AQUATIC RESOURCES SUMMARY REPORT, PROPOSED CROWNED RIDGE II WIND FACILITY, GRANT, DEUEL, AND CODINGTON COUNTIES, SOUTH DAKOTA

FEBRUARY 2019

PREPARED FOR

Crowned Ridge Wind II, LLC

PREPARED BY

SWCA Environmental Consultants

AQUATIC RESOURCES SUMMARY REPORT, PROPOSED CROWNED RIDGE II WIND FACILITY, GRANT, DEUEL, AND CODINGTON COUNTIES, SOUTH DAKOTA

Prepared for

Crowned Ridge Wind II, LLC
700 Universe Boulevard
Juno Beach, Florida 33408

Prepared by

SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501
(701) 258-6622
www.swca.com

SWCA Project No. 44512

February 2019

CONTENTS

Appendices

Tables

This page intentionally left blank.

1 INTRODUCTION

Crowned Ridge Wind II, LLC, a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, plans to develop an approximately 300-megawatt wind facility known as the Crowned Ridge II Wind Energy Facility (the project) in Codington, Deuel, and Grant Counties, South Dakota on 60,996 acres of land (project area; refer to Appendix A for project location maps). Crowned Ridge Wind II, LLC, has entered into a purchase and sale agreement under which it will permit and construct the project (including the on-site generation tie line) and, thereafter, transfer the project, along with its Facility Permits, to Northern States Power at the commercial operations date.

Crowned Ridge Wind II, LLC, contracted SWCA Environmental Consultants (SWCA) to complete an aquatic resources assessment for the project. The objectives of the aquatic resources assessment were to identify and evaluate wetlands and other waters of the U.S. within the project area that may be considered jurisdictional and potentially subject to U.S. Army Corps of Engineers (USACE) jurisdiction under Section 404 of the Clean Water Act. This report provides the methods, results, and conclusions of the aquatic resources assessment that SWCA conducted within the project area during 2017 and 2018.

2 ENVIRONMENTAL SETTING

Ecoregions are delineated based on the continuity of natural resource availability, vegetation communities, and other factors (Bryce et al. 1998). The U.S. Environmental Protection Agency (EPA) and the Commission for Environmental Cooperation defined a hierarchy of ecoregions at various scales, with Level I ecoregions being the coarsest level defined at the global scale, through Level III at the national scale (Commission for Environmental Cooperation 1997). Bryce et al. (1998) defined smaller Level IV ecoregions at a regional scale within the Level III ecoregions for the states of North Dakota and South Dakota.

The project is located within the Level IV Prairie Coteau and Big Sioux Basin ecoregions, which are subdivisions of the Level III Northern Glaciated Plateau ecoregion (Bryce et al. 1998). The Prairie Coteau ecoregion resulted from stagnant glacial ice melting beneath a layer of sediment, and it is dominated by a tightly undulating, hummocky landscape with no drainage pattern. This ecoregion has large chains of lakes and scattered semi-permanent or seasonal wetlands (Bryce et al. 1998). The Big Sioux Basin ecoregion is within the surrounding Prairie Coteau ecoregion and differs from that region in that it has a well-defined drainage network and gentler topography (Bryce et al. 1998).

3 METHODS

SWCA completed an aquatic resources assessment for multiple survey areas within the project area using a combination of desktop review and field survey. A desktop analysis was conducted to identify wetlands and other waterbodies within the project area. Field surveys focused on proposed infrastructure for the project.

3.1 Desktop Analysis

The following publicly available data sources were used to complete a desktop analysis to assess the likelihood of wetlands and waters of the U.S. to occur within the survey areas.

- Aerial imagery (various years, including publicly available colored-infrared imagery)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping (USFWS 2012)
- U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) (USGS 2013)
- National Land Cover Dataset (NLCD) (Homer et al. 2015)

3.2 Field Surveys

SWCA used results of the desktop analysis to direct field investigations in the survey areas. SWCA conducted the aquatic resources field surveys from May 3, 2017, to November 15, 2018, including wetland determinations, in accordance with guidance and information available from the following sources.

- *Corps of Engineers Wetlands Delineation Manual* (USACE 1987); hereafter referred to as the Manual
- *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (Version 2.0) (USACE 2010); hereafter referred to as the Regional Supplement
- *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.0* (Natural Resources Conservation Service [NRCS] 2016)
- Revised (December 2, 2008) Guidance on Clean Water Act Jurisdiction Following the Supreme Court Decision in Rapanos v. U.S. and Carabell v. U.S. (revision to the joint memorandum issued by the USACE and the EPA on 5 June 2007) (EPA 2008)

The presence or absence of wetlands was determined in the field using routine determination methods outlined in the Manual and Regional Supplement (USACE 1987, 2010). Normally, wetland delineations use a three-parameter approach through which wetlands are identified by positive indicators of hydrology, hydrophytic vegetation, and the presence of hydric soils. Under normal conditions, all three parameters must be present for an area to be considered a jurisdictional wetland in accordance with Section 404 of the Clean Water Act. However, soil pits were not used to assess the presence or absence of hydric soils for this project. Rather, the determinations conducted in the field assumed that areas that exhibited positive indicators of hydrology and hydrophytic vegetation were wetlands. In certain situations, normal seasonal or annual variation in environmental conditions or human activities can lead to the development of "problem areas" and "atypical situations" in which wetland vegetation or wetland hydrology may not be readily apparent. These situations typically call for further investigation. For the current project, a shovel test was conducted for problematic situations that lacked readily apparent hydrophytic vegetation or indicators of hydrology to assist in an accurate determination of the presence of a wetland based on the presence of hydric soils or other secondary indicators of hydrology present within the soil profile.

Once a wetland was determined present, wetlands were then classified according to the Cowardin classification system, as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). This is a hierarchical system based on the topographic position and vegetation type of a wetland, which aids resource managers and others by providing uniformity of concepts and terms used to define wetlands according to hydrologic, geomorphologic, chemical, and biological factors. The survey areas feature riverine and palustrine systems in accordance with the Cowardin classification system.

Wetland hydrology was primarily determined in the field by considering the frequency and duration of inundation, visual observation of saturation, and the presence of primary wetland hydrologic indicators

(such as water-stained leaves, water marks, sediment deposits, or algal matting). Secondary indicators used to determine wetland hydrology included, but were not limited to, surface soil cracks, crayfish burrows, geomorphic position, and drainage patterns. Evidence of these secondary indicators is present even during dry periods, and therefore are useful indicators of a wetland. If the area sampled displayed one or more primary hydrologic indicators or two or more secondary hydrologic indicators as listed in the appropriate Manual/Regional Supplement, a positive wetland hydrology determination was made.

Vegetation within the prescribed sampling plot was identified to the species level when possible. The appropriate wetland indicator status, as recorded in the 2016 National Wetland Plant List (Lichvar et al. 2016), was assigned to each species for data recorded. Wetland indicator statuses include the following.

- Obligate (OBL): almost always occurs in wetlands.
- Facultative Wetland (FACW): usually occurs in wetlands, but may occur in non-wetlands.
- Facultative (FAC): occurs in wetlands or non-wetlands.
- Facultative Upland (FACU): usually occurs in non-wetlands, but may occur in wetlands.
- Upland (UPL): almost never occurs in wetlands.

Streams (e.g., creeks, rivers, human-made ditches) were identified by the presence of an ordinary high-water mark (OHWM), which is usually identifiable by indicators such as the level of water present, scouring of the channel, or a vegetation line within the channel. The OHWM is a defining element for identifying the lateral limits of non-wetland waters. SWCA biologists recorded the OHWMs of waterbodies encountered during the wetland determination. Streams were then classified as perennial, intermittent, or ephemeral based on field observations.

4 RESULTS

4.1 Desktop Analysis

SWCA reviewed the USFWS NWI mapping to determine the potential presence of wetland features within the project area. Based on this review, 2,772 potential NWI features are located within the project area. The desktop assessment identified 565 NHD line segments and 74 USFWS protected wetland basins within the project area. During the field surveys, the NHD features were assessed for stream characteristics and the presence of an OHWM. If an OHWM was not present, then the feature was assessed based on wetland criteria (see Appendix A).

4.1.1 Vegetation

Land cover types within the project area were field-verified to confirm NLCD data (Homer et al. 2015). Land cover within the project area consisted primarily of approximately 34,776.8 acres of cultivated crops with the predominant crops being soybean (*Glycine max*), corn (*Zea mays*), and wheat (*Triticum* spp.). Pastureland accounted for approximately 22,810.9 acres. SWCA biologists documented vegetation throughout the project area while conducting field surveys (see Appendix A).

4.1.2 Soils

Desktop analysis identified 121 mapped soil types present within the project area (see Appendix A) according to the NRCS (2018). Table 1 provides additional detail for these soil types, including the approximate acreage within the project area.

Table 1. Mapped Soil Types within the Project Area

Soil Name	Hydric	Drainage Class	Frequency of Flooding/Ponding	Depth to Water Table (inches)	Acreage within Project Area
Arvilla sandy loam, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat excessively drained	None/None	80	10.2
Arvilla sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric	Somewhat excessively drained	None/None	80	35.0
Arvilla sandy loam, 6 to 9 percent slopes	Predominantly Non-Hydric	Somewhat excessively drained	None/None	80	25.3
Arvilla-Sioux complex, 6 to 15 percent slopes	Predominantly Non-Hydric	Somewhat excessively drained	None/None	80	57.0
Barnes clay loam, 2 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	641.0
Barnes-Buse loams, 2 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	158.8
Barnes-Buse loams, 6 to 9 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	17.1
Barnes-Buse loams, 15 to 25 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	106.0
Barnes-Buse-Svea loams, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	39.0
Barnes-Buse-Svea loams, 2 to 15 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	370.7
Barnes-Svea loams, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	202.0
Barnes-Svea loams, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	3,431.2
Barnes-Svea-Buse loams, 2 to 9 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	1,217.8
Barnes-Svea-Buse loams, 2 to 12 percent slopes, stony	Predominantly Non-Hydric	Well drained	None/None	80	35.0
Brookings silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric	Moderately well drained	None/None	30 to 41	549.8
Buse loam, 20 to 40 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	46.5
Buse-Barnes loams, 9 to 40 percent slopes, very stony	Predominantly Non-Hydric	Well drained	None/None	80	130.6
Buse-Lamoure, channeled, complex, 0 to 40 percent slopes	Partially Hydric	Well drained	None/None	80	366.1
Cubden silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18 to 30	96.7
Darnen loam, 2 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	2.0
Divide loam	Predominantly Non-Hydric	Somewhat poorly drained	Occasional/None	18 to 42	237.4
Egeland-Embden complex, 2 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	8.5
Estelline silt loam, coteau, 0 to 2 percent slopes	Non-Hydric	Well drained	None/None	80	108.7

Soil Name	Hydric	Drainage Class	Frequency of Flooding/Ponding	Depth to Water Table (inches)	Acreage within Project Area
Estelline silt loam, coteau, 2 to 6 percent slopes	Non-Hydric	Well drained	None/None	80	110.1
Fordville loam, coteau, 0 to 2 percent slopes	Non-Hydric	Well drained	None/None	80	237.9
Fulda silty clay loam	Hydric	Poorly drained	None/None	6 to 18	14.3
Hamerly-Badger complex	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18 to 42	955.8
Hamerly-Tonka complex, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18 to 30	190.2
Buse-Sioux complex, 9 to 40 percent slopes	Non-Hydric	Well drained	None/None	78	27.3
Colvin silty clay loam, till substratum, 0 to 1 percent slopes	Predominantly Hydric	Poorly drained	None/Occasional	6 to 18	5.4
Kranzburg-Brookings silty clay loams, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	779.9
Kranzburg-Brookings silty clay loams, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	150.4
Darnen loam, stratified substratum, 0 to 2 percent slopes	Non-Hydric	Well drained	None/None	30 to 41	1.2
Kranzburg-Brookings silty clay loams, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	1,100.0
Kranzburg-Brookings silty clay loams, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	1,168.9
Kranzburg-Brookings silty clay loams, 2 to 9 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	62.1
La Prairie loam	Predominantly Non-Hydric	Moderately well drained	Occasional/None	42 to 60	11.1
LaDelle silt loam	Predominantly Non-Hydric	Moderately well drained	Occasional/None	42 to 60	25.1
Lamoure-La Prairie complex, channeled	Predominantly Hydric	Poorly drained	Frequent/None	0 to 18	27.8
Lamoure-Rauville silty clay loams, channeled	Predominantly Hydric	Poorly drained	Frequent/None	0 to 18	1,354.2
Marysland loam	Predominantly Hydric	Poorly drained	Occasional/None	18 to 30	17.0
McKranz-Badger silty clay loams, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18 to 30	1,612.3
McIntosh-Lamoure silty clay loams	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18 to 30	82.4
Oldham silty clay loam	Hydric	Very poorly drained	None/Occasional	6 to 18	54.4
Orthents, gravelly	Non-Hydric	Excessively drained	None/None	80	14.7
Parnell silty clay loam	Hydric	Very poorly drained	None/Frequent	0	312.2
Parnell-Vallers complex	Predominantly Hydric	Very poorly drained	None/Frequent	0	645.4
Playmoor silty clay loam	Hydric	Poorly drained	Frequent/None	0 to 18	4.5

Soil Name	Hydric	Drainage Class	Frequency of Flooding/Ponding	Depth to Water Table (inches)	Acreage within Project Area
Poinsett silty clay loam, 6 to 9 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	12.3
Poinsett-Waubay silty clay loams, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	192.8
Poinsett-Waubay silty clay loams, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	182.6
Renshaw-Sioux complex, coteau, 2 to 6 percent slopes	Non-Hydric	Somewhat excessively drained	None/None	80	4.8
Rentill loam	Predominantly Non-Hydric	Well drained	None/None	80	44.2
Sinai silty clay, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	22.7
Southam silty clay loam, 0 to 1 percent slopes	Predominantly Hydric	Very poorly drained	None/Frequent	0	64.9
Vallers loam	Predominantly Hydric	Poorly drained	Rare/None	6 to 18	91.8
Vienna-Brookings complex, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	2,170.8
Vienna-Brookings complex, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	5,673.9
Vienna-Buse complex, 6 to 9 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	273.9
Vienna-Forestville loams, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	112.8
Vienna-Barnes-Forestville complex, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	2,514.4
Water	Non-Hydric	--	None/None	0	41.2
Tonka silty clay loam, 0 to 1 percent slopes	Predominantly Hydric	Poorly drained	None/Frequent	0	16.4
Badger-Tonka silty clay loams, coteau, 0 to 1 percent slopes	Partially Hydric	Somewhat poorly drained	Frequent/None	18	18.7
Parnell silty clay loam, coteau, 0 to 1 percent slopes	Predominantly Hydric	Very poorly drained	None/Frequent	0	21.9
Vallers-Hamerly loams, coteau, 0 to 2 percent slopes	Partially Hydric	Poorly drained	None/Occasional	6	112.3
Hamerly-Tonka complex, coteau, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18	1,153.3
Hamerly-Badger complex, coteau, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18	302.0
McKranz-Hidewood, frequently flooded, silty clay loams, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18	599.5
McKranz-Badger silty clay loams, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18	1,360.0

Soil Name	Hydric	Drainage Class	Frequency of Flooding/Ponding	Depth to Water Table (inches)	Acreage within Project Area
Hamerly-Balaton loams, coteau, 0 to 3 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18	26.0
Udorthents, loamy, coteau (cut and fill land)	Non-Hydric	Well drained	None/None	80	1.4
Buse-Langhei complex, coteau, 15 to 40 percent slopes	Predominantly Non-Hydric	Well drained	None/None	78	180.9
Barnes-Svea loams, coteau, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	48.75	262.4
Barnes-Svea loams, coteau, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	48.75	1,264.3
Barnes-Buse-Svea loams, coteau, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	48.75	2,125.0
Barnes-Buse-Svea loams, coteau, 2 to 9 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	762.0
Barnes-Buse loams, coteau, 6 to 9 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	481.7
Buse-Barnes loams, coteau, 9 to 20 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	175.5
Buse-Barnes loams, coteau, 2 to 15 percent slopes, very stony	Predominantly Non-Hydric	Well drained	None/None	80	1,103.4
Buse-Barnes loams, coteau, 9 to 40 percent slopes, very stony	Predominantly Non-Hydric	Well drained	None/None	80	1,213.9
Buse-Lamoure, channeled, frequently flooded, complex, 0 to 40 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	387.1
Rauville silty clay loam, coteau, 0 to 1 percent slopes, frequently flooded	Predominantly Hydric	Very poorly drained	Frequent/None	0 to 12	261.4
Lamoure silty clay loam, coteau, 0 to 1 percent slopes, occasionally flooded	Predominantly Non-Hydric	Somewhat poorly drained	Occasional/None	18 to 30	227.0
Lamoure-Rauville silty clay loams, channeled, 0 to 2 percent slopes, frequently flooded	Predominantly Hydric	Poorly drained	Frequent/None	6 to 18	1,146.9
Marysland loam, 0 to 1 percent slopes, occasionally flooded	Predominantly Hydric	Poorly drained	Occasional/None	6 to 18	8.2
Divide loam, 0 to 2 percent slopes, occasionally flooded	Predominantly Non-Hydric	Somewhat poorly drained	Occasional/None	16 to 28	39.9

Soil Name	Hydric	Drainage Class	Frequency of Flooding/Ponding	Depth to Water Table (inches)	Acreage within Project Area
Moritz, occasionally flooded-Lamoure, frequently flooded, complex, 0 to 2 percent slopes	Partially Hydric	Somewhat poorly drained	Occasional/None	18	276.7
Spottswood loam, 0 to 2 percent slopes, occasionally flooded	Predominantly Non-Hydric	Somewhat poorly drained	Occasional/None	16 to 28	3.9
La Prairie loam, coteau, 0 to 2 percent slopes, occasionally flooded	Predominantly Non-Hydric	Moderately well drained	Occasional/None	30 to 41	6.4
Darnen loam, coteau, 2 to 6 percent slopes	Non-Hydric	Well drained	None/None	30 to 41	47.8
Fordtown loam, 0 to 2 percent slopes, rarely flooded	Non-Hydric	Well drained	Rare/None	43	66.0
Renwash loam, 0 to 2 percent slopes, rarely flooded	Non-Hydric	Somewhat excessively drained	Rare/None	43 to 55	8.4
Fordville loam, coteau, 0 to 2 percent slopes	Non-Hydric	Well drained	None/None	80	28.5
Renshaw-Fordville loams, coteau, 0 to 2 percent slopes	Non-Hydric	Somewhat excessively drained	None/None	80	211.4
Renshaw-Fordville loams, coteau, 2 to 6 percent slopes	Non-Hydric	Somewhat excessively drained	None/None	80	721.4
Renshaw-Sioux complex, coteau, 2 to 6 percent slopes	Non-Hydric	Somewhat excessively drained	None/None	80	82.9
Renshaw-Sioux complex, coteau, 6 to 9 percent slopes	Non-Hydric	Somewhat excessively drained	None/None	80	21.8
Sioux-Renshaw complex, coteau, 9 to 15 percent slopes	Non-Hydric	Excessively drained	None/None	80	0.8
Udorthents, coteau (gravel pits)	Non-Hydric	Excessively drained	None/None	80	18.9
Rentill loam, coteau, 0 to 2 percent slopes	Non-Hydric	Well drained	None/None	80	73.0
Sioux-Renshaw complex, 15 to 40 percent slopes, very stony	Non-Hydric	Excessively drained	None/None	80	10.3
Goldsmith silty clay loam, coteau, 0 to 2 percent slopes	Predominantly Non-Hydric	Moderately well drained	None/None	80	3.1
Brandt silty clay loam, 0 to 2 percent slopes	Non-Hydric	Well drained	None/None	80	19.8
Estelline silt loam, coteau, 0 to 2 percent slopes	Non-Hydric	Well drained	None/None	80	122.2
Estelline-Sioux complex, coteau, 2 to 6 percent slopes	Non-Hydric	Well drained	None/None	80	8.0
Egeland-Embden complex, coteau, 2 to 6 percent slopes	Non-Hydric	Well drained	None/None	80	3.4

Soil Name	Hydric	Drainage Class	Frequency of Flooding/Ponding	Depth to Water Table (inches)	Acreage within Project Area
Brookings silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric	Moderately well drained	None/None	30 to 41	225.2
Vienna-Brookings complex, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	4,269.1
Vienna-Brookings complex, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	80	7,001.4
Vienna-Buse complex, coteau, 6 to 9 percent slopes	Non-Hydric	Well drained	None/None	80	592.0
Barnes clay loam, coteau, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	51.6
Barnes clay loam, coteau, 2 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	670.7
Vienna-Forestville loams, coteau, 0 to 2 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	543.3
Vienna-Barnes-Forestville loams, 1 to 6 percent slopes	Predominantly Non-Hydric	Well drained	None/None	49 to 61	3,724.6
McKranz silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric	Somewhat poorly drained	None/None	18 to 30	536.3
Rauville mucky silty clay loam, ponded, 0 to 1 percent slopes, frequently flooded	Hydric	Very poorly drained	Frequent/Frequent	0 to 6	43.9
Hidewood silty clay loam, 0 to 2 percent slopes, frequently flooded	Predominantly Hydric	Poorly drained	Frequent/None	6	63.0
Mahoney silt loam, 0 to 2 percent slopes	Non-Hydric	Somewhat poorly drained	None/None	16 to 30	4.8
Arvilla-Sioux complex, coteau, 6 to 15 percent slopes	Predominantly Non-Hydric	Somewhat excessively drained	None/None	80	8.0
Estelline-Kampeska silt loams, 2 to 6 percent slopes	Non-Hydric	Well drained	None/None	80	15.3

Source: Natural Resources Conservation Service (2018)

4.2 Field Surveys

SWCA biologists conducted field surveys between May 3, 2017, and November 15, 2018, to assess general site characteristics, ground-truth mapped features identified during the desktop analysis, and assess the potential for occurrence of unmapped wetland or other aquatic resources. Representative photographs taken during field surveys are included in Appendix B.

4.2.1 Aquatic Resources

During the field surveys, SWCA biologists performed determinations on potential aquatic resources (NWI, NHD flowlines, and USFWS protected basins) identified during the desktop analysis within the survey areas. Additional aquatic resources encountered by SWCA biologists that were not identified

during the desktop analysis were recorded within the survey areas. Representative photographs are in Appendix B.

4.2.1.1 WETLANDS

SWCA biologists recorded 257 wetlands encompassing approximately 280.0 acres within the project. The 257 wetlands observed include 111 seasonal wetlands (57.15 acres), 67 semi-permanent wetlands (87.84 acres), and 79 permanent wetlands (135.0 acres). Table 2 provides additional detail for all field assessed wetlands in the survey areas.

Table 2. Field Assessed Wetlands Determined for the Survey Areas

Feature ID	Survey Date	Location		Description	Acreage
		Longitude	Latitude		
WET001	5/3/2017	-96.846002	44.889302	Seasonal	1.49
WET002	8/26/2017	-96.910784	45.009007	Semipermanent	1.58
WET003	8/26/2017	-96.907176	45.014204	Permanent	2.21
WET004	8/28/2017	-96.897846	45.002092	Semipermanent	0.24
WET005	8/29/2017	-96.900765	44.970185	Permanent	0.24
WET006	8/29/2017	-96.900507	44.969355	Seasonal	0.62
WET007	8/29/2017	-96.890997	44.940446	Semipermanent	2.60
WET008	8/29/2017	-96.908567	44.947012	Seasonal	0.05
WET009	8/29/2017	-96.897501	44.950539	Seasonal	4.05
WET010	8/30/2017	-96.844833	44.934435	Permanent	0.34
WET011	8/30/2017	-96.849669	44.914834	Seasonal	0.57
WET012	8/30/2017	-96.875388	44.936425	Seasonal	2.14
WET013	8/31/2017	-96.848756	44.822072	Seasonal	0.26
WET014	8/31/2017	-96.849453	44.822197	Seasonal	0.56
WET015	8/31/2017	-96.780104	44.838474	Seasonal	0.44
WET016	8/31/2017	-96.830269	44.851943	Seasonal	0.91
WET017	8/31/2017	-96.819002	44.883107	Semipermanent	1.01
WET018	8/31/2017	-96.831897	44.851517	Seasonal	0.28
WET019	9/5/2017	-96.956623	44.929868	Permanent	1.03
WET020	9/5/2017	-96.962734	44.9254	Semipermanent	0.62
WET021	9/5/2017	-96.939366	44.92395	Permanent	1.44
WET022	9/6/2017	-96.783111	44.902276	Semipermanent	2.02
WET023	9/6/2017	-96.849379	44.852618	Semipermanent	3.99
WET024	9/6/2017	-96.810761	44.837222	Permanent	2.81
WET025	9/6/2017	-96.813104	44.838579	Permanent	2.09
WET026	9/6/2017	-96.836956	44.823422	Semipermanent	4.64
WET027	9/6/2017	-96.839985	44.802112	Seasonal	0.78
WET028	9/7/2017	-96.789462	44.830309	Semipermanent	0.75
WET029	9/7/2017	-96.880298	45.008695	Permanent	2.15
WET030	9/7/2017	-96.868714	45.009049	Permanent	4.88
WET031	9/7/2017	-96.870731	45.009306	Seasonal	0.09
WET032	9/7/2017	-96.871609	45.009243	Seasonal	0.13
WET033	10/29/2017	-96.924033	44.998448	Seasonal	4.81
WET034	10/29/2017	-96.909599	44.991	Semipermanent	1.51
WET035	10/29/2017	-96.89377	44.990554	Seasonal	0.18
WET036	10/29/2017	-96.893849	44.987674	Semipermanent	0.95

Feature ID	Survey Date	Location		Description	Acreage
		Longitude	Latitude		
WET037	10/30/2017	-96.893244	44.981563	Semipermanent	0.72
WET038	10/30/2017	-96.893064	44.979417	Seasonal	0.56
WET039	10/30/2017	-96.893165	44.973511	Semipermanent	0.45
WET040	10/30/2017	-96.892885	44.957819	Semipermanent	1.66
WET041	10/30/2017	-96.893254	44.951069	Seasonal	0.04
WET042	10/30/2017	-96.893448	44.949867	Seasonal	0.23
WET043	10/30/2017	-96.893416	44.953181	Seasonal	0.55
WET044	10/30/2017	-96.893928	44.945805	Seasonal	0.61
WET045	10/30/2017	-96.89381	44.945458	Seasonal	0.10
WET046	10/30/2017	-96.893308	44.942095	Semipermanent	0.40
WET047	10/30/2017	-96.893531	44.941089	Seasonal	0.43
WET048	10/31/2017	-96.893792	44.938347	Seasonal	0.32
WET049	10/31/2017	-96.891496	44.935118	Semipermanent	3.80
WET050	10/31/2017	-96.889486	44.933889	Semipermanent	0.56
WET051	10/31/2017	-96.889432	44.932485	Seasonal	1.73
WET052	10/31/2017	-96.887547	44.931423	Seasonal	0.03
WET053	10/31/2017	-96.887045	44.926579	Seasonal	0.33
WET054	10/31/2017	-96.887262	44.928321	Seasonal	0.51
WET055	10/31/2017	-96.887457	44.92904	Seasonal	0.05
WET056	10/31/2017	-96.883262	44.899731	Semipermanent	4.69
WET057	10/31/2017	-96.879651	44.898198	Permanent	9.00
WET058	10/31/2017	-96.863011	44.895668	Semipermanent	3.62
WET059	10/31/2017	-96.848987	44.889545	Semipermanent	1.07
WET060	11/1/2017	-96.9036	44.923789	Seasonal	1.04
WET061	11/1/2017	-96.902332	44.937077	Semipermanent	1.06
WET062	11/1/2017	-96.902164	44.940523	Seasonal	0.72
WET063	11/1/2017	-96.901903	44.946445	Seasonal	0.34
WET064	11/1/2017	-96.902092	44.948527	Seasonal	0.14
WET065	11/1/2017	-96.901768	44.952595	Seasonal	1.54
WET066	11/1/2017	-96.902056	44.953356	Seasonal	0.10
WET067	11/1/2017	-96.898298	44.955436	Seasonal	5.77
WET068	11/1/2017	-96.902216	44.977438	Seasonal	0.49
WET069	11/1/2017	-96.914259	44.9775	Seasonal	0.23
WET070	11/1/2017	-96.923835	44.984966	Semipermanent	0.83
WET071	10/30/2017	-96.893434	44.964695	Seasonal	0.67
WET072	10/30/2017	-96.893277	44.96487	Seasonal	0.25
WET073	11/1/2017	-96.902527	44.96352	Seasonal	0.51
WET074	11/1/2017	-96.902416	44.963959	Seasonal	0.22
WET075	11/16/2017	-96.852478	44.896049	Semipermanent	0.43
WET076	11/16/2017	-96.893913	44.916883	Seasonal	0.71
WET077	11/16/2017	-96.892074	44.924667	Seasonal	1.03
WET078	11/16/2017	-96.889137	44.925103	Semipermanent	5.27
WET079	11/17/2017	-96.89561	44.955194	Seasonal	0.15
WET080	11/17/2017	-96.892469	44.953258	Semipermanent	1.07
WET081	11/17/2017	-96.90207	44.962457	Seasonal	0.26
WET082	11/17/2017	-96.912781	44.975968	Semipermanent	3.28
WET083	11/17/2017	-96.91239	44.96954	Permanent	1.75
WET084	11/17/2017	-96.905446	44.969912	Seasonal	0.48

Feature ID	Survey Date	Location		Description	Acreage
		Longitude	Latitude		
WET085	11/17/2017	-96.913086	44.988211	Semipermanent	6.46
WET086	11/17/2017	-96.878837	44.905044	Seasonal	0.58
WET087	11/30/2017	-96.922598	44.990295	Seasonal	0.64
WET088	5/9/2018	-96.930901	44.992072	Seasonal	0.38
WET089	5/9/2018	-96.928899	44.994537	Seasonal	0.35
WET090	5/9/2018	-96.929777	44.99286	Seasonal	0.21
WET091	5/23/2018	-96.876454	44.8427	Seasonal	0.01
WET092	5/23/2018	-96.87599	44.842837	Seasonal	0.07
WET093	5/28/2018	-96.774806	44.860432	Permanent	0.80
WET094	5/28/2018	-96.80056	44.820167	Permanent	14.89
WET095	5/28/2018	-96.786916	44.82222	Permanent	5.54
WET096	6/5/2018	-96.888797	44.968606	Permanent	1.09
WET097	6/8/2018	-96.891366	44.981825	Seasonal	0.11
WET098	6/14/2018	-96.827645	44.808481	Permanent	4.01
WET099	6/14/2018	-96.821753	44.795551	Semipermanent	0.43
WET100	6/14/2018	-96.81771	44.799048	Permanent	2.18
WET101	6/14/2018	-96.816645	44.798069	Permanent	1.89
WET102	6/14/2018	-96.833371	44.893817	Permanent	0.72
WET103	6/14/2018	-96.810508	44.825496	Seasonal	0.12
WET104	6/14/2018	-96.8376	44.801156	Seasonal	0.69
WET105	6/14/2018	-96.809042	44.825642	Permanent	0.91
WET106	6/14/2018	-96.827367	44.806671	Permanent	1.83
WET107	6/14/2018	-96.815438	44.800025	Permanent	1.23
WET108	6/14/2018	-96.82847	44.806645	Permanent	0.63
WET109	6/15/2018	-96.77888	44.816706	Permanent	0.97
WET110	6/15/2018	-96.874163	44.858055	Permanent	0.83
WET111	6/15/2018	-96.87835	44.836877	Permanent	0.57
WET112	6/15/2018	-96.781716	44.814185	Permanent	1.87
WET113	6/20/2018	-96.870675	44.895098	Seasonal	0.73
WET114	6/20/2018	-96.889288	44.910386	Permanent	1.87
WET115	6/20/2018	-96.867835	44.894902	Seasonal	1.34
WET116	6/20/2018	-96.869062	44.894094	Seasonal	0.17
WET117	6/22/2018	-96.867768	44.931106	Semipermanent	1.10
WET118	6/22/2018	-96.978185	44.929951	Permanent	4.00
WET119	6/22/2018	-96.978283	44.923465	Permanent	2.01
WET120	6/25/2018	-96.942164	44.856453	Semipermanent	5.22
WET121	6/25/2018	-96.852457	44.847251	Semipermanent	1.01
WET122	6/25/2018	-96.974101	44.837683	Permanent	2.30
WET123	6/24/2018	-96.885771	44.989458	Permanent	4.45
WET124	6/25/2018	-96.853013	44.844929	Seasonal	0.30
WET125	6/25/2018	-96.854328	44.846168	Semipermanent	1.08
WET126	6/23/2018	-96.898009	44.91617	Permanent	0.62
WET127	6/23/2018	-96.80823	44.851196	Seasonal	0.16
WET128	6/23/2018	-96.811432	44.851736	Permanent	0.73
WET129	6/23/2018	-96.777216	44.842619	Permanent	2.38
WET130	6/23/2018	-96.877493	44.968542	Permanent	0.31
WET131	6/23/2018	-96.869383	44.957692	Semipermanent	0.37
WET132	6/23/2018	-96.883696	44.903163	Seasonal	0.28

