SOLAR FARM ENVIRONMENTAL ASSESSMENT
PINE RIDGE INDIAN RESERVATION

United States Department of the Interior
Bureau of Indian Affairs
Great Plains Regional Office
Aberdeen, South Dakota

Prepared for:
Bureau of Indian Affairs
Aberdeen, South Dakota

Prepared by:
Trihydro Corporation
Laramie, Wyoming

on behalf of
Hidden Water, Inc.
Wichita, Kansas

June 2016

For information contact:
Bureau of Indian Affairs, Great Plains Regional Office
115 Fourth Avenue S.E. Suite 400
Aberdeen, South Dakota 57401

Table of Contents

1.0 INTRODUCTION AND BACKGROUND 1-1

1.1 Purpose and Need for Action 1-1

1.1.1 Purpose 1-1

1.1.2 Need 1-1

1.1.3 NEPA and Project Review 1-1

2.0 PROPOSED ACTION AND ALTERNATIVES CONSIDERED 2-1

2.1 Alternatives Considered 2-1

2.1.1 No Action Alternative 2-1

2.1.2 Proposed Action 2-1

2.1.3 Alternatives Considered but Eliminated from Further Study 2-1

2.2 Details of the Proposed Action 2-1

2.2.1 Construction 2-5

2.2.2 Operation 2-6

2.2.3 Decommissioning and Reclamation 2-7

2.3 Measures to Avoid or Reduce Potential Impacts 2-7

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES 3-1

3.1 Introduction 3-1

3.2 Geology 3-1

3.2.1 Existing Environment 3-1

3.2.2 Impacts 3-2

3.2.2.1 No Action Alternative 3-2

3.2.2.2 Proposed Action 3-2

3.3 Paleontology 3-3

3.3.1 Existing Environment 3-3

3.3.2 Impacts 3-3

3.3.2.1 No Action Alternative 3-3

3.3.2.2 Proposed Action 3-3

3.4 Air Quality 3-4

3.4.1 Existing Environment 3-4

3.4.1.1 Regional Air Quality 3-4

3.4.1.2 Regional Climate 3-4

Table of Contents (cont.)

3.4.2 Impacts 3-5
3.4.2.1 No Action Alternative 3-5
3.4.2.2 Proposed Action 3-5
3.5 Climate Change and Greenhouse Gases 3-6
3.5.1 Existing Environment 3-7
3.5.2 Impacts 3-7
3.5.2.1 No Action Alternative 3-7
3.5.2.2 Proposed Action 3-7
3.6 Soils 3-9
3.6.1 Existing Environment 3-9
3.6.1.1 Soil Resources 3-9
3.6.1.2 Soil Taxonomy 3-9
3.6.2 Impacts 3-13
3.6.2.1 No Action Alternative 3-13
3.6.2.2 Proposed Action 3-13
3.7 Vegetation 3-15
3.7.1 Existing Environment 3-15
3.7.1 Impacts 3-16
3.7.1.1 No Action Alternative 3-16
3.7.1.2 Proposed Action 3-16
3.8 Wetlands 3-19
3.8.1 Existing Environment 3-19
3.8.1 Impacts 3-19
3.8.1.1 No Action Alternative 3-19
3.8.1.1 Proposed Action 3-19
3.9 Water Resources 3-23
3.9.1 Existing Environment 3-23
3.9.2 Impacts 3-23
3.9.2.1 No Action Alternative 3-24
3.9.2.2 Proposed Action 3-24
3.10 Threatened, Endangered, and Candidate Species 3-24
3.10.1 Existing Environment 3-25
3.10.1.1 Whooping Crane 3-25
3.10.1.2 Northern Long-eared Bat 3-26
3.10.1.3 Rufa Red Knot 3-26

Table of Contents (cont.)

3.10.1.4 Western Prairie Fringed Orchid 3-27
3.10.1.5 Black-footed Ferret 3-27
3.10.1.6 Sprague's Pipit 3-28
3.10.2 Impacts 3-28
3.10.2.1 No Action Alternative 3-28
3.10.2.2 Proposed Action 3-28
3.10.2.2.1 Whooping Crane 3-28
3.10.2.2.2 Northern Long-eared Bat 3-29
3.10.2.2.3 Rufa Red Knot 3-29
3.10.2.2.4 Western Prairie Fringed Orchid 3-29
3.10.2.2.5 Black-footed Ferret 3-29
3.10.2.2.6 Sprague's Pipit 3-29
3.11 Wildlife 3-29
3.11.1 Existing Environment 3-30
3.11.2 Impacts 3-31
3.11.2.1 No Action Alternative 3-31
3.11.2.2 Proposed Action 3-31
3.12 Cultural Resources 3-32
3.12.1 Existing Environment 3-33
3.12.2 Impacts 3-33
3.12.2.1 No Action Alternative 3-33
3.12.2.2 Proposed Action 3-33
3.13 Land Use 3-33
3.13.1 Existing Environment 3-34
3.13.2 Impacts 3-34
3.13.2.1 No Action Alternative 3-34
3.13.2.2 Proposed Action 3-34
3.14 Socioeconomic Conditions 3-35
3.14.1 Existing Environment 3-35
3.14.2 Impacts 3-36
3.14.2.1 No Action Alternative 3-36
3.14.2.2 Proposed Action 3-36
3.15 Environmental Justice 3-37
3.15.1 Existing Environment 3-38

Table of Contents (cont.)

3.15.2 Impacts 3-39
3.15.2.1 No Action Alternative 3-39
3.15.2.2 Proposed Action 3-39
3.16 Visual Resources 3-40
3.16.1 Existing Environment 3-40
3.16.2 Impacts 3-42
3.16.2.1 No Action Alternative 3-42
3.16.2.2 Proposed Action 3-42
3.17 Public Health and Safety 3-43
3.17.1 Existing Environment 3-43
3.17.2 Impacts 3-43
3.17.2.1 No Action Alternative 3-43
3.17.2.2 Proposed Action 3-43
3.18 Roads and Traffic 3-44
3.18.1 Existing Environment 3-44
3.18.2 Impacts 3-45
3.18.2.1 No Action Alternative 3-45
3.18.2.2 Proposed Action 3-45

4.0 CUMULATIVE IMPACTS 4-1
4.1 Past, Present, and Reasonably Foreseeable Actions 4-1
4.2 Cumulative Impact Assessment 4-1
4.2.1 Geology 4-4
4.2.2 Paleontology 4-4
4.2.3 Air Quality 4-4
4.2.4 Climate Change and Greenhouse Gases 4-4
4.2.5 Soils 4-4
4.2.6 Vegetation 4-5
4.2.7 Wetlands 4-5
4.2.8 Water Resources 4-5
4.2.9 Threatened, Endangered, and Candidate Species 4-6
4.2.10 Wildlife 4-6
4.2.11 Cultural Resources 4-6
4.2.12 Land Use 4-6
4.2.13 Socioeconomic Conditions 4-6

Table of Contents (cont.)

4.2.14 Environmental Justice 4-7
4.2.15 Visual Resources 4-7
4.2.16 Public Health and Safety 4-7
4.2.17 Roads and Traffic 4-7
4.3 Irreversible and Irretrievable Commitment of Resources 4-8
4.4 Short-term Use of the Environment Versus Long-term Productivity 4-8
4.4.1 Land Use Productivity 4-8
4.4.2 Water Resources Productivity 4-9
4.4.3 Biological Resources Productivity 4-9

5.0 CONSULTATION AND COORDINATION 5-1
5.1 Introduction 5-1
5.2 Preparers of the EA 5-1
5.3 Agency Coordination 5-1
5.4 Interagency Scoping and Public Involvement 5-2

6.0 REFERENCES 6-1

List of Tables

TABLE 2-1. PROPOSED SURFACE DISTURBANCE 2-2

TABLE 2-2. COMPARISON OF IMPACTS TO RESOURCE AREAS BY ALTERNATIVES 2-8

TABLE 3-1. STRATIGRAPHY SUMMARY OF PRIR 3-2

TABLE 3-2. OGLALA LAKOTA COUNTY BASELINE EMISSIONS 3-4

TABLE 3-3. OGLALA LAKOTA COUNTY EMISSION SOURCES 3-4

TABLE 3-4. SOIL SERIES CHARACTERISTICS WITHIN THE RESERVATION 3-9

TABLE 3-5. VEGETATION RESOURCES OF THE PROJECT AREA 3-15

TABLE 3-6. THREATENED, ENDANGERED, AND CANDIDATE SPECIES KNOWN TO OCCUR IN THE COUNTY 3-25

TABLE 3-7. EMPLOYMENT BY INDUSTRY 3-36

TABLE 3-8. MINORITY POPULATION CHARACTERISTICS OF OGLALA LAKOTA COUNTY AND THE SURROUNDING AREA 3-38

TABLE 3-9. AVERAGE INCOME AND POVERTY RATES (2010-2014) 3-39

TABLE 4-1. CUMULATIVE IMPACTS EVALUATION 4-2

TABLE 5-1. PREPARERS OF THE EA 5-1

TABLE 5-2. INDIVIDUALS WITH THE BIA WHO PROVIDED TECHNICAL AND/OR REVIEW OF THE EA 5-2

TABLE 5-3. PUBLIC SCOPING LETTERS SENT AND RECEIVED 5-2

List of Figures

FIGURE 1-1. SITE LOCATION MAP 1-3

FIGURE 2-1. PROJECT AREA 2-3

FIGURE 3-1. SOIL RESOURCES OF THE PROJECT AREA 3-11

FIGURE 3-2. VEGETATION RESOURCES OF THE PROJECT AREA 3-17

FIGURE 3-3. WATER RESOURCES OF THE PROJECT AREA 3-21

FIGURE 3-4. VIEW OF THE SOUTHERN BOUNDARY OF PROJECT AREA FROM BIA ROUTE 2, FACING NORTH 3-40

FIGURE 3-5. VIEW OF THE APPROXIMATE MIDDLE OF THE PROJECT AREA, FACING SOUTH 3-41

FIGURE 3-6. VIEW OF THE NORTHERN BOUNDARY OF THE PROJECT AREA, FACING SOUTHWEST 3-41

FIGURE 3-7. TRANSPORTATION NETWORK 3-47

List of Appendices

APPENDIX A. TRIBAL COUNCIL OF THE OGLALA SIOUX TRIBE RESOLUTION NO. 16-50

APPENDIX B. SCOPING RESPONSE LETTERS

APPENDIX C. SECTION 106 LETTERS OF CONCURRENCE

1.0 INTRODUCTION AND BACKGROUND

The United States (U.S.) Department of the Interior, Bureau of Indian Affairs (BIA) prepared this environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, and the regulations of the Council on Environmental Quality (CEQ), 40 Code of Federal Regulations (CFR) parts 1500 through 1508. An EA is an informational document intended for use by both decision-makers and the public. It discloses relevant environmental information concerning the proposed action and the no-action alternative.

1.1 PURPOSE AND NEED FOR ACTION

1.1.1 PURPOSE

The Proponent proposes to construct and operate an approximately 840-acre (specifically mapped as approximately 792 acres) photovoltaic (PV) solar farm and an information and office center (cumulatively the Lookout Solar Farm) (hereon Project Area) on the Pine Ridge Indian Reservation (hereon PRIR or Reservation; Figure 1-1). The purpose of this project is to generate solar energy, provide public education on the benefits of solar energy, encourage future renewable-energy interest and investments, and reduce greenhouse gas (GHG) emissions across the Reservation.

1.1.2 NEED

The need for the NEPA review is for the BIA, under their trust responsibilities, to respond to the Proponent on the approval of the Lookout Solar Farm on the Reservation. The BIA's response to the proposed project complies with NEPA, supports tribal sovereignty and self-determination, and meets the BIA's mission of enhancing the quality of life, promoting economic opportunity, and carrying out the responsibility to protect and improve the trust assets of American Indians. In addition, the NEPA review complies with the Energy Policy Act of 2005 (Public Law [P.L.] 109-58), the Energy Independence and Security Act of 2007 (P.L. 110-140), and the American Recovery and Reinvestment Act (P.L. 111-5).

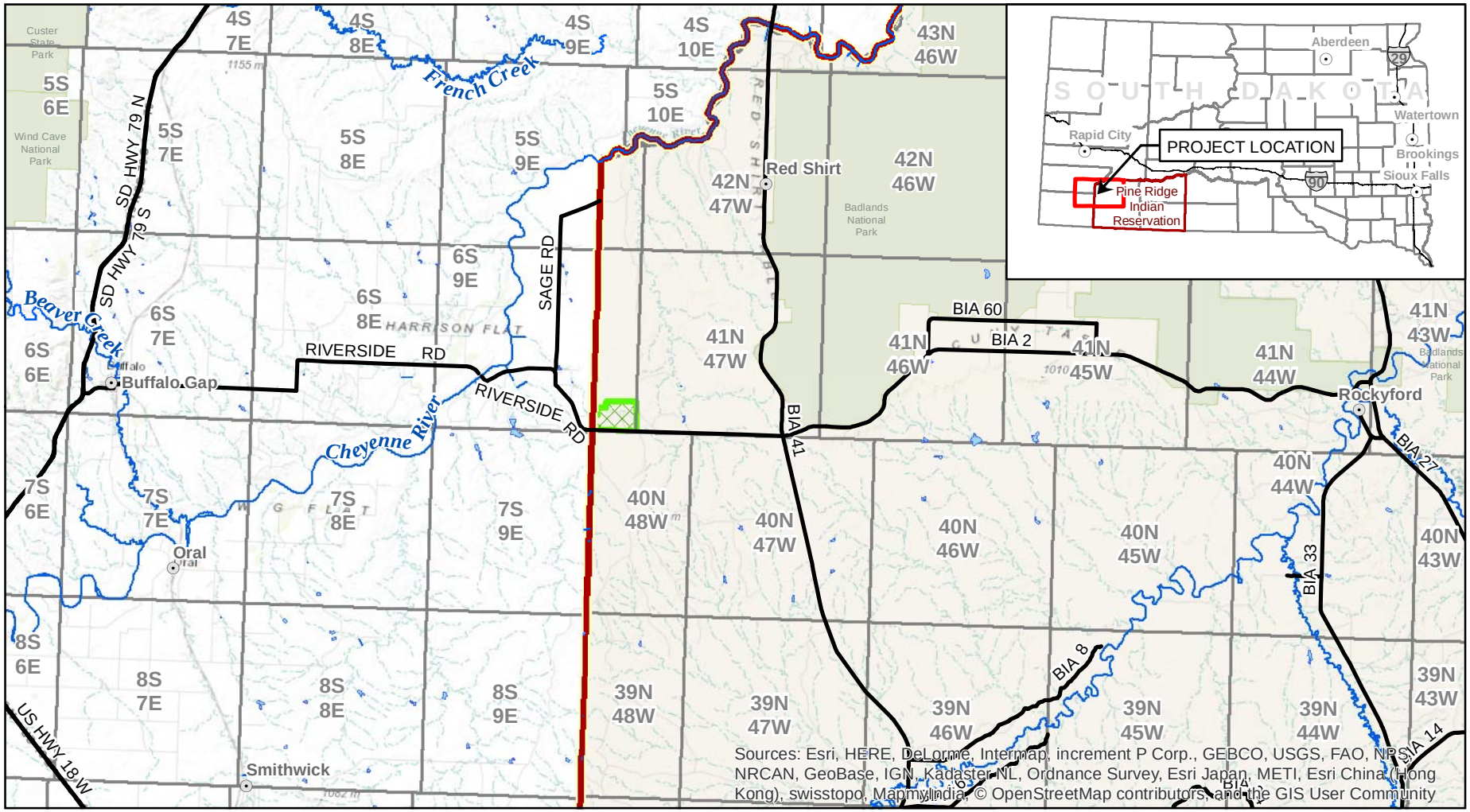
1.1.3 NEPA AND PROJECT REVIEW

The BIA must comply with NEPA before issuing a determination of effect regarding environmental resources. Therefore, an EA for the proposed Lookout Solar Farm is necessary to analyze the direct, indirect, and cumulative impacts of the proposed project.

Development activities on Indian lands are subject to a variety of federal environmental regulations and policies under the authority of the BIA. This inspection and enforcement authority derives from the U.S.' trust obligations to federally recognized American Indian tribes. These trust responsibilities include, but are not limited to, conducting

operations in a manner that ensures the proper handling, measurement, and disposition of leasehold production; and protecting other natural resources, environmental quality, life, and property.

The Tribal Council of the Oglala Sioux Tribe passed Resolution No. 16-50 in support of Look Outs Solar Project to be located on individual Indian trust lands (Appendix A).



EXPLANATION

- STATE/FEDERAL HIGHWAY
- PROJECT AREA
- RESERVATION BOUNDARY
- STATE PARK OR NATIONAL PARK LAND

N

0 5 Miles

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

FIGURE 1-1

SITE LOCATION MAP

LOOKOUT SOLAR FARM EA
PINE RIDGE INDIAN RESERVATION, SOUTH DAKOTA

Drawn By: BR	Checked By: JM	Scale: 1 " = 5 Miles	Date: 5/23/16	File: Fig1-1_PRIR_Solar_SiteLoc.mxd

This Page Intentionally Left Blank

2.0 PROPOSED ACTION AND ALTERNATIVES CONSIDERED

This chapter provides information on the development and evaluation of the proposed Lookout Solar Farm project and the associated alternatives. The development of the alternatives is directly related to the purpose and need for this project. Two alternatives are being considered for this project: the No Action Alternative and the Proposed Action.

2.1 ALTERNATIVES CONSIDERED

2.1.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the BIA would not authorize the Proponent to construct the Lookout Solar Farm. Current conditions would likely continue, including livestock grazing, which is the current land use in the Project Area.

2.1.2 PROPOSED ACTION

Under the Proposed Action, the BIA would grant the Proponent the approval to construct, operate, and maintain an approximately 840-acre PV solar farm and information and office center (i.e., the Lookout Solar Farm Information and Office Center) in Oglala Lakota County (formerly Shannon County), South Dakota. The proposed solar farm would produce up to an average maximum of 50 megawatts (MW) of energy on an average annual basis.

2.1.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

During internal scoping, many alternatives were considered, but eliminated from further study. Alternatives discussed and considered included four different project locations and/or project area sizes within the PRIR. These were eliminated from further study due to potential issues with geology, migratory birds, viewsheds, and/or access.

2.2 DETAILS OF THE PROPOSED ACTION

The proposed Lookout Solar Farm would consist of an approximately 840-acre tract of rangeland located on PRIR in Oglala Lakota County, South Dakota (Figures 1-1 and 2-1). The Project Area is located approximately 22 miles east of Buffalo Gap, South Dakota, in Township 41 North (T41N), Range 48 West (R48W), Section 36 and the southern portion of Section 35. The MW capacity of Lookout Solar Farm would be up to 200 MW of PV power with an estimated efficiency factor of 23 percent (%); therefore, with battery storage, the Lookout Solar Farm would produce a net average of 50 MW of PV power on an average annual basis.

The Lookout Solar Farm would be comprised of approximately 662 acres of solar arrays, including battery storage and the following additional components: the Lookout Solar Farm Information and Office Center, including the office building, a warehouse, an equipment shed, a parking lot, and a substation; overhead and buried transmission lines and associated Rights-of-Way (ROWs); haul roads; and the addition of sheep for vegetation control (further discussed in

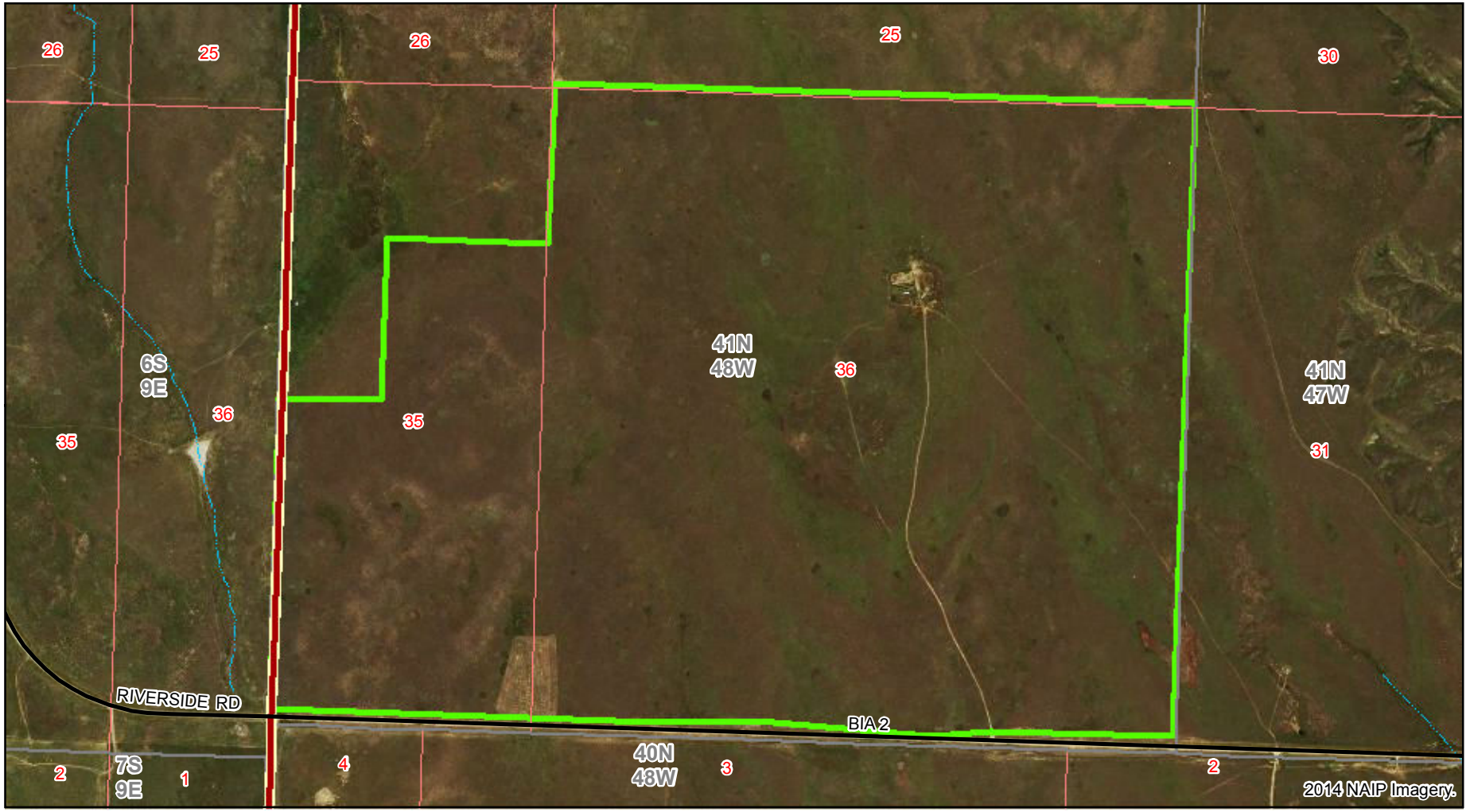
Section 2.2.2). The exact location of the proposed Information and Office Center has not been identified to date; however, it will likely be located in the southwest portion of the Project Area. The transmission lines would be necessary for the transfer of power from the onsite substation to the Western Area Power Association (WAPA) substation (or a possible alternate provider's substation), which is located outside of Reservation boundaries. Table 2-1 shows the proposed surface disturbance associated with the components of the proposed Lookout Solar Farm project, as discussed above.

TABLE 2-1. PROPOSED SURFACE DISTURBANCE

Project Component	Details of the Project Component	Approximate Acreage	Approximate Percent of the Project Area (%)
PV Modules/Panels/Array[1,2]	3.31 acres per 1 MW[3,4]	662	79
Lookout Solar Farm Information and Office Center	2.5 acres for the warehouse, equipment storage, and substation; 0.5 acre for the Information and Office Center building and parking lot	3	0.4
Transmission Line ROWs	1 mile long on the Reservation; 75-foot temporary ROW	9	1
	1 mile long on the Reservation; 50-foot permanent ROW	6	0.7
Haul Roads	2 miles of 12.5-foot wide roads	3	0.4

[1] Modules are also referred to as panels. Multiple modules or panels make up an array.
[2] Battery storage is included with this project component and the associated surface disturbance.
[3] Direct and total land use requirements for PV plants or fields vary based on efficiency, land-use intensity, technologies, etc., and the quality and duration of the impact must be evaluated on a case-by-case basis (Ong et al. 2013).
[4] Average area requirement for 1 MW output in the study area is congruent with other literature; however, area requirements are dependent on the solar irradiation factor and can vary (Tisza 2014).

Note: A 1,000-foot overhead ROW will be necessary for the installation of the overhead transmission lines; however, it is not included in this table because surface disturbance related to the overhead lines would be negligible.
Note: The remaining undisturbed area (i.e., 20%) within the Project Area would not include additional surface disturbance.



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 2-1

PROJECT AREA

LOOKOUT SOLAR FARM EA
PINE RIDGE INDIAN RESERVATION, SOUTH DAKOTA

Drawn By: BR	Checked By: JM	Scale: 1 " = 1,250 '	Date: 5/23/16	File: Fig2-1_PRIR_Solar_ProjArea.mxd

This Page Intentionally Left Blank

2.2.1 CONSTRUCTION

Site preparation activities for the construction of the Lookout Solar Farm would begin with surveying and staking the Project Area and initial land disturbance (approximately 683 acres). The area proposed for the Lookout Solar Farm would be cleared, grubbed, and graded for suitable placement of the solar array field and Information and Office Center. However, it is not anticipated that the existing vegetation in the Project Area would be completely cleared in order to reduce potential surface impacts. Prior to grading, native topsoil would be removed from the area and stockpiled onsite for re-distribution over the disturbed area after the grading is completed. The Proponent would work with the existing landscape (e.g., slope, drainage, use of existing roads), where feasible, to minimize or eliminate grading work and land disturbance to the maximum extent possible. For example, earthmoving equipment would be used for areas requiring grading to maintain a relatively consistent slope to the surrounding area. In addition, appropriate controls (e.g., silt fences, riprap, etc.) would be used to minimize the exposure of soil to erosion and to prevent eroded soil from leaving the disturbed area. All activities would be confined to designated areas and haul roads and each solar panel would be mounted on four support posts that would be driven into the ground. The panel support posts would range in height from approximately 4 to 6 feet depending on the terrain. The placement of the solar panels would allow the native prairie grass, which is the current groundcover, to grow unimpeded. The panels would be sited at site-specific angles and mounted facing due south for maximum sunlight absorption; alternatively, possible rotating panels may utilized by the Proponent. Once the PV panels are constructed, electrical connections between each PV array would be made and verification testing would be performed. Approximately 2 miles of 12.5-foot-wide haul roads would be installed for operation and maintenance activities. Batteries for storing extra solar power would be installed next to each solar array row. Additionally, a fence would be installed for safety, security, and containing the sheep.

