, there are no wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "waters of the United States."

- When was the water delivery system constructed?

The majority of the DWP’s water system was constructed during the 40’s, 50’s, and 60’s. The City of Big Bear Lake acquired the water system from Southern California Water Company in 1989 and has made over $65,000,000 in improvements since that time.

- Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)?

No, the project will not result in any modifications or effects to individual features of an irrigation system.

- Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.

No, there are no buildings, structures, or features in the project area listed or eligible for listing on the National Register of Historic Places.

- Are there any known archeological sites in the proposed project area?

No, there are no known archaeological sites in the proposed project area. See Exhibit 1

- Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?

No, the project will not have a disproportionately high and adverse effect on low income or minority populations.

- Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

No, the project will not limit access to and ceremonial use of Indian sacred sites or result in other negative impacts on tribal lands.

- Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

The project will not contribute to the introduction, continued existence, or spread of noxious weeds or nonnative species known to occur in the area.

LETTERS OF SUPPORT

Please include letters from interested stakeholders supporting the proposed project. To ensure your proposal is accurately reviewed, please attach all letters of support/ partnership letters as an appendix. *(Note: this will not count against the application page limit.)* **Letters of support received after the application deadline for this FOA will not be considered in the evaluation of the proposal.**

Please see Exhibit 2.

REQUIRED PERMITS OR APPROVALS

Applicants must state in the application whether any permits or approvals are required and explain the plan for obtaining such permits or approvals.

There are no required permits anticipated for this project. The DWP Board of Commissioners adopted a categorical exemption on July 26, 2016 and filed a Notice of Exemption on July 29,

2016 for the proposed Solar Project, see Exhibit 1.

NEPA - National Environmental Policy Act: The DWP does not anticipate any impacts on the environment and will fit within a Categorical Exclusion to NEPA. Any environmental impacts will be minimized during construction using best management practices.

NHPA - National Historic Preservation Act: There will be no impacts on historic sites as a result of this project, see Exhibit 1.

ESA - Endangered Species Act: There is no critical habitat or endangered or threatened species that will be negatively affected by this project, see Exhibit 1.

State Permits: No State permits will be required for the project.

Local Permits: There are no other local permits that will be required for the project.

OFFICIAL RESOLUTION

Include an official resolution adopted by the applicant's board of directors or governing body, or, for state government entities, a signed statement from an official authorized to commit the applicant to the financial and legal obligations associated with receipt of a financial assistance award under this FOA, verifying:

• The identity of the official with legal authority to enter into an agreement

• The board of directors, governing body, or appropriate official who has reviewed and supports the application submitted

• The capability of the applicant to provide the amount of funding and/or in- kind contributions specified in the funding plan

• That the applicant will work with Reclamation to meet established deadlines for entering into a grant or cooperative agreement

An official resolution meeting the requirements set forth above is mandatory. If the applicant is unable to submit the official resolution by the application deadline because of the timing of board meetings or other justifiable reasons, the official resolution may be submitted up to 30 days after the application deadline.

The DWP Board of Commissioners are scheduled to consider the Resolution during the January 24, 2017 Board meeting. Once approved, the Resolution will be included with BBLDWP's applications.

PROJECT BUDGET

Section 1. Funding Plan and Letters of Commitment

The funding plan must include all project costs, as follows:

- How you will make your contribution to the cost-share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).

The DWP will fund any costs for the proposed Solar Project, above and beyond the amount funded by the federal government, with a combination of the following: Revenue from water rates, and/or capital improvement reserves.

- Describe any costs incurred before the anticipated Project start date that you seek to include as project costs.

None.

- Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.

Not applicable. The DWP intends to move forward with this project irrespective of potential funding.

- Describe any funding requested or received from other Federal partners.

Not applicable.

- Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.

None.

Please include the following chart to summarize all funding sources. Denote in-kind contributions with an asterisk (*).

Table No. 3 Funding Sources for Solar

FUNDING SOURCES	AMOUNT
Non-Federal Entities	
1. DWP Revenues and Reserves	$1,400,000
Non-Federal Subtotal:	$1,400,000
Other Federal Entities	
1.	N/A
Other Federal subtotal	-0-
Requested Reclamation funding:	$300,000

Section 2. Budget Proposal

The budget proposal should include detailed information on the categories listed below and must clearly identify all project costs. Unit costs shall be provided for all budget items including the cost of work to be provided by contractors. The budget proposal should also include any in-kind contributions of goods and services provided to complete the Project. It is strongly advised that applicants use the budget proposal format shown below or a similar format that provides this information. If selected for award, successful applicants must submit detailed supporting documentation for all budgeted costs.

Table No. 4 Budget Proposal for Solar

Budget Item Description	Computation			
	$/Unit	Quantity	Quantity Type	Total Cost
Labor and Fringe Benefits				$0
Travel				$0
Equipment				$0
Supplies and Materials				$0
Contractual/Construction				
Panels incl. inverter & BVES connection	$1,830	700	Panels	$1,281,000
Fencing	-	1,200 LF	Lump Sum	$35,000
Site work	-	-	Lump Sum	$50,000
Engineering	-	-	Lump Sum	$133,000
Other				
Construction contingency 15%	-	-	Lump Sum	$200,000
USBR Review	-	-	Lump Sum	$1,000
Total Direct Costs				$1,700,000
Indirect Costs				

Section 3. Budget Narrative

Salaries and Wages

The DWP is not including salaries and wages in the budget proposal.

Fringe Benefits

The DWP is not including fringe benefits in the budget proposal.

Travel

The DWP is not including travel in the budget proposal.

Equipment

Equipment will be included in the construction cost of the Solar Project.

Materials and Supplies

Materials and supplies will be included in the construction cost of the Solar Project.

Contractual

The DWP expects enter into two contracts associated with the Solar Project. The first is for engineering design and construction services; this contract is estimated to total $133,000. The second contract for construction of the Solar Project is expected to total $1,566,000.

Environmental and Regulatory Compliance Costs

Applicants must include a line item in their budget to cover environmental compliance costs.

The amount of the line item should be based on the actual expected environmental compliance costs for the project, including Reclamation's cost to review environmental compliance documentation. However, the minimum amount budgeted for environmental compliance should be equal to at least one to two percent of the total project costs. If the amount budgeted is less than one to two percent of the total project costs, you must include a compelling explanation of why less than one to two percent was budgeted.

After consulting with Reclamation staff on funding required for Reclamation to conduct any environmental compliance activities, including Reclamation's cost to review environmental compliance documentation, BBLDWP has budgeted $1,000 for USBR environmental review costs.

Other Expenses

No other expenses are anticipated for this project.

Indirect Costs

No indirect cost reimbursement is being requested for this project.

Total Costs

The total costs projected for the Division Well Field Solar Project are $1,700,000. Of this total $1,400,000 (82.35%) will be funded from non-federal sources and if awarded, up to $300,000 (17.65%) will be funded from proceeds awarded under BOR-DO-17-F012.

UNIQUE ENTITY IDENTIFIER AND SYSTEM FOR AWARD MANAGEMENT

The DWP is registered with SAM, ASAP and Grants.gov. The BBLDWP unique entity identifier has been provided in the SF-424. SAM registration will be maintained throughout the grant period.

Exhibit 1. 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

Service, Quality, Community

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 — 466

STATE CLEARINGHOUSE NUMBER *(If applicable)*
N/A

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY.

