BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE APPLICATION OF LOOKOUT SOLAR PARK I, LLC FOR A PERMIT OF A SOLAR ENERGY FACILITY IN OGLALA LAKOTA COUNTY	* * * * * * *	**RESPONSE TO STAFF'S FIRST SET OF DATA REQUESTS** **EL18-059** **March 11, 2019**

Below, please find Lookout Solar Park I, LLC's ("Lookout Solar" or "Company") responses to the Staff's First Set of Data Requests regarding the Lookout Solar Project (the "Project"). Christian Bohn is responding to each of the interrogatories on behalf of Lookout Solar. Lookout Solar will supplement responses for which it currently does not have complete information.

1-1) Referring to section 6 of the Application and pursuant to ARSD 20:10:22:10, please provide a description of present and estimated consumer demand and estimated future energy needs of those customers to be directly served by the proposed facility. Specifically, will the capacity/energy be sold through a PPA? Or, will the facility be a merchant plant and sell directly to the market?

The Project is in the process of evaluating potential purchasers of the electricity that would be generated by the Project in anticipation of negotiating a power purchase agreement. The purchaser will mostly likely be a single corporate offtaker, via a corporate or "virtual" power purchase agreement. Currently, the Project does not intend to be a merchant generator or sell electricity directly to public markets.

1-2) Referring to section 7 of the Application, please explain why the project cost includes "construction of turbines."

The Project does not include any turbines. The reference to turbines was a typo.

1-3) Referring to section 8.1 of the Application, should an energy storage system be installed, will the location of that system be at the substation near the point of interconnection or within the solar farm boundary?

If the Project includes an energy storage system, then the energy storage project will be located within the Project Area (the solar farm boundary).

1-4) Referring to section 9 of the Application and in accordance with ARSD 20:10:22:12(1), please identify the general criteria used to select alternative sites, how the criteria were measured and weighed, and reasons for selecting the criteria.

The Project Site was identified and selected by a prior development organization. At the time that Lookout Solar became involved in the Project, a lease had already been executed for certain parcels of land on the Pine Ridge Indian Reservation and a review of the impacts of the Project under the National Environmental Policy Act ("NEPA") had already been completed. Accordingly, Lookout Solar was not involved in the consideration of the alternative parcels of land on which the Project might be located.

Portions of the areas subject to the original lease have since been excluded from the Project Area. Lookout Solar selected the current Project Area location (as opposed to the other parcels of land subject to the lease) based on: optimization of the solar radiation potential; the close proximity of the road (BIA 2), which provides access to the road and to the water lines in the road; the close proximity of the Project Area to the Custer County roads (and right of way therein) as well as the point of interconnection to the high voltage transmission lines; and the intent to minimize impacts to neighboring activities, like grazing, by selecting a parcel close to the road rather than a more remote location.

1-5) Referring to section 9 of the Application and in accordance with ARSD 20:10:22:12(2), please provide an evaluation of the four different project locations considered by the Applicant.

The Environmental Assessment completed by the Bureau of Indian Affairs ("BIA") in June 2016 states that during initial scoping, the entity previously developing the Project considered different locations in the Pine Ridge Indian Reservation for the Project but it ruled out those alternatives due to potential issues with geology, migratory birds, viewsheds, and access. Lookout Solar's understanding is that alternative parcels on the Pine Ridge Indian Reservation considered for the Project included parcels 3364 (Section 11, Township 40N, Range 48W), 3455 Section 19, Township 41N, Range 47W), 3522-A (Section 32, Township 41N, Range 47W), and 3523 (Section 33, Township 41N, Range 47W). Lookout Solar does not have additional information regarding the consideration of the different project locations beyond what was provide in the BIA Environmental Assessment because Lookout Solar acquired its interests in the Project after the site selection and BIA review were completed.

1-6) Pursuant to ARSD 20:10:22:14(2), please provide a topographic map of the plant and transmission site.

The Project is working on this request and will submit the map as soon as it is available.

1-7) Pursuant to ARSD 20:10:22:14(3), please provide a map of cross-sections showing bedrock geology and surficial geology to depict the major subsurface variations in the siting area.

The Project is working on this request and will submit the map as soon as it is available.

1-8) Pursuant to ARSD 20:10:22:14(4), please provide "a description and location of economic deposits such as lignite, sand and gravel, scoria, and industrial and ceramic quality clay existent within the plant, wind energy, or transmission site." If no economic deposits exist, please identify such.

The Project is working on this request and will provide a response as soon as it is available.

1-9) Pursuant to ARSD 20:10:22:14(6), please provide "an analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures which will be taken for their control."

The Project is working on this request and will provide a response as soon as it is available. In general, Lookout Solar would expect to implement best management practices under the General Permit for Stormwater Discharges Associated with Construction Activities administered by South Dakota Department of Environment and Natural Resources, and to implement erosion control and dust management in accordance with prudent industry standards and applicable laws, ordinances, regulations and permits.

1-10) Pursuant to ARSD 20:10:22:14(7), please provide information on subsidence potential and slope instability for the plant and transmission site.

The Project is working on this request and will provide a response as soon as it is available. The information that Lookout Solar currently has regarding the Project Area indicates that it does not contain any underground mines or caverns, and is undisturbed land that should pose no major subsidence risks. Lookout Solar plans to confirm this conclusion with appropriate geological analysis.

1-11) Pursuant to ARSD 20:10:22:14(8), please provide "an analysis of any constraints that may be imposed by geological characteristics on the design, construction, or operation of the proposed facility and a description of plans to offset such constraints."

Currently, the Project is not aware of any constraints on the design of the Project that would be imposed by geological characteristics of the Project Area. In general, solar photovoltaic installations can be installed in rough conformity with natural contours, although some local cutting and filling may be required. Any grading, local cutting or filling required for installation of the solar panels will be conducted in accordance with prudent industry standards and applicable laws, ordinances, regulations and permits.

1-12) Pursuant to ARSD 20:10:22:15(1), please provide "a map drawn to scale of the plant, wind energy site, or transmission site showing surface water drainage patterns before and anticipated patterns after construction of the facility."

The Project is working on this request and will provide the map as soon as it is available.

1-13) Pursuant to ARSD 20:10:22:15(2), please provide "… indication on a map drawn to scale of the current planned water uses by communities, agriculture, recreation, fish, and wildlife which may be affected by the location of the proposed facility and a summary of those effects."

The Project is working on this request and will provide the map as soon as it is available.

1-14) Referring to section 13.4.5 of the Application, since three sharp-tailed grouse hens were observed in the project area did the Applicant review locations of known active leks? If so, are there any active leks in the project area?

The Project is not aware of any known active leks in the Project Area. In correspondence with the South Dakota Department of Game, Fish and Parks dated August 2, 2018, the State indicated that, according to the State's incidental lek database, there are no known leks in or near the Project Area or Transmission Line Route. We are consulting with the State to confirm that currently there are no known leks in or near the Project Area or Transmission Line Route.

1-15) Pursuant to ARSD 20:10:22:18(1), please provide a map of the project site using the land-use classifications identified as occurring in the project area found in section 15.1 of the Application.

The Project is working on this request and will submit the map as soon as it is available.

1-16) Pursuant to ARSD 20:10:22:23(1), please provide "a forecast of the impact on commercial and industrial sectors, housing, land values, labor market, health facilities, energy, sewage and water, solid waste management facilities, fire protection, law enforcement, recreational facilities, schools, transportation facilities, and other community and government facilities or services."

The Project is working on the forecast and will provide a response as soon as it is available.

1-17) Pursuant to ARSD 20:10:22:23(2), please provide "a forecast of the immediate and long-range impact of property and other taxes of the affected taxing jurisdictions."

The Project is finalizing a tax analysis and will provide a response to this question as soon as the analysis is complete.

1-18) Pursuant to ARSD 20:10:22:23(4), please provide "a forecast of the impact on population, income, occupational distribution, and integration and cohesion of communities."

The Project is finalizing a forecast and will provide a response to this question as soon as the analysis is complete.

1-19) Pursuant to ARSD 20:10:22:23(5), please provide "a forecast of the impact on transportation facilities."

The Project is finalizing a forecast and will provide a response to this question as soon as the analysis is complete.

1-20) Pursuant to ARSD 20:10:22:23(6), please provide "[…] the applicant's plans to coordinate with the local and state office of disaster services […]."

The Project is located within a rural portion of Oglala Lakota and Custer Counties. During the Project construction period and during subsequent operation, it is expected that the Project would have no significant impact on the security and safety of the local communities and the surrounding area. During Project construction, the Project's general contractor would identify and secure all active construction areas to prevent public access to potentially hazardous areas and work with local and county emergency management to develop procedures for response to emergencies, natural hazards, hazardous materials incidents, manmade problems, and potential incidents concerning Project construction. The contractor would provide site maps, haul routes, project schedules, contact numbers, training, and other requested project information to local and county emergency management. During Project operations, the Project operator would coordinate with local and county emergency management to protect the public and the property related to the Project during natural, manmade, or other incidents. The Project would register with the rural identification/addressing (fire number) system and 911 systems.