The Lookout Solar Farm Information and Office Center and associated components would be constructed on approximately 3 acres adjacent to the solar field, likely in the southwest corner of the Project Area, immediately north of BIA Route 2. The approximately 6,000 to 10,000-square foot building would be positioned with a clear viewing area of the solar field, and have an adjacent parking lot on approximately 0.5 acre. In addition, a warehouse, equipment storage, and substation would be constructed on the remaining 2.5 acres. An approximately 8-foot high chain-link perimeter fence around the substation would be installed for safety and security. A leachate septic system designed for less than 20 people per day would be installed for wastewater disposal. Typical equipment needed for construction activities would include a compactor, impact/vibratory pilings or drill shafts, dump truck, dozer, excavator, generator, grader, pick-up trucks, and a crane.

The solar field would be connected to the substation adjacent to the Lookout Solar Farm Information and Office Center via approximately 1-mile of buried transmission lines. The transmission lines would be installed by plowing the ground surface, with some areas requiring the use of a backhoe. All backhoe excavations would be reclaimed and reseeded to prevent erosion. The temporary transmission line ROW would be 75 feet, while the permanent

transmission line ROW would be reduced to 50 feet for operations. The onsite substation would transmit the solar power to the WAPA substation (or alternative provider) via overhead transmission lines. Approximately 1,000-feet (maximum) of overhead transmission lines would be installed within the exterior boundaries of the Reservation, and an additional 9.5 miles of overhead transmission lines would be constructed off the Reservation for connection to the WAPA substation.

Construction of the Lookout Solar Farm would take approximately 12 months. The construction workforce would be made up of approximately 50 workers who would be bused from local communities. Up to two buses per day would be used for transportation of the workforce.

Approximately 200 cubic yards of waste would be generated from the construction of the solar field and an additional 60 cubic yards of waste would be generated during the construction of the Lookout Solar Farm Information and Office Center. The construction debris would be disposed of at an U.S. Environmental Protection Agency (USEPA) approved/permitted landfill. There would be no onsite deposition of construction waste.

2.2.2 OPERATION

Solar field operations for the Lookout Solar Farm would include operating and maintaining facility equipment, such as verifying connections through electrical tests and inspections, implementing repairs, and managing vegetation. No additional land disturbance is expected to occur during operations of the Proposed Action.

Vegetation on the Lookout Solar Farm would be actively maintained to control growth and prevent overshadowing or shading of the PV arrays. The Proponent would maintain the vegetation by grazing sheep and performing limited mowing. Sheep would be rotated as needed to avoid impacts to the vegetation, such as overgrazing or causing ruts to the ground surface.

Additional operations for the Lookout Solar Farm would also include periodically washing the solar modules. To minimize the rate of evaporation and to avoid impacts to power generation, this task would primarily be conducted during early morning hours or late in the day, in order to avoid sun and/or heat hours. Approximately 200,000 to 400,000 gallons of water per year from the Mini Wiconi Water District would be used for this task. Module washing would occur no more than twice per year and measures would be implemented to prevent soil erosion and to minimize water use.

Operations at the Lookout Solar Farm Information and Office Center would also include operation and maintenance activities, such as interacting with Lookout Solar Farm visitors (e.g., welcoming guests, and distributing maps and

literature), groundskeeping, landscaping, and operating and maintaining water and wastewater systems. These activities would require no more than 10 full-time employees.

2.2.3 DECOMMISSIONING AND RECLAMATION

The Proponent would use the Lookout Solar Farm to supply and sell power to WAPA (or an alternate provider) for approximately 25 years. At the end of the project, the Proponent would assess whether to cease operations at the Lookout Solar Farm or replace equipment (if needed) and attempt to enter into a new power purchase contract with WAPA (or an alternate provider). If WAPA or another entity is willing to enter into such an agreement, the Lookout Solar Farm could continue operating. If no arrangement is possible, the facilities would be decommissioned and dismantled, and the site would be reclaimed and restored to the approximate original site conditions. In general, the majority of decommissioned equipment and materials would be recycled. Materials that cannot be recycled would be disposed of at USEPA approved/permitted facilities.

General decommissioning activities would typically include:

- Dismantling and removing above ground equipment (e.g., solar panels, the substation, the overhead transmission lines, the Lookout Solar Farm Office and Information Center, etc.), unless anything is re-tasked with the approval of the BIA
- Breaking up and removing concrete pads and foundations
- Removing panel support posts
- Pumping and breaking up of the septic tank associated with the Lookout Solar Farm Information and Office Center and backfilling the area with clean soil
- Abandoning underground utilities
- Reestablishing the grazing leases for the Project Area

2.3 MEASURES TO AVOID OR REDUCE POTENTIAL IMPACTS

The following mitigation measures would be implemented by the Proponent for the Proposed Action.

- In the event of an inadvertent discovery of a cultural or paleontological resource during construction or operations, the work would halt in the immediate area, and the cultural or paleontological property would be secured and protected. Notification of inadvertent discovery would be communicated to the Oglala Sioux Tribal Historic Preservation Office (THPO) and the BIA. The THPO and BIA, in consultation, would determine the treatment of the cultural property or paleontological resource.
- A qualified construction/archaeologist monitor would be present during ground disturbing activities.

- Wetting construction areas would be required to control dust within the Project Area and haul roads.
- Native topsoil would be removed from the area and stockpiled onsite for re-distribution after the grading is completed. The Proponent would stockpile the topsoil separately from the subsurface horizons.
- Soil stabilization procedures would be implemented and fencing operations would be performed on dry ground to minimize rutting; operations during excessively wet conditions would not be allowed.
- The Proponent would work with the existing landscape and roads (e.g., slope, drainage, use of existing roads) where feasible, to minimize or eliminate grading work and land disturbance to the maximum extent possible.
- Existing vegetation in the Project Area would only be cleared for grading, and all activities would be confined to designated areas and haul roads.
- Vegetation would be maintained to the lowest height tolerable for plant survival.
- Construction equipment would be properly cleaned before entry into the Project Area.
- Wetlands would be avoided by at least 150 feet.
- Cleaning of the PV arrays with water (only) would occur during the early morning and evening to minimize water loss through evaporation.
- Contractors would follow Occupational Safety and Health Administration (OSHA) regulations.
- Local firefighters would be trained for unique conditions related to solar panel fires and related infrastructure.
- Batteries would be properly stored and employees would conduct routine maintenance inspections.
- Adequate lighting, use of signage, and good housekeeping practices would be employed at the Lookout Solar Farm.
- Buses would be used to transport workers and visitors to the Project Area.

Table 2-2 shows the expected impacts from the No Action Alternative and the Proposed Action, including associated mitigation measures.

TABLE 2-2. COMPARISON OF IMPACTS TO RESOURCE AREAS BY ALTERNATIVES

Resource Area	Impacts from the No Action Alternative	Impacts from the Proposed Action
Geology	No direct or indirect impacts anticipated.	Only minor direct impacts to potential geological resources are expected due to the anticipated minimal subsurface disturbances.
Paleontological Resources	No direct or indirect impacts anticipated.	There are no known sensitive paleontological sites in the Project Area. No impacts to

Resource Area	Impacts from the No Action Alternative	Impacts from the Proposed Action
		paleontological resources are expected due to the mitigation measures that would be implemented.
Air Quality	Minor methane emissions from cattle would continue; however, these emissions are considered negligible.	Short-term minor air emissions from construction are expected; however, mitigation measures would be implemented to minimize these potential effects. The emissions generated from the operations are anticipated to be negligible.
Climate Change and Greenhouse Gases	Impacts from global climate change and variability to the Project Area are anticipated.	Minor short-term GHG emissions are expected from construction and operation; however, the solar power generated could reduce demand of power from other sources (e.g. coal, gas, etc.), which may reduce GHG emissions. Overall reduction in GHG emissions could mitigate climate change. Impacts from climate change and variability within the Project Area are anticipated.
Soils	Potential minor direct impacts could occur depending on grazing practices.	Only minor direct impacts to soils are expected due to the anticipated minimal surface disturbances and the mitigation measures that would be implemented.
Vegetation	Potential direct impacts could occur depending on grazing practices.	Minor short-term and long-term impacts to vegetation resources are expected due to construction and the mitigation measures that would be implemented.
Wetlands	Potential direct impacts could occur depending on grazing practices.	Direct and indirect impacts to wetland resources are not expected due to the mitigation measures that would be implemented.
Water Resources	Potential direct impacts could occur depending on grazing practices.	Direct and indirect impacts to water resources are not expected due to the mitigation measures that would be implemented.

Resource Area	Impacts from the No Action Alternative	Impacts from the Proposed Action
Threatened, Endangered, and Candidate Species	No direct or indirect impacts anticipated.	Direct and indirect impacts to threatened, endangered, and candidate species are not expected due to the unlikelihood of occurrence and/or the mitigation measures that would be implemented.
Wildlife	No direct or indirect impacts anticipated.	Potential minor impacts to wildlife are not expected due to unlikelihood of occurrence and/or the mitigation measures that would be implemented.
Cultural Resources	No direct or indirect impacts anticipated.	There are no known cultural resources identified in the Project Area. No impacts to cultural resources are expected due to the mitigation measures that would be implemented.
Land Use	No direct or indirect impacts anticipated.	Minor impacts to land use are expected.
Socioeconomic Conditions	No direct or indirect impacts anticipated.	Minor short-term and long-term beneficial impacts are expected.
Environmental Justice	No direct or indirect impacts anticipated.	No direct or indirect impacts are anticipated.
Visual Resources	No direct or indirect impacts anticipated.	Potential adverse or beneficial impacts (depending on each observer's viewshed preference) to visual resources are expected; adverse impacts would be minimized because of the mitigation measures that would be implemented.
Public Health and Safety	No direct or indirect impacts anticipated.	Potential adverse short-term and long-term impacts to public health and safety could occur; however, short-term and localized adverse impacts potentially occurring during construction would be minimized from the mitigation measures that would be implemented.
Roads and Traffic	No direct or indirect impacts anticipated.	Negligible temporary and long-term impacts to roads and traffic are expected to occur; however, short-term and localized adverse impacts would be minimized from the mitigation measures that would be implemented.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

The following chapter describes the existing environmental; social and economic conditions of the Project Area and the surrounding areas; and the potential environmental impacts that could result from implementing the No Action Alternative or the Proposed Action.

3.2 GEOLOGY

The following sections describe the existing geological resources within the Reservation, including the Project Area, and the potential impacts from the two alternatives.

3.2.1 EXISTING ENVIRONMENT

The PRIR can be divided into two primary geologic settings. Badlands comprise the northern half of the Reservation, while the southern half is a combination of badlands and sandhills. Cretaceous and Quaternary sedimentary rocks exist to a depth of 5,000 feet (Raymond et al. 1976). Shale, limestone, volcanic ash, silt, sand, and gravel deposits are exposed on the upper surface in the Reservation. The exposed rocks from the Cretaceous age originated from marine habitat.

Additionally, a major graben, or trench, is featured on the PRIR. This dominant structure includes a number of broad, gentle folds that are generally parallel to the faults. A portion of the Pine Ridge escarpment, also known as the White Clay Fault, is constrained to the southwestern side of the graben. Parallel normal faults of small displacement comprise the northeast side of the graben.

The west and northeast areas of the PRIR are occupied by the Pierre Shale, overlying the Niobrara Formation. The Carlile Shale and the Niobrara Formation are the oldest outcropping units dating back to the Lake Cretaceous age. These rock units are primarily exposed in the valley of the White River in the PRIR. The Pierre Shale stratigraphic unit occupies a vast majority of the Project Area. As summarized in Table 3-1, medium gray, brownish gray, and black fissle clay shale, followed by evaporite, comprise the Pierre Shale formation. This formation locally grades to thin beds of calcareous, silty shale or claystone, marl, and sandy shale (U.S. Geological Survey [USGS] 2014). Thin seams of gypsum and selenite crystals have been discovered in this formation as well. Carlile Shale's primary rock is shale, followed by sandstone, with several zones of septarian, fossiliferous, and carbonate concretions. The lithological features of this unit include dark-gray to black silty to sandy shale, which contains up to three sandstone beds and sandy calcareous marl positioned at the bottom (USGS 2014). Niobrara is an argillaceous chalk comprised primarily of

light gray and yellowish gray limestone followed by shale. Fossil clams, oysters, and layers of gypsum and red flint are positioned within the formation.

TABLE 3-1. STRATIGRAPHY SUMMARY OF PRIR

Stratigraphic Unit	Age	Rock Composition
White River Group (includes Chadron and Brule Formations)	Oligocene	claystone, sandstone
Carlile Shale Formation	Late Cretaceous	shale, sandstone, limestone
Niobrara Formation	Late Cretaceous	limestone
Pierre Shale	Late Cretaceous	shale, evaporite

Source: USGS 2014

3.2.2 IMPACTS

The following sections examine whether any adverse geological impacts may be possible in conjunction with the two alternatives.

3.2.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed Lookout Solar Farm would not be constructed; therefore, no project-related direct or indirect impacts on geological resources would result. Existing livestock grazing practices are expected to continue.

3.2.2.2 PROPOSED ACTION

Under the Proposed Action, minimal to no impacts would occur to the on-site geology as a result of construction and operation of the Lookout Solar Farm. The Project Area would be cleared and graded to prepare the site for construction. Relatively small volumes of borrow material, including sand and gravel aggregates, may be required for site grading and foundation construction for the Proposed Action. If borrow material is needed, then these resources would be obtained from BIA approved off-site sources. Minor settlement distress to the subsoils could occur if insufficient compaction, poor drainage, or inadequate foundation preparation occurs during construction. The solar panels would be mounted on support posts driven into the ground; therefore, no direct contact from the solar panels to the subsoils would occur. The installation of buried and overhead transmission lines could potentially require the use of a backhoe. However, due to the minimal subsurface disturbances, only minor direct impacts to potential geological resources are anticipated. Overall, impacts from the construction and operation of the Lookout Solar Farm to geological resources would be minor.

3.3 PALEONTOLOGY

The following sections describe the existing paleontology resources within the Project Area and potential impacts to these resources from the two alternatives.

3.3.1 EXISTING ENVIRONMENT

The Badlands in western South Dakota are thought to contain the richest fossil beds in the world. The fossils from the White River Group in South Dakota preserve the entire late Eocene through the middle Oligocene periods, roughly 30-35 million years ago and more than 30 million years after non-avian dinosaurs became extinct (Benton et al. 2015). The White River Badlands represent all of the badlands within the White River drainage basin of western South Dakota and Nebraska (Benton et al. 2015), and they are located east/southeast of the Project Area. The White River Badlands include Badlands National Park, which is known as the birthplace of "vertebrate paleontology" because of the discovery of fossils of animals with backbones in the area (National Park Service [NPS] n.d.a). Oral traditions among the Oglala Lakota Nation note the discovery of fossilized bones, turtle shells, and fossilized seashells throughout the area (NPS n.d.a). Although the presence of paleontological resources is unknown within the Project Area, it is assumed that paleontological resources could exist in the area due to the high occurrence of these resources in surrounding areas.

3.3.2 IMPACTS

The following sections examine whether any adverse paleontological impacts may be possible in conjunction with the two alternatives.

3.3.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Lookout Solar Farm would not be constructed, and there would not be impacts to paleontological resources. It is expected that cattle grazing would continue to occur in and around the Project Area, which could result in minimal disturbance to surface and subsurface soil environments where paleontological resources could occur.

3.3.2.2 PROPOSED ACTION

Under the Proposed Action, the Lookout Solar Farm would be constructed and potential impacts to paleontological resources could occur. Ground disturbance from construction activities could adversely impact paleontological resources, if the resources are subsequently damaged or destroyed. However, these potential impacts would be mitigated through the presence of a qualified construction/archaeologist monitor during ground disturbing activities. In the event of an inadvertent paleontological discovery during construction and/or operations, the work would halt in the immediate area, and the paleontological resource would be secured and protected. Notification of the inadvertent discovery would be communicated to the Oglala Sioux THPO and the BIA Great Plains Regional Archaeologist. The

Oglala Sioux THPO and BIA, in consultation, would determine the treatment of the paleontological resource. The halted work may continue after proper treatment of the paleontological resources is completed.

3.4 AIR QUALITY

3.4.1 EXISTING ENVIRONMENT

The following sections describe the existing air quality of the Project Area and potential impacts from the alternatives.

3.4.1.1 REGIONAL AIR QUALITY

The Project Area, located in an undeveloped area of Oglala Lakota County in western South Dakota, is in an attainment area for all criteria pollutants (USEPA 2015). Table 3-2 provides the Oglala Lakota County baseline emissions data from the National Emissions Inventory (USEPA 2011). These date include emissions from point sources, area sources, and mobile sources (both on-road and non-road). Additionally, Table 3-3 provides emission source types in Oglala Lakota County.

TABLE 3-2. OGLALA LAKOTA COUNTY BASELINE EMISSIONS

Emissions	Oglala Lakota County (tons/year)
Carbon monoxide (CO)	12,168
Nitrogen oxides (NO_x)	1,340
Particulate matter (PM_{10})	2,644
Sulfur dioxide (SO_2)	45
Volatile organic compounds (VOCs)	14,597
Total	**30,793**

Source: USEPA 2011
Note: PM_{10} = particulate matter with a diameter of less than or equal to 10 microns

TABLE 3-3. OGLALA LAKOTA COUNTY EMISSION SOURCES

	Emissions (tons / year)				
Source Type	**CO_2**	**NO_x**	**PM_{10}**	**SO_2**	**VOCs**
Agricultural - Crops, Biogenics, Fires	3,395	918	787	8	12,562
Dust - Paved and Non-paved Road Dust	-	-	1,836	-	-
Mobile Sources	1,849	365	-	1	183
Total	**5,243**	**1,283**	**2,623**	**9.32**	**12,745**

Source: USEPA 2011
Note: CO_2 = carbon dioxide.

3.4.1.2 REGIONAL CLIMATE

The climate in the region is characterized by mild summers with average temperatures typically in the 60 degrees (°) Fahrenheit (F) range and cold winters with temperatures usually in the low 30°F range. The average annual

temperature for the Project Area is 47°F. Precipitation is distributed throughout the year with higher amounts occurring between April and August and peaking in June (National Climatic Data Center 2002). On average, total annual precipitation amounts to approximately 23 inches per year, and it is received as both rainfall and snowfall (National Climatic Data Center 2015). On average, there are approximately 50 days of thunderstorms (Lyndon State College 2007) and 29 tornadoes per year in South Dakota (National Climatic Data Center 2004).

3.4.2 IMPACTS

The following sections examine whether any adverse air quality impacts may be possible in conjunction with the two alternatives.

3.4.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Lookout Solar Farm would not be constructed and the local land use (i.e., cattle grazing) is expected to continue. As a GHG, methane emissions from the cattle would continue to impact air quality; however, as compared to total annual cattle emissions in the U.S., which amount to 5.5 million metric tons (MT), the GHG emissions of the No Action Alternative are considered negligible (USEPA 2007) (also further discussed in Section 3.5).

3.4.2.2 PROPOSED ACTION

Under the Proposed Action, installation and construction of the Lookout Solar Farm could generate short-term minor air emissions. Such short-term emissions could be caused by heavy construction equipment (gas and diesel powered) and smaller construction equipment used for clearing and grading activities. Additional short-term emissions could be produced from the exhaust of smaller vehicles (i.e., bus transportation and personal vehicles) that are used by workers (approximately 50) for commuting to and from the Project Area. The emissions associated with these construction activities could include a short-term increase in GHG emissions, PM_{10}, and VOCs; however, such emissions would likely be minor. (Note: such emissions have been noted as minor in solar farms of similar size [AECOM 2015, U.S. Department of Energy 2011]).

Mitigation measures and appropriate controls (e.g., wetting) would be used to control fugitive dust (i.e., PM_{10}) during construction. For example, use of wet suppression methods reduced PM_{10} emissions up to 90% at another solar farm (AECOM 2015). Furthermore, wetting was suggested as a key emissions reduction method for a 645-acre solar farm in Lauderdale County, Alabama (AECOM 2015).

The CO_2 emissions generated from the operation of the Lookout Solar Farm would be negligible. Approximately 10 employees would travel to and from the Project Area on a regular schedule during operations, along with occasional visitors via bus transportation. Additionally, the electricity generated through the use of low emission solar power is

expected to offset energy otherwise generated from fossil fuels, which should reduce overall emissions (assuming energy demand remains constant). For example, depending on the type of coal used, coal fired power plants generate an average of 2.13 pounds of CO_2 per kilowatt-hour (U.S. Energy Information Administration [EIA] 2015). Emissions from solar panels are up to 20 times lower than those from coal fired power plants (National Renewable Energy Laboratory [NREL] 2013). Note that this estimate is from a literature review completed by NREL and also includes the emissions associated with production of the solar panels. However, emission reductions of up to 44% have been projected from the construction of solar farms of similar sizes to the proposed Lookout Solar Farm (AECOM 2015). Depending on the type of other electricity generation (e.g., coal, natural gas, etc.), emissions reductions from the Proposed Action's renewable electricity generation could result in long-term benefits to air quality for the community.

Overall, short-term potential adverse impacts to air quality would be minor, and are expected to be offset by the long-term generation of low-emissions solar power, which produce substantially less CO_2 per kilowatt-hour than most current electrical energy generation methods.

3.5 CLIMATE CHANGE AND GREENHOUSE GASES

GHGs are gases that effectively trap heat in the earth's atmosphere. They are produced by both anthropogenic and natural sources. Primary GHGs in the earth's atmosphere include CO_2, methane, NO_x, ozone, and water vapor, all of which are produced naturally and via manmade sources (or anthropogenically). The predominant sources of GHG emissions in the U.S. are energy production and power generation. The primary drivers of GHG emissions are fossil fuel combustion, economic growth, and energy demands based on weather conditions. Approximately 69% of total U.S. energy-related anthropogenic carbon dioxide emissions result from the petroleum and natural gas industry, while coal makes up the other 31% (U.S. EIA 2015).

The CEQ's draft guidance on NEPA and GHGs recommends that the federal government analyze the environmental effects of GHG emissions and climate change when environmental effects of a proposed agency action are described in accordance with NEPA. Climate change issues arise in relation to the consideration of: (1) the GHG emissions effects of a proposed action and alternative actions; and (2) the relationship of climate change effects to a proposed action or alternatives, including the relationship to proposal design, environmental impacts, and mitigation and adaptation measures (CEQ 2014). The following sections provide background information on GHG emissions and climate change and potential impacts that could occur from the alternatives.

The draft guidance includes a presumptive effects threshold of 25,000 MT of CO_2 equivalent (CO_2e) emissions from an action (CEQ 2014). Similarly, the USEPA requires the reporting of GHG emissions under 40 CFR Part 98 for various source categories that emit greater than 25,000 MT of CO_2e. At the time of this drafting, solar farms are exempt from reporting, which is likely due to their overall low GHG emissions.

3.5.1 EXISTING ENVIRONMENT

Additional information regarding climate and specific types of GHG emissions is discussed in Section 3.4.

Future climate change projections for the Great Plains include more violent storms and more frequent flooding (National Oceanic and Atmospheric Administration [NOAA] 2013). Declines in water quality have been associated with a higher incidence of flooding (U.S. Global Change Research Program 2014). In addition to changes in precipitation patterns, climate change in the Great Plains is expected to be manifested through annual increases in temperature. Summers will likely become warmer and winters will likely become milder, as compared to current conditions of mild summers and cold winters.

There is some variability in predictions for changes to total annual precipitation; however, most of the Dakotas and Montana are expected to experience moderate increases in annual precipitation (U.S. Global Change Research Program 2014, NOAA 2013).

3.5.2 IMPACTS

The following sections examine whether any adverse climate change and/or GHG emission impacts may be possible in conjunction with the two alternatives.

3.5.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Lookout Solar Farm would not be constructed, and the current land use (i.e., livestock grazing) is expected to continue. Despite the expected continuation of the current land use, impacts from global climate change and variability are expected to occur independently of the current land use. Local impacts could include more frequent and severe flooding and associated soil erosion and negative impacts to water quality (U.S. Global Change Research Program 2014).

Additionally, emissions from ruminant livestock grazing are a large source of methane worldwide. Globally, livestock grazing produces approximately 80 million metric tons of methane emissions per year (Pew Center on Global Climate Change 2009). In the U.S., ruminant livestock emit about 23% of the U.S. methane emissions from human related activities (or anthropogenic sources) (U.S. Department of State 2014). Methane emissions from cattle grazing have not been quantified for Oglala Lakota or Custer County; however, this likely represents an emission source under the No Action Alternative.

3.5.2.2 PROPOSED ACTION

Under the Proposed Action, construction and operation of the Lookout Solar Farm would generate minimal GHG emissions. However, it is anticipated that electrical power produced by the Lookout Solar Farm would offset and/or

replace electrical power generated by fossil fuels, which would provide an overall net benefit. As noted in Section 3.4, short-term emissions of GHGs could increase due to vehicle emissions. However, these emissions would negligibly contribute to GHG emissions at the local and regional level. In addition, this temporary increase in GHG emissions would be offset overtime by the reduction of emissions associated with the solar power available for use in the power grid.

