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MEMORANDUM

To:	Patrick Brown, BayWa Renewable Energy
From:	Trey Driscoll, PG, CHG
Subject:	Groundwater Technical Studies Required for a Major Use Permit through the County of San Diego
Date:	November 2, 2017
cc:	David Hochart, Dudek
Attachment(s):	Figure 1

BayWa Renewable Energy has requested information regarding technical studies to support its Major Use Permit (MUP) pre-application meeting with the County of San Diego (County) to permit the Jacumba Valley Ranch project site (approximately 1,289 acres) for the development of approximately 100 MW's of solar energy facilities. Dudek has provided an estimated scope of work for the evaluation of groundwater resources to support the County MUP application.

The County regulates groundwater through the San Diego County Groundwater Ordinance (County of San Diego, 2013) under the San Diego County Code Title 6, Division 7, Chapter 7. Projects applying for a MUP are required to prepare a Groundwater Investigation, which includes well testing for any on-site or off-site wells proposed to supply project water for construction use and operational supply. Additionally, projects are required to evaluate potential impacts to groundwater resources in accordance with the County Guidelines for Determining Significance – Groundwater Resources (County of San Diego PDS, 2007). The County Guidelines establish thresholds for determining significance for both groundwater quantity and quality.

The Jacumba Valley Ranch has historically been used for farming and agricultural purposes. Irrigation was supplied by on-site production wells installed in the Jacumba Valley alluvial aquifer (Figure 1). Between 1932 and 1977, Jacumba Valley Ranch pumped an average of 2,066 acre-feet per year from the alluvial aquifer. Large-scale agricultural irrigation at Jacumba Valley Ranch ceased after 1977 with lower irrigation production (212 acre-feet to 721 acre-feet per year) continuing through 1994. From 2003 until the end of 2012, Bornt Farms resumed irrigation at Jacumba Valley Ranch. The water demand of Bornt Farms was reported to be in excess of 1 million gallons per day or about 1,120 acre-feet per year. Proposed groundwater pumping for the Jacumba Valley Ranch renewables project would be a small percentage of historical groundwater production form the Jacumba Valley alluvial aquifer.

Dudek has previously completed Groundwater Resources Investigation Reports (Dudek, 2015a and Dudek, 2015b) within the Jacumba Valley Groundwater Basin (Basin) to support MUP efforts for the Jacumba Solar Renewable Energy Project. The results of the Groundwater Resources Investigations as well as the continued groundwater monitoring program indicate that project pumping for the Jacumba Solar project did not have any significant environmental impacts, as determined by the County Guidelines. Currently, Dudek is monitoring wells within the Basin (Well 8, Well 7, Well 6, Well 4, Gas Station Well, Park Monitoring Well, Highland center Well, and JVR Well 2) as part of the Jacumba Community Services District (JCSD) Groundwater Monitoring program (Figure 1). Water level data at these wells is current through 2017. JVR Well 2 is an existing well located on Jacumba Valley Ranch. The remaining seven wells are located in the town of Jacumba Hot Springs. As part of previous work performed in the Basin, Dudek located and recorded manual water level measurements at other existing groundwater irrigation production and monitoring wells on Jacumba Valley Ranch. Historical groundwater level data exists as far back as 1995 but a continuous water level record is not available. Since 1955, water levels in the Jacumba Valley alluvial aquifer have fluctuated up to 61 feet (based on available data) as a result of groundwater production and cyclical wet and dry climactic periods.

Dudek has completed a cursory review of the project vicinity and has identified the mapped vegetation types 'grasslands, vernal pools, meadows, and other herbs' and 'riparian and bottomland habitat' (Figure 1) as potentially groundwater-dependent habitats that will require consultation with the County to determine required level of analysis and monitoring. Additionally, the County has previously required monitoring of groundwater-dependent users within a 0.5-mile radius of the pumping well. If the northwest irrigation well is utilized as the source of on-site project groundwater supply, there appear to be no groundwater-dependent users within a 0.5-mile radius to monitor. It would be recommended to incorporate the results of the ongoing JCSD Groundwater Monitoring Program, as well as the existing on-site groundwater wells, into the project's groundwater monitoring program to evaluate the impact of pumping on groundwater level.