Feature ID	Survey Date	Location		Description	Acreage
		Longitude	Latitude		
WET133	6/25/2018	-96.816729	44.851227	Permanent	14.02
WET134	6/25/2018	-96.84421	44.946013	Seasonal	0.45
WET135	6/25/2018	-96.845698	44.94456	Permanent	0.46
WET136	6/25/2018	-96.883344	44.85682	Semipermanent	1.27
WET137	6/26/2018	-96.949494	45.004493	Permanent	1.72
WET138	6/26/2018	-96.825555	44.886019	Permanent	0.35
WET139	6/26/2018	-96.82831	44.887622	Permanent	1.70
WET140	6/26/2018	-96.827212	44.886187	Semipermanent	0.24
WET141	6/26/2018	-96.826026	44.886437	Semipermanent	0.14
WET142	6/26/2018	-96.830693	44.898862	Permanent	4.68
WET143	6/26/2018	-96.826127	44.887912	Permanent	2.36
WET144	6/26/2018	-96.825584	44.886791	Semipermanent	0.13
WET145	7/12/2018	-96.884256	44.968115	Permanent	0.91
WET146	7/12/2018	-96.867998	44.946939	Semipermanent	1.88
WET147	8/5/2018	-96.916022	45.004642	Semipermanent	5.84
WET148	8/6/2018	-96.90748	44.941206	Permanent	0.63
WET149	8/10/2018	-96.973021	44.83354	Permanent	1.00
WET150	8/8/2018	-96.921293	45.001313	Permanent	0.74
WET151	8/9/2018	-96.89646	44.863752	Seasonal	0.87
WET152	8/9/2018	-96.894321	44.861761	Permanent	1.03
WET153	8/14/2018	-96.855018	44.808604	Seasonal	0.24
WET154	8/15/2018	-96.816491	44.804247	Permanent	0.75
WET155	8/15/2018	-96.861839	44.826274	Permanent	0.84
WET156	8/16/2018	-96.845104	44.854908	Permanent	0.35
WET157	8/16/2018	-96.836121	44.803844	Permanent	4.07
WET158	8/16/2018	-96.776151	44.861898	Seasonal	0.17
WET159	8/17/2018	-96.783588	44.826605	Permanent	0.20
WET160	8/17/2018	-96.848637	44.853364	Semipermanent	1.92
WET161	8/17/2018	-96.786735	44.82534	Seasonal	1.68
WET162	8/17/2018	-96.777564	44.86196	Semipermanent	0.18
WET163	8/17/2018	-96.815772	44.796337	Permanent	0.11
WET164	8/19/2018	-96.87257	44.892014	Seasonal	0.07
WET165	8/19/2018	-96.872707	44.895161	Seasonal	0.13
WET166	8/19/2018	-96.872629	44.896437	Seasonal	0.03
WET167	8/19/2018	-96.873325	44.897039	Seasonal	0.11
WET168	8/19/2018	-96.868401	44.903387	Seasonal	0.11
WET169	8/21/2018	-96.816811	44.849126	Permanent	0.25
WET170	8/21/2018	-96.816075	44.849361	Permanent	0.30
WET171	8/21/2018	-96.814757	44.849762	Semipermanent	0.33
WET172	8/21/2018	-96.816007	44.848516	Seasonal	0.01
WET173	8/21/2018	-96.842292	44.936482	Permanent	0.30
WET174	8/21/2018	-96.861027	44.931436	Semipermanent	3.02
WET175	8/25/2018	-96.853107	44.82643	Semipermanent	1.02
WET176	8/25/2018	-96.855241	44.821999	Permanent	4.08
WET177	8/25/2018	-96.836265	44.904439	Semipermanent	0.18
WET178	8/26/2018	-96.813804	44.81981	Semipermanent	0.21
WET179	8/26/2018	-96.813814	44.821334	Semipermanent	0.24
WET180	8/26/2018	-96.841838	44.899148	Semipermanent	0.05

Feature ID	Survey Date	Location		Description	Acreage
		Longitude	Latitude		
WET181	8/28/2018	-96.864905	44.809681	Permanent	0.13
WET182	8/28/2018	-96.884214	44.937678	Permanent	0.21
WET183	9/11/2018	-96.895602	44.959307	Seasonal	0.54
WET184	9/11/2018	-96.896963	44.958407	Seasonal	0.35
WET185	<Null>	-96.951259	44.970198	Seasonal	0.20
WET186	9/11/2018	-96.882536	44.988433	Semipermanent	0.04
WET187	10/1/2018	-96.916391	44.944738	Permanent	0.61
WET188	10/1/2018	-96.915489	44.945773	Permanent	0.04
WET189	10/1/2018	-96.917019	44.946273	Semipermanent	0.22
WET190	10/3/2018	-96.861851	44.829781	Permanent	1.07
WET191	10/12/2018	-96.902507	44.939669	Seasonal	0.22
WET192	10/12/2018	-96.850439	44.82235	Seasonal	0.06
WET193	10/14/2018	-96.910111	45.01683	Seasonal	0.01
WET194	10/16/2018	-96.913284	45.002736	Seasonal	0.16
WET195	10/16/2018	-96.914215	45.003238	Semipermanent	0.58
WET196	10/17/2018	-96.839553	44.911835	Permanent	0.03
WET197	10/17/2018	-96.839696	44.911921	Permanent	0.08
WET198	10/17/2018	-96.837962	44.913385	Permanent	0.04
WET199	10/22/2018	-96.862556	44.936975	Permanent	0.27
WET200	10/22/2018	-96.86179	44.937092	Permanent	0.27
WET201	11/10/2018	-96.780727	44.83362	Semipermanent	0.20
WET202	11/10/2018	-96.780582	44.833731	Seasonal	0.09
WET203	11/10/2018	-96.778969	44.814965	Semipermanent	0.22
WET204	11/10/2018	-96.825987	44.827108	Seasonal	0.05
WET205	11/10/2018	-96.832363	44.835358	Seasonal	0.02
WET206	11/10/2018	-96.838671	44.831952	Semipermanent	0.38
WET207	11/11/2018	-96.819861	44.800953	Semipermanent	0.58
WET208	11/11/2018	-96.8263	44.801742	Semipermanent	0.48
WET209	11/11/2018	-96.824632	44.803436	Seasonal	0.01
WET210	11/11/2018	-96.825067	44.811746	Seasonal	0.01
WET211	11/11/2018	-96.825024	44.812689	Permanent	0.90
WET212	11/11/2018	-96.822512	44.814563	Seasonal	0.02
WET213	11/11/2018	-96.821034	44.814255	Permanent	1.39
WET214	11/11/2018	-96.842344	44.821994	Seasonal	0.06
WET215	11/11/2018	-96.855279	44.812361	Seasonal	0.22
WET216	11/12/2018	-96.812923	44.850293	Semipermanent	0.15
WET217	11/12/2018	-96.811954	44.850526	Seasonal	0.10
WET218	11/12/2018	-96.881461	44.848894	Semipermanent	1.17
WET219	11/12/2018	-96.879426	44.847053	Seasonal	0.15
WET220	11/13/2018	-96.877162	44.858052	Permanent	0.24
WET221	11/13/2018	-96.864631	44.867717	Semipermanent	0.30
WET222	11/13/2018	-96.875423	44.862019	Semipermanent	0.22
WET223	11/14/2018	-96.921639	44.850127	Permanent	0.07
WET224	11/14/2018	-96.91753	44.840508	Permanent	0.10
WET225	11/14/2018	-96.922662	44.835121	Permanent	0.18
WET226	11/14/2018	-96.864795	44.874792	Semipermanent	0.39
WET227	11/14/2018	-96.864347	44.88518	Seasonal	1.00
WET228	11/14/2018	-96.867861	44.899078	Seasonal	0.03

Feature ID	Survey Date	Location		Description	Acreage
		Longitude	Latitude		
WET229	11/14/2018	-96.878279	44.907273	Seasonal	0.10
WET230	11/14/2018	-96.886439	44.910739	Seasonal	1.76
WET231	11/14/2018	-96.88662	44.906358	Seasonal	0.16
WET232	11/14/2018	-96.885497	44.904907	Seasonal	0.67
WET233	11/14/2018	-96.884393	44.904789	Seasonal	0.34
WET234	11/14/2018	-96.833507	44.889846	Semipermanent	0.05
WET235	11/14/2018	-96.864279	44.88983	Seasonal	0.02
WET236	11/14/2018	-96.863382	44.889799	Seasonal	0.03
WET237	11/14/2018	-96.857932	44.889801	Seasonal	0.06
WET238	11/14/2018	-96.959174	44.909936	Semipermanent	0.71
WET239	11/14/2018	-96.820193	44.911526	Semipermanent	0.44
WET240	11/14/2018	-96.847567	44.929445	Permanent	0.42
WET241	11/15/2018	-96.948447	44.986623	perennial	0.04
WET242	11/15/2018	-96.916782	44.997472	Seasonal	0.10
WET243	11/15/2018	-96.909012	45.006132	Permanent	0.08
WET244	11/15/2018	-96.908026	45.005664	Permanent	1.14
WET245	11/15/2018	-96.896594	44.916284	Seasonal	0.29
WET246	11/15/2018	-96.894807	44.923126	Seasonal	0.44
WET247	11/15/2018	-96.894779	44.924118	Seasonal	0.07
WET248	11/15/2018	-96.888927	44.952736	Seasonal	0.48
WET249	11/15/2018	-96.889658	44.953645	Seasonal	1.06
WET250	11/15/2018	-96.892774	45.002544	Seasonal	0.03
WET251	11/15/2018	-96.844918	44.944134	Seasonal	0.44
WET252	11/15/2018	-96.844091	44.942849	Permanent	0.34
WET253	11/15/2018	-96.867436	44.936296	Semipermanent	0.29
WET254	11/15/2018	-96.862867	44.93151	Seasonal	0.29
WET255	11/15/2018	-96.918533	45.003634	Semipermanent	0.18
WET256	11/13/2018	-96.956036	44.833663	Seasonal	0.04
WET257	11/12/2018	-96.866138	44.856157	Semipermanent	0.10
Total					***280.06**

*Total acreage may not be exact due to rounding

4.2.1.1.1 Wetland Vegetation and Wetland Hydrology

The majority of field assessed wetlands observed were dominated by emergent vegetation. Dominant emergent vegetation included broadleaf cattail (*Typha latifolia*), Baltic rush (*Juncus balticus*), common spike-rush (*Eleocharis palustris*), prairie cord grass (*Spartina pectinata*), softstem bulrush (*Schoenoplectus tabernaemontani*), Nebraska sedge (*Carex nebrascennsis*), and several water smartweed species (*Polygonum* spp.). Other dominant species were Kentucky bluegrass (*Poa pratensis*) and timothy-grass (*Phleum pratrense*). Note that seasonal wetlands were recorded in plowed agricultural fields where the presence of hydrophytic vegetation was not always apparent due to disturbance, but secondary indicators suggested that a wetland was present. The primary wetland hydrology indicators were saturation and the presence of surface water. Secondary indicators used for wetland hydrology assessment included geomorphic position, saturation visible on aerial imagery, and water marks. A few wetlands had algal mats and soil cracks.

4.2.1.2 WATERBODIES

SWCA biologists recorded 19 streams within the survey areas, all of which exhibited an OHWM at the time of the field visit. The field-assessed streams were classified as one ephemeral stream, six intermittent streams, and 12 perennial streams. The cumulative length within the survey areas for all 19 streams is 1.64 miles. Table 3 provides additional detail for all field-assessed streams in the survey areas.

Table 3. Field-Assessed Streams Determined for the Survey Areas

Feature ID	Survey Date	Location		Description	Length within Survey Area (miles)
		Longitude	Latitude		
STR01	10/30/2017	-96.893469	44.964794	Perennial	0.10
STR02	11/1/2017	-96.902539	44.963863	Perennial	0.06
STR03	5/22/2018	-96.881316	44.841862	Perennial	0.13
STR04	5/23/2018	-96.9571	44.985673	Intermittent	0.27
STR05	10/12/2018	-96.83987	44.914017	Intermittent	0.04
STR06	10/12/2018	-96.838269	44.91355	Intermittent	0.04
STR07	10/12/2018	-96.837612	44.913664	Intermittent	0.05
STR08	10/30/2017	-96.893399	44.965026	Perennial	0.09
STR09	10/31/2017	-96.887084	44.927695	Ephemeral	0.09
STR10	11/1/2017	-96.902665	44.964027	Perennial	0.05
STR11	10/1/2018	-96.917166	44.94495	Perennial	0.03
STR12	10/1/2018	-96.915515	44.945926	Perennial	0.29
STR13	10/2/2018	-96.861427	44.830054	Perennial	0.07
STR14	10/2/2018	-96.862789	44.829369	Perennial	0.10
STR15	10/22/2018	-96.862546	44.936901	Intermittent	0.04
STR16	11/12/2018	-96.869472	44.842824	Perennial	0.10
STR17	11/13/2018	-96.922725	44.835112	Perennial	0.04
STR18	11/13/2018	-96.91753	44.840554	Perennial	0.03
STR19	11/13/2018	-96.92165	44.850101	Intermittent	0.03
Total					***1.64**

*Total length of streams may not be exact due to rounding

5 CONCLUSIONS

SWCA completed an aquatic resources desktop assessment and field surveys for the Crowned Ridge II Wind Energy Facility. Biologists determined the presence of 257 wetlands and 19 streams within the survey areas. The results provided in this report represent SWCA's professional opinion based on SWCA's knowledge and experience with the USACE, including the USACE's regulatory guidance documents and manuals. Crowned Ridge Wind, LLC, plans to use this information to avoid impacts to wetlands and streams to the extent feasible. Any impacts to potentially jurisdictional streams or wetlands that cannot be avoided will be minimized and kept under the thresholds required to comply with Nationwide Permits 12 and 14.

6 REFERENCES

Bryce, S., J.M. Omernik, D.E. Pater, M. Ulmer, J. Schaar, J. Freeouf, R. Johnson, P. Kuck, and S.H. Azevedo. 1998. *Ecoregions of North Dakota and South Dakota*. Jamestown, North Dakota: Northern Prairie Wildlife Research Center.

Commission for Environmental Cooperation. 1997. Ecological Regions of North America: Toward a Common Perspective. Available at: http://www3.cec.org/islandora/en/item/1701-ecological-regions-north-america-toward-common-perspective. Accessed October 2016.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. Washington, D.C.: U.S. Fish and Wildlife Service.

Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N.D. Herold, J.D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States – Representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing* 81(5):345–354.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 Wetland Ratings. *Phytoneuron* 2016-30:1–17.

Natural Resources Conservation Service (NRCS). 2016. *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.0*. Prepared in cooperation with the National Technical Committee for Hydric Soils. Edited by G.W. Hurt, P.M. Whited, and R.F. Pringle. Fort Worth, Texas: U.S. Department of Agriculture, Natural Resources Conservation Service.

———. 2018. Web Soil Survey. Available at: http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed February 2019.

U.S. Army Corps of Engineers (USACE). 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1. Vicksburg, Mississippi: U.S. Army Engineers Waterways Experiment Station.

———. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (Version 2.0). ERDC/EL TR-10-16. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center, Environmental Laboratory.

U.S. Environmental Protection Agency (EPA). 2008. Guidance on Clean Water Act Jurisdiction following the Supreme Court Decision in Rapanos v. U.S. and Carabell v. U.S. (revision on December 2, 2008 to the joint memorandum issued by the USACE and the EPA on June 5, 2007).

U.S. Fish and Wildlife Service (USFWS). 2012. National Wetlands Inventory website. Washington, D.C.: U.S. Fish and Wildlife Service. Available at: http://www.fws.gov/wetlands/. Accessed April 2017.

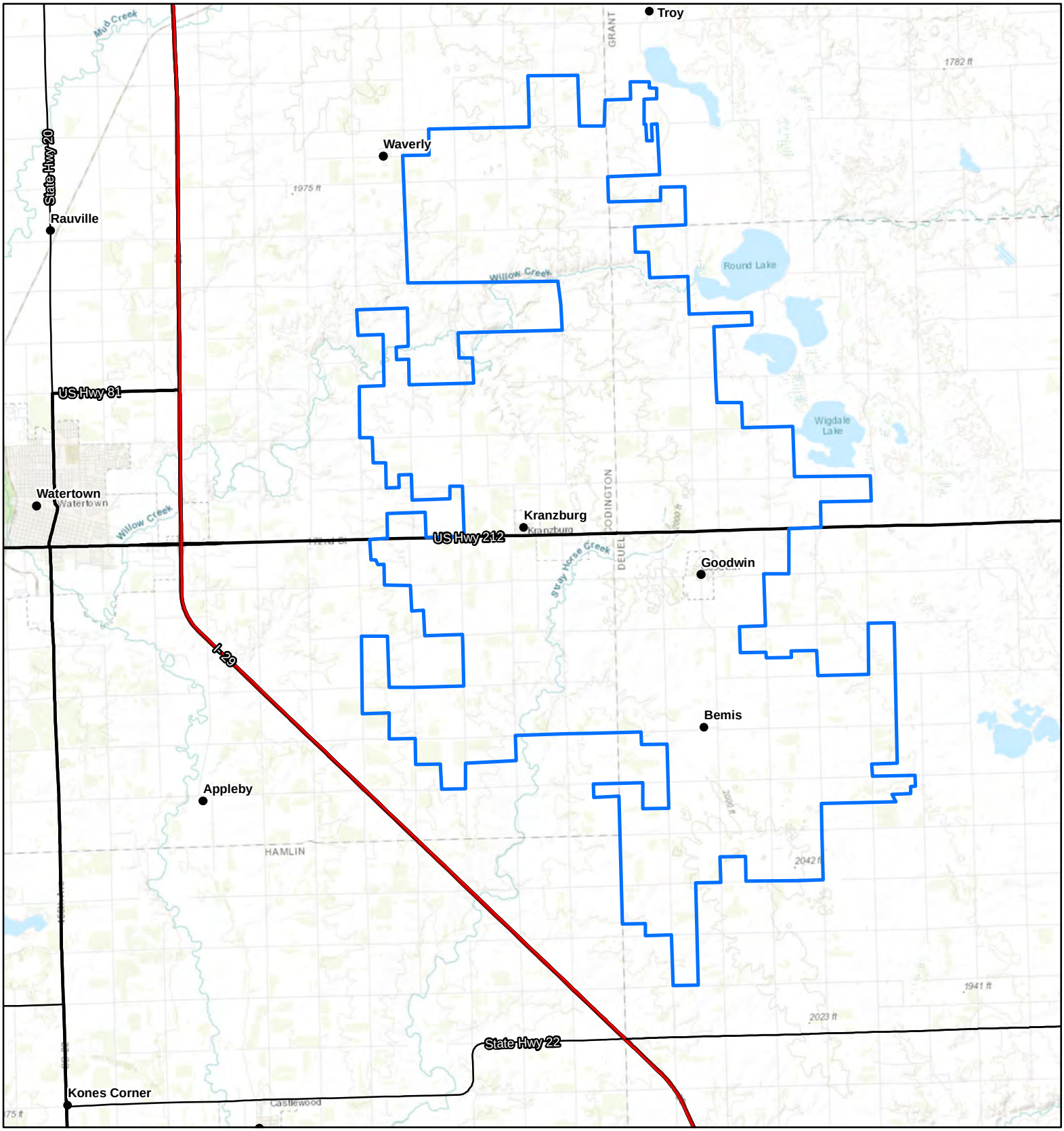
U.S. Geological Survey (USGS). 2013. National Hydrography Dataset. Available at: https://gdg.sc.egov.usda.gov/GDGOrder.aspx. Accessed April 2017.

This page intentionally left blank.

APPENDIX A

Figures

Overview Map



Crowned Ridge II Wind Farm

- City
- Interstate Highway
- U.S. Highway
- State Highway
- Project Boundary

Kilometers
0 5 10

Miles
0 2.5 5

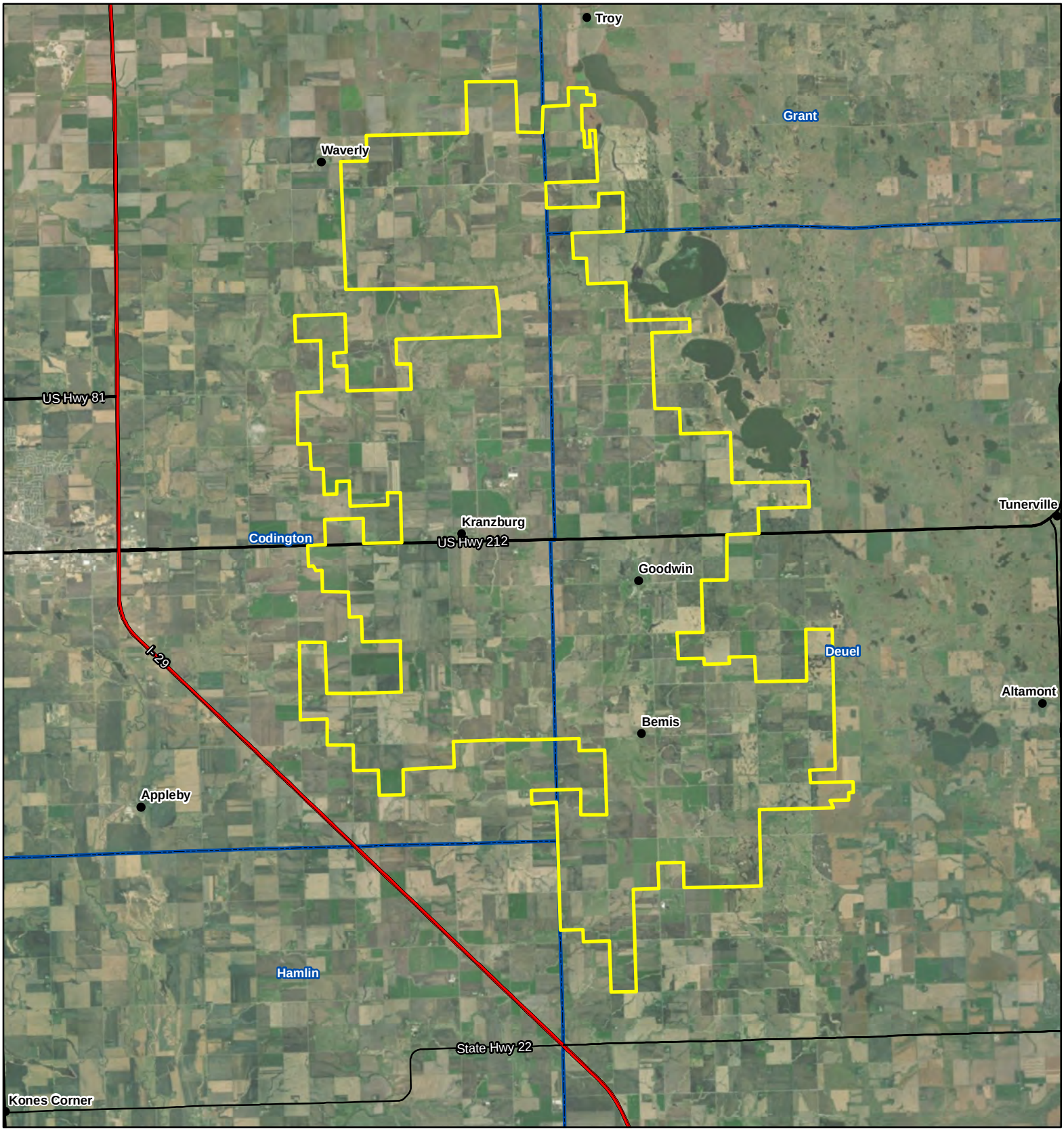
N
W E
S

Base Map: World Topographic Map
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
Codington, Deuel, and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Aerial Map



Crowned Ridge II Wind Farm

- City
- Interstate Highway
- U.S. Highway
- State Highway
- Project Boundary
- County Boundary

Kilometers
0 5 10

Miles
0 2.5 5

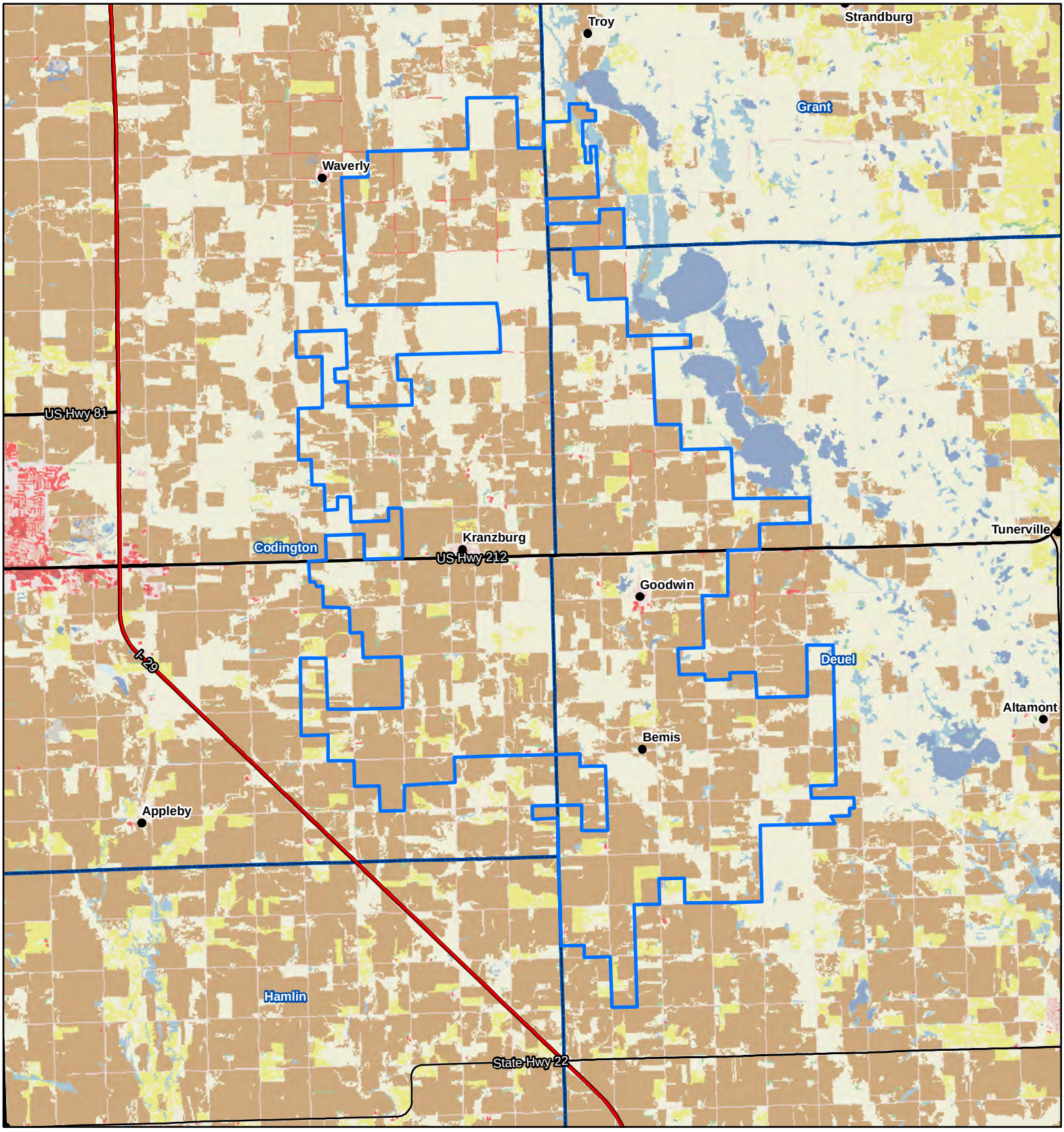
N
W E
S

Base Map: World Imagery
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Codington, Deuel, and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Land Cover Map



Crowned Ridge II Wind Farm

- City
- Interstate Highway
- U.S. Highway
- State Highway
- Project Boundary

Land Cover

- Barren Land
- Cultivated Crops
- Deciduous Forest
- Developed, High Intensity
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
- Emergent Herbaceuous Wetlands
- Evergreen Forest
- Hay/Pasture
- Herbaceuous
- Mixed Forest
- Open Water
- Shrub/Scrub
- Woody Wetlands
- County Boundary

