Appendix F
Wetland Delineation Reports

Wetland Delineation Report

Wild Springs Solar Project

Prepared for:

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INTRODUCTION

Area M Consulting (Area M), on behalf of Geronimo Energy, LLC (Geronimo) conducted a wetland delineation for the proposed Wild Springs Solar Project (Project) located within Pennington County, South Dakota. The on-site field delineation was completed within the entire Project boundaries following procedures and methods outlined by the United States Army Core of Engineers (USACE) Wetland Delineation Manual (USACE, 1987), Great Plains Regional Supplement (USACE, 2010), and South Dakota Natural Resource Conservation Service (NRCS) Mapping Conventions (2011). The field survey was conducted on May 3-6, 2017. This wetland delineation was conducted to fulfill requirements by the South Dakota Public Utilities Commission (SDPUC) and USACE, and is assembled to assist Geronimo with meeting regulatory requirements necessary for permitting a utility scale solar project in Pennington County, South Dakota.

PROJECT DESCRIPTION

The Wild Springs Solar Project, located on the southern boundary of New Underwood, South Dakota, encompasses 999.5 acres within the following sections in Pennington County, South Dakota (Project Site) (Appendix A):

- Sections 5, 6 T001N:R11E
- Section 1 T001N:R10E
- Section 31 T002N:R11E
- Section 36 T002N:R10E

The Project Site topography is undulating, containing several hills with an overall relief of approximately 90 feet. Box Elder Creek bisects the northern corner of the Project Site, running east towards its confluence with the Cheyenne River 20 miles to the southeast. Generally, the Project Site slopes to the north, but several hills and shallow basins divert surface run-off into ephemeral swales and minor drainageways which run north towards Box Elder Creek. The existing landscape is a mixture of pastureland, cropland, disturbed grassland, and riparian areas, with the majority of the land currently being used as cattle pasture. The most common plant species identified by Area M biologists during ground surveys included blue grama (*Bouteloua gracilis*), Kentucky bluegrass (*Poa pratensis*), buffalograss (*Bouteloua dactyloides*), western wheatgrass (*Pascopyrum smithii*), crested wheatgrass (*Agropyron cristatum*) and several low-lying forbs such as common dandelion (*Taraxacum officinale*). Woodlands and shrublands are absent from the Project, with the exception of the cottonwood-dominated riparian corridor along Box Elder Creek and small monotypic communities of willow (*Salix spp.*) and snowberry (*Symphoricarpos occidentalis*). Sparse cottonwoods (*Populus deltoids*) and willows occur in small groups within some of the shallow swales and drainageways.

OFF-SITE REVIEW

Prior to fieldwork, Area M conducted a comprehensive desktop review of data sources available within the public domain to identify the presence/absence and extent of wetlands that could occur within Project Site. Areas with hydric signatures, suggesting potential wetland conditions, were evaluated in greater detail during the field investigation. The following data sources were reviewed; the analysis of each data set is discussed in greater detail in the later part of this section.

- Hydrologic soil data
- Antecedent precipitation data
- Mapped Wetlands/Waterbodies
  - National Wetland Inventory (NWI)
  - National Hydrography Dataset (NHD)
- Elevation Data
  - United States Geological Survey (USGS) topographic maps
- Historic and current aerial photographs

Soils

The NRCS Web Soil Survey (NRCS, 2017a) was accessed to review mapped soil types within the Project Site. Map unit hydric characteristics and acreages are summarized in Table 1.

Table 1. NRCS soil components, acreages, and hydric qualities within Project Site.

Map Unit	Soil type	% Slope	Depth to Water table (Inches)	Ponding/ Flooding Frequency	Hydrologic Group/ Hydric Rating	Acres within Project Site
ArA	Arvada loam	0-3	>80	None/None	D/0	17.4
BfA	Beckton silt loam	0-4	>80	None/None	C/0	12.0
HpB	Hisle silt loam	0-6	>80	None/None	D/0	57.5
KyA	Kyle clay	0-2	>80	None/None	D/0	409.1
KyB	Kyle clay	2-6	>80	None/None	D/0	182.1
Lo	Lohmiller silty clay	--	>80	None/None	C/1	100.4
NuA	Nunn loam	0-2	>80	None/None	C/1	53.0
NuB	Nunn loam	2-6	>80	None/None	C/1	70.7
PeB	Pierre clay	2-6	>80	None/None	D/2	22.9
PeD	Pierre clay	6-20	>80	None/None	D/0	2.1
SzB	Swanboy clay	0-3	>80	None/None	D/0	69.7
W	Water	--	--	--	--	2.6

Source: (NRCS, 2017a)

Overall, mapped soils with hydric ratings are mostly absent from the Project Site. Most soils are well-drained and all contain hydric rating less than 2%. Only one soil series within the Project Site, Lohmiller Silty Clay, is categorized as hydric in Pennington County (NRCS, 2017b).

Antecedent Precipitation Analysis

Mean annual precipitation for Pennington County is 16.3 inches, with most precipitation falling during the growing season (May-September) (NOAA, 2017). Antecedent Precipitation conditions were evaluated using the NRCS Method for Evaluating Antecedent Moisture Conditions prior to the delineation to place field observations in context with recent precipitation. Based on using this three-month approach, precipitation was normal during the field delineation conducted May 3-6, 2017.

Table 2. Project site precipitation data.

Month	Observed Precipitatio	Monthly Average	Condition	Value	Weight	Product
February	0.46	0.44	Normal	2	1	2
March	0.53	0.93	Dry	1	2	2
April	1.77	1.80	Normal	2	3	6
						10

Source: (NOAA, 2017)

Mapped Wetland Data

The NWI (USFWS, 2017) and NHD data sets were reviewed for the presence of mapped wetlands and/or waterbodies within the Project Site prior to the field investigation. Area M confirmed the presence of 27 NWI features, 1 NHD basin, and 11 NHD waterway features located within the Project Site. (Appendix A). Most of these features are associated with Box Elder Creek and its associated ephemeral tributaries. Note that both the NHD and NWI datasets identify many of the same wetland/waterbody features.

Topographic Data

Elevation and topographic data from the USGS was reviewed within the Project Site to identify potential basins, drainageways, or depressional areas which could be indicative of wetlands. The Project contains a mixture of steep topography and gently-sloping flats. Three minor drainageways or swales run north towards their confluence with Box Elder Creek; these drainageways appear to contain possible natural and man-made basins/concave features that are indicative of wetlands (Appendix A). Depending on the amount, duration, and frequency of rain events, these drainageways may contain wetlands.

Historic Aerial Photography Review

Aerial photography from 8 separate years was analyzed to identify areas within the Project Site that exhibited consistent hydric signatures (Appendix B). Overall, consistent hydric signatures were identified within portions of the minor drainageways (outlined in yellow in Appendix B). These areas were investigated in greater detail during the field delineation.

Off-site Review Summary

Overall, the off-site review suggests wetlands may occur within the shallow drainageways associated with Box Elder Creek. In additional, several apparent man-made stock ponds (associated with the same drainages) are located throughout the Project Site (Appendix A). All potential wetland areas identified during this off-site review were investigated in detail during the field delineation May 3-6, 2017.

FIELD DELINEATION

Wetlands identified during the off-site analysis were confirmed in the field using routine on-site delineation methods in accordance with the USACE Wetlands Delineation Manual (USACE, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE, 2010). This included the characterization of vegetation, soils, and hydrology on-site. Wetlands are defined by the USACE as “areas that are inundated or saturated by surface or groundwater at a frequency

and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." For an area to be delineated as a regulated wetland, the vegetative, hydrologic, and soil characteristics must all be present and consistent with federal classification criteria.

Methodology

Transects were established in representative transition zones, perpendicular between suspected wetland and upland areas. Paired Survey Points were recorded along each transect, one in the upland and one in the wetland, in order to identify the wetland boundary. Wetland criteria were evaluated at each Survey Point and a Wetland Determination Form – Great Plains Region (Form) was completed. Additional Survey Points were collected within each unique vegetation community (if present) and/or potential wetland area to document and characterize baseline hydrology, soils, and vegetation within the Project Site. Determination of wetland type was based on the classification system developed by Cowardin et al. (1979). The entire Project Site was surveyed in the field to confirm the absence of additional wetlands. Site conditions during the wetland delineation were dry, during the field delineation May 3-6, 2017. The temperature ranged between 34 and 80 degrees F, with no precipitation falling during the survey. Antecedent precipitation was normal (Table 2).

The location and boundaries of wetland features identified by Area M during field surveys were recorded in the field using a Trimble Geoexplorer 6000 which typically achieves accuracy within 2 feet. A map depicting wetland boundaries is located in Appendix A. Representative photos of the Project Site are included in Appendix C. Field Forms are included in Appendix D.

Field Review Summary

Based upon this routine Wetland Delineation, it is the professional opinion of Area M that the Project Site contains 16 wetlands (Table 3). These wetland are all associated with minor drainages flowing into Box Elder Creek or clearly excavated basins for ranching/farming purposes (Appendix A). Most portions of the drainages/swales identified by the NWI did not exhibit hydric soils, hydrology, or vegetation. Each wetland delineated by Area M in the field is described below.

Table 3. Wetland acreages, locations, and classifications delineated within the Project Site.

Wetland	Cowardin Classification Code[1]	Acreage within Project Site	Lat	Long
Wetland 1	PUBFhx	0.39	44.0824	-102.850165
Wetland 2	PUB3Fhx	0.98	44.074094	-102.832479
Wetland 3	PUB3Fhx	0.21	44.073849	-102.83378
Wetland 4	PEM1Ah	0.21	44.074578	-102.832537
Wetland 5	PEM2A	0.02	44.075999	-102.849574

Wetland	Cowardin Classification Code[1]	Acreage within Project Site	Lat	Long
Wetland 6	PEM2A	0.02	44.075509	-102.849446
Wetland 7	PEM2A	0.01	44.069534	-102.84659
Wetland 8	PEM2A	0.03	44.074315	-102.848216
Wetland 9	PEM2C	0.08	44.082197	-102.849209
Wetland 10	PEM2C	0.14	44.0831	-102.848501
Wetland 11	PEM2A	0.01	44.085658	-102.842145
Wetland 12	PEM2C	0.10	44.088559	-102.844378
Wetland 13	PEM2C	0.17	44.088399	-102.845748
Wetland 14	PEM2C	0.08	44.086807	-102.848462
Wetland 15	PUB3Fxh	0.66	44.067676	-102.837784
Wetland 16	PEM1C	3.37	44.091184	-102.855103

[1]Cowardin et al., 1979

Wetland 1

Wetland 1 is a PUBFx which appears to be associated with the road ditch to the south and the minor drainage to the east. This wetland is excavated and likely used as a cattle pond. Surface water was present within the basin, and SP 1-W was located on the sloped edge above the water line. SP 1-W met the high water table (A2) and saturation (A3) hydrology indicators. Aerial imagery shows this wetland fills with water during the wet season and heavy rain events (B7). The plant community is a mixture of grasses, shrubs, and trees, dominated by boxelder (*Acer negundo*), cottonwood, and low grasses. Soils were clayee, with a depleted strata at approximately 8 inches with clear redox (F3). SP 1-U, located east of the basin did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by bluegrass and blue grama. Soils were clay and relatively uniform. The wetland boundary was mapped by following the abrupt topographic transition from upland into the basin and following the shrub and tree strata.

Wetland 2

Wetland 2 is a PUB3Fxh created from the impoundment of a minor/ephemeral drainage associated with Box Elder Creek. Surface water was present within the wetland, and SP 2-W met the high water table (A2) and saturation (A3) hydrology indicators. Aerial imagery shows this area to be ponded during the wet season or after heavy rain events (B7). The plant community at SP 2-W was dominated by curly dock (*Rumex crispus*) and early Kentucky bluegrass Soils were dark at the surface, but reduced with redox concentrations at approximately 4 inches (A11, F3). SP 2-U, located in the adjacent upland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by

FAC, FAC-U, or UPL grasses and forbs. The wetland boundary was mapped by following a shallow topographic contour and clear distinction between curly dock and grass/forb prairie plant communities. There was heavy cattle use within and around wetland.

Wetland 3

Wetland 3 is a PUB3xh created from the impoundment of a minor/ephemeral drainage associated with Box Elder Creek, located upstream from Wetland 2. Surface water was present within the basin, and SP 3-W met the high water table (A2) and saturation (A3) hydrology indicators. Aerial imagery shows this wetland fills with water during the wet season and heavy rain events (B7). The plant community contained only curly dock; this SP may have been inundated earlier in April. Soils were dark, but a clear reduced strata with redox was present at approximately 3 inches (A11, F3). SP 3-U, located just north of the wetland did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by bluegrass and snakeweed (*Gutierrezia sarothrae*) with several FAC U species present. The wetland boundary was mapped by following a topographic contour and abrupt transition between curly dock and bluegrass/snakeweed community. There was heavy cattle use within and around wetland.

Wetland 4

Wetland 4 is a PEM1Ah located within an indistinct swale that runs into Box Elder Creek. The southern edge is bounded by the dike creating Wetland 2. A culvert transmits water from Wetland 2 into Wetland 4. Surface water was absent from the wetland at the time of sampling, but portions of the wetland were saturated. SP 4-W met the high water table (A2) and saturation (A3) hydrology indicators. Aerial imagery indicates the wetland is saturated during wet seasons or after rain events (C9). The plant community contained a diverse mix of species, dominated by sedge (*Carex nebrascensis*) and blue joint grass (*Calamagrostis canadensis*). Soils were very dark brown underlain by a depleted gray strata with red redox concentrations at approximately 3 inches (A11, F3). SP 4-U, located upland and to the west of SP 4-U, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by bluegrass, western wheatgrass and saltbush (*Atriplex gardneri*). The wetland boundary was mapped by following the gentle topographic break between upland and wetland plant species. There was heavy cattle use within and around wetland.

Wetland 5

Wetland 5 is a PEM2A associated with a disconnected swale that drains into Box Elder Creek. Surface water was mostly absent from the swale, but Wetland 5 is a locally shallow basin within the swale and likely holds water for longer. SP 5-W met the high water table (A2) and saturation (A3) hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill and transports water during the wet season and heavy rain events (B7). The plant community was dominated by sedge and curly dock. Soils were dark near the surface, but a clear reduced strata with redox was present at approximately 2-3 inches (A11, F3). SP 5-U, located just northwest of the wetland did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by smooth brome (*Bromus inermis*) and crested wheatgrass (*Agropyron cristatum*). The wetland boundary was mapped by following a topographic contour and transition between brome and carex.

Wetland 6

Wetland 6 is a PEM2A associated with a disconnected swale that drains into Box Elder. Surface water was mostly absent from the swale, but Wetland 6 appears to be within a slightly deeper basin within the swale. SP 6-W met the high water table (A2) and saturation (A3) hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill and transports water during the wet season and heavy rain events (B7). The plant community was dominated by sedge, but several upland or FAC U species were present, suggesting this wetland likely fluctuates in size relative to antecedent precipitation. Soils were dark near the surface, but a clear reduced strata with redox was present at approximately 3 inches (A11, F3). SP 6-U, located just west of the wetland did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by buffalograss and crested wheatgrass. The wetland boundary was mapped by following a topographic contour and transition between carex and buffalograss.

Wetland 7

Wetland 7 is a PEM2A associated with a disconnected swale that drains into Box Elder Creek. Surface water was mostly absent from the swale, but Wetland 7 is a slightly deeper basin than the surrounding swale. SP 7-W, placed within the concave feature, met the A2 and A3 hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill with water during the wet season and heavy rain events (B7). The plant community was dominated by sedge, dock, and bluegrass. Soils were dark near the surface, but a clear reduced strata with redox was present at approximately 6 inches (A11, F3). SP 7-U, located just north of the wetland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by smooth brome, crested wheatgrass, and bluegrass. The wetland boundary was mapped by following a clear topographic contour and transition between carex and upland grasses.

Wetland 8

Wetland 8 is a PEM2A associated with a disconnected swale that drains into Box Elder Creek. Surface water was mostly absent from the swale, but Wetland 8 is a slightly deeper basin than the surrounding swale. SP 8-W, placed within the concave feature, met the A2 and A3 hydrology indicators. Aerial imagery shows this wetland and swale fill with water during the wet season and heavy rain events (B7). The plant community was dominated by sedge and bluegrass. Soils were light gray, but a clear reduced strata with redox was present at approximately 4 inches (F3). SP 8-U, located just north of the wetland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by buffalograss, crested wheatgrass, and western wheatgrass. The wetland boundary was mapped by following a clear topographic contour and transition between carex and upland grasses. There was evidence of heavy cattle use within this wetland during the growing season.

Wetland 9

Wetland 9 is a PEM2C located in a swale that transports surface water to Box Elder Creek. Surface water was mostly absent from the swale, but several deeper depressions within the swale, such as Wetland 9, hold water longer. SP 9-W, placed within the concave depression, met the A2 and A3 hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill with water during the wet season and heavy rain events (B7). The plant community was dominated by sedge, with blue joint and dock prevalent around

the wetland edge. Soils were dark grey and underlain by a reduced horizon with redox at approximately 2 inches (A11, F3). SP 9-U, located just south of the wetland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by disturbed grass species. The wetland boundary was mapped by following a clear topographic contour and transition between carex and upland grasses.

Wetland 10

Wetland 10 is a PEM2C located in a long swale that transports surface water to Box Elder Creek. Surface water was mostly absent from the swale, but Wetland 10 was holding water at the time of the surevey. SP 10-W, placed within the concave depression, met the A2 and A3 hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill with water during the wet season and heavy rain events (B7). The plant community was dominated by sedge, with blue joint and dock prevalent around the wetland edge. Portions of the wetland were lined by sapling willow (*Salix alba*). Soils were dark grey and underlain by a reduced horizon with redox at approximately 4 inches (A11, F3). SP 10-U, located west of the wetland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by disturbed prairie grasses with snowberry and prairie rose (*Rosa arkansansa*). The wetland boundary was mapped by following a clear topographic contour and transition between the blue joint/sedge community and upland grasses.

Wetland 11

Wetland 11 is a PEM2A located in an ephemeral swale that transports surface water to Box Elder Creek. Surface water was absent from the swale, but soils were saturated at 4 inches. SP 11-W, placed within the concave depression, met the A3, B8, and D2 hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill with water during the wet season and heavy rain events (B7). The plant community was sparse, but dominated by sedge and blue joint grass, with dock prevalent within the center of the wetland. Soils were light gray and underlain by a reduced horizon with redox at approximately 10 inches (F3). SP 11-U, located north of the wetland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by disturbed prairie grasses. The wetland boundary was mapped by following a clear topographic contour and transition between the blue joint/sedge community and western wheatgrass. There is evidence of heavy cattle use within this wetland.

Wetland 12

Wetland 12 is a PEM2C located in an ephemeral swale that transports surface water to Box Elder Creek. Surface water was absent from the swale, but Wetland 12 was saturated at 8 inches. SP 12-W, placed within the shallow, concave depression, met the A3, B8, D2, and B6 hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill with water during the wet season and heavy rain events (B7). The plant community was dominated by sedge, with blue joint and dock prevalent around the wetland edge. Portions of the wetland were lined by cottonwood trees. Soils were dark grey and underlain by a reduced horizon with redox at approximately 5 inches (F3). SP 12-U, located north of the wetland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by disturbed prairie grasses with snowberry, willow, and prairie rose dominant in the shrub/tree strata. The

wetland boundary was mapped by following a clear topographic contour and transition between the blue joint/sedge community and upland grasses/shrubs.

Wetland 13

Wetland 13 is a PEM2C located in an ephemeral swale that transports surface water to Box Elder Creek. Surface water was absent from the swale, but Wetland 13 was saturated at 6 inches. SP 13-W, placed within the shallow, concave depression, met the A3, B6, B8, D2, and B6 hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill with water during the wet season and heavy rain events (B7). The plant community was dominated by sedge, with blue joint and dock prevalent around the wetland edge. Portions of the wetland were lined by willow. Soils were dark grey and underlain by a reduced horizon with redox at approximately 5 inches (F3). SP 13-U, located north of the wetland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by disturbed prairie grasses with dandelion and volunteer alfalfa interspersed throughout. The wetland boundary was mapped by following a clear topographic contour and transition between the blue joint/sedge community and upland grasses.

Wetland 14

Wetland 14 is a PEM2C located in an ephemeral swale that transports surface water to Box Elder Creek. Surface water was absent from the swale, but Wetland 13 was saturated at8 inches. SP 14-W, placed within the shallow, concave depression, met the A2, A3, B6, B8, D2, and B6 hydrology indicators. Aerial imagery shows this wetland and surrounding swale fill with water during the wet season and heavy rain events (B7). The plant community was dominated by sedge, with blue joint and dock prevalent around the wetland edge. Soils were dark grey and underlain by a reduced horizon with redox at approximately 8 inches (A11, F3). SP 14-U, located north of the wetland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by disturbed prairie grasses with dandelion mixed throughout. The wetland boundary was mapped by following a clear topographic contour and transition between the blue joint/sedge community and upland grasses.

Wetland 15

Wetland 2 is a PUB3Fxh created from the impoundment of a minor/ephemeral drainage associated with Box Elder Creek. Surface water was present within the wetland, and SP 15-W met the high water table (A2) and saturation (A3) hydrology indicators. Aerial imagery shows this area to be ponded during the wet season or after heavy rain events (B7). The plant community at SP 15-W was a sparse monoculture of sedge. Soils were dark at the surface, but reduced with redox concentrations at approximately 5 inches (A11, F3). SP 15-U, located in the adjacent upland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by western wheat grass and leafy wild parsley (*Musineon divaricatum*). The wetland boundary was mapped by following a steep contour and clear distinction between the sparsely vegetated sedge and grass/forb prairie plant communities. There was heavy cattle use within and around wetland.

Wetland 16

Wetland 16 is a PEM1C located in very small depressional area along an ephemeral tributary of Box Elder Creek. Unlike most of the tributary/swale, this area is more permanently inundated, perhaps due to the railroad tracks impounding the northern edge of the wetland. Surface water was present within the wetland, and SP 16-W met the high water table (A2) and saturation (A3) hydrology indicators. Aerial imagery shows this area to be inundated or saturated throughout most of the year (B7). The plant community at SP 16-W was a mix of cattails and sedges. Soils were dark at the surface, but reduced with redox concentrations at approximately 4 inches (A11, F3). SP 16-U, located south in the adjacent upland, did not meet any of the wetland criteria for plants, soils, or hydrology. The upland plant community was dominated by disturbed prairie grasses and leafy wild parsley where crops were not planted. The wetland boundary was mapped by following a gentle contour and clear distinction between the cattail community and grassland/cropland.

