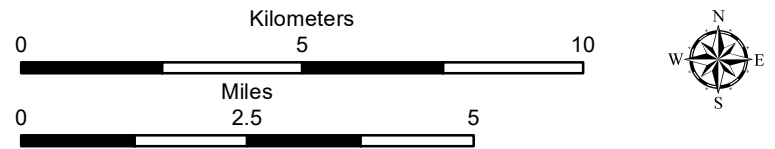


**State and Federal Lands**

- Federal Waterfowl Production Area
- South Dakota Game Production Area
- South Dakota Private Lands Hunting Access

**Figure 2. Public Land and Facilities**

- Crowned Ridge Wind Farm
- City
  - Turbine
  - School
  - Collector Line
  - Access Road
  - Crane Path
  - Electrical Line
  - Railroad
  - Interstate Highway
  - U.S. Highway
  - State Highway
  - Project Boundary

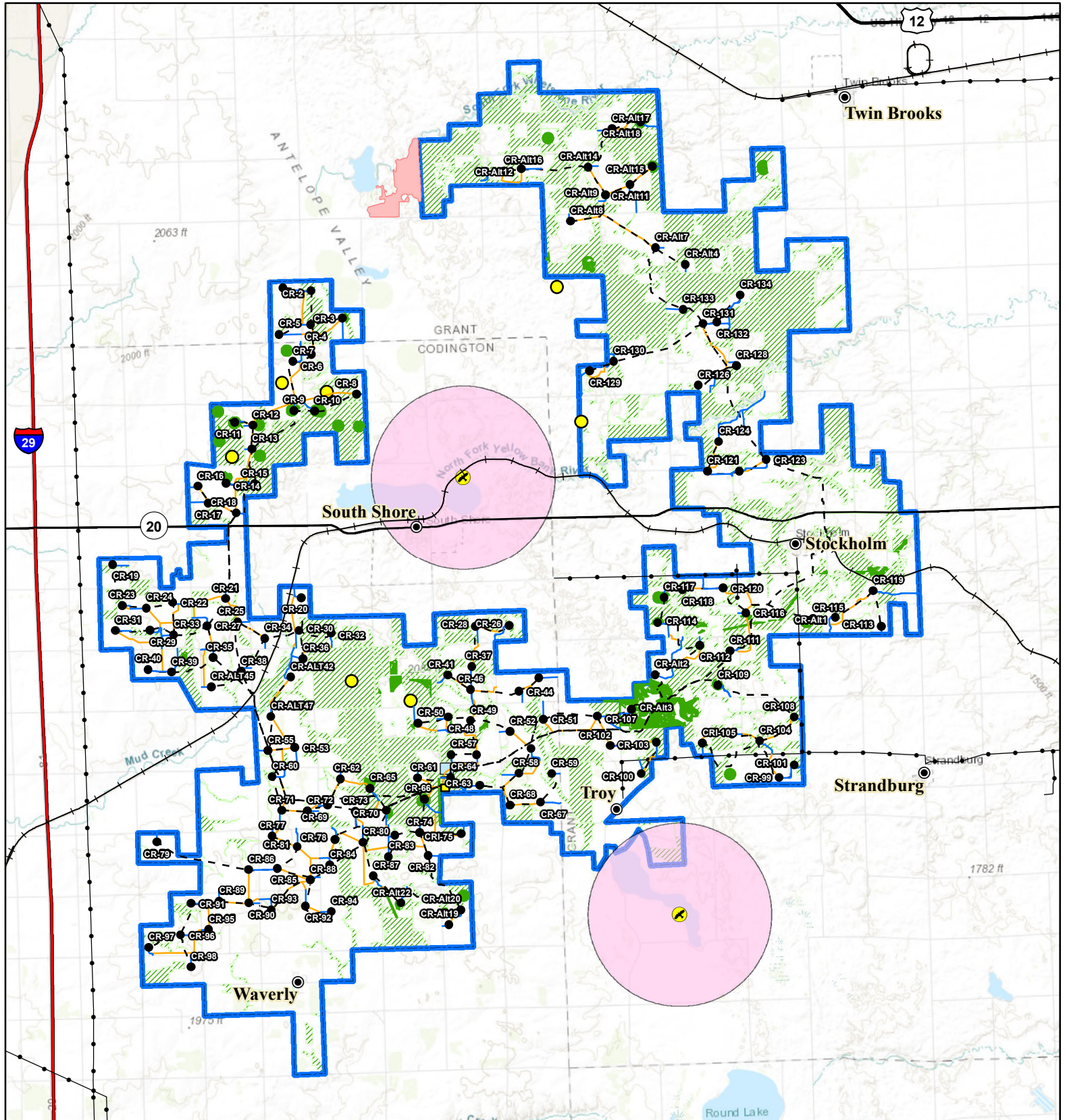


Base Map: World Topographic Map  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community  
 Codington and Grant Counties,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

Projection: NAD 1983 UTM Zone 14N



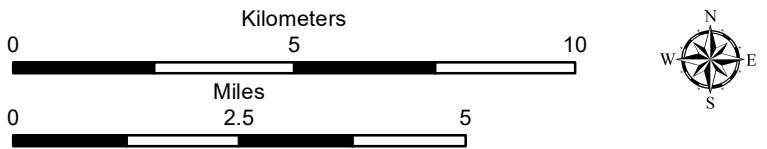




**Figure 6. Environmental Constraints**

Crowned Ridge Wind Farm

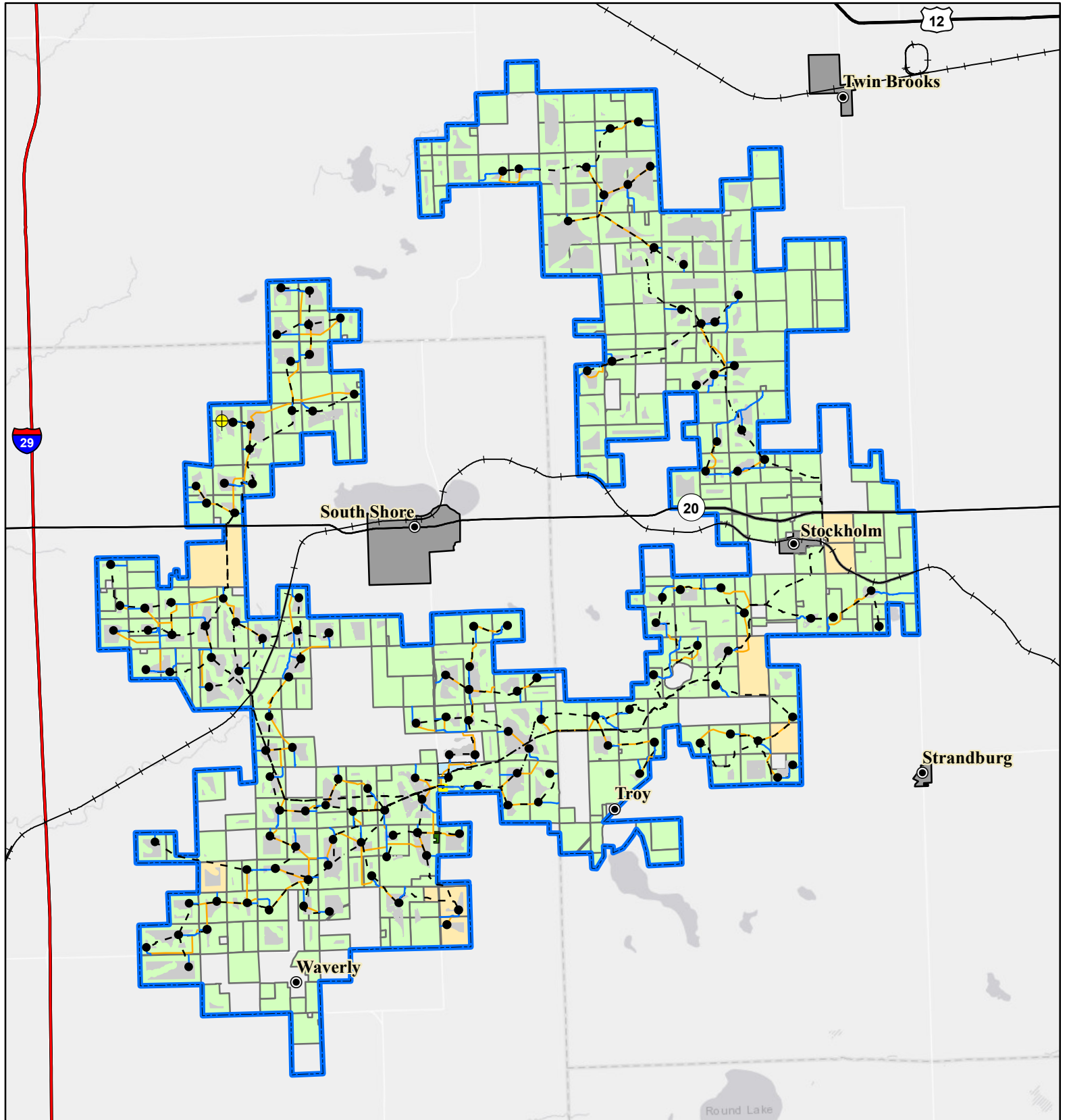
- Bald Eagle Nest Location
- Turbine
- Lek Location
- City
- Access Road
- Collector Line
- Crane Path
- Electrical Line
- Railroad
- Interstate Highway
- U.S. Highway
- State Highway
- O&M Facility/Substation
- Laydown Yard
- Field Assessed Dakota Skipper Habitat
- 1.5-mile Bald Eagle Nest Buffer
- USFWS Critical Habitat
- Undisturbed Native Grasslands (Bauman 2013)
- Project Boundary



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 and Grant Counties, South Dakota

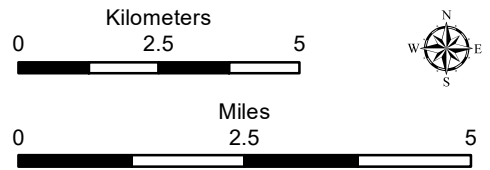
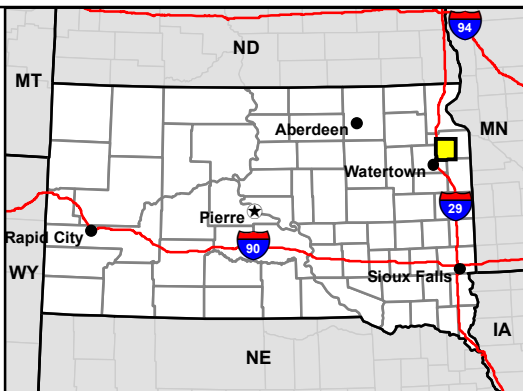
Projection: NAD 1983 UTM Zone 14N