Kilometers

0 5 10

Miles

0 2.5 5

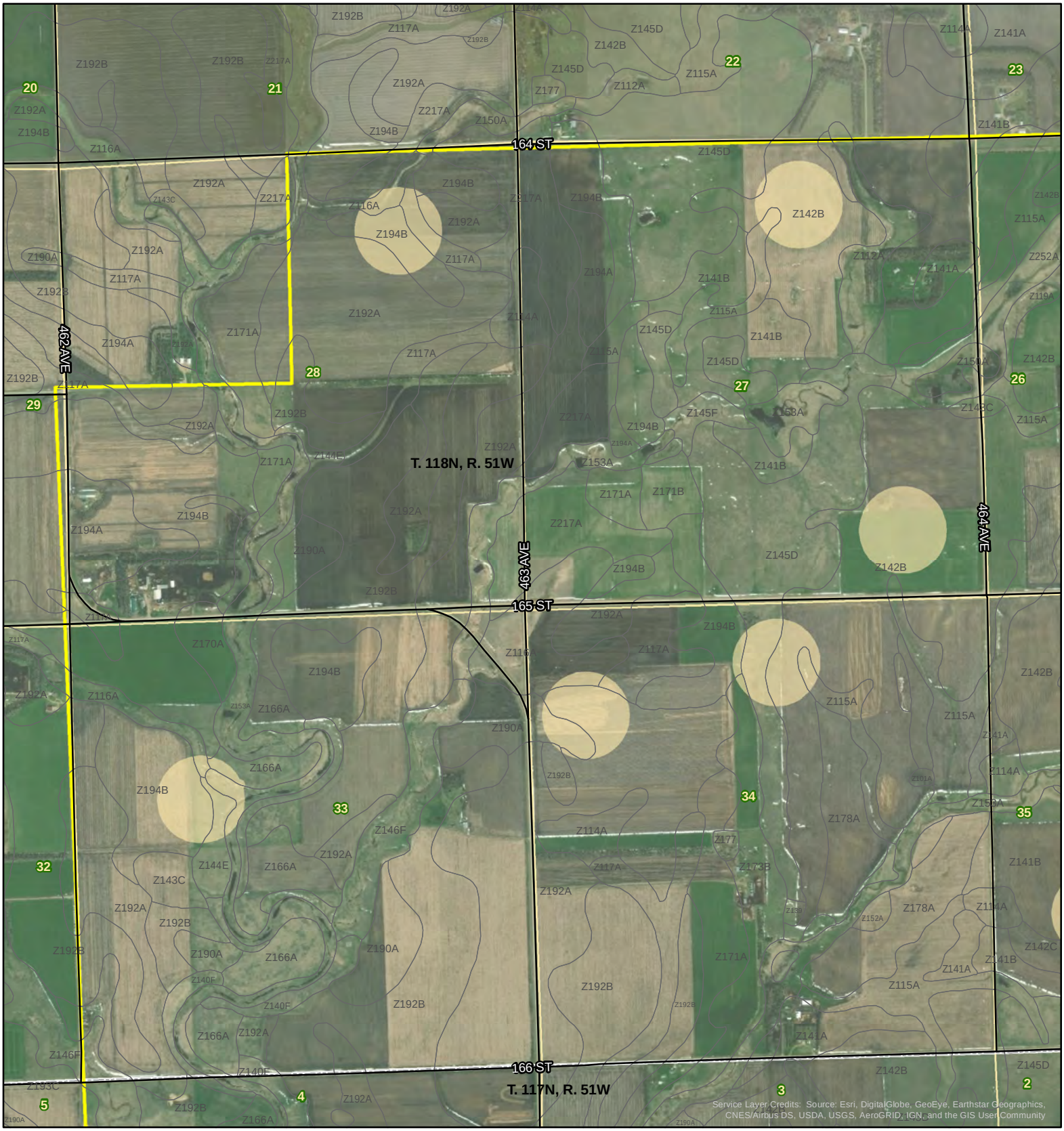
N W E S

Base Map: National Land Cover Dataset
Source: U.S. Geological Survey, 20141010,
NLCD 2011 Land Cover (2011 Edition, amended 2014),
3 x 3 Degree: NLCD2011_LC_N45W096:
U.S. Geological Survey.
Codington, Deuel, and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

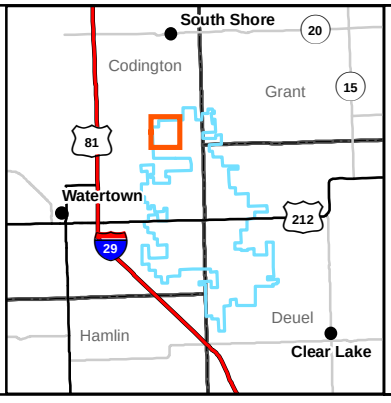
SWCA ENVIRONMENTAL CONSULTANTS

Soil Types Maps



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

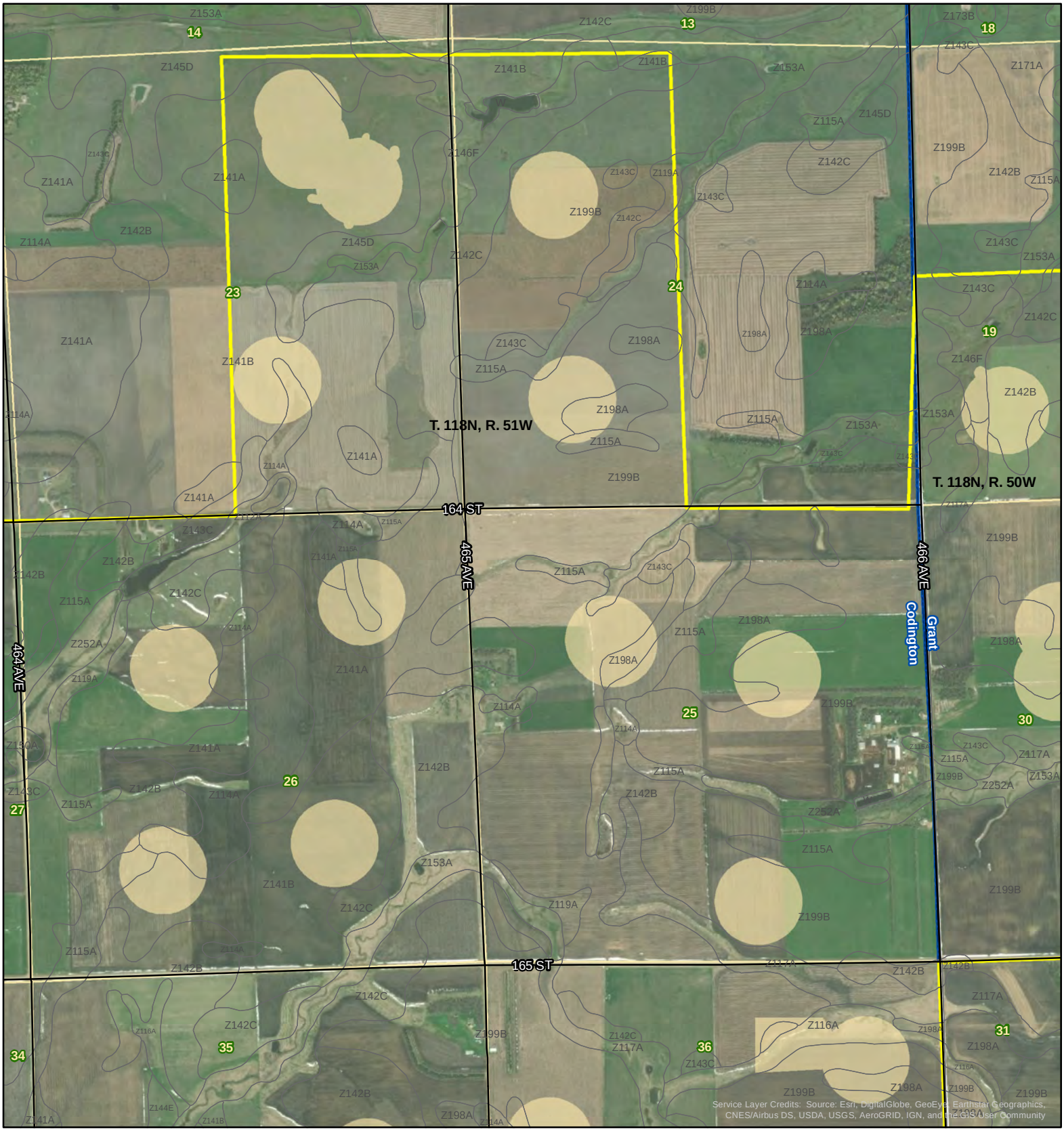
N
W E
S

Base Map: World Imagery
Quadrangle: South Shore (1973), Kranzburg (1970)
Township/Range: T118N, R51W

Codington County, South Dakota

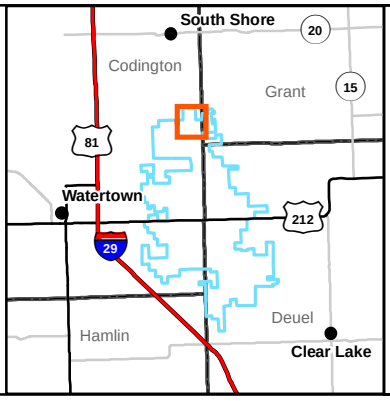
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

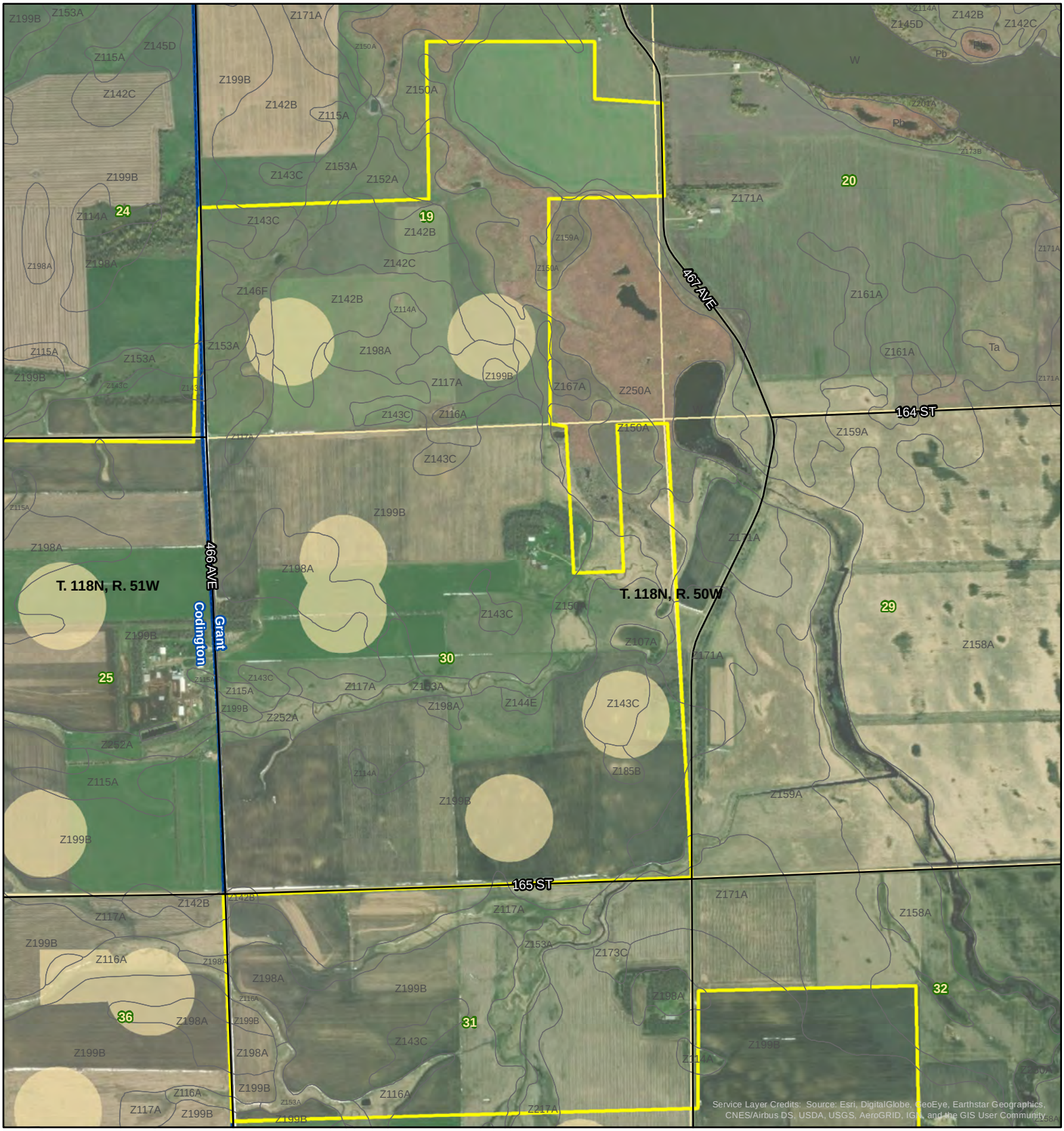
Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: South Shore (1973), Kranzburg (1970)
Township/Range: T118N, R51W

Codington and Grant Counties, South Dakota

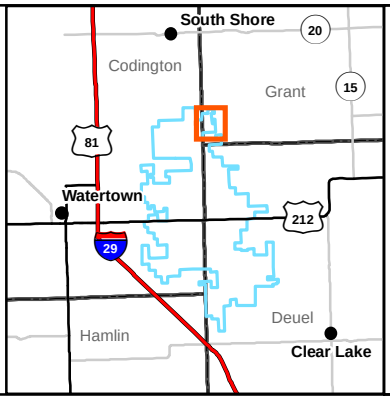
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: South Shore (1973), Kranzburg (1970), Stockholm (1973), Goodwin (1970)
Township/Range: T118N, R51W

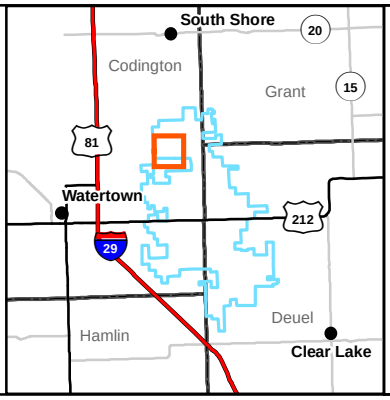
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

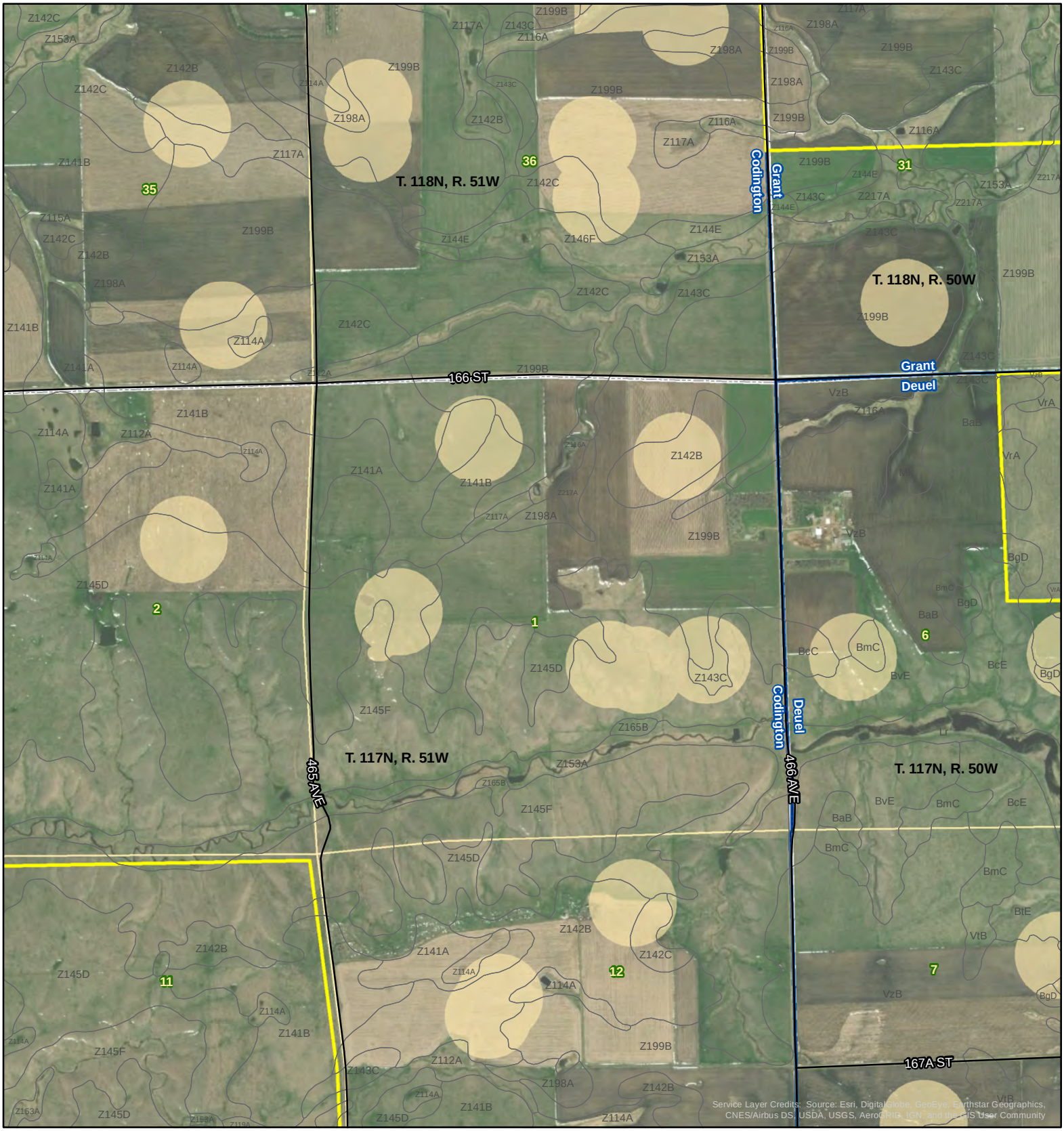
N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T118N, R51W,
T117N, R51W
Codington County, South Dakota

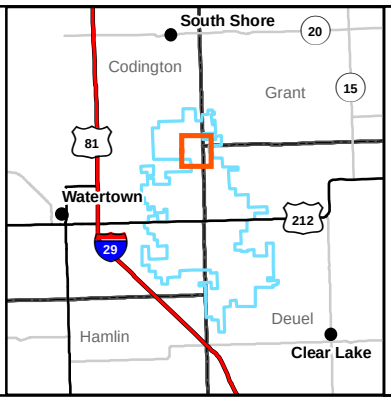
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

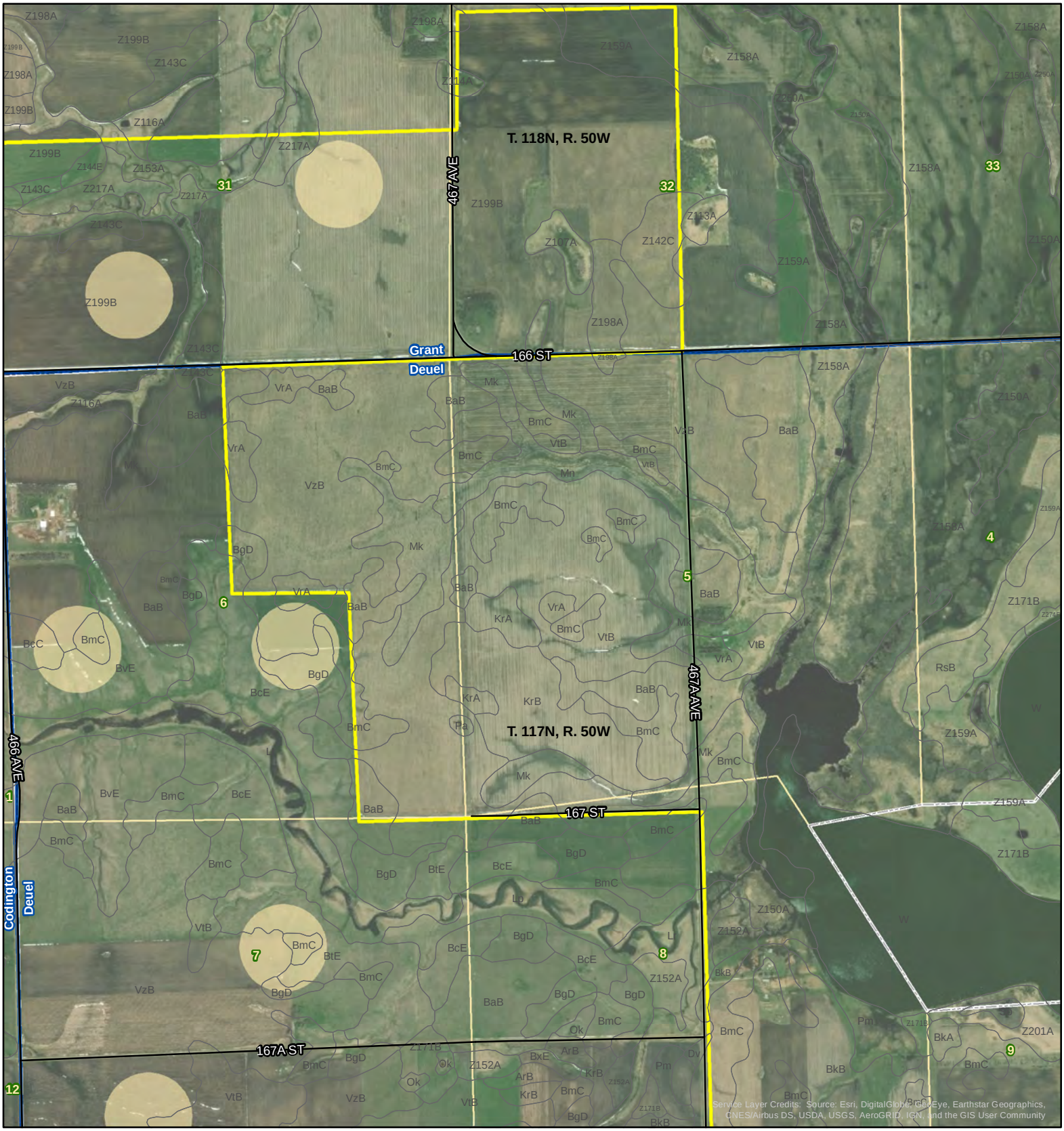
N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T118N, R51W, T118N, R50W, T117N, R51W, T117N, R50W
Codington, Deuel, and Grant Counties, South Dakota

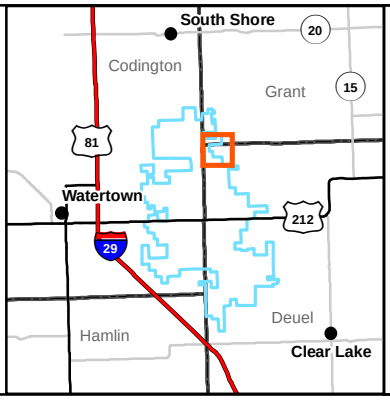
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



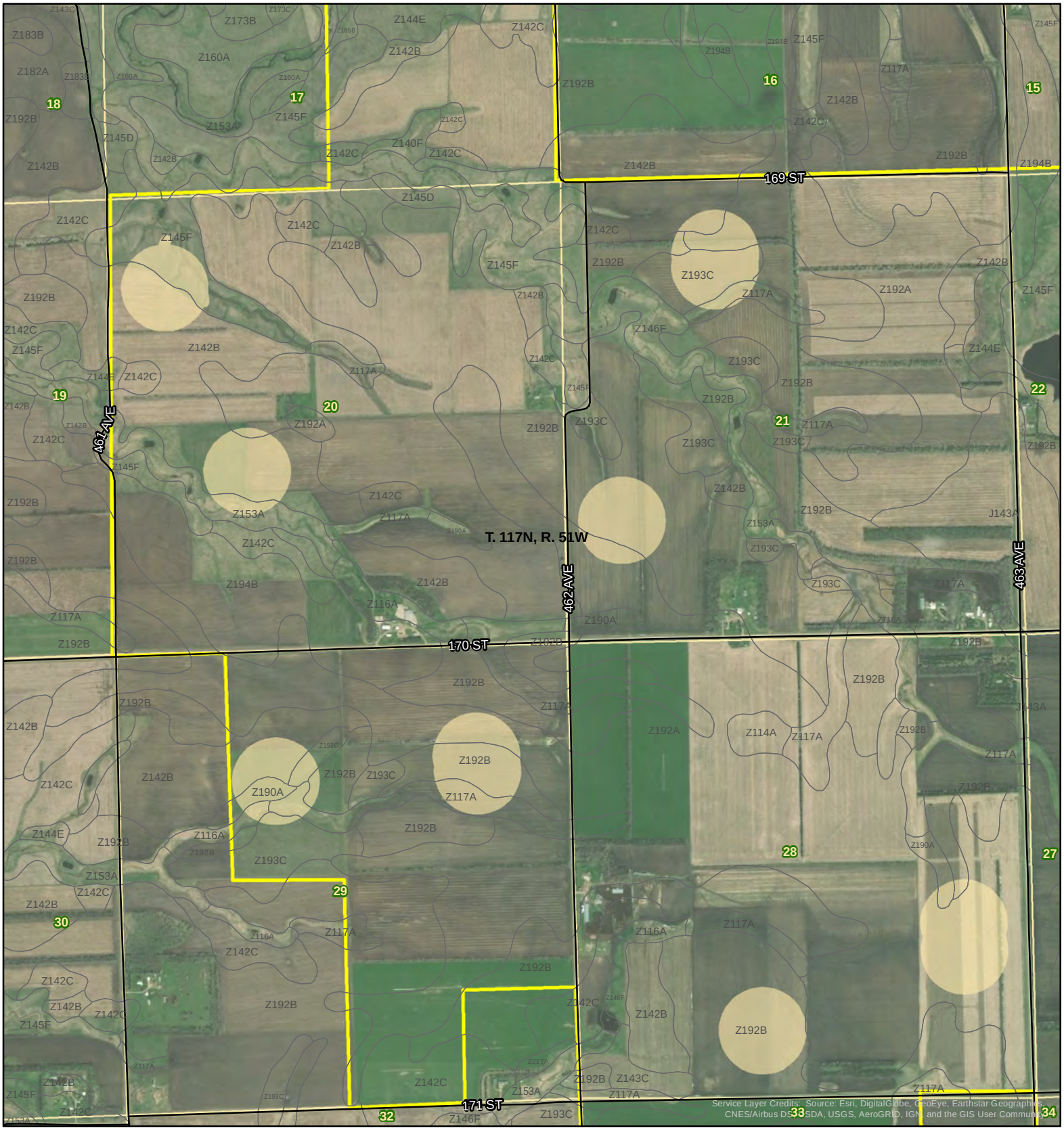
Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T118N, R50W, T117N, R50W
Deuel and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary

Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

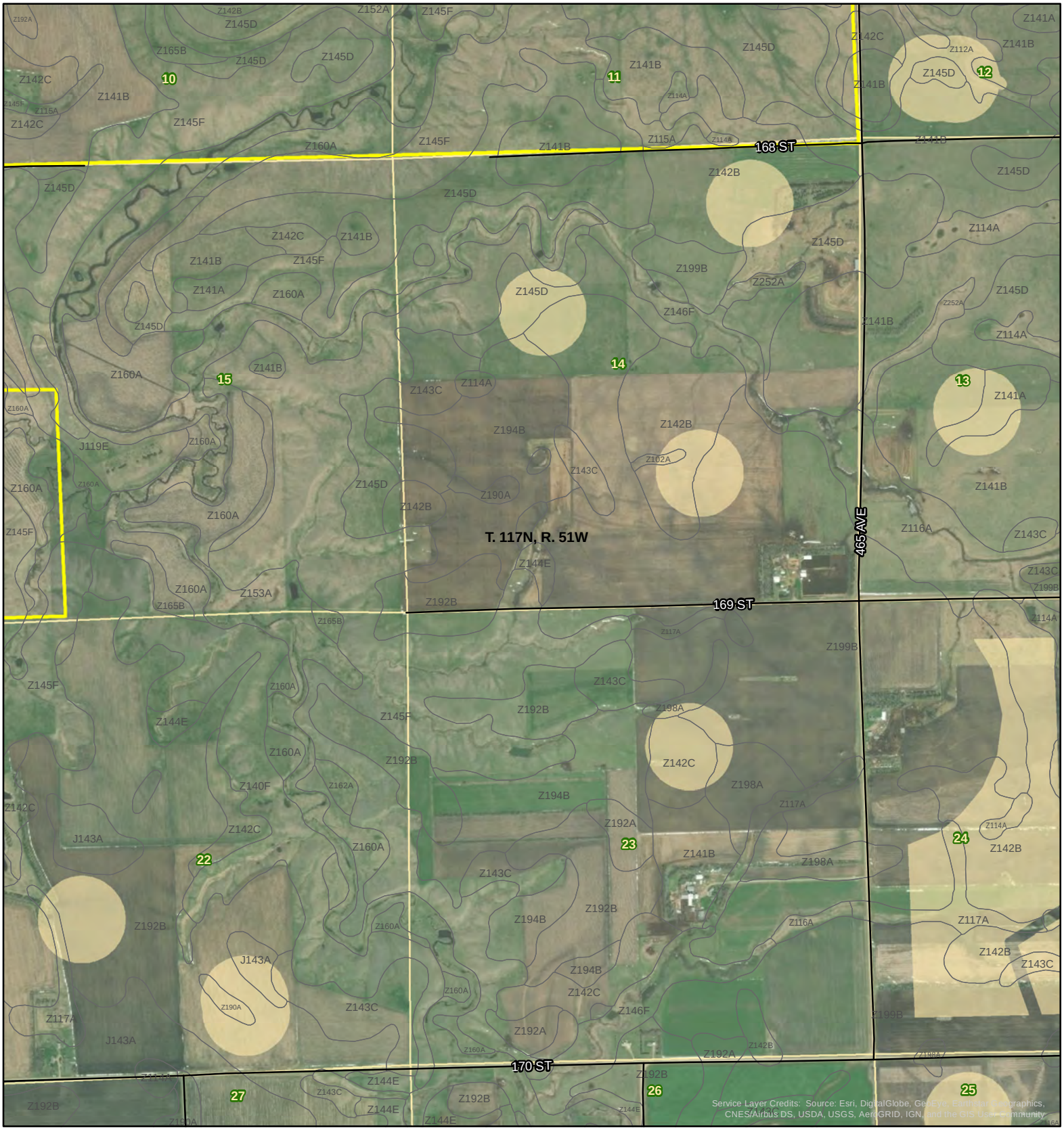
Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T117N, R51W

Codington County, South Dakota

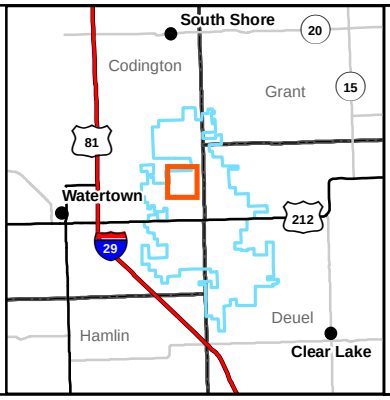
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T117N, R51W

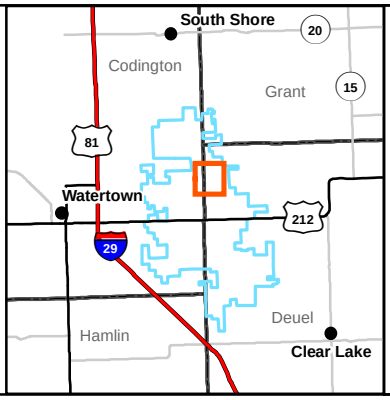
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