Other Aquatic Resources

As described above, several disconnected drainages/swales are mapped by the NWI and NHD as riverine wetlands. During the field survey, it was determined that the majority of these features did not exhibit the requisite soils, vegetation, or hydrology to be wetlands, with exception of the areas delineated in the report (above). The entirety of each swale was surveyed, and Survey Points were collected within representative areas of the drainages (Appendix D). Box Elder Creek, another aquatic resource within the Project Site, is a jurisdictional waterway. This feature was mapped, but did not exhibit wetland characteristics above/outside of its ordinary high water mark. The banks of Box Elder Creek within the Project Site were mapped and are presented in Appendix A. No other areas with wetland vegetation or hydrology were observed within the Project Site.

CONCLUSIONS

Based upon this desktop and field wetland delineation, it is the professional opinion of Area M that 16 wetlands occur within the Project Site (Appendix A). However, only state or federal agencies have final authority over wetland extent and jurisdictional status. These findings are subject to revision based on natural or anthropogenic changes in weather, crop/vegetation management, land use, surface/subsurface drainage, or topography within or near the Project Site which may affect soils, vegetation, or hydrology.

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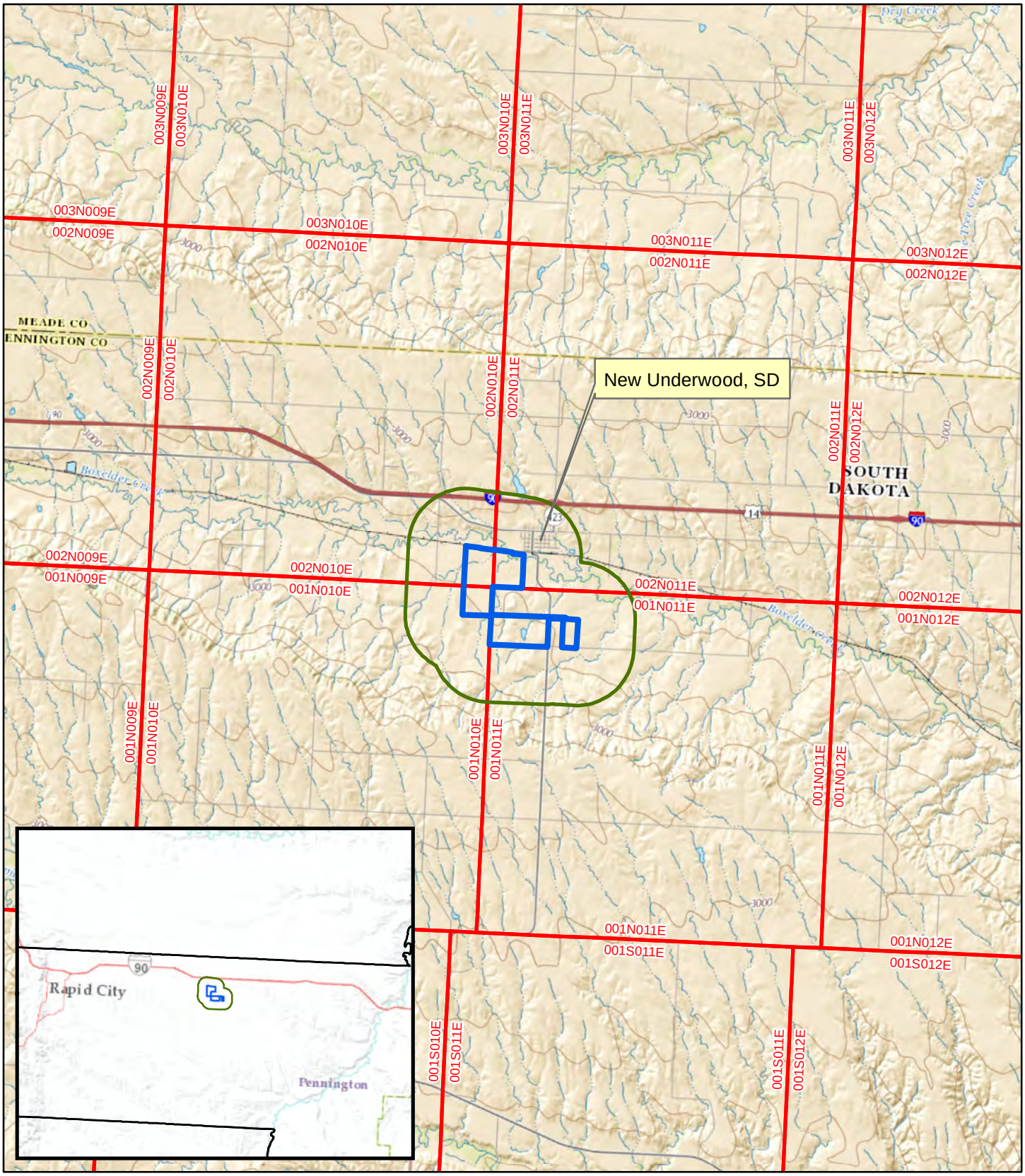
Appendix A:

Maps



Location Map

Geronimo Energy, LLC - Wild Springs Solar Project

Pennington County, South Dakota

Project Site

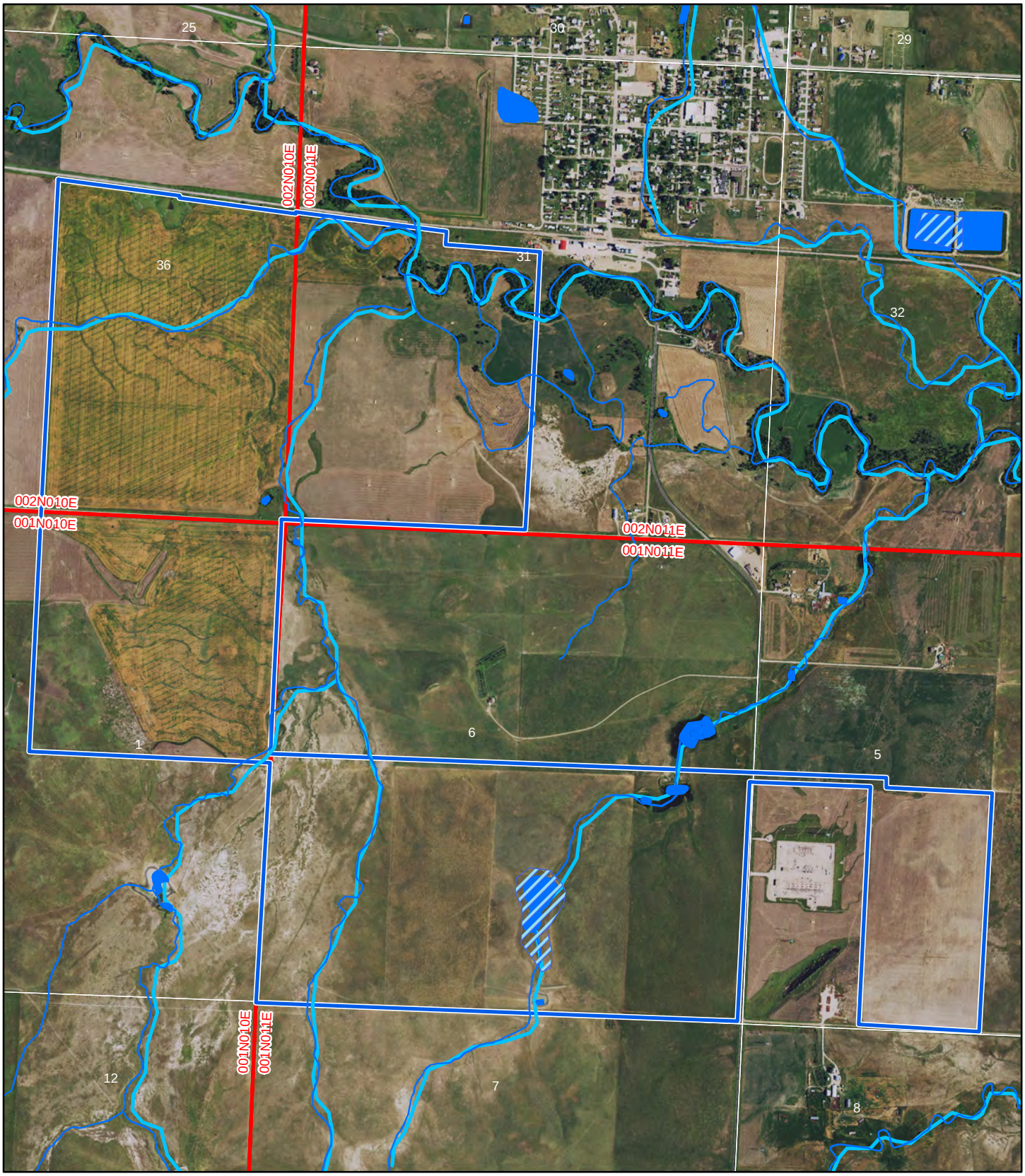
1-Mile Buffer

N

0 5,500 11,000 22,000

1:150,000 Feet

AREA M



Aerial Map

Geronimo Energy, LLC - Wild Springs Solar Project

Pennington County, South Dakota

Project Site

NWI Wetland

NHD Waterbody

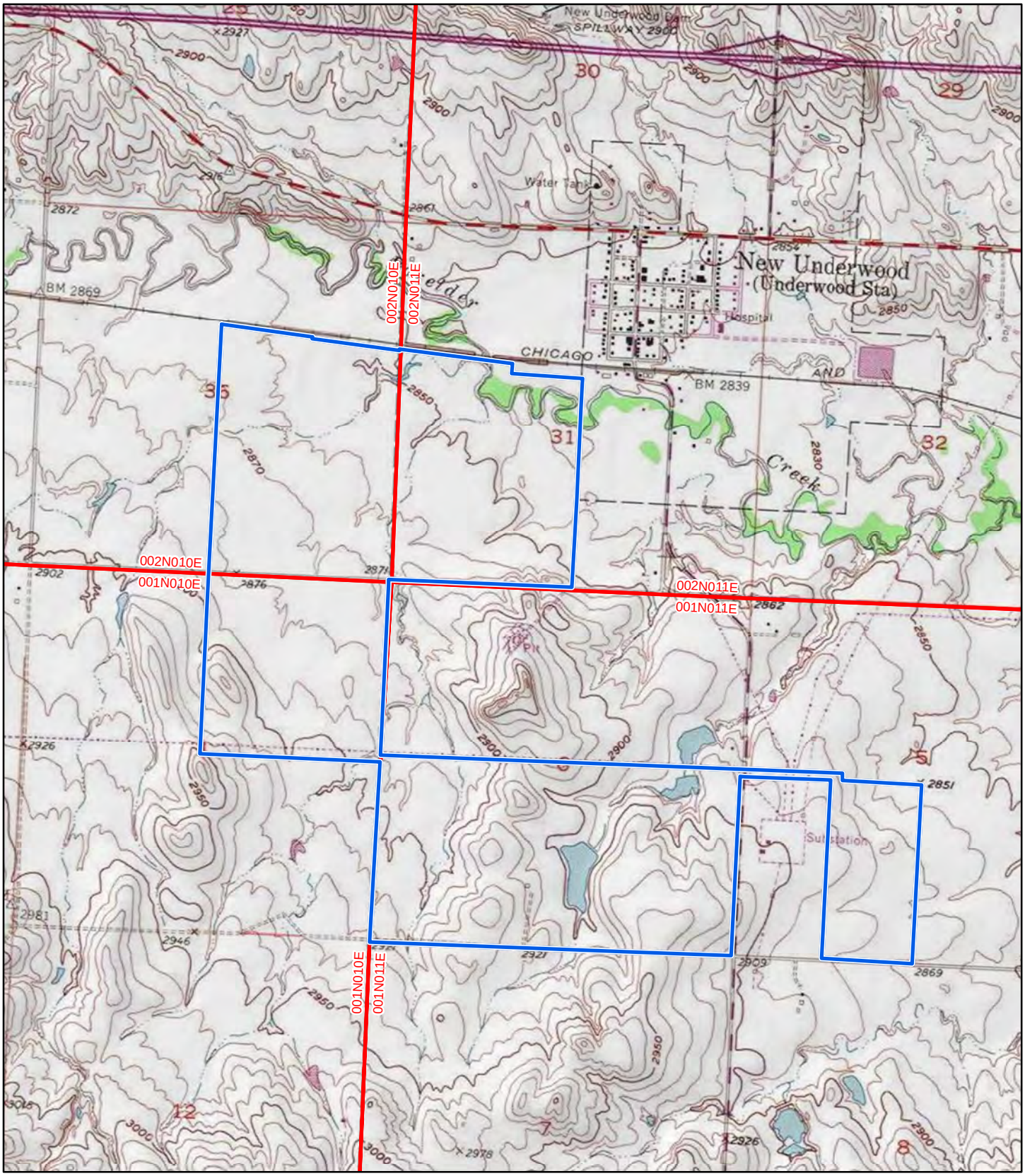
NHD Flowline

0 700 1,400 2,800

1:18,000 Feet

N

AREA M



Topographic Map

Geronimo Energy, LLC - Wild Springs Solar Project

Pennington County, South Dakota

Project Site

0 950 1,900 3,800

1:24,000 Feet

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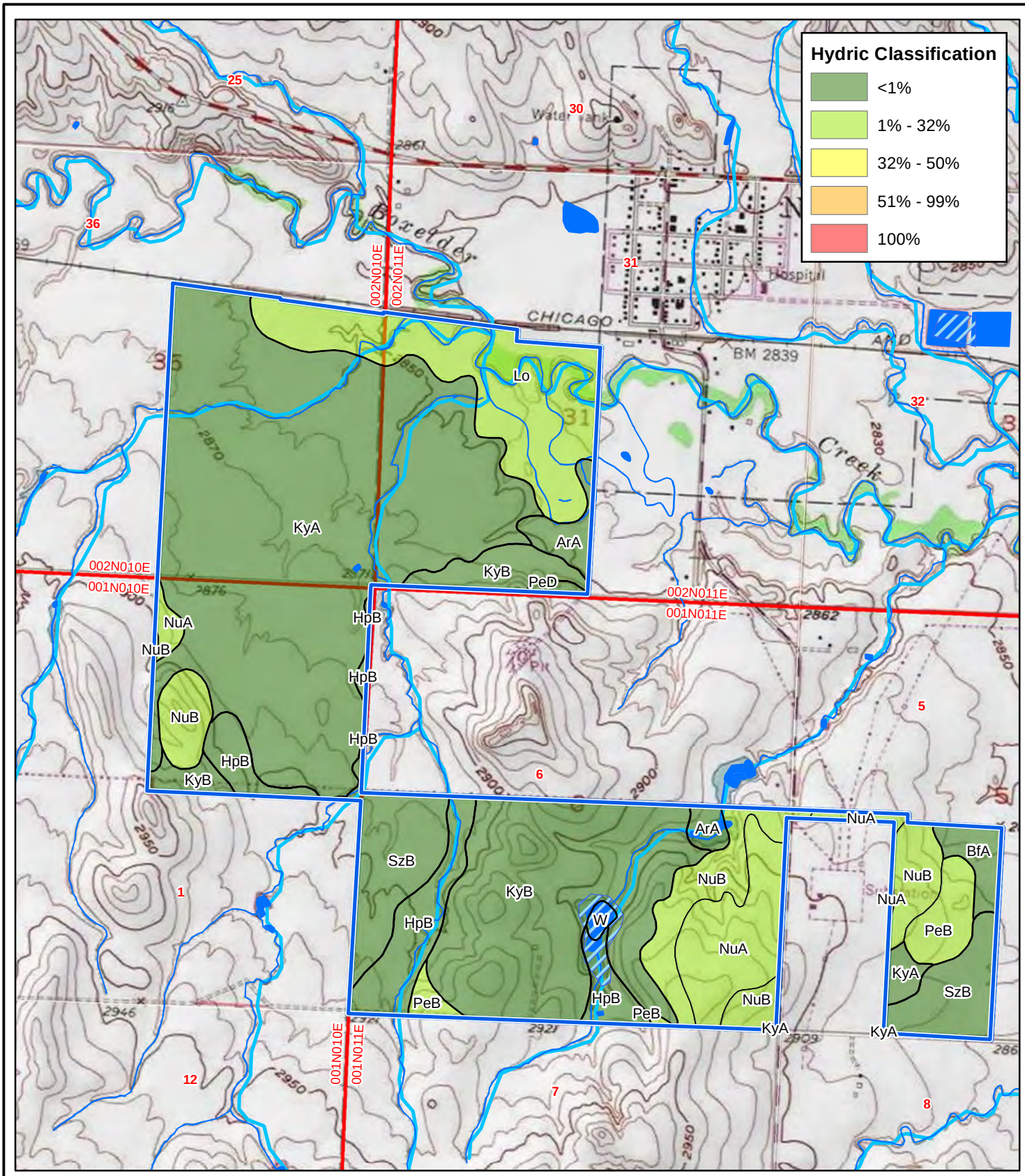