In addition to emissions from vehicles associated with the operation and construction of the Lookout Solar Farm, equipment used during construction of the Lookout Solar Farm would also impact total GHG emissions. Construction equipment emits an average of 22.37 and 19.54 pounds of CO_2 per gallon of diesel and gasoline, respectively (USEPA 2009). Therefore, a slight temporary increase in GHG emissions could occur from the equipment used during construction and operation of the Lookout Solar Farm. Additionally, minor emissions from the information and office center use of electricity would occur. However, the increase in CO_2 emissions would be negligible, and would not be expected to substantially contribute to regional climate change; rather a long-term reduction in emissions contributing to climate change would be expected.

Furthermore, the implementation of sheep grazing would likely result in a minor reduction in methane emissions in the Project Area as the land use shifts away from cattle grazing. Emissions from sheep grazing have been studied with mixed results, but generally reflect slightly lower emissions than cattle grazing (Lockyer 1997). Therefore, it is expected that methane emissions would be less under the Proposed Action than under the No Action Alternative, and would likely not adversely contribute to climate change.

The solar power generated by the Lookout Solar Farm could mitigate climate change. Operation of the Lookout Solar Farm would lead to an increase in solar power available to the power grid. While the solar farm itself would only produce a net average of 50 MW of PV power on an average annual basis, this would result in a slight decrease in total GHG emissions associated with power generation. The continued generation of solar power at the Lookout Solar Farm could also lead to a shift to renewable energy on the PRIR and/or in Oglala Lakota County, which would also lead to an emissions decrease over time.

Overall, emissions from the construction and operation of the Lookout Solar Farm would be minor, and no major impacts to climate change are expected. Beneficial impacts could occur from the increase in renewable energy. Climate change could potentially impact the Project Area through an increase of precipitation; however, impacts are not expected to affect the Proposed Action.

3.6 SOILS

Soil is characterized by horizons, or layers within the profile that can be distinguished from the initial material. Soil development results from geomorphic processes that operate on the underlying geological materials. Soil development or formation is primarily influenced by the soil forming factors including climate, organisms, topography, parent material, and time. Topography includes the shape and slope of the landscape, the direction the slope faces (aspect), and the effects of a high water table (Birkeland 1999). The following sections provide information on the soil resources within the Project Area and the Reservation as a whole, and the possible impacts from the two alternatives.

3.6.1 EXISTING ENVIRONMENT

3.6.1.1 SOIL RESOURCES

The location and type of soil varies with topography within the PRIR. PRIR soils are primarily located on undulating to rolling, excessively drained to well-drained, deep, sandy soils on uplands. Other variable soils are positioned on gently rolling to rolling hillslopes, interdunes, dunes, and valley sides of sandhills (Radeke 1971).

3.6.1.2 SOIL TAXONOMY

Oglala Lakota County is located in the Great Plains physiographic province. The Project Area consists of six soil series. Each soil series is a subdivision of a soil family and is essentially alike in all major profile characteristics except the texture of the A horizon. As shown in Figure 3-1, the Project Area consists of the following soil series: Anselmo series, Valentine series, Pierre series, Richfield series, Jayem series, and Tuthill series. The first four soil series encompass the majority of the Project Area (approximately 90%), and are further discussed below. Additionally, Table 3-4 summarizes each soil series in relation to its slope, location on the landscape, and designated textural description according to the Shannon County, South Dakota Soil Survey (Radeke 1971).

TABLE 3-4. SOIL SERIES CHARACTERISTICS WITHIN THE RESERVATION

Soil Series	Slope (%)	Landscape Location	USDA Texture
Anselmo	5-20	Stable, uniform slopes	Sandy loam to fine sandy loam
Valentine	5-30	Shorter, steeper slopes and upper ridges and knolls	Loamy fine sand to coarse sand
Pierre	3-9	Gently sloping to rolling hillslopes on uplands	Clay to silty clay
Richfield	0-3	Uplands and high terraces	Silt loam to silty clay loam

Source: Radeke 1971
Note: U.S. Department of Agriculture (USDA)

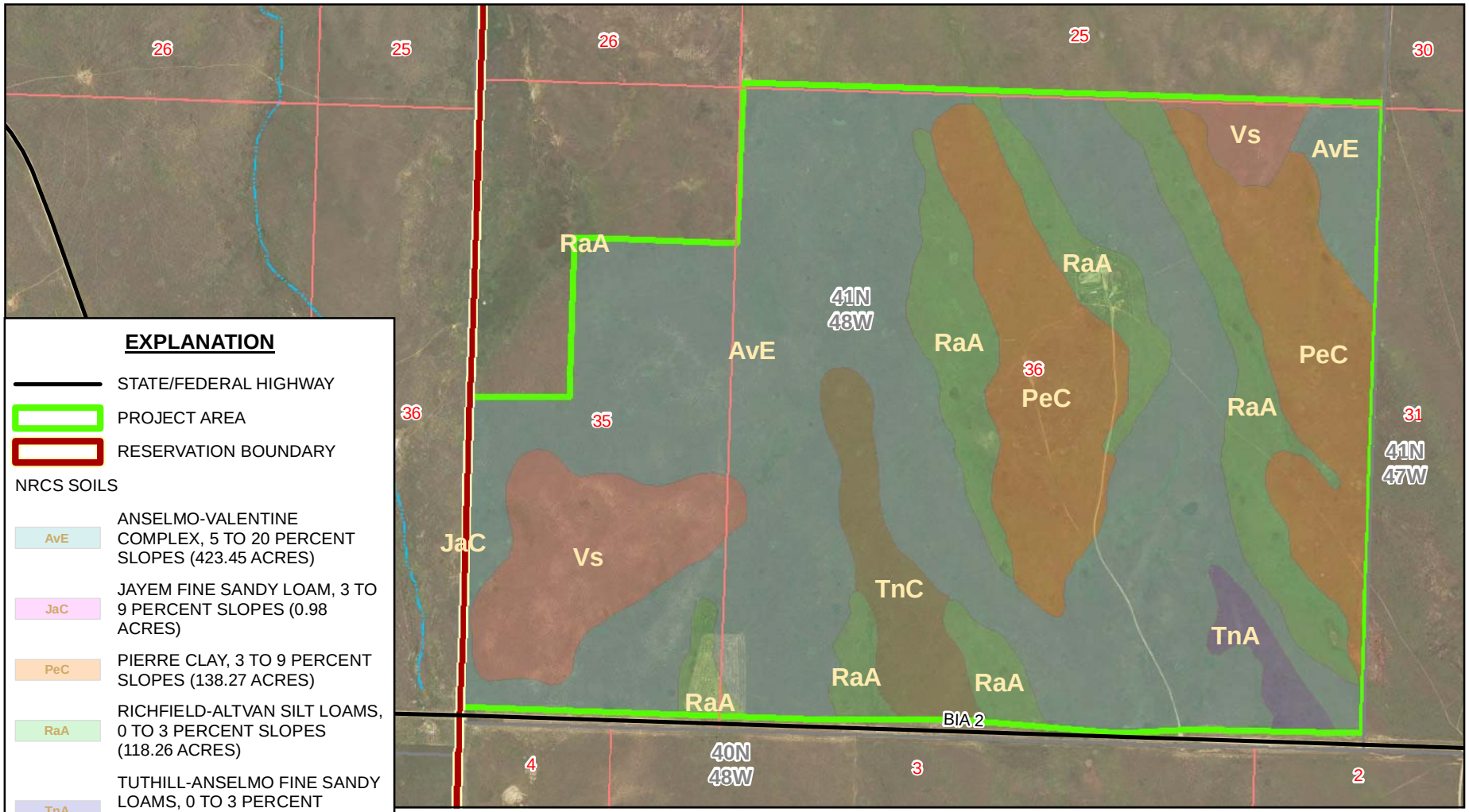
Anselmo Soil Series

The Anselmo soil series is located in the southeastern and northern parts of Oglala Lakota County (the Project Area is located in the western portion of the county). The series consists of deep, well-drained, moderately rapid permeable soils formed in loamy and sandy wind-deposited sediments. The series is located on uplands containing very friable, dark colored, moderately coarse textured soil. The A horizon of Anselmo soils is grayish-brown in color with a fine sandy loam texture that is slightly hard and very friable. Anselmo soils typically lack a B horizon; however, if it is present, then it will have a development of color or structure in the horizon with little or no apparent illuvial accumulation of materials. Anselmo soils are known for slow to medium runoff depending on the slope (Soil Survey Staff, Natural Resources Conservation Service [NRCS] and USDA 2002).

Valentine Soil Series

The Valentine soil series consists of very deep, loose, and excessively drained soils that have formed in eolian sands (Schaetzl and Anderson 2005). Therefore, this series is located on interdunes, dunes and valley sides of sandhills in the Project Area. The slopes can vary ranging from 0 to 80%. As shown in Figure 3-1, the Valentine soil series located in the Project Area have 3 to 30% slopes. In a typical profile, the A horizon is generally subdivided into two to three layers. The top 0 to 4 inches are characterized by a light brownish-gray fine sand that is loose with a clear boundary (Soil Survey Staff, NRCS and USDA 2007). In southeastern parts of the county, Valentine soils are characterized by an underlying calcareous sandstone and very fine sand. Similar to the Anselmo soil series, this series drains excessively and the major land use tends to be grazing (Radeke 1971).

Approximately 420 acres of the Project Area (approximately 50% of the Project Area) include Anselmo-Valentine complex soils with a 5 to 20% slope (shown in Figure 3-1; Anselmo soil series discussed above). Slower runoff and moderately rapid permeability can be expected. Anselmo and Valentine soils each comprise about 35 to 50% of the complex. These two soils are closely related and change with the relief of the area in short distances. Anselmo soils occupy the longer, more stable and uniform slopes present on a 5 to 9% gradient. Valentine soils can be found on shorter, steeper slopes and on the upper parts of ridges and knolls (Radeke 1971). Due to the complexity, nearly this entire complex is covered with common native grasses such as little bluestem *(Schizachyrium scoparium)*, sand bluestem *(Andropogon hallii)*, needle-and-thread *(Hesperostipa comata)*, prairie sandreed *(Calamovilfa longifolia)*, western wheatgrass *(Pascopyrum smithii)*, and blue grama *(Bouteloua gracilis)*; therefore it is used primarily for grazing (Soil Survey Staff, NRCS and USDA 2002).



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

FIGURE 3-1

SOIL RESOURCES OF THE PROJECT AREA

LOOKOUT SOLAR FARM EA
PINE RIDGE INDIAN RESERVATION, SOUTH DAKOTA

Drawn By: BR	Checked By: JM	Scale: 1 " = 1,250 '	Date: 5/23/16	File: Fig3-1_PRIR_Solar_Soils.mxd

This Page Intentionally Left Blank

Pierre Soil Series

The Pierre soil series comprises approximately 16% (135 acres) of the Project Area. This series consists of moderately deep, well drained, firm soils that are moderately dark in color and formed in clayey residuum that is derived from shale bedrock. These soils are located in uplands in the western part of the county on gently rolling hillslopes on the Pierre Shale Plains. Slopes range from 0 to 30%; soils located on the Project Area have a 3 to 9% slope.
In a typical profile, the A horizon is 0 to 5 inches thick and consists of a grayish-brown clay that is slightly hard, and becomes dry, sticky, and plastic-like when moistened. The B horizon may contain an accumulation of pedogenic carbonates (commonly known as calcium carbonate [$CaCO_3$]) (Soil Survey Staff, NRCS and USDA 2015). Presence of lime and salt can occur in the underlying material at approximately 36 inches. Depending on slope, surface runoff is medium to rapid and the release of water to plants is slow. Water erosion and soil blowing are known to be hazards in areas of Pierre soil series that have degraded or minimal vegetation present (Radeke 1971).

Richfield Series

The Richfield soil series comprises approximately 14% (118 acres) of the Project Area. The Richfield soil series consists of deep, dark-colored, silty soils that have formed in calcareous loess or material that has been transported and deposited by wind containing silt-sized particles containing calcium carbonate (Schaetzl and Anderson 2005). These soils are located on uplands and high terraces or tabletop plains with slopes ranging from 0 to 6%. In a typical profile, the surface layer is approximately 9 inches thick, a grayish-brown silt loam, and soft when dry. The subsurface B horizon is typically divided into four separate horizons due to darkness in color that increases with depth (Soil Survey Staff, NRCS and USDA 2006). The majority of these soils contain mid to tall prairie grasses and are primarily utilized for grazing purposes. If this soil is cultivated, conservation of moisture in the surface and subsurface horizons is difficult to manage (Radeke 1971). If cultivated soils are mismanaged, the vulnerability for blowing soil and erosion potential could increase.

3.6.2 IMPACTS

The following sections examine potential impacts to soil resources from the two alternatives.

3.6.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed Lookout Solar Farm would not be constructed and existing livestock grazing practices would persist. The continuation of livestock grazing could possibly cause disturbance to soils if overgrazing occurs; however, this potential impact would be negligible.

3.6.2.2 PROPOSED ACTION

Under the Proposed Action, minimal impacts would occur to the on-site soil resources as a result of construction of the Lookout Solar Farm. As part of the site preparation process, approximately 683 acres of topsoil may be graded. The

Proponent would stockpile the topsoil separately from the subsurface horizons. Biological, chemical, and physical changes would occur while the soil is being stockpiled; therefore, it is important that the disturbed Project Area be reclaimed as soon as possible to minimize these effects to the soil.

The potentially affected soils in the Project Area are generally stable and suitable for standard construction techniques. However, permanent disturbance to the Project Area soils would occur due to the installation of solar panel support posts. Excavation and grading activities would result in minor, short-term, and a limited increase in erosion and sedimentation. The creation of new impervious surfaces (e.g., haul roads, panel footings, and a building foundation) would result in a minimal increase in stormwater runoff and potential soil erosion as well. Use of mitigation measures would be implemented, such as soil stabilization and prohibiting operations during excessively wet conditions, which would assist in minimizing the potential for runoff and erosion after construction activities. The use of fencing would pose temporary soil disturbance, as well. However, temporary impacts would be negligible as long as construction of the fencing was performed on dry ground, in order to avoid rutting from fencing equipment. This practice would be implemented by the Proponent for all construction techniques occurring within the Project Area.

In addition to the on-site soil disturbance from construction and fencing activities, minor impacts would occur from the construction of the transmission lines (approximately 15 acres) and the haul roads (approximately 3 acres). Soil compaction would occur on haul roads, thereby increasing the bulk density of soil particles. Water infiltration could be reduced and stormwater runoff would increase as bulk density continued to increase. Clayey and silty soils tend to have lower bulk densities than sandy loam and sandy clay loam (Schaetzl and Anderson 2005). The Pierre and Richfield soil series are comprised of clay to silty clay and silt loam to silty clay loam, respectively, therefore having a lower bulk density, which would result in less runoff in comparison to the Anselmo and Valentine soil series. However, all activities would be confined to designated areas and haul roads to minimize soil compaction in the Project Area.

During operation of the Lookout Solar Farm, minor disturbances to soil resources are expected. Routine maintenance would include occasional fence repair, noxious weed control, vegetation management, and periodic solar array inspection, repair, and maintenance. However, these maintenance activities are expected to be negligible and are not expected to result in adverse impacts to soil resources in the Project Area during operation activities. Sheep grazing in the Project Area are expected to be used for maintaining and controlling vegetation on the site. The sheep would be restricted by a fence and would be rotated often within the Project Area to limit overgrazing. This grazing regime is not expected to disturb soils.

3.7 VEGETATION

The following sections describe the existing vegetation of the Project Area and potential impacts from the No Action Alternative and the Proposed Action.

3.7.1 EXISTING ENVIRONMENT

The Project Area is located within the Northwestern Great Plains ecoregion. This ecoregion is roughly bordered by the Missouri River and a system of dams and reservoirs along the river. The topography of the Project Area and surrounding area includes the badlands, rolling grassland hills, and dryland prairie (Saylor 2014).

Seven types of vegetative communities occur within the Project Area (shown on Figure 3-2, with percent cover of the Project Area provided in Table 3-5). The seven vegetative communities range from approximately <1% to 68% of the Project Area. The dominant land cover (approximately 68%) of the Project Area is Northwestern Great Plains Mixed Grass Prairie, which is characterized by plant species such as western wheatgrass, green needlegrass (*Nassella viridula*), and several festuca species (*Festuca* spp.) (USGS 2012).

TABLE 3-5. VEGETATION RESOURCES OF THE PROJECT AREA

Habitat Type	Approximate Acres	Percent of the Project Area (%)
Northwestern Great Plains Mixed Grass Prairie	575	68
Western Cool Temperate Developed Ruderal Grassland	<1	<1
Western Great Plains Depressional Wetland Systems	<1	<1
Western Great Plains Sand Prairie Grassland	3	<1
Western Great Plains Sandhill Shrubland	6	<1
Western Great Plains Shortgrass Prairie	125	15
Introduced Upland Vegetation/Perennial Grassland and Forbland	83	10

Source: USGS 2012
Note: The acreages and percentages are approximate. Due to the difference between the mapped and assumed acreages of the Project Area, percentages do not sum to 100%.

The Northwestern Great Plains Mixed Grass Prairie system covers about half of South Dakota. Dynamic vegetative communities make up this diverse prairie ecosystem. These vegetative communities can be found on uplands, slopes, and creek bottoms throughout the Northwestern Great Plains ecoregion. Grasses typically comprise the greatest canopy cover of the ecoregion, and western wheatgrass is the dominant species. Other species include green needlegrass, blue grama, and buffalograss (*Bouteloua dactyloides*). Grazing and agriculture are the primary land use types of this system, which is vulnerable to drought. During dry periods, shifts in abundance from mid-height species to shortgrass species may occur (Drummond and Auch 2014).

3.7.1 IMPACTS

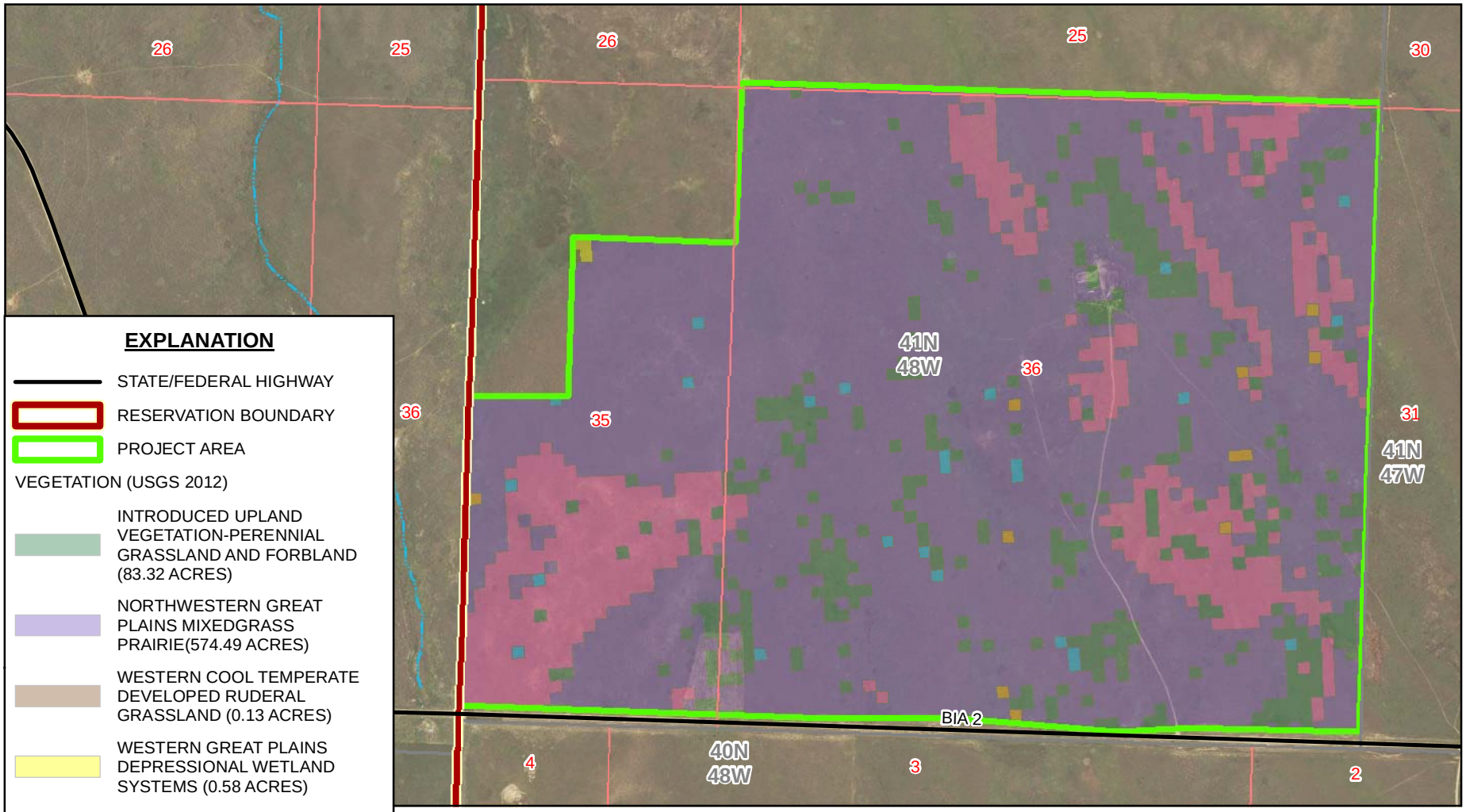
This section describes the potential impacts to vegetation that could occur from the alternatives.

3.7.1.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Lookout Solar Farm would not be constructed and the current land use (i.e., livestock grazing) is expected to continue. Vegetation would continue to be impacted by the grazing with negligible impacts.

3.7.1.2 PROPOSED ACTION

Under the Proposed Action, the Lookout Solar Farm would be constructed, which could result in adverse impacts to vegetation resources. Construction of the Lookout Solar Farm, including the solar arrays, the Information and Office Center, the transmission line ROWs, and haul roads would result in vegetation removal. The loss of vegetation would be an adverse impact in both the short-term (or temporary, depending on the species) and long-term. The vegetation loss associated with the installation of the solar farm panels would be short-term, because vegetation would likely re-establish in and around the solar farm panels (approximately 662 acres) after the initial installation. However, the reestablishment of the vegetation would likely be at an overall lower productivity due to shading. The introduction or spread of invasive species could also occur from the construction of the Proposed Action as construction vehicles and equipment could introduce or spread seed from invasive species. However, this impact would be short-term and minor since the construction equipment would be properly cleaned before entry into the Project Area to avoid such impacts. Additionally, the Proponent would only trim the vegetation to the lowest height tolerable for plant survival to avoid complete removal of vegetation. The vegetation loss due to the construction of the office and information center would be long-term since vegetation would be replaced by the building and associated parking lot. However, the temporary and long-term impacts to vegetation would be minor when considered relative to existing vegetation resources across Oglala Lakota County and the Reservation. The proposed disturbance area (identified in Table 2-1; a total of approximately 683 acres) comprises less than 0.03% of the Reservation.



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

FIGURE 3-2

VEGETATION RESOURCES OF THE PROJECT AREA

LOOKOUT SOLAR FARM EA
PINE RIDGE INDIAN RESERVATION, SOUTH DAKOTA

Drawn By: BR	Checked By: JM	Scale: 1 " = 1,250 '	Date: 5/23/16	File: Fig3-2_PRIR_Solar_Veg.mxd

This Page Intentionally Left Blank

3.8 WETLANDS

Wetlands are lands that are transitional between terrestrial and aquatic systems where the water table is typically at or below the surface, or the land is covered by less than 6.6 feet of water. To be considered a wetland, the area must have all of the following three attributes: (1) land supported predominately by wetlands plants (at least periodically); (2) substrate consisting of predominately undrained hydric soil; and (3) substrate that is nonsoil and is saturated with water or covered by water at some point during the growing season (Cowardin et al. 1979). The following sections provide information on the wetlands occurring within the Project Area and potential impacts associated with the alternatives.

3.8.1 EXISTING ENVIRONMENT

Based on the National Wetland Inventory (NWI), approximately 1.2 total acres of freshwater emergent wetlands (U.S. Fish and Wildlife Service [USFWS] 2015a) are present within the Project Area. The five freshwater emergent wetlands that make up this total acreage are located on the eastern portion of the Project Area (Figure 3-3). One of the freshwater emergent wetlands is likely associated with the man-made stock well. Freshwater emergent wetlands are characterized by erect, rooted, herbaceous vegetation that grows in water. This type of vegetation is typically present most of the growing season (Cowardin et al. 1979). Additionally, one of the wetlands (0.09 acre) located in the Project Area is classified as "other" which is a category of wetlands that is characterized by seasonal flooding, with surface water present for extended periods of time in the early growing season but absent by the end of the growing season (USFWS 2015a). Additional information on surface water features is presented in the following section (Section 3.9).

3.8.1 IMPACTS

The following sections describe the potential impacts to wetlands that could occur from the alternatives.