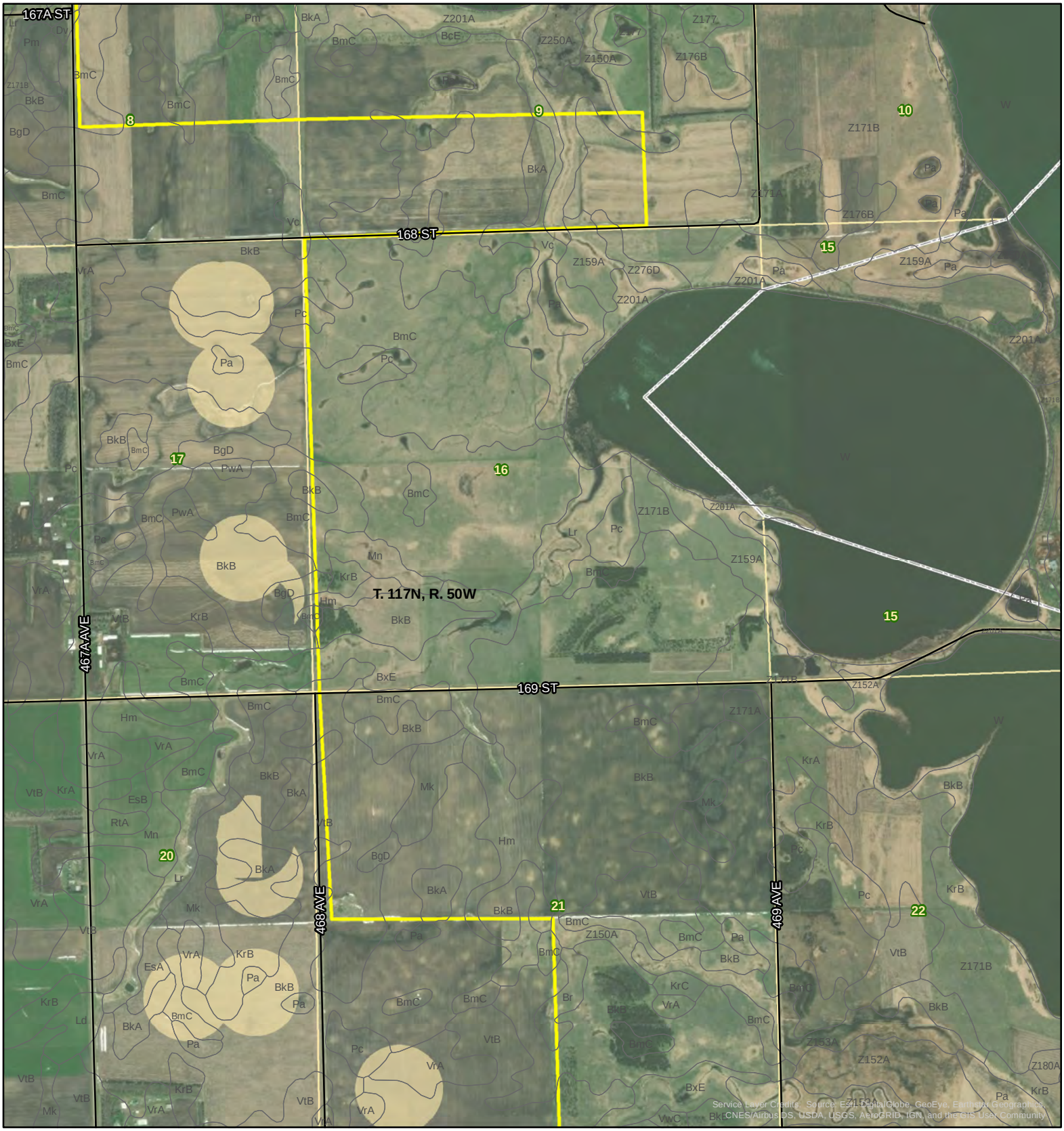
Miles
0 0.25 0.5

N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T117N, R51W, T117N, R50W
Codington and Deuel Counties, South Dakota

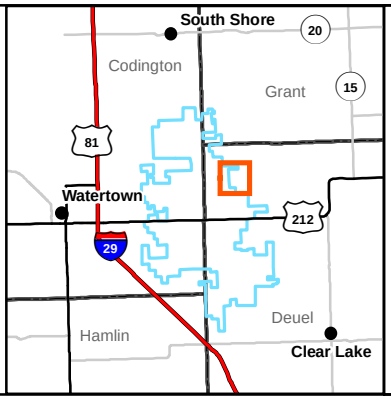
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Goodwin (1970)

Township/Range: T117N, R50W

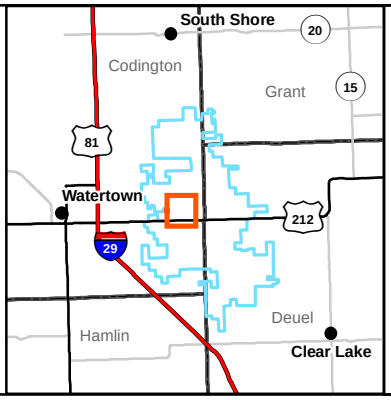
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

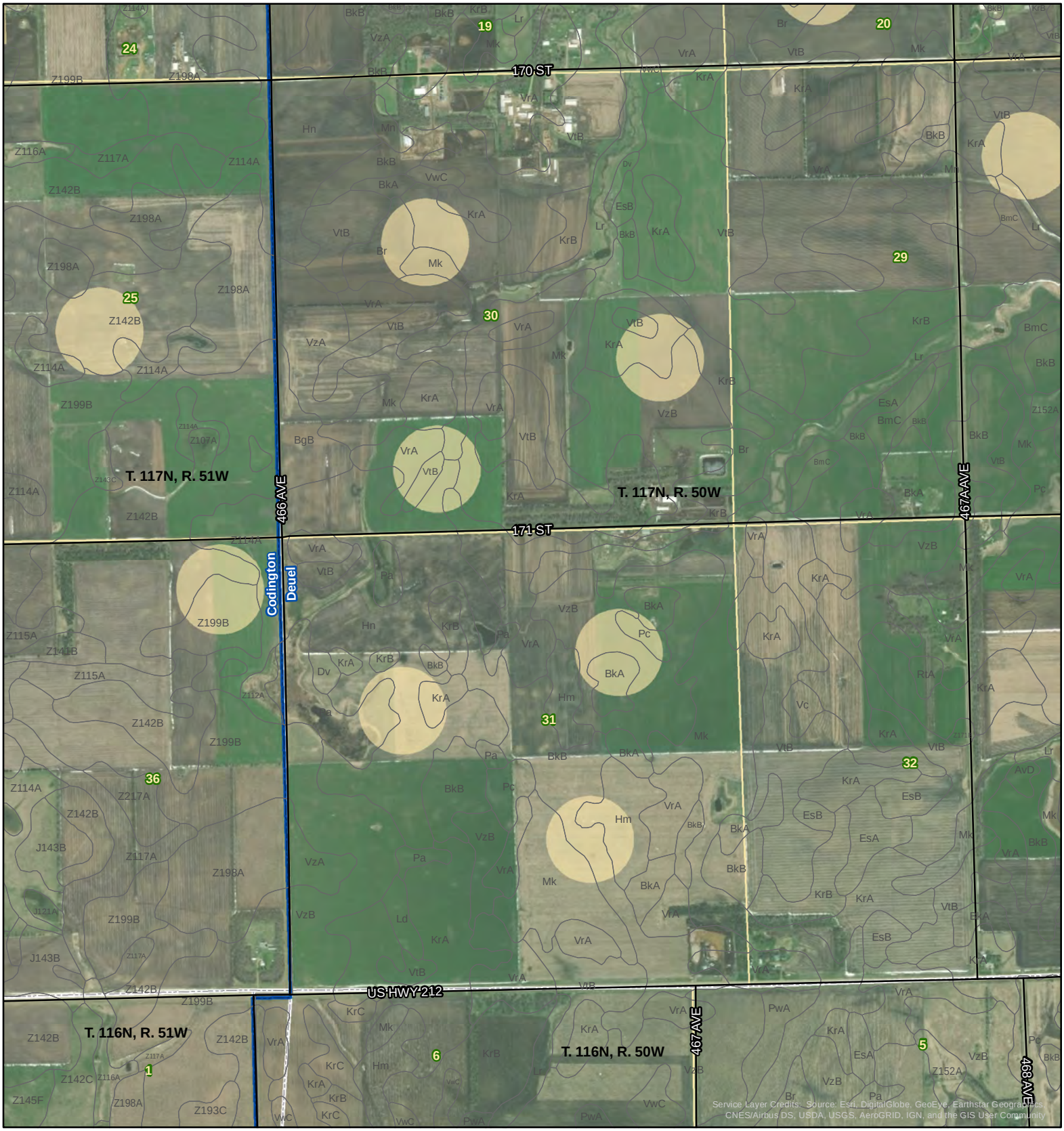
Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T117N, R51W

Codington County, South Dakota

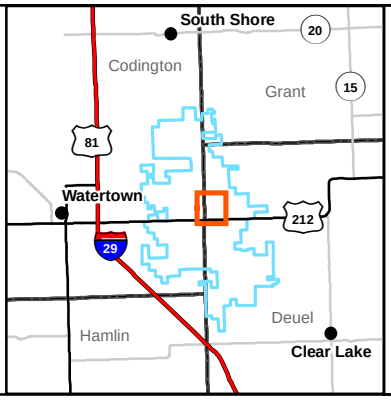
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

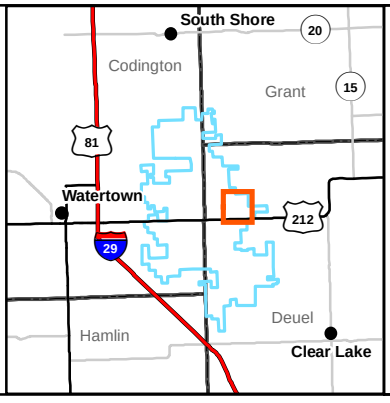
Base Map: World Imagery
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T117N, R51W, T117N, R50W
Codington and Deuel Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

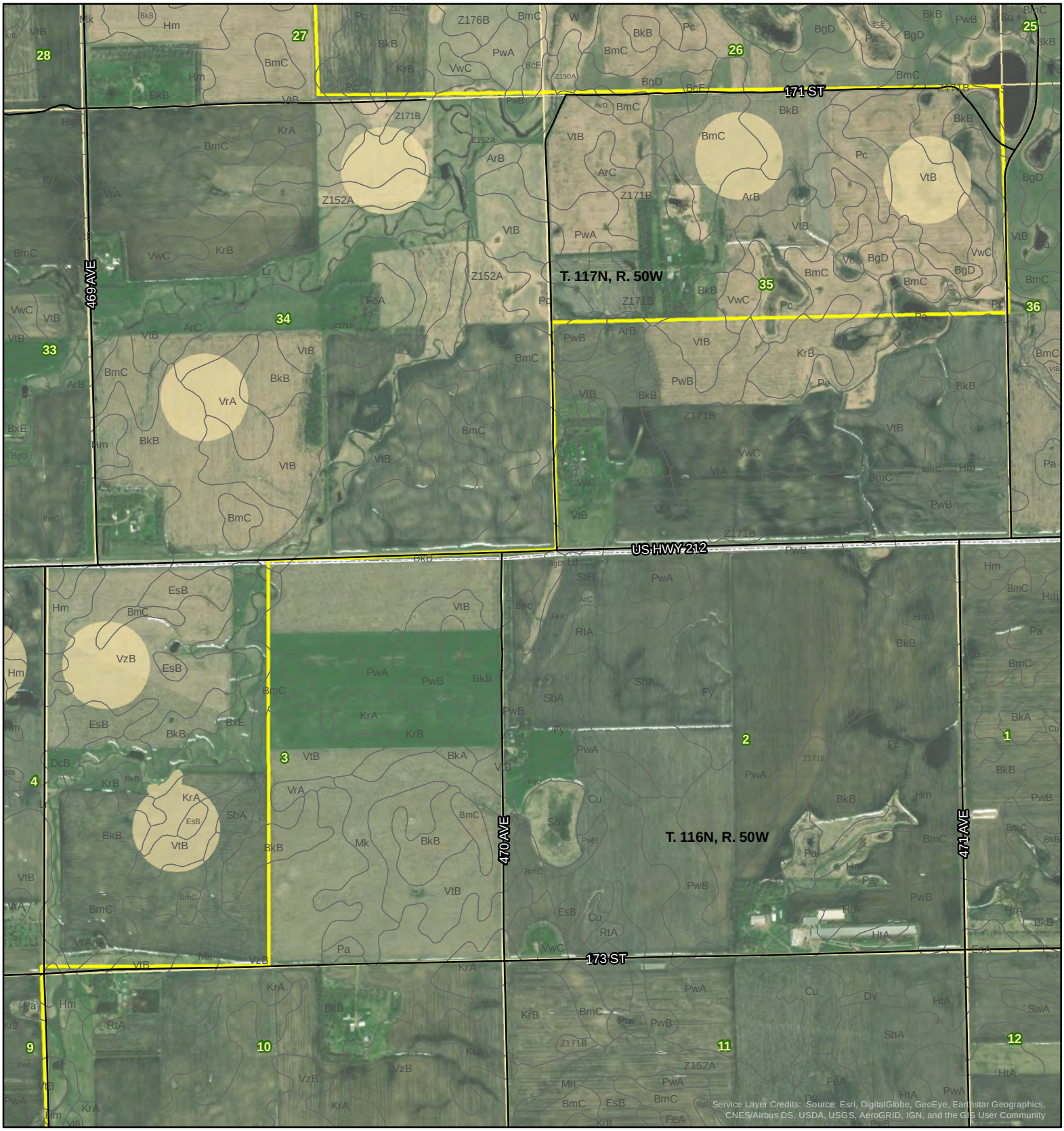
Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Goodwin (1970)

Township/Range: T117N, R50W,
T116N, R50W
Deuel County, South Dakota

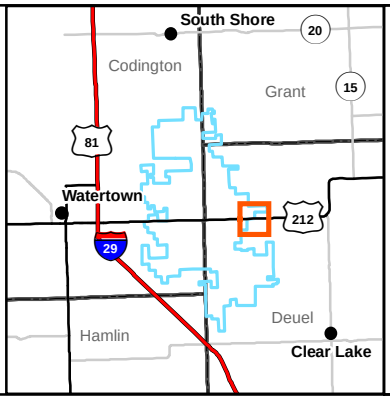
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

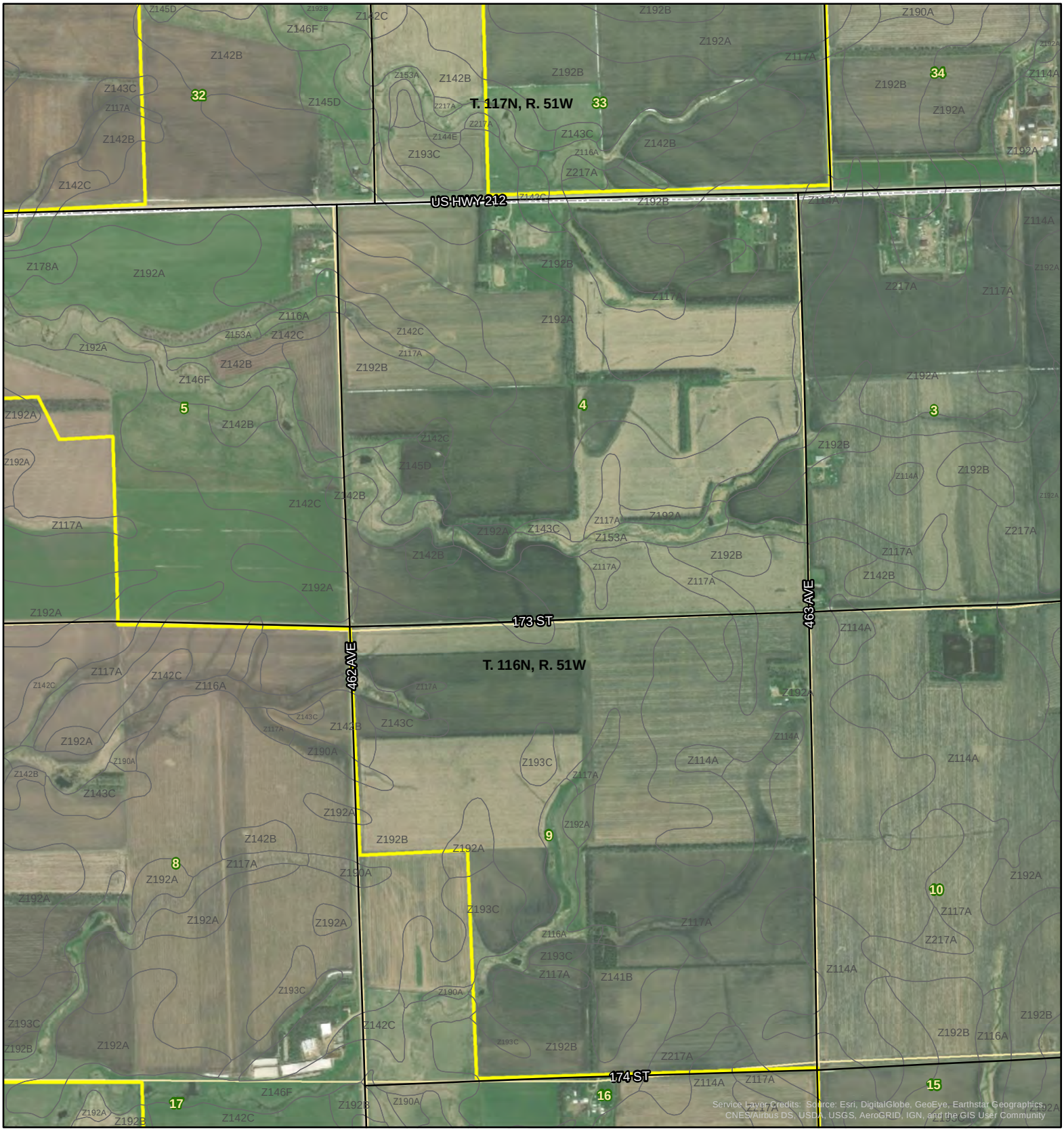
Miles
0 0.25 0.5

N
W E
S

Base Map: World Imagery
Quadrangle: Goodwin (1970), Bemis (1978)
Township/Range: T117N, R50W, T116N, R50W
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary

Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

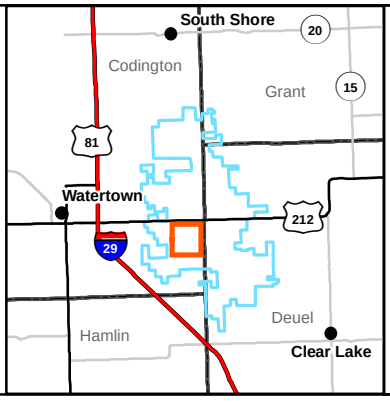
Base Map: World Imagery
Quadrangle: Kranzburg (1970), Kranzburg SW (1970)
Township/Range: T117N, R51W, T116N, R51W
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

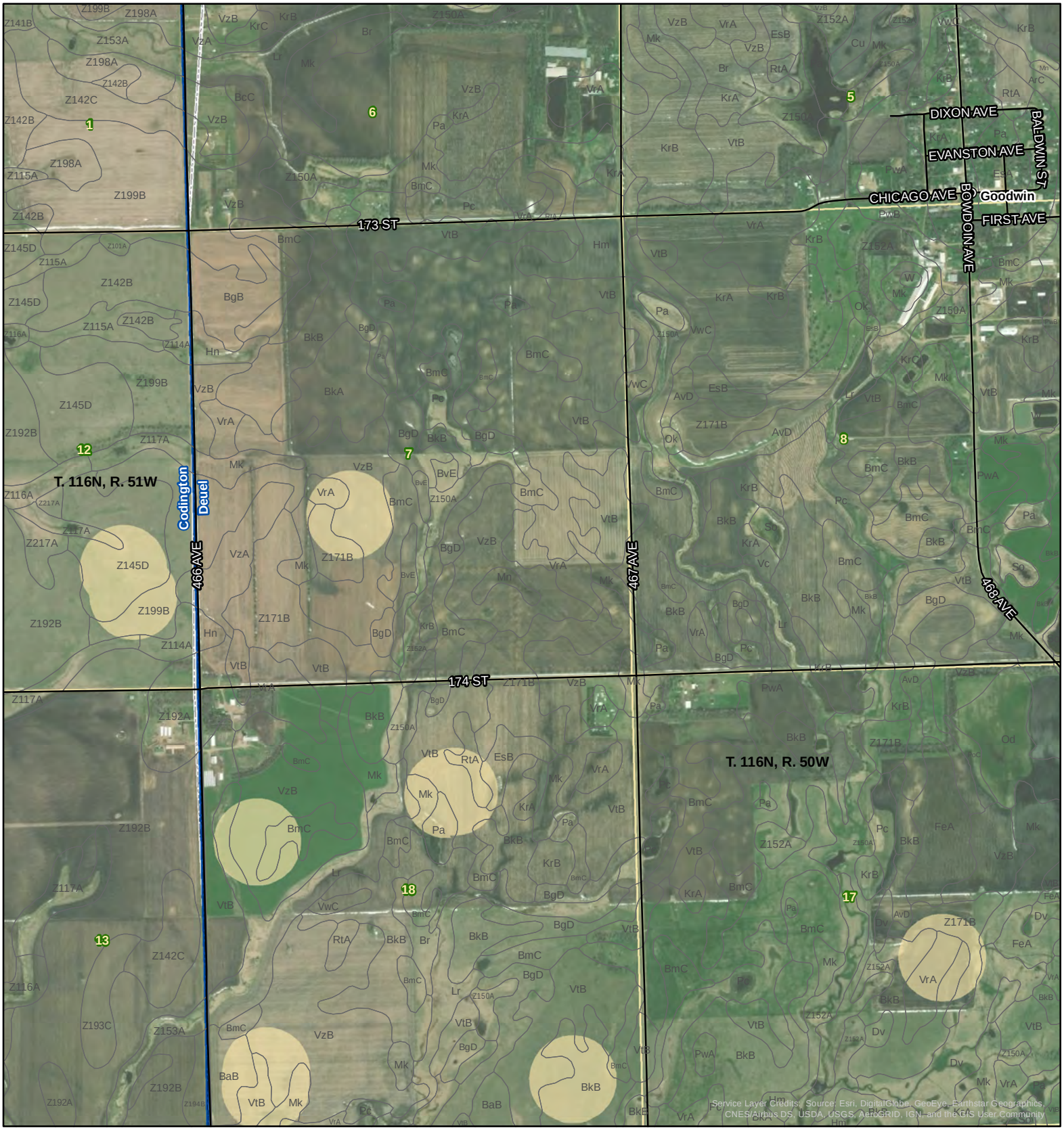
Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Kranzburg SW (1970)
Township/Range: T116N, R51W

Codington County, South Dakota

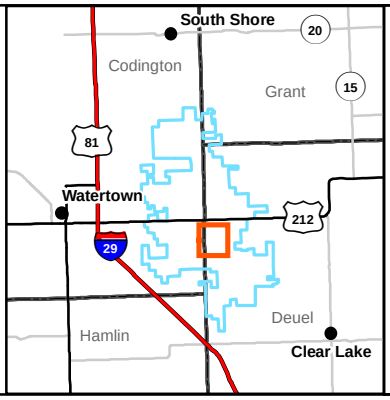
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



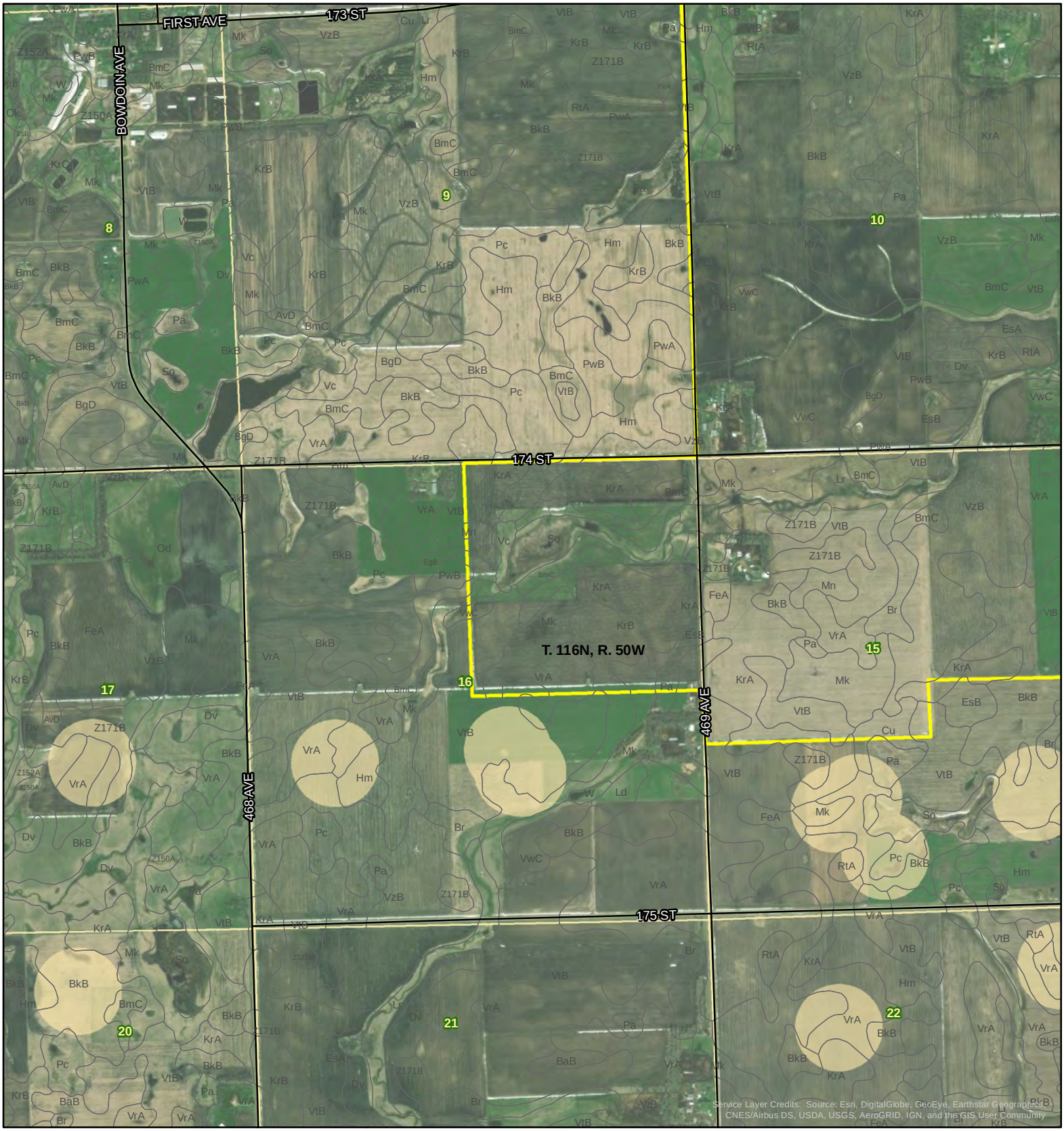
Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Kranzburg SW (1970), Bemis (1978)
Township/Range: T116N, R51W, T116N, R50W
Codington and Deuel Counties, South Dakota

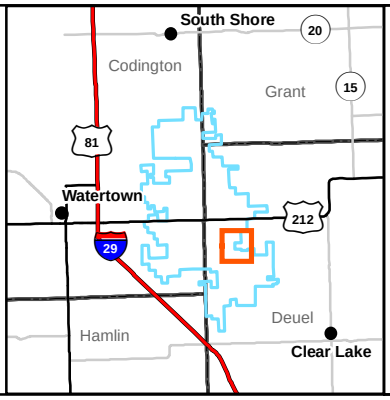
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

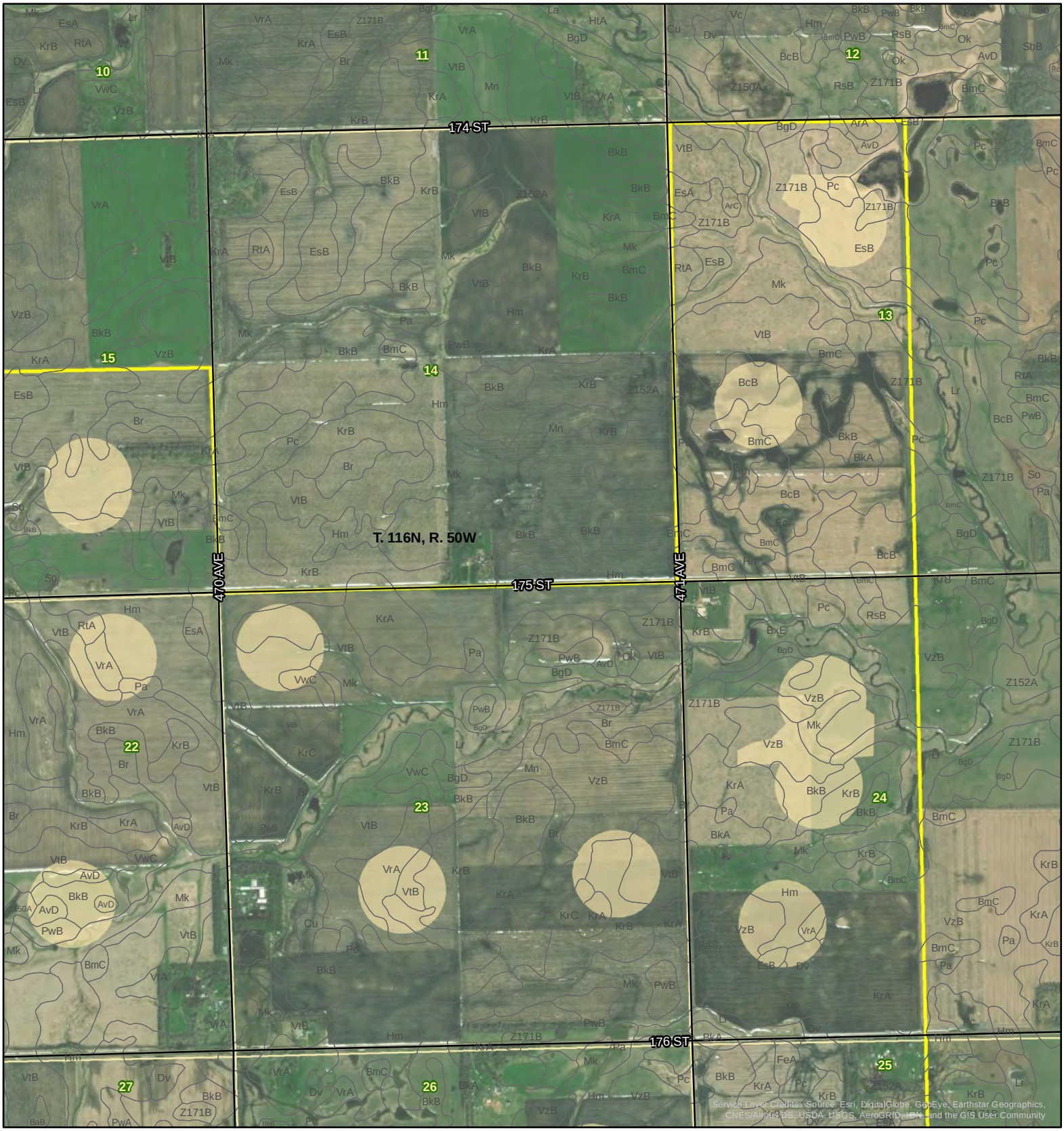
Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W

Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary

Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

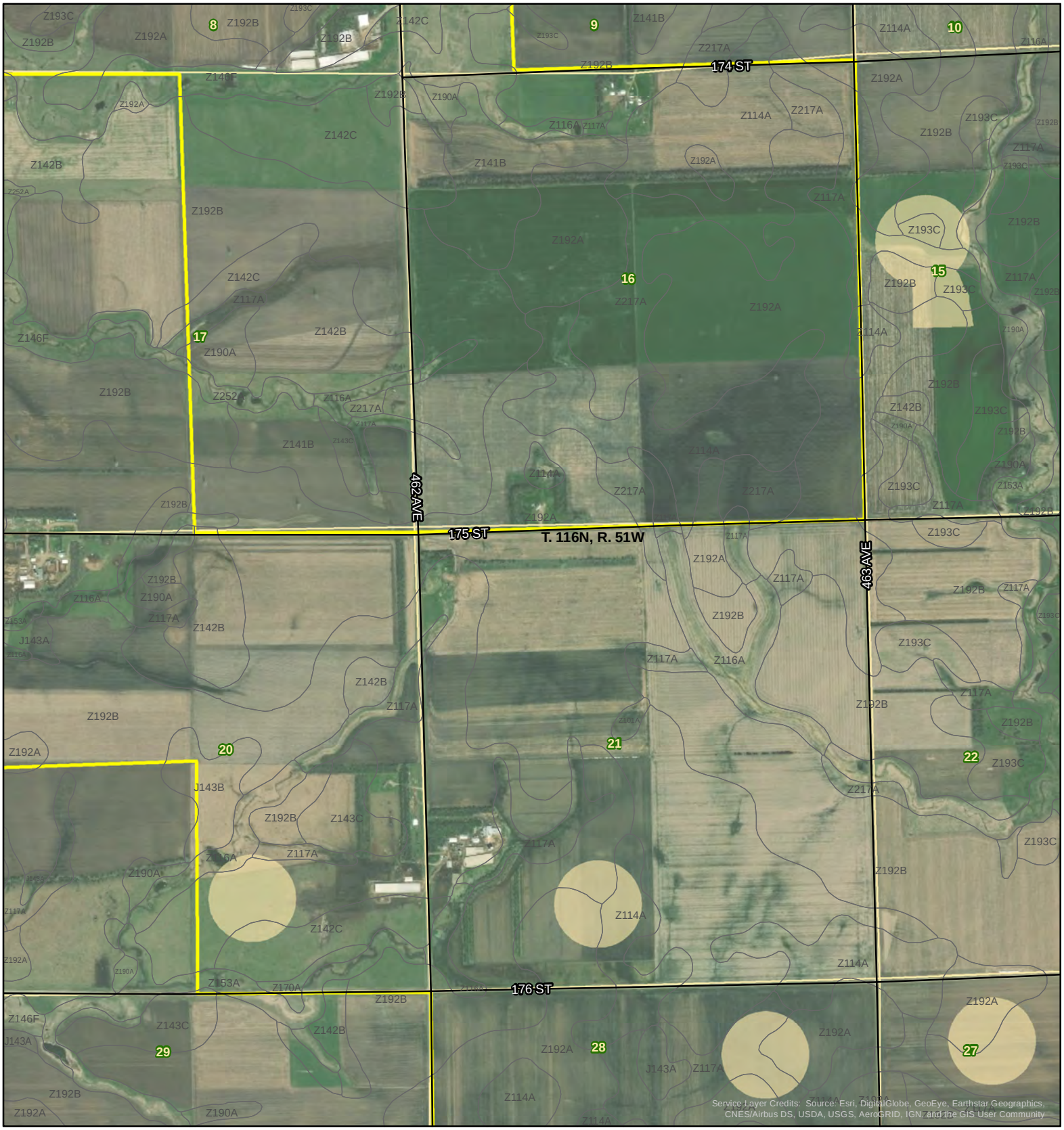
Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W

Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary

Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg SW (1970)

Township/Range: T116N, R51W

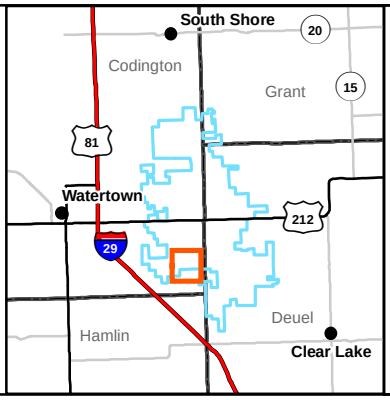
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

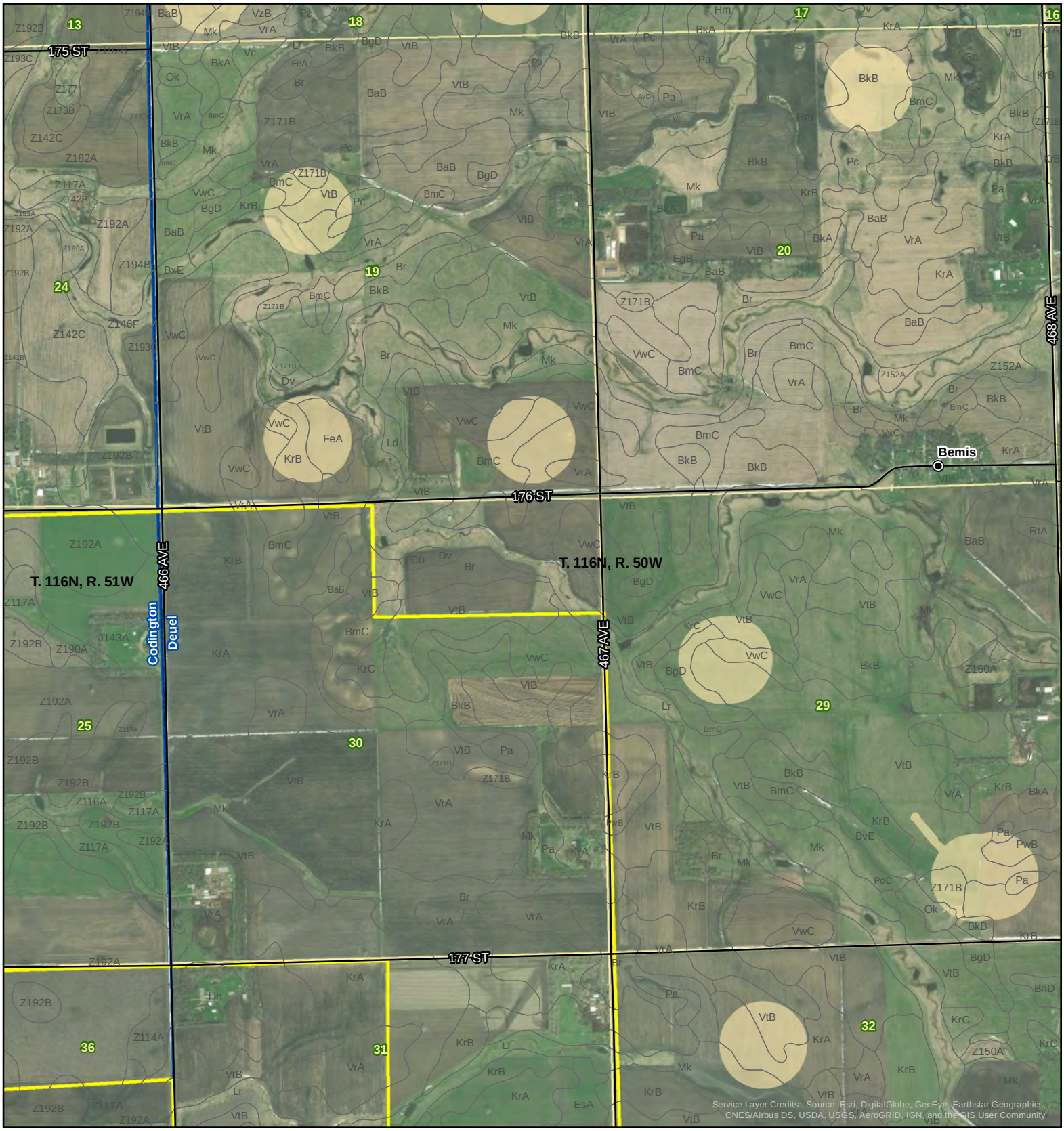
Base Map: World Imagery
Quadrangle: Kranzburg SW (1970)

Township/Range: T116N, R51W

Codington County, South Dakota

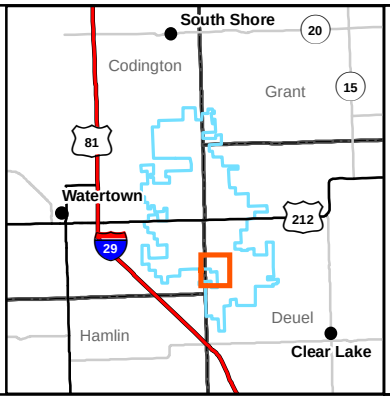
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg SW (1970), Bemis (1978)
Township/Range: T116N, R50W

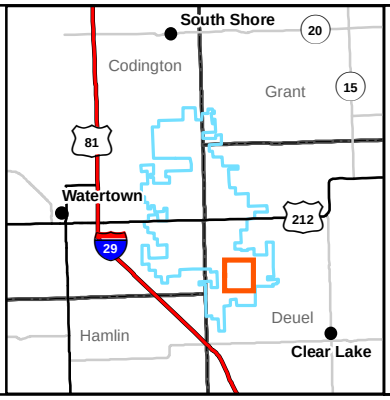
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

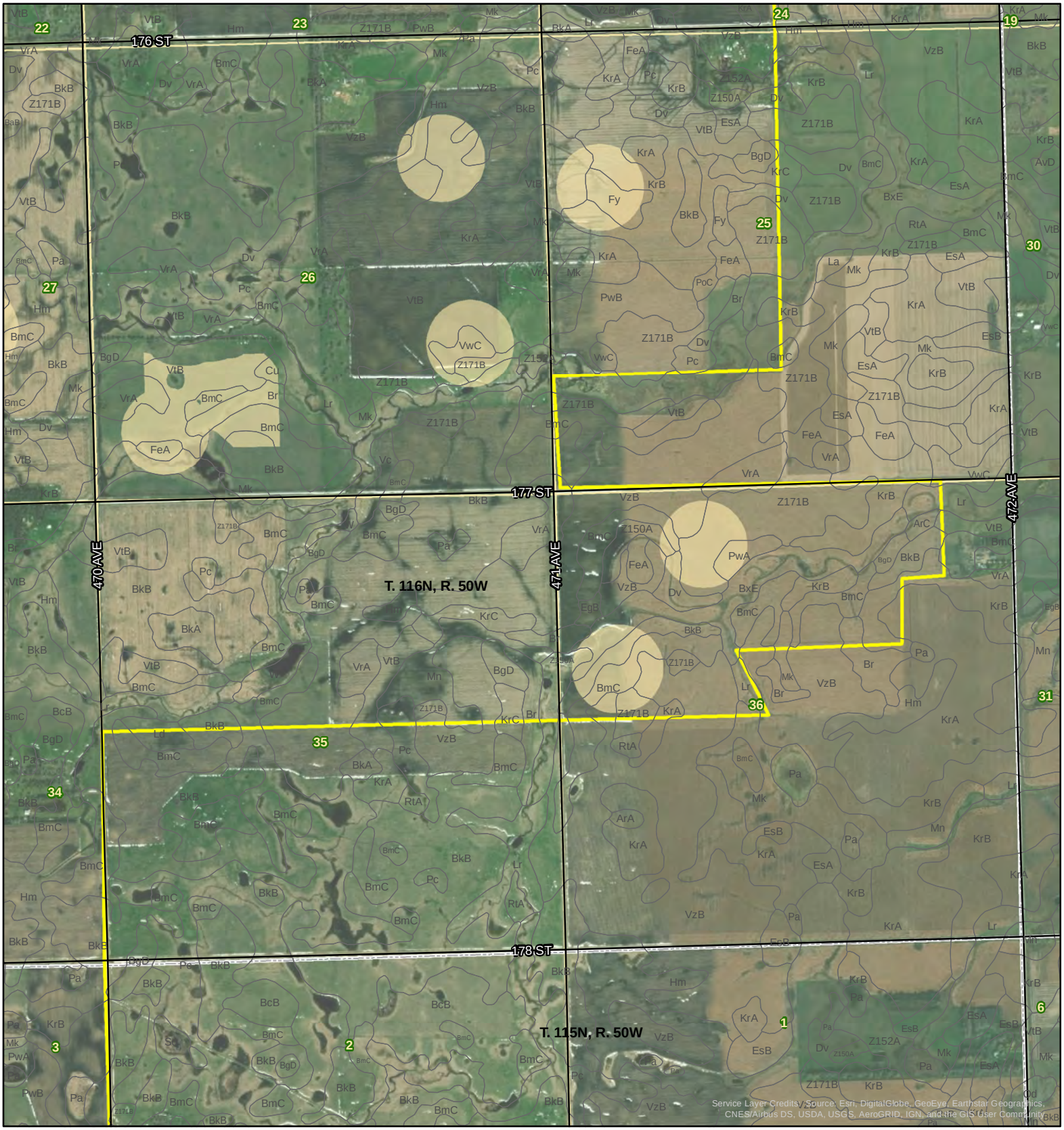
Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W

Deuel County, South Dakota

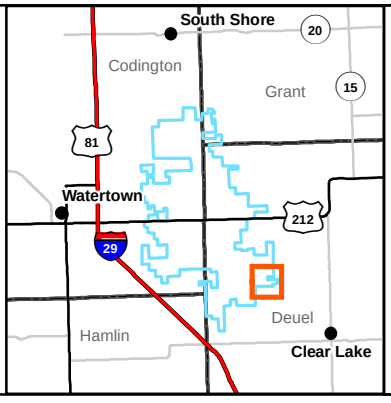
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

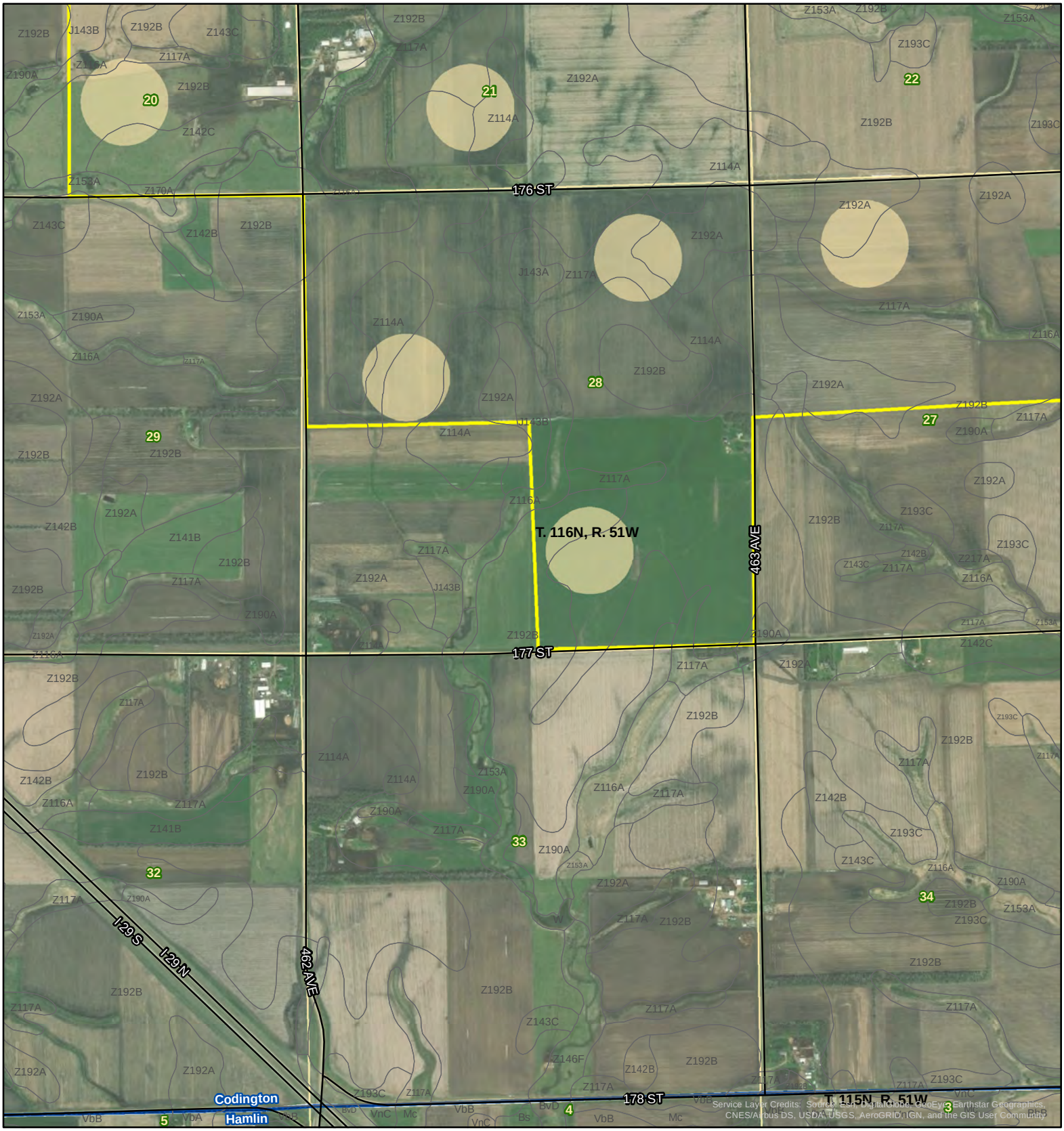
Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W

Deuel County, South Dakota

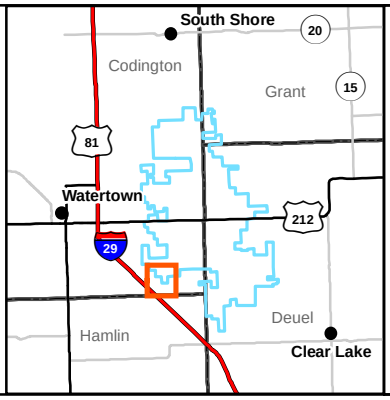
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

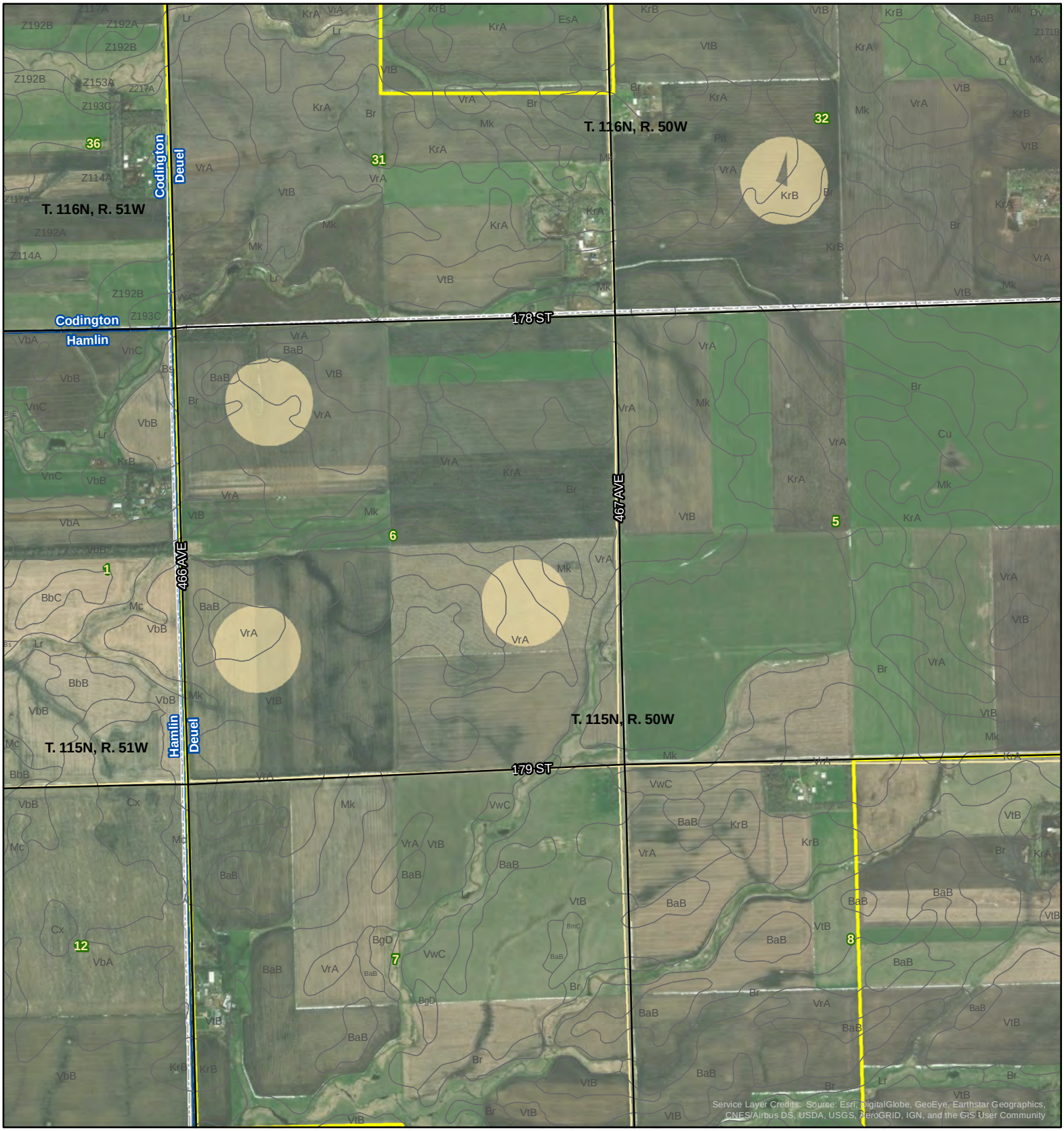
Base Map: World Imagery
Quadrangle: Kranzburg SW (1970)

Township/Range: T116N, R51W

Codington County, South Dakota

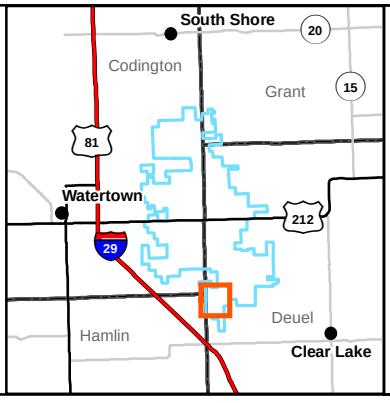
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



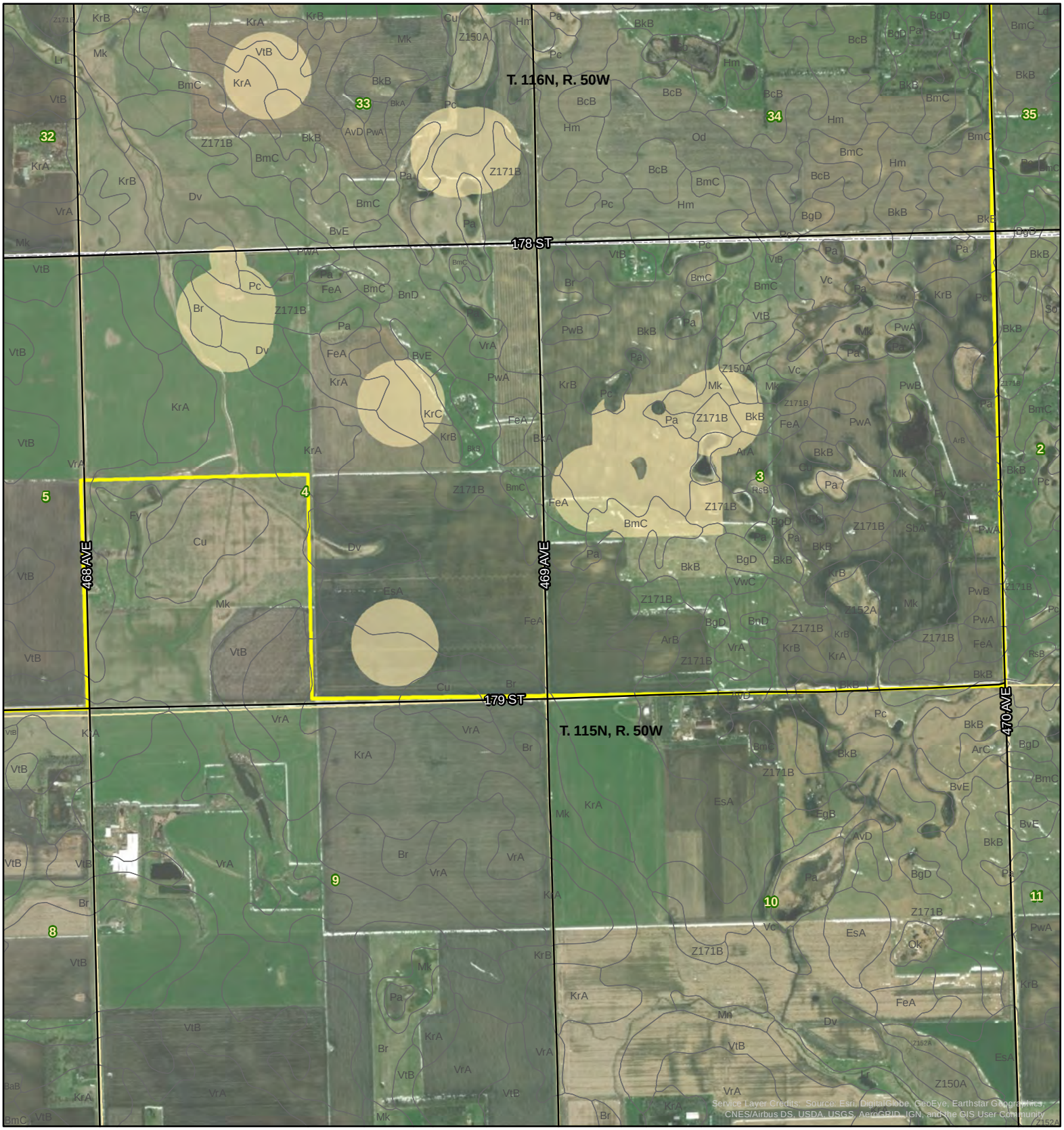
Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg SW (1970), Bemis (1978)
Township/Range: T116N, R50W, T115N, R50W
Deuel County, South Dakota

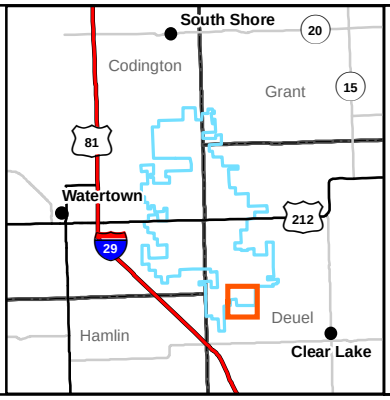
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Existing Road
- Surveyed Area
- Soil Unit Boundary
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

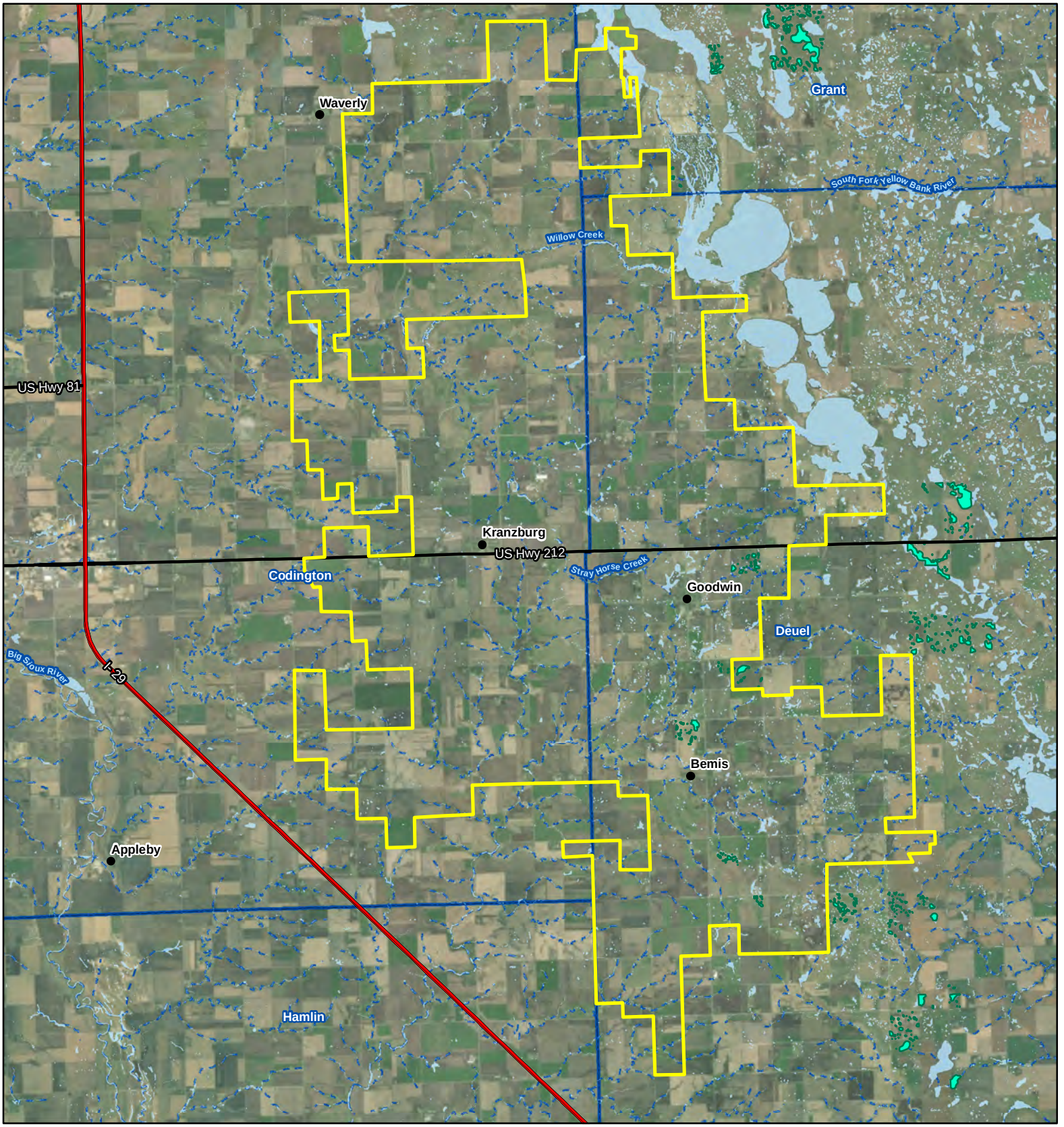
Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W,
T115N, R50W
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Aquatic Resources Desktop Map



Crowned Ridge II Wind Farm

- City
- NHDFlowline
- Interstate Highway
- U.S. Highway
- State Highway
- USFWS Protected Basin
- NWI Wetland
- Project Boundary
- County Boundary

Kilometers
0 5 10

Miles
0 2.5 5

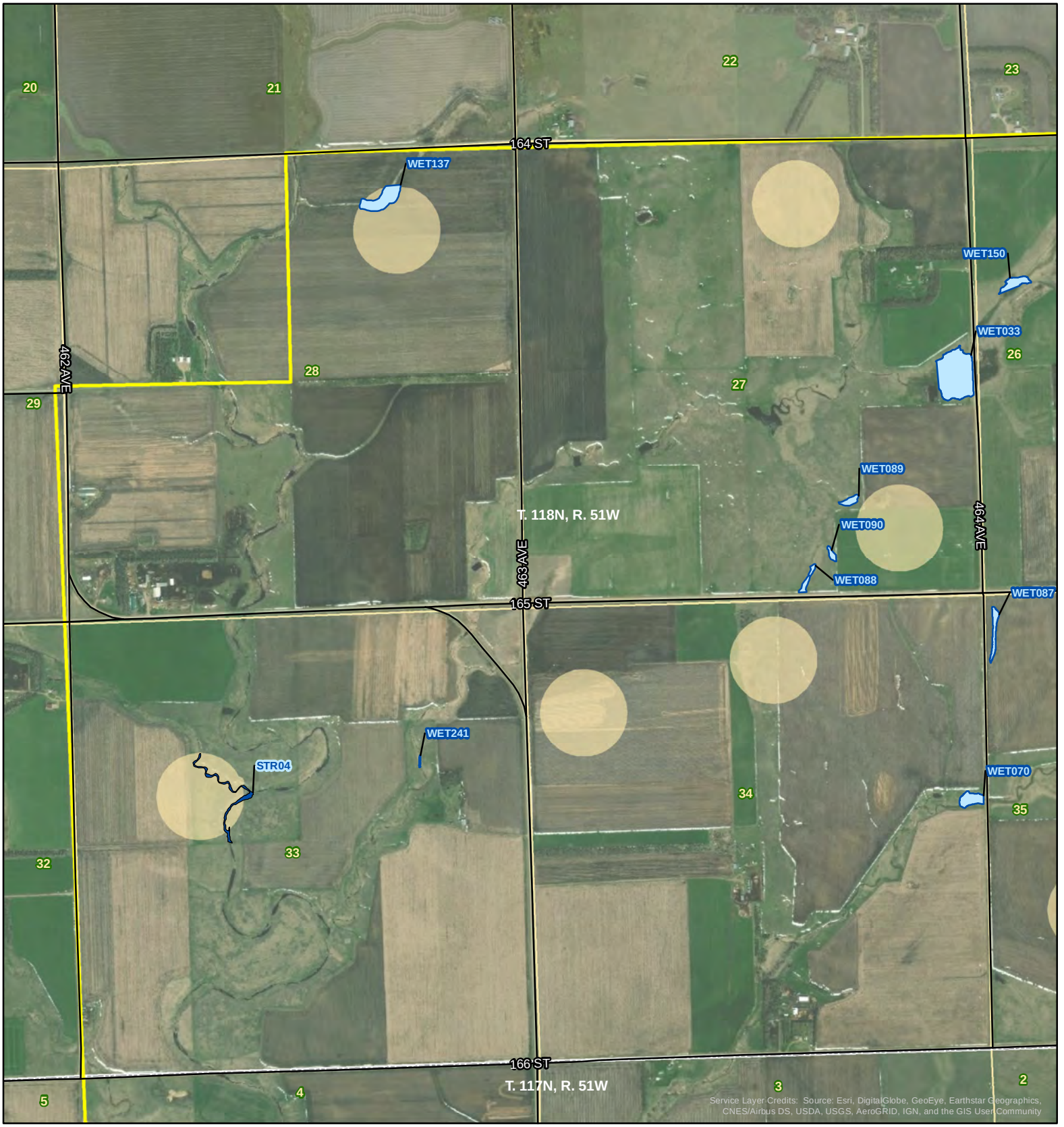
N
W E
S

Base Map: World Imagery
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Codington, Deuel, and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