Soils Map

Geronimo Energy, LLC - Wild Springs Solar Project

Pennington County, South Dakota

Project Site

NWI Wetland

NHD Waterbody

NHD Flowline

0 750 1,500 3,000

1:20,000 Feet

N

AREA M

Wetland Delineation Map

Geronimo Energy, LLC - Wild Springs Solar Project

Pennington County, South Dakota

Project Site

Aquatic Resource

- Field Delineated Wetland
- Box Elder Creek
- Dry Swale/Drainage

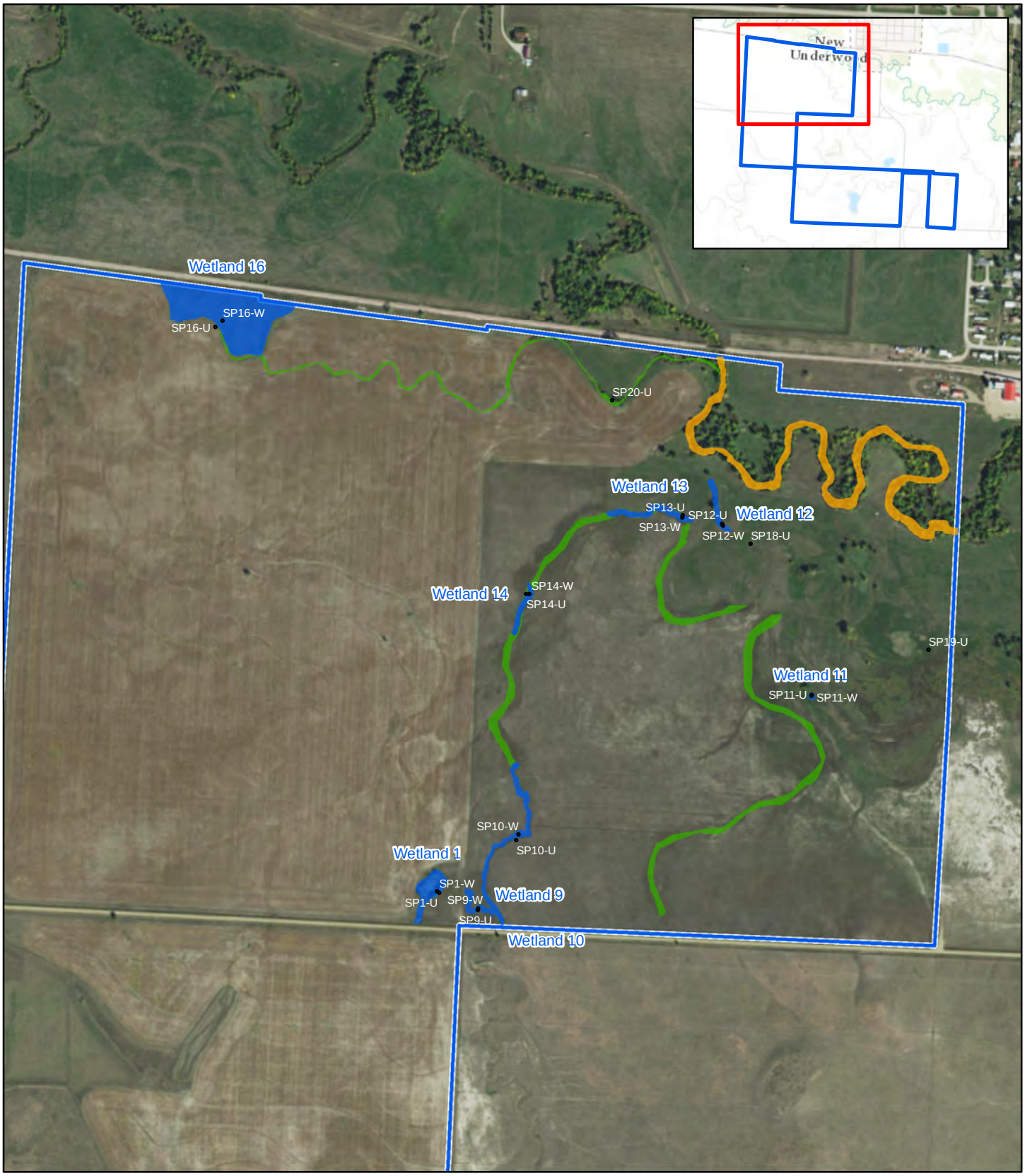
0 700 1,400 2,800

1:18,000 Feet

N

AREA M

*Wetlands are displayed larger than mapped for display purposes



Wetland Delineation Map - Inset

Geronimo Energy, LLC - Wild Springs Solar Project

Pennington County, South Dakota

Project Site

• Wetland Sampling Point

Aquatic Resource

Field Delineated Wetland

Box Elder Creek

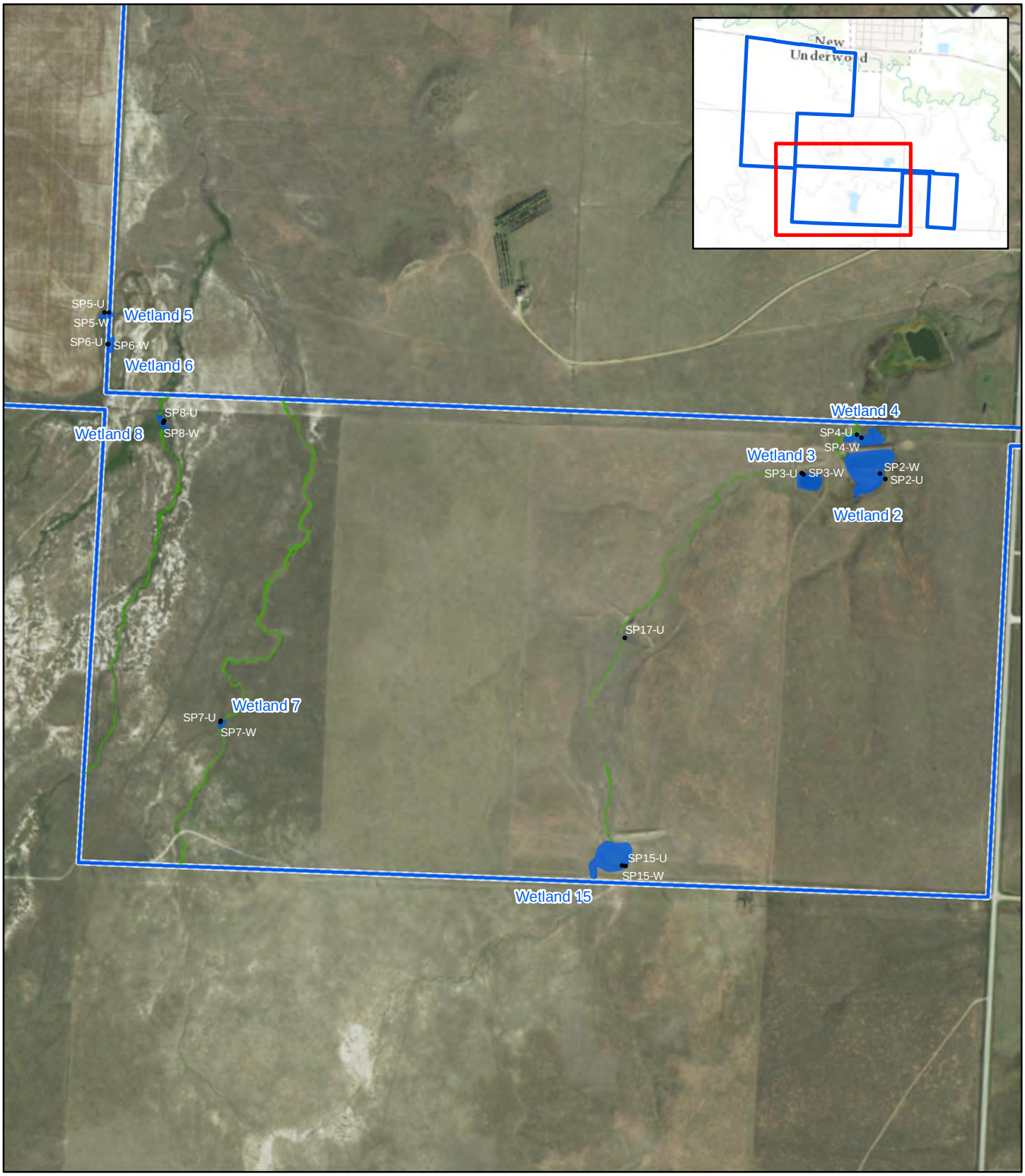
Dry Swale/Drainage

0 375 750 1,500

1:9,240 Feet

N

AREA M



Wetland Delineation Map - Inset

Geronimo Energy, LLC - Wild Springs Solar Project

Pennington County, South Dakota

Project Site

• Wetland Sampling Point

Aquatic Resource

Field Delineated Wetland

Box Elder Creek

Dry Swale/Drainage

0 385 770 1,540

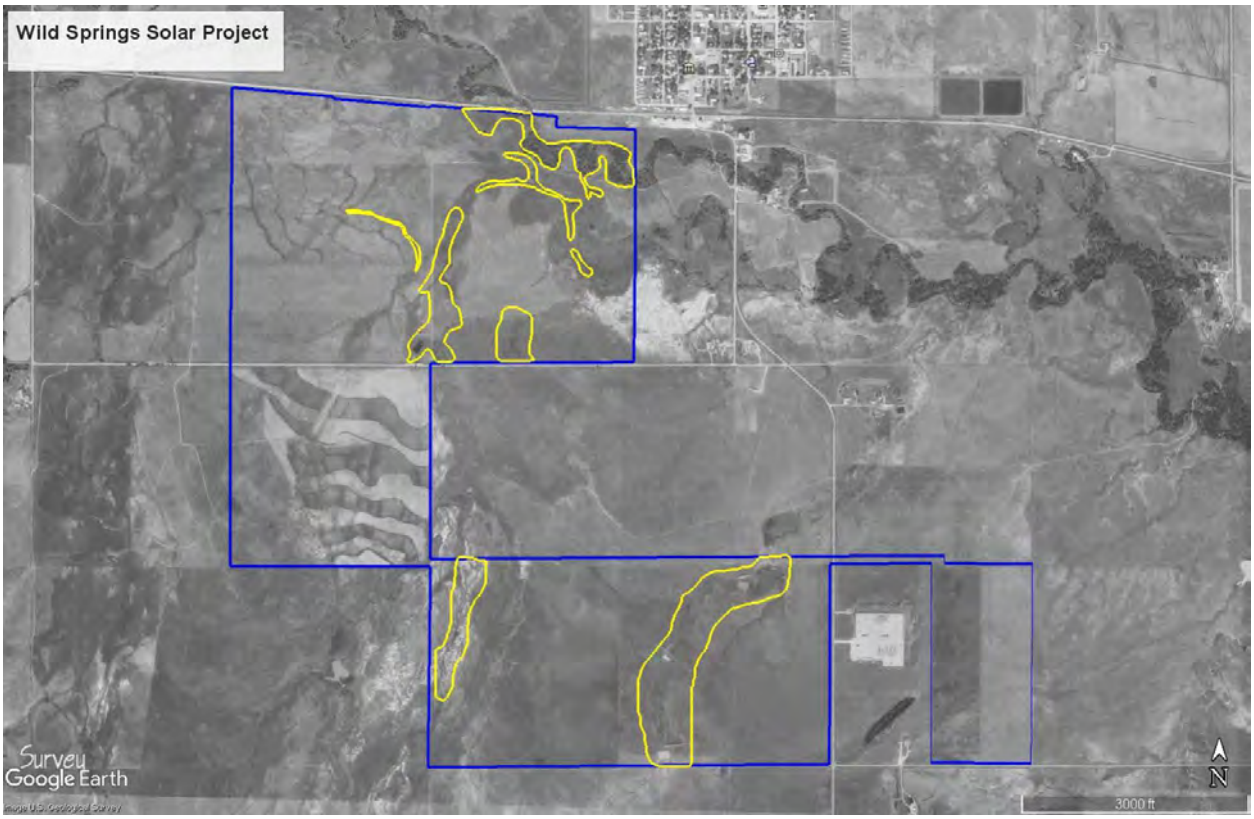
1:9,540 Feet

N

AREA M

Appendix B:

Historic Aerial Imagery



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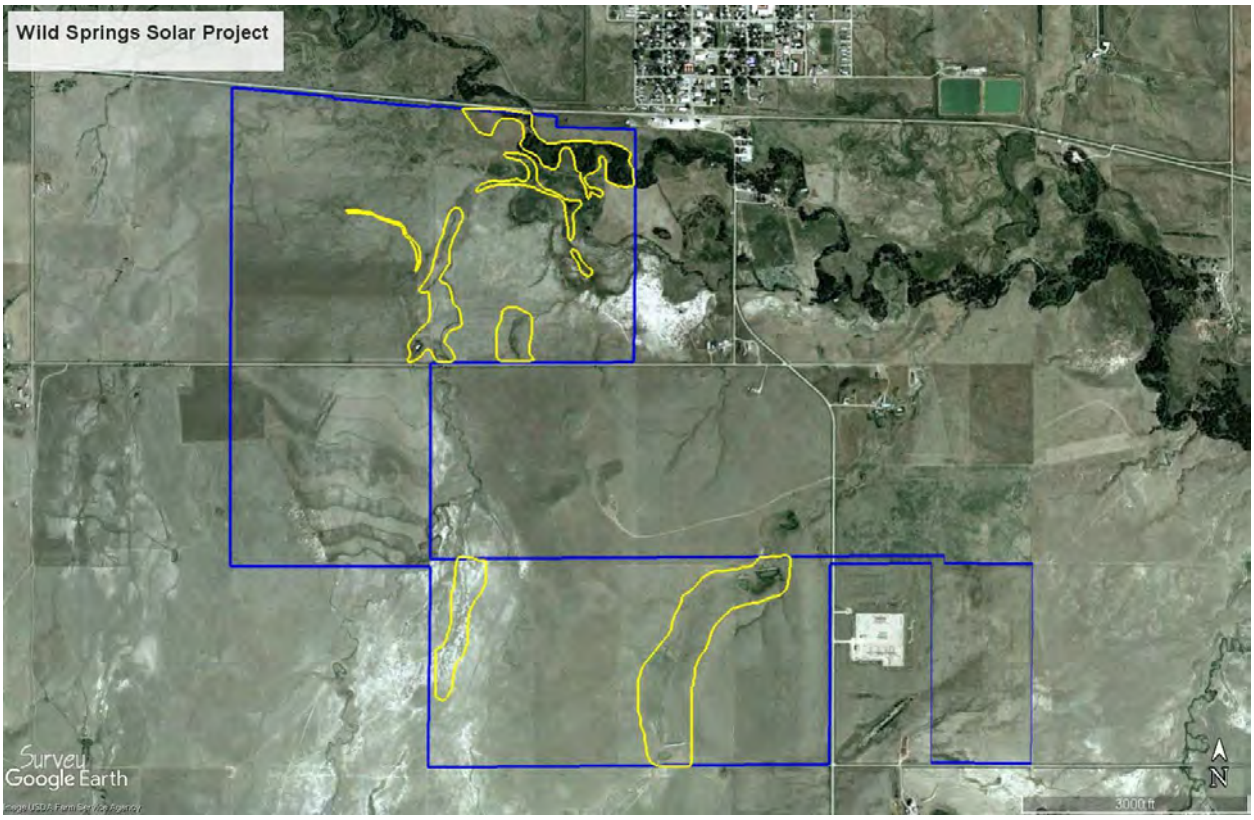

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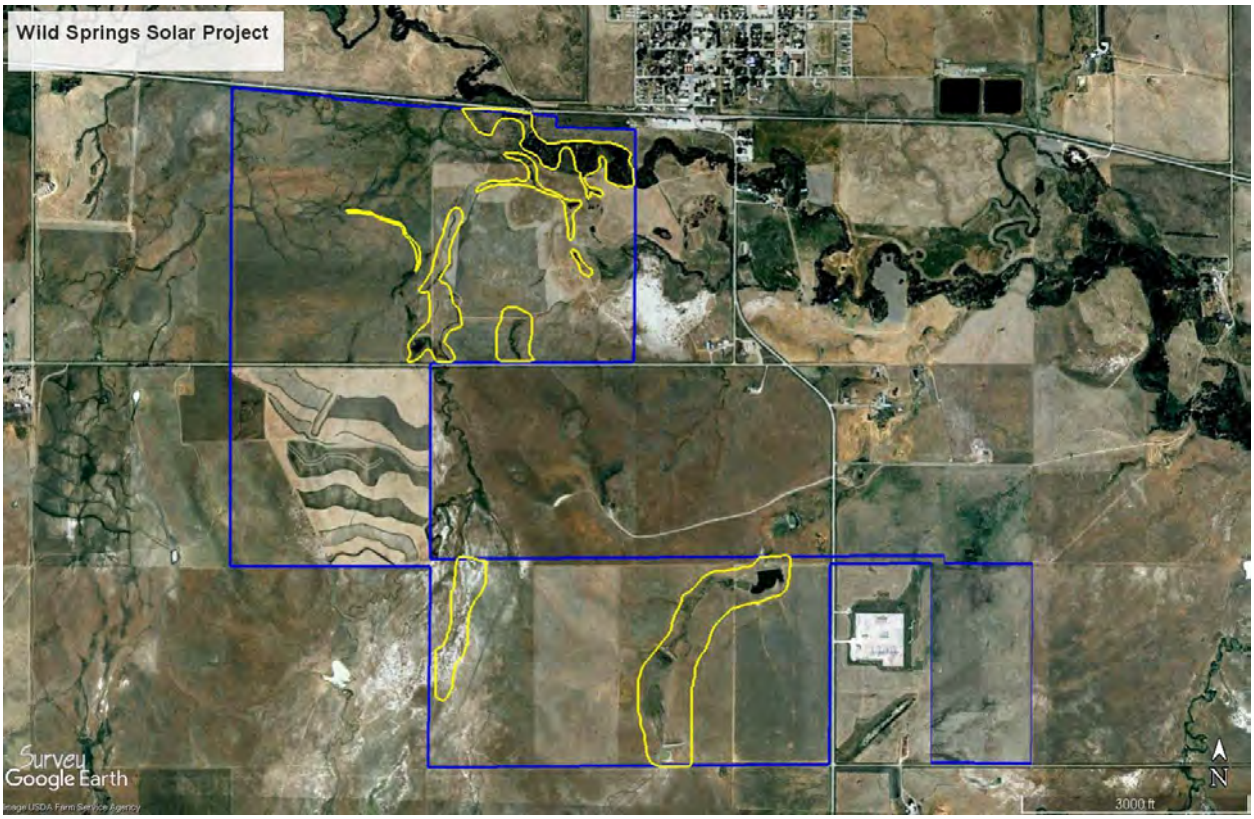

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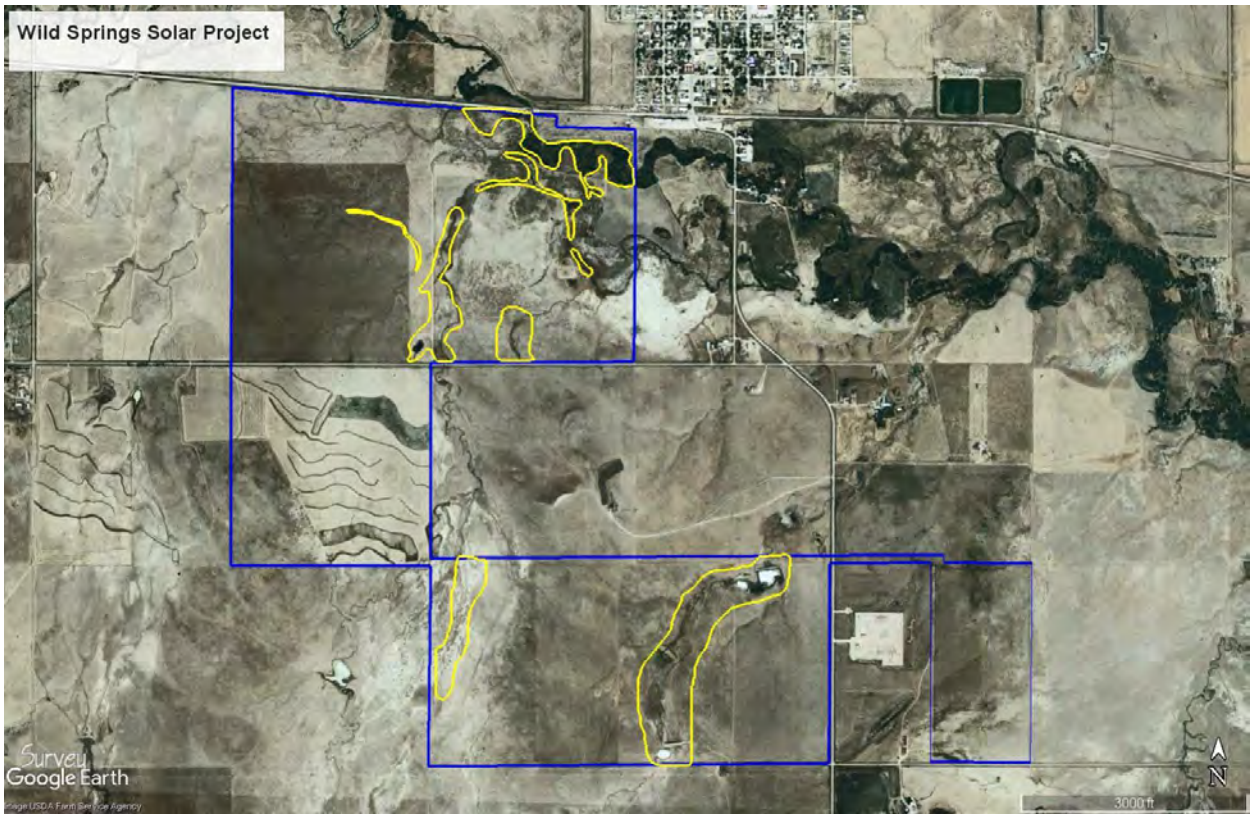

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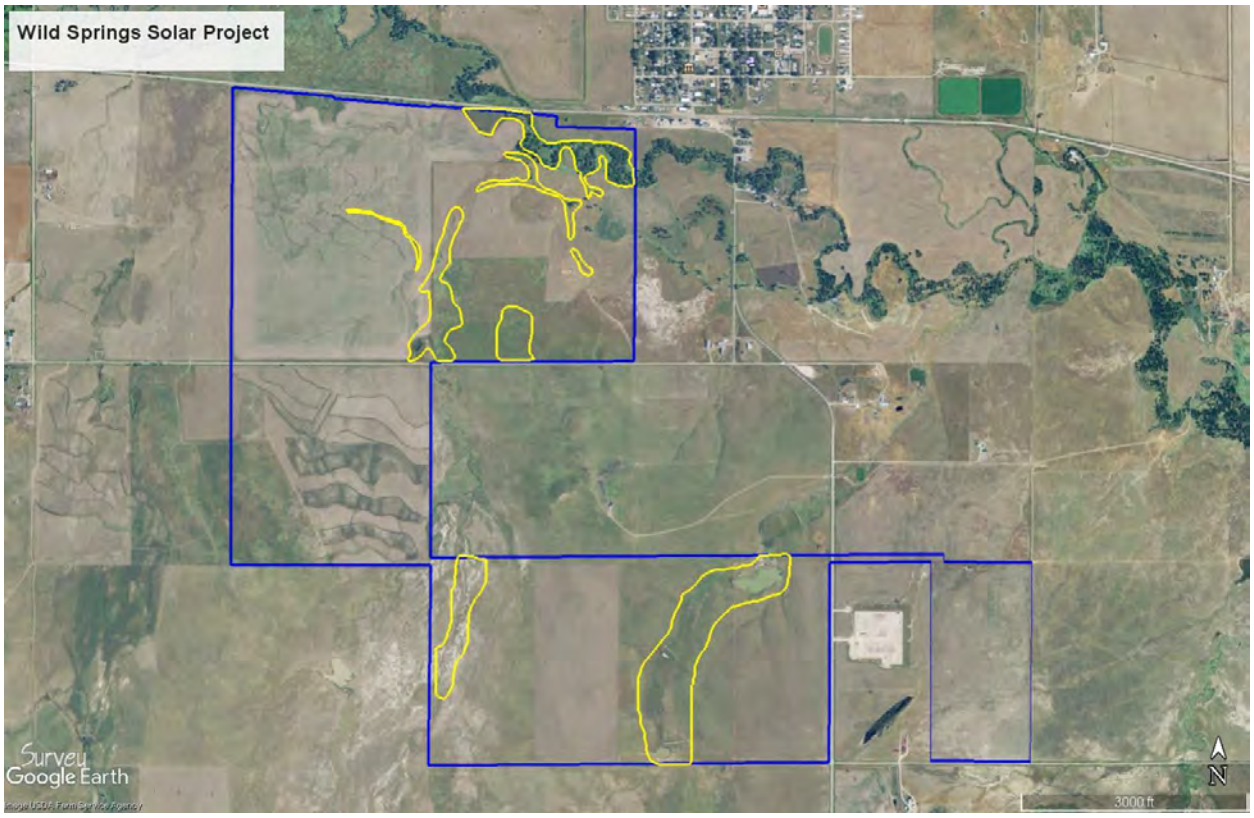

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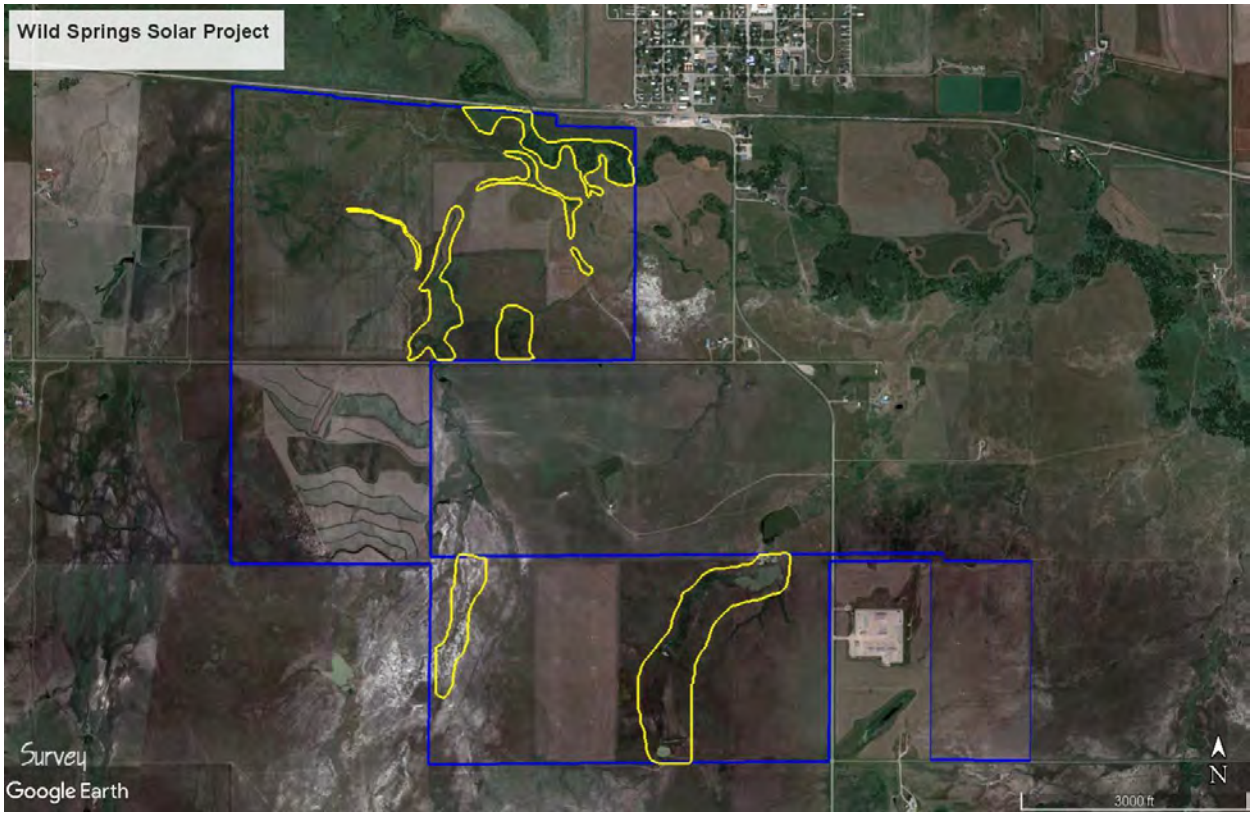