1-21) Pursuant to ARSD 20:10:22:24, please provide "[…] the estimated number of jobs and a description of job classifications, together with the estimated annual employment expenditures of the applicants, the contractors, and the subcontractors during the construction phase of the proposed facility" and "[…] the same data with respect to the operating life of the proposed facility, to be made for the first ten years of commercial operation in one-year intervals."

The Project is finalizing an employment analysis and will provide a response to this question as soon as the analysis is complete.

1-22) Please provide the information required in ARSD 20:10:22:26. If any of the subparts do not apply to the solar farm, please identify such.

The Project is a 110 MW solar generating facility that Lookout Solar anticipates operating for approximately 30 years. The major components of the solar generating facility are solar arrays (i.e., solar panels in a frame), steel mounting systems, cables between the solar arrays, inverters, a safety disconnect switch, a transformer, and a control system. No

materials would be flowing into or out of the system. The solar generating facility would not discharge air emissions, wastewater, or solid waste.

1-23) Please provide the information required in ARSD 20:10:22:27. If this does not apply to the solar farm, please identify such.

This provision is not applicable to the operation of a solar project. The only product generated by the solar generating facility is electricity, and there are no byproducts.

1-24) Please provide the information required in ARSD 20:10:22:28. If this does not apply to the solar farm, please identify such.

This provision does not apply to the operation of a solar project because no fuel is used.

1-25) Please provide the information required in ARSD 20:10:22:29. If this does not apply to the solar farm, please identify such.

This provision does not apply to operation of a solar project because no fuel is used.

1-26) Please provide the information required in ARSD 20:10:22:30. If this does not apply to the solar farm, please identify such.

At the time that Lookout Solar began developing the Project, the BIA had already approved a lease that allowed for a solar project on the Pine Ridge Indian Reservation and issued an Environmental Assessment for the proposed solar project. Accordingly, Lookout Solar continued to develop the Project as a solar project. Lookout Solar's understanding is that the entities previously working on the development of the Project considered development of a wind project but decided not to pursue that option based on the costs, the development timeline and the other wind projects that are currently under development and construction in the state.

1-27) Please provide the information required in ARSD 20:10:22:31. If this does not apply to the solar farm, please identify such.

This provision does not apply to operation of a solar project because no solid or radioactive waste will be generated.

1-28) Please provide the information required in ARSD 20:10:22:32.

The Project is finalizing an estimate of the expected efficiency of the Project and will provide a response to this question as soon as the estimate is complete.

1-29) Referring to section 23 of the Application, please provide support for the estimated decommissioning cost of $1,000,000. Further, please identify what it costs for recycling of the solar panel and any hazardous components of the project that cannot be landfilled.

The estimated cost of decommissioning of the Project was calculated based on the size of the Project, assuming that the project management costs (contractor costs, equipment, etc.) would be approximately $100,000 and the removal of the equipment and site remediation would be approximately $900,000. Many of the components of solar projects can be salvaged (metal, glass, wiring, silicon wafers, etc.). Any photovoltaic panels that contain hazardous materials that are not reusable or recyclable will be disposed of in a landfill that can accept hazardous materials.

1-30) Referring to section 25.2 of the Application, please explain why guard structures will be used during the installation of the transmission line when the line will in fact be buried.

The transmission line will be underground. Therefore, no guard structure will be used during installation.

1-31) Referring to section 25.2 of the Application, please explain why the applicant mentions a transmission pole falling when the proposed line will be buried.

The Project does not include any transmission line poles. The reference to a transmission line pole was a typo. The transmission line will be underground.

1-32) Pursuant to ARSD 20:10:22:35(3), please provide a map of the proposed transmission site and major alternatives considered for the route.

The current Transmission Line Route was selected due to Custer County having entered into agreements with private landowners for a right of way for utilities along Riverside Road and the County's statutory right of way for utilities in county roads on section lines, such as 148th Avenue and Cottonwood Cutoff. The Project is currently finalizing a map and will provide the map as soon as the analysis is complete.

1-33) Pursuant to ARSD 20:10:22:35(7), please provide the depth of burial, distance between access points, conductor configuration and size, and number of circuits for the proposed transmission line.

The Project is finalizing a response and will provide a response to this question as soon as the response is complete.

1-34) Please identify if any tree/shrub clearing will be needed for the transmission line for the Application is conflicting on this item.

The Project does not anticipate clearing any shrubs or trees along the Transmission Line Route. There are some shrubs (sand sagebrush) that may need to be cleared in the Project Area depending on the final solar generating facility layout.

1-35) Referring to a question asked by Commissioner Nelson at the Public Input Hearing, please identify the project's benefits for the tribe. Further, please identify what taxes will be paid to the tribe, if any.

The Project is finalizing a tax analysis and will provide a response to this question as soon as the analysis is complete.

Dated this 11th day of March 2019.

/s/ Christian Bohn

Christian Bohn
CFO Lookout Solar Park I, LLC

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE APPLICATION OF LOOKOUT SOLAR PARK I, LLC FOR A PERMIT OF A SOLAR ENERGY FACILITY IN OGLALA LAKOTA COUNTY	* * * * * * *	**SUPPLEMENTAL RESPONSE TO STAFF'S FIRST SET OF DATA REQUESTS** **EL18-059** **June 13, 2019**

Below, please find Lookout Solar Park I, LLC's ("Lookout Solar" or "Company") supplemental responses to the Staff's First Set of Data Requests regarding the Lookout Solar Project (the "Project"). Christian Bohn is responding to each of the interrogatories on behalf of Lookout Solar. Lookout Solar will supplement responses for which it currently does not have complete information.

1-1) Pursuant to ARSD 20:10:22:14(2), please provide a topographic map of the plant and transmission site.

Please see attached Figures 2-1 and 2-2.

1-2) Pursuant to ARSD 20:10:22:14(3), please provide a map of cross-sections showing bedrock geology and surficial geology to depict the major subsurface variations in the siting area.

Please see attached Figure 3-1.

1-3) Pursuant to ARSD 20:10:22:14(4), please provide "a description and location of economic deposits such as lignite, sand and gravel, scoria, and industrial and ceramic quality clay existent within the plant, wind energy, or transmission site." If no economic deposits exist, please identify such.

No economic deposits exist within the Project Area.

1-4) Pursuant to ARSD 20:10:22:14(6), please provide "an analysis of potential erosion or sedimentation which may result from site clearing, construction, or operating activities and measures which will be taken for their control."

The soils in the Project Area are moderately susceptible to erosion. The soils have K Factors ranging from 0.05 to 0.4.[1] *The Project Area slope ranges from 0 to 30 percent.*

[1] Erosion factor K indicates the susceptibility of a soil to erosion Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt,

1-5) Pursuant to ARSD 20:10:22:14(7), please provide information on subsidence potential and slope instability for the plant and transmission site.

The risk for subsidence and slope instability within the Project Area and the Transmission Line Route is minimal. Pierre Shale and Eolian deposits form the bedrock and are present at the surface, or beneath a thin veneer of residual soil, throughout a vast majority of the Project Area. This type of bedrock does not exhibit karst topography or contain layers or members susceptible to dissolution by water.

1-6) Pursuant to ARSD 20:10:22:15(1), please provide "a map drawn to scale of the plant, wind energy site, or transmission site showing surface water drainage patterns before and anticipated patterns after construction of the facility."

Surface water drainage patterns will be the same before and after construction of the Project. Please see the attached Aquatic Resources Report for maps and descriptions of drainage patterns in the Project Area and the Transmission Line Route.

1-7) Pursuant to ARSD 20:10:22:15(2), please provide "… indication on a map drawn to scale of the current planned water uses by communities, agriculture, recreation, fish, and wildlife which may be affected by the location of the proposed facility and a summary of those effects."

Please see Figures 3-4 (cropland and pastureland), 3-12 (soil resources), and 3-14 (raptor nests).

1-8) Pursuant to ARSD 20:10:22:18(1), please provide a map of the project site using the land-use classifications identified as occurring in the project area found in section 15.1 of the Application.

Please see Figures 3-4 (cropland and pastureland), 3-12 (soil resources), and 3-14 (raptor nests).

1-9) Pursuant to ARSD 20:10:22:23(1), please provide "a forecast of the impact on commercial and industrial sectors, housing, land values, labor market, health facilities, energy, sewage and water, solid waste management facilities, fire protection, law enforcement, recreational facilities, schools, transportation facilities, and other community and government facilities or services."

There is likely to be a minor increase in demand for temporary housing during construction as a result of construction workers that do not live locally. The Project would not have

sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

impacts on long-term housing or land values. The Project is not expected to increase demand for public services, such as energy, sewage, solid waste management, police, fire protection, schools, or other community, government, or recreational facilities due to the short-term duration of the construction activities. No significant increase in permanent population of local communities would be expected from construction and operation of the facility, and the construction workforce would not create any measurable impact to the local government, utilities, or community services.