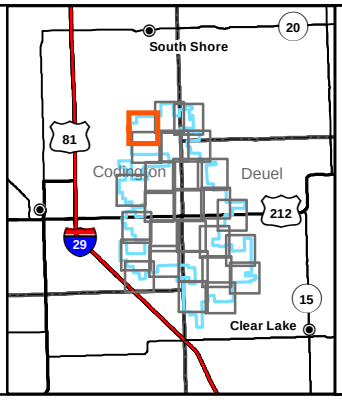
SWCA ENVIRONMENTAL CONSULTANTS

Aquatic Resources Field-Assessed Features Maps



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

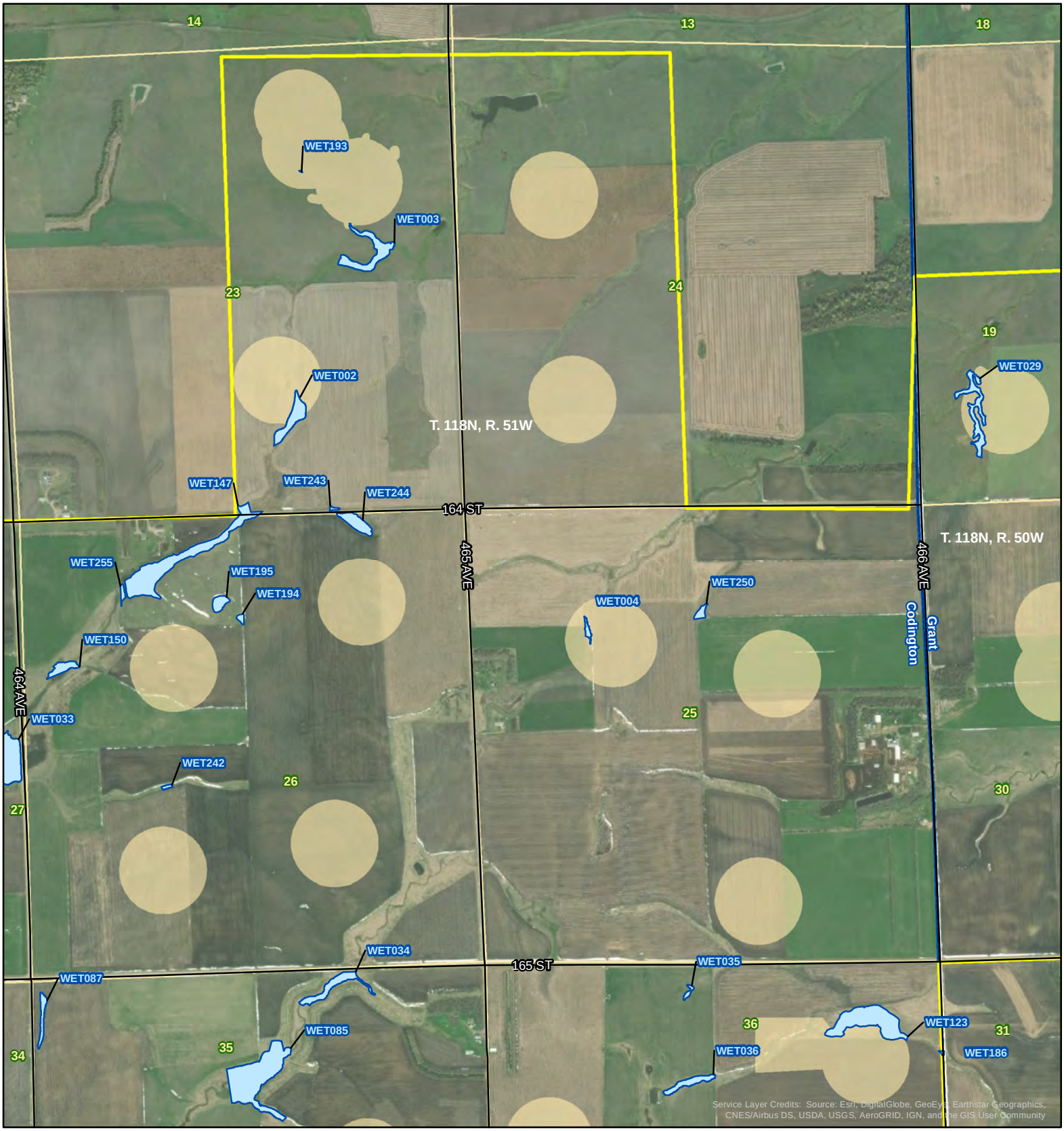
N
W E
S

Base Map: World Imagery
Quadrangle: South Shore (1973), Kranzburg (1970)
Township/Range: T118N, R51W

Codington County, South Dakota

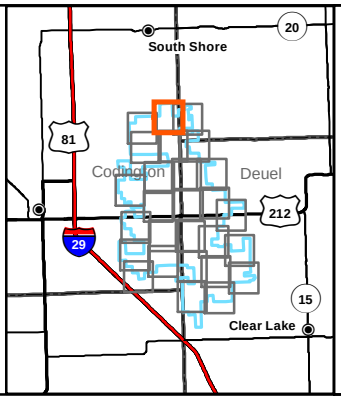
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

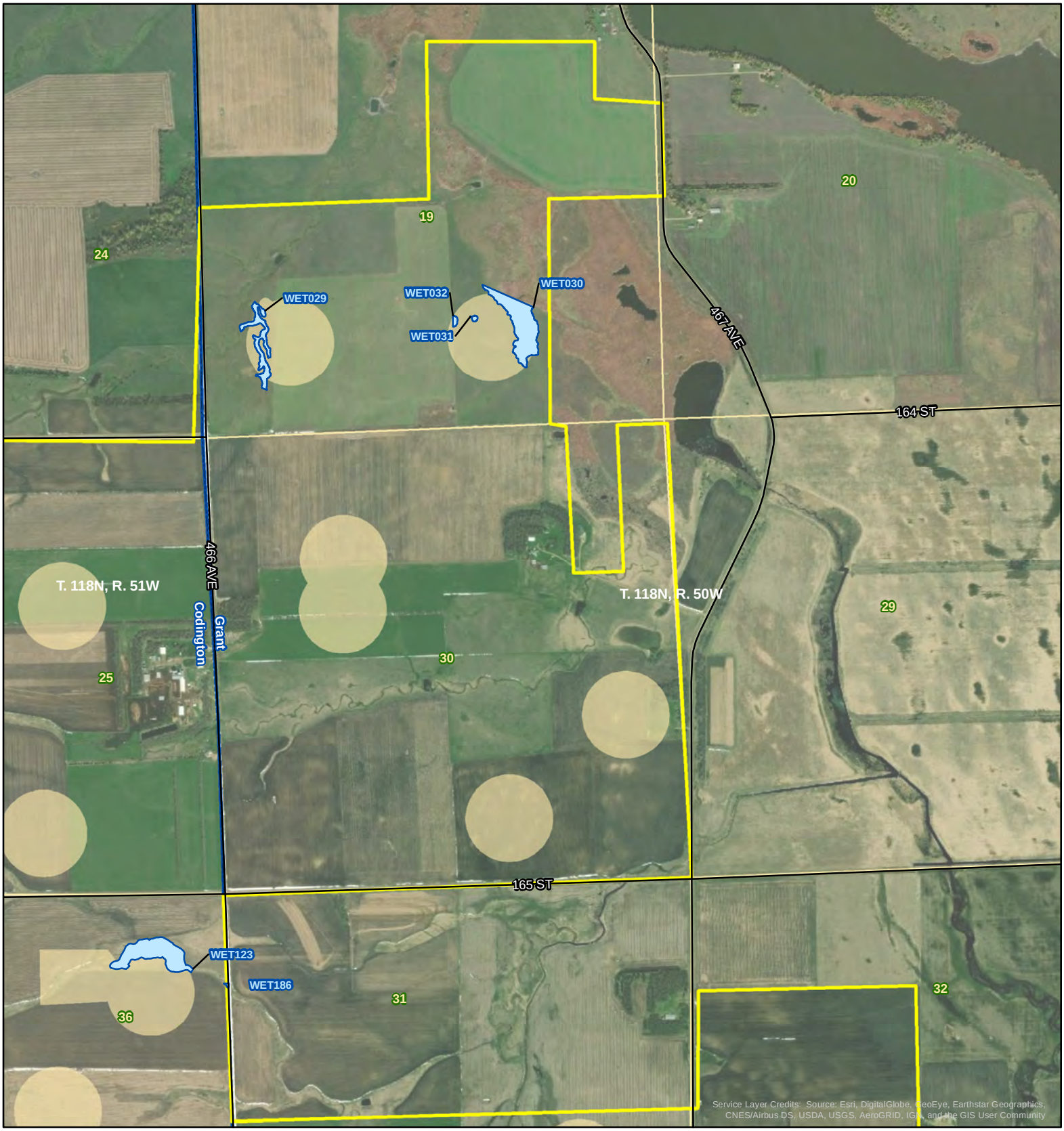
N
W E
S

Base Map: World Imagery
Quadrangle: South Shore (1973), Kranzburg (1970)
Township/Range: T118N, R51W

Codington and Grant Counties, South Dakota

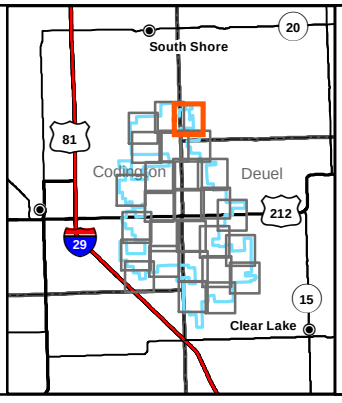
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: South Shore (1973), Kranzburg (1970), Stockholm (1973), Goodwin (1970)
Township/Range: T118N, R51W

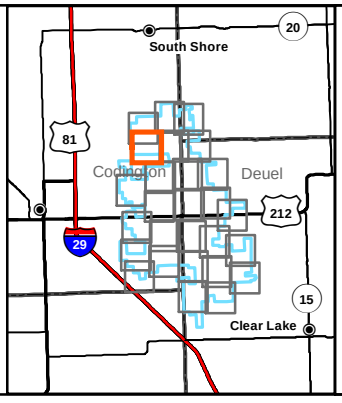
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

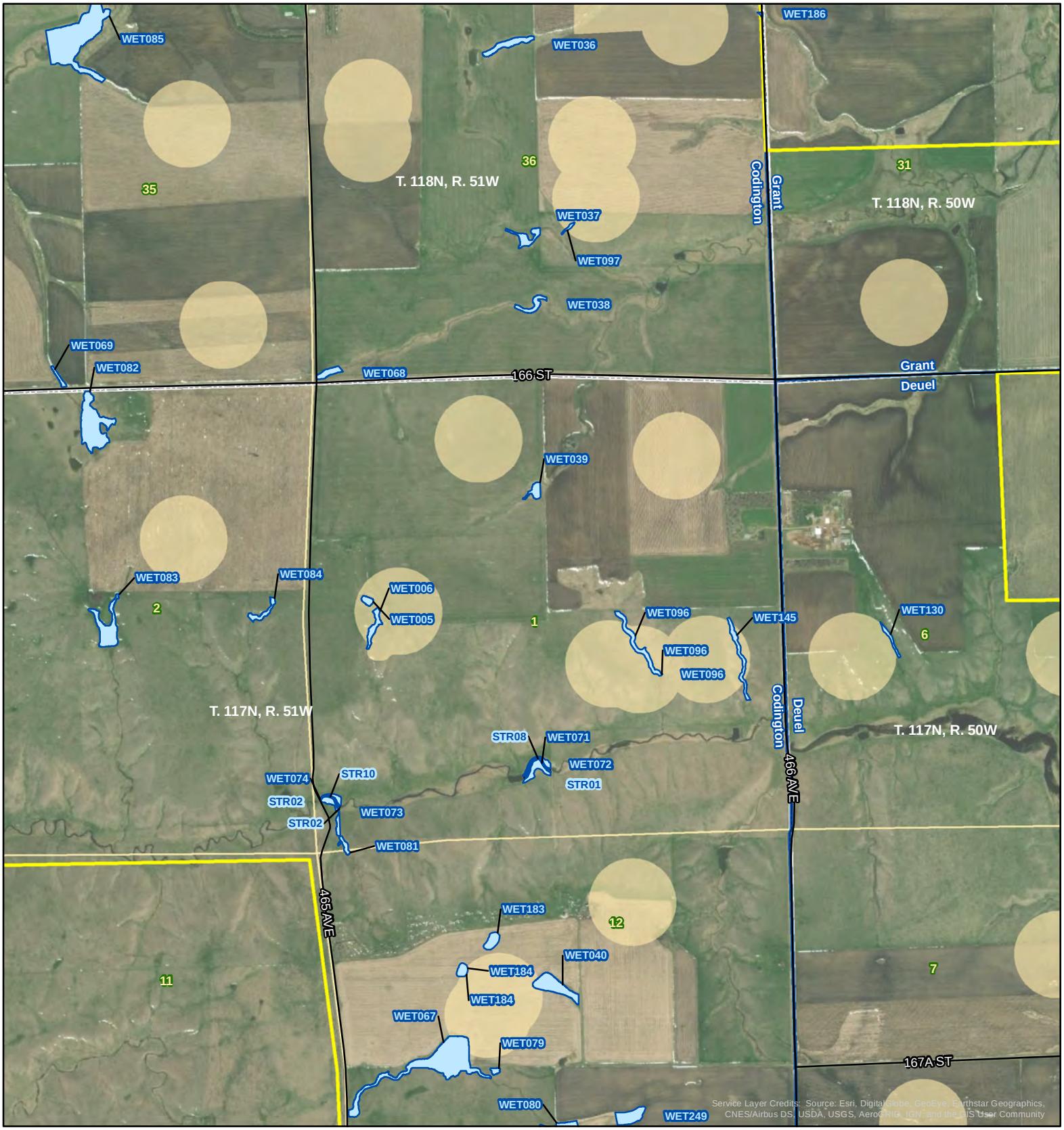
N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T118N, R51W,
T117N, R51W
Codington County, South Dakota

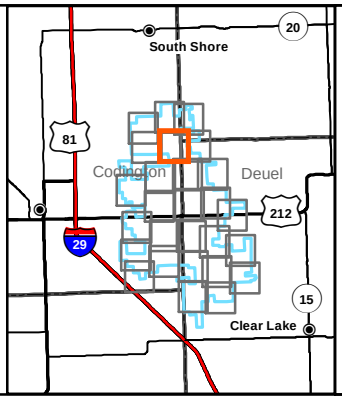
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

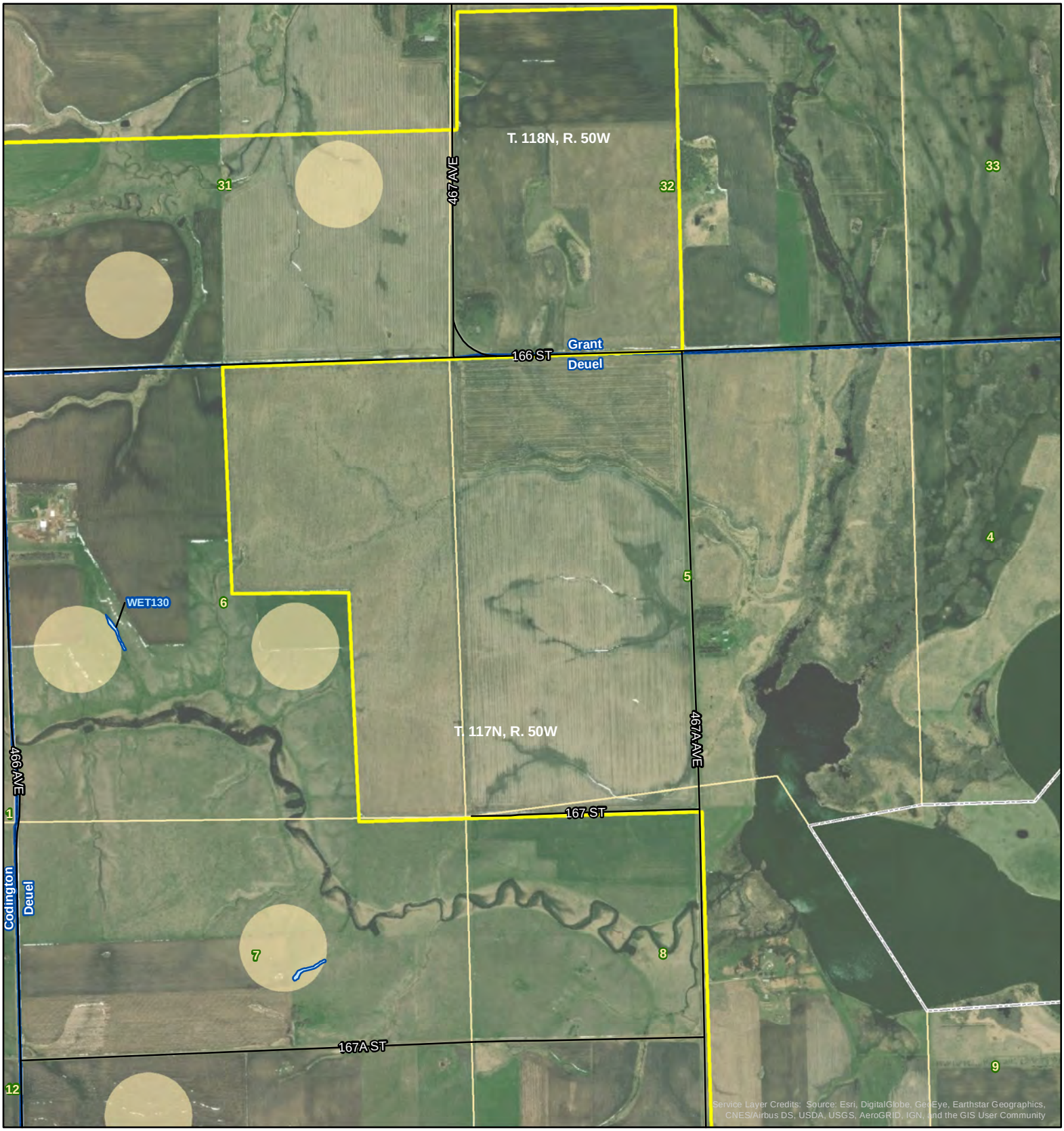
N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T118N, R51W, T118N, R50W, T117N, R51W, T117N, R50W
Codington, Deuel, and Grant Counties, South Dakota

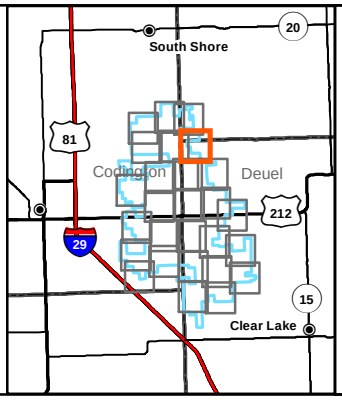
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



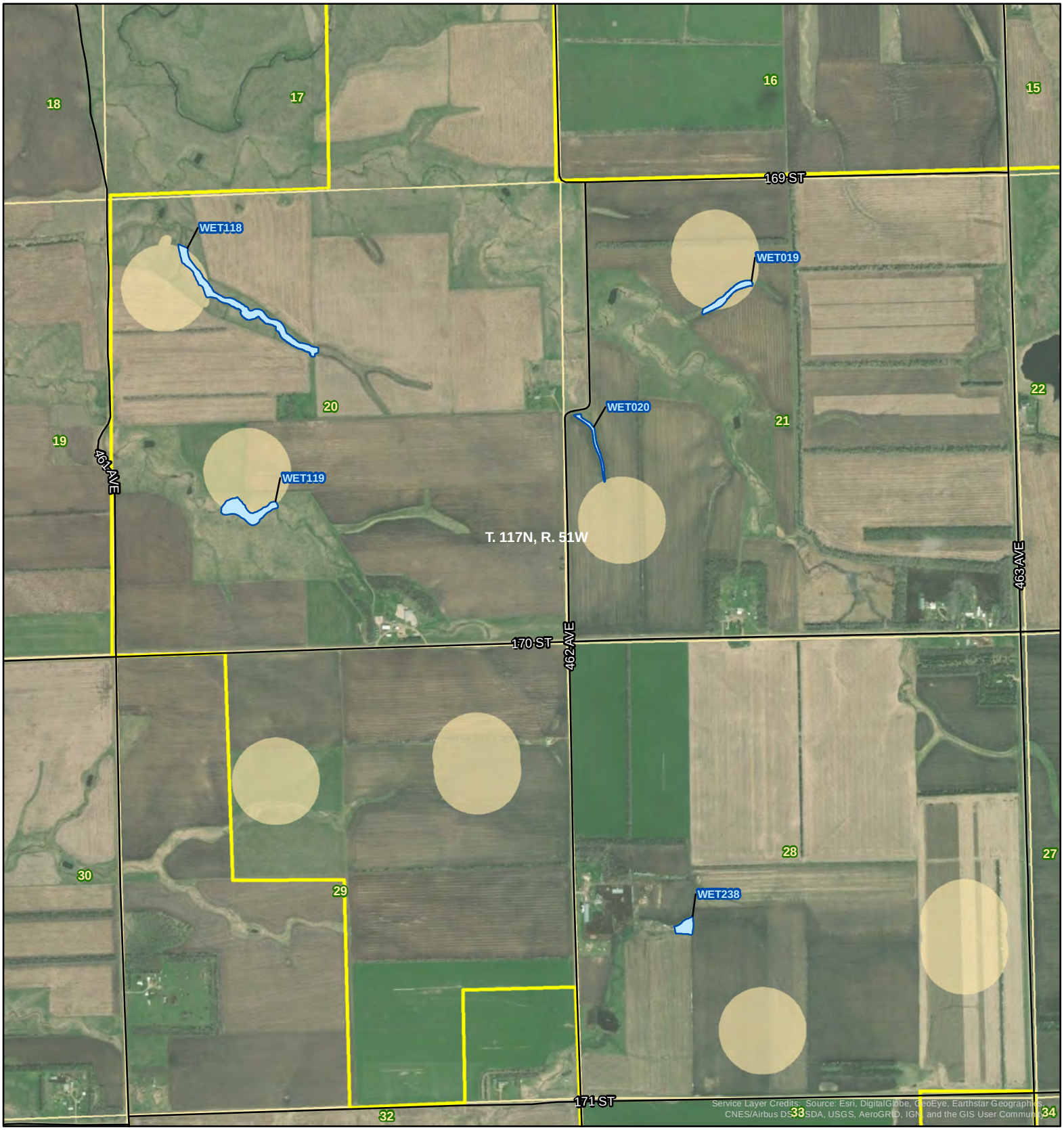
Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T118N, R50W, T117N, R50W
Deuel and Grant Counties, South Dakota

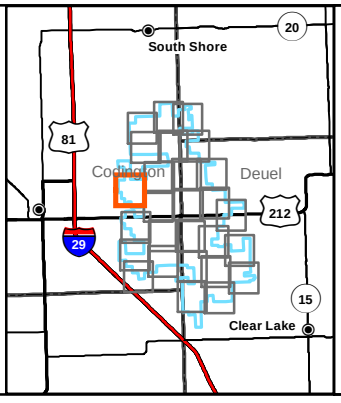
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

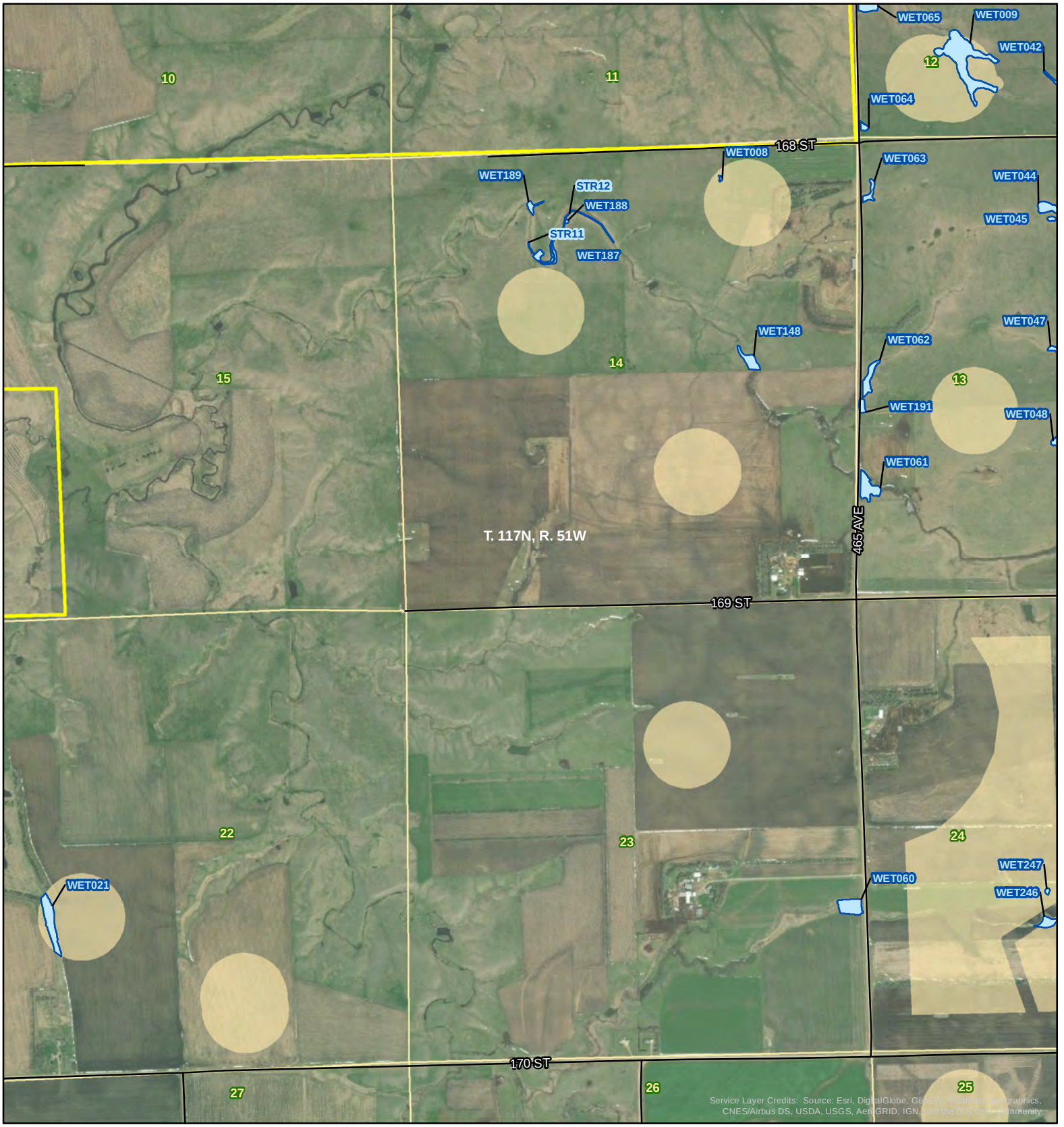
Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T117N, R51W

Codington County, South Dakota

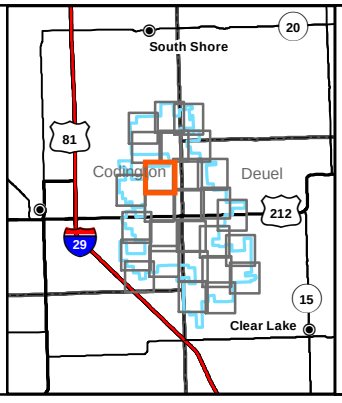
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

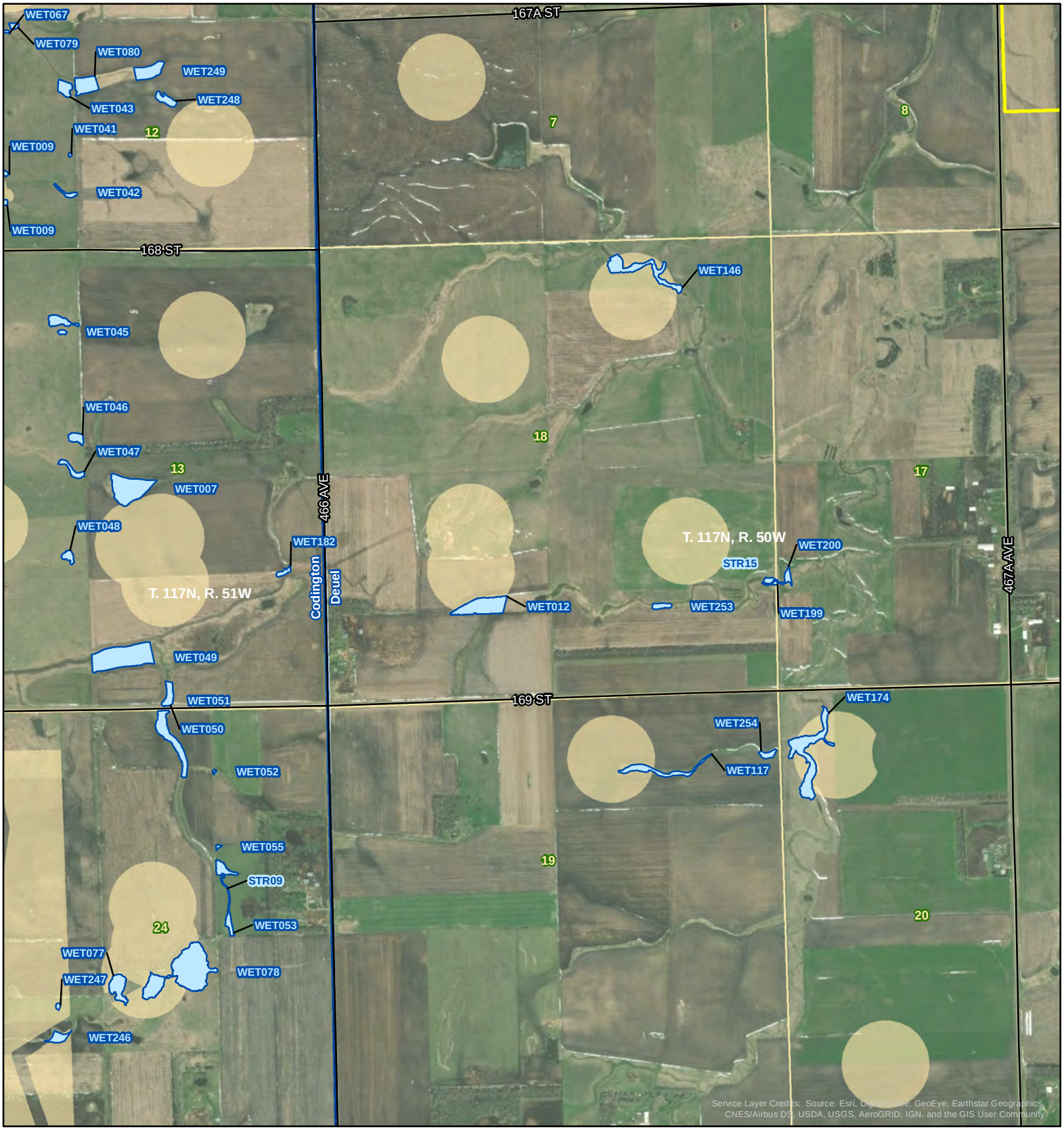
Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T117N, R51W