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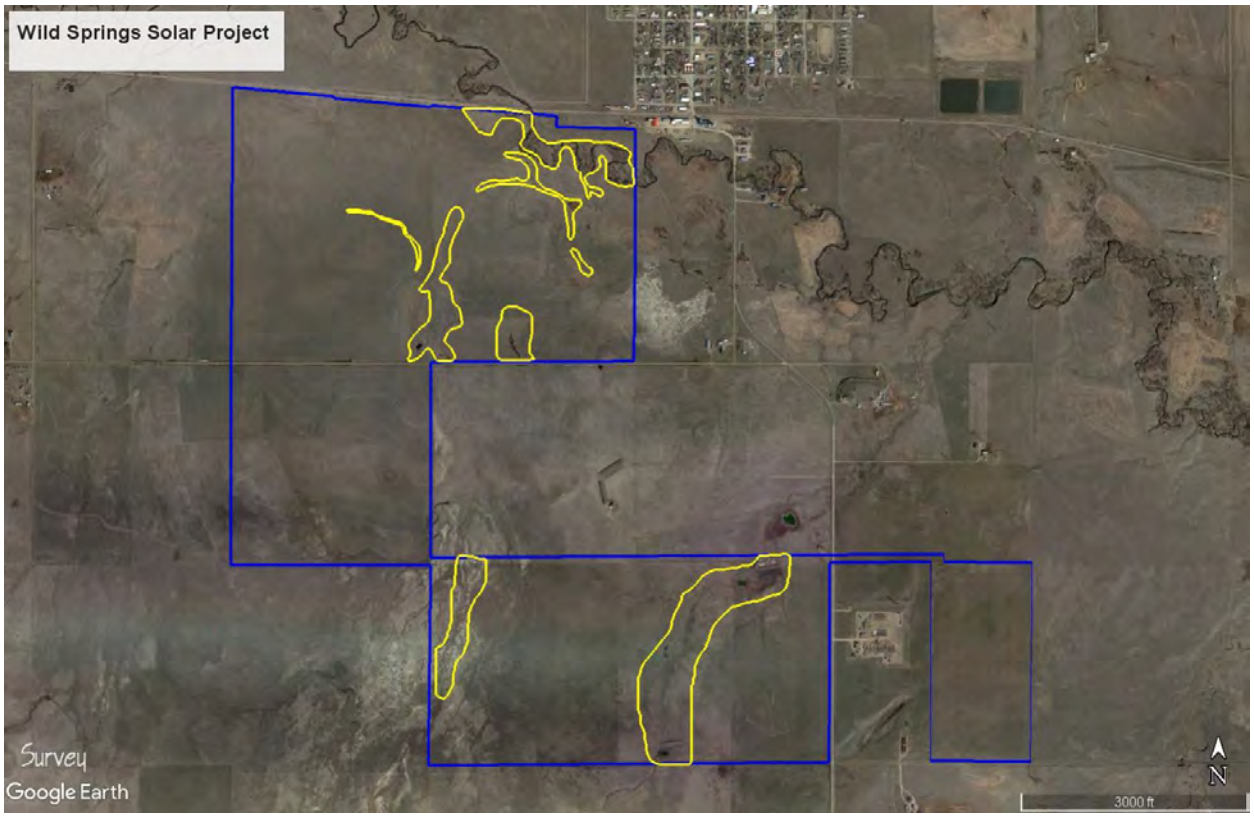
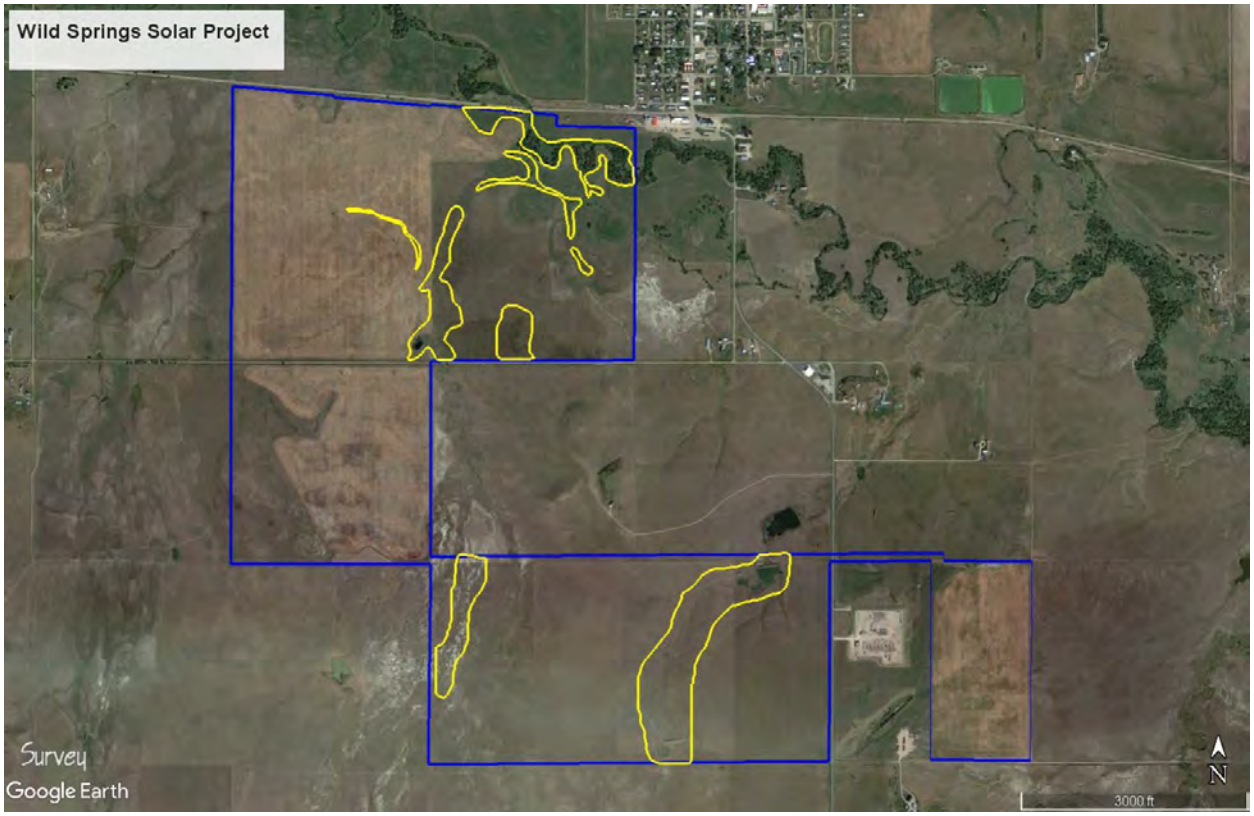


4/1/2013



9/12/2015

AREA M

Appendix C:

Field Photographs

Representative short-grass pastureland located within the Project Site

Small, upland swale with isolated cottonwood patches located within the Project Site

Representative cropland located within the Project Site

Representative upland shortgrass prairie located within the Project Site

Small upland swale, mapped as an NWI wetland, located within the Project Site

Depressional swale containing isolated wetlands located within the Project Site

Wetland 1

Wetland 2

Wetland 3

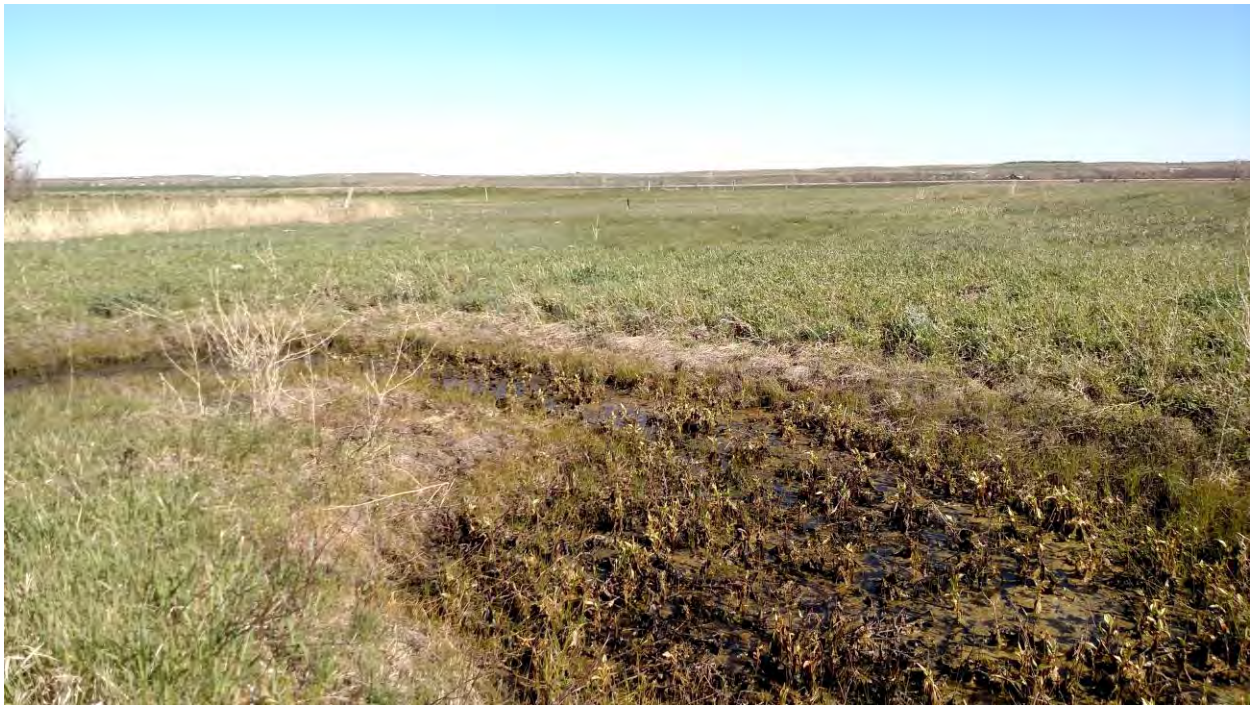
Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland 8



Wetland 9

Wetland 10

Wetland 11

Wetland 12

Wetland 13

Wetland 14

Wetland 15

Level 2 Wetland Delineation Report
Wild Springs Solar
Pennington County, South Dakota

Prepared for:

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AREAM

February 2020

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I certify that, to the best of my knowledge, this wetland delineation and report were completed following current wetland standards as set forth by the USACE and NRCS. Findings in this report represent Area M's best judgement based on conditions and information available at the time of the wetland delineation.

Jonathan Knudsen, WDC, MS
Principal Biologist/Wetland Specialist
MN Certified Wetland Delineator 1307

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TABLES

APPENDICES

INTRODUCTION

Area M Consulting (Area M), on behalf of Wild Springs Solar, LLC, a wholly owned subsidiary of Geronimo Energy, LLC (Client), a National Grid Company, conducted a wetland delineation for the Wild Springs Solar (Wild Springs or Project), a proposed utility-scale solar facility located within Pennington County, South Dakota. The Area M biologist conducted a routine Level 2 (field) Delineation, as defined by the United States Army Corps of Engineers (USACE) within the Project boundaries. The objective of the wetland delineation was to identify and map wetlands and provide a jurisdictional opinion of aquatic resources within the Project. An initial wetland delineation was conducted by Area M for in 2017 for a portion the Project, which subsequently expanded in 2019. This wetland delineation was conducted within only the expansion area (Study Area). This wetland delineation report is assembled to assist the Client with internal planning and to meet regulatory requirements necessary for permitting a commercial solar project in Pennington County.

PROJECT DESCRIPTION

The Wild Springs Solar Project located south of New Underwood, South Dakota, encompasses 1498.6 acres in Pennington County, South Dakota. The Project is a commercial-level solar garden proposed to produce up to 128 MW of electricity from ground-mounted photovoltaic arrays. The Project will consist of a series of solar arrays, access and maintenance roads, equipment pads, and aboveground transmission lines connecting the Project to a nearby Western Area Power Authority (WAPA) substation. A wetland delineation was previously conducted by Area M for a large portion of the Project (Appendix A). This portion was a reviewed by the USACE and an Approved Jurisdictional Determination was rendered (#NWO-2017-110-PIE) However, the Project has expanded substantially to the south and east, encompassing several additional parcels totaling 647.0 acres within Sections 5, 7, 8, and 9 T001N:R11E (Study Area).

The topography within the Study Area is undulating, containing several hills and drainageways with an overall relief of approximately 160 feet (2,840-3,020 ft). Box Elder Creek is located approximately one mile north of the Study Area, flowing east towards its confluence with the Cheyenne River 20 miles to the southeast. Generally, the Study Area slopes to the north, but several hills and shallow basins divert surface run-off into ephemeral swales and minor drainageways which flow north towards Box Elder Creek. The existing landscape is a mixture of cropland, disturbed grassland, and drainageways with most of the land currently being used as cattle pasture. The most common plant species identified by Area M biologists during ground surveys included blue grama (*Bouteloua gracilis*), Kentucky bluegrass (*Poa pratensis*), buffalograss (*Bouteloua dactyloides*), western wheatgrass (*Pascopyrum smithii*), crested wheatgrass (*Agropyron cristatum*) and several low-lying forbs such as common dandelion (*Taraxacum officinale*) and fringed sage (*Artemesia frigida*). Woodlands and shrublands are absent from the Project, with the exception of small monotypic communities of willow (*Salix spp.*) and snowberry (*Symphoricarpos occidentalis*). Sparse cottonwoods (*Populus deltoids*), boxelder (*Acer negundo*), and willows occur in small clusters within some of the shallow swales and along drainageways. The Study Area is composed of private land with the exception of a parcel that is owned by Western Area Power Administration (WAPA) and contains the WAPA owned New Underwood Substation.

OFF-SITE REVIEW

Prior to fieldwork, Area M conducted a comprehensive desktop review of data sources to identify the presence/absence and extent of wetlands that could occur within the Study Area. Areas with wetland signatures, suggesting potential wetland conditions, were evaluated in greater detail during the field investigation. The following data sources were reviewed; the analysis of each data set is discussed in greater detail in the later part of this section.

- Hydrologic soil data
- Elevation Data
  - United States Geological Survey (USGS) topographic maps
- Mapped Wetlands/Waterbodies
  - U.S. Fish and Wildlife Services (USFWS) National Wetland Inventory (NWI)
  - National Hydrography Dataset (NHD)
- Historic and current aerial photographs
- Antecedent precipitation data

Soils

The Web Soil Survey (NRCS, 2019a) was accessed to summarize mapped soil types which occur within the Study Area. Map Units and their associated hydric attributes are presented in Table 1.

Table 1. All NRCS soil units within the Study Area (NRCS, 2019).

Map Unit	Soil type	% Slope	Depth to Water table (Inches)	Ponding/ Flooding Frequency	Hydrologic Group/ Hydric Rating	Acres within Study Area	Percent within Study Area
HpB	Hisle silt loam	0-6	>80	None/None	D/0	134.9	20.8
KyA	Kyle clay	0-2	>80	None/None	D/0	134.9	20.8
KyB	Kyle clay	2-6	>80	None/None	D/0	36.5	5.6
NuA	Nunn loam	0-2	>80	None/None	C/1	52.4	8.1
NuB	Nunn loam	2-6	>80	None/None	C/1	44.6	6.9
PeB	Pierre clay	2-6	>80	None/None	D/2	213.1	32.9
PeC	Pierre clay	6-9	>80	None/None	D/0	11.0	1.7
PeD	Pierre clay	6-20	>80	None/None	D/0	1.4	0.2
SzB	Swanboy clay	0-3	>80	None/None	D/0	18.1	2.8

Overall, the Study Area consists of an even mix of soils with hydric and non-hydric ratings. All soils are well-drained and contain hydric rating less than 2. Only two soil series within the Study Area, Lohmiller Silty Clay and Nunn loam, are categorized as hydric in Pennington County (Neilson, 1996). The full list of hydric soils components and attributes are listed in Appendix B.

Mapped Wetland Data

The NWI (USFWS, 2019) and NHD (USGS, 2019) data sets were reviewed to document suspected wetlands and/or waterbodies within the Study Area. Area M confirmed seven NWI features, six NHD flowlines, and one NHD waterbody occur within the Study Area (Appendix A). All wetland and waterbody features within these datasets appear to be hydrologically associated with Box Elder Creek.

Topographic Data

Elevation and topographic data from the USGS were reviewed within the Study to identify potential basins, drainageways, or depressional areas which are indicative of wetlands. The Project contains a mixture of steep topography, drainageways, eroded hillsides, and gently sloping flats. Several minor drainageways or swales run north or northeast towards their confluence with Box Elder Creek; these drainageways appear to contain possible natural and man-made basins or seeps that are indicative of wetlands (Appendix A). Depending on the amount, duration, and frequency of rain events, these drainageways may contain wetlands.

Historic Aerial Review

Aerial photography from 10 separate years was analyzed to identify areas within the Study Area that exhibited wetland hydrology signatures (Appendix C). Overall, consistent hydric signatures were identified within portions of minor drainageways (outlined in yellow in Appendix C). These areas were investigated in greater detail during the field delineation.

Off-site Summary

Overall, the off-site review suggests wetlands may occur within the shallow drainageways associated with Box Elder Creek. In additional, several apparent man-made stock ponds are located adjacent to or in-line with swales or drainageways (Appendix A). All potential wetland areas identified during this off-site review, as well as the remainder of the Study Area, were investigated in detail during the field delineation.

FIELD DELINEATION

Methodology

Wetlands identified during the off-site analysis were confirmed in the field using routine on-site delineation methods in accordance with the USACE Wetlands Delineation Manual (USACE, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE, 2010). This included the characterization of vegetation, soils, and hydrology on-site. Wetlands are defined by the USACE as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." For an area to be delineated as a regulated wetland, the vegetative, hydrologic, and soil characteristics must all be present and consistent with federal classification criteria.

Transects were established in representative transition zones, perpendicular between suspected wetland and upland areas. Paired Survey Points were recorded along each transect, one in the upland and one in the wetland, in order to identify the wetland boundary. Wetland criteria were evaluated at each Survey Point and a Wetland Determination Form – Great Plains Region (Form) was completed. Additional Survey Points were collected within each unique vegetation community (if present) and/or potential wetland area to document and characterize baseline hydrology, soils, and vegetation within the Study Area. Determination of wetland type was based on the classification system developed by Cowardin et al. (1979). The entire Study Area was surveyed in the field to confirm the absence of additional wetlands.

The location and boundaries of wetland features identified by Area M during field surveys were recorded in the field using a Trimble Geoexplorer 6000 which typically achieves accuracy within 2 feet. Waterways detected within the Study Area were mapped by identifying the Ordinary High Water Mark (OHWM). A map depicting wetland and waterway boundaries, survey points, and transects is included in Appendix A. Representative photos of the Study Area are included in Appendix D. Field Forms are included in Appendix E.

Field Conditions

Area M conducted a field delineation within the Study Area October 8-11 for the western parcels and November 22-25, 2019 for the eastern parcels. Field conditions were variable, ranging from calm, clear days to persistent rain. The temperature varied between days but remained between 32- and 50-degrees Fahrenheit during surveys in October and November. As indicated during the off-site review, the majority of the Study Area is used as pastureland, and some fields were hayed (natural grasses) at the time of the surveys. Several fenced fields were used as cropland in 2019. Due to the surveys being conducted in the fall, only shrubs, trees, late-season grasses, and late-blooming forbs could be positively identified in the field. However, the ground was still unfrozen; soil and hydrology indicators were observable.

Antecedent Precipitation Conditions

Antecedent Precipitation conditions were evaluated using the NRCS Method for Evaluating Antecedent Moisture Conditions prior to the delineation to place field observations in context with recent precipitation. Based on using this three-month approach, precipitation was greater than normal during the field delineations on October 8-11, 2019 and November 22-25.

Table 2. Study Area precipitation data.

Month	Observed Precipitation	Monthly Average	Condition	Value	Weight*	Product*
August	3.17	1.56	Wet	3	1/-	3/-
September	1.47	1.29	Normal	2	2/1	4/2
October	2.45	1.42	Wet	3	3/2	9/6
November	1.09	0.61	Wet	3	-/3	-/9
						16/17

Source: (NOAA, 2019)
* October survey /November survey

Field Review Summary

Based upon this routine Level 2 Wetland Delineation, it is the professional opinion of Area M that ten wetlands occur within the Study Area (Table 3, Appendix A).

Table 3. Delineated Wetlands

Wetland[1]	Cowardin Classification Code	Acreage within Study Area	Lat	Long
Wetland 17	PEM1C	0.04	44.066034	-102.840597
Wetland 18	PEM1C	0.09	44.066608	-102.838861
Wetland 19	PUBhx	0.83	44.060656	-102.833476
Wetland 20	PEMC/R4SB5	0.98	44.06076	-102.831606
Wetland 21	PUBG/PEM1C	1.67	44.068953	-102.826508
Wetland 22	PEM1A/R4SB5	0.10	44.066888	-102.811164
Wetland 23	PEM1C/R4SB5	0.03	44.063758	-102.792983
Wetland 24	PEM1C	0.02	44.06377	-102.791216
Wetland 25	PEM1C	0.02	44.064095	-102.790164
Wetland 26	PEMC/R4SB5	0.05	44.063801	-102.789499

[1]Wetland numbering starts after last delineated wetland from previous report (Area M, 2017)

Wetland 17: PEM1C – 0.04 acres

Wetland 17 is a small depressional emergent wetland contained within an upland swale in the western portion of the Study Area. Aerial imagery suggests inundation and saturation is highly variable between years, ranging from being completely dry in some years to supplying intermittent water flow to the stock pond to the north. At SP 17-W, located on the edge of the feature, Standing Water (A1) was observed. Soils were reduced with redox concentration under a dark stratum, meeting the Depleted Matrix (F3) and Depleted Below Dark Surface (A11) indicators. The plant community was hydric, dominated by sedge (*Carex sp.*), curly dock (*Rumex crispus*), and *poa*. Several upland or FAC U species were also present, suggesting this wetland likely fluctuates in size relative to antecedent precipitation. At SP 17-U, located upland from the feature, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by Kentucky bluegrass and buffalograss. The wetland boundary was mapped by following the perimeter of the sedge community.