1-10) Pursuant to ARSD 20:10:22:23(2), please provide "a forecast of the immediate and long-range impact of property and other taxes of the affected taxing jurisdictions."

Over the life of the Project, the Project is projected to provide over $24 million in direct payments:

- *Approximately $1.3 million in lease payments to landowners, or $44,400 annually;*
- *Approximately $3 million to the Oglala Sioux Tribe[2];*
- *Approximately $5.4 million to Custer County, $180,000 annually from taxes;*
- *Approximately $5.4 million to area school district(s), or $180,000 annually from taxes paid; and*
- *Approximately $9 million to the State of South Dakota, or $300,000 annually from taxes paid.[3]*

1-11) Pursuant to ARSD 20:10:22:23(4), please provide "a forecast of the impact on population, income, occupational distribution, and integration and cohesion of communities."

The Project is not expected to have significant impacts on the population, occupational distribution, and integration and cohesion of communities. The Project will have temporary minor impacts on the population during construction due to the presence of construction workers. Local businesses, such as restaurants, grocery stores, hotels, and gas stations, would see increased business during this phase from construction-related workers. Local industrial businesses, including aggregate and cement suppliers, welding and industrial suppliers, hardware stores, automotive and heavy equipment repair, electrical contractors, and maintenance providers, would also likely benefit from construction of the Project. The Project would not impact occupation distribution long-term because only a few employees are required for the operation of the Project. The Project is not expected to have impacts on the integration and cohesion of communities because the Project is located on private land in a remote location.

[2] The estimated tax payment to the Oglala Sioux Tribe is based on the Tribe collecting the sales/services or use tax on materials and construction services for the generating facility portion of the Project.

[3] The estimated tax payment to the state, Custer County and the school districts is based on the assumption that the Project will pay the nameplate and production taxes to the state, a portion of which will then be distributed to the County and school districts. The state would also collect the sales/services or use tax on materials and construction services for the transmission line and substation portions of the Project.

1-12) Pursuant to ARSD 20:10:22:23(5), please provide "a forecast of the impact on transportation facilities."

The primary access to the Project Area is via BIA Route 2. The Transmission Line Route follows Riverside Road, 148th Avenue, and Cottonwood Cutoff. These roads are all gravel roads. Custer County and Oglala Sioux County gravel roads would be maintained by the Project's contractor during construction, at the Project's expense. Paved roads would be returned to preconstruction condition if damage occurs. During construction, it is anticipated that several types of light, medium, and heavy-duty construction vehicles would travel to and from the site, as well as private vehicles used by the construction personnel. The movement of equipment and materials to the site would cause a relatively short-term increase in traffic on local roadways during the construction period. Most equipment (e.g., heavy earthmoving equipment) would remain at the site for the duration of construction activities. Shipments of materials, such as gravel, concrete, and water would not be expected to substantially affect local primary and secondary road networks. At the completion of each construction phase, this equipment would be removed from the site. The Project would not result in any permanent impacts to the area's ground transportation resources.

1-13) Pursuant to ARSD 20:10:22:24, please provide "[…] the estimated number of jobs and a description of job classifications, together with the estimated annual employment expenditures of the applicants, the contractors, and the subcontractors during the construction phase of the proposed facility" and "[…] the same data with respect to the operating life of the proposed facility, to be made for the first ten years of commercial operation in one-year intervals."

Lookout Solar estimates that up to 150 people would be employed during the peak construction phase[4] of the Project and two to three people during the operation of the Project. It is likely that general skilled labor is available in Custer and Oglala Sioux Counties, or the State, to serve the basic infrastructure and site development needs of the Project. Specialized labor will be required for certain components of Project construction, which may be imported from other areas of the State or from other states, as the relatively short duration of construction makes special training of local or regional labor impracticable. The estimated number of jobs by classification and annual employment expenditures are included in the tables below.

Table 1: Anticipated Construction Jobs and Employment Expenditures

Job Classification	Number	Estimated Annual Salary
Civil Workers	80	$85,000
Construction Managers	12	$110,00
Collection Workers	15	$65,000

[4] The average jobs during construction may be lower than the peak number of construction jobs.

Transmission Workers	16	$75,000
Substation Workers	15	$80,000
Foundation Workers	12	$70,000

Table 2: Anticipated Operation Jobs and Employment Expenditures

Job Classification	Number	Estimated Annual Salary
Facility Manager	1	$70,000
Solar Project Technician	1	$60,000
Administrative	1	$30,000

1-14) Please provide the information required in ARSD 20:10:22:32.

In the context of solar panels, efficiency means the ability of the solar panel to convert sunlight into electricity.[5] *Most solar panels have a panel conversion efficiency between 15% and 20%. Lookout Solar has not yet entered into a contract for solar panels and therefore cannot provide the exact efficiency of the solar panels at this time, but is plans to use Tier 1 solar panels.*

1-15) Pursuant to ARSD 20:10:22:35(3), please provide a map of the proposed transmission site and major alternatives considered for the route.

A map of the current Transmission Line Route is attached as Figure 1. No major alternatives for the route were considered. The current route was selected due to Custer County having entered into agreements with private landowners for a right of way for utilities along Riverside Road and the County's statutory right of way for utilities in county roads on section lines, such as 148th Avenue and Cottonwood Cutoff.

1-16) Pursuant to ARSD 20:10:22:35(7), please provide the depth of burial, distance between access points, conductor configuration and size, and number of circuits for the proposed transmission line.

The transmission line will be buried at least 48 inches below the surface. Lookout Solar would place the transmission line deep enough to ensure that the thermal discharge from the transmission line would not melt snow and any hillside slopes during the winter. The final designs for the transmission line have not yet been completed at this time, so Lookout Solar is not able to provide the exact distance between access points, conductor configuration and size, and number of circuits at this time.

[5] See, e.g., Energy Sage, *What are the most efficient solar panels on the market? Solar panel efficiency explained*, https://news.energysage.com/what-are-the-most-efficient-solar-panels-on-the-market/.

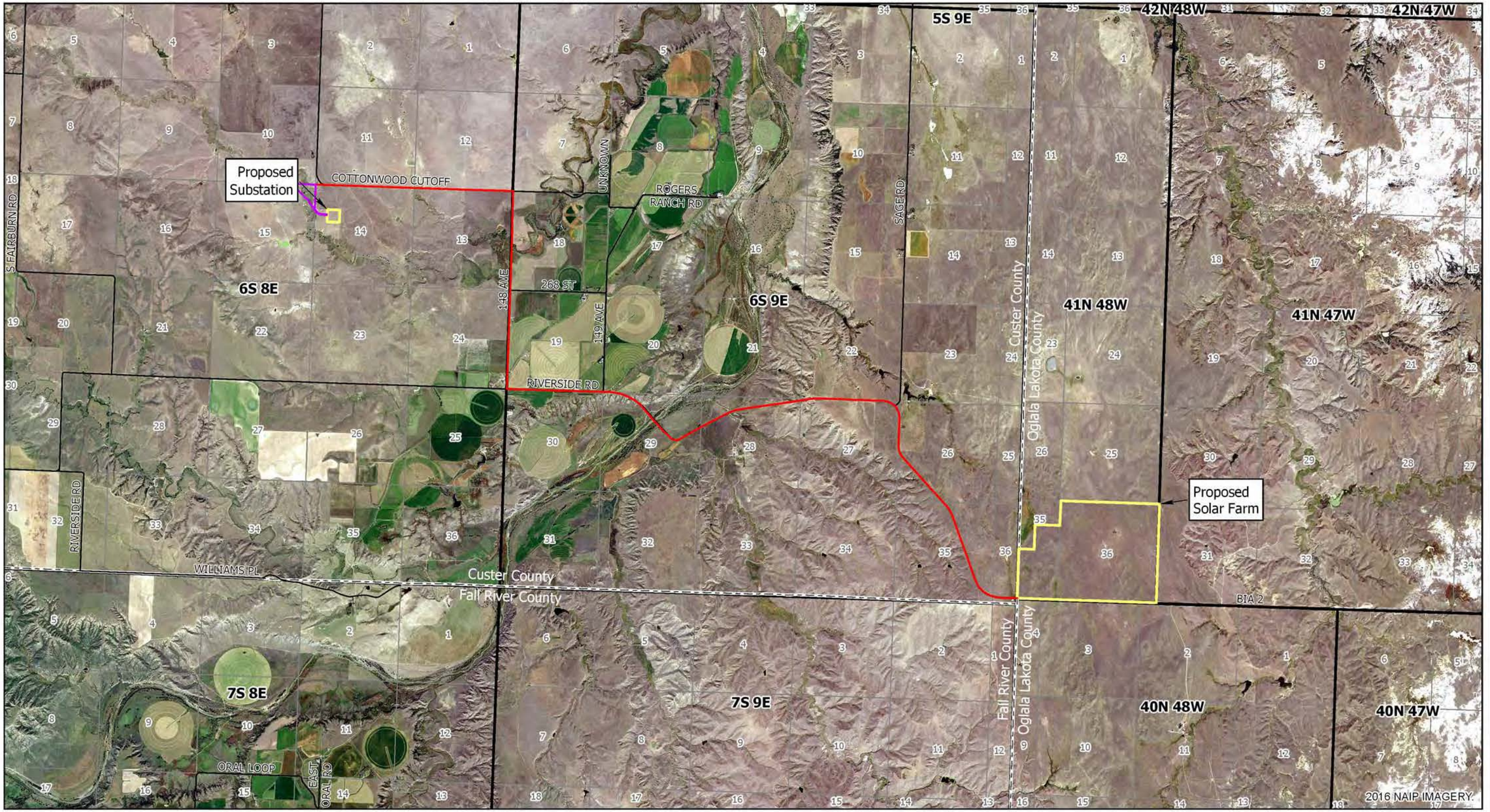
1-17) Referring to a question asked by Commissioner Nelson at the Public Input Hearing, please identify the project's benefits for the tribe. Further, please identify what taxes will be paid to the tribe, if any.