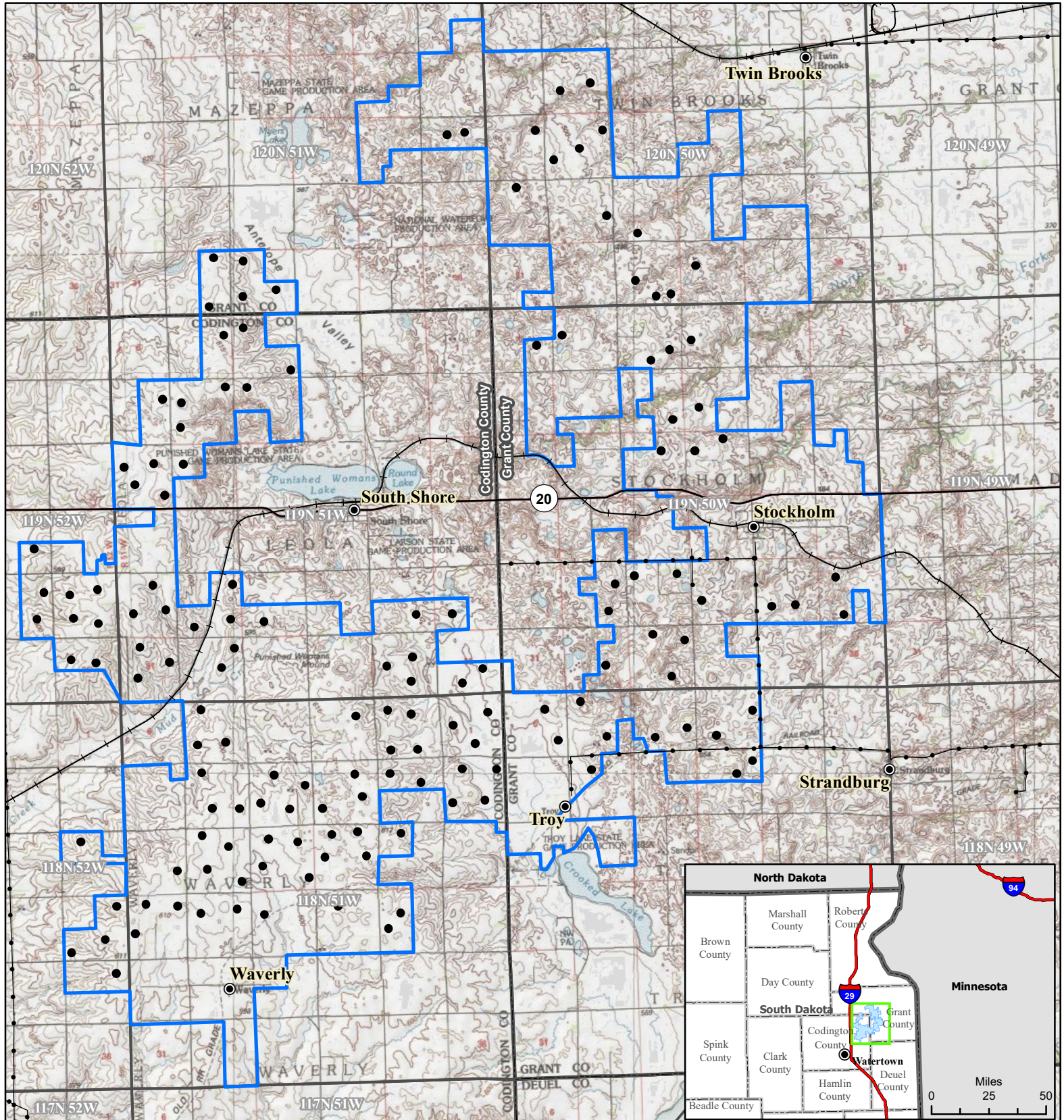
**Figure 7. Constraints Map**  
Crowned Ridge Wind Farm

- |  |                    |                     |                               |
|--|--------------------|---------------------|-------------------------------|
|  | MET Tower          |                     | Batch Plant                   |
|  | Turbine            |                     | Laydown Yard                  |
|  | City               |                     | O & M Facility/<br>Substation |
|  | Railroad           |                     | Available Land                |
|  | Access Road        |                     | Town Boundary                 |
|  | Collector Line     |                     | Project Boundary              |
|  | Crane Path         | <b>Lease Status</b> |                               |
|  | Interstate Highway |                     | Leased, Signed                |
|  | U.S. Highway       |                     | Pending Approval              |
|  | State Highway      |                     |                               |



Base Map: World Light Gray Canvas Base  
Sources: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community  
Codington and Grant Counties, South Dakota

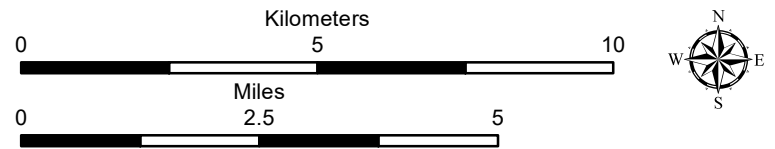




**Figure 8. Topographic Map**

Crowned Ridge Wind Farm

- Turbine
- City
- +— Railroad
- Electrical Line
- State Highway
- ▭ Project Boundary
- ▭ County Boundary
- ▭ Township/Range Boundary

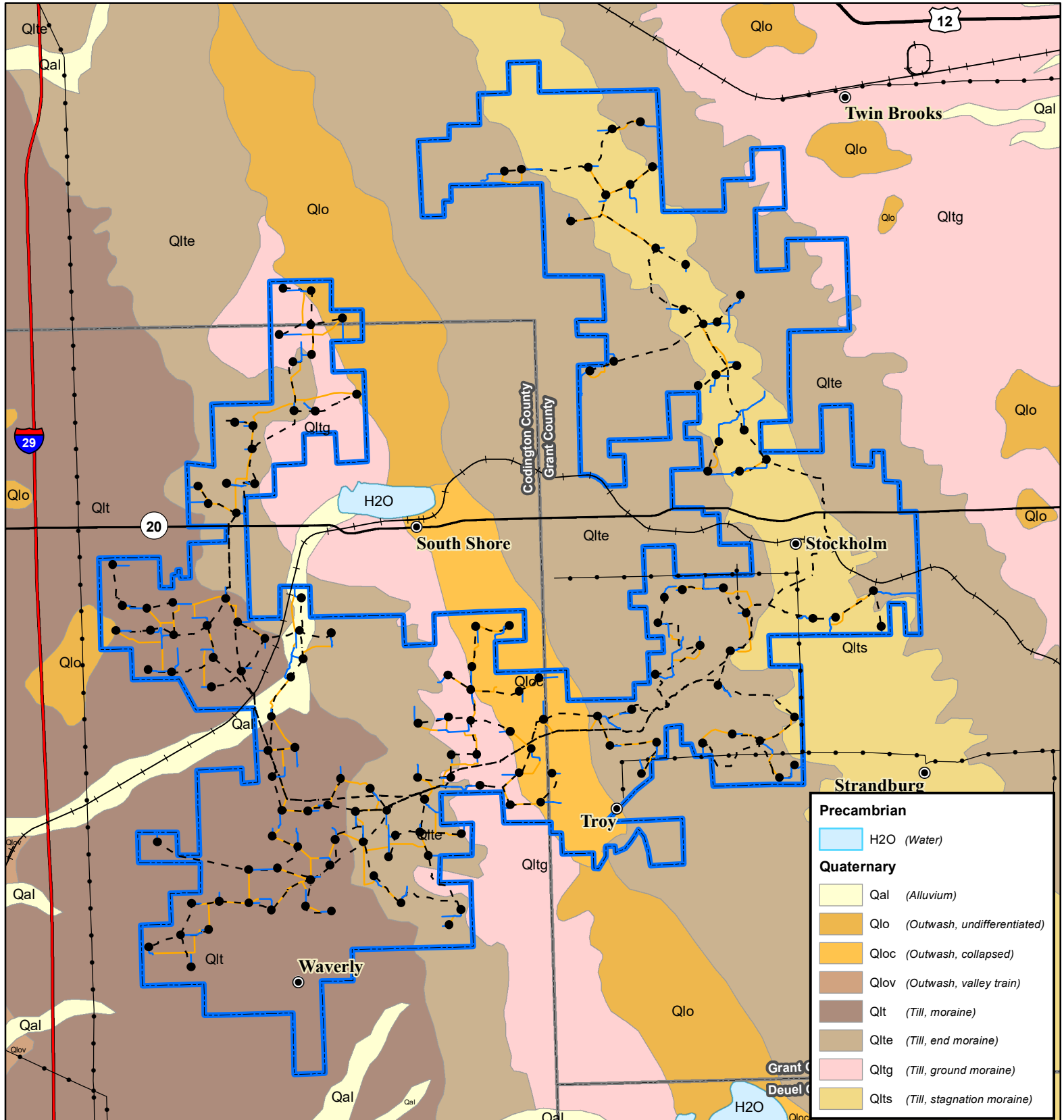


Base Map: USGS 7.5' Topographic Map  
 Source: Copyright: ©2014 National Geographic Society, i-cubed  
 Codington and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N





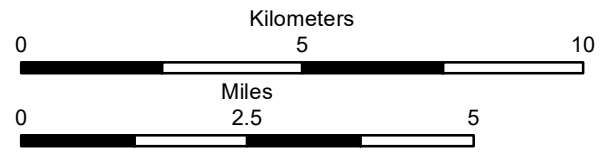


Precambrian	
<span style="display:inline-block; width:15px; height:10px; background-color:lightblue; border:1px solid black;"></span>	H2O (Water)
Quaternary	
<span style="display:inline-block; width:15px; height:10px; background-color:yellow; border:1px solid black;"></span>	Qal (Alluvium)
<span style="display:inline-block; width:15px; height:10px; background-color:orange; border:1px solid black;"></span>	Qlo (Outwash, undifferentiated)
<span style="display:inline-block; width:15px; height:10px; background-color:darkorange; border:1px solid black;"></span>	Qloc (Outwash, collapsed)
<span style="display:inline-block; width:15px; height:10px; background-color:lightbrown; border:1px solid black;"></span>	Qlov (Outwash, valley train)
<span style="display:inline-block; width:15px; height:10px; background-color:tan; border:1px solid black;"></span>	Qlt (Till, moraine)
<span style="display:inline-block; width:15px; height:10px; background-color:lightpink; border:1px solid black;"></span>	Qlte (Till, end moraine)
<span style="display:inline-block; width:15px; height:10px; background-color:pink; border:1px solid black;"></span>	Qltg (Till, ground moraine)
<span style="display:inline-block; width:15px; height:10px; background-color:yelloworange; border:1px solid black;"></span>	Qlts (Till, stagnation moraine)