LEAD AGENCY	LEADAGENCY 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)

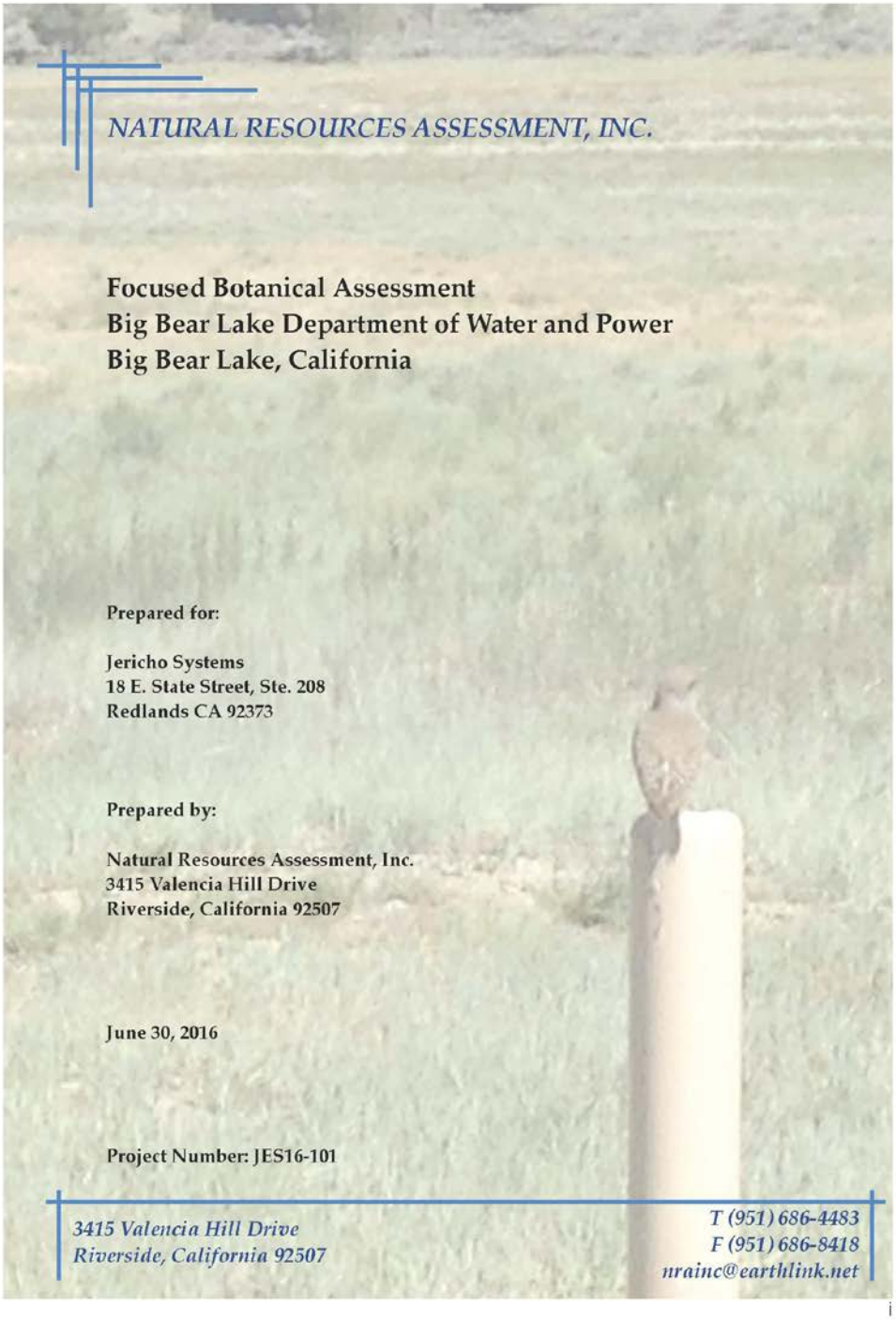
☐ Water Right Application or Petition Fee (State Water Resources Control Board only)	$850.00	$	0.00
☑ County documentary handling fee		$	50.00
☐ Other		$	

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. 20151215)



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Appendices

Executive Summary

Natural Resources Assessment, Inc. (NRAI) was contracted by Jericho Systems on behalf of Big Bear Lake Department of Water and Power to conduct a focused botanical assessment for their proposed solar facility in Big Bear Lake.

The botanical assessment was required because of the potential presence on site of sensitive botanical species of concern to the City of Big Bear Lake and the resource agencies.

Ms. Karen Kirtland of NRAI and Mr. Andrew C. Sanders, Museum Scientist of the Herbarium at the University of California, Riverside (subconsultant to NRAI), conducted botanical assessments of the proposed development area on April 20, June 1 and June 15, 2016, making notes on the general and sensitive biological resources present.

Sensitive species potentially present include those listed, or candidates for listing by the U. S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), California Native Plant Society (CNPS), and the City of Big Bear Lake. All sensitive species were considered as potentially present on the project site if its known geographical distribution encompassed all or part of the project area or if its distribution was near the site and its general habitat requirements were present.

No sensitive plant species were observed on site.

1.0 Introduction

Natural Resources Assessment, Inc. (NRAI) was contracted by Jericho Systems on behalf of Big Bear Lake Department of Water and Power to conduct a focused botanical assessment for their proposed solar facility in Big Bear Lake.

The botanical assessment was required because of the potential presence on site of sensitive botanical species of concern to the City of Big Bear Lake and the resource agencies.

2.0 Site Location and Project Description

The property is located along Division Road south of the lake in the city of Big Bear Lake. Big Bear Lake is on the north, residential development on the east, mixed commercial use and vacant property on the west and a commercial center on the south (Figures 1 and 2).

The property lies in Section 15, Township 2 north, Range 1 east, San Bernardino base and meridian (Figure 1).

The proposed project is the construction of solar facilities (Figure 3).

3.0 Methods

3.1 Data Review

NRAI conducted a data search for information on plant species known occurrences within the vicinity of the project. This review included biological texts on general and specific biological resources, and those resources considered to be sensitive by various wildlife agencies, local governmental agencies and interest groups.

NRAI used the information to focus our survey efforts in the field. Please see Section 6.0 for a complete listing of documents reviewed.

3.2 Field Assessment

Ms. Karen Kirtland of NRAI and Mr. Andrew C. Sanders, Museum Scientist of the Herbarium at the University of California, Riverside (subconsultant to NRAI), conducted botanical assessments of the proposed development area on April 20, June 1 and June 15, 2016, making notes on the general and sensitive biological resources present.

4.0 Results

The field team determined that status of flowering on site on April 20 and June 1 was not far enough along for proper identification of sensitive species. On June 15, some species had not yet fully flowered, but that flowering was far enough advanced to determine whether sensitive species were or would be flowering.

4.1 Weather, Topography and Soils

Weather at the beginning of the June 15 survey was 63 degrees Fahrenheit, 26 percent humidity, clear skies and an average wind of less than one mile per hour, gusting to three miles per hour. By the end of the survey, the temperature was 65 degrees Fahrenheit, the skies were still clear, humidity was 26 percent, and winds had increased to an average 1.1 miles hour, gusting to 2.7 miles per hour.

The site is generally flat, with a very slight downward slope northwest to the lake.