The Project currently anticipates that the sales/services or use tax on materials and construction services will be paid to the Tribe for the generating facility portion of the Project.

Dated this 13 day of June 2019.

/s/ Christian Bohn

Christian Bohn
CFO Lookout Solar Park I, LLC



EXPLANATION

- PROPOSED POWERLINE
- PROPOSED ACCESS ROAD
- PROPERTY BOUNDARIES

N

0 1 Mile

Trihydro Corporation
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307.745.7474 (F) 307/745.7729

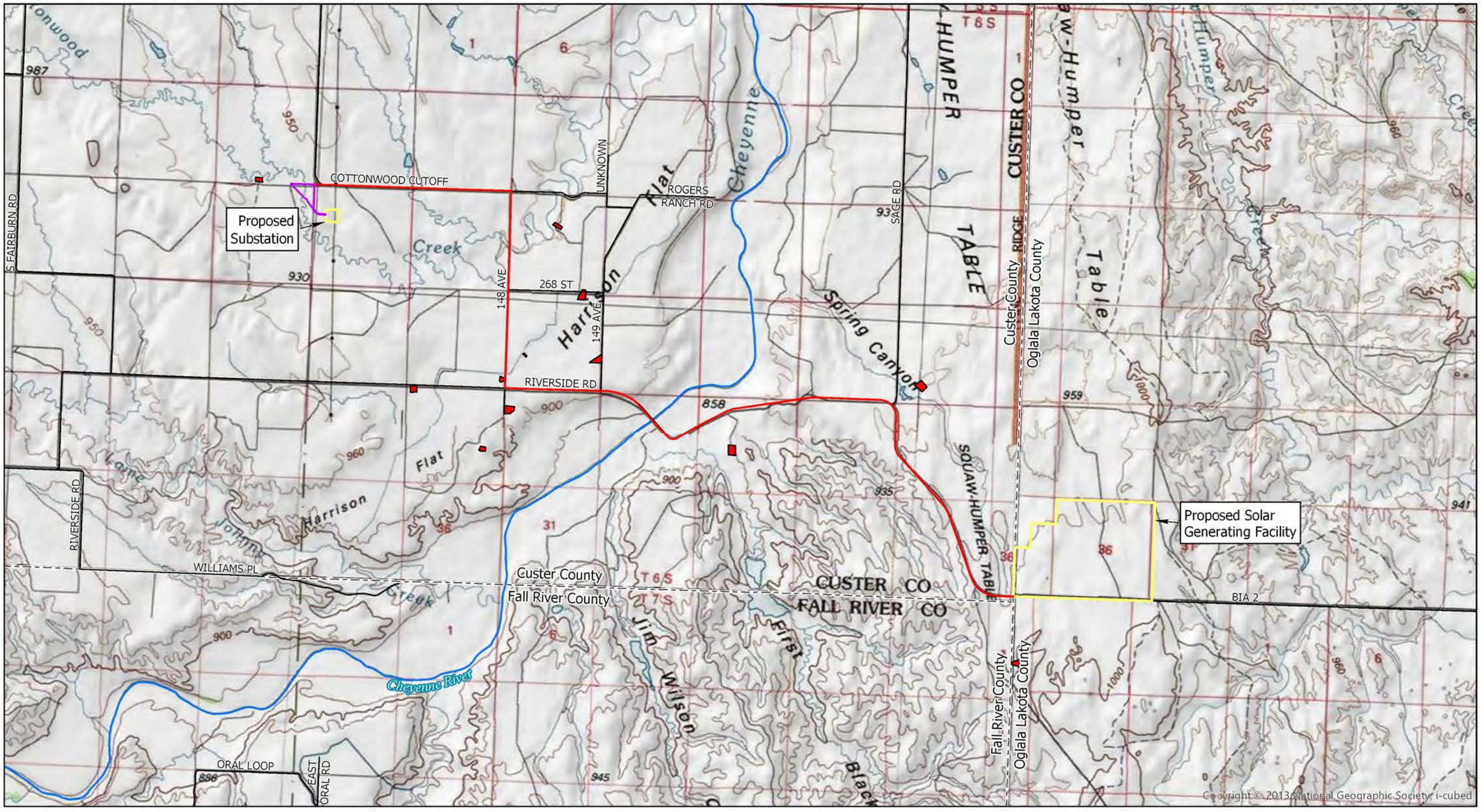
DRAFT

FIGURE 1

PROJECT AREA

AQUATIC RESOURCE INVENTORY REPORT
LOOKOUT SOLAR PARK I, LLC
CUSTER & OGLALA LAKOTA COUNTIES, SD

Drawn By: BR	Checked By: ES	Scale: 1" = 1 Mile	Date: 7/31/18	File: Lookout_ARI.aprx



EXPLANATION

- PROPOSED POWERLINE
- PROPOSED ACCESS ROAD
- PROPERTY BOUNDARIES
- RESIDENTIAL STRUCTURES

N

0 1 Mile

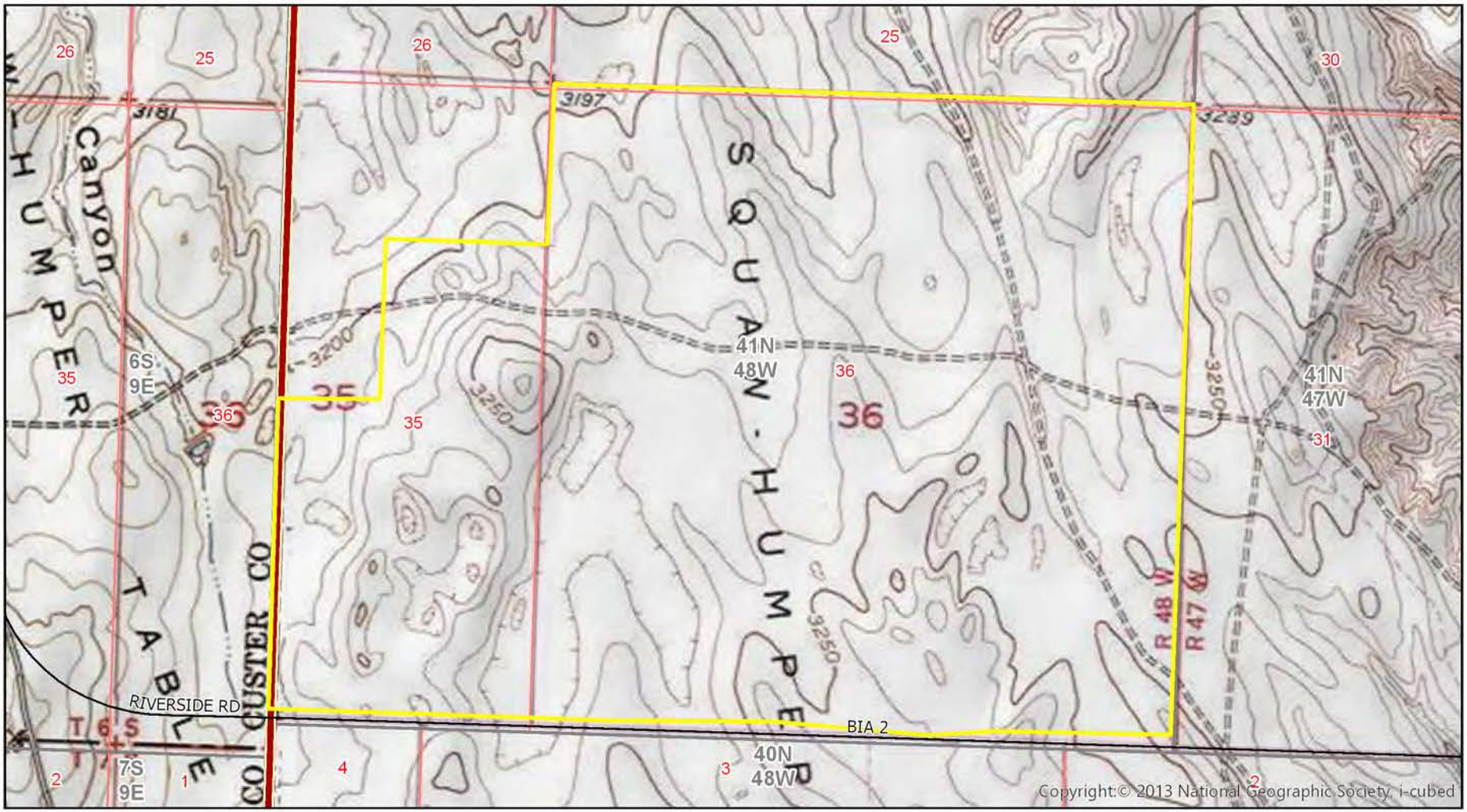
Trihydro CORPORATION
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 2-1