**Figure 9a. Surficial Geology**

Crowned Ridge Wind Farm

- City
- Turbine
- Access Road
- - - Collector Line
- Crane Path
- Electrical Line
- +— Railroad
- Interstate Highway
- U.S. Highway
- State Highway
- ▭ Project Boundary
- ▭ County Boundary

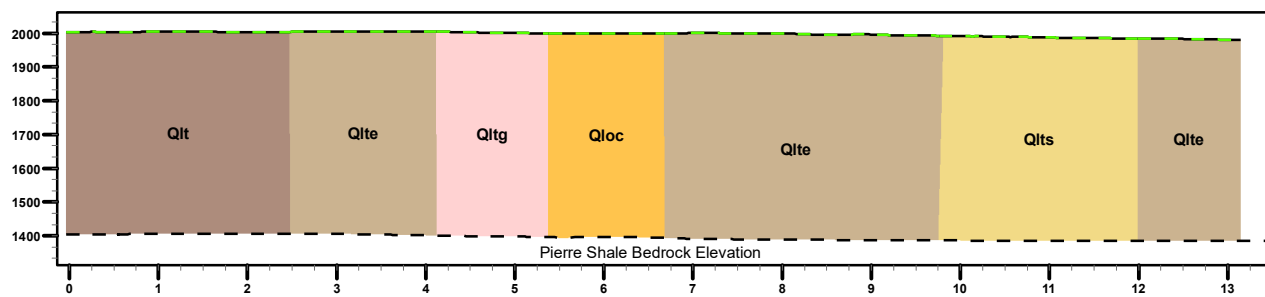
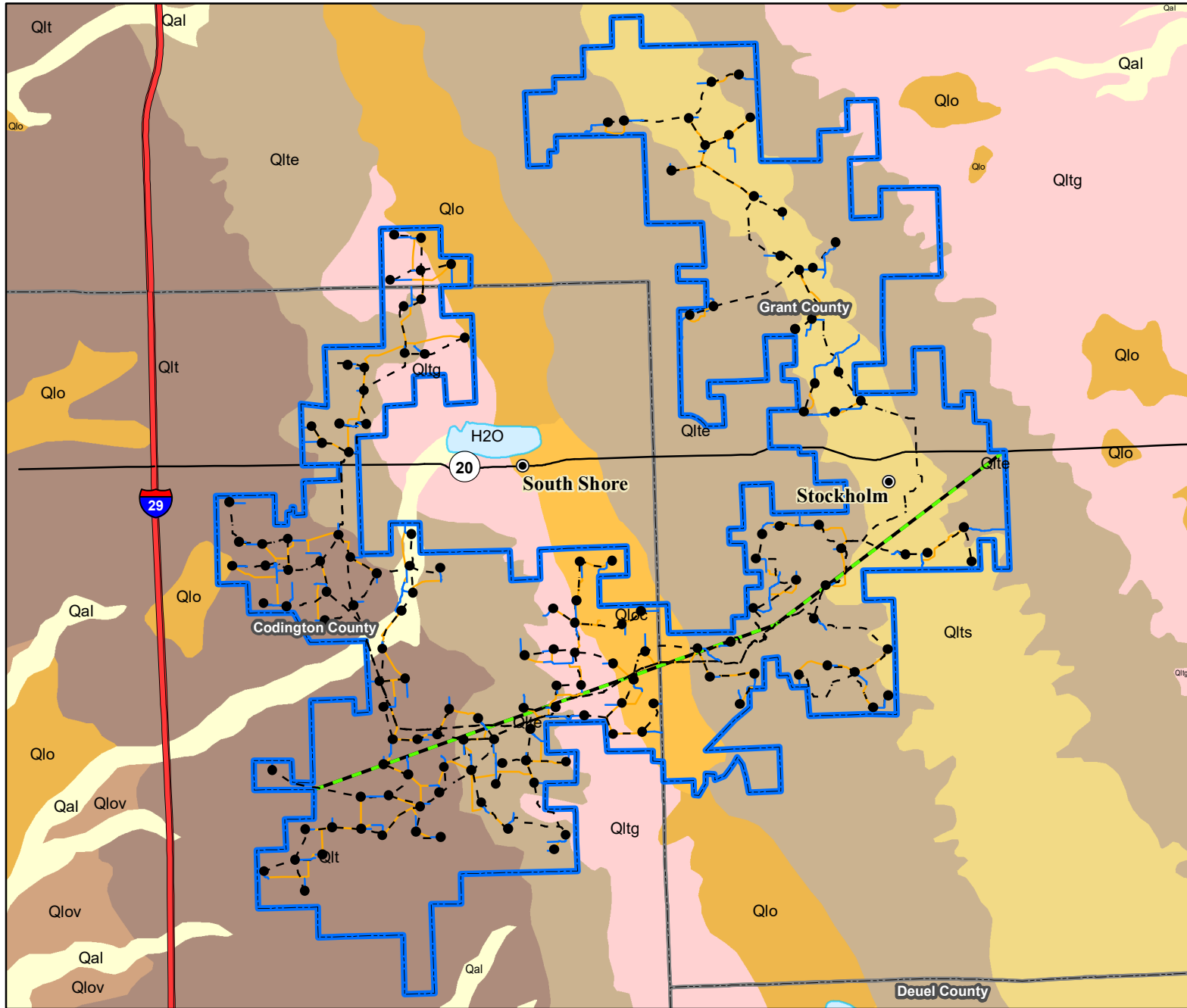


Base Map: Surficial Geology  
 Source: South Dakota Geological Survey via  
 State of South Dakota GIS  
 Codington and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N





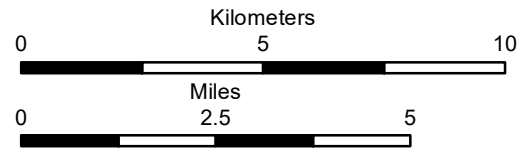


\*Vertical axis in feet above sea level; Horizontal axis in miles

### Figure 9b. Geology Cross Sections

Crowned Ridge Wind Farm

- City
- Turbine
- Access Road
- - Collector Line
- Crane Path
- Cross Section
- Interstate Highway
- State Highway
- ▭ Project Boundary
- ▭ County Boundary
- Surficial Geology**
- Precambrian**
- ▭ H2O (Water)
- Quaternary**
- ▭ Qal (Alluvium)
- ▭ Qlo (Outwash, undifferentiated)
- ▭ Qloc (Outwash, collapsed)
- ▭ Qlov (Outwash, valley train)
- ▭ Qlt (Till, moraine)
- ▭ Qlte (Till, end moraine)
- ▭ Qltg (Till, ground moraine)
- ▭ Qlts (Till, stagnation moraine)

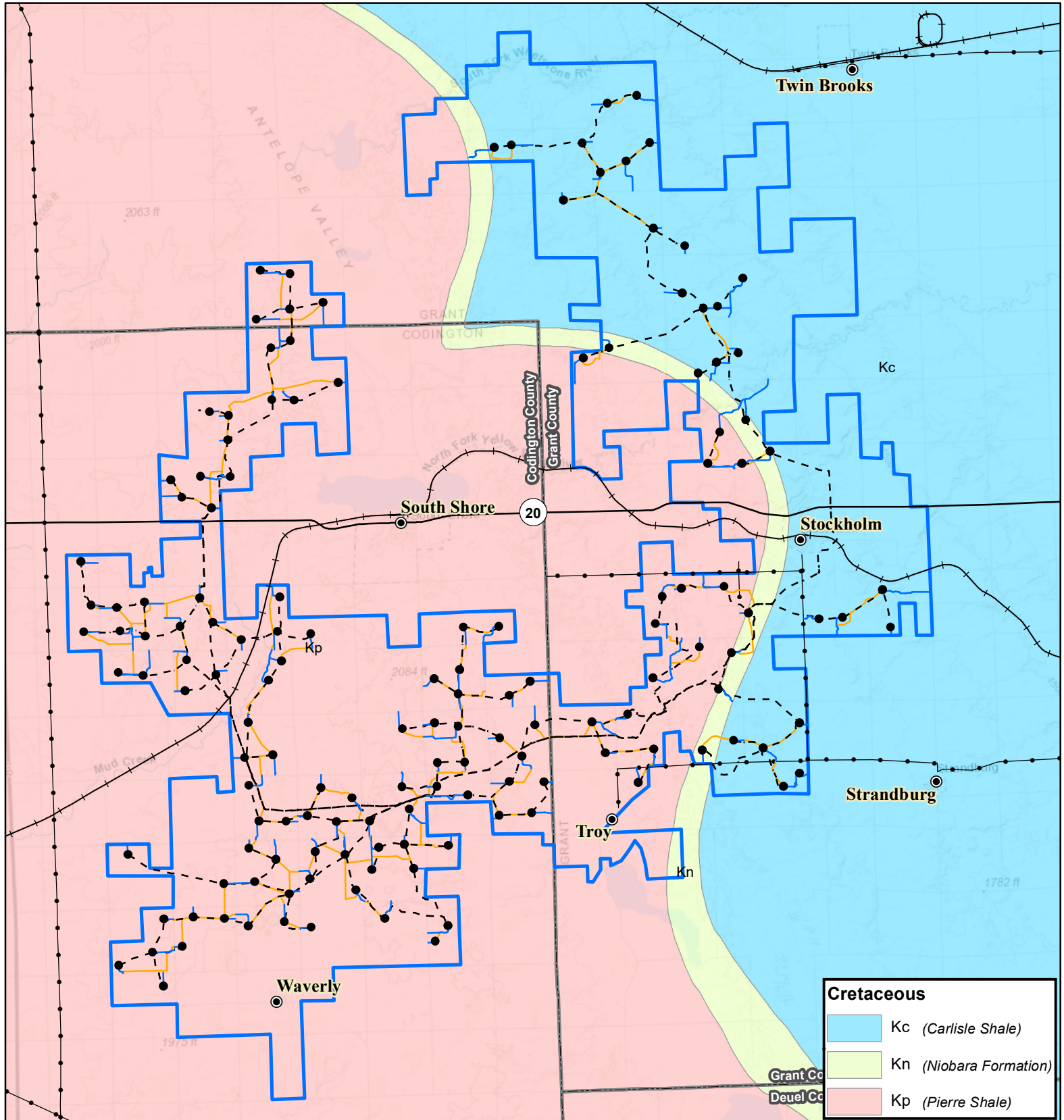


Base Map: Surficial Geology  
 Source: South Dakota Geological Survey via State of South Dakota GIS  
 Codington and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N