Map Base: Big Bear City (date unknown)
7.5' USGS topographic quadrangle

Figure 1. Project Location and Site Vicinity

N

Feet
(approximate)
0 60 120

June 30, 2016 Division Road JES16-101

Solar Site
Big Bear Lake Department of Water and Power
Big Bear Lake, California
2

Map Source: Google Earth 2014

Figure 2. Project Aerial

N

Feet
(approximate)

0 104 208

June 30, 2016 Division Road JBS16-101

Solar Site
Big Bear Lake Department of Water and Power
Big Bear Lake, California

3

Figure 3. Project Layout
Solar Site
Big Bear Lake Department of Water and Power
Big Bear Lake, California

The only soil identified on site is the Morical, very deep-Hecker families complex, found on two to fifteen percent slopes (Soil Survey Staff 2016). This soil is found over most of the site, except for the extreme northwestern corner. This area is identified in the soil study as being under the lake at the time of the original soil survey.

Morical soils are gravelly loams. Below the six inch A horizon is a gravelly clay loam. This can be seen in the small erosional ditch that flows north across the lake to the site. Morical soils are derived from alluvium and are found on terraces.

4.2 Land Uses

The project site has some structures on site, and a U-shaped paved road. In the southeastern corner, it appears there has been an attempt to revegetate the site with mix of native and non-native species such as Sierra juniper (*Juniperus grandis*), a native plant in the San Bernardino Mountains, and English yew (*Taxus baccata*), a non-native plant. Otherwise, the site appears to have been left fallow for the most part.

4.3 Plant Communities

The plant community found on site is a native meadow consisting of a mix of native and nonnative species. Species observed included native annuals such as spreading fleabane (*Erigeron divergens*), biennial cinquefoil (*Potentilla biennis*), and autumn willowweed (*Epilobium brachycarpum*), and nonnative annuals such as red-stemmed filaree (*Erodium cicutarium*), common malva (*Malva neglecta*) and tubercled crowfoot (*Ranunculus testiculatus*).

Shrub species observed were mostly natives such as green rabbitbrush (*Chrysothamnus viscidiflorus*) and rubber rabbitbrush (*Ericameria nauseosa*). Perennials include natives such as western aster (*Symphyotrichum ascendens*) and coast clover (*Trifolium wormskioldii*). Only two non-native perennials were observed: English plantain (*Plantago lanceolata*) and horned dandelion (*Taraxacum officinale*).

A list of all plant species observed is provided in Appendix A.

4.4 Sensitive Plant Species

Sensitive species potentially present include those listed, or candidates for listing by the U. S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), California Native Plant Society (CNPS), and the City of Big Bear Lake. All sensitive species were considered as potentially present on the project site if its known geographical distribution encompassed all or part of the project area or if its distribution was near the site and its general habitat requirements were present.

Table 1 lists the species from the Bear Valley area and the likelihood of occurrence. None of the sensitive plant species were observed on site.

Table 1. Sensitive Biological Resources

Resource	Habitat and Distribution	Activity Period	Status Designation	Occurrence Probability
Cushenbury oxytheca *Acanthoscyphus parishii* var. *goodmaniana*	Annual. Pinyon and juniper woodland on carbonate talus from 4200 to 7800 feet. Northern slopes of the San Bernardino Mountains. Threatened by carbonate mining.	May - September	FED: END STATE: ND CNPS: 1B.1	None. No limestone talus is present.
Big Bear Valley milk vetch *Astragalus lentiginosus* var. *sierrae*	Perennial. Stony places from 6000 to 7000 feet. Sagebrush scrub, yellow pine forest. Eastern end of the San Bernardino Mountains.	April - July flowering period	FED: C2* STATE: ND CNPS: 1B.2	None. As a perennial, it should have been observable during the field surveys. Property west of known habitat areas.
Big Bear Valley woolly pod *Astragalus leucolobus*	Perennial. Dry rocky areas, openings in sandy woods and stony shores in the mountains overlooking the desert. At elevations of 6000 to 8000 feet. Sagebrush scrub, central San Gabriel Mountains, San Bernardino and Santa Rosa Mountains.	May - July flowering period	FED: C2* STATE: ND CNPS: 1B.2	None. As a perennial, it should have been observable during the field surveys. In addition, project site is not on the desert side of the mountains where this species occurs.
Nevin's barberry *Berberis nevinii*	Perennial. Sandy and gravelly places below 2000 feet. Coastal sage scrub and chaparral. Hills south of Loma Linda, San Bdno. Co. and in the area around Vail Lake, Riverside Co.	Year round	FED: END STATE: END CNPS: 1B.1	None. This site does not have sandy or gravelly places. In addition, the site is above the known elevation distribution.
Parish's rock cress *Boechera parishii*	Tufted perennial from a branched caudex. Dry sunny slopes from 6500 to 9800 feet. Yellow pine forest, red fir forest. Bear Valley and Sugarloaf Peak, San Bernardino Mountains.	April - May flowering period	FED: C2* STATE: ND CNPS: 1B.2	None. As a perennial, it should have been observable during the field surveys. Species was not identified during the surveys.
Shockley's rock cress *Boecheris shockleyi*	Perennial from thick simple caudex. Dry rocky places in pinyon juniper woodland. Northern slopes of the San Bernardino Mountains. Western Nevada.	May - June flowering period	FED: ND STATE: ND CNPS: 2b.2	None. No suitable pinyon juniper woodland.

Table 1. Sensitive Biological Resources

Resource	Habitat and Distribution	Activity Period	Status Designation	Occurrence Probability
Palmer's mariposa lily *Calochortus palmeri* var. *palmeri*	Meadows and moist places in early spring. 3500 to 6500 feet. Chaparral and yellow pine forest. San Bernardino Mts. to Tehachapi Mts. East San Luis Obispo.	May - July	FED: C2* STATE: ND CNPS: 1B.2	None. The species was not observed.
Plummer's mariposa lily *Calochortus plummerae*	Dry, rocky areas in coastal sage scrub, chaparral, and yellow pine forest. Below 1700 meters (5000 feet) elevation. Santa Monica Mts. to San Jacinto Mts.	May - July	FED: C2* STATE: ND CNPS: 4.2	None. Site is well above the known elevation range for this species. No suitable habitat present.
Ash-gray Indian paintbrush *Castilleja cinerea*	Perennial. Local on dry benches and slopes, from 5000 to 9800 feet. Montane coniferous forest. San Bernardino Mountains.	May - August flowering period	FED: THR STATE: ND CNPS: 1B.2	None. As a perennial, it should have been observable during the field surveys.
San Bernardino Mountains owl's clover *Castilleja lasiorhyncha*	Annual. Meadows from 4600 to 7400 feet. Yellow pine forest. San Bernardino Mountains to Cuyamaca Mountains.	June - July	FED: C2* STATE: ND CNPS: 1B.2	None. The species was not observed.
Salt marsh bird's beak *Chloropyron maritimus* ssp. *maritimus*	Coastal salt marsh below 10 meters (30 feet) elevation. Southern California coast.	May - Oct	FED: END STATE: END CNPS: 1B.2	None. Site does not support coastal salt marsh habitat.
Mojave tarplant *Deinandra mohavensis*	Riparian scrub, Joshua tree woodland and chaparral from 2500 to 4800 feet. Low sand bars along riverbeds. Mostly in riparian areas or in ephemeral grassy areas. Deep Creek in San Bernardino Mtns; San Jacinto Mtns.	July - Sept	FED: ND STATE: END CNPS: 1B.3	None. Site does not support suitable riparian scrub habitat for this species.
San Bernardino Mountains dudleya *Dudleya abramsii* ssp. *affinis*	Pebble plains habitats in pinyon pine and juniper woodlands and upper montane coniferous forest. Granitic or quartzite or carbonate soils from 6000 to 8500 feet. San Bernardino Mountains.	April - June flowering period	FED: C2* STATE: ND CNPS: 1B.2	None. No plants observed, and suitable pebble plains habitat does not exist.