Codington County, South Dakota

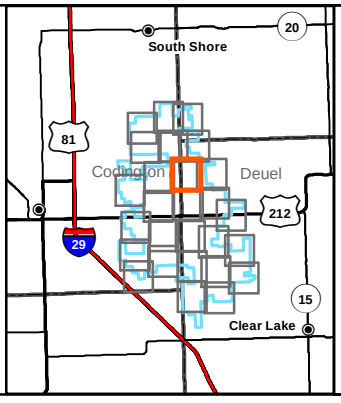
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



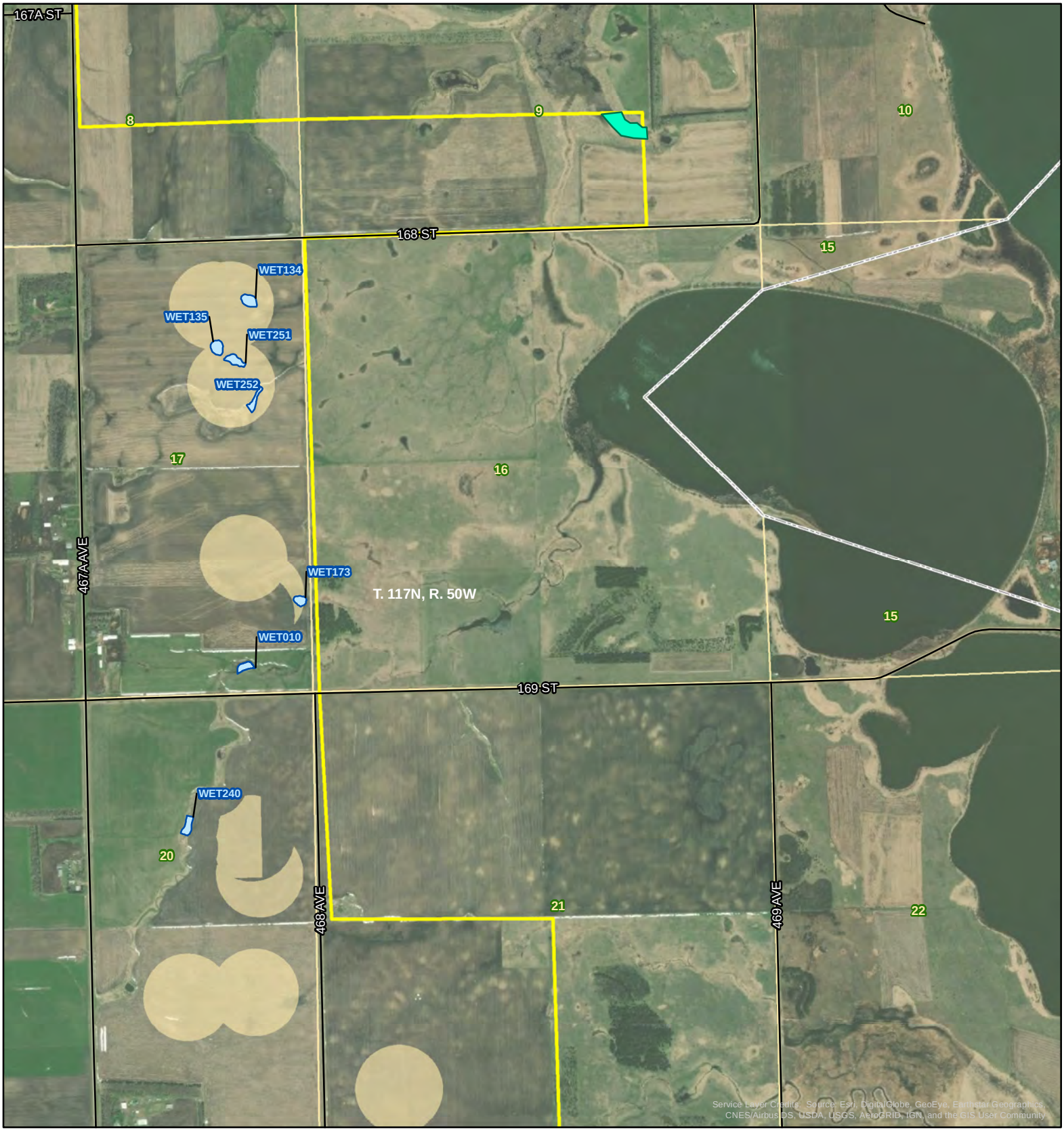
Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T117N, R51W, T117N, R50W
Codington and Deuel Counties, South Dakota

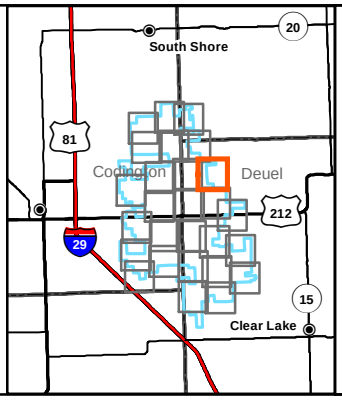
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Goodwin (1970)

Township/Range: T117N, R50W

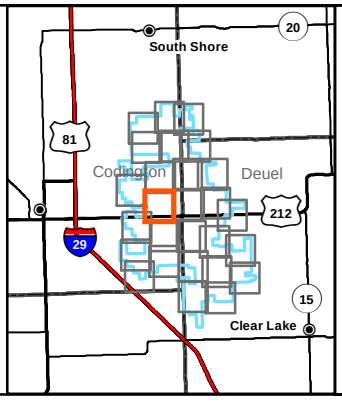
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

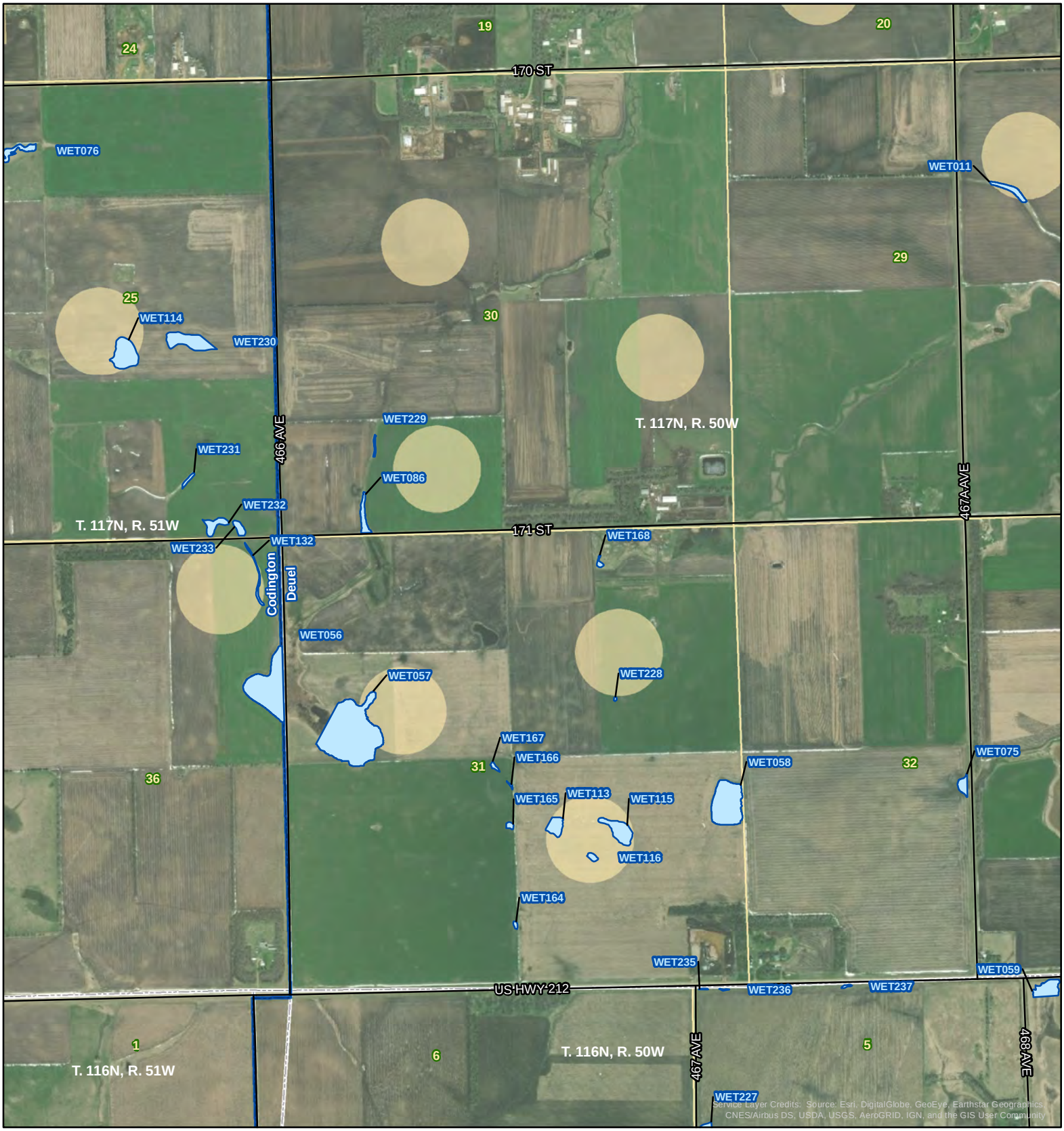
Base Map: World Imagery
Quadrangle: Kranzburg (1970)

Township/Range: T117N, R51W

Codington County, South Dakota

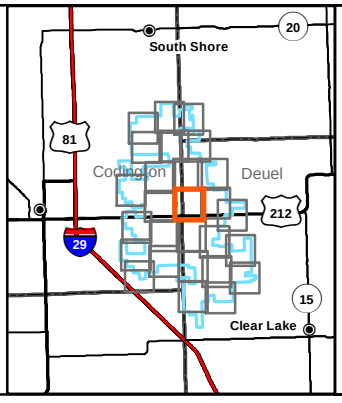
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



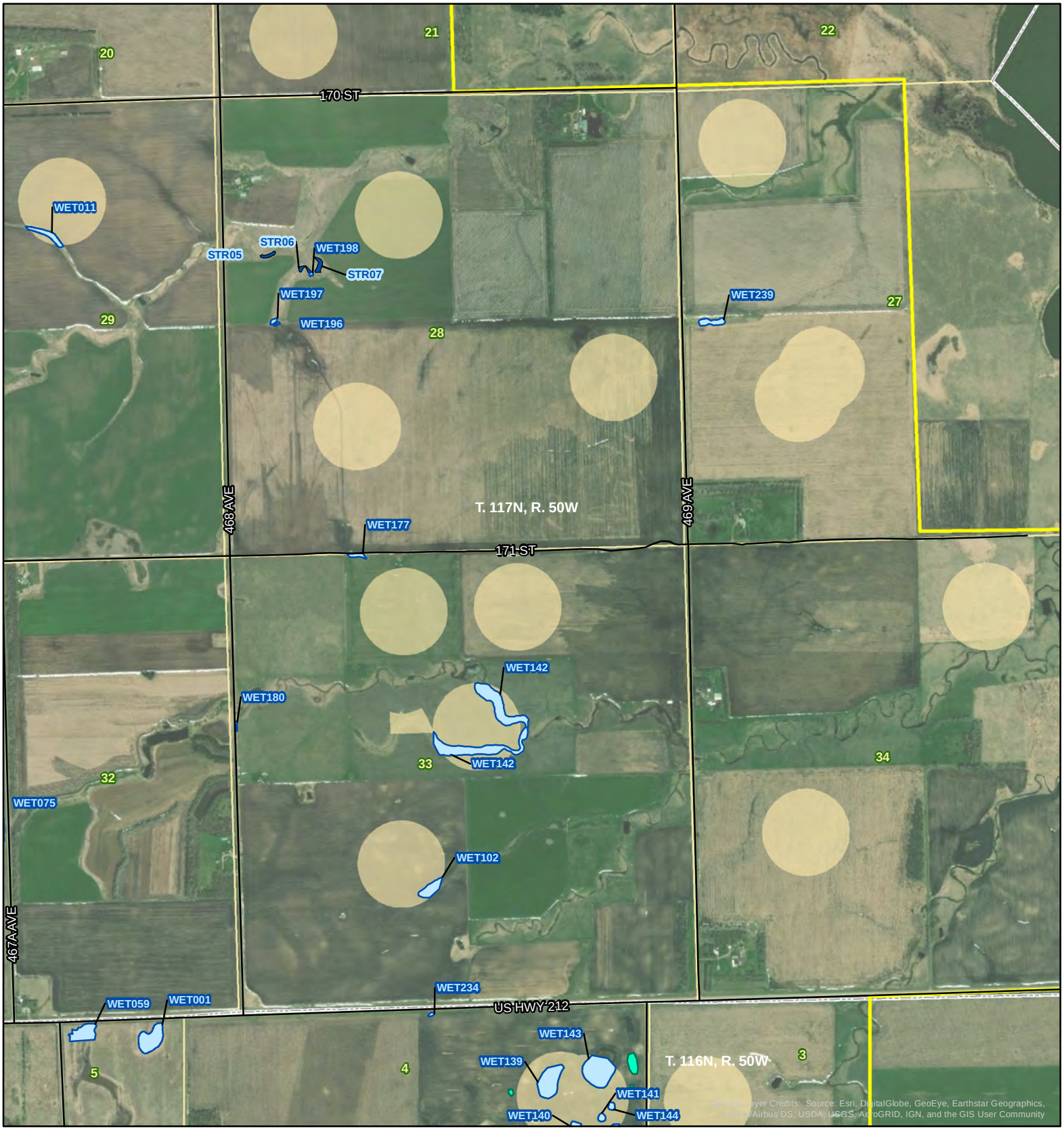
Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T117N, R51W, T117N, R50W
Codington and Deuel Counties, South Dakota

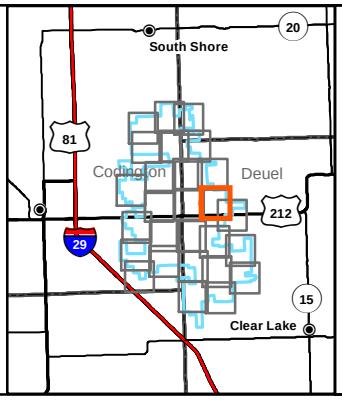
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

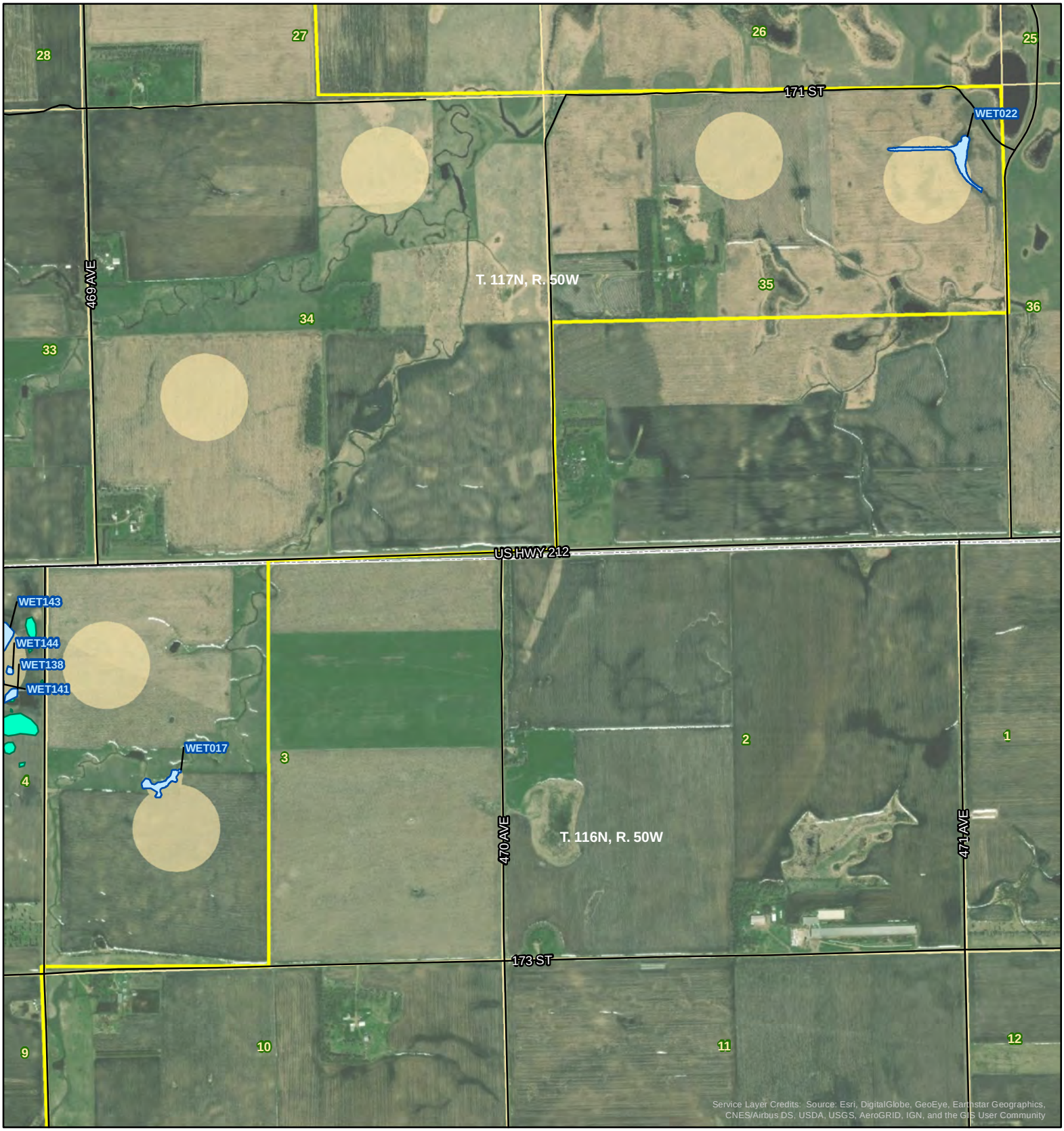
Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Goodwin (1970)

Township/Range: T117N, R50W,
T116N, R50W
Deuel County, South Dakota

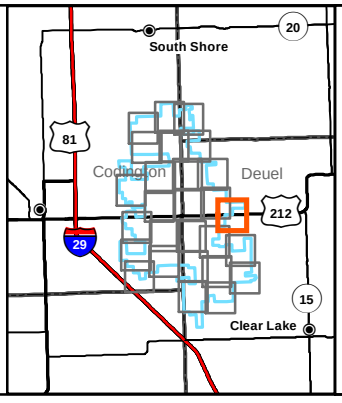
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

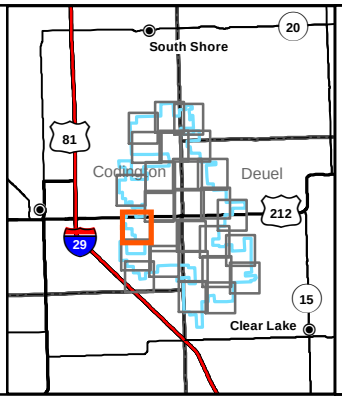
Base Map: World Imagery
Quadrangle: Goodwin (1970), Bemis (1978)
Township/Range: T117N, R50W, T116N, R50W
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

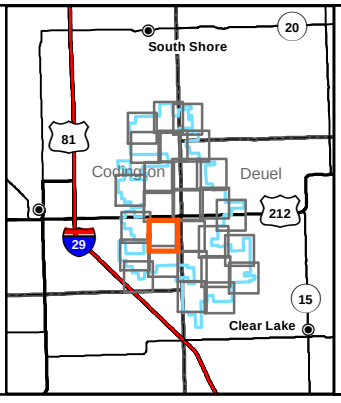
Base Map: World Imagery
Quadrangle: Kranzburg (1970), Kranzburg SW (1970)
Township/Range: T117N, R51W, T116N, R51W
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

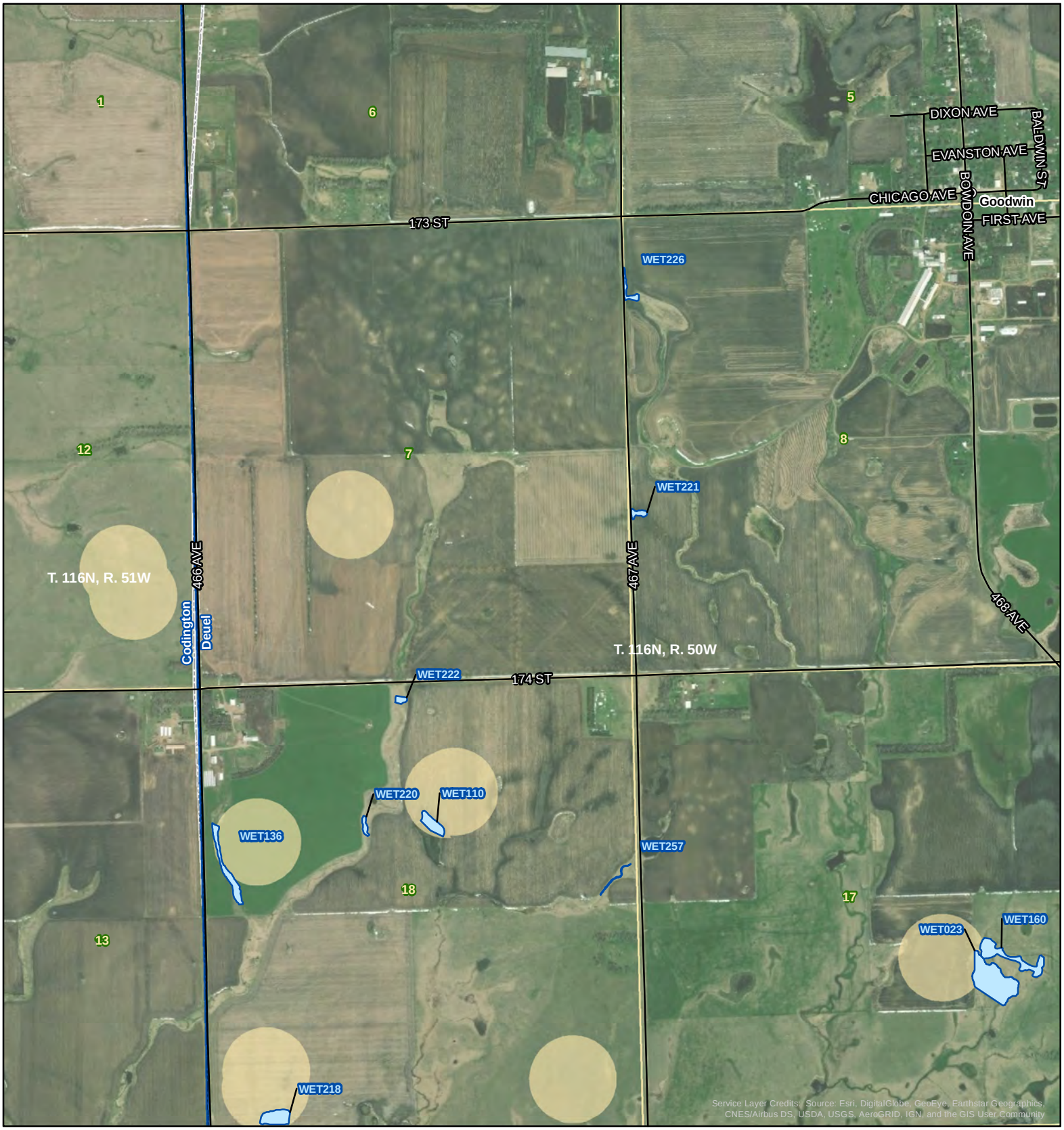
Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Kranzburg SW (1970)
Township/Range: T116N, R51W

Codington County, South Dakota

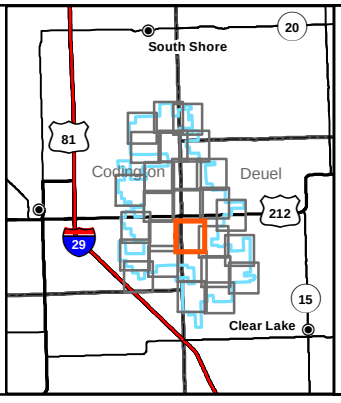
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

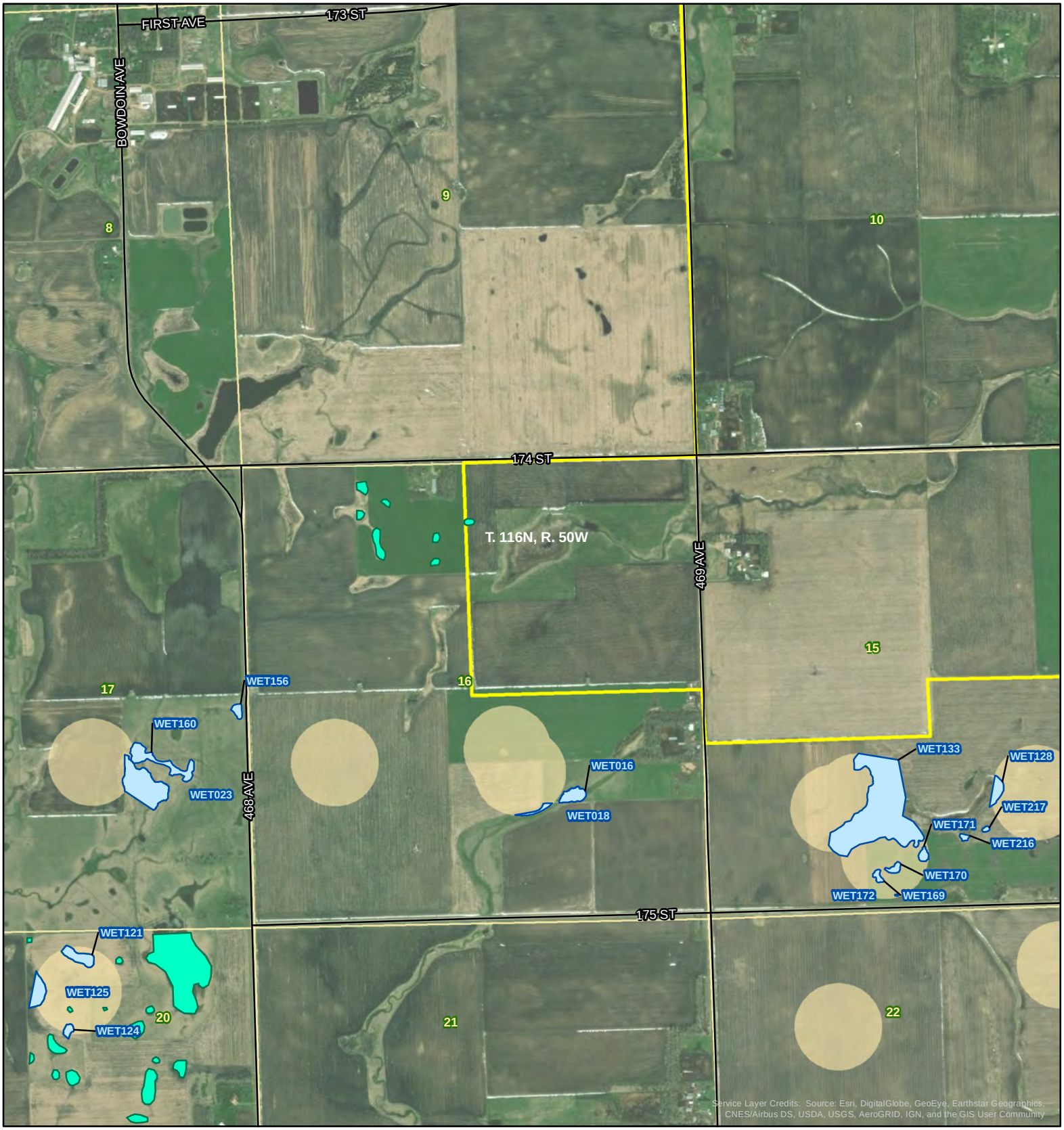
Miles
0 0.25 0.5

N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg (1970), Kranzburg SW (1970), Bemis (1978)
Township/Range: T116N, R51W, T116N, R50W
Codington and Deuel Counties, South Dakota

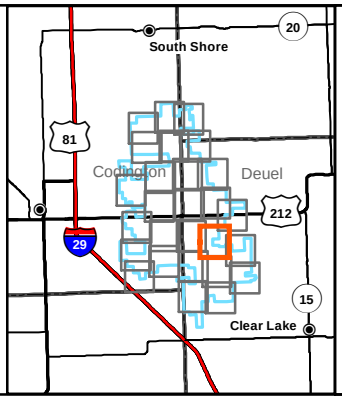
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