3.8.1.1 NO ACTION ALTERNATIVE

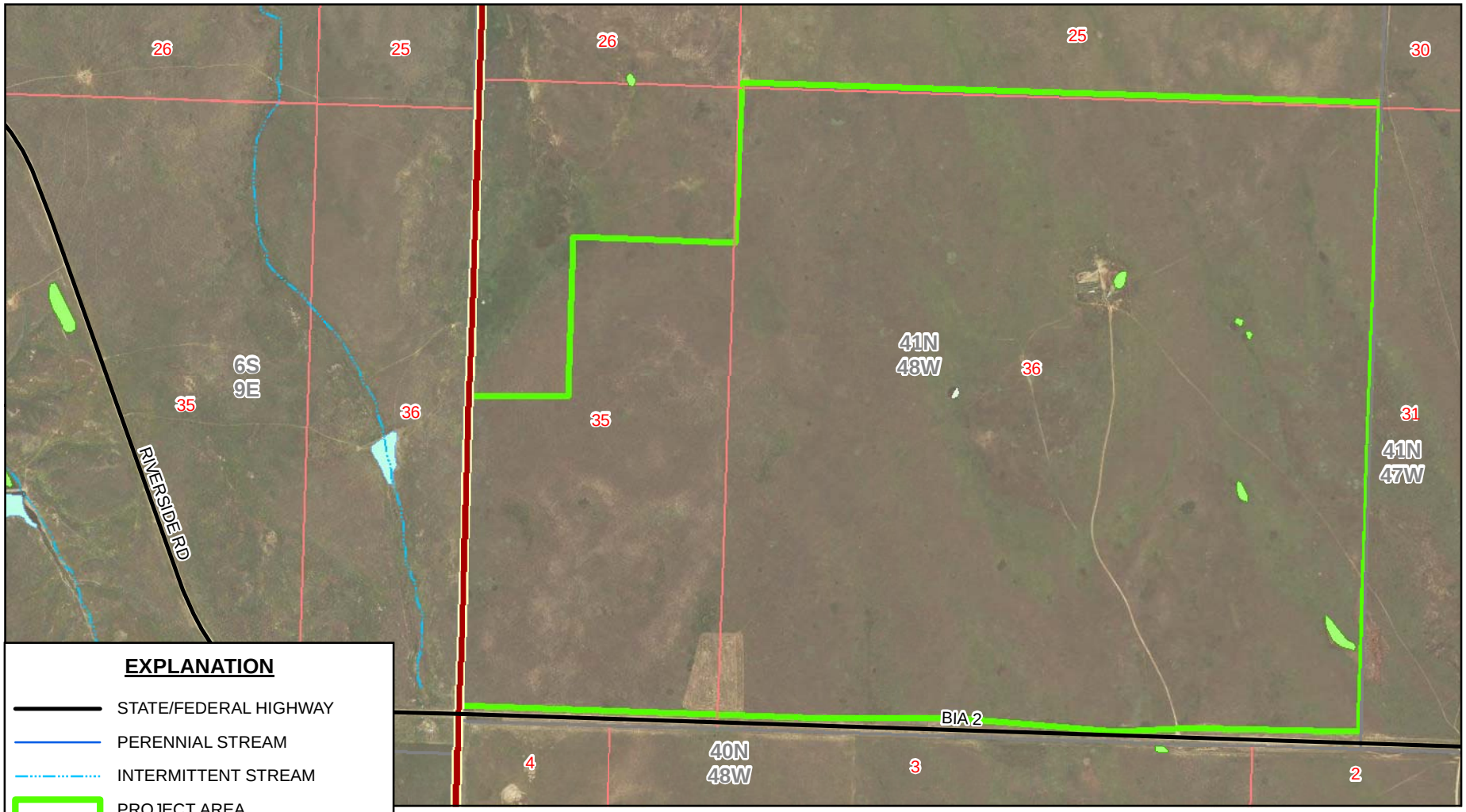
Under the No Action Alternative, the Lookout Solar Farm would not be constructed and the current land use (i.e., cattle grazing) is expected to continue. Current impacts to wetlands in the Project Area as the result of cattle grazing (e.g., sedimentation, impacts to water quality, etc.) are expected to continue.

3.8.1.1 PROPOSED ACTION

Under the Proposed Action, indirect impacts to wetlands could potentially occur from the construction of the Lookout Solar Farm. For example, potential spills of fuels and/or runoff from construction material waste could indirectly impact wetlands. However, such impacts would be minimized through the use of a 150-foot non-disturbance buffer surrounding each wetland. During Lookout Solar Farm operations, wetlands could also be potentially impacted by

spills, including spills from the batteries used for storing solar power, if they were damaged. These impacts would also be minimized through the use of the 150-foot buffer.

Direct disturbance to wetlands is not anticipated because the 150-foot non-disturbance buffer around the wetlands would be followed for all construction and operation activities. If any disturbance to wetlands, or if discharge of dredged or fill material into waters subject to federal regulation would be expected, then the Proponent would coordinate with Department of Army, U.S. Army Corps of Engineers to determine whether any permits would be needed to ensure compliance with the Clean Water Act (CWA) prior to construction. Overall, the potential for any short-term or long-term adverse impacts to wetlands in the Project Area would be reduced by the 150-foot non-disturbance buffer.



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

FIGURE 3-3

WATER RESOURCES OF THE PROJECT AREA

LOOKOUT SOLAR FARM EA
PINE RIDGE INDIAN RESERVATION, SOUTH DAKOTA

Drawn By: BR	Checked By: JM	Scale: 1 " = 1,250 '	Date: 5/23/16	File: Fig3-3_PRIR_Solar_Water.mxd

This Page Intentionally Left Blank

3.9 WATER RESOURCES

The following sections describe the existing water resources of the Project Area and the potential impacts from the No Action Alternative and the Proposed Action.

3.9.1 EXISTING ENVIRONMENT

The Project Area is located above the Ogallala Aquifer also known as the Arikaree Aquifer because the geologic units of the Ogallala and Arikaree aquifers constitute only parts of the groundwater system (Filipovic 2011). The predominant sources of public and domestic water supply on the Reservation are wells and springs (USGS 2013a). Water samples collected on the Reservation (Bennett County, east of the Project Area) have shown that total dissolved solids (TDS) generally range from 102 to 508 milligrams per liter (mg/L), which is under or slightly above the USEPA's secondary maximum contaminate level of 500 mg/L (USEPA 2016). Note, secondary maximum contaminate levels are only established as a guideline to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminates are not considered to present risks to human health at the identified secondary maximum contaminate level (USEPA 2016).

Hardness in drinking water is defined as those minerals that dissolve in water that have a positive electrical charge (New Hampshire Department of Environmental Services [NHDES] 2008). The presence or absence of hardness minerals in drinking water is not known to pose a health risk to users. However, at higher concentrations, hardness creates consumer problems such as soap scum on tubs and showers, white mineral deposits on dishes and glassware, and a reduction in the efficiency of devices that heat water (NHDES 2008). Hardness concentrations from the water samples collected on the Reservation range from 14 to 286 mg/L, and therefore fall in each category of the hardness scale in the soft (0 to 60 mg/L), moderately hard (61 to 120 mg/L), hard (121 to 180 mg/L), and very hard (over 180 mg/L) categories (USGS 2013b).

Surface water resources in the Project Area include a stock tank and four wetlands (Figure 3-3) (wetlands are further discussed in Section 3.8) (USFWS 2015a). The principal use of the surface water resources within the Project Area is for livestock watering. An intermittent stream, which is a tributary of the Cheyenne River to the north (USFWS 2015a), is located approximately 600 feet west of the Project Area. Generally, water levels in such surface water features increase during flooding events and after snowmelt and heavy precipitation events.

3.9.2 IMPACTS

The following sections describe the potential impacts to water resources that could occur from the alternatives.

3.9.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Lookout Solar Farm would not be constructed and current impacts (e.g., contamination of water sources from livestock grazing) are expected to continue. Water use under this alternative could potentially impact the water availability within the Project Area; however, minimal use of the water resources for the cattle is expected.

3.9.2.2 PROPOSED ACTION

Under the Proposed Action, there could be potential adverse impacts to water resources in the Project Area due to accidental spills during construction and operation activities. For example, a bulldozer could leak oil during on-site construction activities, which could impact both surface and groundwater quality. However, routine maintenance and daily equipment checks would help prevent accidental spills. In addition, the mitigation measure of a 150-foot buffer around wetlands will also minimize potential impacts to water resources. Impacts could occur if panels were damaged during decommissioning of the Lookout Solar Farm, as well, but the buffer would minimize potential impacts. Overall, there could be potential adverse impacts to water resources; however, generally these potential impacts are expected to be minimal.

Under the Proposed Action, there could be potential adverse impacts to water resource availability in the Project Area due to water requirements for construction and operation activities. In particular, 200,000 to 400,000 gallons of water per year would be necessary for periodic solar module washing. To minimize the volume of water needed to complete this task, the Proponent would complete solar module washing during early morning hours or late in the day to avoid periods of greatest sun intensity and peak daytime temperatures when evaporative demand is highest. Additionally, the Tribe's Department of Water Maintenance and Conservation has approved the availability and use of water for the Proposed Action (Appendix B) and impacts are not expected.

3.10 THREATENED, ENDANGERED, AND CANDIDATE SPECIES

The Endangered Species Act (ESA), enforced by the USFWS, establishes measures for the protection of federally listed threatened and endangered plant and animal species. Endangered species are species that are in danger of extinction throughout all or a significant portion of their range. Threatened species are species that are likely to become endangered within the foreseeable future. While candidate species receive no protection under the ESA, it is within the spirit of the ESA to consider these species as having significant value and worth protecting, as they may become listed in the future. The following sections describe potential threatened, endangered, and candidate species that may occur in and around the Project Area, and the potential impacts to these species associated with the alternatives.

3.10.1 EXISTING ENVIRONMENT

Six threatened, endangered, and candidate species that are known to occur in Oglala Lakota County are included Table 3-6.

TABLE 3-6. THREATENED, ENDANGERED, AND CANDIDATE SPECIES KNOWN TO OCCUR IN THE COUNTY

Species Common Name	Species Latin Name	Listing	Occurrence	Effect Determination
Whooping Crane	*Grus americana*	Endangered	Known	No Effect
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	Possible	No Effect
Rufa Red Knot	*Calidris canutus*	Threatened	Possible	No Effect
Western Prairie Fringed Orchid	*Platanthera praeclara*	Threatened	Possible	No Effect
Black-footed Ferret[1]	*Mustela nigripes*	Experimental	Possible	No Effect
Sprague's Pipit	*Anthus spragueii*	Candidate	Possible Migration	No Effect

Source: USFWS 2016
Notes:
[1] Black-footed ferrets have been reintroduced in the Badlands National Park, Buffalo Gap National Grasslands, Cheyenne River Sioux Reservation, Lower Brule Sioux Reservation, Rosebud Sioux Reservation and Wind Cave National Park.

3.10.1.1 WHOOPING CRANE

Whooping cranes were listed as endangered under the ESA in 1967. The species is the tallest of North American birds, standing approximately 5 feet tall with a wingspan of up to 7 feet long. It is white with black wingtips and red markings on the head (USFWS 2011). Juvenile plumage is a reddish cinnamon color with the full adult plumage present late in the second summer of an individual's life (Canadian Wildlife Service and USFWS [CWS and USFWS] 2007). Individuals are typically long lived, with estimates of up to 30 years or longer (USFWS 2011).

Whooping cranes typically leave their breeding area in mid-September, with migration lasting 2 to 6 weeks. Southward migration requires approximately a 2-day flight from the birds' breeding range to staging area in Saskatchewan where the birds remain 1 to 5 weeks, followed by a rapid 1-week trip across the U.S. prairie states. Fall migration consists of most birds spending several weeks resting and feeding in Saskatchewan before moving quickly through the U.S. (Lewis 1995). Their wintering habitat is located primarily in the Aransas National Wildlife Refuge, which is primarily made up of salt flats and adjacent islands (CWS and USFWS 2007).

Whooping cranes are found on various sizes of wetlands and croplands. However, Stahlecker (1992) concluded that wetlands less than 2 acres seldom were suitable roost sites. The most common stopover habitat for migrating cranes is palustrine wetlands; specifically, wetlands adjacent to croplands that can be used for feeding are predominately used.

No known occurrences of the whooping crane have been documented in the Project Area. The closest occurrence of the whooping crane is 40 miles to the north of the Project Area (Tacha n.d.). The Project Area is located west of the

whooping crane's migration route (Tacha n.d.); however, another source notes that the Project Area is within the whooping crane passage migrant range map (Ridgely et al. 2003).

3.10.1.2 NORTHERN LONG-EARED BAT

The northern long-eared bat was listed as threatened under the ESA in 2015. The medium-sized bat's fur varies between medium and dark brown on its back and tawny pale on its underside. The species ranges between 3 to 3.7 inches long with a wingspan of 9 to 10 inches, and has ears that average 0.7 inch in length (Whitaker and Mumford 2009). This species spends winter hibernating in caves or mines with constant temperatures and high humidity, and summer roosting singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees (USFWS 2014).

The current geographical distribution of the northern long-eared bat has not changed from its historical distribution. The northern long-eared bat can be found in the eastern and north-central U.S., including the entire state of South Dakota, and all Canadian provinces from the Atlantic Ocean west to southern Yukon Territory and eastern British Columbia (Amelon and Burhans 2006).

No known occurrences of the northern long-eared bat have been documented in the Project Area due to topography. However, occurrences have been documented within Badlands National Park (Mann-Klager 2016). The Stronghold South Unit of the Park is located approximately 5 miles northeast of the Project Area.

3.10.1.3 RUFA RED KNOT

The rufa red knot was listed as threatened under the ESA in 2015. The species is a medium-sized shorebird with a relatively short, straight bill that tapers to the tip. The species' head and breast consist of reddish plumage during the breeding season that fades to grey during the rest of the year. The species migrates annually between its breeding grounds in Canadian provinces and the southeast U.S., to the southern tip of South America, utilizing intertidal, marine habitats near coastal inlets, estuaries, and bays.

The current geographic distribution of the red knot has not changed from its historical distribution. The rufa red knot breeds in the Canadian Arctic and migrates approximately 19,000 miles to winter on the U.S. Gulf Coast and in South America (Harrington 2001).

The rufa red knot could potentially migrate through the Project Area; however, minimal migratory habitat (approximately 2 acres) exists in the Project Area.

3.10.1.4 WESTERN PRAIRIE FRINGED ORCHID

The western prairie fringed orchid has been an ESA threatened species since 1989. The plant occurs in moist, tallgrass prairies and sedge meadows. It is commonly found with sedges, reedgrass, and rushes or where those plants merge with upland grasses, such as big blue stem (*Andropogon gerardi*), little bluestem, and switchgrass (*Panicum virgatum*) (USFWS 2013). Vegetative shoots of the western prairie fringed orchid emerge in late May. Flowers do not emerge until mid-June to late July. The entire plant can display flowers for about 21 days, with individual flowers lasting up to 10 days. Pollination of flowers is completed by mothhawks, resulting in seed production. The western prairie fringed orchid is a perennial and most plants live 3 years or less (USFWS 2013).

The current geographical distribution of the western prairie fringed orchid ranges from the arctic Canadian provinces to Oklahoma, North and South Dakota, Wyoming, Minnesota, Iowa, and Missouri.

No known occurrences of the western prairie fringed orchid have been documented in the Project Area (Mann-Klager 2016), and the species is not expected to be present due to the lack of meadows in the Project Area.

3.10.1.5 BLACK-FOOTED FERRET

The black-footed ferret has been listed as endangered under the ESA since 1976. The black-footed ferret is a slender, medium-sized member of the weasel family with black feet, a black-tipped tail, and a distinctive black facemask. Historically, the range of this species extended throughout western North America's prairie grasslands and coincided with the range of the black-tailed prairie dog (*Cynomys ludovicianus*), Gunnison's prairie dog (C. *gunnisoni*), and the white-tailed prairie dog (*C. leucurus*) (USFWS 2015b). Prairie dogs are the primary prey of the black-footed ferret, and prairie dog complexes provide habitat for the species. Black-footed ferret habitat is limited to grasslands containing large prairie dog complexes, of which the black-footed ferret uses the burrows for shelter and dens (USFWS 2015b).

The current range of the black-footed ferret is limited to populations at 16 reintroduction sites in the U.S. The nearest reintroduction site to the PRIR is at Badlands National Park, Conata Basin (located approximately 42 miles northeast of the Project Area) (National Park Service n.d.b). No occurrences of the black-footed ferret are documented within the PRIR (Mann-Klager 2016).

Additionally, as noted above, prairie dog towns are necessary for survival of the ferret. No known prairie dog towns occur within the Project Area (Rapp 2016); and based on a recent inventory of prairie dog towns in the state, prairie dog towns do not seem to occur in the Project Area (approximate review of Project Area relative to the county location) (Kempema et al. 2015).

3.10.1.6 SPRAGUE'S PIPIT

The Sprague's pipit has been a candidate for federal listing under the ESA since 2010. The Sprague's pipit is a small passerine bird about 5 inches in length, with dark brown wings and tail, and with two pale indistinct wing-bars (Jones 2010).

The species' wintering habitats consist of large grassland areas where the grass is very short, including pastures, prairie dog towns, cropland, and short-mixed and heavily grazed tall-grass prairies. Their summer habitat includes similar shortgrass habitats. The species usually nests in grassy fields or in clumps of grass (Jones 2010).

The current geographical distribution of the Sprague's pipit extends from its breeding grounds in the northern shortgrass prairies of southern Canada and the northern U.S. to wintering grounds in the southern U.S. and northern Mexico.

Occurrences of the Sprague's pipit have been documented within Badlands National Park (the Stronghold South Unit of the Badlands National Park is located approximately 5 miles northeast of the Project Area) (eBird.org 2016). The species may possibly migrate through Oglala Lakota County (USFWS 2016) traversing the Project Area.

3.10.2 IMPACTS

Impacts from the alternatives to the listed species that could potentially occur within the Project Area are described below.

3.10.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, existing conditions would continue and no new impacts to the listed species are expected within the Project Area.

3.10.2.2 PROPOSED ACTION

3.10.2.2.1 WHOOPING CRANE

The Project Area is located on the western edge of the whooping crane migratory corridor (Tacha n.d.); therefore, the species may avoid the Project Area during migration due to construction noise. However, wetland habitat used by this species would be avoided by the 150-foot wetland buffer, and it is important to note that this wetland habitat makes up less than 1% of the Project Area and the limited number of wetlands are isolated and small in size. Impacts to the whooping crane from the Proposed Action are not anticipated since the likelihood of occurrence of the species in the Project Area is low. Therefore, the Proposed Action would have no effect to the whooping crane.

3.10.2.2.2 NORTHERN LONG-EARED BAT

The Project Area lacks hibernacula and habitat preferred by the northern long-eared bat. In addition, no occurrences of the northern long-eared bat have been documented within the Project Area (Mann-Klager 2016). Therefore, the Proposed Action would have no effect to the northern long-eared bat.

3.10.2.2.3 RUFA RED KNOT

Impacts to the rufa red knot from the Proposed Action are not anticipated as the occurrence of the species within the Project Area is not expected. The species requires wetland and coastal areas which make up less than 1% of the Project Area. Therefore, the Proposed Action would have no effect to the rufa red knot.

3.10.2.2.4 WESTERN PRAIRIE FRINGED ORCHID

Impacts to the western prairie fringed orchid from the Proposed Action are not anticipated since the occurrence of the plant species within the Project Area is not expected, and wetlands would be avoided by the 150-foot buffer. Therefore, the Proposed Action would have no effect to the western prairie fringed orchid.

3.10.2.2.5 BLACK-FOOTED FERRET

Impacts to the black-footed ferret from the Proposed Action are not anticipated since the occurrence of the species within the Project Area is not expected. No known prairie dog towns occur within the Project Area (Rapp 2016), which is what the black-footed ferret uses as shelter and dens. No occurrences of the black-footed ferret are documented within the PRIR (Mann-Klager 2016). Therefore, the Proposed Action would have no effect to the black-footed ferret.

3.10.2.2.6 SPRAGUE'S PIPIT

The Project Area consists of abundant prairie habitat that is potentially suitable for Sprague's pipit; however, occurrences of the Sprague's pipit within the Project Area have not been previously documented (Mann-Klager 2016). In addition, under the Proposed Action, construction and operations of the Lookout Solar Farm would affect no more than approximately 683 total acres of grasslands if surface disturbance were to occur only within suitable grassland habitat. Even if the entire disturbed area was within suitable grassland habitat, it represents a negligible amount of the total grassland habitat within the general region. Furthermore, if the species was present, existing suitable habitat is present immediately adjacent to and surrounding the Project Area. Therefore, the Proposed Action would have no effect to the Sprague's pipit.

3.11 WILDLIFE

The following sections describe the possible wildlife in the Project Area and the potential impacts to wildlife from the alternatives. Because a comprehensive species list does not exist for the Project Area, species common to Badlands

National Park (the Stronghold South Unit of the Park is located approximately 5 miles northeast of the Project Area) are included below as species potentially present in the Project Area. A summary of federal protections afforded to migratory birds and eagles is also provided below.

Migratory birds present on the PRIR are protected by the Migratory Bird Treaty Act (MBTA) (16 United States Code [U.S.C.] 703-712). The MBTA was developed in the early 20th century in response to the precipitous decline in populations of many bird species from overharvest for commercial operations. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Unless otherwise permitted, the MBTA provides that is it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not.

Under the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668-668d) the taking, killing, possession or commerce of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) (including their eggs, nests, or parts) is prohibited unless allowed by permit.

3.11.1 EXISTING ENVIRONMENT

Carnivores potentially present within the Project Area could include, but are not limited to, coyote (*Canis latrans*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and weasel *(Mustela spp*.). These species occur year-round in the Project Area. Some species such as the raccoon and striped skunk prefer habitats such as forests and deserts, and their occurrence in the Project Area is less likely. Medium-size omnivores and herbivores that could occur include mountain cottontail (*Sylvilagus nutalli*), white-tailed jackrabbit (*Lepus townsedii*), and northern pocket gopher (*Thomomys talpoides*). Other common mammals that could occur within the Project Area include pronghorn (*Antilocapra americana*) (further discussed below), porcupine (*Erethizon dorsatum*), and mule deer (*Odocoileus hemionus*) (NPS 2016a).

In South Dakota, pronghorn are most commonly found in sagebrush habitat interspersed with grasslands, with lower densities of animals occupying rolling grasslands habitat (South Dakota Department of Game, Fish, and Parks [SD GFP] 2014). Pronghorn migrate between their summer and winter ranges in response to severe weather and/or habitat conditions such as the relative amount of snowfall and forbs that are available as forage. Healthy pronghorn populations are seldom found more than 3 to 4 miles from water (Jacques et al. 2009).

Birds potentially present in the Project Area could include, but are not limited to, hawks, such as Cooper's hawk (*Accipiter cooperii*), northern goshawk (*Accipiter gentilis*), and the ferruginous hawk (*Buteo reglais*); eagles, such as the golden eagle and bald eagle; and other birds, such as killdeer (*Charadrius vociferous*), blue jay (*Cyanocitta*

cristata), and lesser goldfinch (*Cardeuelis psaltria*) (NPS 2016b). The Project Area is considered a summer range for some hawk species; however, the majority of hawks prefer to nest and hunt in wooded areas or on the edge of wooded areas. Other hawk species, as well as golden and bald eagles, use the region as a winter range (Mann-Klagger 2016), but still prefer wooded areas versus the grassland and open country that make up the Project Area. The Cheyenne River flows adjacent to the Project Area and could be used as hunting grounds for winter or summer range migratory bird species. These species may be seen perching on powerlines and fence posts surrounding the Project Area (Mann-Klagger 2016).

The presence of reptiles and amphibians within the Project Area is limited due to the lack of hydrology. However, potential reptiles that could occur include, but are not limited to, the racer snake (*Coluber constrictor*), the western hog-nosed snake (*Heterodon nasicus*), gopher snake (*Pituophis catenifer*), the Plains garter snake (*Thamnophis radix*), and the prairie rattlesnake (*Crotalus viridis*). Common types of amphibians that could occur include, but are not limited to, the tiger salamander (*Ambystoma tigrinum*), the Great Plains toad (*Anaxyus cognatus*), the northern leopard frog (*Lithobates pipiens*), and the Plains spadefoot toad (*Spea bombifrons*) (NPS 2016a).

3.11.2 IMPACTS

This section describes the potential impacts to wildlife that could occur from the alternatives.

3.11.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Lookout Solar Farm would not be constructed and there would be no impacts to wildlife, other than disturbance from the grazing activity that is already occurring.

3.11.2.2 PROPOSED ACTION

Under the Proposed Action, construction and operation of the Lookout Solar Farm could cause potential minor, adverse impacts to wildlife in the Project Area. For example, the construction and placement of the solar field could result in vegetation loss and subsequently direct habitat loss for some species. Other species may avoid the Project Area itself and/or habitat adjacent to the Project Area because of construction noise or activity. However, large mammals and raptors could adapt to the new land use changes and utilize habitats adjacent to the Project Area, during and/or after construction ceases. It is important to note that there are no unique habitat types that exist within the Project Area (including known migratory corridors); rather all habitat types are abundantly present within the immediate surrounding area. Raptors may still use transmission ROWs for foraging and roosting. In addition to the loss of habitat and vegetation loss, vehicle use along highways and haul roads could increase the potential for vehicle-wildlife collisions, especially during construction activities when traffic would be higher (additional information on Roads and Traffic is included in Section 3.18). Animals may also avoid the area because of the greater level of activity and increased human presence. Project-related impacts to amphibians and reptiles are not likely to occur due to the lack of

amphibians and reptiles in the Project Area. Additionally, potential impacts to amphibians would be minimized through the use of the 150-foot buffer around wetlands. Overall, impacts to wildlife would be minor.

3.12 CULTURAL RESOURCES

Historic properties, or cultural resources, on federal or tribal lands are protected by many laws, regulations and agreements. The National Historic Preservation Act of 1966 (16 U.S.C 470 et seq.) at Section 106 requires, for any federal, federally assisted or federally licensed undertaking, that the federal agency take into account the effect of that undertaking on any district, site, building, structure, or object that is included in the National Register of Historic Places (National Register) before the expenditure of any federal funds or the issuance of any federal license.

Cultural resources is a broad term encompassing sites, objects, or practices of archaeological, historical, cultural, and religious significance. Eligibility criteria (36 CFR 60.6) include association with important events or people in our history, distinctive construction or artistic characteristics, and either a record of yielding or a potential to yield information important in prehistory or history. In practice, properties are generally not eligible for listing on the National Register if they lack diagnostic artifacts, subsurface remains, or structural features, but those considered eligible are treated as though they were listed on the National Register, even when no formal nomination has been filed. This process of taking into account an undertaking's effect on historic properties is known as "Section 106 review," or more commonly as a cultural resource inventory.

