APPENDIX J – UNBROKEN GRASSLAND ASSESSMENT

Unbroken Grassland Assessment

Flickertail Solar Project

Richland County, North Dakota

September 30, 2024

PRESENTED TO

Flickertail Solar Project, LLC
422 Admiral Boulevard
Kansas City, MO 64106

PRESENTED BY

Tetra Tech, Inc.
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EXECUTIVE SUMMARY

Flickertail Solar Project, LLC proposes to develop the Flickertail Solar Project (the Project) in Abercrombie Township, Richland County, North Dakota. The Project Area is 3,464-acres and consists predominantly of agricultural cropland and grassland areas. To assist with facility siting, Tetra Tech, Inc. (Tetra Tech) conducted a desktop assessment that included a review of the North Dakota Game and Fish (NDGF) 2014 Unbroken Grassland Base Raster Layer and historical aerial photographs to assist in the identification of potential unbroken grasslands within the Project Area. Additionally, Tetra Tech completed a field assessment of areas identified as potential unbroken grasslands in the desktop assessment to verify current conditions.

A review of the 2014 Unbroken Grassland Base Raster Layer identified approximately 29 acres of potential unbroken grassland within the Project Area, with the largest contiguous area (23 acres) identified in the south-central portion of the Project Area. Tetra Tech's review of the 2021 U.S. Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) aerial imagery identified 27 locations totaling approximately 511 acres within the Project Area dominated by grassy vegetation. Through review of historical aerial photographs from 2020 to 1957-1962, 26 locations totaling approximately 488.4 acres within the Project Area revealed evidence of cultivation in one or more years. Evidence of cultivation was not observed in one 22.6-acre area located in the south-central portion of the Project Area.

However, an interview with the current landowner, Mr. Earl Myhre, revealed that his grandfather and father had cultivated the parent parcel containing the 22.6-acre area in the 1950s and 1960s, and the parcel was overseeded with a brome grass mix.

The 22.6-acre area was also field reviewed during a natural resource inventory completed by a Tetra Tech biologist in June 2024. The 22.6 acre is currently located within a fenced cattle pasture that includes wetlands. Within the 22.6 acres, 22.1 acres were observed to be moderately to heavily grazed pasture with the following the dominant plant species: Kentucky bluegrass (*Poa pratensis*), Canada bluegrass (*Poa compressa*), and smooth brome (*Bromus inermis*). Other plant species observed include dandelion (*Taraxacum officinale*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), switchgrass (*Panicum virgatum*), western wheatgrass (*Pascopyrum smithii*), and wintercress (*Barbarea vulgaris*). Approximately 0.4 acres were observed to be wetlands dominated by the following species: freshwater cordgrass (*Spartina pectinate*), narrow-leaf cattail (*Typha angustifolia),* and sedges (*Carex spp*.). Areas near wetlands were unvegetated due to cattle use. Less than 0.1 acre was observed to be wooded consisting of Russian olive (*Elaeagnus angustifolia*). Tetra Tech's site visit in June 2024 confirmed that the species composition of the 22.6-acre area was characteristic of a heavily modified grassland.

Based on the information reviewed, there is no unbroken grassland present in the Project Area.

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1.0 INTRODUCTION

1.1 PURPOSE

Flickertail Solar Project, LLC proposes to develop the Flickertail Solar Project (the Project) in Abercrombie Township, Richland County, North Dakota (Appendix A: Figure 1). The Project Area is 3,464-acres and consists predominantly of agricultural cropland and grassland areas. To assist with facility siting, Tetra Tech, Inc. (Tetra Tech) conducted a desktop assessment that included a review of the North Dakota Game and Fish (NDGF) 2014 Unbroken Grassland Base Raster Layer and historical aerial photographs to assist in the identification of potential unbroken grasslands within the Project Area. Additionally, Tetra Tech completed a field assessment of areas identified as potential unbroken grasslands in the desktop assessment to verify current conditions.

1.2 ENVIRONMENTAL SETTING

The Project Area lies within the Red River Valley of the Central Lowlands physiographic region in southeastern North Dakota (Bluemle 2000). This Red River Valley is characterized by flat plains created from the sedimentation on the floor of glacial Lake Agassiz. Lake Agassiz was formed when the route of the Red River to Hudson Bay was blocked by glacial ice. Historically, the Project Area was characterized as bluestem prairie and was the most mesic grassland in North Dakota (Severson and Sieg 2006). The dominant grass species included big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and Indiangrass (*Sorghastrum nutan*). Based on 2021 NLCD (Dewitz 2023), 95 percent of the Project Area includes land covers associated with agricultural purposes (95 percent cultivated crops and less than 1 percent hay/pasture); other land covers within the Project Area include developed (3 percent) and emergent herbaceous wetland (1 percent).