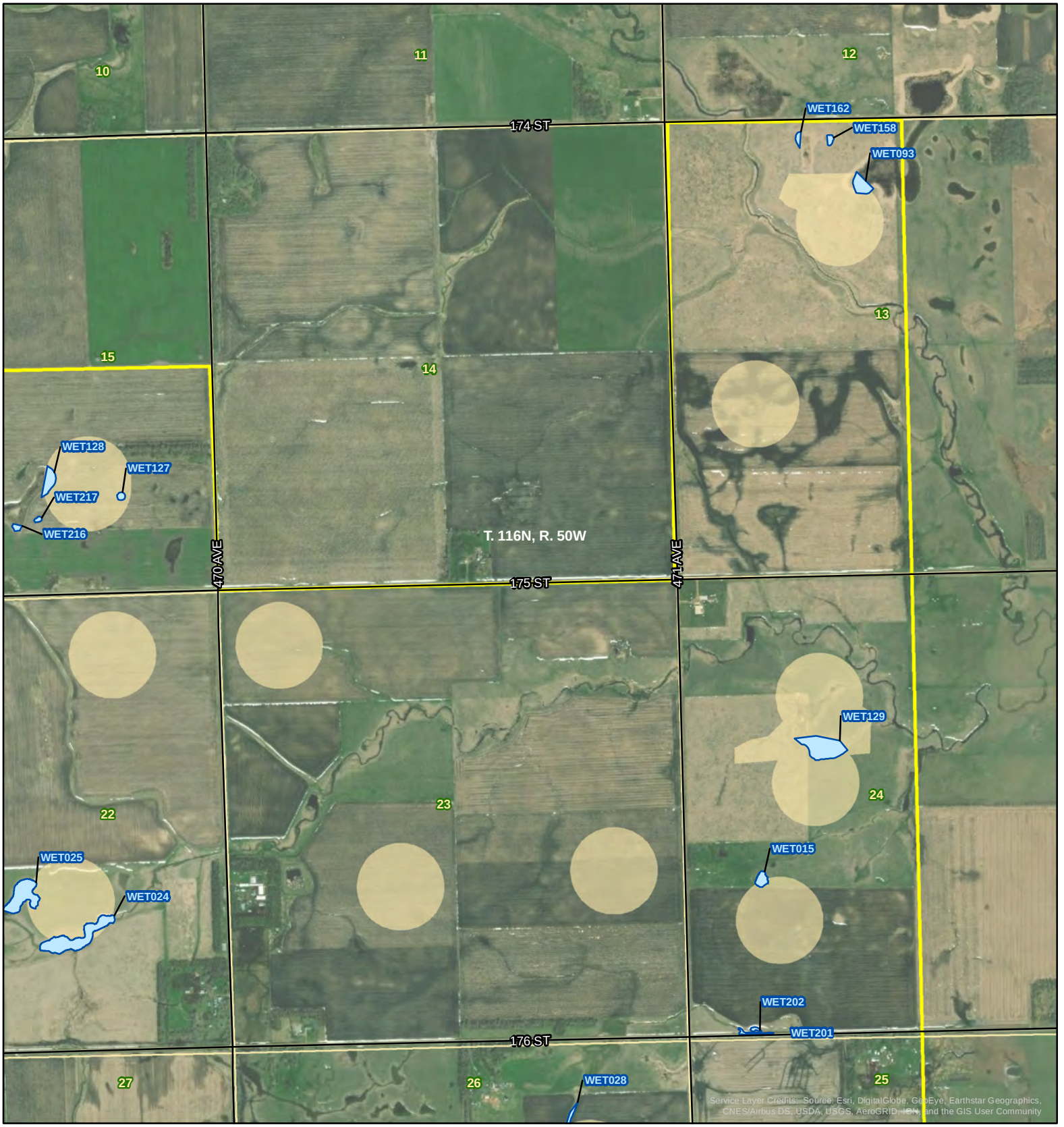
Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W

Deuel County, South Dakota

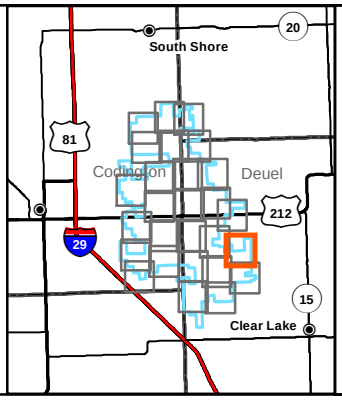
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W

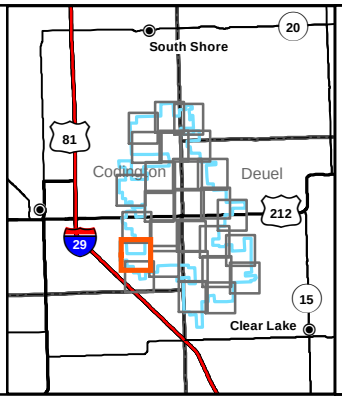
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg SW (1970)

Township/Range: T116N, R51W

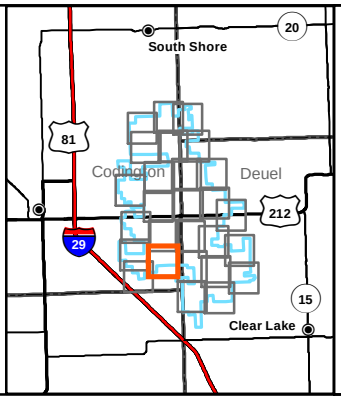
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

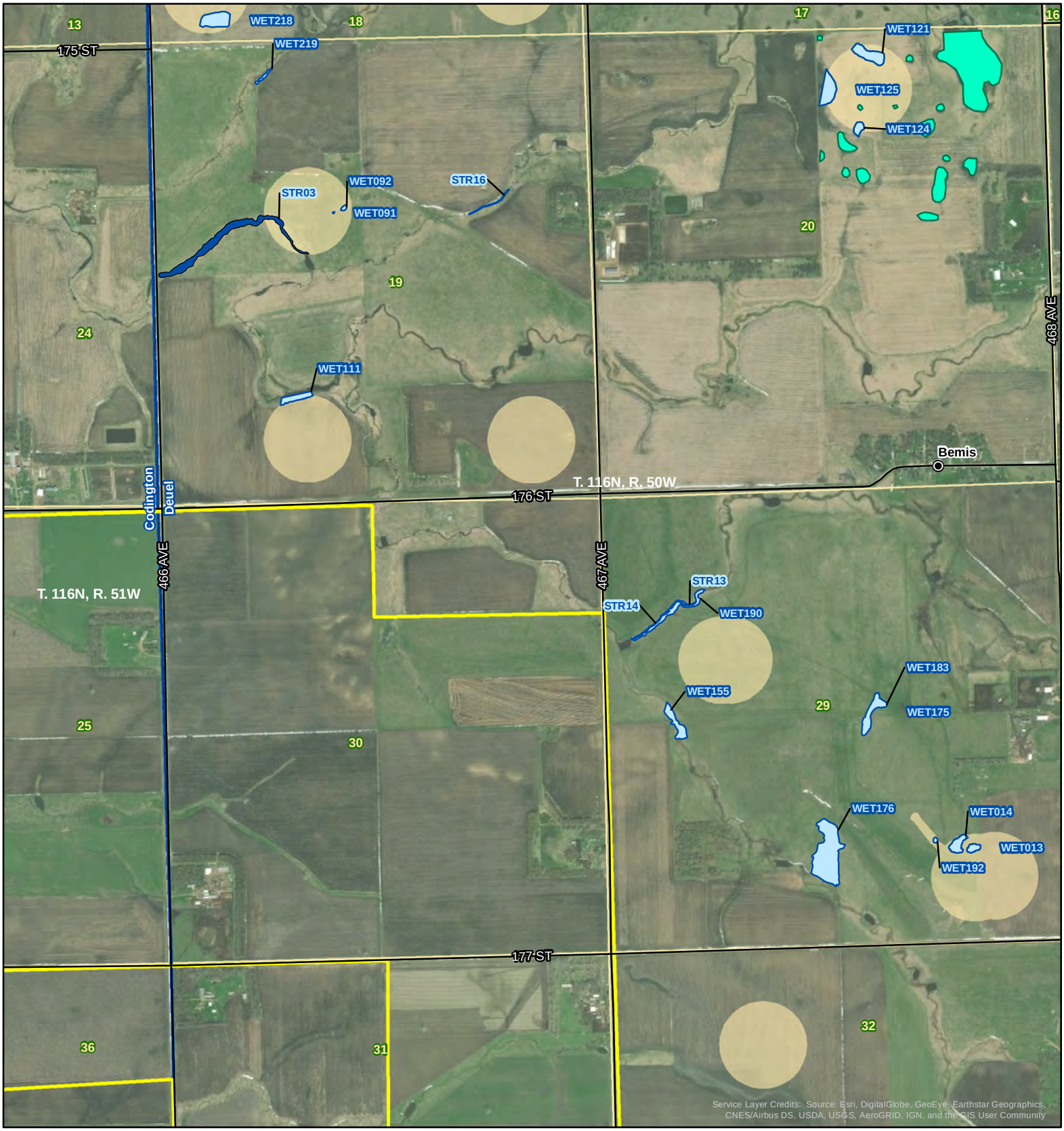
Base Map: World Imagery
Quadrangle: Kranzburg SW (1970)

Township/Range: T116N, R51W

Codington County, South Dakota

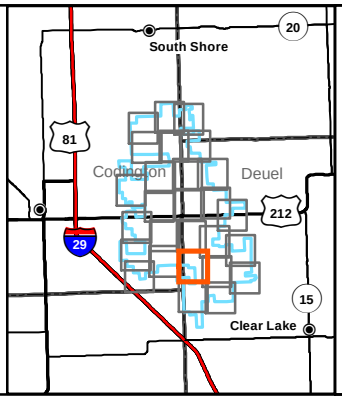
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

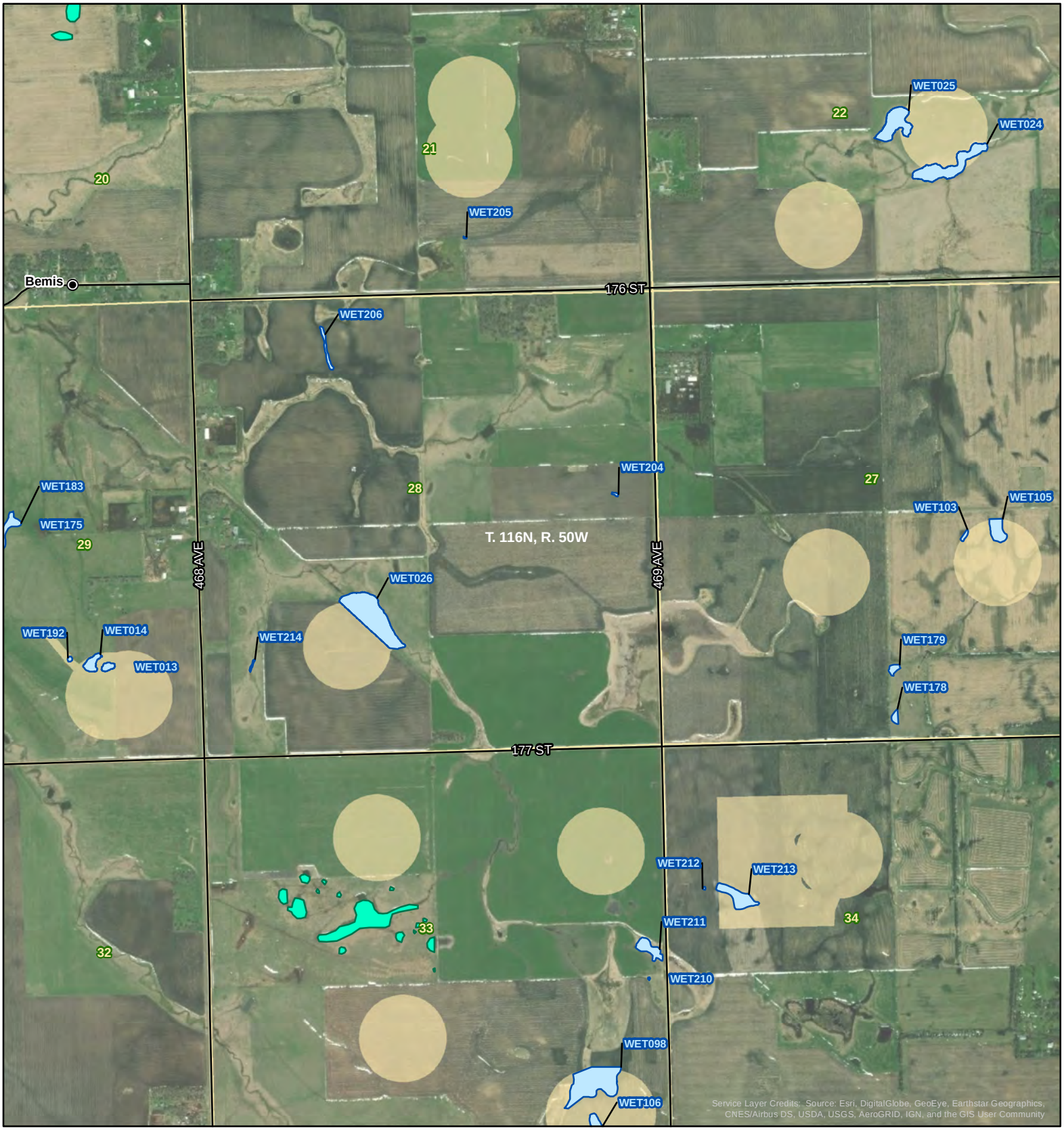
Miles
0 0.25 0.5

Base Map: World Imagery
Quadrangle: Kranzburg SW (1970), Bemis (1978)
Township/Range: T116N, R50W

Deuel County, South Dakota

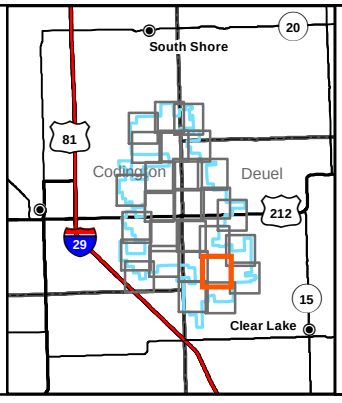
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

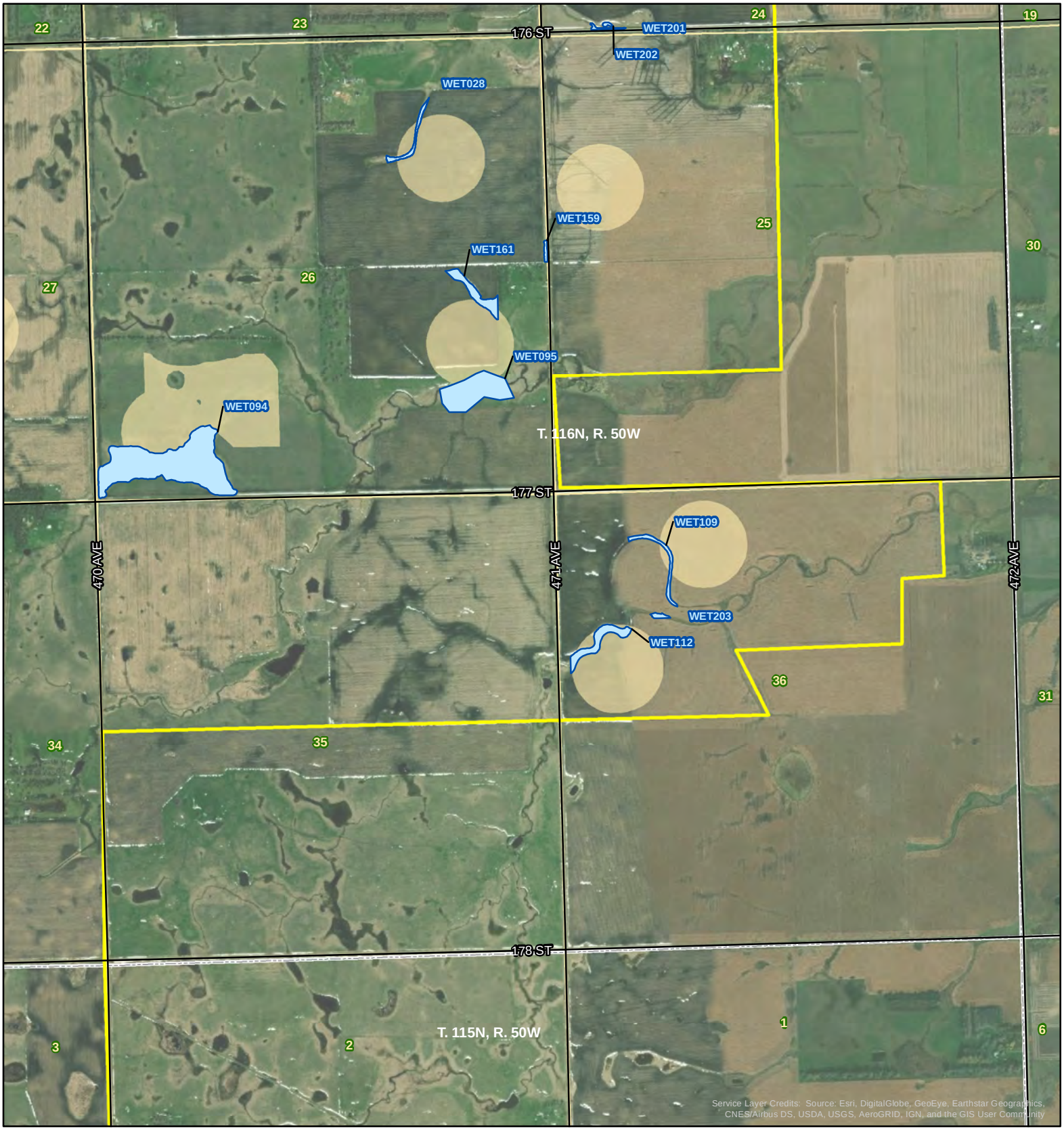
Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W

Deuel County, South Dakota

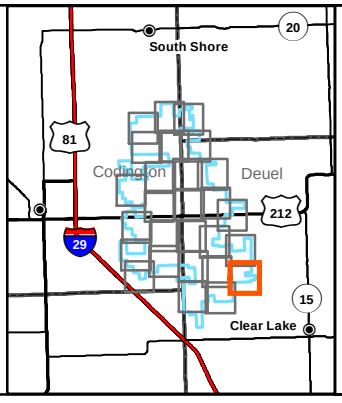
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

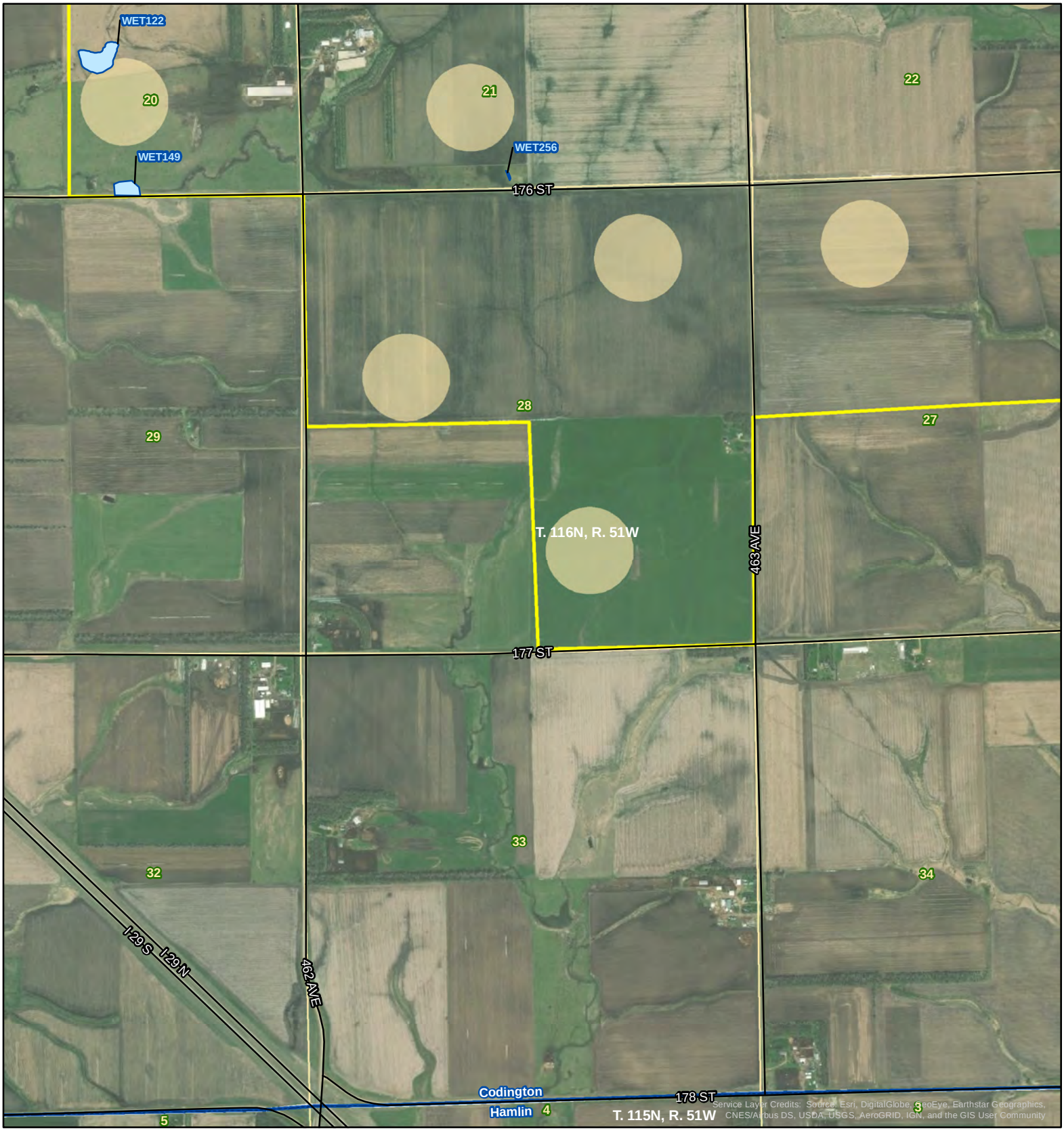
Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W

Deuel County, South Dakota

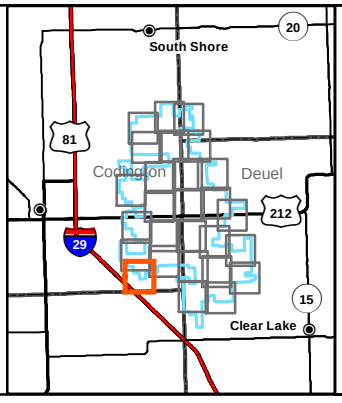
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

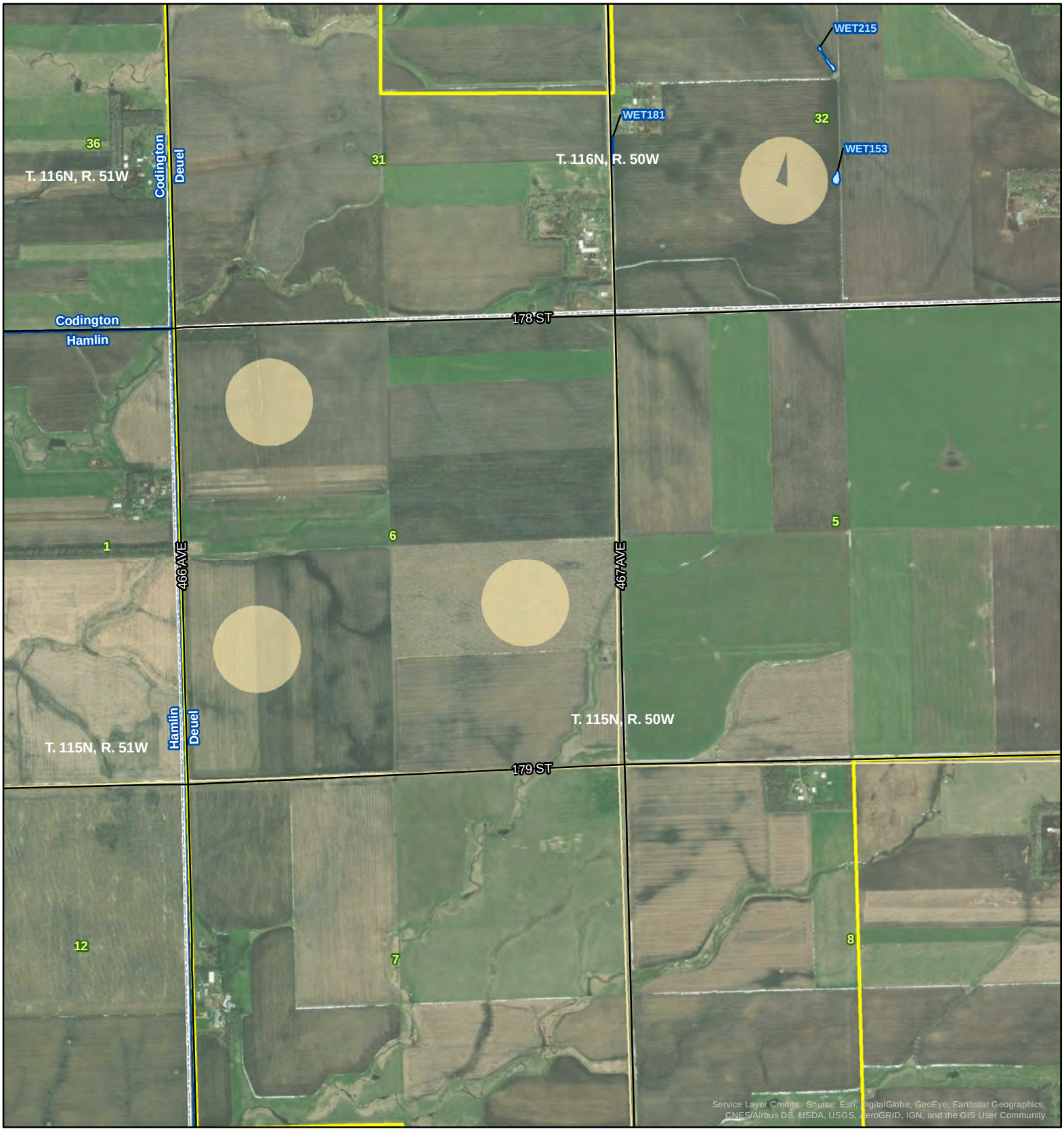
Base Map: World Imagery
Quadrangle: Kranzburg SW (1970)

Township/Range: T116N, R51W

Codington County, South Dakota

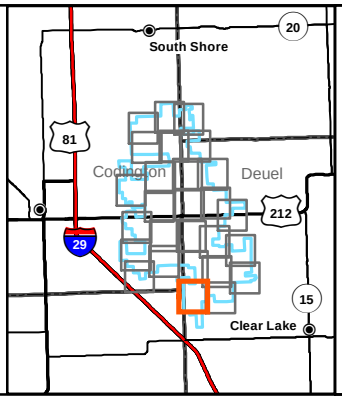
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

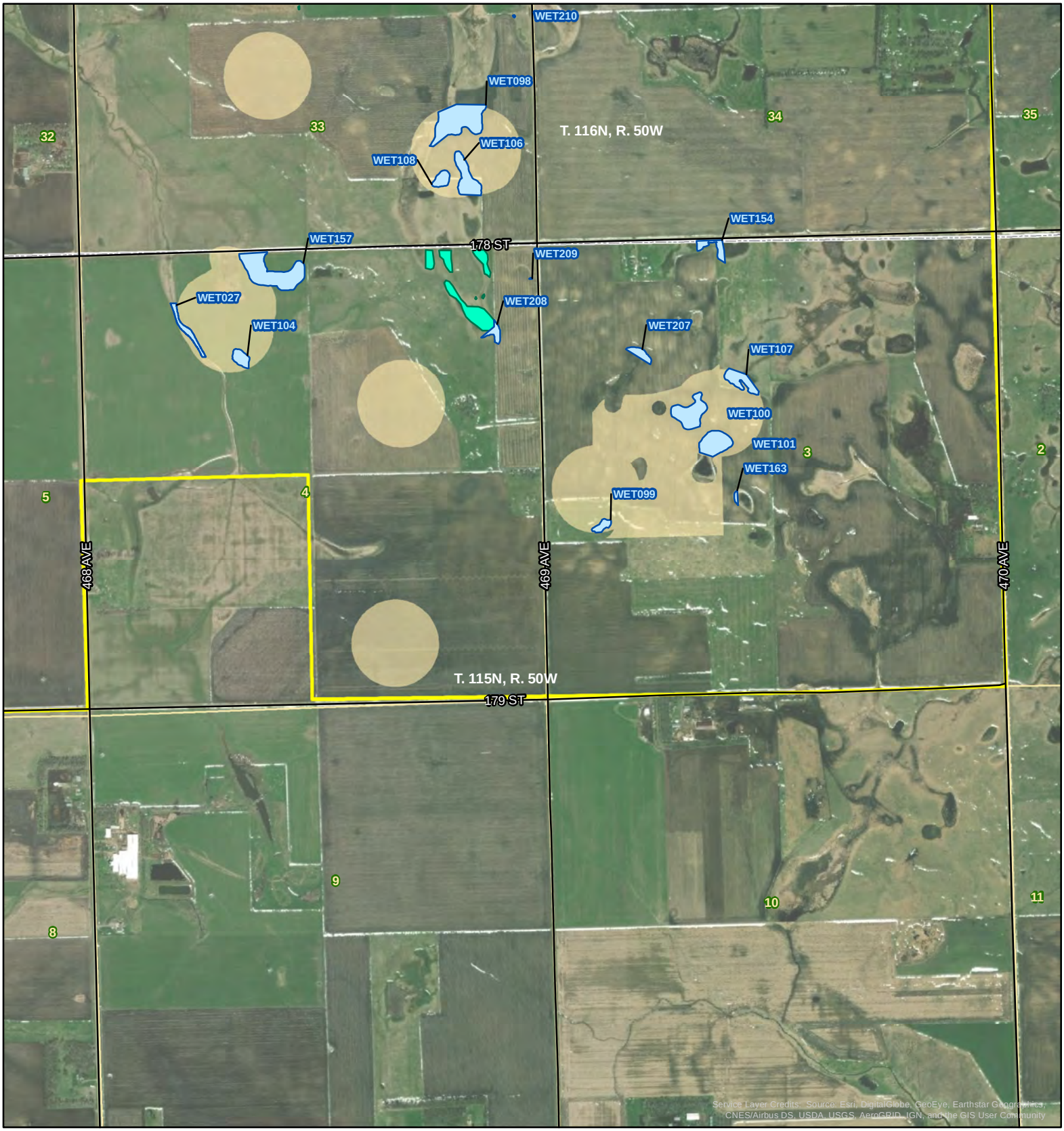
Miles
0 0.25 0.5

N
W E
S

Base Map: World Imagery
Quadrangle: Kranzburg SW (1970), Bemis (1978)
Township/Range: T116N, R50W, T115N, R50W
Deuel County, South Dakota

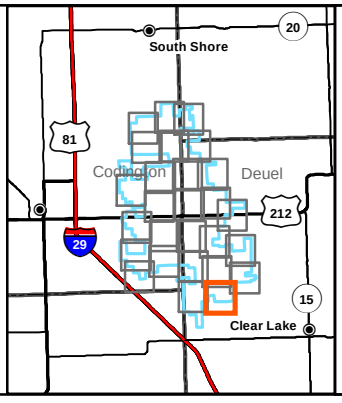
Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Crowned Ridge II Wind Farm

- Town
- Field Assessed Stream
- Existing Road
- Field Assessed Wetland
- Field Assessed Stream
- Surveyed Area
- USFWS Protected Basin
- Project Boundary
- County Boundary
- Township/Range Boundary
- Section Boundary



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
S

Base Map: World Imagery
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W,
T115N, R50W
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

APPENDIX B

Representative Photographs

Figure B-1. Seasonal wetland recorded on August 22, 2017; facing south.

Figure B-2. Seasonal wetland recorded on June 6, 2018; facing east.

Figure B-3. Seasonal wetland recorded on August 21, 2018; facing east.

Figure B-4. Semi-permanent wetland recorded on May 22, 2018; facing south.

Figure B-5. Semi-permanent wetland recorded on August 30, 2017; facing north.

Figure B-6. Semi-permanent wetland recorded on August 31, 2017; facing south.

Figure B-7. Permanent wetland recorded on August 27, 2017; facing south.

Figure B-8. Permanent wetland recorded on June 6, 2018; facing east.

Figure B-9. Perennial stream recorded on October 30, 2017; facing east.

Figure B-10. Intermittent stream recorded on May 23, 2018; facing southwest.

Figure B-11. Perennial stream recorded on June 5, 2018; facing northeast.