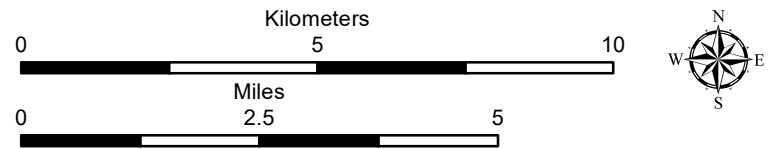
**Cretaceous**

- Kc (*Carlisle Shale*)
- Kn (*Niobara Formation*)
- Kp (*Pierre Shale*)

**Figure 10. Bedrock Geology**

Crowned Ridge Wind Farm

- City
- Turbine
- Access Road
- - - Collector Line
- Crane Path
- +— Railroad
- Electrical Line
- State Highway
- ▭ Project Boundary
- ▭ County Boundary

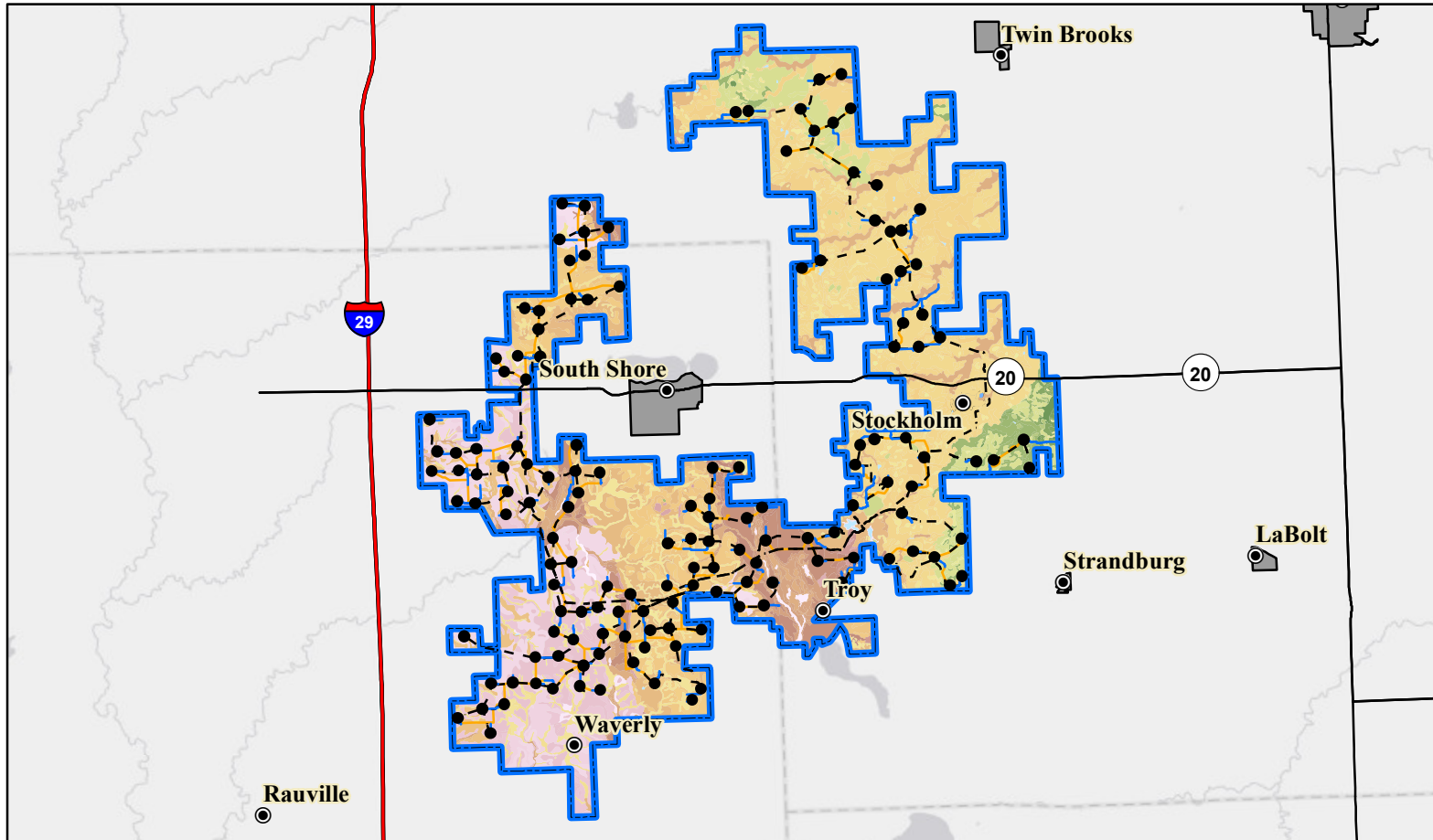


Base Map: World Topographic Map  
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community  
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Projection: NAD 1983 UTM Zone 14N





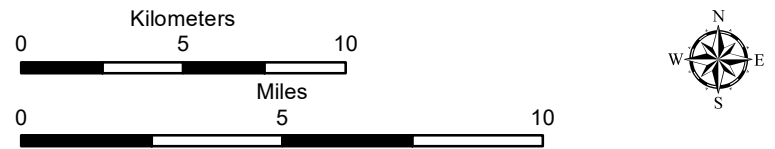


MUSYM (Soil Type)	
BeF (Buse-Forman loams, 25-40% slopes)	PeB (Peever clay loam, 2 to 6% slopes)
BfD (Buse-Forman-Aastad loams, 4-15% slopes)	Ph (Playmoor silty clay loam)
Fa (Flom Clay loam)	Ta (Tonka silty clay loam, 0 to 1% slopes)
FdB (Forman-Aastad loams, 1-6% slopes)	Vb (Vallers-Parnell complex)
FdC (Forman-Aastad loams, 3-9% slopes)	W (Water)
FdD (Forman-Aastad loams, 4-15% slopes)	Z101A (Tonka silty clay loam, 0 to 1% slopes)
FgC (Forman-Buse loams, 6-9% slopes)	Z102A (Badger-Tonka silty clay loam, 0 to 1% slopes)
FgE (Forman-Buse loams, 15-25% slopes)	Z105A (Oldham silty clay loam, coteau, 0 to 1% slopes)
FhE (Forman-Buse extremely stony loams, 9-40% slopes)	Z106A (Southam silty clay loam, 0 to 1% slopes)
HaD (Hattie clay loam, 9 to 15% slopes)	Z107A (Parnell silty clay loam, coteau, 0 to 1% slopes)
HaE (Hattie clay loam, 15 to 40% slopes)	Z110A (Vallers loam, coteau, 0 to 1% slopes)
J119E (Buse-Sioux complex, 9 to 40% slopes)	Z112A (Vallers-Hamerly loams, coteau, 0 to 2% slopes)
J136A (Great Bend-Beotia silt loams, 0 to 2% slopes)	Z113A (Vallers-Parnell complex, coteau, 0 to 2% slopes)
J225B (Forman-Aastad complex)	Z114A (Hamerly-Tonka complex, coteau, 0 to 2% slopes)
Lb (LaDelle silt loam, channeled)	Z115A (Hamerly-Badger complex, coteau, 0 to 2% slopes)
Lc (Ludden silty clay)	Z116A (McKranz-Hidwood, frequently flooded, silty clay loams, 0 to 2% slopes)
M-W (Miscellaneous Water)	Z117A (McKranz-Badger silty clay loams, 0 to 2% slopes)
Pa (Parnell silty clay loam)	Z119A (Hamerly-Balaton loams, coteau, 0 to 3% slopes)
Pb (Southern silty clay loam, 0 to 1% slopes)	Z128B (Hettland silty clay loam, 2 to 6% slopes)
PcA (Peever clay loam, coteau, 0 to 2% slopes)	Z131A (Forman-Aastad loams, coteau, 0 to 2% slopes)
PcB (Peever clay loam, coteau, 2 to 6% slopes)	Z131B (Forman-Aastad loams, coteau, 1 to 6% slopes)
PcC (Peever clay loam, 6 to 9% slopes)	Z132B (Forman-Buse-Aastad loams, coteau, 1 to 6% slopes)
	Z132C (Forman-Buse-Aastad loams, coteau, 2 to 9% slopes)
	Z132D (Forman-Buse-Aastad loams, coteau, 2 to 15% slopes)
	Z135D (Forman-Buse loams, very stony, 2 to 15% slopes)
	Z136F (Buse-Langhei complex, very stony, 9 to 40% slopes)
	Z137F (Buse-Forman loams, very stony, 15 to 40% slopes)
	Z140F (Buse-Langhei complex, coteau, 15 to 40% slopes)
	Z141A (Barnes-Svea loams, coteau, 0 to 2% slopes)
	Z141B (Barnes-Svea loams, coteau, 1 to 6% slopes)
	Z142B (Barnes-Buse-Svea loams, coteau, 1 to 6% slopes)
	Z142C (Barnes-Buse-Svea loams, coteau, 2 to 9% slopes)
	Z143C (Barnes-Buse loams, coteau, 6 to 9% slopes)
	Z144E (Buse-Barnes loams, coteau, 9 to 20% slopes)
	Z145D (Buse-Barnes loams, coteau, very stony, 2 to 15% slopes)
	Z145F (Buse-Barnes loams, coteau, very stony, 9 to 40% slopes)
	Z146F (Buse-Lamoure, channeled, frequently flooded, complex, 0 to 40% slopes)
	Z148F (Buse very stony-Lamoure, channeled, frequently flooded, complex, 0 to 40% slopes)
	Z149F (Buse-Langhei, very stony-La Prairie, channeled, occasionally flooded, complex, 0 to 60% slopes)
	Z150A (Rauville silty clay loam, coteau, frequently flooded, 0 to 1% slopes)
	Z152A (Lamoure silty clay loam, coteau, occasionally flooded, 0 to 1% slopes)
	Z153A (Lamoure-Rauville silty clay loams, channeled, frequently flooded, 0 to 2% slopes)
	Z157A (Fairdale loam, channeled, frequently flooded, 0 to 2% slopes)
	Z158A (Marysland loam, occasionally flooded, 0 to 1% slopes)
	Z159A (Divide loam, occasionally flooded, 0 to 2% slopes)
	Z160A (Moritz, occasionally flooded-Lamoure, frequently flooded, complex, 0 to 2% slopes)
	Z161A (Spottswood loam, occasionally flooded, 0 to 2% slopes)
	Z162A (La Prairie loam, coteau, occasionally flooded, 0 to 2% slopes)
	Z166A (Forttown loam, rarely flooded, 0 to 2% slopes)
	Z167A (Renwash loam, rarely flooded, 0 to 2% slopes)
	Z171A (Renshaw-Fordville loams, coteau, 0 to 2% slopes)
	Z171B (Renshaw-Fordville loams, coteau, 2 to 6% slopes)
	Z172A (Renshaw loam, coteau, 0 to 2% slopes)
	Z172B (Renshaw loam, coteau, 2 to 6% slopes)
	Z173B (Renshaw-Sioux complex, coteau, 2 to 6% slopes)
	Z173C (Renshaw-Sioux complex, coteau, 6 to 9% slopes)
	Z174D (Sioux-Renshaw complex, coteau, 9 to 15% slopes)
	Z174F (Sioux-Renshaw complex, coteau, 15 to 40% slopes)
	Z175D (Renshaw-Sioux complex, very stony, 2 to 15% slopes)
	Z176C (Arvilla-Sandberg sandy loams, coteau, 6 to 9% slopes)
	Z177 (Udortheims, coteau (gravel pits))
	Z178A (Rentll loam, coteau, 0 to 2% slopes)
	Z179F (Sioux-Renshaw complex, very stony, 15 to 40% slopes)
	Z184E (Maddock loamy fine sand, 9 to 25% slopes)
	Z185A (Egeland-Embsden complex, coteau, 0 to 2% slopes)
	Z185B (Egeland-Embsden complex, coteau, 2 to 6% slopes)
	Z186B (Maddock-Egeland sandy loams, coteau, 2 to 6% slopes)
	Z186C (Maddock-Egeland sandy loams, coteau, 6 to 9% slopes)
	Z190A (Brookings silty clay loam, 0 to 2% slopes)
	Z192A (Vienna-Brookings complex, coteau, 0 to 2% slopes)
	Z192B (Vienna-Brookings complex, coteau, 1 to 6% slopes)
	Z193C (Vienna-Buse complex, coteau, 6 to 9% slopes)
	Z194A (Barnes clay loam, coteau, 0 to 2% slopes)
	Z194B (Barnes clay loam, coteau, 2 to 6% slopes)
	Z198A (Vienna-Forestville loams, coteau, 0 to 2% slopes)
	Z199B (Vienna-Barnes-Forestville loams, 1 to 6% slopes)
	Z205B (Mauvais clay loam, occasionally ponded, extremely stony, 2 to 6% slopes)
	Z217A (McKranz silty clay loam, 0 to 2% slopes)
	Z250A (Rauville mucky silty clay loam, ponded, frequently flooded, 0 to 1% slopes)
	Z252A (Hidewood silty clay loam, frequently flooded, 0 to 2% slopes)