2.0 METHODS

2.1 DESKTOP ASSESSMENT

2.1.1 NDGF 2014 Unbroken Grassland Base Raster Layer

The NDGF 2014 Unbroken Grassland Base Raster Layer provides the foundation for identification of potential unbroken grassland in the Project Area. The NDGF developed this layer in 2014 to identify extant unbroken grassland (i.e., native prairie, uncultivated grassland) (NDGIS 2022, NDGF 2021). The USGS 2010 GAP Landcover and NLCD 2011 were used in the development of the dataset. To prevent overestimation of native grassland, the NASS 2013 Cultivated Layer and USDA Farm Service Agency 2012 CRP data were also reviewed. Grassland vegetation classes were extracted from the foundation layers, reclassified and merged to create one raster layer identifying native grassland. The NASS 2013 Cultivated Layer and FSA CRP 2012 were used to subtract cells

potentially misclassified as grassland to prevent overestimation, and provide a current representation of potentially unbroken grassland. The final product consists of a 30 x 30 meter raster layer of potentially unbroken grassland.

2.1.2 Historical Aerial Photograph Review

Tetra Tech reviewed historical aerial photographs for the Project Area to identify if areas observed as grassland in the 2021 U.S. Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) aerial imagery (USDA 2021) showed evidence of cultivation in previous aerial photographs.

The aerial photographs reviewed included the following.

- USDA NAIP aerial imagery (USDA 2021)
    - 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2010, 2003, 1995-1998, 1975
- NDGISHUB Farm Service Agency (FSA) aerial photography (1957-1962) (NDGIS 2017)

2.2 LANDOWNER INTERVIEW

If potentially unbroken grasslands were identified during the historical aerial photograph review, then landowner interviews were undertaken to gain additional information on the historical use of the parcels.

2.3 FIELD ASSESSMENT

A Tetra Tech biologist field-verified locations within the Project Area identified as potential unbroken grassland during the cumulative desktop analysis. Potential unbroken grassland was assessed to confirm extent, condition, and dominant species.

An Arrow 100 GPS receiver with sub-meter accuracy paired with a tablet running ESRI's Survey123 for ArcGIS application was used in the field to survey the locations of potential unbroken grassland. Upon completion of the survey, the biologist who captured the field data conducted a quality control review to ensure the spatial and attribute data of the features collected correspond with field observations.

3.0 RESULTS

3.1 DESKTOP ASSESSMENT

3.1.1 NDGF 2014 Unbroken Grassland Base Raster Layer

A review of the 2014 Unbroken Grassland Base Raster Layer identified approximately 29 acres of potential unbroken grassland within the Project Area, with the largest contiguous area (23 acres) identified in the south-central portion of the Project Area (Appendix A: Figure 2).

3.1.2 Historical Aerial Photograph Review

Tetra Tech's review of the 2021 USDA NAIP aerial imagery identified 27 locations totaling approximately 511 acres within the Project Area dominated by grassy vegetation. Through review of historical aerial photographs from 2020 to 1957-1962, 26 locations totaling approximately 488.4 acres within the Project Area revealed evidence of cultivation in one or more years. Evidence of cultivation was not observed in one 22.6-acre area located in the south-central portion of the Project Area. Evidence of cutting for hay (i.e., faint north-south rows) was visible in multiple aerial photographs within the 22.6-acre area (Appendix A: Figure 2).

3.2 LANDOWNER INTERVIEW

An interview with the current landowner, Mr. Earl Myhre, revealed that his grandfather and father had cultivated the parent parcel containing the 22.6-acre area and then was overseeded with a brome grass mix (Appendix B).

3.3 FIELD ASSESSMENT

The 22.6 acres was field reviewed by a Tetra Tech biologist in June 2024. The 22.6 acres were observed to be a fenced cattle pasture with wetlands and a few trees (Appendix C: Photographs 1 through 6).

Within the 22.6 acres, 22.1 acres were observed to be moderately to heavily grazed pasture (Appendix C: Photographs 1 through 5) with the following dominant plant species: Kentucky bluegrass (*Poa pratensis*), Canada bluegrass (*Poa compressa*), and smooth brome (*Bromus inermis*). Other plant species observed include dandelion (*Taraxacum officinale*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), switchgrass (*Panicum virgatum*), western wheatgrass (*Pascopyrum smithii*), and wintercress (*Barbarea vulgaris*).