PROJECT AREA OVERVIEW

LOOKOUT SOLAR PARK I
CUSTER & OGLALA LAKOTA COUNTIES, SD

Drawn By: BR	Checked By: ES	Scale: 1" = 1 Mile	Date: 3/29/19	File: Fig2-1_ProjectOverview



EXPLANATION

- STATE/FEDERAL HIGHWAY
- PROJECT AREA
- RESERVATION BOUNDARY

N

0 1,250'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 2-2

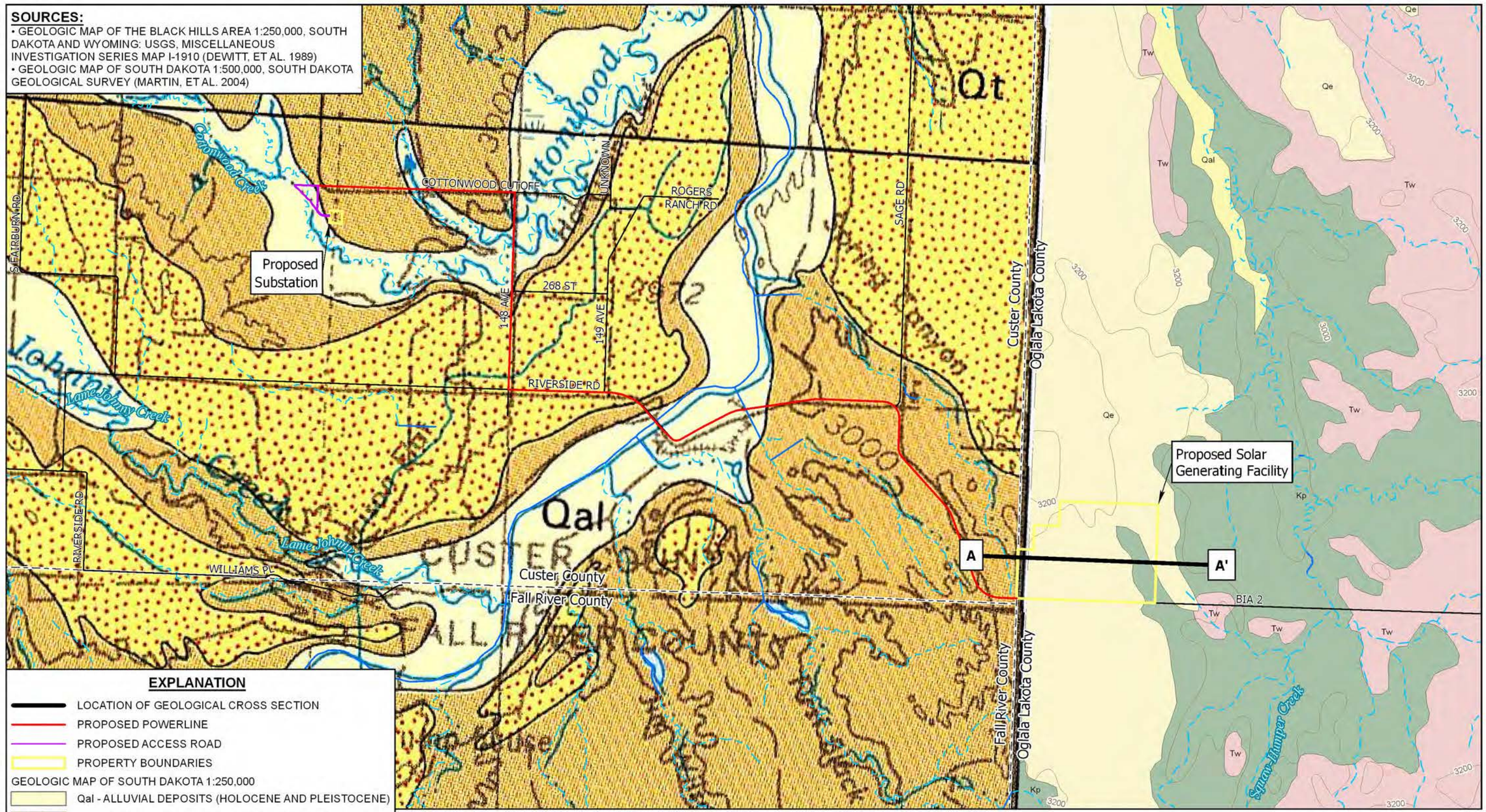
SOLAR GENERATING FACILITY OVERVIEW

LOOKOUT SOLAR PARK I
CUSTER & OGLALA LAKOTA COUNTIES, SD

Drawn By: BR	Checked By: ES	Scale: 1" = 1,250'	Date: 3/29/19	File: Fig2-2_SolarFarmLocation

SOURCES:

- GEOLOGIC MAP OF THE BLACK HILLS AREA 1:250,000, SOUTH DAKOTA AND WYOMING: USGS, MISCELLANEOUS INVESTIGATION SERIES MAP I-1910 (DEWITT, ET AL. 1989)
- GEOLOGIC MAP OF SOUTH DAKOTA 1:500,000, SOUTH DAKOTA GEOLOGICAL SURVEY (MARTIN, ET AL. 2004)



EXPLANATION

- LOCATION OF GEOLOGICAL CROSS SECTION
- PROPOSED POWERLINE
- PROPOSED ACCESS ROAD
- PROPERTY BOUNDARIES

GEOLOGIC MAP OF SOUTH DAKOTA 1:250,000

- Qal - ALLUVIAL DEPOSITS (HOLOCENE AND PLEISTOCENE)
- Qt - TERRACE DEPOSITS (HOLOCENE AND PLEISTOCENE)
- Kp - PIERRE SHALE (UPPER CRETACEOUS)

GEOLOGIC MAP OF SOUTH DAKOTA 1:500,000

- Qal - ALLUVIUM (QUATERNARY)
- Qe - EOLIAN DEPOSITS (QUATERNARY)
- Tw - WHITE RIVER GROUP (OLIGOCENE AND EOCENE)
- Kp - PIERRE SHALE (UPPER CRETACEOUS)

N

0 1 Mile

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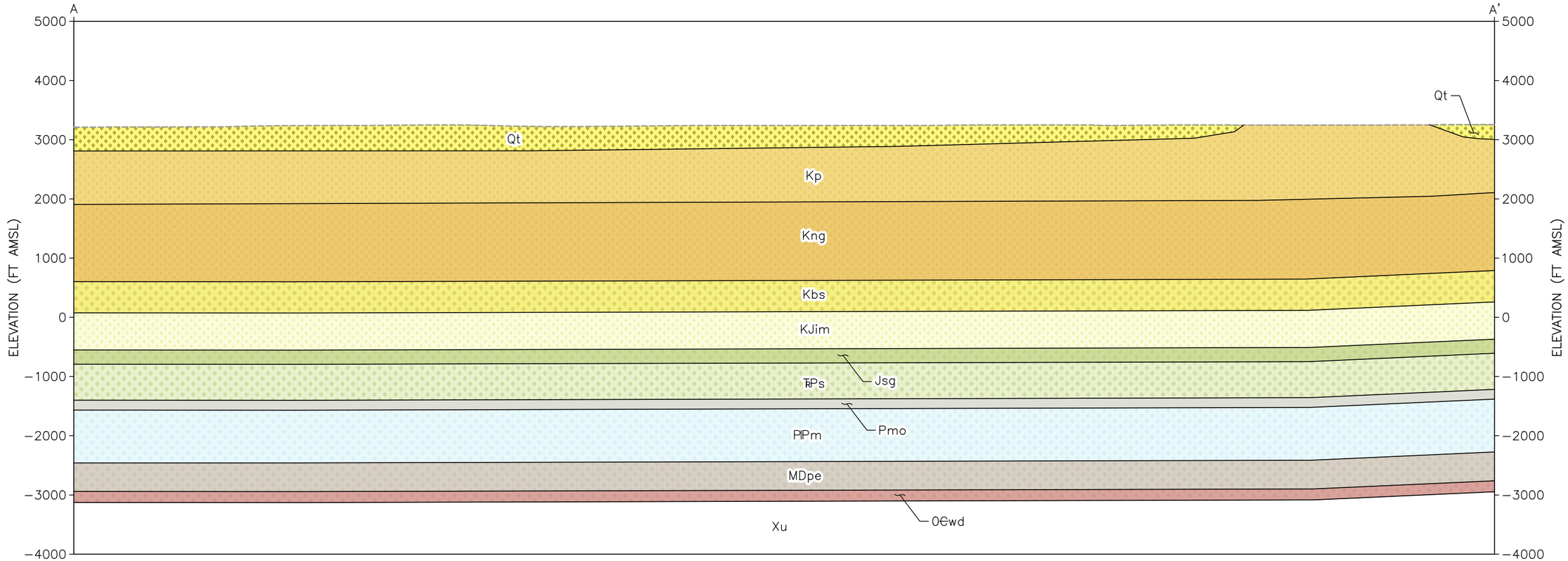
FIGURE 3-1