The area of potential effect (APE) of any federal undertaking must also be evaluated for significance to Native Americans from a cultural and religious standpoint. Sites and practices may be eligible for protection under the American Indian Religious Freedom Act of 1978 (42 U.S.C 1996). Sacred sites may be identified by a tribe or an authoritative individual (Executive Order 13007). Special protections are afforded to human remains, funerary objects, and objects of cultural patrimony under the Native American Graves Protection and Repatriation Act (25 U.S.C 3001 et seq.).

Whatever the nature of the cultural resource addressed by a particular statute or tradition, implementing procedures invariably includes consultation requirements at various stages of a federal undertaking. The Oglala Sioux Tribe has designated a THPO by tribal council resolution, whose office and functions are certified by the NPS. The THPO operates with the same authority exercised in most of the rest of South Dakota by the State Historic Preservation Officer (SHPO). Thus, BIA consults and corresponds with the THPO regarding cultural resources on all projects proposed within the exterior boundaries of the Reservation.

3.12.1 EXISTING ENVIRONMENT

Cultural resource inventories for this development project were conducted by BIA personnel and the Tribal Archaeologist, using an intensive pedestrian methodology. Approximately 810.62 acres within tracts 3395, 3395-A and 6368 were inventoried on June 1, 2015 (LeBeau 2015). No historic properties were located that appeared to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.6) for inclusion on the National Register. As the lead federal agency, and as provided for in 36 CFR 800.5, on the basis of the information provided, BIA reached a determination of no historic properties affected for this undertaking. This determination was communicated to the THPO on June 18, 2015, and the THPO concurred on August 10, 2015. These letters of concurrence are included in Appendix C.

3.12.2 IMPACTS

Potential impacts to cultural resources that could occur as a result of the alternatives are described below.

3.12.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed Lookout Solar Farm would not be constructed and the existing land use is expected to continue (i.e., cattle grazing). No new or additional impacts to cultural resources are expected as a result of this alternative.

3.12.2.2 PROPOSED ACTION

Under the Proposed Action, construction and operation of the Lookout Solar Farm could adversely impact cultural resources, if a cultural resource was inadvertently damaged or destroyed. However, this potential impact would be minimal since no historical properties were located in the Project Area during the cultural resource inventory. In addition, these potential impacts would be mitigated through the presence of a qualified construction/archaeologist monitor during ground disturbing activities. In the event of an inadvertent discovery during construction or operations, the work would be halted in the immediate area, and the cultural property would be secured and protected. Notification of inadvertent discovery would be communicated to the THPO and the BIA. The THPO and BIA, in consultation, would determine the treatment of the cultural property.

3.13 LAND USE

The following sections describe the current land use in and around the Project Area and potential impacts to land use associated with the alternatives.

3.13.1 EXISTING ENVIRONMENT

The Project Area is located in Oglala Lakota County, South Dakota, on approximately 840 acres of land owned in trust. BIA Route 2 makes up the southern boundary of the Project Area and the Custer/Oglala Lakota county line makes up the western boundary of the Project Area, while a no-name two-track road crosses the Project Area. Current land use in and around the Project Area includes cattle grazing within the bounds of tribal grazing units. In addition, there are some isolated rural homes near the Project Area. No residential structures are currently located in the Project Area; the nearest house is located approximately 0.6 mile south of the Project Area. The nearest populated area, Buffalo Gap, South Dakota, is located approximately 22 miles west of the Project Area.

3.13.2 IMPACTS

This section describes the potential impacts to land use that could occur from the alternatives.

3.13.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Lookout Solar Farm would not be constructed, and there would not be any impacts to land use. It is expected that cattle grazing would continue to occur in and around the Project Area.

3.13.2.2 PROPOSED ACTION

Under the Proposed Action, the Lookout Solar Farm would be constructed and land use would change from agricultural to commercial. This land use modification would require BIA approval through a request to remove the Project Area from a grazing unit. Although the land would be removed from a grazing unit, sheep would be used to provide vegetation control in and around the solar panels. This change in land use would be a minor impact, as it would remove approximately 0.06% of land from the Reservation's grazing units.

Approximately 683 acres of the Project Area would be disturbed for the construction of the solar farm modules, the Lookout Solar Farm Information and Office Center, the transmission line ROW, and haul roads. These impacts would be adverse, but considered minor since less than 0.03% of the Reservation's land would be affected. Following decommission of the Lookout Solar Farm, the facilities would be dismantled, and the site would be reclaimed and restored to the approximate original site conditions. At that time, the land use would be changed from commercial back to agricultural land, and the land would be placed back in the tribal grazing unit.

3.14 SOCIOECONOMIC CONDITIONS

The socioeconomic analysis, which includes data on current population, employment, and educational attainment, is conducted for the Reservation, the three counties that comprise the Reservation (Bennett, Jackson, and Oglala Lakota counties), and the State of South Dakota for comparison purposes. However, since the Project Area is located in Oglala Lakota County, and the county is located entirely within the exterior boundaries of the Reservation, the socioeconomic analysis mainly focuses on Oglala Lakota County, as opposed to the Project Area and Reservation as a whole.

3.14.1 EXISTING ENVIRONMENT

The Oglala Lakota County population (14,005) comprises approximately 1% of South Dakota's total population (834,708) and approximately 19% of the state's American Indian and Alaska Native population (U.S. Census Bureau 2010-2014). An estimated 38,332 people are enrolled Oglala Lakota tribal members, of whom, approximately 19,639 reside on the Reservation (South Dakota 2016).

Over the 2010 to 2014 period, Oglala Lakota County had a civilian labor force of 4,274, with an approximately 27% unemployment rate. Over the same period, the PRIR had an unemployment rate of approximately 24%, and the State of South Dakota had an unemployment rate of approximately 5% (U.S. Census Bureau 2010-2014). However, it is important to note that the unemployment rate on the Reservation varies according to source. For example, the American Indian Relief Council reports an 80% unemployment rate on the Reservation, and the State of South Dakota reports an 89% unemployment rate for the Reservation (American Indian Relief Council 2016, South Dakota 2010), both of which significantly differ from the 24% unemployment rate reported from the U.S. Census Bureau (2010-2014).

The median age in Oglala Lakota County is 24.9, which is lower than the median age on the Reservation (25.4) and in South Dakota (36.8) (U.S. Census Bureau 2010-2014). Over the 2010 to 2014 period, approximately 28% of residents in Oglala Lakota County age 25 years and over were high school graduates (or equivalent) and 10% had a bachelor's degree or higher. Over the same period, approximately 32% of South Dakota residents age 25 years and over were high school graduates (or equivalent) and 19% had a bachelor's degree or higher (U.S. Census Bureau 2010-2014).

Jobs in educational services, health care, and social assistance accounted for the largest share of those employed in Oglala Lakota County (48%), followed by public administration (20%), and arts, entertainment, recreation, and accommodation and food services (10%) (U.S. Census Bureau 2010-2014). Table 3-7 provides a breakdown of employment by industry for Oglala Lakota, Bennett, and Jackson counties, the Reservation, and the State of South Dakota. The tribe and the federal government supply the majority of employment on the Reservation (America Indian Relief Council 2016).

TABLE 3-7. EMPLOYMENT BY INDUSTRY

Industry	Percent of Population Employed in Each Industry				
	Oglala Lakota County	PRIR	Bennett County	Jackson County	South Dakota
Agriculture, forestry, fishing and hunting, and mining	4.3	10.2	17.7	24.3	7.1
Construction	2.7	4.4	7.3	7.1	6.5
Manufacturing	0.5	0.6	1.1	1.4	9.7
Wholesale trade	0.2	1.1	2.1	3.9	3.0
Retail trade	4.3	5.4	8.9	6.0	11.4
Transportation, warehousing, and utilities	1.5	2.2	5.1	2.8	4.1
Information	0.2	0.8	2.4	0.6	1.7
Finance and insurance, real estate, and rental and leasing	3.1	3.3	2.8	4.0	7.4
Professional, scientific, management, and administrative and waste management services	2.9	2.6	1.9	3.2	5.9
Educational services, health care, and social assistance	47.5	42.5	31.3	28.8	24.3
Arts, entertainment, recreation, accommodation, and food services	10.3	8.3	6.6	9.2	9.3
Other services, except public administration	2.2	2.4	3.1	2.6	4.5
Public administration	20.3	16.1	9.7	6.1	5.2

Source: America Indian Relief Council 2016

3.14.2 IMPACTS

The potential impacts to socioeconomic resources under each alternative are described below.

3.14.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, existing land use is expected to continue. There would be no impacts to the socioeconomic conditions of Oglala Lakota County or the Reservation; population and employment rates would be expected to stay the same within Oglala Lakota County and the Reservation.

3.14.2.2 PROPOSED ACTION

Under the Proposed Action, there would be positive short-term and long-term socioeconomic impacts associated with increased employment and income. Construction of the Lookout Solar Farm would take approximately 12 months and would require a workforce of approximately 50 people. It is assumed that the workforce would originate from local communities, which would be a short-term beneficial impact. Once the Lookout Solar Farm is constructed, it is expected to operate for approximately 25 years. During that time, approximately 10 full-time employees would be needed for operation and maintenance activities. This would also be a long-term beneficial impact to local communities.

In addition to the direct benefits associated with increased employment opportunities and income for the local communities, indirect benefits associated with the expenditure of the wages earned by the workforce involved in

construction, operation, and maintenance activities at the Lookout Solar Farm would also result from the Proposed Action. Overall, socioeconomic impacts from the Proposed Action are anticipated to be positive, although small in comparison to the relative economy of the county and Reservation.

There would also be long-term impacts to the allottee landowner. One potential adverse impact would be the landowner's loss of grazing income due to the change in land use of the Project Area. However, a beneficial impact associated with the change in land use would be the annual payments to the allottee landowner per the lease agreement for the Project Area. The overall impacts could be adverse or beneficial depending on the amount of grazing income lost and the amount of income gained from leasing the land for the Proposed Action.

3.15 ENVIRONMENTAL JUSTICE

Environmental Justice is defined by the USEPA as …*The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people including racial, ethnic, or socioeconomic groups should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies* (USEPA 1998).

According to Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, *each Federal agency [must] make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations.*

The memorandum accompanying Executive Order 12898 states that each federal agency shall analyze the environmental effects, including human health, economic, and social effects of federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA (Clinton 1994).

The key parameters addressed within this section for environmental justice are race/ethnicity and measures of social and economic well-being, including per capita income and poverty rates. Site-specific data for the Project Area are not available; therefore, the environmental justice analysis of the two alternatives is conducted for the Reservation, the three counties that comprise the Reservation (Bennett, Jackson, and Oglala Lakota counties), and the State of South Dakota. However, since the Project Area is located in Oglala Lakota County, and the county is located entirely within the exterior boundaries of the Reservation, the environmental justice analysis will mainly focus on Oglala Lakota County as opposed to the Project Area and Reservation as a whole.

3.15.1 EXISTING ENVIRONMENT

Between 2010 and 2014, approximately 95% of the Oglala Lakota County residents were American Indian or Alaska Natives. In comparison, American Indian and Alaska Native populations ranged between 9 and 85% of all residents in the two counties partially located on the Reservation, the Reservation as a whole, and the State of South Dakota. Table 3-8 summarizes minority population characteristics for Oglala Lakota County, the PRIR, the two counties located partially within the Reservation boundaries, and the State of South Dakota. It is important to note that approximately 19% of land within the exterior boundaries of the Reservation is fee land (U.S. BIA 2016). The fee land is predominately located in the southeast corner of the Reservation, outside Oglala Lakota County. The high incidence of fee land in Bennett and Jackson counties as opposed to Oglala Lakota County could be the explanation for a higher population of American Indian and Alaska Natives in Oglala Lakota County as opposed to the Reservation as a whole.

TABLE 3-8. MINORITY POPULATION CHARACTERISTICS OF OGLALA LAKOTA COUNTY AND THE SURROUNDING AREA

	Total Population	American Indian or Alaska Native Population	Approximate Percent American Indian or Alaska Native
Oglala Lakota County	14,005	13,250	95
PRIR	19,282	16,441	85
Bennett County	3,440	1,825	53
Jackson County	3,180	1,458	46
South Dakota	834,708	72,016	9

Source: U.S. Census Bureau 2010-2014

Note: Bennett and Jackson counties contain portions of the PRIR, which, in some cases, increase their share of American Indian and Alaska Native populations substantially. Oglala Lakota County is completely encompassed within the boundaries of the Reservation. Because of this, demographic and economic characteristics of Oglala Lakota County closely reflect those of the Reservation.

With respect to low-income populations, the incidence of poverty in Oglala Lakota County is higher than the Reservation as a whole, and is much higher than the counties located partially within the Reservation and the state as a whole. Table 3-9 illustrates the per capita income and poverty rates for Oglala Lakota County, the Reservation, the two counties located partially within the Reservation, and the State of South Dakota. Over the 2010 to 2014 period, the average per capita income for Oglala Lakota County ($9,226) was approximately 16% lower than the per capita income for the Reservation ($10,976) and approximately 65% lower than the per capita income for South Dakota ($26,311). Further, the proportion of residents in Oglala Lakota County living in poverty was almost five times as high as statewide.

TABLE 3-9. AVERAGE INCOME AND POVERTY RATES (2010-2014)

Location	Per Capita Income ($)	Poverty Rate (%)[1]
Oglala Lakota County	9,226	45.5
PRIR	10,976	40.1
Bennett County	16,032	28
Jackson County	19,333	18.6
South Dakota	26,311	9.2

Source: U.S. Census Bureau 2010-2014
[1]Percentage of families and people whose income in the past 12 months was below the poverty level

With approximately 45.5% of its population living below the poverty line and 95% of its population identifying themselves as American Indian or Alaska Native, Oglala Lakota County contains both low income and minority communities. As a result, the population in the Project Area is considered an environmental justice population, and under the requirements of Executive Order 12898, analysis of the disproportionate impacts of the proposed project is required.

3.15.2 IMPACTS

This section examines whether adverse environmental, human health, or other effects identified in conjunction with the alternatives would be disproportionately high and adverse with regard to their incidence on minority or low-income communities in Oglala Lakota County or specific sub-sets of that population. In general, the environmental, health and safety, and other effects of past, ongoing, and future solar activities are undifferentiated for residents of Oglala Lakota County and residents in the surrounding area.

3.15.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Lookout Solar Farm would not be constructed and there would be no changes to the current land use in the Project Area; therefore, there would be no discernable effects to the environmental justice communities of Oglala Lakota County.

3.15.2.2 PROPOSED ACTION

As discussed throughout this EA, the construction and operation of the Lookout Solar Farm would not result in adverse human health impacts or significant adverse environmental effects. Therefore, there would not be disproportionately high and adverse impacts to the environmental justice population located in and around Oglala Lakota County.

3.16 VISUAL RESOURCES

The visual resources of an area include natural and man-made attributes that are included in a viewshed. A viewshed is the environment that can be seen from a certain vantage point. Visual resources can affect how an observer experiences a place. For example, a largely agricultural area will affect how an observer experiences a place differently than a largely industrial area. Additionally, it is suggested that solar elements can be used to enhance aesthetic appeal, and positive effects of advertising the fact that solar energy is being used could occur (Tsoutsos et al. 2005). The following sections describe the existing visual resources of the Project Area and the potential impacts from the two alternatives.

3.16.1 EXISTING ENVIRONMENT

The Project Area is located in the Pierre Hills physiographic region, immediately adjacent to the Southern Plateaus physiographic region that makes up the majority of Oglala Lakota County. The visual resources of the Project Area and vicinity are typical of these physiographic regions. These regions are characterized by smooth hills and ridges, with rounded tops and a series of buttes and benches (Malo 1997). Wide panoramic vistas with a prevailing sky dominate the area. Attributes of the Project Area and vicinity include cattle grazing, agricultural improvements such as stock tanks and fences, dispersed rural residential homes, and single lane roads; however, despite these mad-made attributes, the area is predominately barren. Figures 3-4 through 3-6 provide an example of the visual resources that are typical of the Project Area and surrounding area.

FIGURE 3-4. VIEW OF THE SOUTHERN BOUNDARY OF THE PROJECT AREA FROM BIA ROUTE 2 FACING NORTH

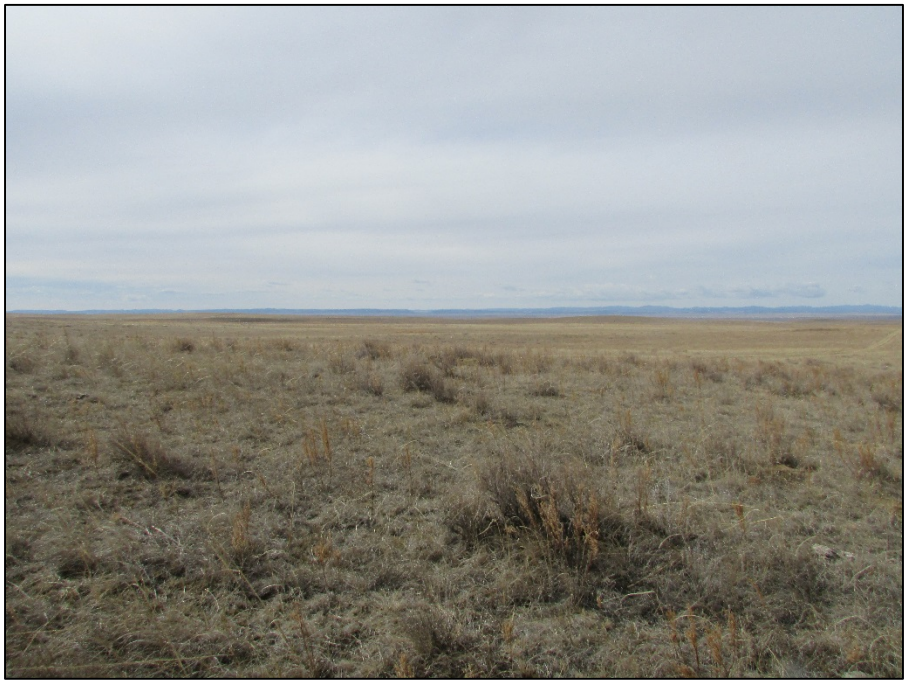


FIGURE 3-5. VIEW OF THE APPROXIMATE MIDDLE OF THE PROJECT AREA FACING SOUTH.

FIGURE 3-6. VIEW OF THE NORTHERN BOUNDARY OF THE PROJECT AREA FACING SOUTHWEST.

In addition to the rural agriculture and dispersed homes common throughout the area, the Stronghold South Unit of Badlands National Park is located approximately 5 miles northeast of the Project Area. Further, a lookout location in Badlands National Park (i.e., Red Shirt Table Overlook), is located approximately 6.5 miles from the Project Area; however the lookout faces away from the Project Area. The topography of the area between the Project Area and the Badlands National Park, Stronghold South Unit, is dominated by smooth hills and ridges, with mixedgrass prairie. The relief of the region is about 3,000 feet; the highest elevation reaches approximately 3,300 feet.

3.16.2 IMPACTS

Neither the Tribe nor the BIA has established a formal visual resource classification system for the Reservation; impacts to visual resources are described below.

3.16.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no new impacts to visual resources. Existing agricultural activities, such as grazing, would continue within the Project Area.

3.16.2.2 PROPOSED ACTION

Under the Proposed Action, the construction and operation of the Lookout Solar Farm would create adverse or beneficial long-term impacts to the visual environment, depending on the opinion of the observer (as suggested in Tsoutsos et al. 2005). Construction of the Lookout Solar Farm would convert grazing land to commercial use. The new construction and man-made attributes (e.g., the Lookout Solar Farm Information and Office Center, the parking lot, and the solar field) would add new colors and texture to the viewshed. The solar field panels and the information and office center building would be visible from the immediate surrounding area, including from BIA Route 2 (located to the south of the Project Area) and possibly from Red Shirt Table Overlook in the Badlands National Park. However, since the overlook is positioned to face the opposite direction of the Project Area and the topography of the area between the Project Area and Badlands National Park is dominated by a series of smooth hills and ridges with mixedgrass prairie, the Project Area is not likely to impact the viewshed from the overlook. In addition, the proposed Lookout Solar Farm could be observed from the highest buttes in the Badlands National Park Stronghold South Unit, as noted as a concern by the NPS. However, if a viewer were to observe the Lookout Solar Farm from this location, potential impacts to the viewer are expected to be minimal. Additionally, as noted in Section 2.1.3, other alternatives (i.e., project size and project locations) were considered but eliminated from further study, with consideration of the viewshed included in evaluation process. The location of the Project Area is one of the alternatives with the greatest distance from the Overlook.

Although the construction and operation of the Lookout Solar Farm would impact the visual resources of the area, the impacts could be considered adverse or positive. However, aesthetic impacts of solar panels are a matter of taste, so the impacts could also be considered adverse.

Additionally, the U.S. Department of Interior [USDOI] recommends leaving vegetation low or trimmed to lowest height tolerable for plant survival as best management practices for reducing visual impacts of renewable energy facilities (U.S. Bureau of Land Management [BLM] 2013). The Proponent will follow these recommendations and avoid complete vegetation removal of the Project Area. Overall, potential impacts to visual resources immediately surrounding the Project Area (whether they are adverse or beneficial) would be minor because of the area's sparse population.

3.17 PUBLIC HEALTH AND SAFETY

The following sections address potential public health and safety issues associated with the two alternatives.

3.17.1 EXISTING ENVIRONMENT

Since the Project Area is located on allotted land and is not used by the public, there are currently no public health and safety issues. The Oglala Sioux Tribe's Department of Public Safety provides law enforcement services for the Reservation. The nearest police department to the Project Area is located approximately 26 miles south at the Oglala Substation. There is one hospital and two health centers located on the Reservation. The Pine Ridge Hospital is located approximately 42 miles southeast of the Project Area in Pine Ridge, South Dakota. The BIA operates a fire station on the Reservation, which is located approximately 45 miles southeast of the Project Area and also within Pine Ridge, South Dakota.

3.17.2 IMPACTS

The following sections examine whether adverse public health and safety impacts have been identified in conjunction with the two alternatives.

3.17.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, current conditions are expected to continue, including grazing. There would continue to be no impacts to public health and safety.

3.17.2.2 PROPOSED ACTION

Under the Proposed Action, construction of the Lookout Solar Farm would pose potential health and safety impacts to workers on site. For example, potential hand or back injuries could result from the construction and installment of the

solar panels and/or the Lookout Solar Farm Information and Office Center. However, construction work has known hazards and the contractors would be required to follow OSHA regulations, which would minimize potential public health and safety impacts.

Traffic associated with construction of and operations at the Lookout Solar Farm could present potential adverse impacts to public health and safety because of the increased traffic along BIA Route 2. Employees would be required to follow normal traffic regulations, including following posted speed limits, which would minimize potential impacts to public health and safety.

In addition, operation of the solar field could also result in potential adverse health and safety impacts. Such impacts could include electric shock from the electricity generated from the solar panels, especially if a fire were to occur. Training and education are important for firefighters prior to battling solar panel fires to reduce potential public health and safety impacts. In addition, depending on the type of battery present, there could be potential leakage and hazardous material concerns (Grant 2013), which could pose a potential health and safety impact to employees and emergency responders (if present at the site). The potential presence of hazardous materials on site due to a leaking battery and/or damaged solar panels would be minimized through the proper use and storage of the batteries, and routine maintenance inspections performed by Lookout Solar Farm employees.

Public access to the solar panels would be restricted and no hazardous materials would be stored on site. Potential adverse impacts to the public, as they relate to the operation of the Lookout Solar Farm Information and Office Center include slips, trips, and falls. To minimize the potential for slips, trips, and falls, the Lookout Solar Farm Information and Office Center would employ adequate lighting, utilize signage, and maintain good housekeeping practices. Overall, under the Proposed Action impacts to public health and safety would be minor.

3.18 ROADS AND TRAFFIC

The following sections describe the existing roads and traffic surrounding the Project Area and the potential impacts from the two alternatives.

3.18.1 EXISTING ENVIRONMENT

Approximately 198 miles of South Dakota highways occur on the Reservation, including approximately 60 miles in Oglala Lakota County. A total of approximately 460 miles of BIA roads cross the Reservation as well. There is no estimate for the mileage of secondary and dirt roads on the Reservation (Federal Emergency Management Agency [FEMA] 2015). Roads in and around the Project Area are limited to BIA Route 2, which makes up the southern boundary of the Project Area; BIA Route 41, which is located approximately 5 miles east of the Project Area; and a

no-name two-track road, which crosses the Project Area (Figure 3-7). BIA Route 2 has typical traffic volumes of less than 10 vehicles per day, while BIA Route 41 has typical traffic volumes of less than 100 vehicles per day.

3.18.2 IMPACTS

This section describes the potential impacts to roads and/or traffic that could occur from the alternatives.