Approximately 0.4 acre were observed to be wetlands (Appendix C: Photographs 3 and 6) dominated by the following species: freshwater cordgrass (*Spartina pectinate*), narrow-leaf cattail (*Typha angustifolia),* and sedges (*Carex spp.*). Areas near wetlands were unvegetated due to cattle use (Appendix C: Photograph 3). Less than 0.1 acre was observed to be wooded consisting of Russian olive (*Elaeagnus angustifolia*) (Appendix C: Photograph 6).

4.0 DISCUSSION

Through this potential unbroken grassland assessment, a total of 22.6 acres of potentially unbroken grassland were identified during the historical aerial review. A landowner interview revealed that the parent parcel for the 22.6 acres was cultivated in the 1950s and 1960s. Tetra Tech's site visit in June 2024 confirmed that the species composition of the 22.6-acre area was characteristic of a heavily modified grassland.

Based on the information reviewed, there is no unbroken grassland present in the Project Area.

5.0 LITERATURE CITED

Bluemle, J. 2000. *The Face of North Dakota*. Third Edition. North Dakota Geological Survey. Education Series 26.

Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, https://doi.org/10.5066/P9JZ7AO3.

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NDGIS 2017. NDGISHUB FSA Aerial Photography 1957-1962. Available online at https://gishubdata-ndgov.hub.arcgis.com/datasets/NDGOV::ndgishub-fsa-aerial-photography-1957-1962/about, accessed August 8, 2024.

NDGIS 2022. NDGISHUB Unbroken Grassland 2014. Available online at https://gishubdata-ndgov.hub.arcgis.com/maps/0107971cdc464f009be31cba01e6b97e/about, accessed July 26, 2024.

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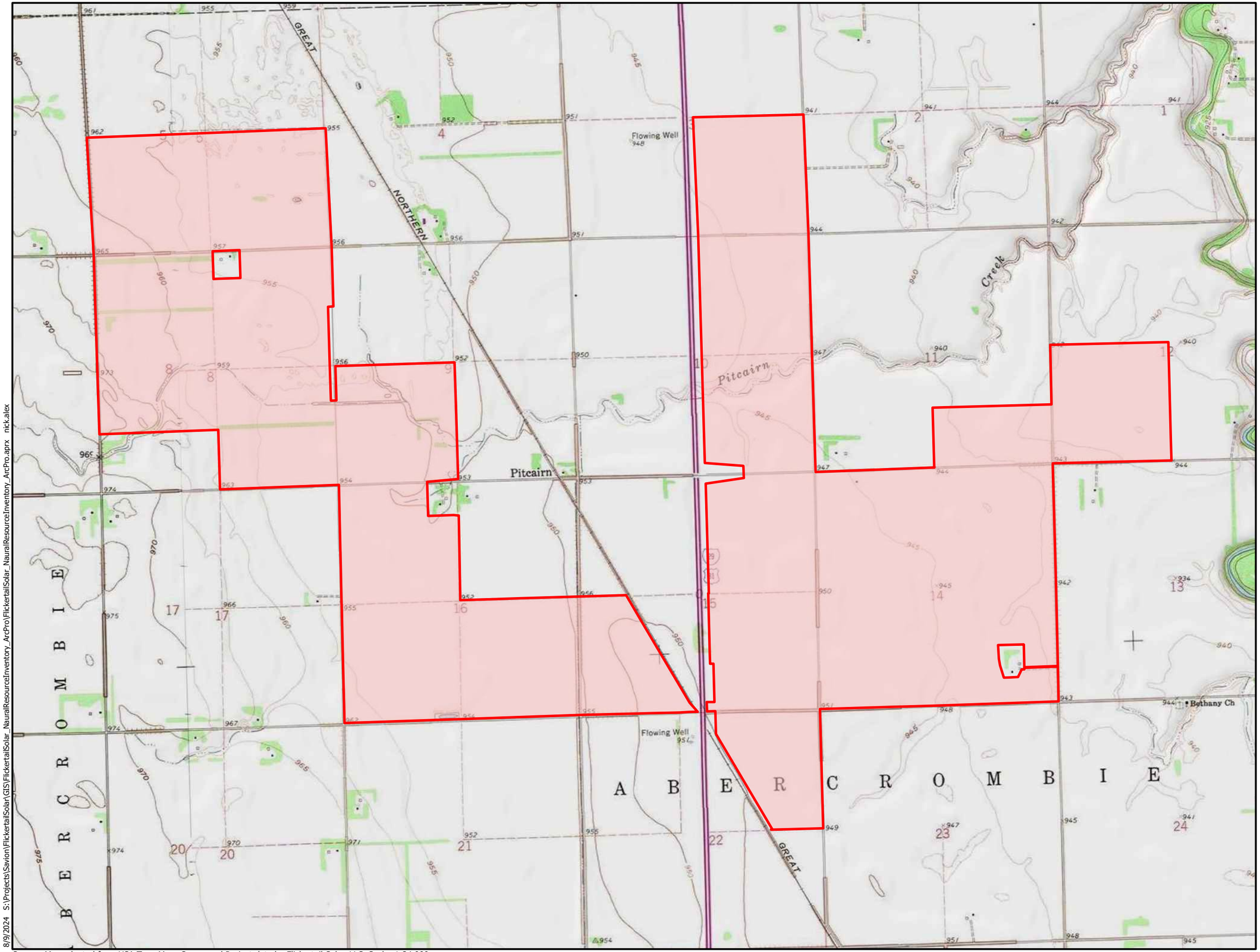
USDA 2021. National Agriculture Imagery Program (NAIP) (various years), available online at https://gishubdata.nd.gov/, accessed July 24, 2024.