COUNTY SCOPING MEETING

The groundwater investigation for the proposed project must follow established County Guidelines (County of San Diego PDS, 2007). A project-specific scoping meeting is proposed with Mr. James Bennett, County groundwater geologist. Mr. Trey Driscoll, PG, CHG, of Dudek will be the County California Environmental Quality Act (CEQA)-certified consultant in charge for this project. He will be assisted by Mr. Stephen Dickey, PG, CEG, CHG (both professionals are listed as approved CEQA consultants on the County's CEQA Consultant List). Based on the scoping meeting, the County will determine project requirements, including pump testing and on-site or off-site monitoring of wells. If required, the pump test results will be used to evaluate whether the proposed project exceeds the County's significance thresholds for groundwater. In addition to the initial

scoping meeting, Dudek hydrogeologists will attend up to one additional meeting with the County for project scoping.

GROUNDWATER INVESTIGATION WORK PLAN AND WELL TEST PLAN

A well test plan must be prepared and subsequently approved by the County groundwater geologist. The plan details the work to be performed in accordance with Section 67.703.3 of the Groundwater Ordinance (County of San Diego, 2013). The County may require well testing on any proposed project well(s) as well as potentially monitoring all on-site and off-site wells within about a 0.5-mile radius. For this project, there does not appear to be any off-site wells within a 0.5-mile radius, provided that the northwest irrigation well is utilized for production. Therefore, the monitoring network will consist of existing on-site wells and the JCSD monitoring network. The well test will likely require a step-drawdown test (12-hour) followed by a minimum 72-hour constant rate test. Dudek will prepare and submit a Groundwater Investigation Work Plan and Well Test Plan to the County groundwater geologist for review and approval.

WELL TESTING AND WATER QUALITY SAMPLING

Based on previous MUP requirements, Dudek anticipates that the County may require a step-drawdown test followed by a constant rate pump test at each proposed project site well location (to be verified based on the scoping meeting and proposed sources of project water supply). This task includes supplying monitoring equipment, collect groundwater samples, provide supervision of the pump testing, and general project management. At the end of the 72-hour constant rate test, Dudek will collect water quality samples and submit them for laboratory analysis of the following constituents: general minerals, coliform bacteria, fecal and E. coli bacterium, total dissolved solids, inorganic chemicals including nitrate, radionuclides including gross alpha and uranium, and volatiles.

UPDATED GROUNDWATER RESOURCES INVESTIGATION REPORT

Extraction of groundwater resources must comply with the County guidelines, which contain a series of thresholds for determining significance for water quantity and quality. Dudek has previously prepared Groundwater Resources Investigation Reports (Dudek, 2015a and Dudek, 2015b) within the Basin to support MUP efforts for the Jacumba Solar Renewable Energy Project. Dudek will provide an updated Groundwater Investigation Report based on previous report findings. The updated Report will evaluate the well test data collected at each well location and provide a comparative analysis of proposed project groundwater production to historical groundwater production from the Jacumba Valley alluvial aquifer. To evaluate off-site well interference resulting from the proposed project, drawdown at off-site wells will be evaluated.

As with the well test plan, the groundwater investigation report must follow County guidelines detailing the correct report format and contents. Dudek will use available historical on-site and off-site well data, results of the on-site well tests, results of previous water balance analysis (Dudek 2015a and 2015b) and historical groundwater production in the Jacumba Valley alluvial basin to assess the potential for significant impacts, as defined by the County, resulting from the proposed project.

GROUNDWATER MITIGATION AND MONITORING PLAN

Groundwater extraction from the project site has the potential to impact the surrounding area. Therefore, a Groundwater Monitoring and Mitigation Plan (GMMP) must be developed. The GMMP will define limits on potential groundwater production volume and set a threshold for groundwater level decline in wells so that pumping does not unduly impact existing well users. The GMMP will detail groundwater level and production monitoring requirements for on-site wells. The GMMP will outline mitigation measures to be taken should groundwater levels drop below the established thresholds. These mitigation measures may include reduction or cessation of pumping until groundwater levels rebound above the established threshold.

Dudek is pleased to have the opportunity to assist BayWa is this effort. If you need clarification or additional information, please contact me at tdriscoll@dudek.com or (760) 415-1425.