3.18.2.1 NO ACTION ALTERNATIVE

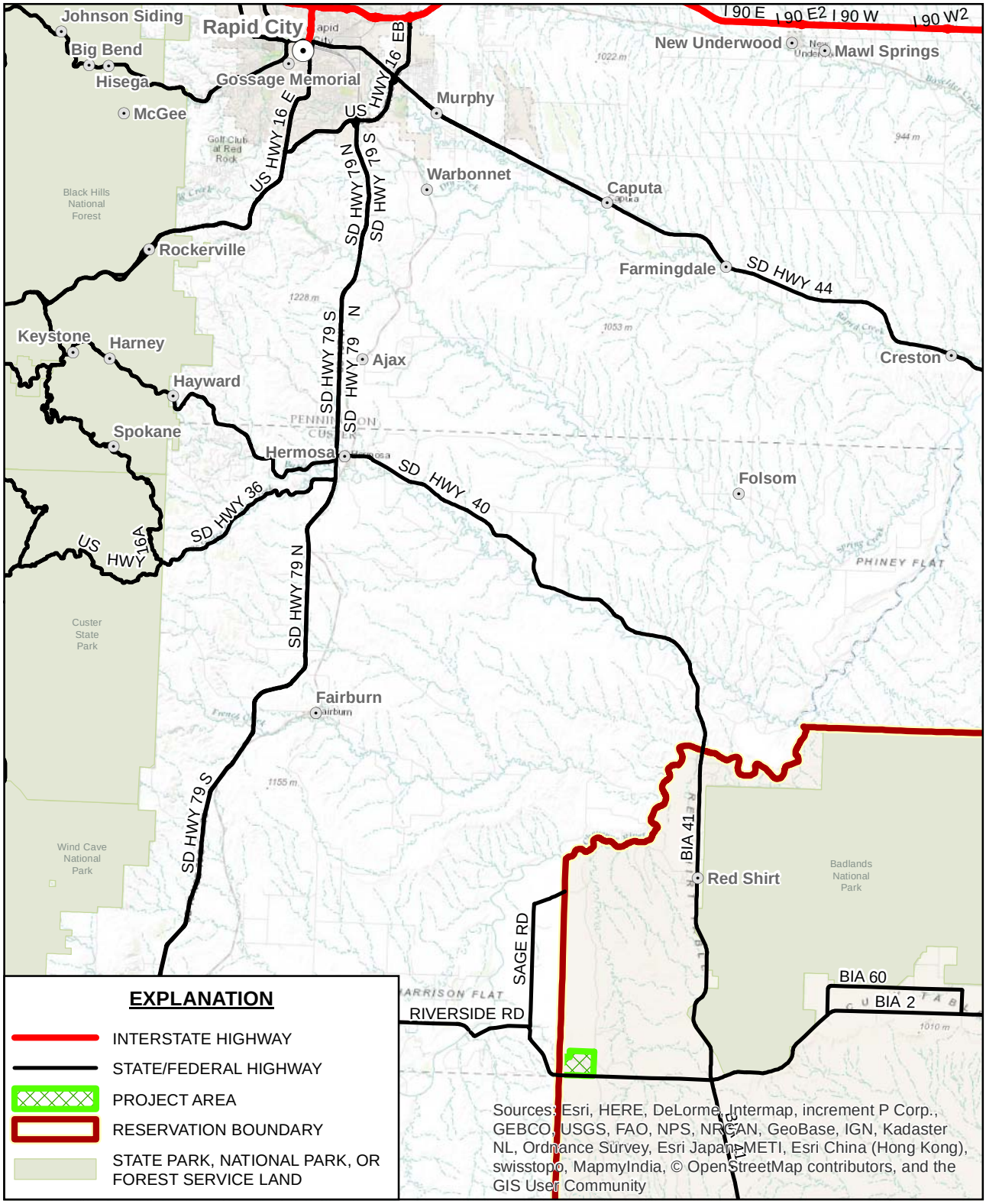
Under the No Action Alternative, current conditions are expected to continue. There would be no new or additional impacts to roads and traffic.

3.18.2.2 PROPOSED ACTION

Under the Proposed Action, up to two buses would be used to transport workers to the Project Area during the 12-month construction period. The addition of two buses to the roads in and around the Project Area would cause negligible impacts to roads and associated traffic. For example, an additional two vehicles per day would increase traffic on BIA Route 2 by 20%; however, the additional bus traffic on BIA Route 41 would be an approximate increase of 2%, which would be negligible. Although construction activities associated with the Proposed Action would result in an adverse impact to roads and traffic, these impacts would be minor because of the rural character of the Project Area and surrounding area, which results in underutilized and nearly vacant roads. In addition, these impacts would be temporary due to the limited period for the construction phase.

During operations, up to 10 cars for the employees of the Lookout Solar Farm would utilize the roads in and around the Project Area. In addition, it is expected that there will be approximately 200 visitors to the Lookout Solar Farm each year. It is assumed that the majority of these visitors would be transported via bus from local schools. Similar to the impacts from construction traffic, impacts from traffic during operations would cause negligible impacts to roads and traffic. For example, the addition of 10 vehicles to BIA Route 2 would double the daily traffic; however, it is not known which routes employees would utilize for travel to and from the Project Area, including how long they would drive on BIA Route 2. When the location and rural setting of the Project Area is considered with the additional traffic, impacts are expected to be long-term but minimal. In addition, potential adverse impacts to roads and traffic associated with the buses utilized by visitors is also expected to be minimal. Overall, the adverse impacts from construction and operation activities to roads and traffic would be minor because of the remote location of the Project Area.

This Page Intentionally Left Blank



N

0 6 Miles

Trihydro CORPORATION

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

FIGURE 3-7

TRANSPORTATION NETWORK

LOOKOUT SOLAR FARM EA
PINE RIDGE INDIAN RESERVATION, SOUTH DAKOTA

Drawn By: BR	Checked By: JM	Scale: 1 " = 6 Miles	Date: 5/23/16	File: Fig3-7_PRIR_Solar_Roads.mxd

This Page Intentionally Left Blank

4.0 CUMULATIVE IMPACTS

NEPA and CEQ regulations require the consideration of the cumulative impacts of a proposed action. A cumulative impact is defined in the CEQ regulations as the impact on the environment that results from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Part 1508.7). The cumulative impacts analysis area varies by resource, and it may be restricted to Oglala Lakota County, the entire Reservation, or the State of South Dakota; each resource is discussed below.

4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Past, present, and reasonably foreseeable actions must be considered in determining whether there are potential cumulative impacts. Past actions are actions that occurred in the past, which may warrant consideration in determining whether there are potential cumulative impacts. Present actions are actions that are occurring in the same general period as the Proposed Action. Reasonably foreseeable actions are actions that may affect the projected impacts of the Proposed Action.

Past and present actions that should be considered in the cumulative impacts assessment include the construction and operation of the Red Cloud Renewable Energy Center, which is located approximately 30 miles southeast of the Project Area. The center provides hands-on training in renewable energy applications for Native American trainers, in addition to building solar air furnaces (Lakota Solar Enterprises 2016). Similarly, other past and present actions include the construction and operation of renewable energy facilities across the State of South Dakota. In 2015, approximately 73% of the state's net electricity was supplied by wind and hydroelectric power (U.S. EIA 2016). Lastly, South Dakota State Highway 79 was widened from two to four lanes in late 2015. This highway is located approximately 20 miles west of the Project Area, and it serves as a major transportation corridor through the state.

Reasonably foreseeable actions include potential development of additional solar power facilities on the Reservation and across the state, and the continued promotion of renewable energy at the Red Cloud Renewable Energy Center. The U.S. EIA (2016) indicates the PRIR has some of the greatest solar power potential in the state. There are no other known major projects in the area that can be evaluated in conjunction with this project for cumulative effects.

4.2 CUMULATIVE IMPACT ASSESSMENT

This section analyzes cumulative impacts of the Proposed Action combined with the past, present, and reasonably foreseeable actions identified above. Table 4-1 identifies the overall cumulative impacts under the Proposed Action

associated with each resource area and resource specific mitigation measures for the Proposed Action. If the Lookout Solar Farm was not constructed, there would be no contribution to cumulative effects.

TABLE 4-1. CUMULATIVE IMPACTS EVALUATION

Resource Area	Overall Cumulative Impacts of the Proposed Action	Mitigation Measures with Proposed Action
Geology	Cumulative impacts from construction would be negligible.	No mitigation measures required for this specific resource.
Paleontology	No cumulative impacts to paleontological resources are expected.	A qualified construction/archaeologist monitor would be present during ground disturbing activities. In the event of an inadvertent discovery of a paleontological resource during construction or operations, the work would halt in the immediate area, and the paleontological property would be secured and protected.
Air Quality	Adverse cumulative impacts would be short-term and minor, and beneficial cumulative impacts would be long-term.	Wetting construction areas would be required.
Climate Change and GHGs	Adverse cumulative impacts would be short-term and minor, and beneficial cumulative impacts would be long-term.	No mitigation measures required for this specific resource.
Soils	Cumulative impacts are expected to be minor.	Native topsoil would be removed and stockpiled on-site for re-distribution after grading is completed. The stockpiled subsoil would be stored separately from the subsurface horizons. Soil stabilization procedures would be implemented and fencing operations would be performed on dry ground. Operations during excessively wet conditions would not be allowed.
Vegetation	Cumulative impacts are expected to be negligible assuming additional renewable energy facilities avoid removal of all vegetation.	The Proponent would work with the existing landscape and roads, where feasible, to minimize or eliminate grading work and land disturbance. Existing vegetation would only be cleared or graded as necessary, and all activities would be confined to designated areas and haul roads. Vegetation would be maintained to the lowest height for plant survival.
Wetlands	Cumulative impacts to wetlands are expected to be negligible.	Wetlands would be avoided by at least 150 feet.

Resource Area	Overall Cumulative Impacts of the Proposed Action	Mitigation Measures with Proposed Action
Water Resources	Cumulative impacts to water resources are expected to be negligible.	Waterbodies (if present) would be avoided by at least 150 feet. Cleaning of the PV arrays (with water) would occur during the early morning and evening to minimize water loss through evaporation.
Threatened, Endangered, and Candidate Species	Cumulative impacts to threatened, endangered, and candidate species are expected to be minor.	No mitigation measures required for this specific resource.
Wildlife	Cumulative impacts are expected to be minor due to the nature of impacts.	No mitigation measures required for this specific resource.
Cultural Resources	No cumulative impacts to cultural resources are expected.	A qualified archaeologist/construction monitor would be present during ground disturbing activities. In the event of an inadvertent discovery of a cultural resource during construction or operations, the work would halt in the immediate area, and the cultural property would be secured and protected
Land Use	Cumulative impacts are expected to be minor in nature.	No mitigation measures required for this specific resource.
Socioeconomic Conditions	Cumulative impacts would be beneficial to the socioeconomic conditions.	No mitigation measures required for this specific resource.
Environmental Justice	No cumulative impacts.	No mitigation measures required for this specific resource.
Visual Resources	Cumulative impacts would be minor and could be considered adverse or beneficial, depending on the opinion of the observer.	No mitigation measures required for this specific resource.
Public Health and Safety	Cumulative impacts to public health and safety are expected to be minor.	Contractors would follow OSHA regulations. Local firefighters would be trained for unique conditions related to solar panel fires and related infrastructure. Batteries would be properly stored and employees would conduct routine maintenance inspections. Adequate lighting, use of signage, and good housekeeping practices would be employed in the Project Area.
Roads and Traffic	Cumulative impacts are expected to be negligible.	Buses would be used to transport workers and visitors to the Project Area. All construction and operation activities would be confined to designated areas and haul roads.

4.2.1 GEOLOGY

Construction associated with past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could have cumulative impacts on geology resources throughout the state, such as minor settlement distress to the subsoils. However, these cumulative impacts from construction would be negligible.

4.2.2 PALEONTOLOGY

Construction associated with past, present, and reasonably foreseeable actions (as identified in Section 4.1) could have impacts on paleontological resources, depending on the location of the construction. For example, construction on fee land, without mitigation measures such as the presence of a qualified construction/archaeologist monitor during ground disturbing activities, could potentially impact paleontological resources. However, no impacts to paleontological resources from the Proposed Action are expected due to the presence of a required and qualified construction/archaeologist monitor who would halt work if resources were to be found. Therefore, there would be no cumulative impacts to paleontological resources.

4.2.3 AIR QUALITY

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact air quality in the region and the state. Cumulative impacts to air quality could include an increase in short-term minor air emissions due to construction activities of present and foreseeable actions. However, the operation of the renewable energy facilities is expected to reduce overall emissions due to the reduction in energy generated from fossil fuels. Overall, the adverse cumulative impacts would be short-term and minor, and beneficial cumulative impacts would be long-term.

4.2.4 CLIMATE CHANGE AND GREENHOUSE GASES

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact climate change and GHGs in the region and the state. Cumulative impacts to climate change and GHGs could include a minor increase in short-term GHG emissions due to construction and operation activities (e.g., traffic associated with workers and visitors) of present and foreseeable actions. However, the operation of the renewable energy facilities is expected to reduce overall GHG emissions from the reduction in energy generated from fossil fuels. Overall, the adverse cumulative impacts would be short-term and minor, and beneficial cumulative impacts would be long-term.

4.2.5 SOILS

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact soils in Oglala Lakota County, the Reservation, and the state.

Cumulative impacts to soils could include an increase in erosion and sedimentation and soil compaction from construction and various operation activities. However, the cumulative impacts are expected to be minor due to the overall disturbance area and the nature of possible impacts. In addition, mitigation measures are in place for the Proposed Action to further minimize possible impacts.

4.2.6 VEGETATION

The past, present, and reasonably foreseeable actions (Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact vegetation in Oglala Lakota County, the Reservation, and the state. Cumulative impacts to vegetation could include a loss of vegetation if present and reasonably foreseeable actions, such as construction and operation of renewable energy facilities, involve development of undeveloped land. However, if the additional construction and design plans for renewable energy facilities are written to minimize vegetation removal and include measures to promote re-establishment of native species, cumulative impacts are expected to be negligible. In addition, measures could be implemented to minimize the introduction and/or spread of weed or invasive species to native landscapes.

4.2.7 WETLANDS

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact wetlands in Oglala Lakota County, the Reservation, and the state. Cumulative impacts to wetlands could include impacts such as sedimentation and pollution (e.g., from spills), though no other impacts are expected due to other regulations in place (i.e., CWA). Additionally, impacts from the Proposed Action are expected to be negligible due to the mitigation measures that would be in place. Therefore, cumulative impacts to wetlands are expected to be negligible.

4.2.8 WATER RESOURCES

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact water resources in the Oglala Lakota County, the Reservation, and the State. Depending on the water need and usage of the present and reasonably foreseeable actions (i.e., additional renewable energy facilities), cumulative impacts to water resources could include reduced water availability. Other impacts, such as sedimentation and pollution could also occur if mitigation measures are not in place. However, impacts from the Proposed Action are expected to be negligible due to the mitigation measures that would be in place and the requirements under the CWA. Therefore, cumulative impacts to water resources are expected to be negligible.

4.2.9 THREATENED, ENDANGERED, AND CANDIDATE SPECIES

Past, present, and reasonably foreseeable actions (as identified in Section 4.1) have the potential to impact threatened, endangered, and candidate species in Oglala Lakota County, the Reservation, and the state. However, under the Proposed Action, there would be no effect to any of the threatened, endangered, and candidate species potentially present in the Project Area. Present and reasonably foreseeable actions (e.g., construction and operation of additional renewable energy facilities) could impact threatened, endangered, and candidate species if mitigation measures to avoid the species are not in place and if species' occurrences are within the project areas of potential new facilities. Therefore, cumulative impacts to threatened, endangered, and candidate species are expected to be minor.

4.2.10 WILDLIFE

Past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact wildlife in Oglala Lakota County, the Reservation, and the state. Cumulative impacts to wildlife could include habitat loss and disturbance. However, this cumulative impact is expected to be minor due to the nature of impacts.

4.2.11 CULTURAL RESOURCES

Construction of the past, present, and reasonably foreseeable actions (as identified in Section 4.1) could have impacts on cultural resources, depending on the location of the construction in Oglala Lakota County, the Reservation, and the state. For example, construction on fee land without mitigation measures (e.g., the presence of a qualified construction/archaeologist monitor during ground disturbing activities) could have or could potentially impact cultural resources. However, no impacts to cultural resources from the Proposed Action are expected due to the presence of a required construction/archaeologist monitor who would be onsite during ground disturbing activities and the practice of halted work if resources were to be found. Therefore, there would be no cumulative impacts to cultural resources.

4.2.12 LAND USE

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact land use in Oglala Lakota County, the Reservation, and the state. Cumulative impacts to land use from these actions could include a loss of undeveloped land and a change in land use. However, these cumulative impacts are expected to be minor in nature due to the sparseness of development throughout Oglala Lakota County, the Reservation, and the state.

4.2.13 SOCIOECONOMIC CONDITIONS

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact socioeconomic conditions in Oglala Lakota County, the Reservation, and

the state. Cumulative impacts to socioeconomic conditions from these actions could include an increase in the amount of jobs; an increase in the amount of tourists due to the improvement of South Dakota Highway 79 and/or increased interest and promotion of renewable energy facilities due to the Red Cloud Renewable Energy Center; and increased revenues for the Tribe, county, and/or state. These cumulative impacts would be beneficial to the socioeconomic conditions.

4.2.14 ENVIRONMENTAL JUSTICE

Under the Proposed Action, no impacts to the environmental justice population are expected. Thus, there are no cumulative impacts.

4.2.15 VISUAL RESOURCES

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact visual resources in Oglala Lakota County, the Reservation, and the state. Cumulative impacts to visual resources from the Proposed Action and other potential renewable energy facilities could include land use changes, an increase in the amount of developed land, and an increase in the amount of man-made attributes in viewsheds, depending upon the observer's vantage point. Overall, these cumulative impacts would be minor and could be considered adverse or beneficial, depending on the opinion of the observer.

4.2.16 PUBLIC HEALTH AND SAFETY

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) in combination with the Proposed Action could incrementally and cumulatively impact public health and safety in Oglala Lakota County, the Reservation, and the state. Cumulative impacts to public health and safety could include construction hazards (for present and reasonably foreseeable actions) and an increase in the hazards associated with facility fires. These cumulative impacts to public health and safety are expected to be minor due to proposed mitigation measures that are required for the Proposed Action and likely required for other potential additional projects (e.g., OSHA regulations, local firefighter training, etc.).

4.2.17 ROADS AND TRAFFIC

The past, present, and reasonably foreseeable actions (as identified in Section 4.1) combined with the Proposed Action could incrementally and cumulatively impact roads and traffic in Oglala Lakota County, the Reservation, and the state. Cumulative impacts to roads and traffic from these actions could include an increase in the amount of traffic (during construction and during operations from workers and tourists), which could potentially affect road conditions. These cumulative impacts are expected to be negligible since the overall short-term and long-term increases in traffic would be minimal when compared with current average annual traffic volumes.

4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA regulations require a discussion on any irreversible and irretrievable commitments of resources that would be involved if the Proposed Action were implemented. A commitment of resources is irreversible when its primary or secondary impacts limit the future option for a resource. An irreversible commitment refers to a loss of future options. An irretrievable commitment refers to the use or consumption of resources that is neither renewable nor recoverable for later use by future generations. This section discusses the effects of the Proposed Action with regards to irreversible and irretrievable commitments of resources.

Irreversible commitments of resources could include the loss of income from the conversion of grazing land to commercial activities; soil lost to increased erosion from construction activities; loss of biological resources (e.g., plants, animals, and habitat); and the loss of land use due to the operation of the Lookout Solar Farm. The Proposed Action would require an irretrievable commitment of resources primarily from the use of fossil fuels, water, labor, and electricity (renewable and non-renewable) for construction and operation of the Lookout Solar Farm.

4.4 SHORT-TERM USE OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

This section discusses whether the short-term uses of the environmental resources by the Proposed Action would affect (either positively or negatively) the long-term productivity of the environment. For this section only, short-term refers to the analysis period for the Proposed Action (25 years). Long-term refers to an indefinite period beyond the 25-year project. Note: the defined period and definition of short-term and long-term impacts only applies to Section 4.4.

Short-term uses of the environment associated with the Proposed Action are generally the same as the impacts identified in Chapter 3. These include short-term use of the physical environment resulting from the construction and operation of the Proposed Action. In considering the effect of these uses on long-term productivity, three main types of long-term productivity are considered: land use productivity, water resources productivity, and biological resources productivity.

4.4.1 LAND USE PRODUCTIVITY

Maintenance of long-term land use productivity, including soil productivity, is mainly a concern in areas that are in agricultural use, but this concern also can arise anywhere that soils provide an economic or ecological benefit. Construction of the project would occur in an area that is currently used for agricultural purposes (i.e., grazing) and could affect long-term soil productivity through land clearing, grading, and occupation by project facilities, if vegetation fails to reestablish. These impacts are expected to be short-term and minor due to the expected life of the project and the mitigation measures that would be followed. If continuing operations under a new power purchase agreement contract are not possible after the current contracting arrangement has expired, the facilities would be

decommissioned and dismantled, and the site would be reclaimed and restored to the approximate original site conditions.

4.4.2 WATER RESOURCES PRODUCTIVITY

Wetlands, groundwater, and surface water contribute to long-term water resources productivity by providing habitat for aquatic and terrestrial species, filtration, flood attenuation, recharge, and general water use. Construction and operation of the Proposed Action would result in short-term minor impacts to water resources productivity. Construction and operations of the Lookout Solar Farm would only require minimal consumption of water resources, and as a result, impacts to groundwater and/or surface water are expected to be minimal. Wetlands would be avoided by at least 150 feet and are not expected to be impacted.

4.4.3 BIOLOGICAL RESOURCES PRODUCTIVITY

Construction and operation of the Proposed Action would convert undeveloped land and land used for cattle grazing and wildlife habitat to a solar farm; however, grazing would continue with the use of sheep. This land use change would cause some individuals and species to initially avoid the Project Area, but most would habituate to small-scale operations at the Lookout Solar Farm. These impacts are expected to be short-term, as the land would be returned to cattle grazing after 25 years. Additionally, any loss of wildlife habitat and vegetation is expected to be returned to the site through reclamation activities.

This Page Intentionally Left Blank

5.0 CONSULTATION AND COORDINATION

5.1 INTRODUCTION

The CEQ Regulations under NEPA require that the lead agency (i.e., BIA) involve the public in the preparation of an EA or environmental impact statement. This chapter describes this public involvement process as well as other key components of consultation and coordination.

5.2 PREPARERS OF THE EA

An interdisciplinary team of natural resource specialists employed by Trihydro Corporation (Trihydro) on behalf of and in coordination with Hidden Water Inc. (Hidden Water) assisted in the preparation of this EA under the supervision of the BIA Great Plains Regional Office. The team that prepared this EA is provided below in Table 5-1.

TABLE 5-1. PREPARERS OF THE EA

Name	Role/Section Prepared
Dean Markham	Project Director; Quality Assurance (Hidden Water)
Juli Anna McNutt	Project Manager
Jana White/Kathy White	Quality Assurance
Juli Anna McNutt/Kara Mulvihill	Chapters 1 and 2
Ted Koller	Air Quality; Climate Change and Greenhouse Gases
Kara Mulvihill	Paleontology; Cultural Resources; Land Use; Socioeconomic Conditions; Environmental Justice; Visual Resources; Public Health and Safety; Roads and Traffic
Brian Robeson	GIS Mapping
Danielle Tavis	Geology; Soils
Tyler Worley	Vegetation; Wetlands; Water Resources; Threatened, Endangered, and Candidate Species; Wildlife

5.3 AGENCY COORDINATION

The BIA hosted meetings with the Proponent to discuss the project and potential options, in addition to meetings, as needed, with Trihydro. A project kick-off meeting was held at the BIA Great Plains Regional Office in Aberdeen, South Dakota in February 2016. BIA representatives, Trihydro personnel, and the project Proponent attended (in person and via conference calls on different occasions).

Table 5-2 includes the names of individuals employed by the BIA Great Plains Regional Office who were consulted with, and, who provided input on the development of the EA.

TABLE 5-2. INDIVIDUALS WITH THE BIA WHO PROVIDED TECHNICAL AND/OR REVIEW OF THE EA

Name	Affiliation
Marilyn Bercier	Regional Environmental Scientist, Great Plains Regional Office
Mark Herman	Environmental Engineer, Great Plains Regional Office
Kodi Augare-Estey	Regional Environmental Protection Specialist, Great Plains Regional Office
Dianne Mann-Klagger	Natural Resources Officer, Great Plains Regional Office
Dr. Carson Murdy	Regional Archaeologist, Great Plains Regional Office

5.4 INTERAGENCY SCOPING AND PUBLIC INVOLVEMENT

The BIA requested public comments via a letter mailed to 32 local, state, and federal agencies; seven comments were received in response (Appendix B). Table 5-3 lists the agencies contacted and a summary of their response, if received.

TABLE 5-3. PUBLIC SCOPING LETTERS SENT AND RECEIVED

Agency Contacted	Comment Summary
Badlands National Park, NPS	The NPS supports green energy of all types; however, they are concerned about potential impacts to the viewshed. They requested to be included on all upcoming meetings and/or discussions related to the preparation and development of the EA. The NPS submitted comments on the draft EA, which identified their concerns about potential viewshed issues from the Stronghold South Unit of Badlands National Park and increased traffic along BIA Route 2.
Black Hills Electric Cooperative	Black Hills Electric Cooperative does not own, operate, or maintain a single-phase power line in the area.
Custer County Planning and Economics Office	No response received
EPA Region 8, Tribal Assistance Program	No response received
Golden West Telecommunication Cooperative Inc.	Requested to be kept informed of any potential easement or construction issues involving their infrastructure.
Nebraska National Forests and Grasslands	No comments on the project.
NRCS	No response received
Oglala Lakota College	No response received
Oglala Sioux THPO Office	No response received
Oglala Sioux Tribal Employment Rights Office	No response received
Oglala Sioux Tribal Environmental Protection Office	No response received
Oglala Sioux Tribal Health Administration	No response received
Oglala Sioux Tribal Land Office	No response received
Oglala Sioux Tribal Natural Resources	No response received

Agency Contacted	Comment Summary
Oglala Sioux Tribal Parks and Recreation	No response received
Oglala Sioux Tribal Rural Water	No response received
Oglala Sioux Tribal Transportation	No response received
Oglala Sioux Tribal Transportation Planner	No response received
Oglala Sioux Tribal Utilities Office	No response received
Oglala Sioux Tribal Water and Sewer	No response received
Oglala Sioux Tribal Water Maintenance and Conservation	No response received in response to the scoping letter; however, a letter was received by the Proponent, which indicated water demands for the project are within the parameters for their service area.
Oglala Sioux Tribal Water Resources	No response received
Oglala Sioux Tribe, Roads Program	No response received
Oglala Sioux Tribe, Executive Director	No response received
Oglala Sioux Tribe, Tribal President	No response received
Pine Ridge Agency, Natural Resources Officer	No response received
Pine Ridge Agency, Realty Officer	No response received
Pine Ridge Agency, Superintendent	No response received
Pine Ridge Indian Health Services	No response received
South Dakota Public Utilities Commission	No comment on the project.
U.S. Army Corps of Engineers	No response received
Upper Great Plains Region Manager WAPA	The developer must submit an interconnection request in order to connect with WAPA's transmission line. This process will also require NEPA.