APPENDIX A: FIGURES



Project Area

0 0.25 0.5 Mile

N

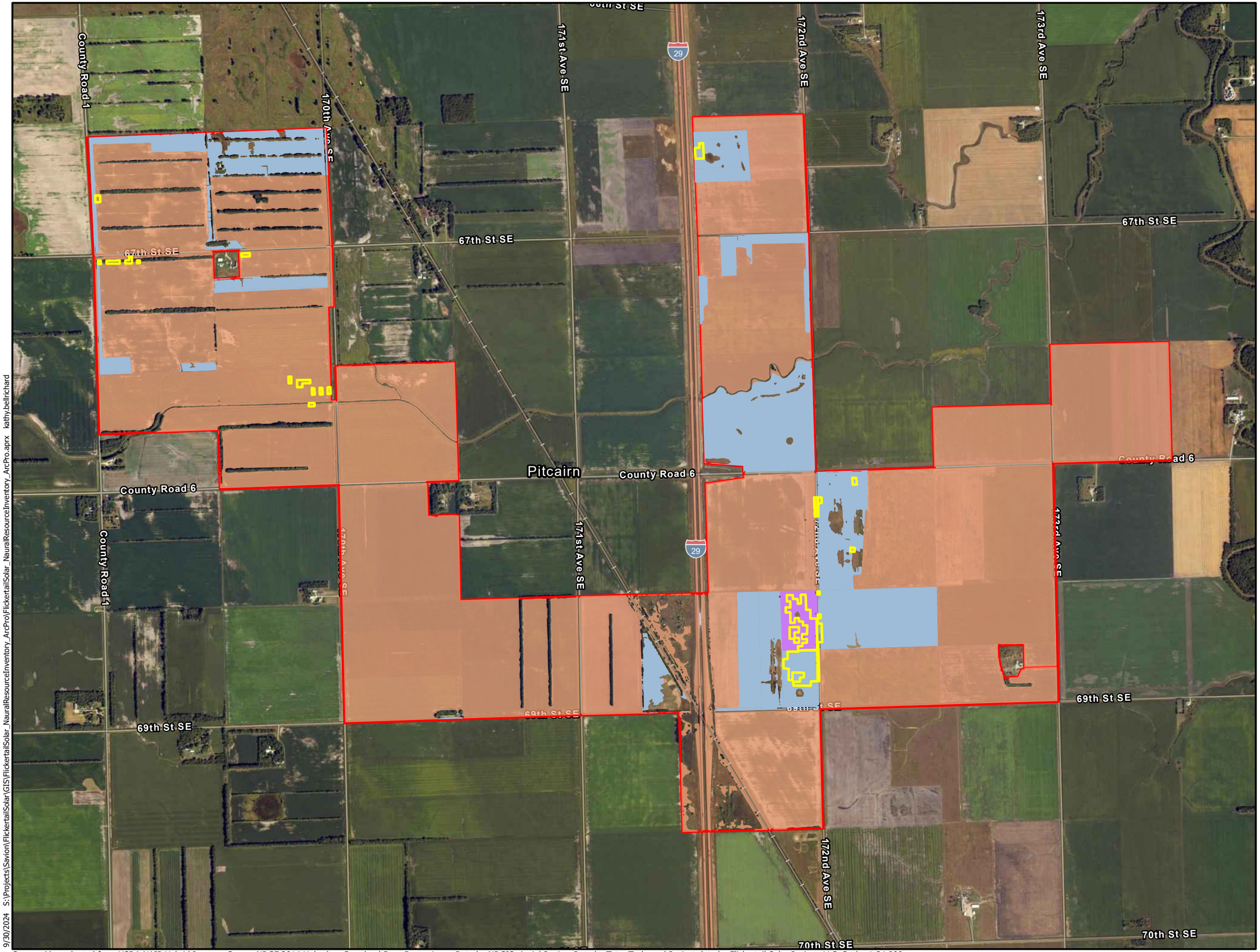
Figure 1
Project Location

Flickertail Solar Project
Richland County,
North Dakota

TETRA TECH

8/9/2024 S:\Projects\Savion\FlickertailSolar\GIS\FlickertailSolar_NaturalResourceInventory_ArcPro\FlickertailSolar_NaturalResourceInventory_ArcPro.aprx nick.alex

Source: Map adapted from USA Topo Maps Server and Project data by Flickertail Solar, LLC. Scale: 1:24,000



Project Area

Desktop Assessment

NDGF 2014 Unbroken Grassland Base Raster Layer

Field Assessment and Landowner Interview

Currently Cultivated Land

Broken Grassland Verified by Landowner

Broken Grassland Verified in Historical Aerial Photography

0 0.25 0.5 Mile

N

Figure 2
Unbroken Grassland Assessment Results

Flickertail Solar Project
Richland County, North Dakota

TETRA TECH

9/30/2024 S:\Projects\Savion\FlickertailSolar\GIS\FlickertailSolar_NaturalResourceInventory_ArcPro\FlickertailSolar_NaturalResourceInventory_ArcPro.aprx kathy.bellrichard

Source: Map adapted from USDA NAIP Hybrid Imagery Server, NDGF 2014 Unbroken Grassland Base Raster Layer Data by NDGIS, Aerial Review Data by Tetra Tech, and Project data by Flickertail Solar Project, LLC. Scale: 1:24,000

APPENDIX B: LANDOWNER INTERVIEW

September 25, 2024

Flickertail Solar Project, LLC
c/o Dennis Beck
dennis@diamondnd.com

Re: Flickertail Solar Project, Richland County, North Dakota

Dear Dennis:

I am a participating landowner in the Flickertail Solar Project (Project) that is being developed by Flickertail Solar Project, LLC (Flickertail) in Richland County, North Dakota. I, along with the other owners, have entered into an Option and Solar Energy Lease with Flickertail to allow the Project to be constructed, maintained, and operated on land we own ("Property"), which is described as follows:

> Southeast Quarter (SE1/4) of Section 15, in Township 134, Range 49, excepting therefrom such portion thereof previously reserved and/or taken for highway purposes.

The Property includes the following parcel of land: the Northeast Quarter of the Southeast Quarter of Section 15, in Township 134, Range 49 ("Parcel"). Based on personal knowledge, the Parcel was tilled by my grandfather and father in the 1950s and late 1960s respectively and then overseeded with a brome grass mix.

Sincerely,

Earl R. Myhre

Earl R. Myhre

APPENDIX C: PHOTOGRAPHS

Site Photographs
Flickertail Solar Project
Richland County, North Dakota

Photograph: 1 **Type:** Grassland - Pasture **Orientation:** Facing east **Location:** 46.4181°, -96.8222° **Date:** 5/2/2024	

Photograph: 2 **Type:** Grassland - Pasture **Orientation:** Facing southwest **Location:** 46.4202°, -96.8198° **Date:** 6/8/2024	

Site Photographs
Flickertail Solar Project
Richland County, North Dakota

Photograph: 3 **Type:** Grassland - Pasture **Orientation:** Facing east **Location:** 46.4187°, -96.8217° **Date:** 5/2/2024	

Photograph: 4 **Type:** Grassland - Pasture **Orientation:** Facing southwest **Location:** 46.4195°, -96.8220° **Date:** 5/3/2024	

Site Photographs
Flickertail Solar Project
Richland County, North Dakota

Photograph: 5 **Type:** Grassland - Pasture **Orientation:** Facing northeast **Location:** 46.4197°, -96.8214° **Date:** 5/2/2024	

Photograph: 6 **Type:** Grassland - Pasture **Orientation:** Facing north **Location:** 46.4199°, -96.8198° **Date:** 5/2/2024