Table 1. Sensitive Biological Resources

Resource	Habitat and Distribution	Activity Period	Status Designation	Occurrence Probability
Big Bear Valley sandwort *Eremogne ursina*	Perennial with caespitose caudex. Dry slopes from 6000 to 7000 feet. Yellow pine forest, San Bernardino Mtns.	June - July flowering period	FED: THR STATE: ND CNPS: 1B.2	None. Suitable habitat (pebble plains or slopes containing similar habitat) is not present on site.
Limestone daisy *Erigeron uncialis* var. *uncialis*	Caespitose perennial. Crevices of limestone cliffs, 7000 to 9500 feet. Sagebrush scrub, bristlecone forest, pinyon juniper woodland. Clark Mountains, eastern San Bernardino Co., Inyo Mountains, Tin Mountain. Also western Mojave along the San Bernardino Mountains.	June - July flowering period	FED: ND STATE: ND CNPS: 1B.2	None. Project site lacks carbonate or limestone soils.
Southern mountain buckwheat *Eriogonum kennedyi* var. *austromontanum*	Perennial. Dry gravelly soils, and pebble (pavement) plains. On flat ground and slopes. 6,300 to 6,500 feet. Lower montane coniferous forest. Bear Valley, San Bernardino Mountains.	July - August flowering period	FED: THR STATE: ND CNPS: 1B.2	None. Suitable habitat lacking on site. In addition, as a perennial, it should have been observable during the field surveys. Species was not observed.
Cushenbury buckwheat *Eriogonum ovalifolium* var. *vineum*	Cespitose perennial. Limestone slopes from 5000 to 5500 feet. Joshua tree woodland, Cushenbury region on the northern slopes of the San Bernardino Mtns.	May - June flowering period	FED: END STATE: ND CNPS: 1B.1	None. Site is not in Joshua tree woodland.
Los Angeles sunflower *Helianthus nuttallii* ssp. *parishii*	Herbaceous perennial. Wet ground. 1000 to 1500 feet. Los Angeles, San Bernardino and Orange counties. Nearly if not entirely extinct.	August - October flowering period	FED: C2* STATE: ND CNPS: 1A	None. The species was not observed. In addition, the project site is well above the known elevation range.
Parish's alum root *Heuchera parishii*	Perennial herb. Alpine boulder and rock fields, lower to subalpine coniferous forests. Rocky places, 5000 to 8900 feet. Montane coniferous forest. San Bernardino Mountains.	July - August flowering period	FED: ND STATE: ND CNPS: 1B.3	None. Species is a perennial. It was not observed during the surveys.

Table 1. Sensitive Biological Resources

Resource	Habitat and Distribution	Activity Period	Status Designation	Occurrence Probability
Barton Flats horkelia *Horkelia wilderae*	Perennial herb from a deep taproot. Grows on dry benches from the upper elevations of chaparral habitat through to upper montane coniferous forest. 6000 to 8000 feet. San Bernardino Mountains. Known from less than 10 occurrences in the Barton Flats area. Threatened by logging and recreational activities	May – September flowering period	FED: C2* STATE: ND CNPS: 1B.1	None. Species is a perennial. It was not observed during the surveys.
Silver-haired ivesia *Ivesia argyrocoma* var. *argyrocoma*	Perennial. Dry meadows from 6500 to 7500 feet. Montane coniferous forest. San Bernardino Mountains.	June - August flowering period	FED: C2* STATE: ND CNPS: 1B.2	None. Species is a perennial. It was not observed during the surveys.
Lemon lily *Lilium parryi*	Springy places and wet banks; 4000 to 9000 feet elev. Montane coniferous forest. San Gabriel Mts. To San Diego County.	July - Aug	FED: C2* STATE: ND CNPS: 1B.2	None. The site does not contain springy places or wet banks suitable for this species.
San Gabriel linanthus *Linanthus concinnus*	Dry rocky slopes 5000 to 8500 ft elev. San Gabriel Mountains. Montane coniferous forest.	May - July	FED: C2* STATE: ND CNPS: 1B.2	None. The site is not in the San Gabriel Mountains.
Baldwin Lake linanthus *Linanthus killipii*	Annual. Meadows and seeps on alkaline soils, pebble pavement plains habitat, pinyon and juniper woodland to upper montane coniferous forest. Pinyon juniper woodland, Cactus Flat area to Baldwin Lake, San Bernardino Mountains. Recent data suggests this plant is now limited to the Baldwin Lake area.	May - July	FED: C2* STATE: ND CNPS: 1B.2	None. This species was not observed.
Parish's desert-thorn *Lycium parishii*	Perennial. Sandy to rocky slopes and canyons below 3000 feet. Possibly coastal sage scrub, definitely in creosote bush scrub. San Bernardino Valley and western Colorado Desert.	Year round	FED: ND STATE: ND CNPS: 2B.3	None. Species should have been observable during surveys. In addition, site does not contain coastal sage scrub or creosote bush scrub.

Table 1. Sensitive Biological Resources

Resource	Habitat and Distribution	Activity Period	Status Designation	Occurrence Probability
San Bernardino Mountains monkeyflower *Mimulus exiguus*	Annual. Meadows and seeps, pebble pavement plain habitats. Upper montane coniferous forest, usually on clay soils. 6000 to 7500 feet. San Bernardino Mountains, northern Baja California.	June - July	FED: C2* STATE: ND CNPS: 1B.2	None. This species was not observed.
Purple monkeyflower *Mimulus purpureus*	Annual. Annual. Meadows and seeps, pebble pavement plain habitats. Upper montane coniferous forest 6000 to 7500 feet, San Bernardino Mountains.	May - July	FED: C2* STATE: ND CNPS: 1B.2	None. This species was not observed.
Hall's monardella *Monardella macrantha* ssp. *hallii*	Perennial from slender woody rootstocks. Dry slopes and ridges, 2400 - 7200 feet. Valley grasslands to lower montane coniferous forest. San Gabriel and San Bernardino Mtns. to Cuyamaca and Santa Ana Mtns.	June - Aug flowering period	FED: C2* STATE: ND CNPS: 1B.3	None. Species was not found on site.
Short-joint beavertail *Opuntia basilaris* var. *brachyclada*	Historically distributed on the desert slopes of the San Gabriel and San Bernardino Mountains, and also the Providence Mountains. Occurs on dry slopes in chaparral and riparian woodland areas. Also found in Joshua tree woodland. 1400 to 6000.	Year round	FED: C2* STATE: ND CNPS: 1B.2	None. Not observed during the surveys. Site is outside known range and habitat for this species.
Cushenbury oxytheca *Acanthoscyphus parishii* var. *goodmaniana*	Annual. Pinyon and juniper woodland on carbonate talus from 4200 to 7800 feet. Northern slopes of the San Bernardino Mountains. Threatened by carbonate mining.	May - September	FED: END STATE: ND CNPS: 1B.1	None. No limestone talus is present.
San Bernardino ragwort *Packera bernardina*	Annual. Meadows and seeps, pebble pavement plain habitats. Upper montane coniferous forest. 6000 to 7500 feet. Bear and Holcomb Valleys, San Bernardino Mountains.	May - July flowering period	FED: C2* STATE: ND CNPS: 1B.2	None. This species was not observed.