Furthermore, a letter was sent to the BIA Division of Energy and Mineral Development by the South Dakota Renewable Energy Association. The letter indicated that the South Dakota Renewable Energy Association supports the PV project and noted that the site of the project will have minimal effects on the existing environment.

This Page Intentionally Left Blank

6.0 REFERENCES

AECOM. 2015. Final environmental assessment, River Bend solar project, Lauderdale County, Florida. Prepared for Tennessee Valley Authority. November 2015.

Amelon, S., and Burhans, D. 2006. Conservation assessment: *Myotis septentrionalis* (northern long-eared bat) in the eastern United States. Pages 69-82 in Conservation assessments for five forest bat species in the eastern United States, Thompson, F. R., III, editor. U.S. Department of Agriculture, Forest Service, North Central Research Station, General Technical Report NC-260. St. Paul, Minnesota. 82pp.

American Indian Relief Council. 2016. South Dakota: Pine Ridge Reservation. Available from: http://www.nrcprograms.org/site/PageServer?pagename=airc_res_sd_pineridge.

Benton, R.C., Terry, D.O., Evanoff, E., and McDonald, H.G. 2015. The White River Badlands. Bloomington, Indiana: Indiana University Press.

Birkeland, P. W. 1999. Soils and geomorphology. 3rd ed. New York, New York: Oxford University Press.

Canadian Wildlife Service and U.S. Fish and Wildlife Service (CWS and USFWS). 2007. International recovery plan for the whooping crane (*Grus americana*). Ottawa: Recovery of Nationally Endangered Wildlife (RENEW), and U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 162 pp.

Clinton, President W.J. 1994. Memorandum for the heads of all departments and agencies: Executive Order on federal actions to address environmental justice in minority populations and low-income populations. Washington, D.C.: The White House. February 11, 1994.

Council on Environmental Quality (CEQ). 2014. Revised draft guidance on the consideration of greenhouse gas emissions and the effects of climate change in NEPA review. Available from: https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance

Cowardin, L., Carter, V., Golet, F.C., and LaRoe, E.T. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, Washington, D.C.

Drummond, M. and Auch, R. 2014. Land-cover change in the United States Great Plains. USGS. Available from: http://landcovertrends.usgs.gov/gp/regionalSummary.html.

eBird.org. 2016. Sprague's pipit occurrence map. Available from: http://ebird.org/ebird/map/sprpip?neg=true&env.minX=-167.9740110984896&env.minY=10.322851488573562&env.maxX=-42.9056517234896&env.maxY=63.473745796782225&zh=true&gp=false&ev=Z&mr=1-12&bmo=1&emo=12&yr=all&byr=1900&eyr=2015.

Federal Emergency Management Agency (FEMA). 2015. Programmatic environmental assessment, housing mission for the Oglala Sioux Tribe, Pine Ridge Indian Reservation. October 2015.

Filipovic, D. 2011. Hydrogeologic assessment of the High Plains Aquifer in Bennett County, South Dakota. Vermillion, South Dakota: Akeley-Lawrence Science Center 92-UR. 5-14. Available from: http://www.sdgs.usd.edu/pubs/PDF/UR-92.pdf.

Grant, C. 2013. Fire fighter safety and emergency response for solar power systems. A final report prepared by the Fire Protection Research Foundation.

Harrington. B.A. 2001. Red knot (*Calidris canutus*). *In* A. Poole, and F. Gill eds. The Birds of North America, Inc., Philadelphia, PA.

Jacques, C.N., Jenks, J.A., and Klaver, R.W. 2009. Seasonal movements and home-range use by female pronghorns in sagebrush-steppe communities of Western South Dakota. Journal of Mammalogy. 90/2 P. 433-441. Available from: http://jmammal.oxfordjournals.org/content/90/2/433.

Jones, S.L. 2010. Sprague's pipit (*Anthus spragueii*) conservation plan. Denver: U.S. Fish & Wildlife Service Report. 24. Available from: http://www.fws.gov/mountain-prairie/species/birds/spraguespipit/SpraguesJS2010r4.pdf.

Kempema, S.L.F., Berg, H., Krause, C., and Freidel, D. 2015. Colony acreage and distribution of the black-tailed prairie dog in South Dakota, 2012. South Dakota Department of Game, Fish and Parks Wildlife Division Report Number 2014-04, Pierre, South Dakota USA.

Lakota Solar Enterprises. 2016. About: our work. Available from: http://www.lakotasolarenterprises.com/our-work/.

LeBeau, S.C., II. 2015. Surface reconnaissance survey proposed solar energy farm, Renewable Alternative Power Productions Inc. (RAPP), Oglala Lakota County, South Dakota. BIA, Aberdeen, South Dakota.

Lewis, J. C. 1995. Whooping crane (*Grus americana*), The birds of North America online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. Available online at: [http://bna.birds.cornell.edu/bna/species/153].

Lockyer, D.R. 1997. Methane emissions from grazing sheep and calves. Volume 66, Issue 1. Okehampton, Devon, UK. Abstract.

Lyndon State College. 2007. Thunderstorm distribution over the U.S. Available from: http://apollo.lsc.vsc.edu/classes/met130/notes/chapter14/thunderstorm_dist.html.

Malo, D. 1997. South Dakota's physiographic regions. Aberdeen, SD. Available from: http://www3.northern.edu/natsource/EARTH/Physio1.htm.

Mann-Klager, D. 2016. Personal Communication. February 11, 2016.

National Climatic Data Center. 2002. Monthly station normals of temperature, Precipitation, and heating and cooling degree days 1971-2000: South Dakota, High Plains Regional Climate Center. Available from: http://www.ncdc.noaa.gov/climate-information/regional.

National Climatic Data Center. 2004. Annual average number of tornadoes, 1953–2004. Available from: http://www.ncdc.noaa.gov/img/climate/research/tornado/small/avgt5304.gif , http://www.usclimatedata.com/climate/south-dakota/united-states/3211 , http://www.usclimatedata.com/climate/pine-ridge/south-dakota/united-states/ussd0581.

National Climatic Data Center. 2015. Climate at a glance, precipitation 1916-2016. Available from: http://www.ncdc.noaa.gov/cag/time-series/us/39/9/pcp/ytd/12/1916-2016?base_prd=true&.

National Oceanic and Atmospheric Administration (NOAA). 2013. Regional climate trends and scenarios for the U.S. national climate assessment; Part 4 climate of the U.S. Great Plains. Available from: http://www.nesdis.noaa.gov/technical_reports/NOAA_NESDIS_Tech_Report_142-4-Climate_of_the_U.S.%20Great_Plains.pdf.

National Park Service (NPS). n.d.a. Paleontology in the White River Badlands. National Park Service, Badlands National Park. Paleontology-Bulletin.

National Park Service (NPS). n.d.b. Restoration of native animals. National Park Service, Badlands National Park. Available from: http://www.nps.gov/badl/planyourvisit/upload/Wildlife-Reintroductions-Site-Bulletin.pdf.

National Park Service (NPS). 2016a. Badlands animals. Available from: http://www.nps.gov/badl/learn/nature/animals.htm.

National Park Service (NPS). 2016b. Badlands bird list. Available from: http://www.nps.gov/badl/learn/nature/bird-list.htm.

National Renewable Energy Laboratory (NREL). 2013. Life cycle greenhouse gas emissions from electricity generation. Fact Sheet. NREL/FS-6A20-57187. January 2013.

New Hampshire Department of Environmental Services (NHDES). 2008. Hardness in Drinking Water. Available from: http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-3-6.pdf.

Ong, S., Campbell, C., Denholm, P., Margolis, R., and G. Heath. 2013. Land-use requirements for solar power plants in the United States. Technical Report NREL/TP-6A20-56290.

Pew Center on Global Climate Change. 2009. Enteric fermentation mitigation. Available from: http://www.c2es.org/docUploads/Enteric-Fermentation-09-09.pdf.

Radeke, R. E. 1971. Soil survey of Shannon County, South Dakota. USDA Soil Conservation Service and U.S. Department of the Interior Bureau of Indian Affairs, in cooperation with SD Agricultural Experiment Station.

Rapp, J. 2016. Personal Communication. February 11, 2016.

Raymond, W. H., King, R. U., and Gries, J. P. 1976. Status of mineral resource information for the Pine Ridge Indian Reservation, South Dakota. U.S. Geological Survey and U.S. Bureau of Mines. Administrative Report BIA-12.

Ridgely, R.S., Allnutt, T.F., Brooks, T., McNicol, D.K., Mehlman, D.W., Young, B.E., and Zook, J.R. 2003. Digital distribution maps of the birds of the western hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.

Saylor, K.L. 2014. Contemporary land cover change in the Northwestern Great Plains ecoregion. USGS. Available from: http://landcovertrends.usgs.gov/gp/eco43Report.html.

Schaetzl, R., and Anderson, S. 2005. Soils: genesis and geomorphology. Cambridge University Press, New York.

Soil Survey Staff, Natural Resources Conservation Service, U.S. Department of Agriculture (NRCS and USDA). 2002. Official soil series description: anselmo series. Available from: USDA-NRCS soil query facility via the internet: (https://soilseries.sc.egov.usda.gov/osdnamequery.asp).

Soil Survey Staff, Natural Resources Conservation Service, U.S. Department of Agriculture (NRCS and USDA). 2006. Official soil series description: richfield series. Available from: USDA-NRCS soil query facility via the internet: (https://soilseries.sc.egov.usda.gov/osdnamequery.asp).

Soil Survey Staff, Natural Resources Conservation Service, U.S. Department of Agriculture (NRCS and USDA). 2007. Official soil series description: valentine series. Available from: USDA-NRCS soil query facility via the internet: (https://soilseries.sc.egov.usda.gov/osdnamequery.asp).

Soil Survey Staff, Natural Resources Conservation Service, U.S. Department of Agriculture (NRCS and USDA). 2015. Official soil series description: pierre series. Available from: USDA-NRCS soil query facility via the internet: (https://soilseries.sc.egov.usda.gov/osdnamequery.asp).

South Dakota. 2010. Oglala Sioux Tribe's 2010 Statistical Profile.

South Dakota. 2016. Oglala Sioux Tribe. South Dakota Department of Tribal Relations. Available from: http://www.sdtribalrelations.com/oglala.aspx.

South Dakota Department of Game, Fish, and Parks (SD GFP). 2014. Pronghorn management plan for South Dakota. Completion report 2014-08. South Dakota Department of Game, Fish, and Parks, Pierre, South Dakota, USA. Available from: https://gfp.sd.gov/wildlife/management/plans/docs/Pronghorn_Plan_%20Sept_2014_Final.pdf.

Stahlecker, D. W. 1992. Using National Wetlands Inventory maps to quantify whooping crane stopover habitat in Oklahoma. Proceedings North American Crane Workshop 6:62-68.

Tacha, M. n.d. USFWS unpublished data. Whooping crane sightings along the migration route.

Tisza, K. 2014. GIS-based suitability modeling and multi-criteria decision analysis for utility scale solar plants in four states in the Southeast U.S. All Theses. Paper 2005. Available from: http://tigerprints.clemson.edu/all_theses/2005/

Tsoutsos, T., Frantzeskakib, N., and Gekas, V. 2005. Environmental impacts from the solar energy technologies. Energy Policy 33 (2005) 289–296.

U.S. Bureau of Indian Affairs (BIA). 2016. Pine Ridge Agency. Available from: http://www.bia.gov/WhoWeAre/RegionalOffices/GreatPlains/WeAre/Agencies/PineRidge/index.htm.

U.S. Bureau of Land Management (BLM). 2013. Best management practices for reducing visual impacts of renewable energy facilities on BLM-administered lands. Bureau of Land Management. Cheyenne, Wyoming. 342 pp, April. Available from: http://www.blm.gov/style/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy/renewable_references.Par.1568.File.dat/RenewableEnergyVisualImpacts_BMPs.pdf.

U.S. Census Bureau. 2010-2014. 2010-2014 American community survey 5-year estimates. Available from: http://factfinder.census.gov/faces/nav/jsf/pages/guided_search.xhtml.

U.S. Department of Energy. 2011. Final environmental assessment, West Tennessee solar farm project, Haywood County, Tennessee. Pittsburgh, Pennsylvania: U.S. Department of Energy, National Energy Technology Laboratory.

U.S. Department of State. 2014. United States Climate Action Report 2014. Chapter 3: Greenhouse gas inventory. Available from: http://www.state.gov/e/oes/rls/rpts/car6/index.htm

U.S. Energy Information Administration (EIA). 2015. Frequently asked questions: What are the sources of energy related carbon dioxide emissions by type of fuel for the United States and World? February 2, 2015. Available from: https://www.eia.gov/tools/faqs/faq.cfm?id=79&t=11.

U.S. Energy Information Administration (EIA). 2016. South Dakota state energy profile. February 18, 2016. Available from: https://www.eia.gov/state/analysis.cfm?sid=SD.

U.S. Environmental Protection Agency (USEPA). 1998. Final guidance for incorporating environmental justice concerns in EPA's NEPA compliance analyses. Washington, D.C.: U.S. Environmental Protection Agency, Office of Federal Activities. April 1998.

U.S. Environmental Protection Agency (USEPA). 2007. Ruminant Livestock, Frequent Questions. Available from: http://www.epa.gov/rlep/faq.html.

U.S. Environmental Protection Agency (USEPA). 2009. Potential for reducing greenhouse gas emission in the construction sector. USEPA Archive Document. February 2009.

U.S. Environmental Protection Agency (USEPA). 2011. 2011 National Emissions Inventory. Available from: https://www3.epa.gov/ttn/chief/net/2011inventory.html.

U.S. Environmental Protection Agency (USEPA). 2015. Current nonattainment counties for all criteria pollutants. Available from: https://www3.epa.gov/airquality/greenbook/ancl.html.

U.S. Environmental Protection Agency (USEPA). 2016. Secondary drinking water standards: Guidance for nuisance chemicals. Available from: https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals.

U.S. Fish and Wildlife Service (USFWS). 2011. Whooping crane. Oklahoma Ecological Service Field Office. August 2011.

U.S. Fish and Wildlife Service (USFWS). 2013. Western prairie fringed orchid (*Platanthera praeclara*). Available from: http://www.fws.gov/northdakotafieldoffice/endspecies/species/western_prairie_fringed_orchid.htm.

U.S. Fish and Wildlife Service (USFWS). 2014. Northern long-eared bat interim conference and planning guidance. January 6, 2014. Available from: http://www.fws.gov/midwest/endangered/mammals/nlba/pdf/NLEBinterimGuidance6Jan2014.pdf.

U.S. Fish and Wildlife Service (USFWS). 2015a. National wetlands inventory, wetlands mapper [shapefile]. Available from: http://wetlands.fws.gov/.

U.S. Fish and Wildlife Service (USFWS). 2015b. Black-footed Ferret (*Mustela nigripes*). Denver, Colorado: U.S. Fish and Wildlife Service Mountain-Prairie Region 6.

U.S. Fish and Wildlife Service (USFWS). 2016. South Dakota listed species by county list. Updated March 8, 2016. Available from: http://www.fws.gov/southdakotafieldoffice/SpeciesByCounty_March2016.pdf.

U.S. Geological Survey (USGS). 2012. Landfire existing vegetation type [shapefile]. Wildland Fire Science, Earth Resources Observation and Science Center, U.S. Geological Survey.

U.S. Geological Survey (USGS). 2013a. Potentiometric surface mapping of the Arikaree Aquifer, Pine Ridge Indian Reservation, and Bennett County, South Dakota. Available from: http://sd.water.usgs.gov/projects/PineRidgePotentio/PineRidgePotentio.html.

U.S. Geological Survey (USGS). 2013b. Water hardness and alkalinity. USGS Water-Quality Information. Available from: http://water.usgs.gov/owq/hardness-alkalinity.html.

U.S. Geological Survey (USGS). 2014. Geologic units in Shannon County, SD: Pierre Shale, Carlile Shale, and Niobrara Formation. Available from: U.S. Department of the Interior-USGS geology query facility via the internet: (http://mrdata.usgs.gov/geology/state/fips-unit.php?code=f46113).

U.S. Global Change Research Program. 2014. Regional highlights from the third national climate assessment. Climate Change Impacts in the United States, 2014. Available from: http://www.globalchange.gov/sites/globalchange/files/Regional_GP_2pg_NCA2_final.pdf.

Whitaker, J.O. and Mumford, R.E. 2009. *Myotis septentrionalis/northern myotis In* Mammals of Indiana. Indiana University Press: Bloomington, Indiana. 660pp.

APPENDIX A

TRIBAL COUNCIL OF THE OGLALA SIOUX TRIBE RESOLUTION NO. 16-50

RESOLUTION NO. 16-50

RESOLUTION OF THE OGLALA SIOUX TRIBAL COUNCIL
OF THE OGLALA SIOUX TRIBE
(AN UNICORPORATED TRIBE)

RESOLUTION OF THE TRIBAL COUNCIL OF THE OGLALA SIOUX TRIBE IN SUPPORT OF LOOK OUTS SOLAR PROJECT TO BE LOCATED ON INDIVIDUAL INDIAN TRUST LAND OWNED BY LOIS WILSON RAPP.

WHEREAS, the Oglala Sioux Tribe organized in accordance with Section 16 of the Indian Reorganization Act of 1934 on December 14, 1935 by adopting a federally approved Constitution and By-laws, and the Tribal Council is the governing body of the Tribe, and

WHEREAS, the Tribal Constitution authorizes the Oglala Sioux Tribal Council, in Article IV, Section 1(f) to manage all economic affairs of the Tribe, and in Section in Section 1(x) to manage and protect Tribal lands, and

WHEREAS, Article IV, Section 1(t) of the Constitution gives the Tribal Council the power to delegate its enumerated powers to subordinate boards or officers, reserving the right to review their actions taken by virtue of such delegated power, and

WHEREAS, the Economic and Business Development Committee is a standing committee of the Oglala Sioux Tribal Council and has been delegated the power to oversee all matters relating to economic development on behalf of the Oglala Sioux Tribe, and

WHEREAS, on April 8, 2016, members of the Economic and Business Development Committee heard a presentation by Frank Rapp and Lynn Rapp related to their company, "Look Outs Alternative Energy LLC," and their plans to pursue the Look Outs Solar Project to be located on 840 acres of allotted land owned by Lois Wilson Rapp, all as described in the attached documents (herein, the "Project"), and

WHEREAS, the Rapps requested a Resolution from the Tribal Council in support of the Project, and

WHEREAS, the Economic and Business Development Committee considered the information submitted by the Rapps and voted to forward the issue of supporting the Project to the full Tribal Council, and

WHEREAS, the Tribal Council has considered the matter and determined that it is in the best interest of the Tribe and its members to support the Project, now

THEREFORE BE IT RESOLVED, that the Tribal Council of the Oglala Sioux Tribe supports the "Look Outs Solar Project" as described in the documents attached hereto.

C-E-R-T-I-F-I-C-A-T-I-O-N

I, as undersigned Secretary of the Oglala Sioux Tribal Council of the Oglala Sioux Tribe, hereby certify that this Resolution was adopted by the vote of: 12 For; 1 Against; 0 Abstain; 1 Not Voting; during a REGULAR SESSION held on the 18th day of MAY, 2016.

RHONDA TWO EAGLE
Secretary
Oglala Sioux Tribe

A-T-T-E-S-T:

JOHN YELLOW BIRD STEELE
President
Oglala Sioux Tribe

APPENDIX B

SCOPING RESPONSE LETTERS

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E., Suite 400
Aberdeen, South Dakota 57401

IN REPLY REFER TO
DECRM
MC-208

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Dear Interested Party:

The Bureau of Indian Affairs (BIA), Division of Environmental, and Cultural Resource Management (DECRM), and the Pine Ridge Agency are preparing an environmental document for a proposed Solar Farm project located within the Pine Ridge Reservation. The proposed project location is: T. 40 N., R. 48 W., Sections 1, 2, 11, and 13; T. 41 N., R. 47 W., Sections 19, 28, 32, and 33; T. 41 N., R. 48 W., Sections 36 and 35, 6th PM, Oglala County, South Dakota, containing 4,222 acres more or less.

To ensure that all social, economic, and environmental affects have been considered in the development of this project, we are soliciting your views and comments, pursuant to Section 102 (2) (D) (IV) of the National Environmental Policy Act (NEPA) of 1969, as amended. We are particularly interested in any property you may own, regulate or have other interest in that is near or adjacent to the proposed developments.

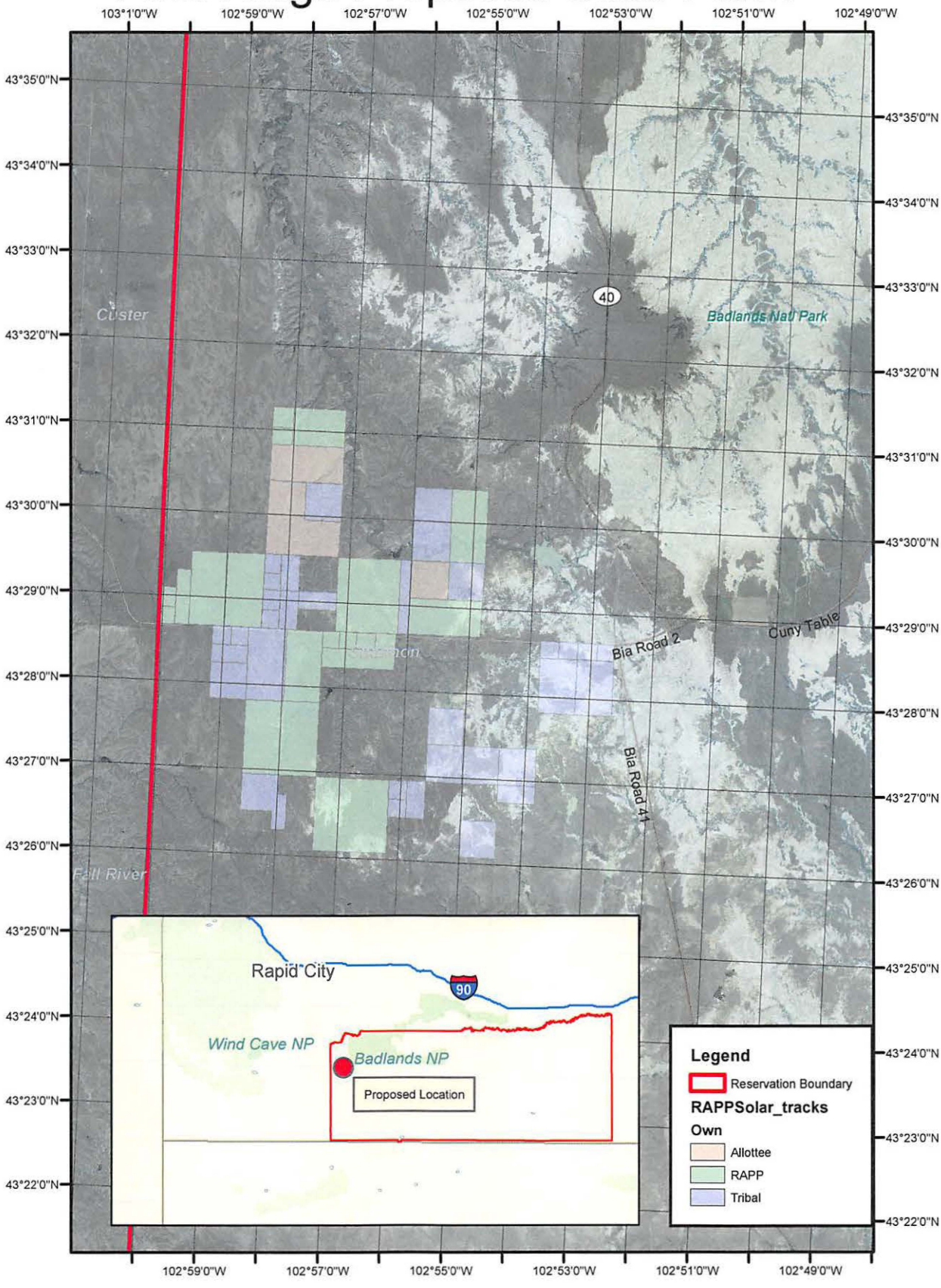
Sincerely,

Regional Director

Attachment

cc: Superintendent, Pine Ridge Agency
See Distribution List

Pine Ridge Proposed Solar Farm



Distribution List:

7013 1710 0001 0677 4935
Allen Davis, Program Director
Pine Ridge Indian Health Services
Post Office Box 1201
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 4942
Brian Rounds, Utility Analyst
South Dakota Public Utilities Commission
Capital Building, 1st floor
500 E. Capitol Ave.
Pierre, South Dakota, 57501

7013 1710 0001 0677 4959
Cleve Her Many Horses, Superintendent
Pine Ridge Agency
Post Office Box 1203
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 4966
Derrel Brown Bull, Executive Director
Oglala Sioux Tribe
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 4973
David Kelly, Program Director
Oglala Sioux Tribal Roads Program
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 4980
Denise Mesteth, Program Director
Oglala Sioux Tribal Land Office
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 4997
Dennis Yellow Thunder, Program Director
Oglala Sioux THPO Office
Post Office Box 129
Kyle, South Dakota 57770

7013 1710 0001 0677 5000
Dirk Shulund, Project Manager
Upper Great Plains Region Manager Western Area
Power Administration
Post Office Box 35800
Billings, Montana 59107

7013 1710 0001 0677 5024
Greg Oleson, Director
Golden West Tele Communication Cooperative Inc.
415 Crown Street
P.O. Box 411
Pine Ridge, South Dakota 57790

7013 1710 0001 0677 5017
John Yellow Bird Steele, Tribal President
Oglala Sioux Tribe
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5031
Kevin Atchley, Supervisor
Nebraska National Forests and Grasslands
125 North Main
Chadron, Nebraska 69337

7013 1710 0001 0677 5048
Lionel Weston, Natural Resources Manager
Pine Ridge Agency
111 Main Street
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5055
Mike Pflaum, Superintendent
Badlands National Park
Post Office Box 6
Interior, SD 57750

7013 1710 0001 0677 5062
ATTN: Program Director
Oglala Sioux Tribal Employment Rights Office
TERO Road
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5079
ATTN: Program Director
Oglala Sioux Tribal Health Administration
Post Office. Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5086
ATTN: Program Director
Oglala Sioux Tribal Natural Resources
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5093
ATTN: Program Director
Oglala Sioux Tribal Parks and Recreation
Post Office Box 570
Kyle, South Dakota 57752

7013 1710 0001 0677 5109
ATTN: Program Director
Oglala Sioux Tribal Rural Water
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5116
ATTN: Program Director
Oglala Sioux Tribal Transportation
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5123
ATTN: Program Director
Oglala Sioux Tribal Transportation Planner
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5130
ATTN: Program Director
Oglala Sioux Tribal Utilities Office
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5147
ATTN: Program Director
Oglala Sioux Tribal Water and Sewer
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5154
ATTN: Program Director
Oglala Sioux Tribal Water Resources
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5161
ATTN: Program Director
Oglala Sioux Tribal Water
Maintenance and Conservation
Post Office Box 2070
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5178
Patty Yellow Boy, Realty Officer
Pine Ridge Agency
Post Office Box 1203
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5185
Randy Brown, Tribal Program Manager
EPA Region 8 Tribal Assistance Program
Mail Code 8P-TA
1595 Wynkoop Street
Denver, Colorado 80202

7013 1710 0001 0677 5192
Rex Harris, Planning Director
Custer County Planning and Economic Office,
Custer County Courthouse
420 Mount Rushmore Road
Custer, South Dakota 57730

7013 1710 0001 0677 5208
Suzy Mesteth, Program Director
Oglala Sioux Tribal Environmental
Protection Office
Post Office Box 2008
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5215
Steve Naylor, State Program Manager
U.S. Army Corps of Engineers
South Dakota Regulatory Office
28563 Powerhouse Road
Pierre, South Dakota 57501

7013 1710 0001 0677 5222
Thomas Shortbull, College President
Oglala Lakota College
3 Miles Creek Road
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5239
Trudy Ecoffey, Tribal Liaison
Natural Resources Conservation Service
Post Office Box 2024
Pine Ridge, South Dakota 57770

7013 1710 0001 0677 5246
Walker Witt, General Manager
Black Hills Electric Cooperative
Post Office Box 792
Custer, South Dakota 57730

Department of Energy
Western Area Power Administration
Upper Great Plains Customer Service Region
P.O. Box 35800
Billings, MT 59107-5800

JAN 2 9 2015

B0401.BL

Ms. Kodi Augare-Estey
Division of Environmental and Cultural Resource Management
Bureau of Indian Affairs
1115 4th Avenue SE, Suite 400
Aberdeen, SD 57401

Dear Ms. Augare-Estey:

Western Area Power Administration's (Western) Upper Great Plains Regional Office received a request from the Bureau of Indian Affairs (Bureau) for comments on project MC-208 (Project), a proposed solar farm located within the Pine Ridge Reservation. In an email exchange with Micah Reuber of this office on January 13 and 14, 2016, you notified Western that the developer intends the Project to interconnect with Western's transmission system and that the Project would have a 400 megawatt nameplate capacity. Western offers the following comments on the Project.