SURFICIAL GEOLOGY

LOOKOUT SOLAR PARK I
CUSTER & OGLALA LAKOTA COUNTIES, SD

Drawn By: BR	Checked By: PC	Scale: 1" = 1 Mile	Date: 4/1/19	File: Fig3-1_SD_Geology



Source: Cross–Geologic Map of the Black Hills Area 1:250,000, South Dakota and Wyoming: USGS Survey, Miscellaneous Investigation Series Map I–1910 (DeWitt, et al. 1989)

EXPLANATION

Qt — TERRACE DEPOSITS (HOLOCENE AND PLEISTOCENE) - WELL ROUNDED AND MODERATELY WELL SORTED GRAVEL DEPOSITS, MOST OF WHICH ARE CONCENTRATED ON EASTERN FLANK OF BLACK HILL AND EAST OF BEAR LODGE MOUNTAINS. MINOR DEPOSITS NOT SHOWN. MAY BE AS OLD AS PLIOCENE. THICKNESS 0-60 FT.

Kp — PIERRE SHALE (UPPER CRETACEOUS) - DARK GRAY TO BLACK SHALE CONTAINING MINOR LIMESTONE LENSES AND LARGE CONCENTRATIONS. AS REPORTED BY LOVE AND CHRISTIANSEN (1985), AGE IN WYOMING IS 72 - 78 MA. CHARACTERIZED GEOCHEMICALLY BY ANOMALOUS CONCENTRATIONS OF RUBIDIUM, NIOBIUM, AND LANTHANUM IN BENTONITE BEDS, ZINC, CADMIUM, BISMUTH, VANADIUM, AND ANTIMONY IN BLACK SHALE, AND MANGANESE, NICKEL, CHROMIUM, AND ZINC IN CONCRETION-RICH HORIZONS. MUCH OF UNIT DISTINGUISHED RADIOMETRICALLY FROM SURROUNDING UNITS BY ANOMALOUSLY HIGH CONCENTRATIONS OF POTASSIUM; BASAL PART OF UNIT DISTINGUISHED BY URANIUM ANOMALIES THAT LACK COINCIDENT THORIUM ANOMALIES. THICKNESS 1,00 - 2,700 FT.

Kng — NIOBRARA FORMATION, CARLILE SHALE, AND GREENHORN LIMESTONE (UPPER CRETACEOUS)
NIOBRARA FORMATION - LIGHT-GRAY TO YELLOWISH-GRAY MARL AND SHALE. AS REPORTED BY LOVE AND CHRISTIANSEN (1985), AGE IN WYOMING IS ABOUT 83 MA. SOIL DEVELOPED ON NIOBRARA MAY HAVE HIGH CONCENTRATIONS OF SELENIUM. THICKNESS 83 - 300FT.
CARLILE SHALE - DARK-GRAY TO BLACK SANDY SHALE CONTAINING LARGE CONCRETIONS. CHARACTERIZED GEOCHEMICALLY BY ANOMALOUS CONCENTRATIONS OF RUBIDIUM AND LITHIUM IN BENTONITE BEDS, AND LEAD, VANADIUM, AND ANTIMONY IN BLACK SHALE. THICKNESS 345 - 620 FT.
GREENHORN LIMESTONE - LIGHT-GRAY LIMESTONE AND LIMY SANDSTONE. THICKNESS 245 - 620 FT.

Kbs — BELLE FOURCHE SHALE (UPPER CRETACEOUS) AND MOWRY SHALE, NEWCASTLE SANDSTONE, AND SKULL CREEK SHALE (LOWER CRETACEOUS) - SHOWN IN EASTERN BLACK HILLS.

KJim — INYAN KARA GROUP (LOWER CRETACEOUS) AND MORRISON FORMATION AND UNKPAPA SANDSTONE (UPPER JURASSIC)
INYAN KARA GROUP - DISTINGUISHED RADIOMETRICALLY FROM SURROUNDING UNITS BY HIGH CONCENTRATIONS OF URANIUM AND SURPRISINGLY LOW CONCENTRATIONS OF POTASSIUM
FALL RIVER SANDSTONE - BROWN TO OCHER SANDSTONE AND MINOR SILTSTONE. THICKNESS 100 - 200FT.
LAKOTA FORMATION - BROWN, YELLOW, AND REDDISH-BROWN CLAYSTONE AND SANDSTONE LOCALLY IMBEDDED WITH LIMESTONE AND LIGNITE LENSES. THICKNESS 35 - 700 FT.
MORRISON FORMATION - MASSIVE WHITE GYPSUM AND MINOR CLAYSTONE. THICKNESS 0 - 125 FT.

Jsg — SUNDANCE FORMATION (UPPER AND MIDDLE JURASSIC) AN GYPSUM SPRING FORMATION (MIDDLE JURASSIC)
SUNDANCE FORMATION - REDDISH-GRAY TO LIGHT-GRAY SILTSTONE, SANDSTONE WHITE LIMESTONE, AND GLAUCONITIC SANDSTONE AND SHALE. THICKNESS 250 -475 FT.
GYPSUM SPRING FORMATION - MASSIVE WHITE GYPSUM AND MINOR CLAYSTONE. THICKNESS 0 - 125 FT.

TRPs — SPEARFISH FORMATION (TRIASSIC AND PERMIAN) - RED SHALE AND SILTSTONE, AND WHITE GYPSUM AND MINOR LIMESTONE. CHARACTERIZED GEOCHEMICALLY BY HIGH CONCENTRATIONS OF STRONTIUM AND LITHIUM, PRESUMABLY IN GYPSUM BEDS. DISTINGUISHED RADIOMETRICALLY FROM SURROUNDING UNITS BY ANOMALOUS CONCENTRATIONS OF POTASSIUM AND URANIUM. THICKNESS 325 - 900 FT.

Pmo — MINNEKAHTA LIMESTONE AND OPECHE SHALE (LOWER PERMIAN)
MINNEKAHTA LIMESTONE - GRAY TO PURPLISH-GRAY, SLABBY LIMESTONE. THICKNESS 35 - 50 FT.
OPECHE SHALE - RED SILTY SHALE. THICKNESS 25 - 150 FT.

PIPm — MINNELUSA FORMATION (LOWER PERMIAN AND PENNSYLVANIAN) - LIGHT-BROWN TO RED AND GRAY SANDSTONE, SOLUTION BRECCIA (ANHYDRATE IN SUBSURFACE), LIMESTONE, AND SHALE. DISTINGUISHED RADIOMETRICALLY FROM SURROUNDING UNITS BY SLIGHT URANIUM ANOMALIES IN BASAL PART OF FORMATION. THICKNESS 400 TO GREATER THAN 1,500 FT.

MDpe — PAHASAPA LIMESTONE (LOWER MISSISSIPPIAN) AND ENGLEWOOD FORMATION (LOWER MISSISSIPPIAN AND UPPER DEVONIAN)
PAHASAPA LIMESTONE - GRAY TO LIGHT TAN, CAVERNOUS DOLOMITIC LIMESTONE THAT FORMS CONSPICUOUS CLIFFS. THICKNESS 300 - 630 FT.
ENGLEWOOD FORMATION - PINK TO LIGHT-GRAY DOLOMITIC LIMESTONE. THICKNESS 35 - 60 FT.

0Cwd — WHITEWOOD DOLOMITE (UPPER ORDOVICIAN), WINNIPEG FORMATION (MIDDLE ORDOVICIAN), AND DEADWOOD FORMATION (LOWER ORDOVICIAN AND UPPER CAMBRIAN)
WHITEWOOD DOLOMITE - GRAY TO TAN DOLOMITE. THICKNESS 0 - 150 FT.
WINNIPEG FORMATION - GRAY TO LIGHT-GREEN SHALE AND SILTSTONE. THICKNESS 0 - 110 FT.
DEADWOOD FORMATION - BROWN TO LIGHT-GRAY GLAUCONITIC SANDSTONE, SHALE, AND LIMESTONE; BASAL CONGLOMERATE DEVELOPED LOCALLY. THICKNESS 4 - 700 FT.