Table 1. Sensitive Biological Resources

Resource	Habitat and Distribution	Activity Period	Status Designation	Occurrence Probability
Parish's yampah *Perideridia parishii* ssp. *parishii*	Damp meadows, and seeps. 4800 to 9850 feet. Lower to upper montane coniferous forest. San Bernardino Mountains.	June - July	FED: ND STATE: ND CNPS: 2B.2	None. This species was not observed.
Big Bear Valley phlox *Phlox dolichantha*	Perennial herb from underground rootstock. Pebble pavement plains in openings in montane coniferous forest. 6000 to 9700 feet. Bear Valley, San Bernardino Mountains.	June - July	FED: C2* STATE: ND CNPS: 1B.2	None. As a perennial, it should have been observable during the field surveys. The site is outside the known geographic range for this species.
San Bernardino Mountains bladderpod *Physaria kingii* ssp. *bernardina*	Perennial. Dry flats from 6600 to 6700 feet. Lower montain coniferous forest to pinyon and juniper woodland. Usually on carbonate soils. Eastern end of Bear Valley, San Bernardino Mountains. Known from only five occurrences in the Big Bear Valley area.	May - June flowering period	FED: END STATE: ND CNPS: 1B.1	None. Site does not contain dry flats.
San Bernardino blue grass *Poa atropurpurea*	Rhizomatous perennial. Meadows and seeps. 4400 to 8100 feet. Montane coniferous forest, San Bernardino Mountains.	Jan - July flowering period	FED: END STATE: ND CNPS: 1B.2	None. As a perennial, it should have been observable during the field surveys. No suitable moist habitat present.
Frosted mint *Poliomintha incana*	Collected only from wet place above Cushenbury Springs. Only one population recorded. Lower montane coniferous forest. 5200 to 6000 feet. Northern base of the San Bernardino Mountains.	June - July flowering period	FED: ND STATE: ND CNPS: 2A	None. No suitable wet places are present. Site is not near known populations.
Bear Valley pyrrocoma *Pyrrocoma uniflora* var. *gossypina*	Alkaline soils of pavement plains. 5200 to 7600 feet. Baldwin Lake area, San Bernardino Mountains.	July - September flowering period	FED: C2* STATE: ND CNPS: 1B.2	None. No suitable alkaline soils are present.
Parish's gooseberry *Ribes divaricatum* var. *parishii*	Perennial. Willow thickets, swamps, similar moist and damp sites. 200 to 3200 feet. Coastal sage scrub. San Bernardino region and Los Angeles County.	March - April flowering period	FED: C2* STATE: ND CNPS: 1A	None. No suitable swamps, thickets, or similar moist places are present on site. Site is outside known range.

Table 1. Sensitive Biological Resources

Resource	Habitat and Distribution	Activity Period	Status Designation	Occurrence Probability
Parish's checkerbloom *Sidalcea hickmanii* ssp. *parishii*	Found on dry mountain slopes within chaparral cismontane woodlands and lower montane coniferous forest 3200 and 8200 feet. San Bernardino and Los Padres National forests. Found in recently burned areas, grazed and maintained fuel breaks, and in areas along recent trail construction.	July - August	FED: C STATE: ND CNPS: 1B.2	None. This is a perennial species and should have been present during the survey.
Bird-foot checkerbloom *Sidalcea pedata*	Annual. Meadows and seeps, pebble pavement plain habitats. 5200 to 8200 feet. San Bernardino Mountains, northern Baja California. Montane coniferous forest, San Bernardino Mountains.	May - July	FED: END STATE: END CNPS: 1B.1	None. This species was not observed.
San Bernardino Mountains Jewel-flower *Streptanthus bernardinus*	Mostly perennial. Dry slopes, 1900 to 8200 feet. Chaparral and montane coniferous forest. San Gabriel Mountains to Laguna Mountains.	June - July flowering period	FED: ND STATE: ND CNPS: 4.3 Forest Sensitive Species	None. This is a perennial species and should have been present during the survey. Site does not contain suitable soils for this species.
California dandelion *Taraxacum californicum*	Moist meadows from 5300 to 9100 feet. Montane forest. San Bernardino Mountains.	May - July	FED: END STATE: ND CNPS: 1B.2	None. This species was not observed.
Slender-petalled thelypodium *Thelypodium stenopetalum*	Moist meadows and seeps on alkaline soils. 5200 to 8200 feet. Montane forest. Bear Valley, San Bernardino Mountains.	June - July	FED: END STATE: END CNPS: 1B.1	None. This species was not observed.
Sonoran maiden fern *Thelypteris puberula* var. *sonorensis*	Occasional in wet shaded canyons below 3000 feet in meadows, seep and stream areas. Chaparral, creosote bush scrub. Lower slopes of Peninsular and Transverse mountains to Baja California.	Year round	FED: ND STATE: ND CNPS: 2B.2	None. Site does not contain suitable watered habitats Site is above known elevation range.

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Appendix A - Plant Species Observed

Division Dr., Big Bear

Fam.	Scientific Name	Habit	CA	Abundance	Notes
CUPR	Juniperus grandis R.P. Adams ?	tree	N		Planted small saplings
PIN+	Pinus	tree			Planted small sapling
TAX+	Taxus baccata L. ?	shrub	I		Planted small saplings (2)
ASTE	Achillea millefolium L.	perennial	N		
ASTE	Artemisia cana Pursh ?	shrub	N		Out of range, no fls. or frt. except old remnants.
ASTE	Artemisia ludoviciana Nutt.	perennial	N		
ASTE	Carduus nutans L. ssp. nutans	annual	I		
ASTE	Chrysothamnus viscidiflorus (Hook.) Nutt.	shrub	N		
ASTE	Conyza canadensis (L.) Cronq.	annual	I		
ASTE	Ericameria nauseosa (Pallas ex Pursh) Nesom & Baird	shrub	N		
ASTE	Erigeron divergens Torr. & Gray	annual	N		
ASTE	Lactuca serriola L.	annual	I		
ASTE	Matricaria discoidea DC.	annual	N		
ASTE	Sonchus asper (L.) Hill	annual	I		
ASTE	Symphyotrichum ascendens (Lindl.) Nesom ?	perennial	N		Vegetative
ASTE	Taraxacum officinale G.H. Weber ex Wiggers	perennial	I		
ASTE	Tragopogon dubius Scop.	biennial	I		
BRAS	Chorispora tenella (Pallas) DC.	annual	I		
BRAS	Descurainia pinnata (Walt.) Britt.	annual	N		
BRAS	Descurainia sophia (L.) Webb ex Prantl	annual	I		
BRAS	Lepidium perfoliatum L.	annual	I		
BRAS	Lepidium virginicum L.	biennial	N		
BRAS	Sisymbrium altissimum L.	annual	I		
CHEN	Atriplex rosea L.	annual	I		
CHEN	Chenopodium fremontii S. Wats. ?	annual	N		Very immature