Wetland 18: PEM1C – 0.09 acres

Wetland 18 is a small depressional emergent wetland contained within an upland swale in the western portion of the Study Area (within the same broken channel as Wetland 17). Aerial imagery suggests inundation and saturation is highly variable between years, ranging from being completely dry in some years to supplying intermittent water flow to the stock pond to the north. At SP 18-W, located on the edge of the feature, Standing Water (A1) was observed. Soils were reduced with redox concentration under a dark stratum, meeting the Depleted Matrix (F3) and Depleted Below Dark Surface (A11) indicators. The plant community was hydric, dominated by sedge, but several upland or FAC U species were present,

suggesting this wetland likely fluctuates in size relative to antecedent precipitation. At SP 18-U, located upland from the feature, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by Kentucky bluegrass, curlycup gumweed (*Grindelia squarrosa*), sweet clover (*Meliotus officinale*), and buffalograss. The wetland boundary was mapped by following the perimeter of the sedge community and distinct topographic margin.

Wetland 19: PUBhx – 0.83 acres

Wetland 19 is a small stock pond created from the impoundment of a minor/ephemeral drainage (Wetland 20) associated with Box Elder Creek. Aerial imagery suggests this reservoir contains water most years. At SP 19-W, located at the OHWM, surface water was present was present (A1). Aerial imagery demonstrates this area to be ponded in all reviewed imagery (B7). Soils were dark at the surface but reduced with redox concentrations at approximately 3 inches (A11, F3). The plant community was hydric, dominated by sedge and curly dock. The wetland boundary was mapped by following the OHWM. Wetland 19 was significantly disturbed due to the cattle use.

Wetland 20: PEMC/R4SB5 – 0.98 acres

Wetland 20 includes an intermittent to perennial tributary to Box Elder Creek and associated wetland fringe within the southern portion of the Study Area. Wetland 20 displayed both lentic and lotic qualities during the survey, with large pools of water and saturated soils both inside and outside of the channel. At SP 20-W, located within the wetland fringe adjacent to the channel, Saturated Soils (A2) and a High Water Table (A3) were observed at two inches and six inches, respectively. Soils were reduced with redox concentration under a dark stratum, meeting the Depleted Matrix (F3) and Depleted Below Dark Surface (A11) indicators. The plant community was hydric, dominated by prairie cordgrass (*Spartina pectinata*) at the SP, but other hydric plants (e.g. *Typha sp.*) were prevalent within adjacent portions of the wetland. At SP 20-U, located upland from the wetland fringe, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by Kentucky bluegrass, western wheatgrass, leadplant (*Amorpha canescens*), and dandelion (residual). The wetland boundary was mapped by following the perimeter of the distinct wetland plant community (mostly cordgrass) and presence of saturated soils.

Wetland 21: PUBG/PEM1C– 1.67 acres

Wetland 21 is a large, ponded basin in the northcentral portion of the Study Area. Wetland 21 appears to be isolated, as no inlets or outlets were identified during the survey. The wetland includes both a pond and wetland fringe, with a community of young boxelder and willow trees surrounding the feature. At SP 21-W, located within the wetland fringe and adjacent to the pond, Saturated Soils (A2) and a High Water Table (A3) were observed at five inches and eight inches, respectively. Soils were reduced with redox concentration under a dark stratum, meeting the Depleted Matrix (F3) and Depleted Below Dark Surface (A11) indicators. The plant community was hydric, dominated by green bulrush (*Scirpus atrovirens*), prairie cordgrass, boxelder, and willow (*Salix alba*). At SP 21-U, located on the relatively steep bank surrounding the wetland fringe, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by disturbed upland species including sweet clover, crested wheatgrass, and Canada thistle (*Cirsium arvense*). The wetland boundary was mapped by following the perimeter of the distinct transition between upland and wetland plant communities.

Wetland 22: PEM1A/R4SB5 – 0.10 acres

Wetland 22 includes an intermittent to perennial tributary to Box Elder Creek and associated wetland fringe within the central portion of the Study Area. The wetland is mostly contained within the channel but extends outside of the shallow banks and into the ditch to the west as the stream meets a culvert at its northern extent. Wetland 22 displayed both lentic and lotic qualities during the survey, with large pools of water and a gently flowing channel. This wetland/waterbody is located downstream of Wetland 20. At SP 22-W, located within the wetland fringe adjacent to the channel, Saturated Soils (A2) and a High Water Table (A3) were observed at eight inches and twelve inches, respectively. Soils were reduced with redox, meeting the Depleted Matrix (F3) indicator. The plant community was hydric, dominated by prairie cordgrass and Kentucky bluegrass. At SP 22-U, located upland from the wetland fringe, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by crested wheatgrass, sweet clover, and curlycup gumweed. The wetland boundary was mapped by following the OHWM of the channel and expanding to include saturated soils and wetland plant species along the southern edge of the road at the culvert. The wetland was mapped west along the ditch to encompass the extent of cordgrass.

Wetland 23: PEM1C/R4SB5 – 0.03 acres

Wetland 23 is an intermittent drainage associated with Box Elder Creek within the southeastern portion of the Study Area. Wetland 23 did not contain flowing water at the time of the survey, but likely transmits large volumes after rainfall and during spring melt. At SP 23-W, located on the edge of the narrow channel, Saturated Soils (A2) and a High Water Table (A3) were observed at five inches and ten inches, respectively. Soils were reduced with redox concentration, meeting the Depleted Matrix (F3) indicator. The plant community was hydric, dominated by prairie cordgrass and bluejoint (*Calamagrostis canadensis*). At SP 23-U, located just outside of the channel, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by Kentucky bluegrass, western wheatgrass and sweet clover. The wetland boundary was mapped by following the perimeter of the distinct wetland plant community and natural topographic transition between convex and concave landform.

Wetland 24: PEM1C – 0.02 acres

Wetland 24 is a small depressional emergent wetland contained within an upland swale in the southeastern portion of the Study Area (within the same broken swale as Wetland 25). This wetland is contained within an eroded depression within the swale, which may have historically been part of the main channel of the drainage to the south. The swale is upland throughout the majority of its extent within the Study Area, except for Wetland 24 and 25. At SP 24-W, located on the edge of the eroded feature, Saturated Soils (A2) and a High Water Table (A3) were observed at three inches and twelve inches, respectively. Soils were reduced with redox concentration, meeting the Depleted Matrix (F3) indicator. The plant community was hydric and dominated by bluejoint and Kentucky bluegrass. At SP 24-U, located on a flat area adjacent to the wetland, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by western wheatgrass, crested wheatgrass, and sweet clover. The wetland boundary was mapped by following the perimeter of the bluejoint community and distinct topographic transition.

Wetland 25: PEM1C – 0.02 acres

Wetland 25 is a depressional emergent wetland contained within an upland swale in the southeastern portion of the Study Area (within the same broken swale as Wetland 24). This wetland is contained within an eroded depression within the swale, which may have historically been part of the main channel of the drainage to the south. The swale is upland throughout the majority of its extent within the Study Area, except for Wetland 24 and 25. At SP 25-W, located within the eroded depression, Saturated Soils (A2) and a High Water Table (A3) were observed at four inches and ten inches, respectively. Soils were reduced with redox concentration, meeting the Depleted Matrix (F3) indicator. The plant community was hydric, dominated by bluejoint, prairie cordgrass, and Kentucky bluegrass. At SP 25-U, located on the slope adjacent to the wetland, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by western wheatgrass, crested wheatgrass, and sweet clover. The wetland boundary was mapped by following the perimeter of the bluejoint/cordgrass community and distinct topographic transition.

Wetland 26: PEM1C/R4SB5 – 0.03 acres

Wetland 26, located downstream from Wetland 23, is an intermittent drainage associated with Box Elder Creek within the southeastern portion of the Study Area. The channel encompassing Wetland 26 was flattened out at this point on the landscape and water was ponded. At SP 26-W, located on the edge of the wide ponded area, Surface Water (A1) was present. Several aquatic insects were also observed swimming within the wide pool (B13). Soils were reduced with redox concentration, meeting the Depleted Matrix (F3) indicator. The plant community was hydric. Dominant species included prairie cordgrass and cattail (*Typha angustifolia*) At SP 26-U, located on the edge of the ponded area, wetland hydrology indicators were absent, and soils were non-hydric. The plant community was also non-hydric, dominated by a monoculture of blue grama. The wetland boundary was mapped by following the perimeter of the distinct wetland plant community and very steep topographic transition between convex and concave landform. This wetland was extremely degraded due to heavy cattle grazing.

Upland Areas:

Upland areas within the Study Area were predominantly mid-grass prairie used as pastureland/hay, agricultural fields (winter wheat and alfalfa), and upland swales. Areas identified as depressions, or which had hydric signatures in at least one historic slide, were visited in the field and corresponding SP's were recorded. Most areas did not meet any wetland criteria (soils, vegetation hydrology).

RESULTS AND RECOMMENDATIONS

Based upon this routine Level 2 Wetland Delineation, it is the professional opinion of Area M that the Study Area contains **ten** features that satisfy the criteria to be wetlands pursuant to the Army Corps of Engineers' 1987 Manual with subsequent clarification memoranda and pursuant to confirmation by the USACE (Appendix A). Note that only the USACE which regulate activates impacting wetlands/waterbodies, has final authority over aquatic resource extent and jurisdictional status.

It is the professional opinion of Area M that Wetlands 19, 20, 22, 23, and 26 are jurisdictional under Section 404 of the Clean Water Act due to their hydrologic connectivity to Box Elder Creek. Wetlands 17, 18, 21,

24, and 25 are likely not jurisdiction under Section 404 due to their isolation or lack of hydrologic significance. This Jurisdictional Opinion is based on the results of the desktop and field studies and should not be used as proof of wetland presence/absence, extent, or jurisdiction without written concurrence from the USACE. Note that local government units and zoning authorities may impose additional restrictions on wetland disturbance.

Note that this wetland delineation is based on scientific standards and protocols set forth by the USACE and NRCS and represents wetland status and extent based on the conditions within the Study Area at the time of the delineation. These boundaries are subject to approval and amendment after review by the appropriate regulatory agencies.

REFERENCES

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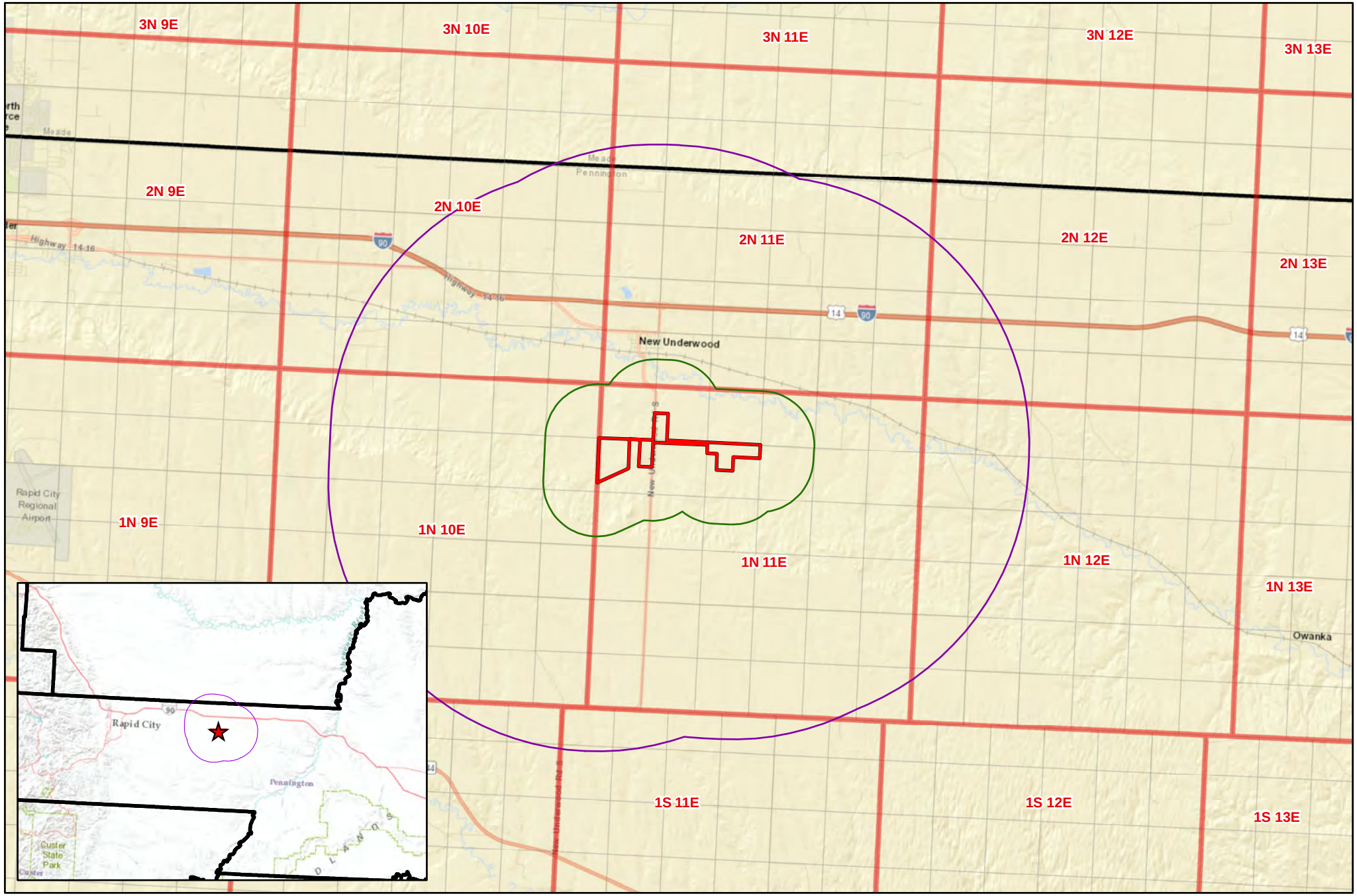
Sprecher, S.W. and Andrew G. Warne, A.G., 2000. Accessing and Using Meteorological Data to Evaluate Wetland Hydrology. WRAP Technical Notes Collection, ERDC/EL TR-WRAP-00-1. U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Appendix A:

Maps



Project Location

Wild Springs Solar

Pennington County, South Dakota

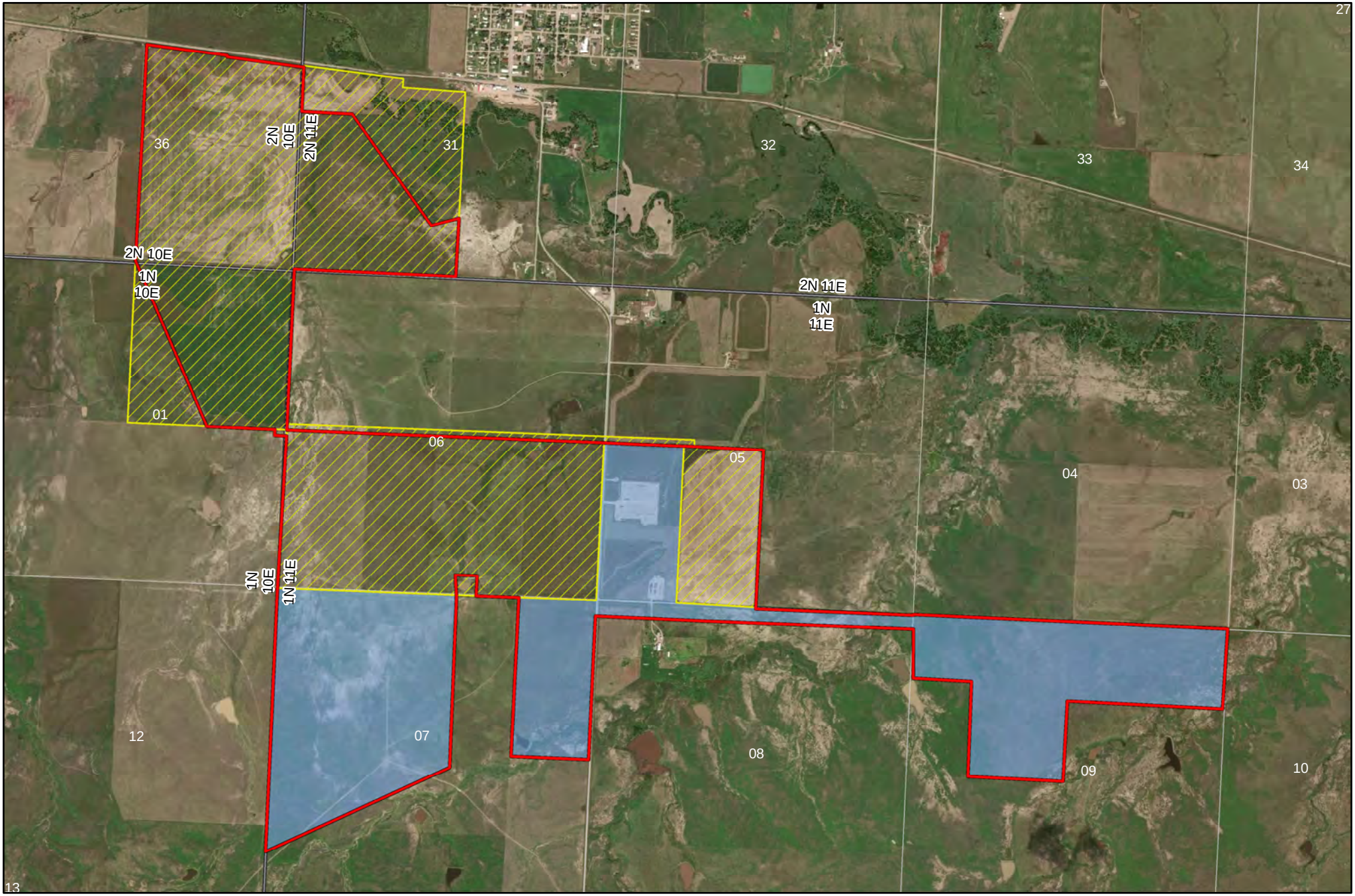
- Study Area
- Project Location
- 1-mile Buffer
- 5-Mile Buffer
- Township Boundary
- Section Boundary
- County Boundary

0 6,250 12,500 25,000

1:150,000 Feet

N

AREA M



Overview Map

Wild Springs Solar

Pennington County, South Dakota

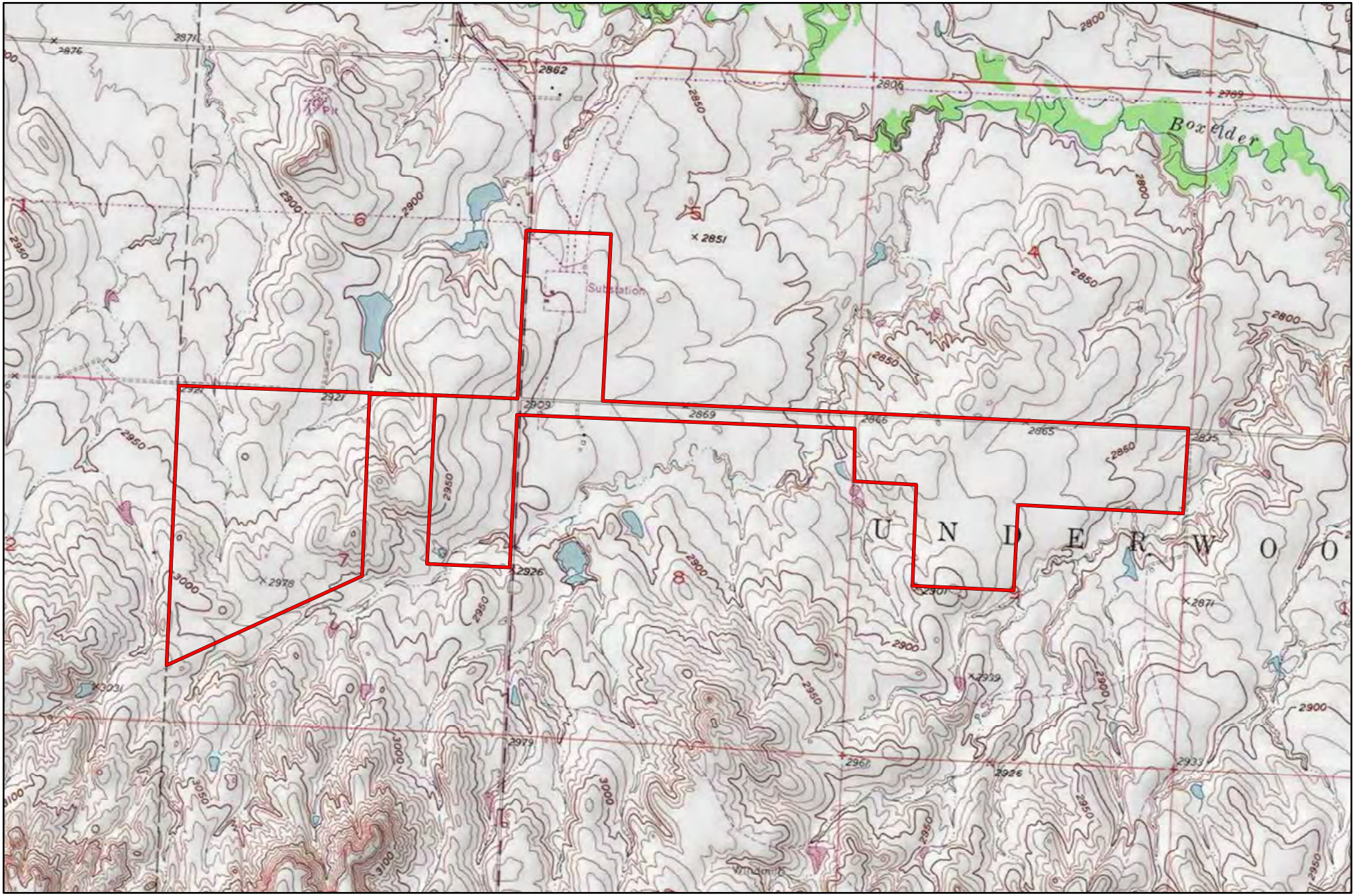
- Study Area
- 2017 Study Area - AJD Issued
- Section Boundary
- Total Project Area
- Township Boundary

0 1,050 2,100 4,200

1:25,500 Feet

N

AREA M



Topographic Map (1:24,0000)