Xu — UNDIFFERENTIATED PROTEROZOIC ROCKS (EARLY PROTEROZOIC) SHOWN ONLY IN CROSS SECTIONS

FT AMSL — FEET ABOVE MEAN SEA LEVEL

0 ~600' HORIZONTAL
0 ~1,800' VERTICAL

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DRAFT

FIGURE 3-2

WEST TO EAST GEOLOGICAL CROSS SECTION

LOOKOUT SOLAR PARK I
CUSTER & OGLALA LAKOTA COUNTIES, SD

Drawn By: PAC	Checked By: PC	Scale: AS SHOWN	Date: 3/27/2019	File: 52V-GEOXSEC-201903

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MUSYM	muname
Aa	Lohmiller silty clay loam, channeled, 0 to 2 percent slopes
AaA	Altvan loam, 0 to 2 percent slopes
AaB	Altvan loam, 2 to 6 percent slopes
AaC	Altvan loam, 6 to 9 percent slopes
AbA	Altvan loam, 0 to 2 percent slopes
Ar	Arvada loam, 0 to 3 percent slopes
ArA	Arvada loam, 0 to 3 percent slopes
AsB	Ascalon fine sandy loam, 0 to 6 percent slopes
AsC	Ascalon fine sandy loam, 6 to 9 percent slopes
AvE	Anselmo-Valentine complex, 5 to 20 percent slopes
Ba	Badland
BaA	Baca silt loam, 0 to 4 percent slopes
Bb	Bankard fine sandy loam
BcB	Bankard loamy fine sand, 0 to 4 percent slopes
BfA	Beckton silt loam, 0 to 4 percent slopes
ClF	Colby silt loam, 9 to 40 percent slopes
CmC	Colby-Norka silt loams, 6 to 15 percent slopes
Co	Colombo loam, channeled
Eg	Egas silty clay loam
EkE	Epping-Kadoka silt loams, 9 to 18 percent slopes
Ga	Glenberg fine sandy loam
Gb	Glenberg fine sandy loam
GoA	Mobridge silt loam, 0 to 3 percent slopes
Gr	Nihill gravelly loam, 3 to 40 percent slopes
Ha	Haverson loam, 0 to 2 percent slopes, rarely flooded
Hc	Haverson loam, channeled
He	Hisle-Slickspots complex, 0 to 6 percent slopes
Hs	Hisle silt loam, 0 to 6 percent slopes
Hv	Hoven silt loam, 0 to 1 percent slopes
JaA	Jayem fine sandy loam, 0 to 3 percent slopes
JaB	Jayem fine sandy loam, 2 to 9 percent slopes
JaC	Jayem fine sandy loam, 3 to 9 percent slopes
KyA	Kyle clay, 0 to 2 percent slopes
KyB	Kyle clay, 2 to 6 percent slopes
KyC	Kyle clay, 6 to 9 percent slopes
Lm	Interior silt loam, 0 to 3 percent slopes

MUSYM	muname
Lo	Lohmiller silty clay loam
Lp	Lohmiller silty clay, channeled, 0 to 3 percent slopes, occasionally flooded
N658E	Pierre silty clay, 6 to 25 percent slopes
N667E	Pierre-Samsil, moderately deep clays, 6 to 25 percent slopes
NgA	Norka silt loam, 0 to 2 percent slopes
NgB	Norka silt loam, 2 to 6 percent slopes
NuA	Nunn clay loam, 0 to 2 percent slopes
NuB	Nunn clay loam, 2 to 6 percent slopes
NuC	Nunn loam, 6 to 9 percent slopes
PeB	Pierre clay, 2 to 6 percent slopes
PeC	Pierre clay, 3 to 9 percent slopes
PeD	Pierre clay, 6 to 20 percent slopes
PhB	Pierre-Hisle complex, 0 to 9 percent slopes
RaA	Richfield-Altvan silt loams, 0 to 3 percent slopes
Rv	Riverwash
SaE	Samsil clay, 15 to 40 percent slopes
SbF	Samsil clay, 15 to 40 percent slopes
SeA	Satanta loam, 0 to 2 percent slopes
SeB	Satanta loam, 2 to 6 percent slopes
SgA	Satanta-Beckton complex, 0 to 3 percent slopes
SmB	Savo silt loam, 2 to 6 percent slopes
SmE	Schamber-Eckley complex, 9 to 40 percent slopes
Ss	Samsil-Rock outcrop complex, 10 to 50 percent slopes
StE	Schamber-Samsil complex, 15 to 40 percent slopes
Sw	Swanboy clay, 0 to 3 percent slopes
SzB	Swanboy clay, 0 to 3 percent slopes
TnA	Tuthill-Anselmo fine sandy loams, 0 to 3 percent slopes
TnC	Tuthill-Anselmo fine sandy loams, 3 to 9 percent slopes
TuB	Tuthill-Manter fine sandy loams, 3 to 5 percent slopes
VaE	Valent loamy fine sand, 6 to 25 percent slopes
VbD	Valent loamy fine sand, 6 to 25 percent slopes
Vs	Valentine sand, 3 to 30 percent slopes
W	Water
Wh	Whitelake fine sandy loam
Ww	Wortman-Wanblee silt loams, 0 to 6 percent slopes

Proposed Substation

Proposed Solar Generating Facility

Custer County
Fall River County

EXPLANATION

- PROPOSED POWERLINE
- PROPOSED ACCESS ROAD
- RIGHT OF WAY BUFFER (33 & 50 FEET)

SOILS (NRCS JULY 2018)

- FARMLAND OF STATEWIDE IMPORTANCE
- PRIME FARMLAND IF IRRIGATED
- NOT PRIME FARMLAND

N

0 1,500 3,000'

2016 NAIP IMAGERY.

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FIGURE 3-3

SOIL SURVEY OF THE PROJECT AREA AND TRANSMISSION LINE ROUTE

LOOKOUT SOLAR PARK I
CUSTER & OGLALA LAKOTA COUNTIES, SD

Drawn By: BR	Checked By: ES	Scale: 1" = 1,500'	Date: 3/29/19	File: Fig3-3_Soils

EXPLANATION

- PROPOSED POWERLINE
- PROPOSED ACCESS ROAD
- PROPERTY BOUNDARY
- 1/2 MILE BUFFER ZONE AROUND ACCESS ROAD, PROPERTY BOUNDARIES, AND POWER LINES
- 91 - RUDERAL FOREST
- 119 - WESTERN GREAT PLAINS WOODED DRAW AND RAVINE
- 143 - NORTHWESTERN GREAT PLAINS - BLACK HILLS PONDEROSA PINE WOODLAND AND SAVANNA
- 144 - ROCKY MOUNTAIN FOOTHILL LIMBER PINE-JUNIPER WOODLAND
- 193 - WESTERN GREAT PLAINS FLOODPLAIN SYSTEMS
- 325 - NORTHWESTERN GREAT PLAINS MIXEDGRASS PRAIRIE
- 328 - WESTERN GREAT PLAINS SAND PRAIRIE
- 329 - WESTERN GREAT PLAINS SANDHILL STEPPE
- 331 - WESTERN GREAT PLAINS SHORTGRASS PRAIRIE
- 422 - EASTERN GREAT PLAINS WET MEADOW, PRAIRIE AND MARSH
- 426 - WESTERN GREAT PLAINS DEPRESSIONAL WETLAND SYSTEMS
- 535 - WESTERN GREAT PLAINS BADLAND
- 556 - CULTIVATED CROPLAND
- 557 - PASTURE/HAY
- 559 - INTRODUCED UPLAND VEGETATION - PERENNIAL GRASSLAND AND FORBLAND
- 579 - OPEN WATER (FRESH)
- 581 - DEVELOPED, OPEN SPACE
- 582 - DEVELOPED, LOW INTENSITY
- 584 - DEVELOPED, HIGH INTENSITY

N

0 4,000 '

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FIGURE 3-4

ECOLOGICAL SYSTEMS IN THE PROJECT AREA AND TRANSMISSION LINE ROUTE

LOOKOUT SOLAR PARK I
CUSTER & OGLALA LAKOTA COUNTIES, SD

Drawn By: BR	Checked By: ES	Scale: 1 " = 4,000 '	Date: 3/29/19	File: Fig3-4_GAP_EcoSystems.mxd