Observers: A.C. Sanders, K. Kirtland **01 Jun, 2016**

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Division Dr., Big Bear

Fam.	Scientific Name	Habit	CA	Abundance	Notes
CHEN	Kochia scoparia (L.) Schrad.	annual	I		Immature
CHEN	Salsola tragus L.	annual	I		
CORN	Cornus?	shrub			cultivated
FAB+	Lupinus lepidus Dougl. ex Lindl. var. confertus (Kell.) Smith	perennial	N		
FAB+	Medicago lupulina L.	annual	I		
FAB+	Melilotus officinalis (L.) Lam	annual	I		
FAB+	Trifolium wormskioldii Lehm.	perennial	N		Coll
GERA	Erodium cicutarium (L.) L'Her. ex Ait.	annual	I		
MALV	Malva neglecta Wallroth.	annual	I		
ONAG	Epilobium brachycarpum C. Presl	annual	N		
ONAG	Epilobium ciliatum Raf.	annual/perennial	N		
ONAG	Oenothera californica Wats.	perennial	N		
PAPA	Argemone munita Dur. & Hilg.	perennial	N		
PLAN	Plantago lanceolata L.	perennial	I		
POLG	Polygonum aviculare L.	annual	I		
POLG	Rumex salicifolius Weinm.	perennial	N		Coll
RANU	Aquilegia formosa Fisch. ex DC. ?	perennial	N		Vegetative; escape from cultivation? planted?
RANU	Ranunculus testiculatus Crantz	annual	I		
ROS+	Potentilla anserina L.	perennial	N		
ROS+	Potentilla biennis Greene	biennial	N		
ROS+	Potentilla wheeleri S. Wats.	perennial	N		
ROS+	Prunus cerasifera Ehrh.	tree	I		Seedling
SALI	Populus tremuloides Michx.	tree	N		Planted small sapling
SALI	Salix lasiolepis Benth.	shrub	N		
SCRO	Verbascum thapsus L.	biennial	I		

Observers: A.C. Sanders, K. Kirtland **01 Jun, 2016**

Division Dr., Big Bear

Fam.	Scientific Name	Habit	CA	Abundance	Notes
SCRO	Veronica peregrina L. ssp. xalapensis (Kunth) Pennell	annual	N		
SOLA	Nicotiana attenuata Torr. ex S. Wats.	annual	N		
URTI	Urtica dioica L.	perennial	N		
VERB	Verbena lasiostachys Link.	perennial	N		
CYPE	Carex athrostachya Olney	perennial	N		
CYPE	Carex praegracilis W. Boott	perennial	N		
JUNC	Juncus balticus Willd.	perennial	N		
PO++	Bromus carinatus Gray	perennial	N		
PO++	Bromus japonicus Thunb. ex Murr. ?	annual	I		Coll
PO++	Bromus tectorum L.	annual	I		
PO++	Elymus triticoides Buckl.	perennial	N		
PO++	Hordeum brachyantherum Nevski ssp. brachyantherum	perennial	N		
PO++	Hordeum jubatum L.	perennial	N		
PO++	Hordeum murinum L.	annual	I		
PO++	Muhlenbergia richardsonis (Trin.) Rydb.	perennial	N		
PO++	Poa pratensis L.	perennial	N/I		
PO++	Puccinellia nuttalliana (J.A. Schultes) A.S. Hitchc.	perennial	N		
PO++	Sporobolus cryptandrus (Torr.) Gray ?	perennial	N		

Appendix B - Definitions of Species Status Classification

FED: Federal Classifications

END	Taxa listed as endangered
THR	Taxa listed as threatened
PE	Taxa proposed to be listed as endangered
PT	Taxa proposed to be listed as threatened
C2*	The U.S. Fish and Wildlife Service (USFWS) revised its classifications of candidate taxa (species, subspecies, and other taxonomic designations). Species formerly designated as "Category 1 Candidate for listing" are now known simply as "Candidate". The former designation of "Category 2 Candidate for listing" has been discontinued. The USFWS will continue to assess the need for protection of these taxa and may, in the future, designate such taxa as Candidates. NRAI has noted the change in species status by marking with an asterisk (*) those C2 candidates that were removed from the list.
C	Candidate for listing. Refers to taxa for which the USFWS has sufficient information to support a proposal to list as Endangered or Threatened and issuance of the proposal is anticipated but precluded at this time.
BCC	Bird of Conservation Concern
ND	Not designated as a sensitive species

STATE: State Classifications

END	Taxa listed as endangered
THR	Taxa listed as threatened
CE	Candidate for endangered listing
CT	Candidate for threatened listing
CFP	California Fully Protected. Species legally protected under special legislation enacted prior to the California Endangered Species Act.
SSC	Species of Special Concern. Taxa with populations declining seriously or that are otherwise highly vulnerable to human development.
SA	Special Animal. Taxa of concern to the California Natural Diversity Data Base regardless of their current legal or protected status.
WL	Watch list.
ND	Not designated as a sensitive species

CNPS: California Native Plant Society Classifications

1A	Plants presumed by CNPS to be extinct in California
1B	Plants considered by CNPS to be rare or endangered in California and elsewhere
2P	Plants considered by CNPS to be rare, threatened or endangered in California, but which are more common elsewhere.
3	Review list of plants suggested by CNPS for consideration as endangered but about which more information is needed.
4	Watch list of plants of limited distribution whose status should be monitored

CNPS: Threat Codes

.1	Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2	Fairly endangered in California (20-80% occurrences threatened)
.3	Not very endangered in California (<20% of occurrences threatened or no current threats known)

June 6, 2016

Shay Lawrey
Jericho Systems, Inc.
108 Orange Street, Suite 10
Redlands, California 92373

Subject: **Cultural Resources Records Search for the City of Big Bear Lake Department of Water and Power Solar Project, Big Bear Lake, San Bernardino County, California (BCR Consulting Project No. JER1606)**

Dear Shay:

BCR Consulting LLC (BCR Consulting) was retained by Jericho Systems, Inc. to complete a cultural resources records search for the City of Big Bear Lake Department of Water and Power Solar Project in the City of Big Bear Lake, San Bernardino County, California. The purpose of this study was to identify prehistoric or historic-period resources within one mile of the project site.

Cultural Resources Records Search

BCR Consulting Principal Investigator/Archaeologist David Brunzell conducted the cultural resources records search at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton. The records search included a review of all recorded historic and prehistoric archaeological sites, as well as recorded built environment resources within one mile of the project site. The research also reviewed known cultural resource reports completed in the vicinity.

The research revealed that 19 cultural resource studies have taken place resulting in 27 cultural resources recorded within one mile of the project site. Of these resources, 24 were prehistoric, two were historic-period, and one had historic-period and prehistoric components. The nearest resource was a small prehistoric lithic scatter (designated P-36-22577) located approximately one-quarter mile north of the project site. The project site has been subject to one previous cultural resources study that reviewed conditions and probability based on previous surveys, but did not conduct any fieldwork. No cultural resources have been previously recorded within the project site boundaries. Aerial photos from the U.S. Department of Agriculture were also reviewed. This research indicates that facilities for Division Well No. 8 were constructed in 2012/2013. Big Bear Lake Department of Water and Power personnel have confirmed this construction date. The records search results are summarized in Table A.

Table A. Records Search Results (One-Mile Radius)

USGS 7.5 Min. Quad	Cultural Resources	Cultural Resource Reports*
Big Bear City (1996) and *Fawnskin* (1996), *California*	P-36-22568, 22569, 22570, 22572, 22577, 22578, 22579, 22580, 22593, 22594, 22595, 22598, 22599, 22600, 22601, 22602, 22604, 22605, 22606, 22608, 22610, 22611, 22612, 22613, 22614, 22573, 22663	SB-106-0555, 0605, 0930, 1136, 1889, 0217, 0297, 2210, 2392, 2446, 3208, 3209, 3297*, 3883, 4618, 4621, 4919, 5312, 5364

*Previously assessed the project site as a General Plan Assessment. No fieldwork was conducted.

Summary and Recommendations

The project site has been subject to one cultural resources study, although no fieldwork was conducted during this study. However, since minimal ground disturbance is proposed in an area that has been subject to modern development, impacts to cultural resources are not likely. Based on these results, no additional cultural resources work or monitoring is recommended. If any cultural resources are discovered during project activities, ground disturbance should stop and a qualified archaeologist should be contacted to record and evaluate the find.

