



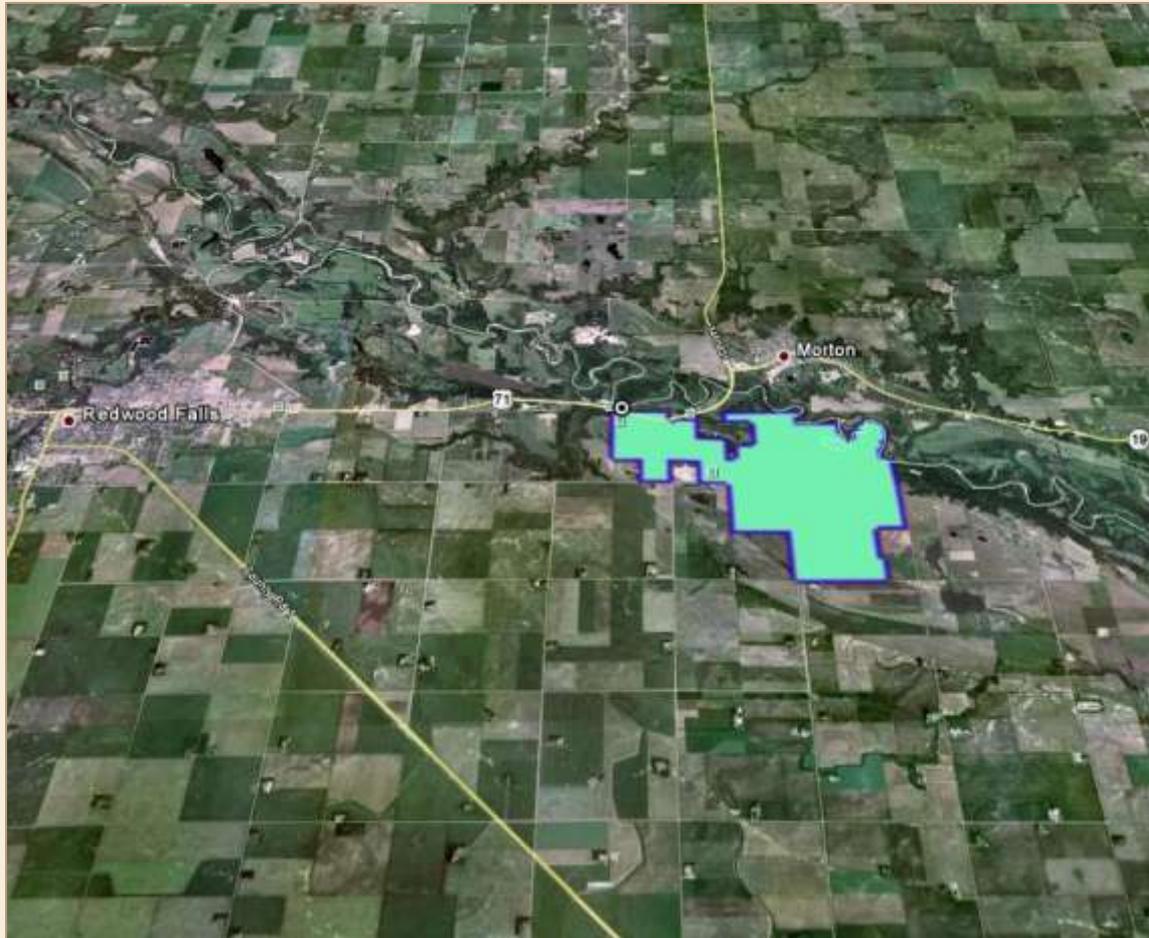
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# Lower Sioux Indian Community Wind Energy Development

DOE Tribal Energy Program Review,  
October 2010

# Lower Sioux Community



# Lower Sioux Energy Goals

- Provide clean and environmentally safe energy resources for tribal reservation by installing wind turbine in community
- Sell excess power to nearby power utility
- Lower cost of energy to local businesses and homeowners in the community
- Provide new employment opportunities



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# Facility-Scale Wind

- The Lower Sioux Community's original renewable energy goal was to build a single facility-scale turbine, followed by several more for a community-scale farm.
- After discussions with local utilities, we found that local distribution grids could not support a community-scale farm.
- Current plans include a 1.5MW wind turbine and an accompanying solar field.