Sincerely,

Trey Driscoll, PG No. 8511, CHG No. 936
Principal Hydrogeologist

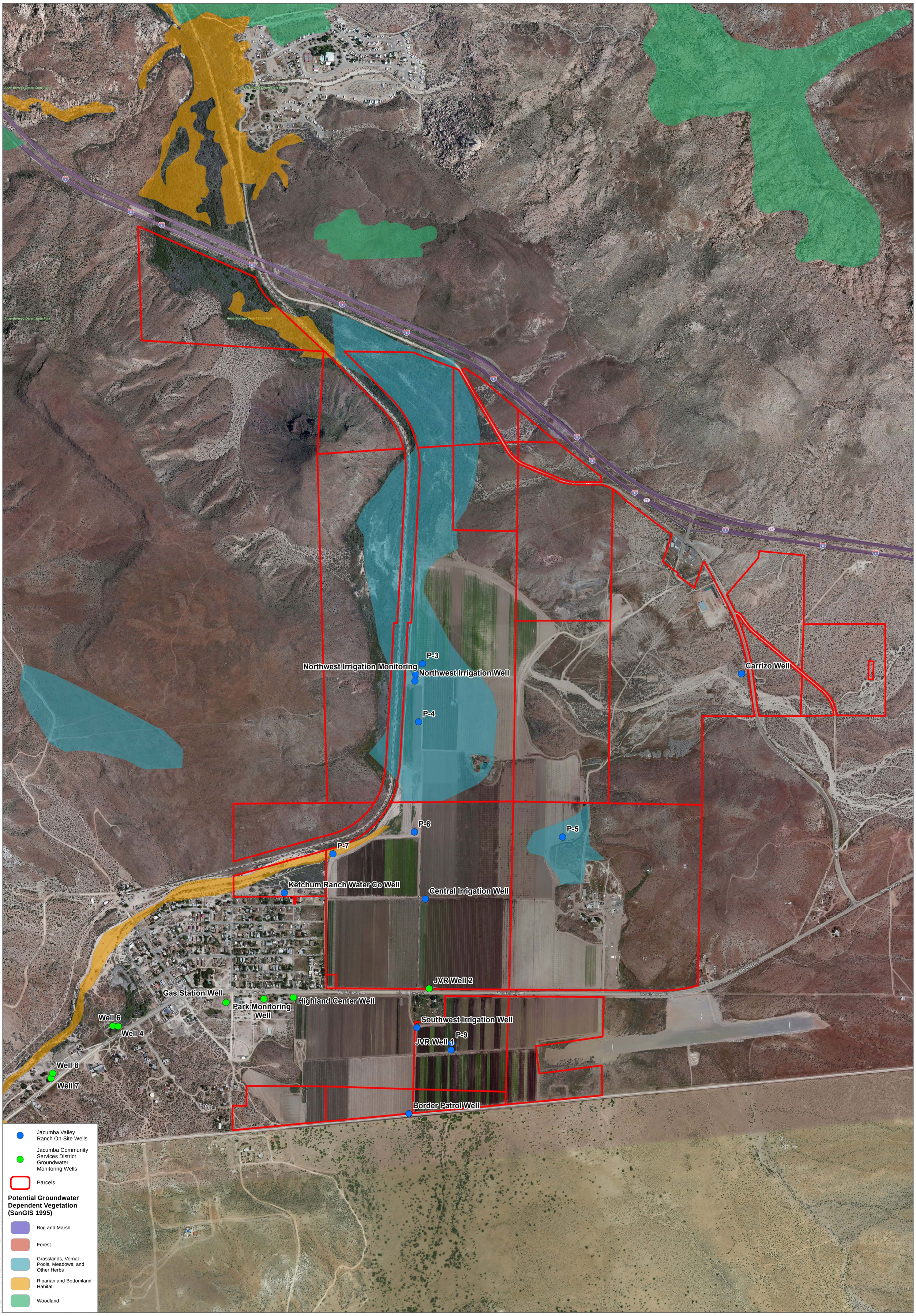
REFERENCES

County of San Diego PDS (Planning and Development Services), 2007. *The County Guidelines for Determining Significance – and Report Format and Content Requirements: Groundwater Resources*. March 19, 2007.

County of San Diego, 2013. San Diego County Groundwater Ordinance: An Excerpt from the San Diego County Code of Regulatory Ordinances Amendments Effective March 1, 2013.

Dudek, 2015a. DRAFT Groundwater Resources Investigation Report – Flat Creek Watershed Analysis. Jacumba Community Services District, Jacumba Hot Springs, San Diego County, California. April 2015

Dudek, 2015b. DRAFT 2 Groundwater Resources Investigation Report. Jacumba Community Services District, Jacumba Hot Springs, San Diego County, California. March 2015



SOURCE: BING; SanGIS

FIGURE 1

Project Parcels, On-Site Wells and Off-Site Wells

Jacumba Valley Ranch

DUDEK

0 287.5 575 Feet