If human remains are encountered during activities associated with the proposed project, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC.

Please contact me by phone at 909/525-7078 or e-mail at david.brunzell@yahoo.com with any questions or comments.

Sincerely,

David Brunzell, M.A./RPA
Principal Investigator/Archaeologist

Exhibit 2. Letters of Support

PAUL COOK
8TH DISTRICT, CALIFORNIA

1222 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-5861

Congress of the United States
House of Representatives
Washington, DC 20515–0508

January 4, 2017

Bureau of Reclamation
Financial Assistance Services
Attn: Ms. Rupal Shah
P. O. Box 25007
Denver, Colorado 80225

RE: WaterSmart 2017: Division Well Field Solar Project

Ms. Shah,

It is my pleasure to submit this letter in support of the City of Big Bear Lake, Department of Water and Power (BBLDWP) Division Well Field Solar Project (Solar Project). The Solar Project is proposed to be located near the west end of the Big Bear Airport, in the remote mountain community of Big Bear Lake, a four-season resort town that can attract in excess of 100,000 people on holiday weekends. The proposed Solar Project will provide renewable energy to power five (5) BBLDWP Well Pumping Plants and will reduce annual operating costs by an estimated $125,000.

Funds will be used to construct approximately 700 solar panels that will provide power to the Division Well Pumping Plants. The solar panels are made with non-reflective material and there are numerous installations of this type constructed adjacent to airports. The proposed project is located between the Big Bear Airport and Baker Pond, an area where very few residential homes are located. The proposed project will produce approximately 165,000 KWh of power per year. The Solar panels will be set approximately three feet above finish grade and the Solar Project site will be surrounded by a 6-foot high chain link fence with slats to minimize the visual impact of the facility. The Project will reduce BBLDWP's electrical power operating costs by approximately 25% and is a beneficial project for the community.

The proposed Solar Project will remove a significant electrical load from Bear Valley Electric Service's facilities, which will defer costly upgrades to their electrical system. To bolster the community's efforts to use renewable energy sources, the BBLDWP is taking a proactive approach to conserve energy.

I fully support the efforts of the BBLDWP as they seek external funding for the Solar Project.

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power Division Well Field Solar Project.

Sincerely,

Col. Paul Cook (Ret.)
Congressman, 8th District of California

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CAPITOL OFFICE
STATE CAPITOL
ROOM 3056
SACRAMENTO, CA 95814
TEL (916) 651-4023
FAX (916) 651-4923

DISTRICT OFFICE
10350 COMMERCE CENTER DRIVE
SUITE A-220
RANCHO CUCAMONGA, CA 91730
TEL (909) 919-7731
FAX (909) 919-7739

California State Senate

MIKE MORRELL
SENATOR, TWENTY-THIRD DISTRICT

COMMITTEES
PUBLIC EMPLOYMENT AND RETIREMENT
VICE CHAIR
BANKING & FINANCE
ENERGY

Bureau of Reclamation
Financial Assistance Services
Attn: Ms. Rupal Shah
P. O. Box 25007
Denver, Colorado 80225

RE: WaterSmart 2017: City of Big Bear Lake, Department of Water and Power - Division Well Field Solar Project

Ms. Shah,

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power (BBLDWP) Division Well Field Solar Project (Solar Project). The Solar Project will provide renewable energy to power five (5) BBLDWP Well Pumping Plants and will reduce annual operating costs an estimated $125,000. Funds will be used to construct approximately 700 solar panels to provide power to the Division's Well Pumping Plants. The proposed solar project will be located near the west end of the Big Bear Airport and Baker Pond. This location is well removed from residential homes in the community.

The solar panels are made with non-reflective material and utilizing current practices for installation of solar projects adjacent to airports. The Solar Project will produce approximately 165,000 KWh of power per year. The solar panels will be set approximately three feet above finish grade. Additionally, the Solar Project site will be fenced with 6-foot high chain link fence with slats to minimize the visual impact of the facility. The project will reduce BBLDWP's electrical power operating costs by approximately 25% and remove a significant electrical load from Bear Valley Electric Service's facilities, which will defer costly upgrades to their electrical system.

I support the efforts of the BBLDWP as they seek grant funding for the Solar Project.

Sincerely,

Senator Mike Morrell
California's 23rd District
Suite A-220
Rancho Cucamonga, CA 91730
(909) 919-7731

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STATE CAPITOL
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DISTRICT OFFICE
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Assembly
California Legislature

JAY OBERNOLTE
ASSEMBLYMAN, THIRTY-THIRD DISTRICT

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SUBCOMMITTEES
BUDGET SUBCOMMITTEE NO. 6 ON BUDGET PROCESS, AND PROGRAM EVALUATION

JOINT COMMITTEES
JOINT COMMITTEE ON ARTS
JOINT LEGISLATIVE BUDGET

Bureau of Reclamation
Financial Assistance Services
Attn: Ms. Rupal Shah
P. O. Box 25007
Denver, Colorado 80225

RE: WaterSmart 2017: City of Big Bear Lake, Department of Water and Power - Division Well Field Solar Project

Ms. Shah,

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power (BBLDWP) Division Well Field Solar Project (Solar Project). The Solar Project is proposed to be located near the west end of the Big Bear Airport, in the remote mountain community of Big Bear Lake, a four-season resort town that can attract in excess of 100,000 people on holiday weekends. The proposed Solar Project will provide renewable energy to power five (5) BBLDWP Well Pumping Plants and will reduce annual operating costs an estimated $125,000.

Funds will be used to construct approximately 700 solar panels to provide power to the Division Well Pumping Plants. The solar panels are made with non-reflective material and there are numerous installations of this type constructed adjacent to airports. The proposed project is located between the Big Bear Airport and Baker Pond, so there are very few residential homes in the area. The proposed project will produce approximately 165,000 KWh of power per year. The Solar panels will be set approximately three feet above finish grade and the Solar Project site will be fenced with 6-foot high chain link fence with slats to minimize the visual impact of the facility. The Project will reduce BBLDWP's electrical power operating costs by approximately 25% and is a beneficial project for the community.

The proposed Solar Project will remove a significant electrical load from Bear Valley Electric Service's facilities, which will defer costly upgrades to their electrical system. To bolster the community's efforts to use renewable energy sources, the BBLDWP is taking a proactive approach to conserve energy.

I fully support the efforts of the BBLDWP as they seek external funding for the Solar Project.

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power Division Well Field Solar Project.

Sincerely,

Assemblyman Jay Obernolte
33rd Assembly District
State Capitol Office: Room 4116
Sacramento, CA 94249
(916) 319-2033

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Service, Quality, Community

Bear Valley
Electric Service
A Division of Golden State Water Company

Bureau of Reclamation
Financial Assistance Services
Attn: Ms. Rupal Shah
P. O. Box 25007
Denver, Colorado 80225

RE: WaterSmart 2017: City of Big Bear Lake, Department of Water and Power - Division Well Field Solar Project

Ms. Shah,

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power (BBLDWP) Division Well Field Solar Project (Solar Project). The Solar Project is proposed to be located near the west end of the Big Bear Airport, in the remote mountain community of Big Bear Lake, a four-season resort town that can attract in excess of 100,000 people on holiday weekends. The proposed Solar Project will provide renewable energy to power five (5) BBLDWP Well Pumping Plants.