**Figure 11. Soil Types**

Crowned Ridge Wind Farm

- City
- Turbine
- Access Road
- - - Collector Line
- Crane Path
- Interstate Highway
- State Highway
- ▭ Town Boundary
- ▭ Project Boundary

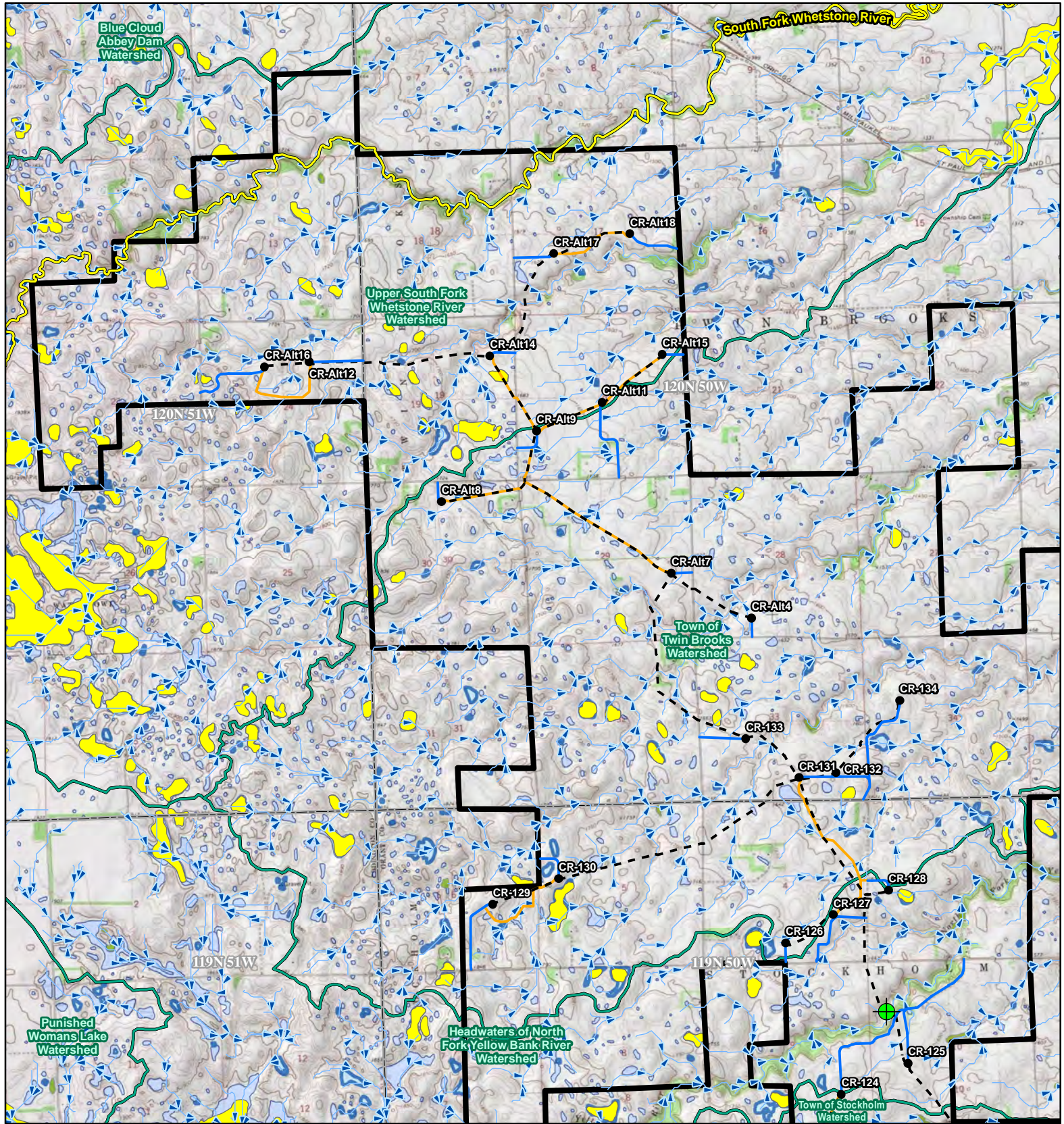


Base Map: World Light Gray Canvas Base  
 Sources: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community  
 Codington and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

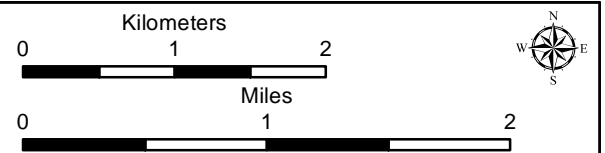
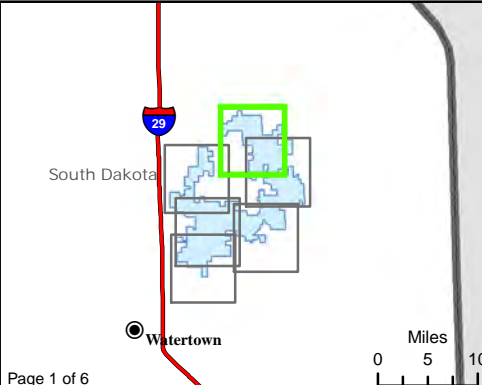






**Figure 12. Water Resources**  
Crowned Ridge Wind Farm

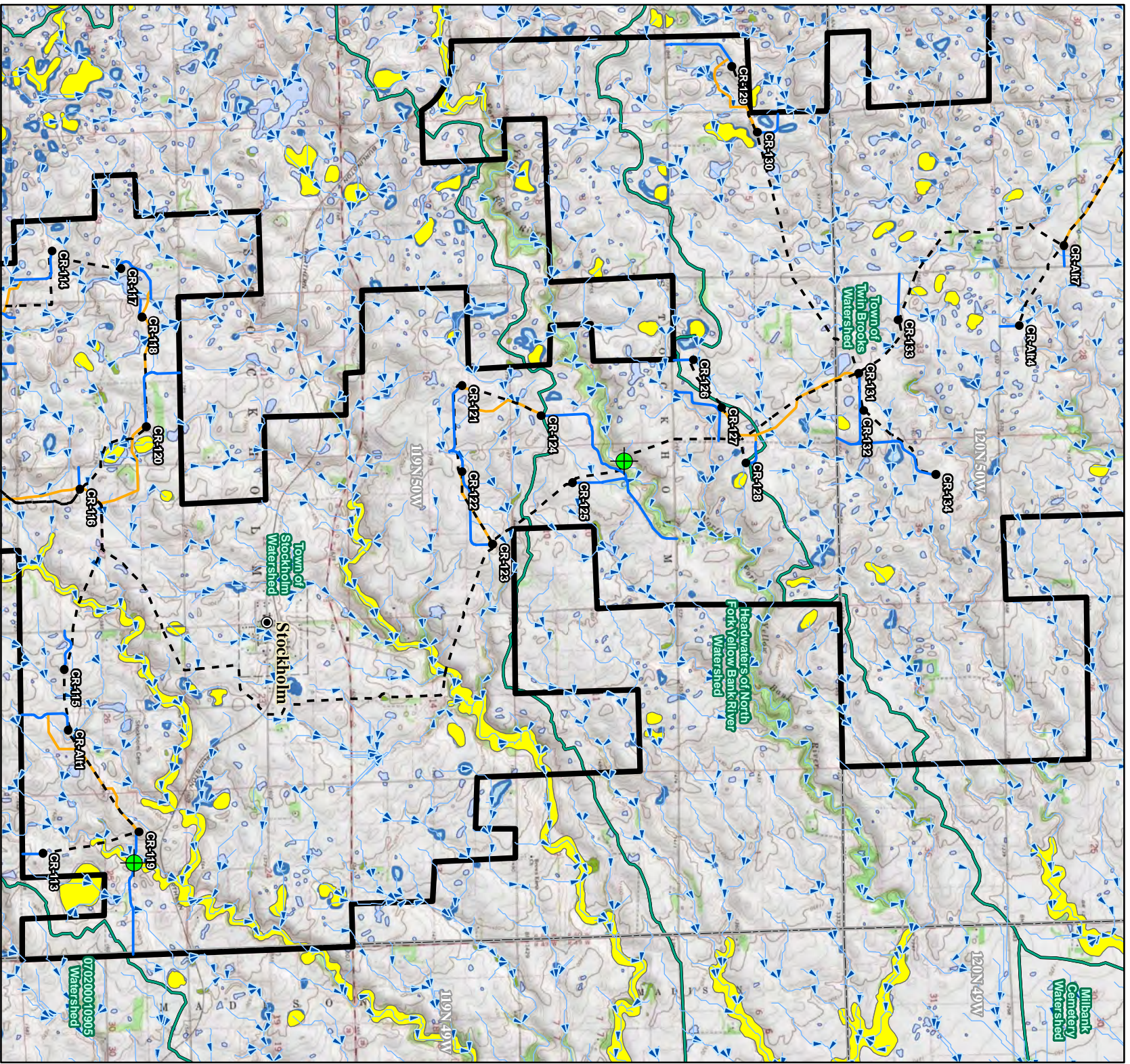
- City
- Intersection of Floodplain and Project Infrastructure
- Turbine
- Access Road
- Collector Line
- Crane Path
- Flow Direction
- South Dakota Beneficial Use Stream
- South Dakota Beneficial Use Lake
- Watershed Boundary (HUC12)
- Project Boundary
- County Boundary
- Township/Range Boundary
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Lake, Pond, or Riverine Wetland
- FEMA Flood Zone A