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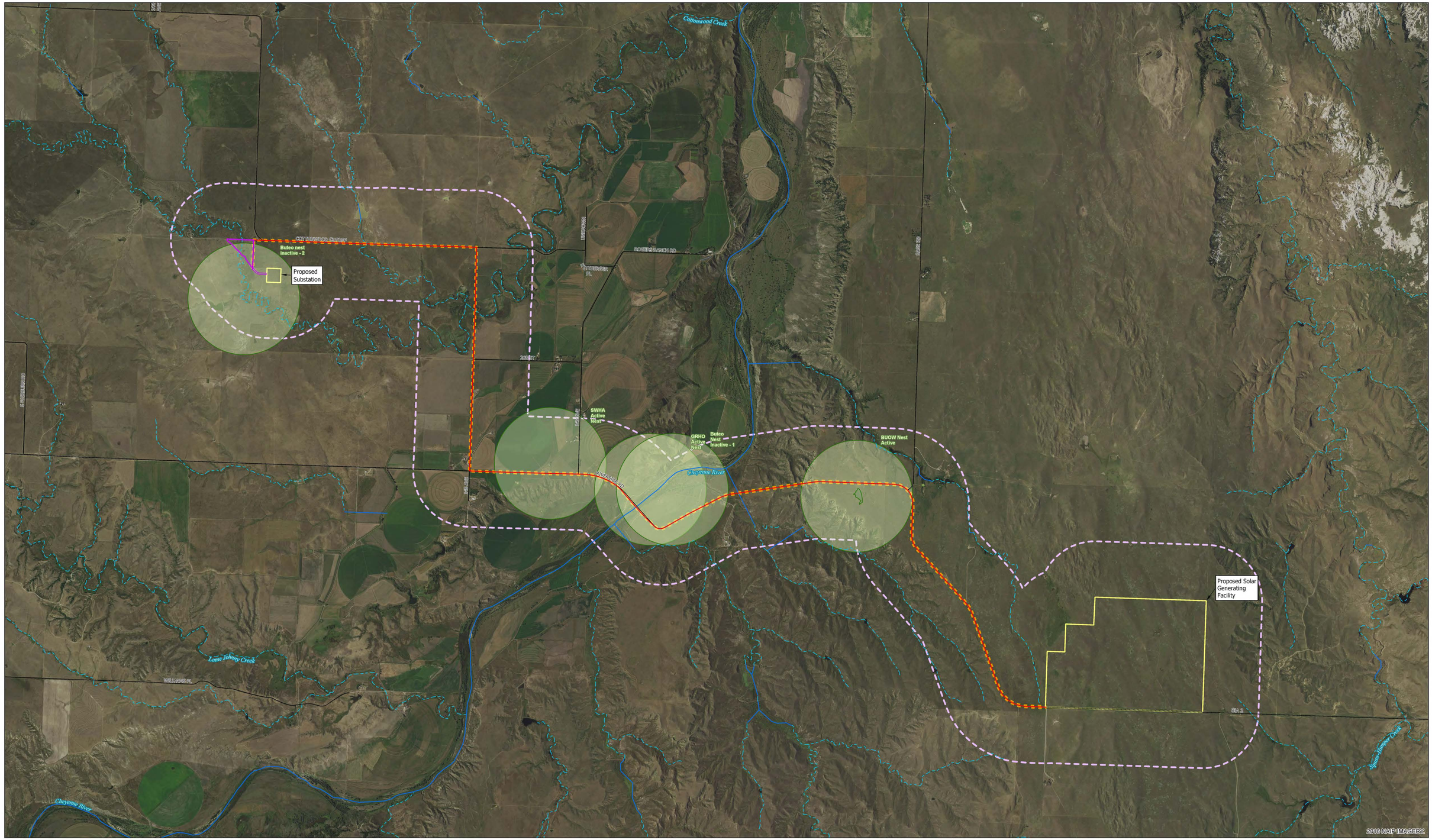

EXPLANATION

- PROPOSED ACCESS ROAD
- PROPOSED POWERLINE

NATIONAL HYDROGRAPHY DATASET (USGS FEB. 2016)

- PERENNIAL STREAM
- INTERMITTENT STREAM
- PROPERTY BOUNDARIES
- RIGHT OF WAY BUFFER (33 & 50 FEET)
- 1/2 MILE BUFFER ZONE AROUND ACCESS ROAD, PROPERTY BOUNDARIES, AND POWER LINES
- BLACK-TAILED PRAIRIE DOG COLONY
- APPROXIMATE RAPTOR NEST LOCATION

N

0 2,000 4,000'

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FIGURE 3-14

RAPTOR NESTS IN THE PROJECT AREA

LOOKOUT SOLAR PARK I
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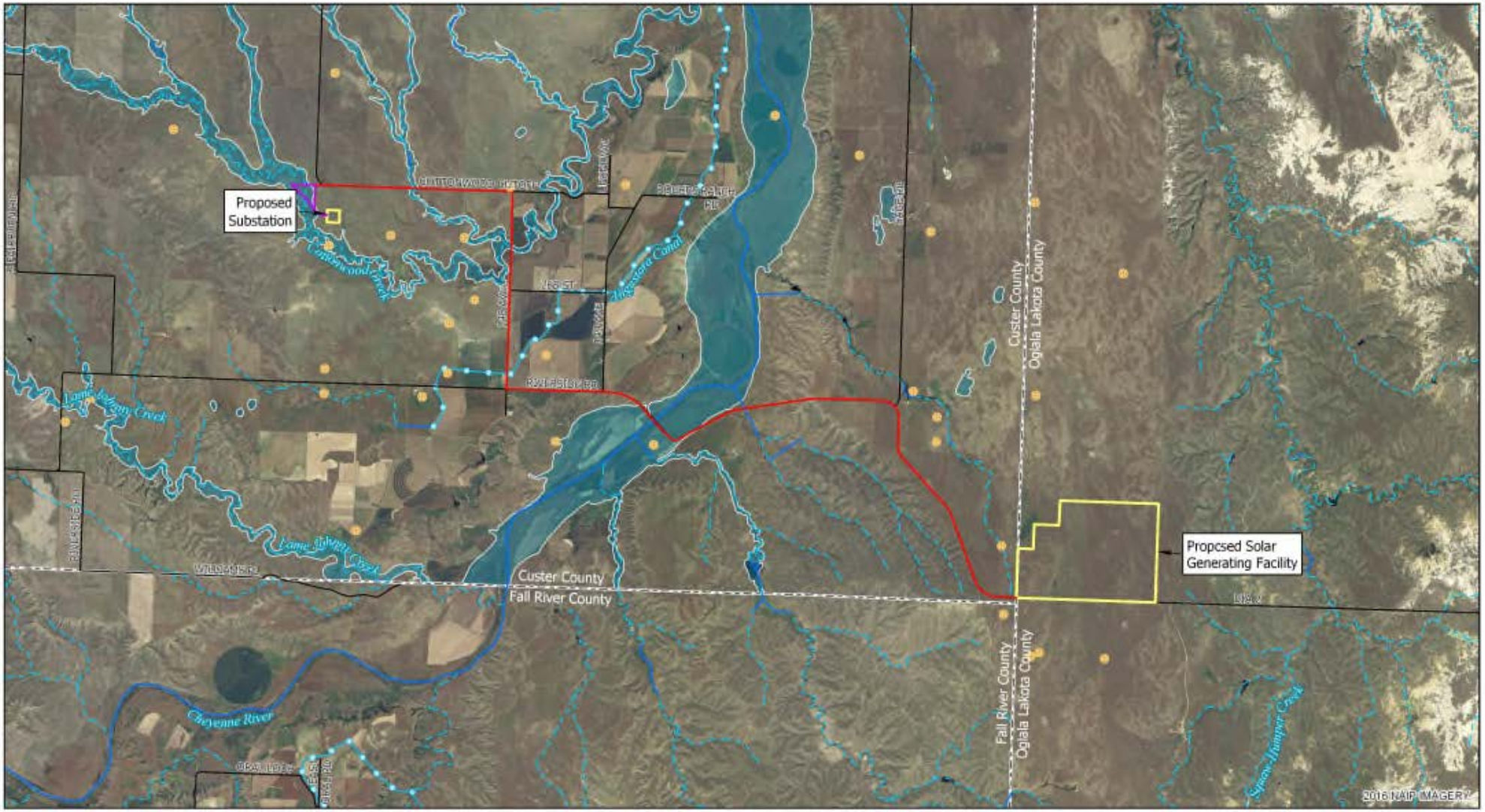
Drawn By: BR	Checked By: ES	Scale: 1" = 2,000'	Date: 3/29/19	File: Fig3-14_RaptorNests



EXPLANATION

- WATER WELL (DENR 2019)
- PROPOSED ACCESS ROAD
- PROPOSED POWERLINE
- PROPERTY BOUNDARIES

NATIONAL HYDROGRAPHY DATASET (USGS FEB. 2016)

- PERENNIAL STREAM
- INTERMITTENT STREAM
- CANAL
- 1% ANNUAL CHANCE FLOOD HAZARD (FEMA 2019)

N

0 1 Mile

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FIGURE 3-12

FEMA FLOOD ZONES IN THE PROJECT AREA

LOOKOUT SOLAR PARK I
CUSTER & OGLALA LAKOTA COUNTIES, SD

Drawn By: BR	Checked By: ES	Scale: 1" = 1Mile	Date: 3/29/19	File: Fig3-12_Floodplains