Funds will be used to construct approximately 700 solar panels to provide power to the Division Well Pumping Plants. The solar panels are made with non-reflective material and there are numerous installations of this type constructed adjacent to airports. The proposed project is located between the Big Bear Airport and Baker Pond, so there are very few residential homes in the area. The proposed project will produce approximately 165,000 KWh of power per year. The Solar panels will be set approximately three feet above finish grade and the Solar Project site will be fenced with 6-foot high chain link fence with slats to minimize the visual impact of the facility. The Project will reduce BBLDWP's electrical power operating costs by approximately 25% and is a beneficial project for the community.

The proposed Solar Project will remove a significant electrical load from Bear Valley Electric Service's facilities, which may defer costly upgrades to their electrical system. To bolster the community's efforts to use renewable energy sources, the BBLDWP is taking a proactive approach to conserve energy.

I fully support the efforts of the BBLDWP as they seek external funding for the Solar Project.

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power Division Well Field Solar Project.

Sincerely,

Paul Marconi
Director

P.O. Box 1547, 42020 Garstin Drive, Big Bear Lake, California 92315
Tel: (909) 866-4678 Fax: (909) 866-5056

BIG BEAR CITY
Community Services District

Bureau of Reclamation
Financial Assistance Services
Attn: Ms. Rupal Shah
P. O. Box 25007
Denver, Colorado 80225

RE: WaterSmart 2017: City of Big Bear Lake, Department of Water and Power - Division Well Field Solar Project

Ms. Shah,

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power (BBLDWP) Division Well Field Solar Project (Solar Project). The Solar Project is proposed to be located near the west end of the Big Bear Airport, in the remote mountain community of Big Bear Lake, a four-season resort town that can attract in excess of 100,000 people on holiday weekends. The proposed Solar Project will provide renewable energy to power five (5) BBLDWP Well Pumping Plants and will reduce annual operating costs an estimated $125,000.

Funds will be used to construct approximately 700 solar panels to provide power to the Division Well Pumping Plants. The solar panels are made with non-reflective material and there are numerous installations of this type constructed adjacent to airports. The proposed project is located between the Big Bear Airport and Baker Pond, so there are very few residential homes in the area. The proposed project will produce approximately 165,000 KWh of power per year. The Solar panels will be set approximately three feet above finish grade and the Solar Project site will be fenced with 6-foot high chain link fence with slats to minimize the visual impact of the facility. The Project will reduce BBLDWP's electrical power operating costs by approximately 25% and is a beneficial project for the community.

The proposed Solar Project will remove a significant electrical load from Bear Valley Electric Service's facilities, which will defer costly upgrades to their electrical system. To bolster the community's efforts to use renewable energy sources, the BBLDWP is taking a proactive approach to conserve energy.

I fully support the efforts of the BBLDWP as they seek external funding for the Solar Project.

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power Division Well Field Solar Project.

Sincerely,

Scott Heule
General Manager

Office 909.585.2565 | After Hours Emergency 909.585.2567 | Fax 909.585.0025 | 139 E. Big Bear Blvd. | PO Box 558 | Big Bear City, CA 92314 | bbccsd.org

Santa Ana Watershed Project Authority

OVER 45 YEARS OF INNOVATION, VISION, AND WATERSHED LEADERSHIP

One Water One Watershed
AWRA INTEGRATED WATER RESOURCES MANAGEMENT AWARD
HARVARD KENNEDY SCHOOL'S TOP 25 INNOVATIONS IN AMERICAN GOVERNMENT

January 10, 2017

Bureau of Reclamation
Financial Assistance Services
Attn: Ms. Rupal Shah
P. O. Box 25007
Denver, Colorado 80225

RE: WaterSmart 2017: City of Big Bear Lake, Department of Water and Power - Division Well Field Solar Project

Ms. Shah,

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power (BBLDWP) Division Well Field Solar Project (Solar Project). The Solar Project is proposed to be located near the west end of the Big Bear Airport, in the remote mountain community of Big Bear Lake, a four-season resort town that can attract in excess of 100,000 people on holiday weekends. The proposed Solar Project will provide renewable energy to power five BBLDWP Well Pumping Plants and will reduce annual operating costs an estimated $125,000.

Funds will be used to construct approximately 700 solar panels to provide power to the Division Well Pumping Plants. The solar panels are made with non-reflective material and there are numerous installations of this type constructed adjacent to airports. The proposed project is located between the Big Bear Airport and Baker Pond, so there are very few residential homes in the area. The proposed project will produce approximately 165,000 KWh of power per year. The Solar panels will be set approximately three feet above finish grade and the Solar Project site will be fenced with 6-foot high chain link fence with slats to minimize the visual impact of the facility. The Project will reduce BBLDWP's electrical power operating costs by approximately 25% and is a beneficial project for the community.

The proposed Solar Project will remove a significant electrical load from Bear Valley Electric Service's facilities, which will defer costly upgrades to their electrical system. To bolster the community's efforts to use renewable energy sources, the BBLDWP is taking a proactive approach to conserve energy.

I fully support the efforts of the BBLDWP as they seek external funding for the Solar Project. It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power Division Well Field Solar Project.

Sincerely,

Celeste Cantú
General Manager

11615 Sterling Avenue, Riverside, CA 92503 • 951.354.4220
www.sawpa.org • www.sawpa.org/OWOW

Santa Ana Watershed Project Authority

OVER 45 YEARS OF INNOVATION, VISION, AND WATERSHED LEADERSHIP

One Water One Watershed

AWRA INTEGRATED WATER RESOURCES MANAGEMENT AWARD

HARVARD KENNEDY SCHOOL'S TOP 25 INNOVATIONS IN AMERICAN GOVERNMENT

January 10, 2017

Bureau of Reclamation
Financial Assistance Services
Attn: Ms. Rupal Shah
P. O. Box 25007
Denver, Colorado 80225

RE: WaterSmart 2017: City of Big Bear Lake, Department of Water and Power - Advanced Metering Infrastructure Project

Ms. Shah,

It is my pleasure to write this letter in support of the City of Big Bear Lake, Department of Water and Power (BBLDWP) Advanced Metering Infrastructure (AMI) Project. Sustained support of the AMI project will allow the BBLDWP to continue to convert meters from old, outdated, and sometimes inaccurate, meters to "smart" meters. This project provides real time radio reads of water consumption to the BBLDWP staff, allowing them to reduce water waste through active monitoring and leak detection along with enforcement of water regulations and enhanced customer engagement.

The BBLDWP serves a mountain community of about 15,600 connections and is somewhat unique in its need for AMI. First, extreme weather creates two water loss issues; heavy winter snows mean meter reads must sometimes be estimated, which means leaks can go undetected for months and freezing temperatures result in leaky pipes, wasted water and customer property damage. Second, nearly 70% of BBLDWP customers are second homeowners which can make leak detection and timely repair exceedingly difficult. In addition, some affluent homeowners have an expectation of landscaping that may not be suitable for arid and high elevation properties and requires irrigation that is inconsistent with BBLDWP water conservation regulations. Lastly, the BBLDWP has no imported water so conservation is a constant. AMI will help the BBLDWP address all of these issues.

Last but not least this project is in alignment with the Santa Ana Watershed Project Authority's One Water One Watershed (OWOW) sustainability initiative identified in the Bureau of Reclamation's Basin Study. In conclusion, I fully support the efforts of the BBLDWP as they seek external funding to support a program designed to provide a robust dataset for water management that will result in water and energy conservation.

Sincerely,

Celeste Cantú
General Manager