Base Map: USGS 7.5' Topographic Map  
 Source: Esri ArcGIS Online service  
 Quadrangle: Antelope Valley (1973),  
 Twin Brooks (1973), Stockholm (1973)  
 Township/Range: T120N, R51W &  
 T120N, R50W & T119N, R50W  
 Grant County, South Dakota

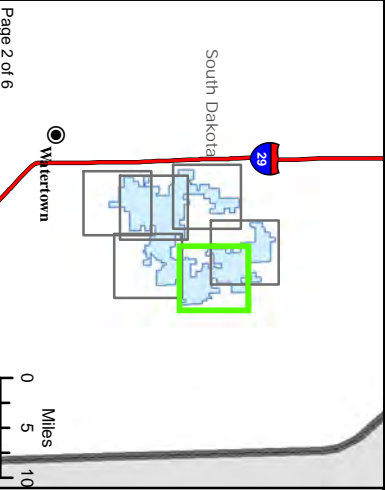
Projection: NAD 1983 UTM Zone 14N  
**SWCA**  
 ENVIRONMENTAL CONSULTANTS





**Figure 12. Water Resources**  
Crowned Ridge Wind Farm

- City
- Intersection of Floodplain and Project Infrastructure
- Project Boundary
- County Boundary
- Township/Range Boundary
- Turbine
- Access Road
- Collector Line
- Crane Path
- Flow Direction
- South Dakota Beneficial Use Stream
- South Dakota Beneficial Use Lake
- Watershed Boundary (HUC12)
- Freshwater Wetland
- Strud Wetland
- Lake, Pond, or Riverine Wetland
- FEMA Flood Zone A



0 1 2  
Kilometers

0 5 10  
Miles

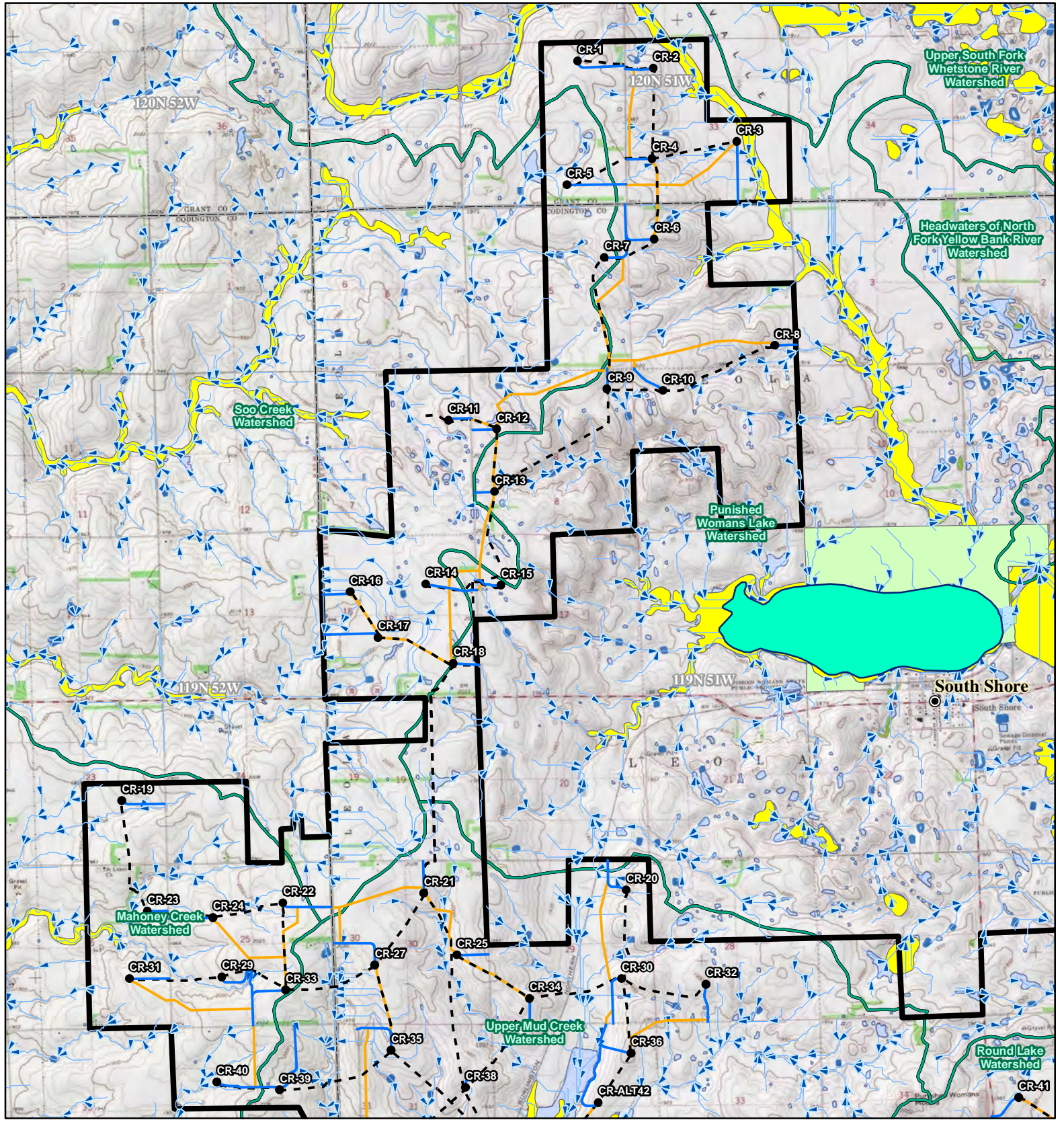
0 1 2  
Miles

Projection: NAD 1983 UTM Zone 14N

Base Map: USGS 7.5' Topographic Map  
Source: Esri ArcGIS Online service  
Quadrangle: Twin Brooks (1973),  
Stockholm (1973)  
Township/Range: T120N, R50W &  
T119N, R50W  
Grant County, South Dakota

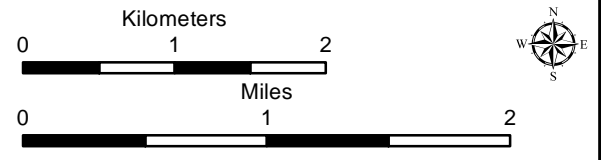
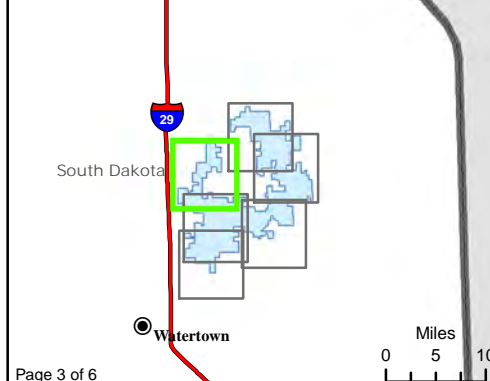
070200010903 Watershed





**Figure 12. Water Resources**  
Crowned Ridge Wind Farm

- City
- Intersection of Floodplain and Project Infrastructure
- Turbine
- Access Road
- - Collector Line
- Crane Path
- Flow Direction
- South Dakota Beneficial Use Stream
- South Dakota Beneficial Use Lake
- Watershed Boundary (HUC12)
- Project Boundary
- County Boundary
- Township/Range Boundary
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Lake, Pond, or Riverine Wetland
- FEMA Flood Zone
  - A
  - D