Wild Springs Solar

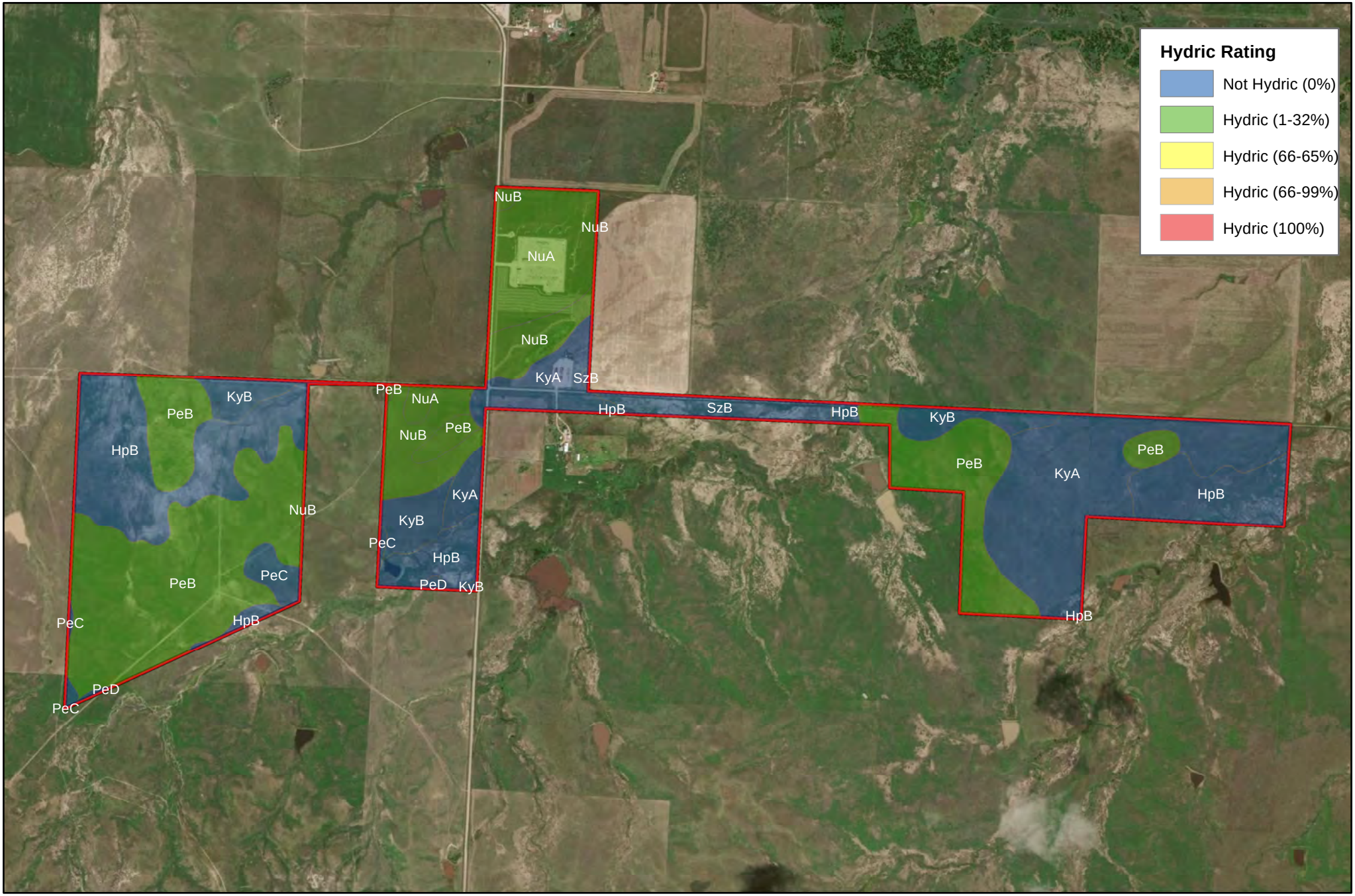
Study Area

Pennington County, South Dakota

N

0 1,000 2,000 4,000
1:24,000 Feet

AREA M



Soils Map

Study Area

Wild Springs Solar

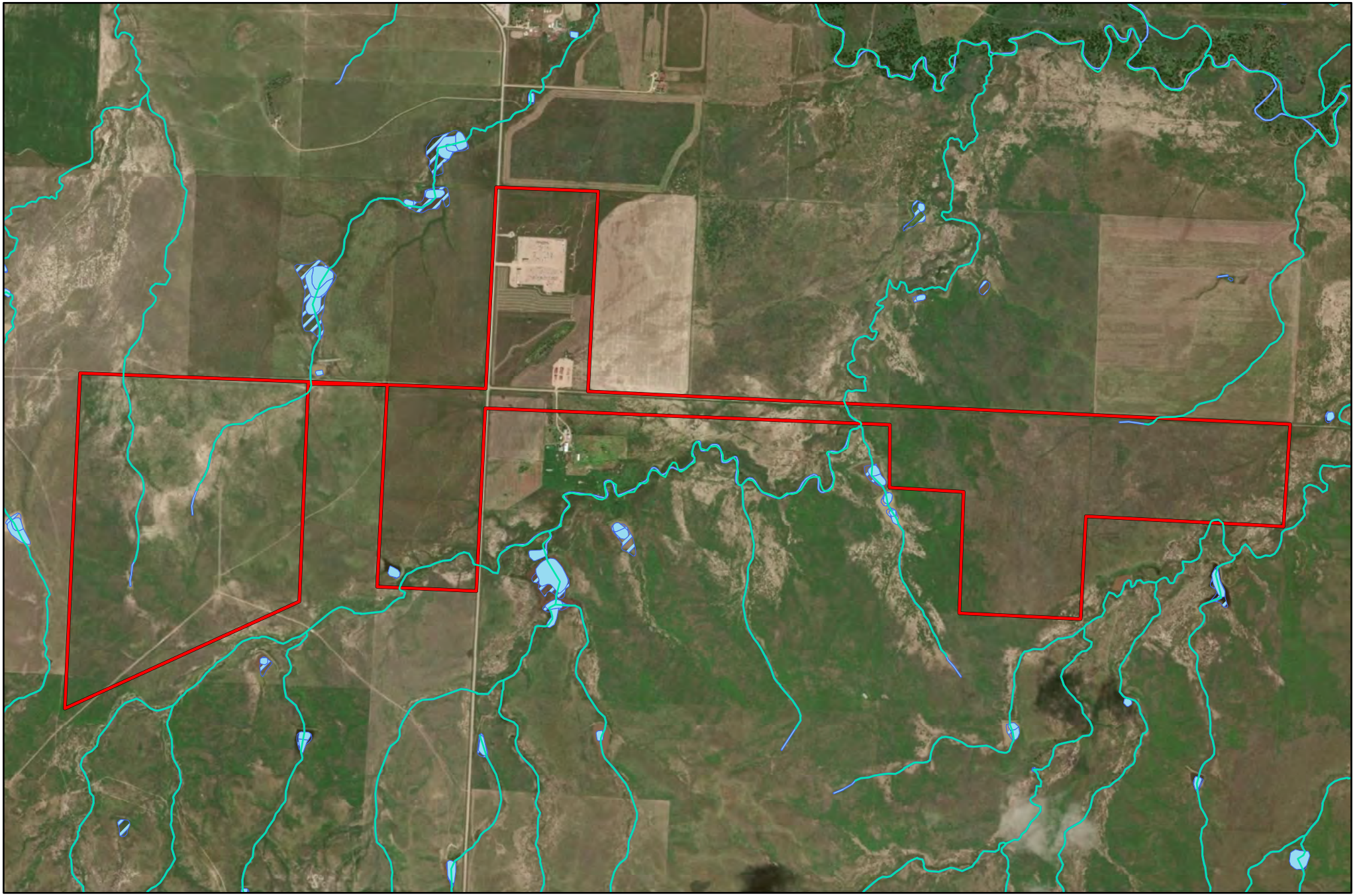
Pennington County, South Dakota

N

0 800 1,600 3,200

1:20,020 Feet

AREA M



Aerial Map

Wild Springs Solar

Pennington County, South Dakota

Study Area

NWI Wetland

NHD Flowline

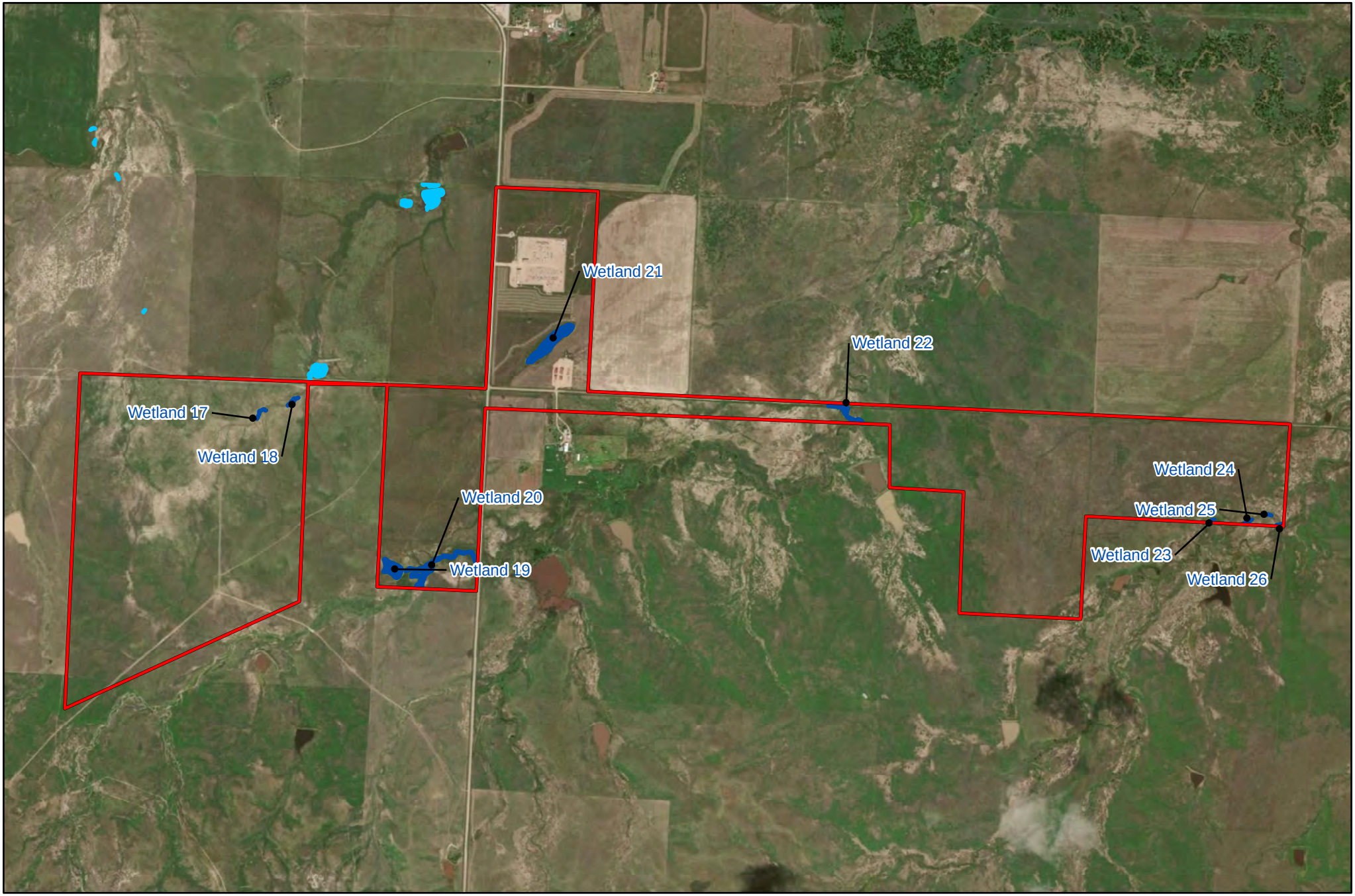
NHD Waterbody

N

0 800 1,600 3,200

1:20,020 Feet

AREA M



Wetland Delineation Overview Map

Wild Springs Solar

Pennington County, South Dakota

Study Area

Previously-delineated Wetland

Delineated Wetland

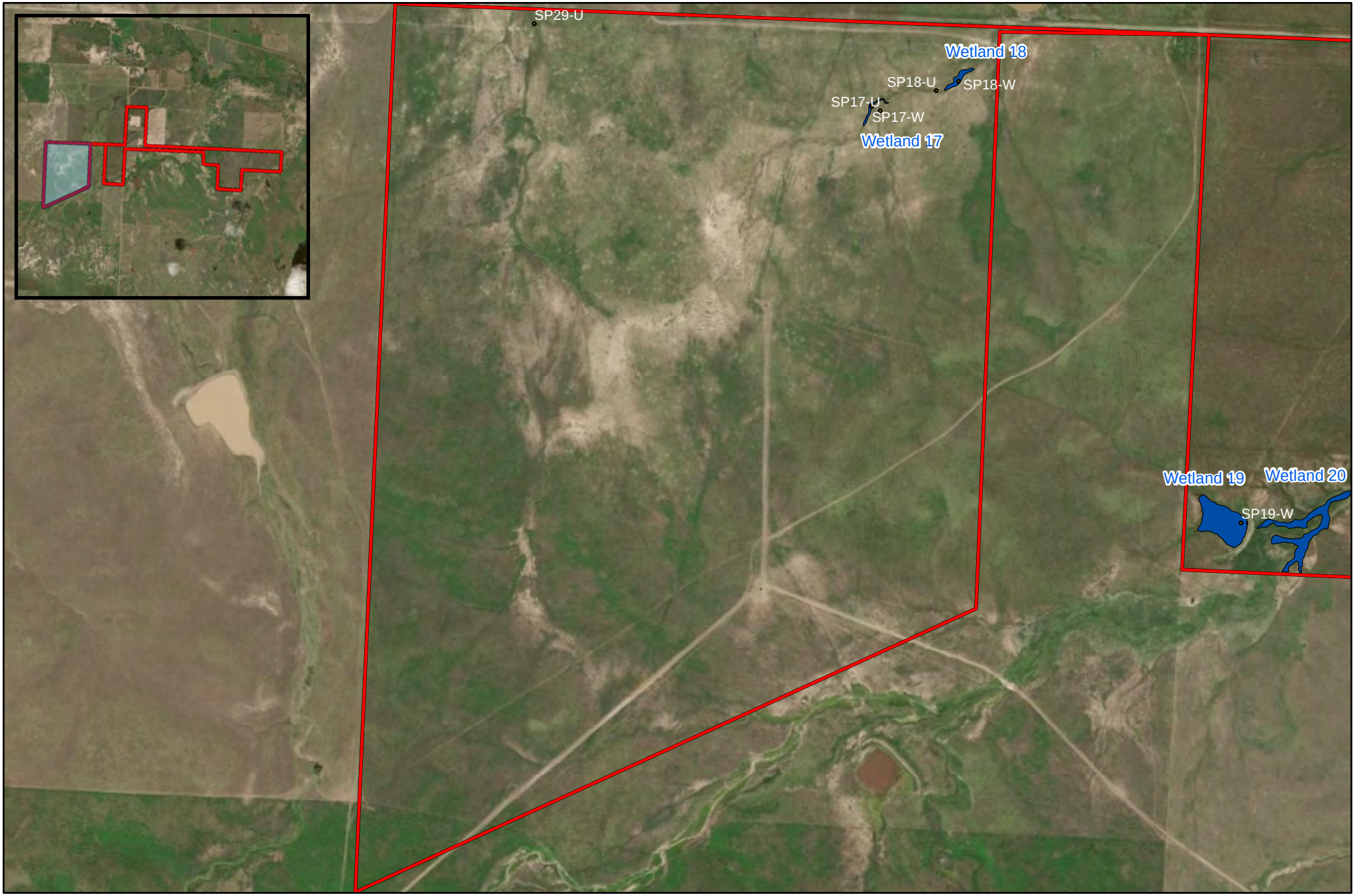
Wetland boundaries enlarged for display

0 800 1,600 3,200

1:20,020 Feet

N

AREA M



Delineation Inset Map

Wild Springs Solar

Pennington County, South Dakota

Study Area

Delineated Wetland

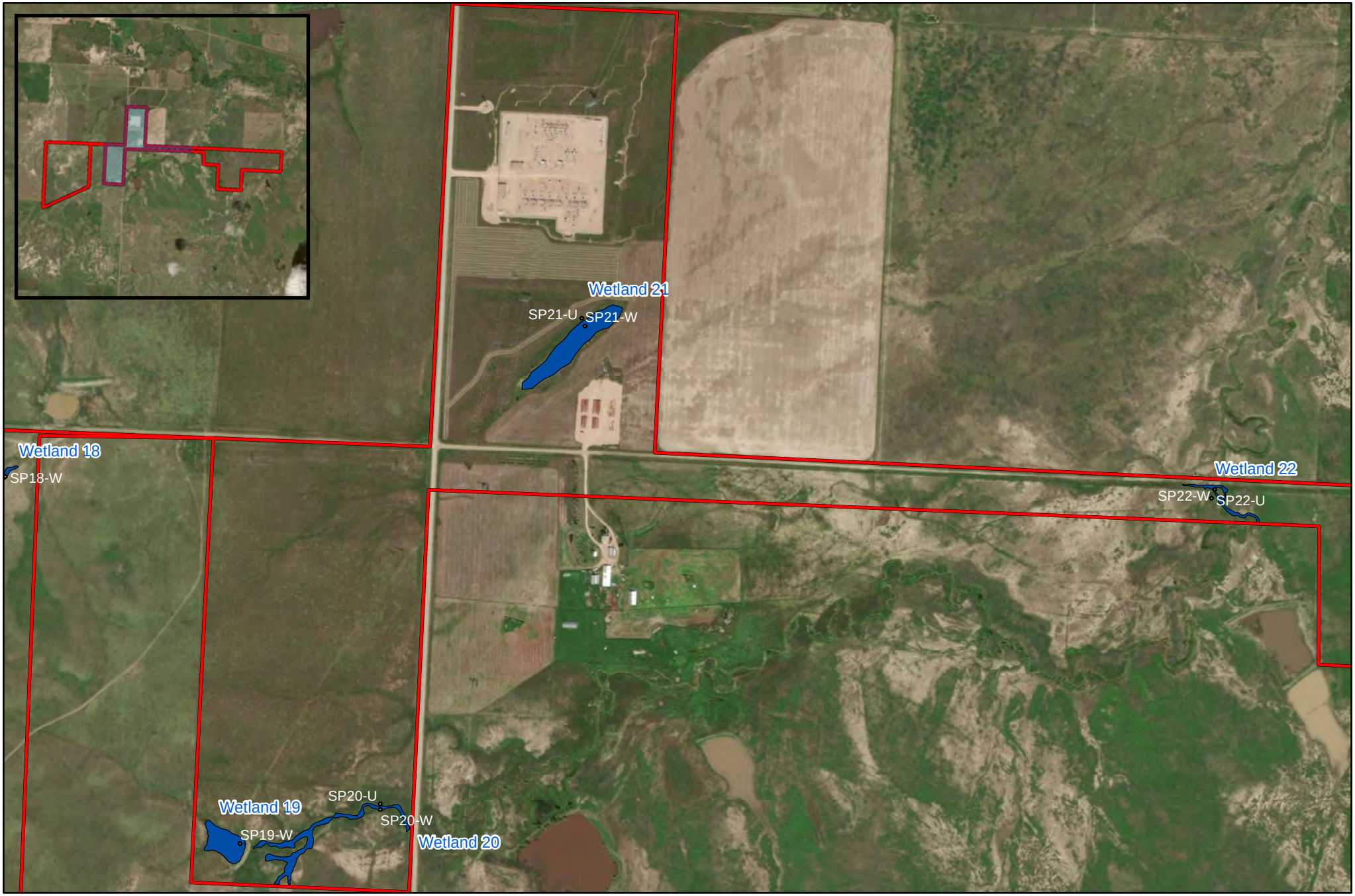
Wetland Sampling Point

0 320 640 1,280

1:7,560 Feet

N

AREA M



Delineation Inset Map

Wild Springs Solar

Pennington County, South Dakota

Study Area

Delineated Wetland

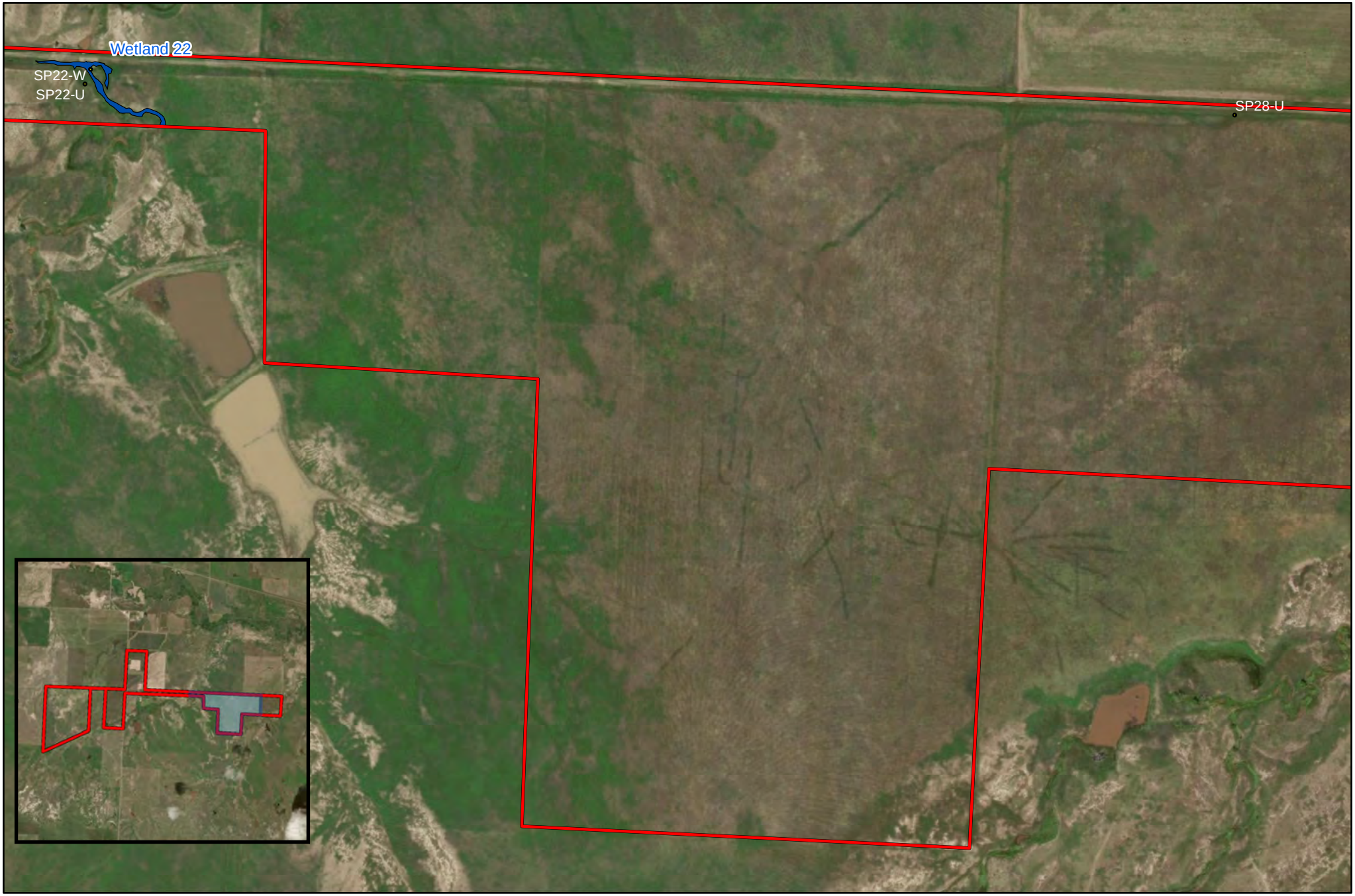
Wetland Sampling Point

0 385 770 1,540

1:9,100 Feet

N

AREA M



Delineation Inset Map

Wild Springs Solar

Pennington County, South Dakota

Study Area

Delineated Wetland

Wetland Sampling Point

0 230 460 920

1:5,420 Feet

N

AREA M

Delineation Inset Map

Wild Springs Solar

Pennington County, South Dakota

Study Area

Delineated Wetland

Wetland Sampling Point

0 100 200 400

1:2,410 Feet

N

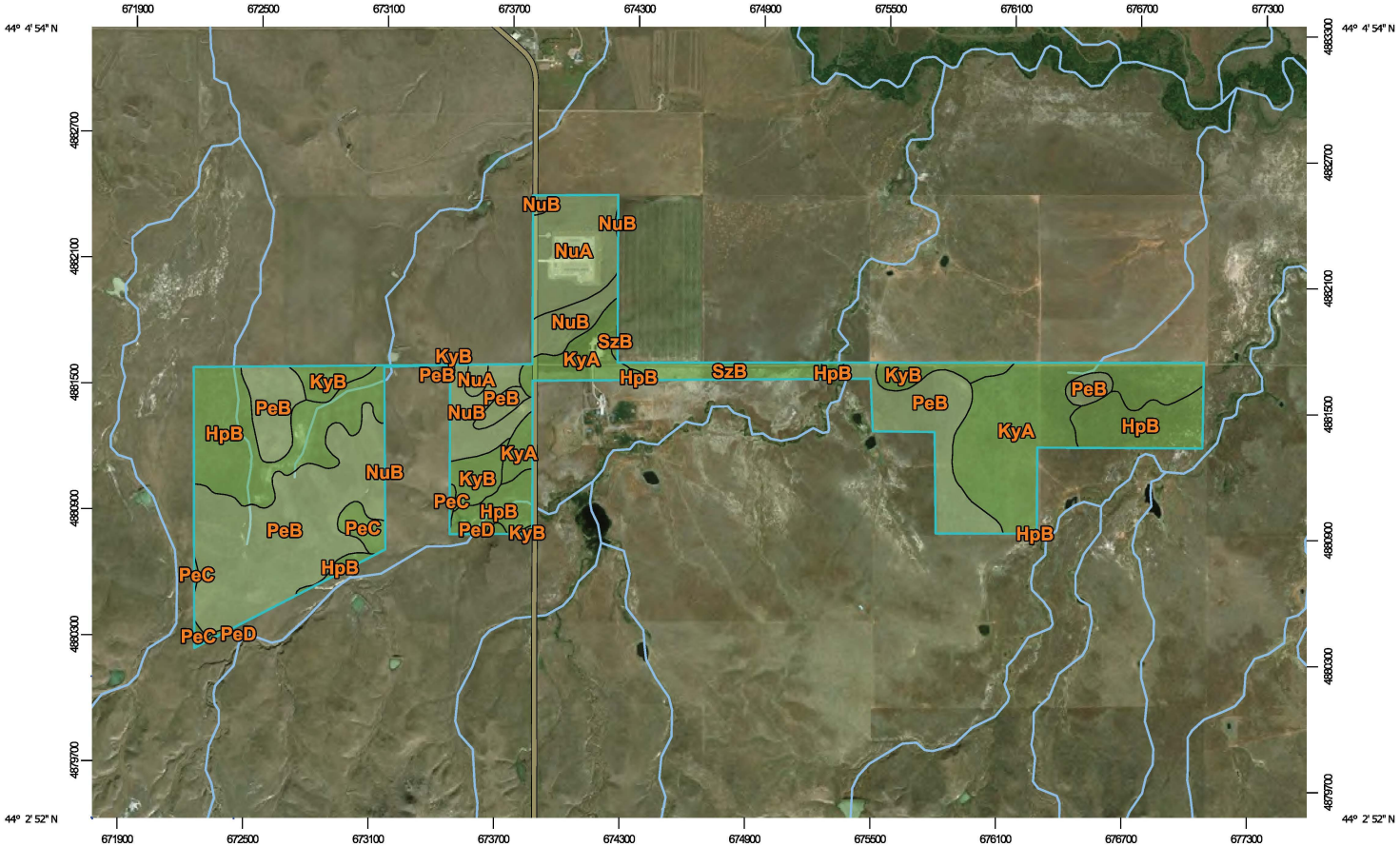
AREA M

Appendix B:

Soils Report

Hydric Rating by Soils Unit and Hydric Soil List – All components

Hydric Rating by Map Unit—Custer and Pennington Counties Area, Prairie Parts, South Dakota
(Wetland_PA)



Map Scale: 1:26,500 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 350 700 1400 2100

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

Hydric Rating by Map Unit—Custer and Pennington Counties Area, Prairie Parts, South Dakota
(Wetland_PA)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Custer and Pennington Counties Area, Prairie Parts, South Dakota
Survey Area Data: Version 11, Sep 17, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 23, 2015—Mar 4, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HpB	Hisle silt loam, 0 to 6 percent slopes	0	134.9	20.8%
KyA	Kyle clay, 0 to 2 percent slopes	0	134.9	20.9%
KyB	Kyle clay, 2 to 6 percent slopes	0	36.5	5.6%
NuA	Nunn loam, 0 to 2 percent slopes	1	52.4	8.1%
NuB	Nunn loam, 2 to 6 percent slopes	1	44.6	6.9%
PeB	Pierre clay, 2 to 6 percent slopes	2	213.1	32.9%
PeC	Pierre clay, 6 to 9 percent slopes	0	11.0	1.7%