Western owns and operates the Underwood-Stegall 230-kV transmission line oriented north-south and approaching to approximately seven miles west of the proposed solar farm. To interconnect the Project with Western's transmission line, the developer must submit an interconnection request to the Southwest Power Pool (SPP) Regional Transmission Organization. Western's facilities are included in the SPP Open Access Transmission Tariff, including the Generator Interconnection Procedures (GIP). Generator interconnection requests to Western's facilities must be submitted to SPP in accordance with the GIP. Proposed interconnections with Western's transmission system undergo system impact studies by SPP and Western to ensure the operation and reliability of the transmission system will not be adversely affected.

Western's National Environmental Policy Act (NEPA) implementing regulations at 10 CFR §1021, subpart D, require Western to complete an environmental assessment for "the interconnection of, or acquisition of power from, new generation resources that are equal to or less than 50 average megawatts," or an environmental impact statement for "the interconnection of, or acquisition of power from, new generation resources greater than 50 average megawatts." Completion of an appropriate NEPA decision document will be required before an interconnection agreement can be executed. If the developer's project has an efficiency factor of greater than 12.5% (i.e. the project produces an average of greater than 50 MW of energy on an average annual basis), Western's NEPA implementing procedures would require an EIS to be completed. Western's NEPA review can be initiated after submittal of a valid interconnection request to SPP, either concurrent with the system impact studies or upon completion of the system impact studies.

Several federal agencies administer land or other resources that may be impacted by the Project. Western recommends establishing a lead agency for the purpose of NEPA review in accordance with 40 CFR §1501.5 and designation of cooperating agencies in accordance with 40 CFR §1501.6.

Thank you for the opportunity to provide comments. If you have any questions, please feel free to contact Micah Reuber by telephone at (406) 255-2811 or by email at reuber@wapa.gov.

Sincerely,

Matthew Marsh
Environmental Manager

United States Department of the Interior

National Park Service
Badlands National Park
P.O. Box 6
25216 Ben Reifel Rd
Interior, SD 57750

IN REPLY REFER TO:

10A(BADL)

February 1, 2016

Regional Director
Bureau of Indian Affairs
115 Fourth Ave SE Suite 400
Aberdeen, SD 57401

Dear Sir/Madam,

Thank you so much for contacting us regarding your proposed solar panel farm project located near the South Unit of Badlands NP. The National Park supports green energy of all types; however, we are also concerned with cumulative impacts and view-shed analysis of any and all proposed projects that may occur near and/or adjacent to our border. Consequently, we would like to be included in all upcoming meetings and/or discussions that you may schedule as you prepare and develop the NEPA environmental document for this project.

Thank you again for contacting us regarding this proposed project near our boundary.

Sincerely,

Mike D. Pflaum,
Park Superintendent

Route	Initial	Date
[illegible] 101	CFE	2/5/16
208		
✓ 301	MB	2/5/16

Kara Mulvihill

From: Herman, Mark <mark.herman@bia.gov>
Sent: Wednesday, May 18, 2016 7:00 AM
To: Juli Anna McNutt
Cc: Kara Mulvihill; Bercier, Marilyn
Subject: Fwd: Draft Solar Farm EA-Pine Ridge South Dakota

FYI

---------- Forwarded message ----------
From: **Childers, Eddie** <eddie_childers@nps.gov>
Date: Mon, May 16, 2016 at 6:35 PM
Subject: Re: Draft Solar Farm EA-Pine Ridge South Dakota
To: "Pflaum, Michael" <mike_pflaum@nps.gov>
Cc: Pamela Livermont <pamela_livermont@nps.gov>, Mark Herman <mark.herman@bia.gov>

Mike:

Our only comments so far from our NEPA team include:

1. View shed issues from the highest buttes in the South Unit.

2. Increased traffic on BIA 2.

I will keep you posted if I receive any other comments from the team by our May 17 deadline.

In the mean time, I will cc Mark Herman since the deadline is tomorrow.

On Tue, May 3, 2016 at 2:39 PM, Pflaum, Michael <mike_pflaum@nps.gov> wrote:

> Resource Team (and any others),
>
> Please take a close look at this. Eddie was the lead in our last response on this. The BIA would like our comments by approximately May 17, 2016. Eddie, would you be willing to consolidate our comments and draft a response? I have not yet looked at this. Thanks.
>
> Mike
> ---------- Forwarded message ----------
> From: **Herman, Mark** <mark.herman@bia.gov>
> Date: Tue, May 3, 2016 at 9:49 AM
> Subject: Draft Solar Farm EA-Pine Ridge South Dakota
> To: Michael Pflaum <mike_pflaum@nps.gov>
> Cc: "Bercier, Marilyn" <Marilyn.Bercier@bia.gov>

Mike

Per our phone call, attached is the draft document for your review and comment.

Thanks,

Mark

--

--
Mike Pflaum
Park Superintendent
Badlands National Park
P.O Box 6
25216 Ben Reifel Road
Interior, SD 57750
605-433-5280

--
Eddie Childers
Wildlife Biologist, Badlands National Park
25216 Ben Reifel Road
PO Box 6
Interior, SD 57750

office: 605.433.5263
fax: 605.433.5404
605.391.3680 (cell)

--

protected from disclosure under applicable laws. If you are not the intended recipient, you are hereby notified that any distribution or copy of this e-mail is strictly prohibited.

"ACCESS TO THIS INFORMATION IS LIMITED TO AUTHORIZED PERSONNEL ONLY". Information will not be disclosed unless permitted pursuant to 43 CFR 2.56.

MC-208

Chris Nelson, Chairperson
Kristie Fiegen, Vice Chairperson
Gary Hanson, Commissioner

PUBLIC UTILITIES COMMISSION

500 East Capitol Avenue
Pierre, South Dakota 57501-5070
www.puc.sd.gov

Capitol Office
(605) 773-3201

Grain Warehouse
(605) 773-5280

Consumer Hotline
1-800-332-1782

Email
puc@state.sd.us

January 4, 2016

Regional Director Diane Mann-Klager
U.S. Department of the Interior
Bureau of Indian Affairs
Great Plains Regional Office
115 4th Ave SE Suite 400
Aberdeen SD 57401

Dear Regional Director Mann-Klager:

Your letter requesting views and comments on an environmental document for a proposed project arrived in the U.S. mail at the South Dakota Public Utilities Commission addressed to staff member Brian Rounds. Mr. Rounds no longer works at the South Dakota Public Utilities Commission.

Please update your database to address further correspondence to:

ATTN: Executive Director
South Dakota Public Utilities Commission
500 E Capitol Ave
Pierre SD 57501

The proper email address for any such correspondence at the commission is: PUC@state.sd.us

Thank you.

Sincerely,

Patricia Van Gerpen
Executive Director

Black Hills
Electric Cooperative, Inc.
P.O. Box 792
Custer, South Dakota 57730-0792

Telephone: (605) 673-4461
Toll Free: (800) 742-0085
E-mail: bhec@bhec.coop
Fax: (605) 673-3147

January 4, 2016

Bureau of Indian Affairs
Great Plains Regional Office
115 Fourth Avenue S.E., Suite 400
Aberdeen, South Dakota 57401

Re: Proposed Solar Farm Project
Pine Ridge Reservation

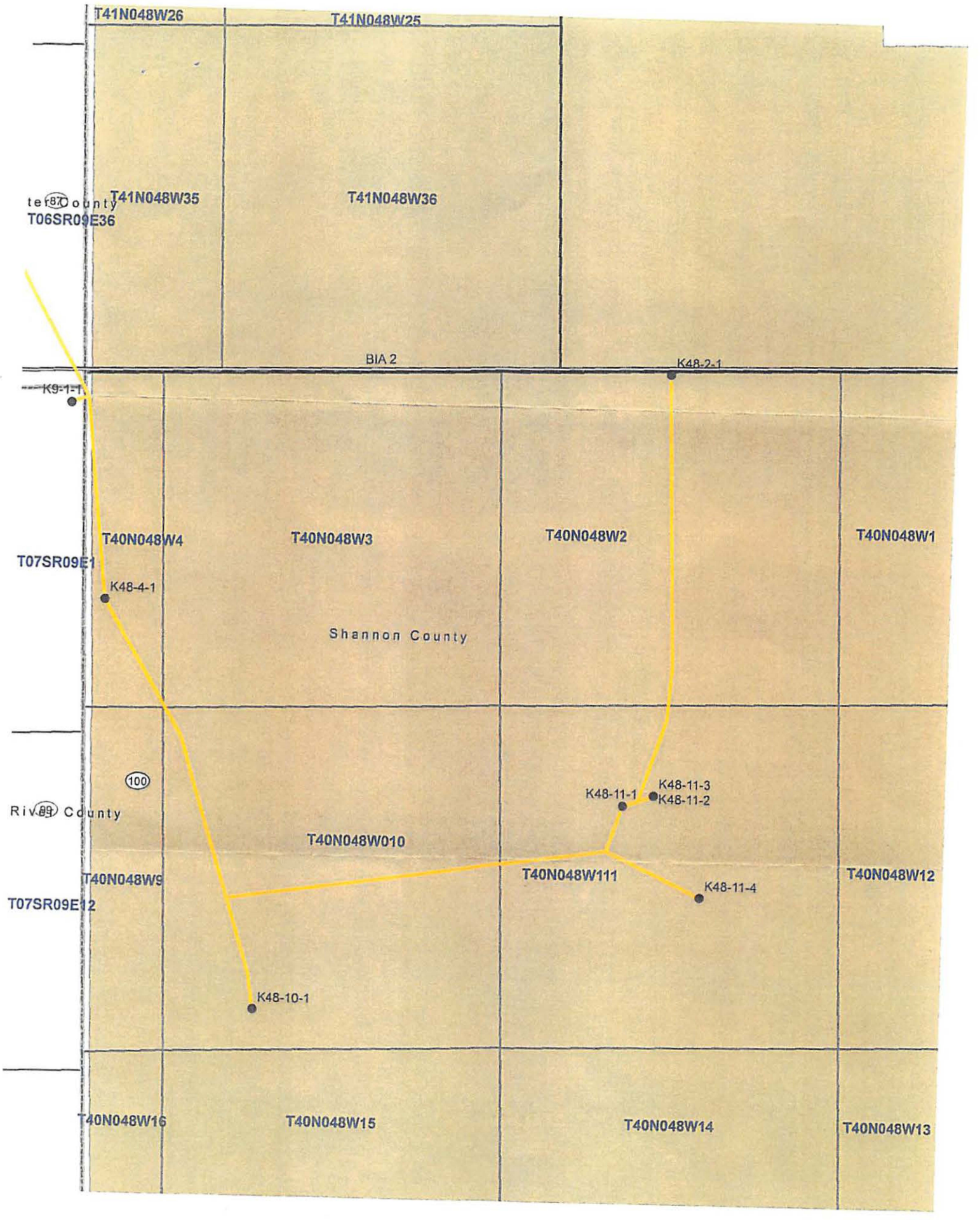
To Whom It May Concern:

Black Hills Electric Cooperative, Inc. does own, operate, and maintain a single phase power line in the proposed project area. I am inclosing a map of BHEC's lines in the project area. Please keep us informed as to the status of the project. If you have any further questions or concerns feel free to contact me at 1-800-742-0085.

Thank you.

Sincerely,

Jesse Sorenson
Black Hills Electric Cooperative
System Coordinator


T41N048W26
T41N048W25
T41N048W35
T41N048W36
T06SR09E36
BIA 2
K48-2-1
K9-1-1
T40N048W4
T40N048W3
T40N048W2
T40N048W1
T07SR09E1
K48-4-1
Shannon County
100
K48-11-1
K48-11-3
K48-11-2
T40N048W010
T40N048W9
T40N048W111
K48-11-4
T40N048W12
T07SR09E12
K48-10-1
T40N048W16
T40N048W15
T40N048W14
T40N048W13

USDA United States Department of Agriculture | Forest Service | Nebraska National Forests and Grasslands

125 North Main Street
Chadron, NE 69337
308-432-0300
TDD: 308-432-0304

File Code: 1900
Date: January 28, 2016

Tim LaPointe, Regional Director
Bureau of Indian Affairs
Great Plains Regional Office
115 Fourth Avenue S.E. Suite 400
Aberdeen, SD 57401

Dear Mr. LaPointe:

I want to thank you for including our office in the review of your proposed Solar Farm Project (DECRM MC-208) to be located within the Pine Ridge Reservation. I have visited with our specialist on the Nebraska National Forests and Grasslands and we have no comments at this time.

We do own land adjacent from the proposed development and would appreciate staying on your mailing list as a contact for further reviews. Please send all correspondence about this project to our Environmental Coordinator, Carla Loop, at the above address. Should you have questions or would like to discuss the project with Carla, her phone number is (308) 432-0336, or email cloop@fs.fed.us.

Sincerely,

KEVIN W. ATCHLEY
Forests and Grasslands Supervisor

cc: Carla Loop

Route	Initial	Date
Regional Director		
Deputy Regional Director 10\	CLL	2/2/16
Deputy Regional Director		
208		

Golden West
TELECOMMUNICATIONS

United States Department of the Interior
Bureau of Indian Affairs
Great Plains Regional Office
115 Fourth Avenue S.E. Suite 400
Aberdeen, SD 57401

January 12, 2016

Dear Diane,

Thank you for contacting us about the proposed Solar Farm project on the Pine Ridge Reservation. We appreciate your efforts to include us in this process. At this time, we request that you keep us informed of any potential easement or construction issues involving our infrastructure.

Sincerely,

Greg Oleson

Greg Oleson
Director of Communications, Member Services, and Government Affairs
Golden West Telecommunications

P.O. Box 411 • 415 Crown Street, Wall, SD 57790 • 605-279-2161 • Fax: 605-279-2727 • info@goldenwest.com • www.goldenwest.com

SD Renewable Energy Assn.

Post Office Box 491, Pierre, D 57501

605 – 295-1221

Roger Knight
U.S. Department of the Interior
Assistant Secretary - Indian Affairs
Office of Indian Energy and Economic Development
Division of Energy and Mineral Development
13922 Denver West Parkway, Ste. 200
Lakewood, CO 80401-3142

Dear Mr. Knight,

The South Dakota Renewable Energy Association would support the Lookout Solar Farm on Pine Ridge Reservation in South Dakota.

This project is proposed to build on allotted land on west side of Pine Ridge Reservation near the Western Area Power Administration right of way of existing transmission line.

This is excellent photovoltaic project in the area that will have minimal effect on existing environment.

If you have any questions please contact Steve Wegman at wind@pie.midco.net or call him at 605- 295 1221.

Thanks for your support.

Sincerely,

Steve Wegman

Oglala Sioux Tribe
Department of
Water Maintenance and Conservation

September 18, 2015

Re: Letter of support

This letter is concerning our conversation on April 27, 2015 and your future water demand at the solar facility located west of BIA 2 and BIA 41 junction. As we discussed your environmental assessment requires concurrence from Rural Water for water demand purposes.

The Mni Wiconi Water Project provides water to rural areas within the Pine Ridge Reservation borders. There are eight high production wells and treated surface water from the Missouri River that will be providing water for this future development.

We had our design engineers look over your request and the water demand estimates at 200,000 to 400,000 gallons of water per year are within our parameters for this service area. There would be a user fee assessed to this connection as it is considered a commercial tap. The fee schedule will be $3.75 per 1,000 gallons used and billed on a monthly basis.

Please let our office know of any further developments associated with this solar facility. If you should have any questions or concerns please feel free to contact myself or our program director Mr. Chuck Jacobs.

Best Regards,

Willard Clifford
Water Systems Construction Manager
OST DWM&C

Concurred: Chuck Jacobs 10-7-15

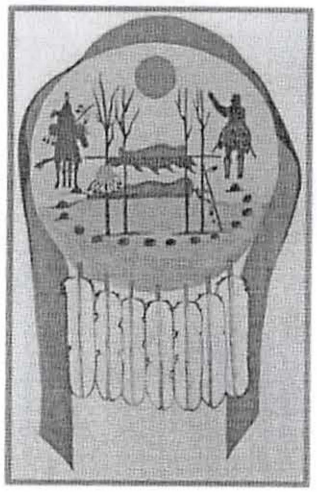
Mr. Chuck Jacobs, Director — Date

Cc: Richard Kamerzell, Supervisor OST DWMC
Craig Nowak, P.E. Morrison-Maierle, Inc.

P.O. Box 386 • Pine Ridge, SD 57770
Phone: 605-867-1999 • 1-888-771-9780 • Fax: 605-867-2114

APPENDIX C

SECTION 106 LETTERS OF CONCURRENCE



Oglala Lakota Cultural Affairs & Historic Preservation

P.O. Box 128, Kyle, SD 57752 (mailing)
790 Oglala Prairie Drive, Kyle, SD 57752 (physical)
(605) 455-1225 business; (605) 455-1136 fax
Email: dennis@oglalathpo.org

August 10, 2015,

Via Postal Mail

Tim LaPointe, Regional Director
Great Plains Regional Office
U.S. Department of the Interior
Bureau of Indian Affairs
115 Fourth Avenue S.E., Suite 400
Aberdeen, SD 57401

RE: Section 106 concurrence –Surface Reconnaissance Survey proposed Solar Energy Farm, Renewable Alternative Power Productions Inc. (RAPP) Oglala Lakota County, South Dakota (BIA Case # AAO-3337/PR/2015)

Dear Mr. LaPointe,

Thank you for the opportunity to comment on the above referenced projects pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended). The Oglala Sioux Tribal Cultural Affairs & Historic Preservation Office (OSTCAHPO) has reviewed the proposed undertaking on the non-renewable cultural resources of the Oglala Sioux Tribe based on the information provided in your correspondence dated June 18, 2015 (stamped received here on July 7, 2015 via postal delivery), regarding this project, with attached report dated June 8, 2015, entitled:

LeBeau, Sebastian C. II
(2015) Surface Reconnaissance Survey proposed Solar Energy Farm, Renewable Alterative Power Productions Inc. (RAPP) Oglala Lakota (Shannon) County, South Dakota, BIA Aberdeen, South Dakota. Ms. on file ***(AAO-3337/PR/2015).***

Route	Initial	Date
Regional Director		
✓ Deputy Regional Director 101	CHZ	10/9/15
Deputy Regional Director		
✓ 208	✓ WB	10/13/15

As a statutory obligation, the Bureau of Indian Affairs (BIA) as the lead land managing federal agency, for this proposed project on the Pine Ridge Reservation, has made the determination of "no historic properties affected". Given that no historic properties (as defined by 36 CFR part 800.16(l)(1), which are the implementing regulations for Section 106 of NHPA) were considered significant enough for inclusion on the National Register of Historic Places within the project area of potential effects, including necessary utility corridors, the OSTCAHPO **concurs** with the determination of "no historic properties affected" for this undertaking with the stipulation of construction/ground-disturbing activities by CAHPO Cultural Resource Monitoring.

Activities occurring in areas not identified in the project area, namely any new ground-disturbances outside of the approximate total 810.62 acres, will require the submission of additional documentation pursuant to 36 CFR Part 800.4. If additional historic properties are discovered or unanticipated effects on historic properties are found after the agency officials (BIA) has completed the Section 106 process, the agency officials (BIA) shall avoid, minimize or mitigate the adverse effects to such properties and notify the OSTCAHPO and any other Indian Tribes that might attach religious and cultural significance to the affected property within 48 hours of the discovery, pursuant to 36 CFR part 800.13.

Concurrence of the OSTCAHPO at this juncture of the proposed ***Solar Energy Farm, Renewable Alternative Power Productions Inc. (RAPP) Pine Ridge Indian Reservation*** does not relieve the federal agency official (BIA) from consulting with other appropriate parties, as described in 36CFR Part 800.2(c). Should you require any additional information from this office, please contact me immediately at (605) 455-1225 or by email at dennis@oglalathpo.org Your concern for our non-renewable cultural resources and heritage of the Oglala Sioux Tribe is appreciated.

Respectfully,

Dennis Yellow Thunder
Director/Tribal Historic Preservation Officer

Cc: Honorable Oglala Sioux Tribal President John Yellowbird Steele
Executive Director, Darrell Brown Bull
Jhon Goes In Center, OSTCAHPAC Member
Garvard Good Plume, Jr., OSTCAHPAC Member
Mike Catches Enemy, OSTCAHPO Tribal Archaeologist
Bureau of Indian Affairs - GPRO DESCRM (AAO-3337/PR/2015)
File

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E., Suite 400
Aberdeen, South Dakota 57401

IN REPLY REFER TO:
DECRM
MC-208

JUN 18 2015

Dennis Yellow Thunder
Tribal Historic Preservation Officer
Post Office Box 129
Kyle, South Dakota 57752

Dear Mr. Yellow Thunder:

In accordance with Section 106 Consultation with Indian Tribes, we have considered the potential effects on cultural resources for the proposed Solar Energy Farm, Renewable Alternative Power Productions, Inc. (RAPP), project area on the Pine Ridge Indian Reservation, Oglala Lakota County, South Dakota. Approximately 810.62 acres were inventoried for cultural resources as depicted in the attached report. No historic resources were located that appear to possess the quality of integrity and meet at least one of the criteria (36 CFR § 60.4) for inclusion on the National Register of Historic Places. No resources are known to be present that appear to qualify for protection under the American Indian Religious Freedom Act (42 USC 1996).

As the surface management agency, and as provided for in 36 CFR § 800.5, we have therefore reached a determination of **no historic properties affected** for this undertaking. Catalogued as **BIA Case Number AAO-3337/PR/2015**, the proposed undertaking, location, and project dimensions are described in the following report:

LeBeau, Sebastian C. II
(2015) Surface Reconnaissance Survey proposed Solar Energy Farm, Renewable Alternative Power Productions Inc. (RAPP), Oglala Lakota County, South Dakota. BIA, Aberdeen, South Dakota. Ms. on file (**AAO-3337/PR/2015**)

If your office concurs with this determination, consultation will be completed under the National Historic Preservation Act and its implementing regulations.

If you have any questions, please contact Dr. Sebastian C. LeBeau II, Bureau of Indian Affairs Archaeologist, Fire Program, at (605) 226-7656.

Sincerely,

Carla H. Clark

Acting Regional Director

Enclosure

cc: President, Oglala Sioux Tribe
Superintendent, Pine Ridge Agency