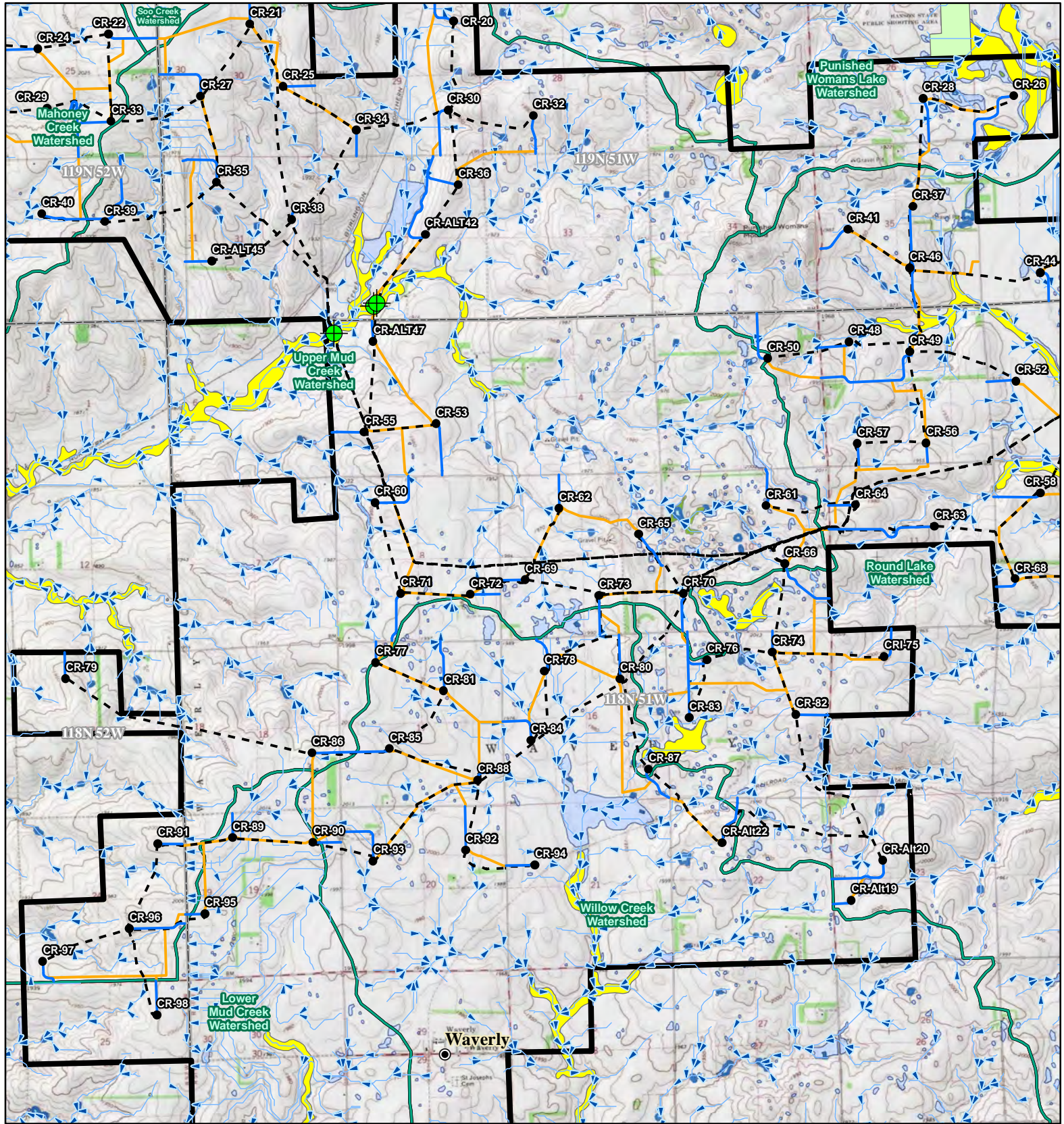


Base Map: USGS 7.5' Topographic Map  
 Source: Esri ArcGIS Online service  
 Quadrangle: Antelope Valley (1973),  
 Still Lake SE (1970), South Shore (1973)  
 Township/Range: T120N, R51W &  
 T119N, R52W & T119N, R51W  
 Codington and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

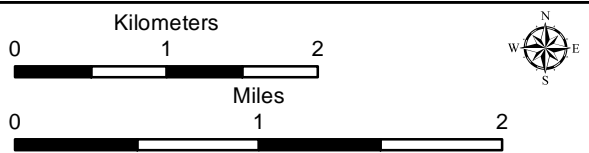
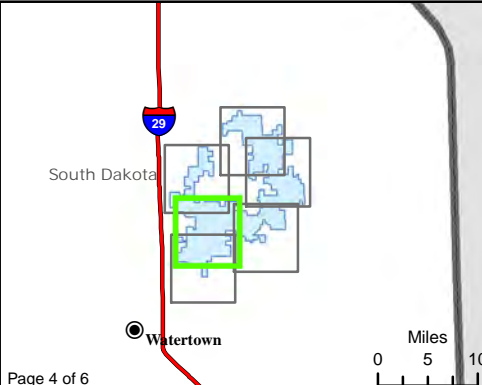






**Figure 12. Water Resources**  
Crowned Ridge Wind Farm

- City
- Intersection of Floodplain and Project Infrastructure
- Turbine
- Access Road
- - Collector Line
- Crane Path
- Flow Direction
- South Dakota Beneficial Use Stream
- South Dakota Beneficial Use Lake
- Watershed Boundary (HUC12)
- ▭ Project Boundary
- ▭ County Boundary
- ▭ Township/Range Boundary
- ▭ Freshwater Emergent Wetland
- ▭ Freshwater Forested/Shrub Wetland
- ▭ Lake, Pond, or Riverine Wetland
- ▭ FEMA Flood Zone
  - ▭ A
  - ▭ D

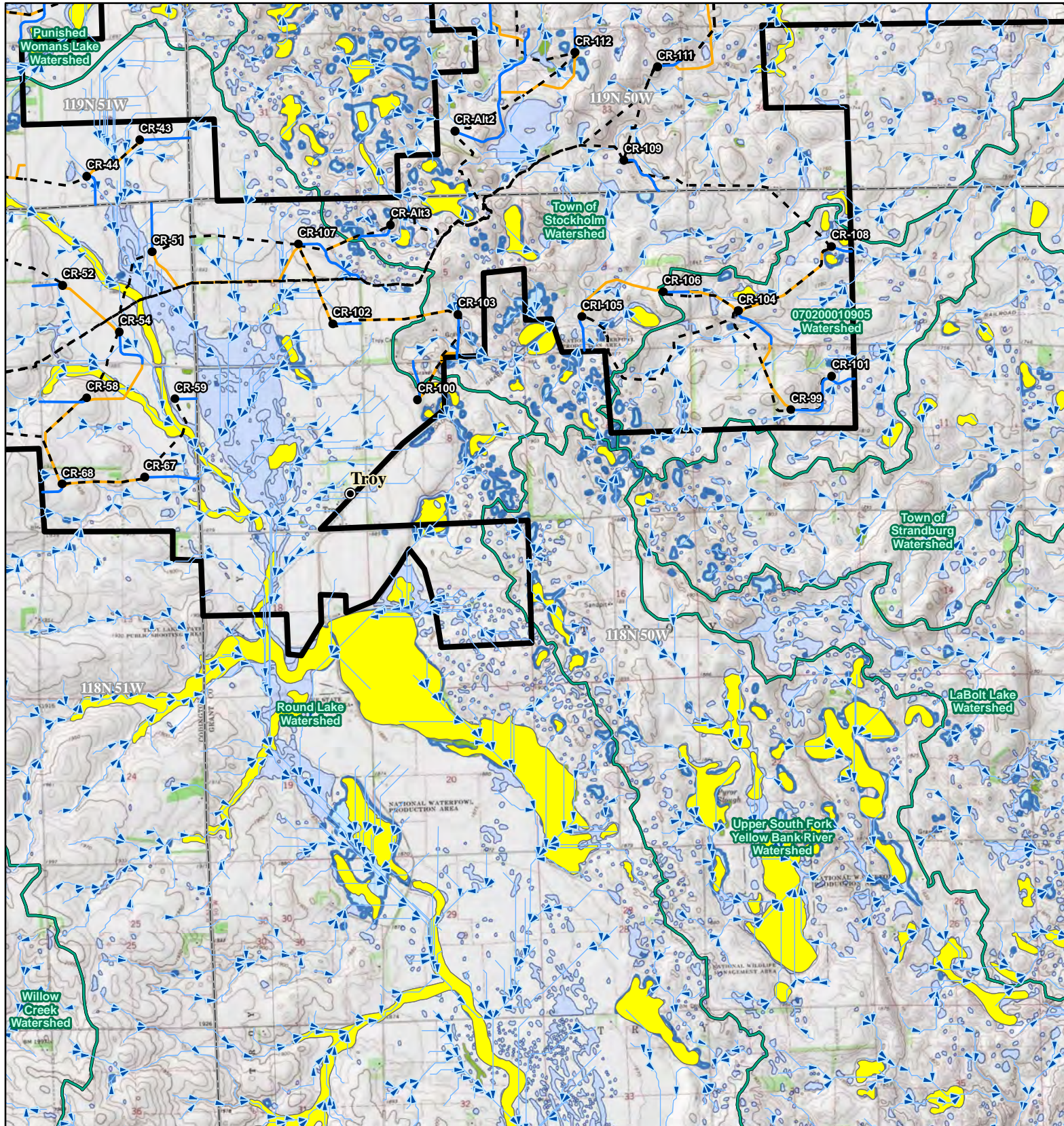


Base Map: USGS 7.5' Topographic Map  
 Source: Esri ArcGIS Online service  
 Quadrangle: Still Lake SE (1970), South Shore (1973),  
 Watertown East (1969), Kranzburg (1970)  
 Township/Range: T119N, R52W & T119N, R51W &  
 T118N, R52W & T118N, R51W  
 Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

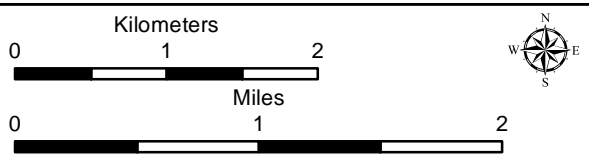
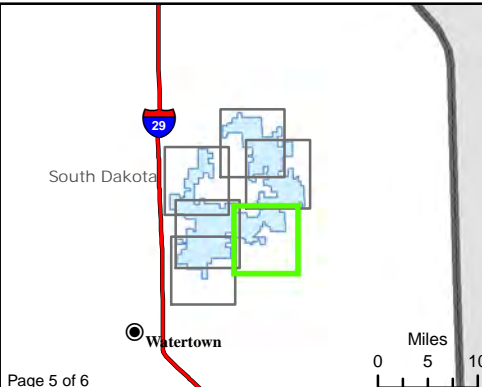






**Figure 12. Water Resources**  
Crowned Ridge Wind Farm

- City
- Intersection of Floodplain and Project Infrastructure
- Turbine
- Access Road
- - Collector Line
- Crane Path
- Flow Direction
- South Dakota Beneficial Use Stream
- South Dakota Beneficial Use Lake
- Watershed Boundary (HUC12)
- ▭ Project Boundary
- ▭ County Boundary
- ▭ Township/Range Boundary
- ▭ Freshwater Emergent Wetland
- ▭ Freshwater Forested/Shrub Wetland
- ▭ Lake, Pond, or Riverine Wetland
- ▭ FEMA Flood Zone A