PeD	Pierre clay, 6 to 20 percent slopes	0	1.4	0.2%
SzB	Swanboy clay, 0 to 3 percent slopes	0	18.1	2.8%
Totals for Area of Interest			**647.0**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. Doc. 2012-4733 Filed 2-28-12. February, 28, 2012. Hydric soils of the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Vasilas, L.M., G.W. Hurt, and C.V. Noble, editors. Version 7.0, 2010. Field indicators of hydric soils in the United States.

Report—Hydric Soil List - All Components

Hydric Soil List - All Components–SD606-Custer and Pennington Counties Area, Prairie Parts, South Dakota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
HpB: Hisle silt loam, 0 to 6 percent slopes	Hisle	90	Hillslopes	No	—
	Kyle	3	Hillslopes	No	—
	Pierre	3	Hillslopes	No	—
	Samsil	3	Ridges	No	—
	Slickspots	1	Hillslopes	No	—
KyA: Kyle clay, 0 to 2 percent slopes	Kyle	85	Alluvial fans,terraces	No	—
	Lohmiller-Rarely flooded	5	Flood plains	No	—
	Hisle	5	Hillslopes,terraces	No	—
	Swanboy	5	Terraces	No	—
KyB: Kyle clay, 2 to 6 percent slopes	Kyle	85	Terraces,alluvial fans	No	—
	Hisle	5	Hillslopes,terraces	No	—
	Swanboy	5	Terraces	No	—
	Pierre	5	Hillslopes	No	—
NuA: Nunn loam, 0 to 2 percent slopes	Nunn	90	Fans,terraces	No	—
	Beckton	5	Alluvial fans	No	—
	Recluse	4	Fans,terraces	No	—
	Hoven	1	Playas	Yes	2,3
NuB: Nunn loam, 2 to 6 percent slopes	Nunn	90	Terraces,fans	No	—
	Beckton	5	Alluvial fans	No	—
	Recluse	4	Fans,terraces	No	—
	Hoven	1	Playas	Yes	2,3
PeB: Pierre clay, 2 to 6 percent slopes	Pierre	85	Hillslopes	No	—
	Kyle	4	Alluvial fans,terraces	No	—
	Hisle	3	Plains,terraces	No	—
	Lismas	2	Ridges	No	—
	Hoven	2	Playas	Yes	2,3
	Samsil	2	Ridges	No	—
	Stetter	2	Flood plains,swales	No	—
PeC: Pierre clay, 6 to 9 percent slopes	Pierre	85	Plains	No	—
	Hisle	4	Swales	No	—

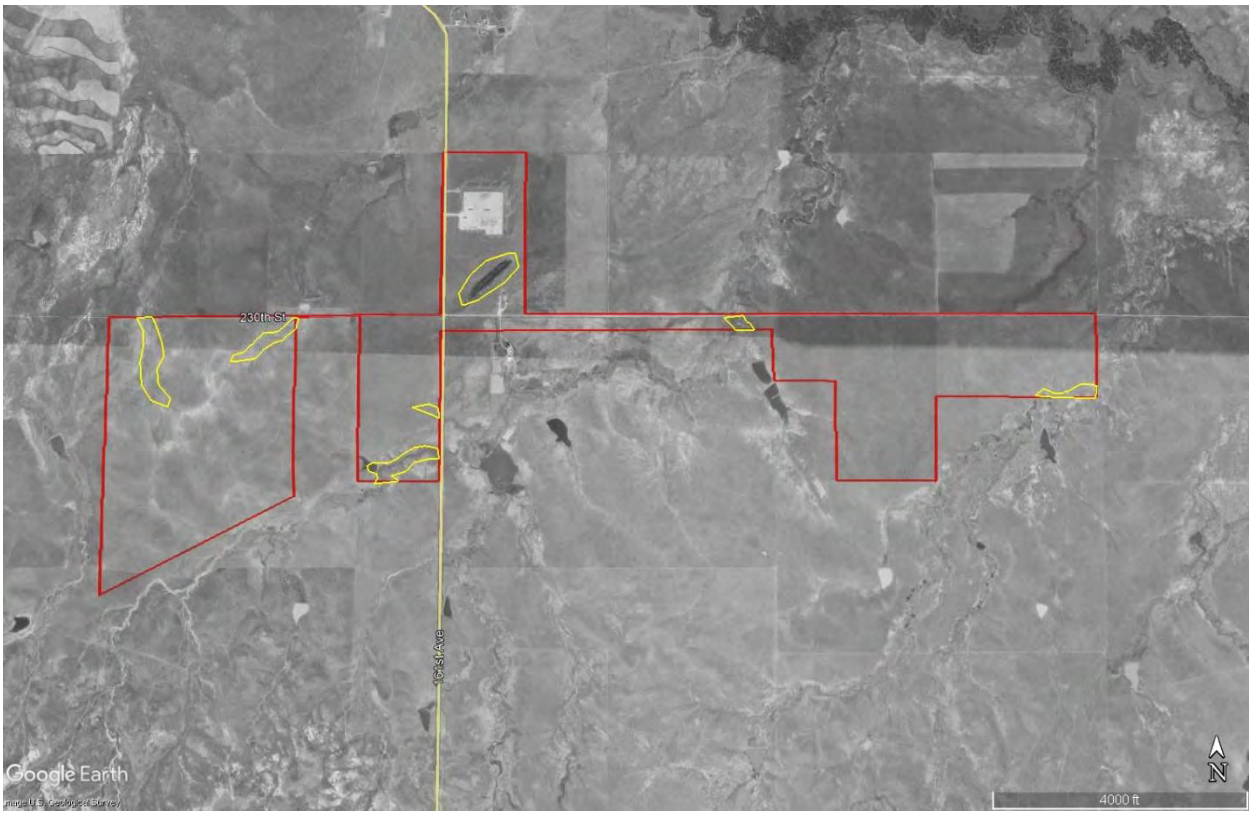
Hydric Soil List - All Components–SD606-Custer and Pennington Counties Area, Prairie Parts, South Dakota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
	Kyle	4	Plains	No	—
	Samsil	4	Plains	No	—
	Lohmiller	3	Drainageways	No	—
PeD: Pierre clay, 6 to 20 percent slopes	Pierre	85	Hillslopes	No	—
	Kyle	6	Alluvial fans,terraces	No	—
	Samsil	3	Ridges	No	—
	Stetter	2	Flood plains,swales	No	—
	Hisle	2	Terraces,hillslopes	No	—
	Lismas	2	Ridges	No	—
SzB: Swanboy clay, 0 to 3 percent slopes	Swanboy	85	Terraces	No	—
	Kyle	7	Terraces,alluvial fans	No	—
	Hisle	3	Alluvial fans,terraces	No	—
	Slickspots	3	Terraces	No	—
	Stetter	2	Flood plains	No	—

Data Source Information

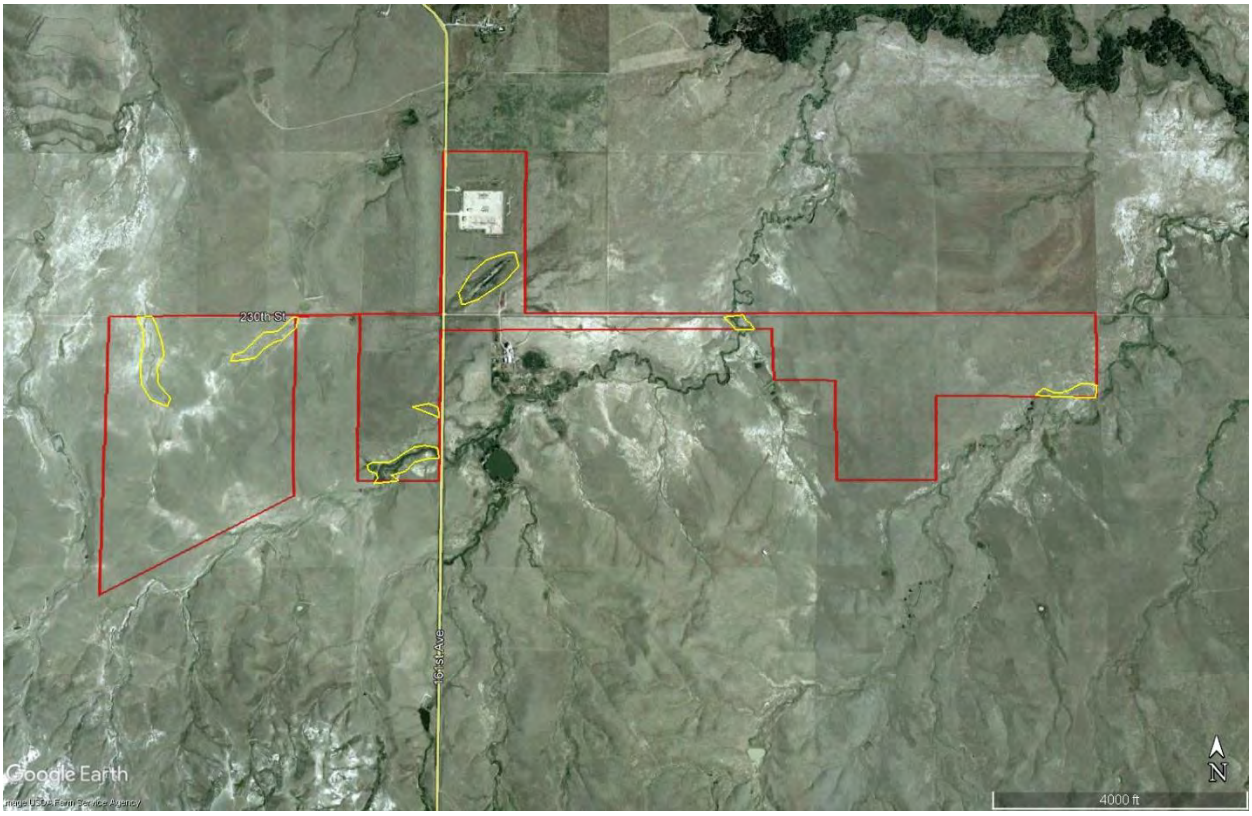
Soil Survey Area: Custer and Pennington Counties Area, Prairie Parts, South Dakota
Survey Area Data: Version 11, Sep 17, 2019

Appendix C:

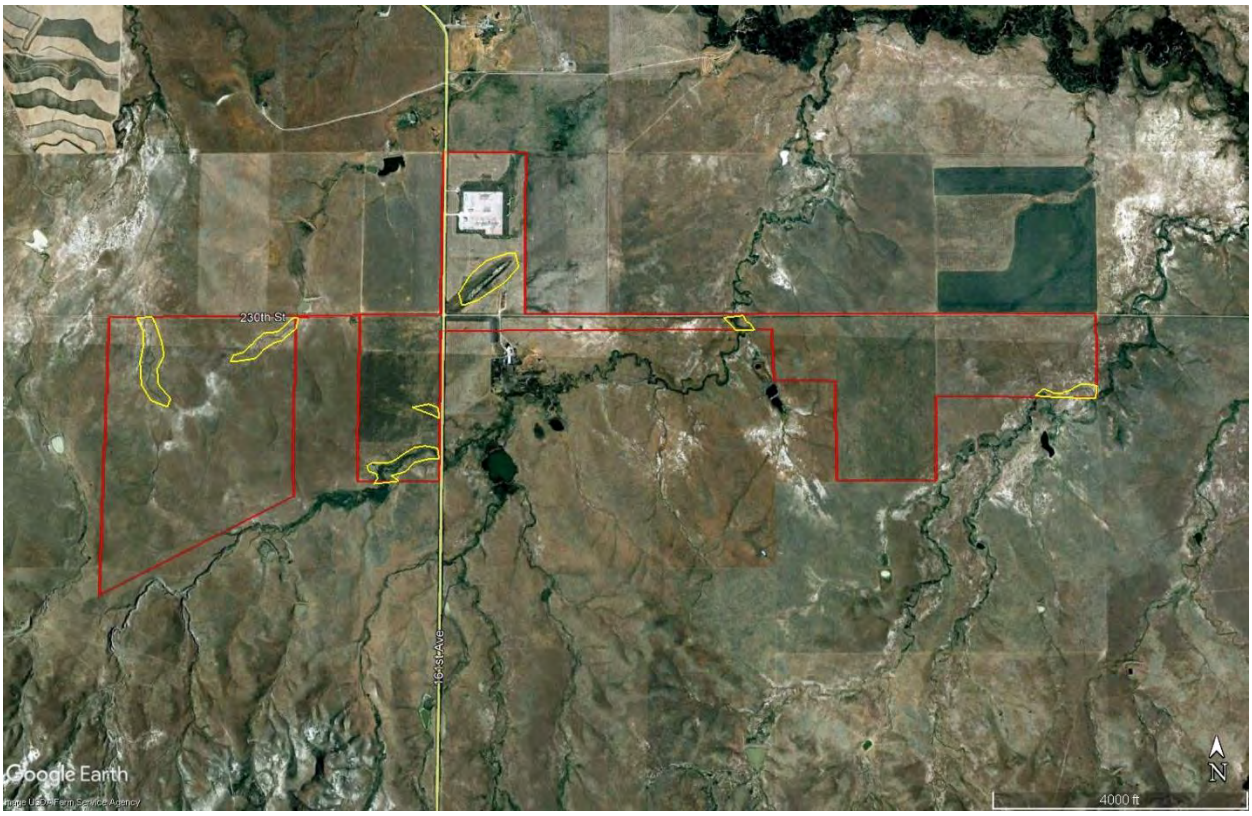
Aerial Imagery Review



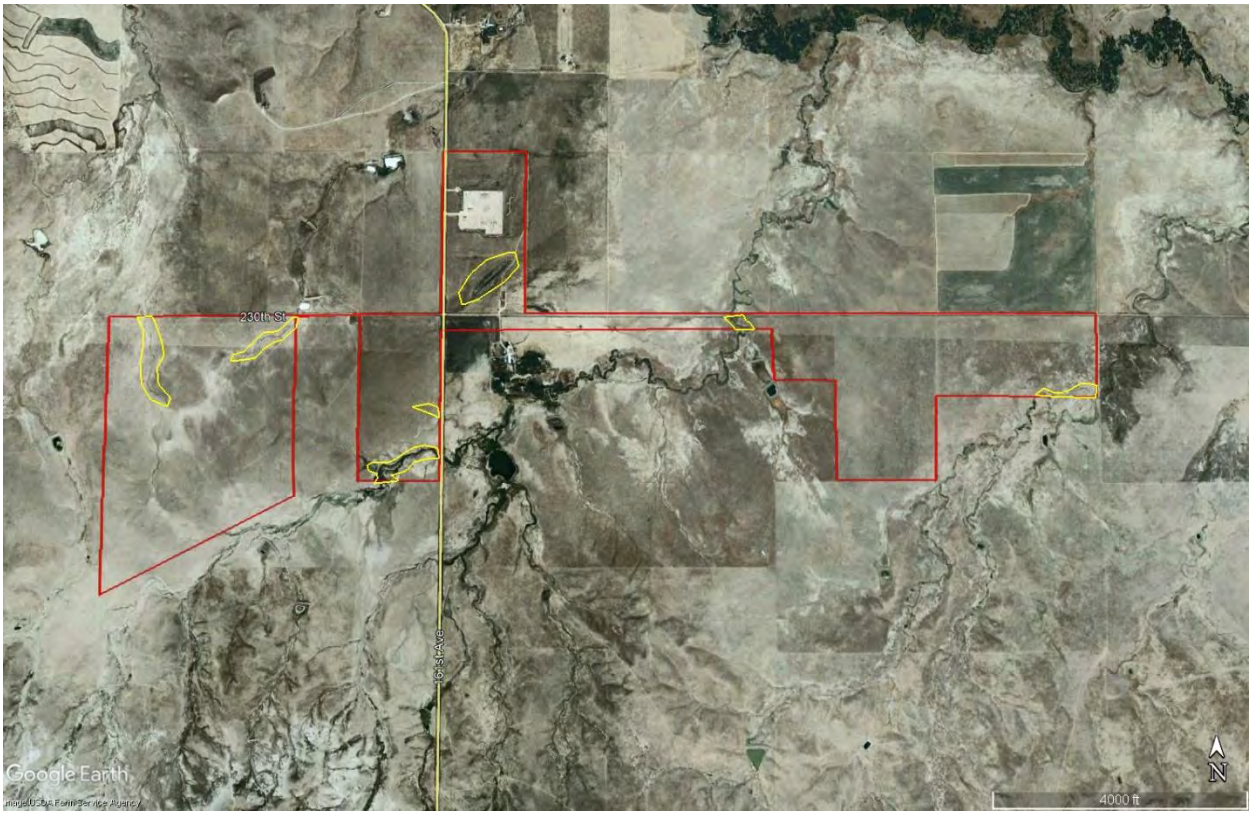
September 1997



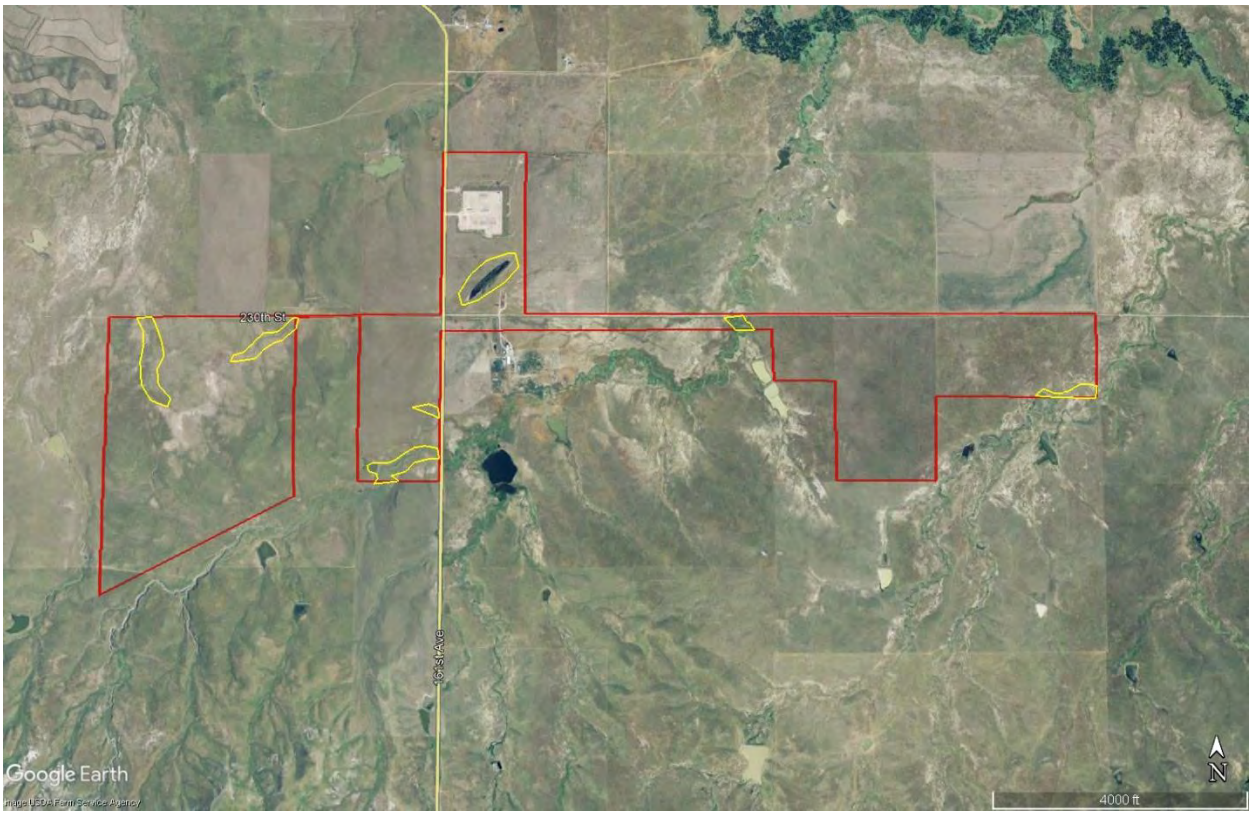
March 2003



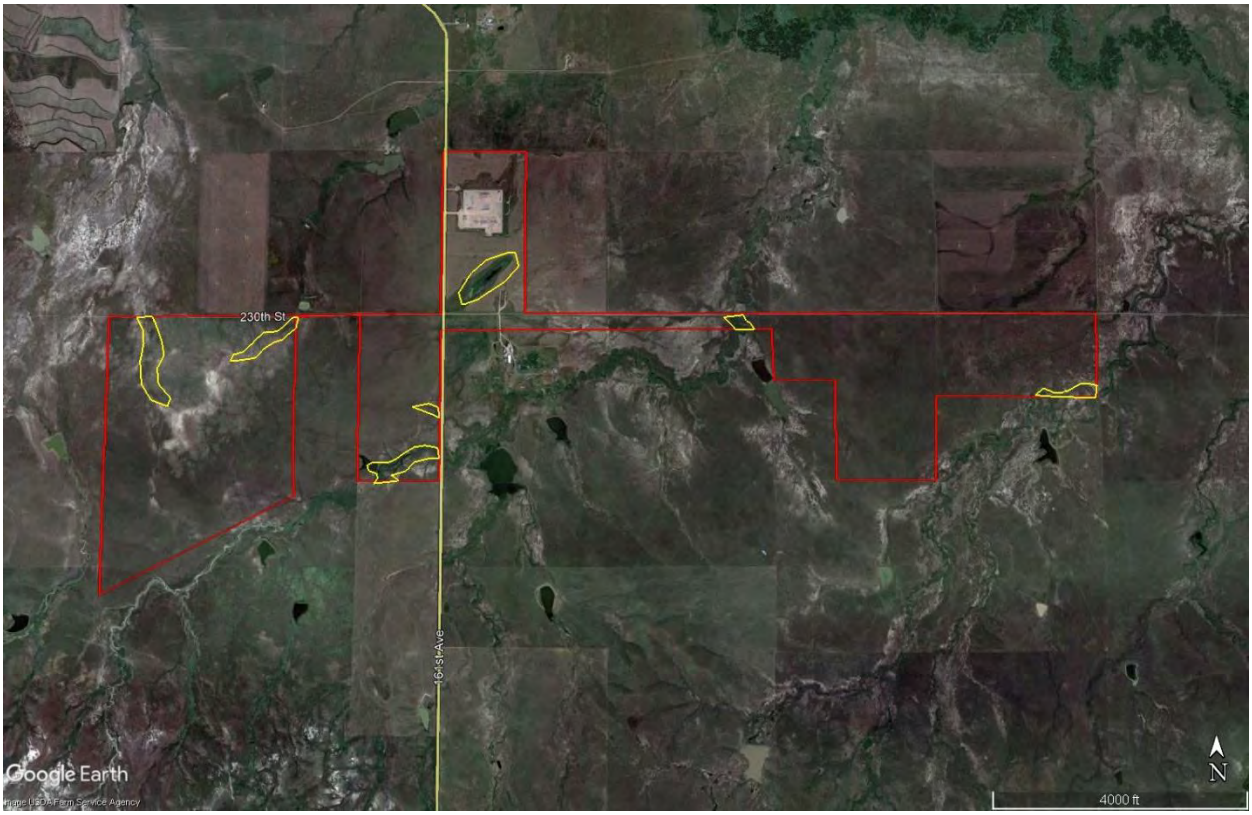
May 2005



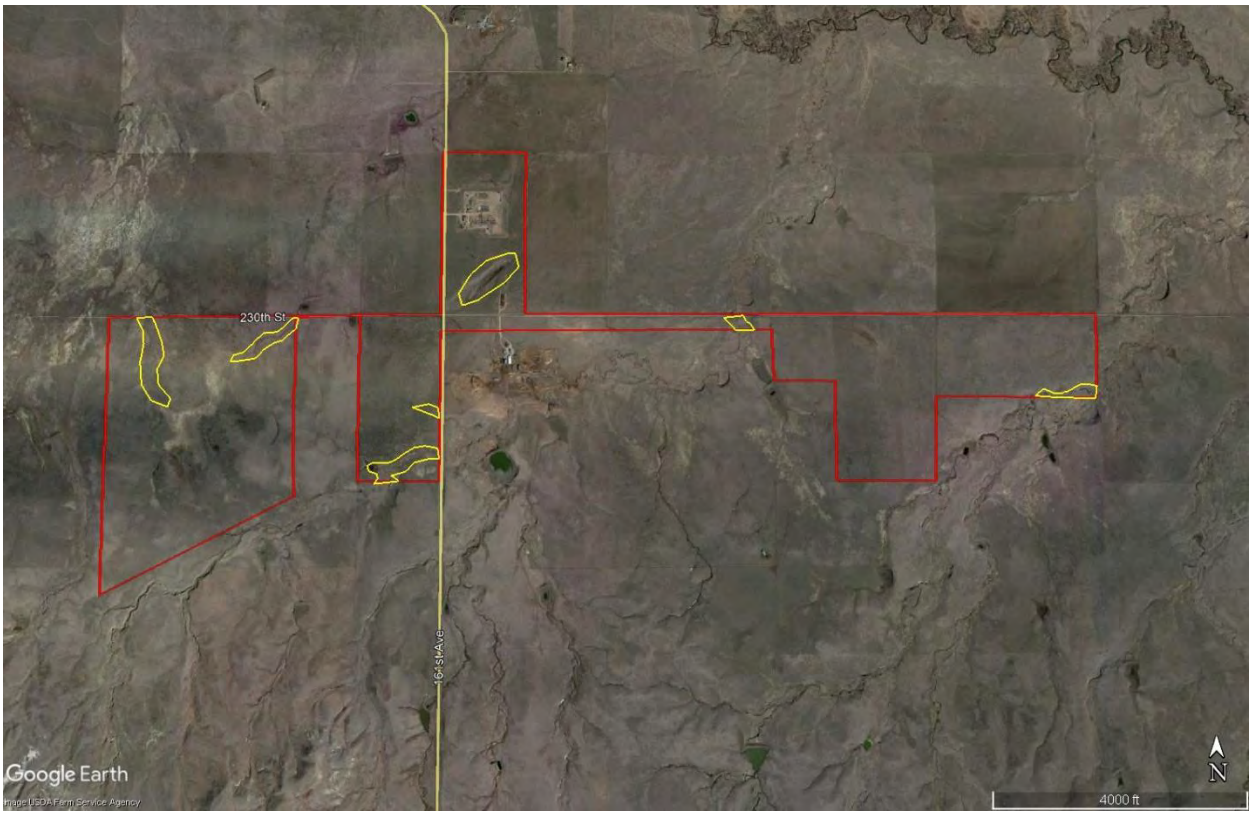
April 2006



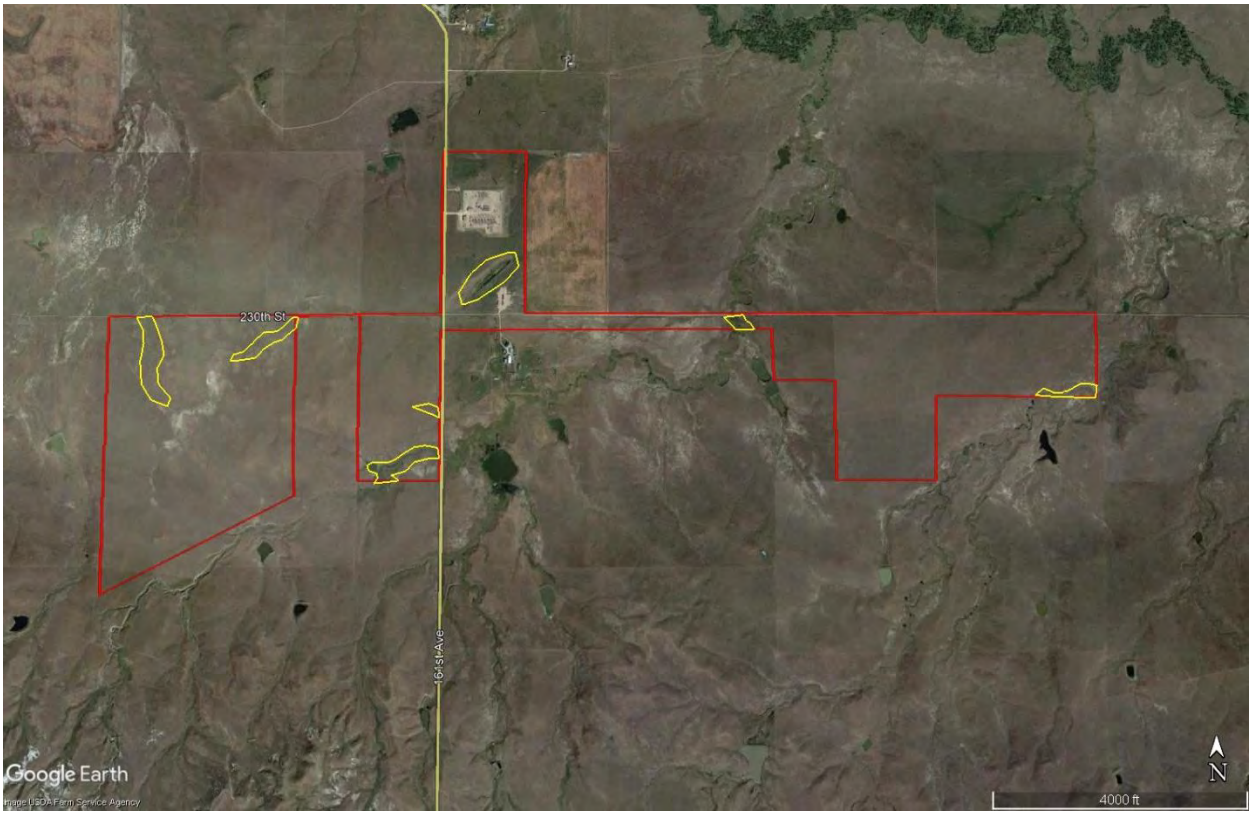
June 2009



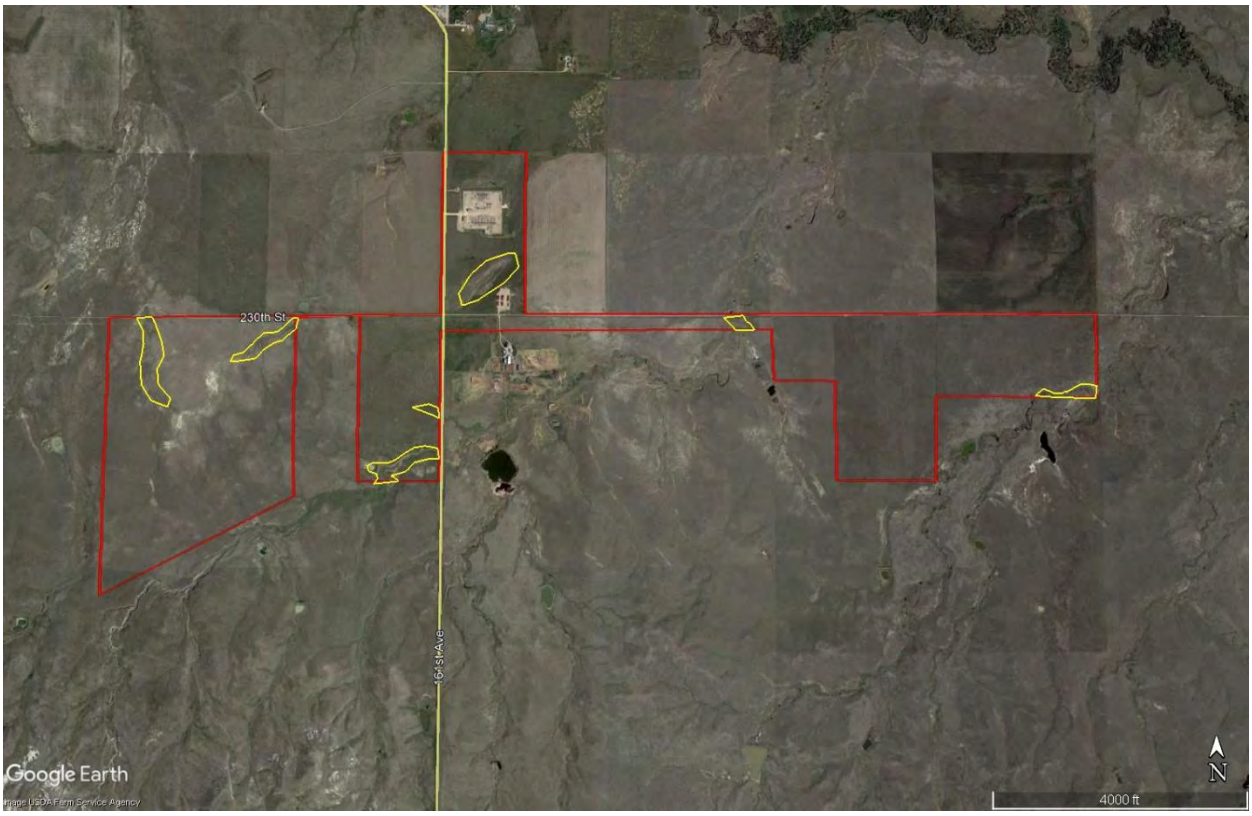
July 2011



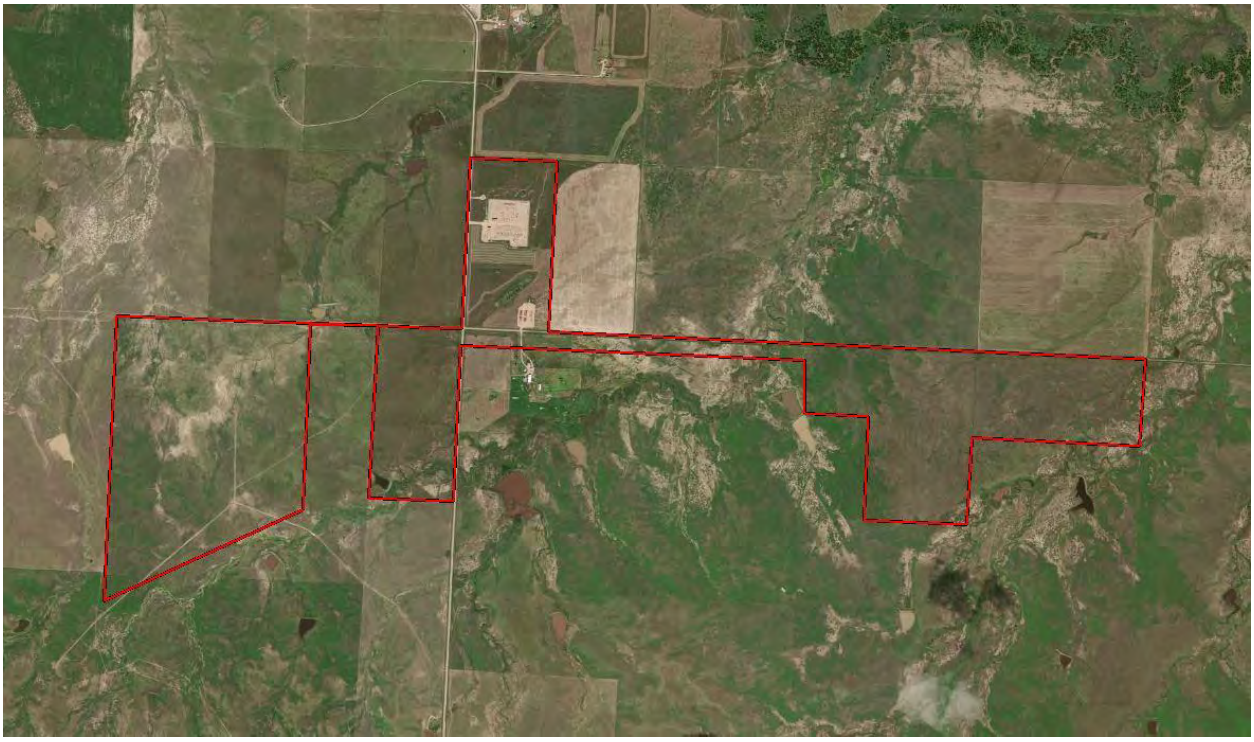
April 2013



September 2015



April 2017

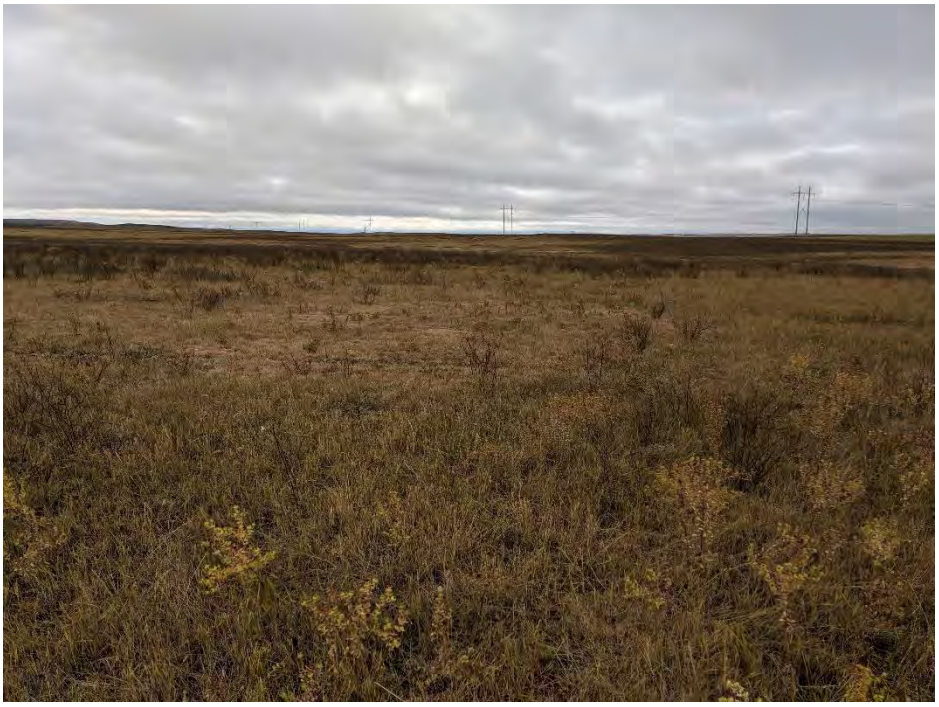


June 2018

Appendix D:

Field Photos

Representative cropland (hay field) located within the Study Area



Representative short grass prairie/pastureland located within the Study Area

Representative hayfield/disturbed landscape located within Study Area

Small upland swale, mapped as an NWI wetland, located within the Study Area

Wetland 17, a depressional PEM, contained within an upland swale/drainage

Wetland 18, a depressional PEM, contained within an ephemeral/intermittent drainage

Wetland 19, a PUB, created from the embankment of an upland drainage

Wetland 20, a depressional PEM, contained within an ephemeral/intermittent drainage

Wetland 20 outlet, facing east towards a culvert under 161st Avenue

Wetland 21, an isolated PUB/PEM, located in a small basin

Wetland 21 landscape with surrounding willow trees

Wetland 22, a PEM/Riverine wetland, contained within the OWM of an intermittent tributary to Box Elder Creek

Wetland 23, an ephemeral PEM, located within a small swale associated with Box Elder Creek

Wetland 24, an ephemeral PEM, located within a small swale associated with Box Elder Creek

Wetland 25, an ephemeral PEM, located within a small swale associated with Box Elder Creek

Wetland 26, a PEM, associated with Box Elder Creek