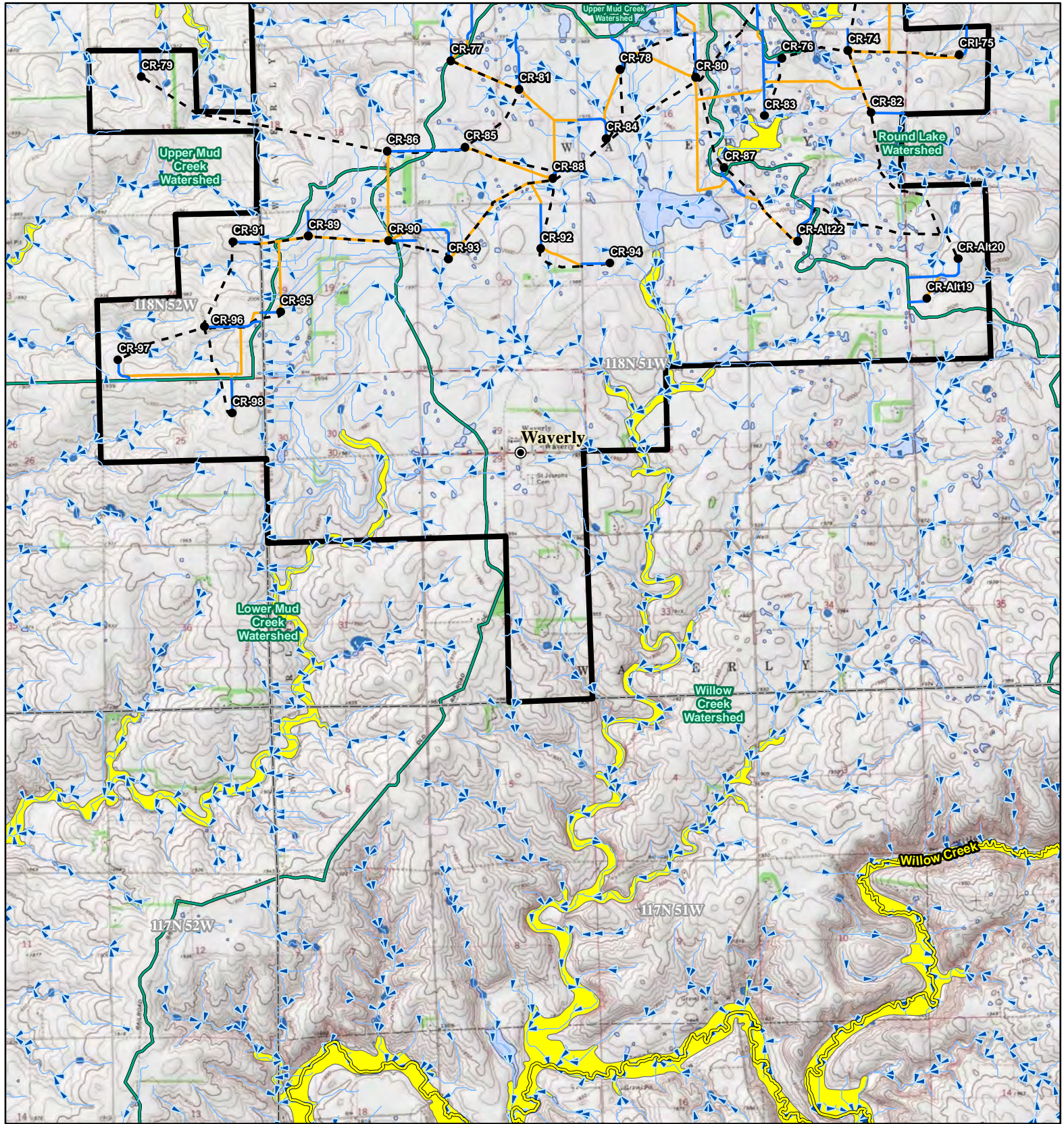


Base Map: USGS 7.5' Topographic Map  
 Source: Esri ArcGIS Online service  
 Quadrangle: South Shore (1973), Stockholm (1973)  
 Township/Range: T119N, R51W & T119N, R50W & T118N, R51W & T118N, R50W  
 Codington and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

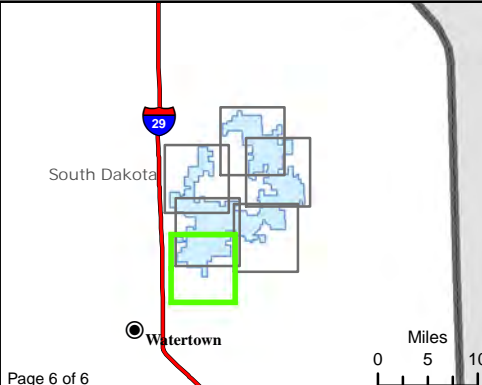






**Figure 12. Water Resources**  
Crowned Ridge Wind Farm

- City
- Intersection of Floodplain and Project Infrastructure
- Turbine
- Access Road
- Collector Line
- Crane Path
- Flow Direction
- South Dakota Beneficial Use Stream
- South Dakota Beneficial Use Lake
- Watershed Boundary (HUC12)
- ▭ Project Boundary
- ▭ County Boundary
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- ▭ Freshwater Emergent Wetland
- ▭ Freshwater Forested/Shrub Wetland
- ▭ Lake, Pond, or Riverine Wetland
- ▭ FEMA Flood Zone A



Kilometers

0 1 2

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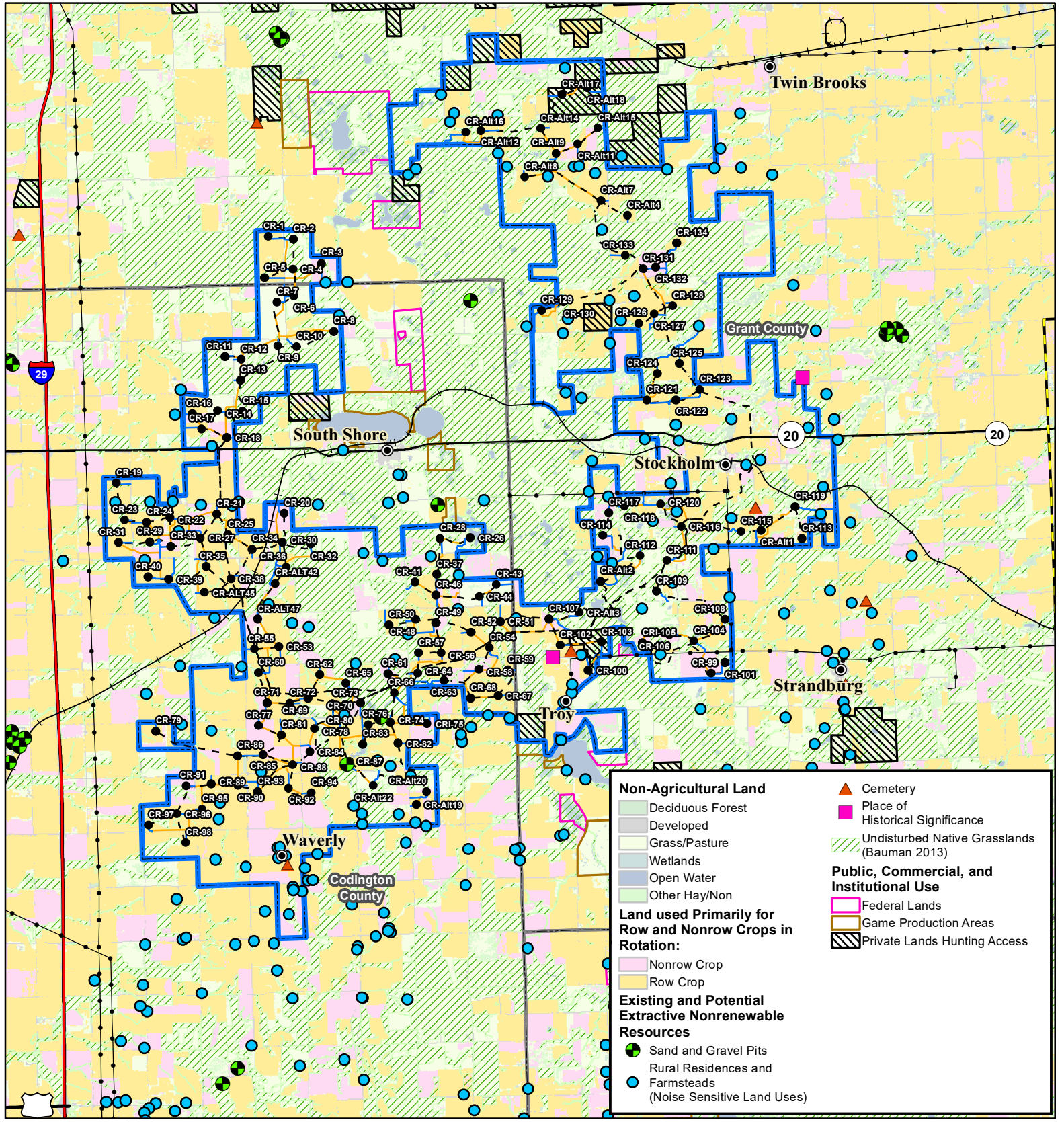
Miles

0 1 2

Base Map: USGS 7.5' Topographic Map  
 Source: Esri ArcGIS Online service  
 Quadrangle: Still Lake SE (1970), South Shore (1973),  
 Watertown East (1969), Kranzburg (1970)  
 Township/Range: T118N, R52W & T118N, R51W  
 Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N



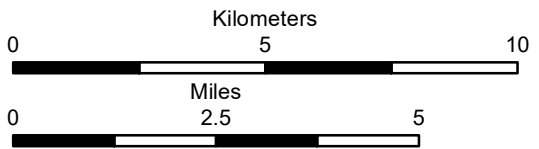


**Figure 13. Land Use**

Crowned Ridge Wind Farm

- City
- Turbine
- Access Road
- - - Collector Line
- Crane Path
- Electrical Line
- Natural Gas Line
- +— Railroad
- Interstate Highway
- U.S. Highway
- State Highway
- ▭ Project Boundary
- ▭ County Boundary

- Non-Agricultural Land**
- Deciduous Forest
  - Developed
  - Grass/Pasture
  - Wetlands
  - Open Water
  - Other Hay/Non
- Land used Primarily for Row and Nonrow Crops in Rotation:**
- Nonrow Crop
  - Row Crop
- Existing and Potential Extractive Nonrenewable Resources**
- Sand and Gravel Pits
  - Rural Residences and Farmsteads (Noise Sensitive Land Uses)
- Public, Commercial, and Institutional Use**
- Cemetery
  - Place of Historical Significance
  - Undisturbed Native Grasslands (Bauman 2013)
  - Federal Lands
  - Game Production Areas
  - Private Lands Hunting Access



Base Map: 2017 South Dakota Cropland Data Layer | NASS/USDA  
 Source: United States Department of Agriculture (USDA), National Agricultural Statistics Service (NASS), Research and Development Division (RDD), Geospatial Information Branch (GIB), Spatial Analysis Research Section (SARS); 2017 Edition Codington, Deuel, and Grant Counties, South Dakota  
 Projection: NAD 1983 UTM Zone 14N