# Wind Feasibility Study

- Lower Sioux Community partnered with Westwood Professional Services to undertake a detailed Wind Feasibility Study and assist in project development.
- To date, Westwood has completed Phase I of the Study:
  - Land Usage, Constraint, and Permitting Matrix
  - Preliminary Site Selection and Layout
  - Preliminary Financial Analysis
  - Interconnection application and engineering studies



# Land Usage, Constraint, and Permitting

- The foundation for evaluating the land which could potentially host wind turbines.
- A geographic information system (GIS) was created to overlay the Lower Sioux Community with digital data pertaining to:
  - Aerial photography
  - Wind resource
  - Land use
  - Physical infrastructure
  - Communications infrastructure
  - Environmental features
  - Known cultural resource features

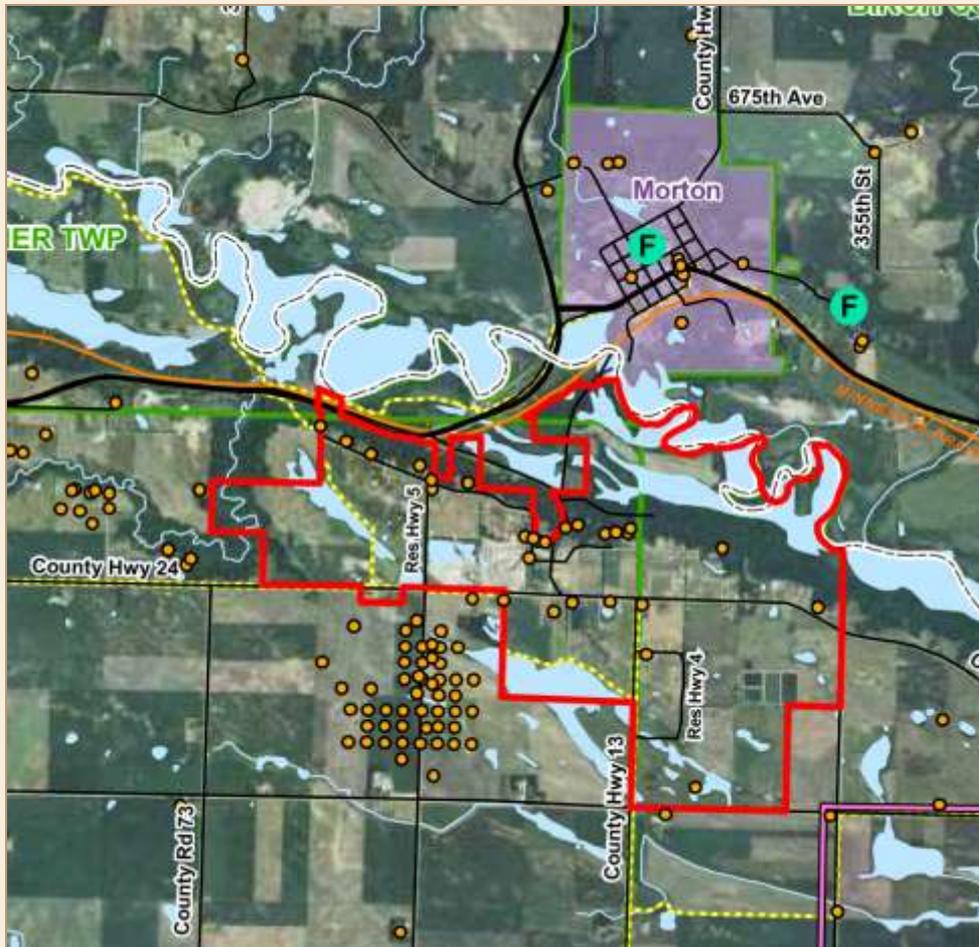


# GIS

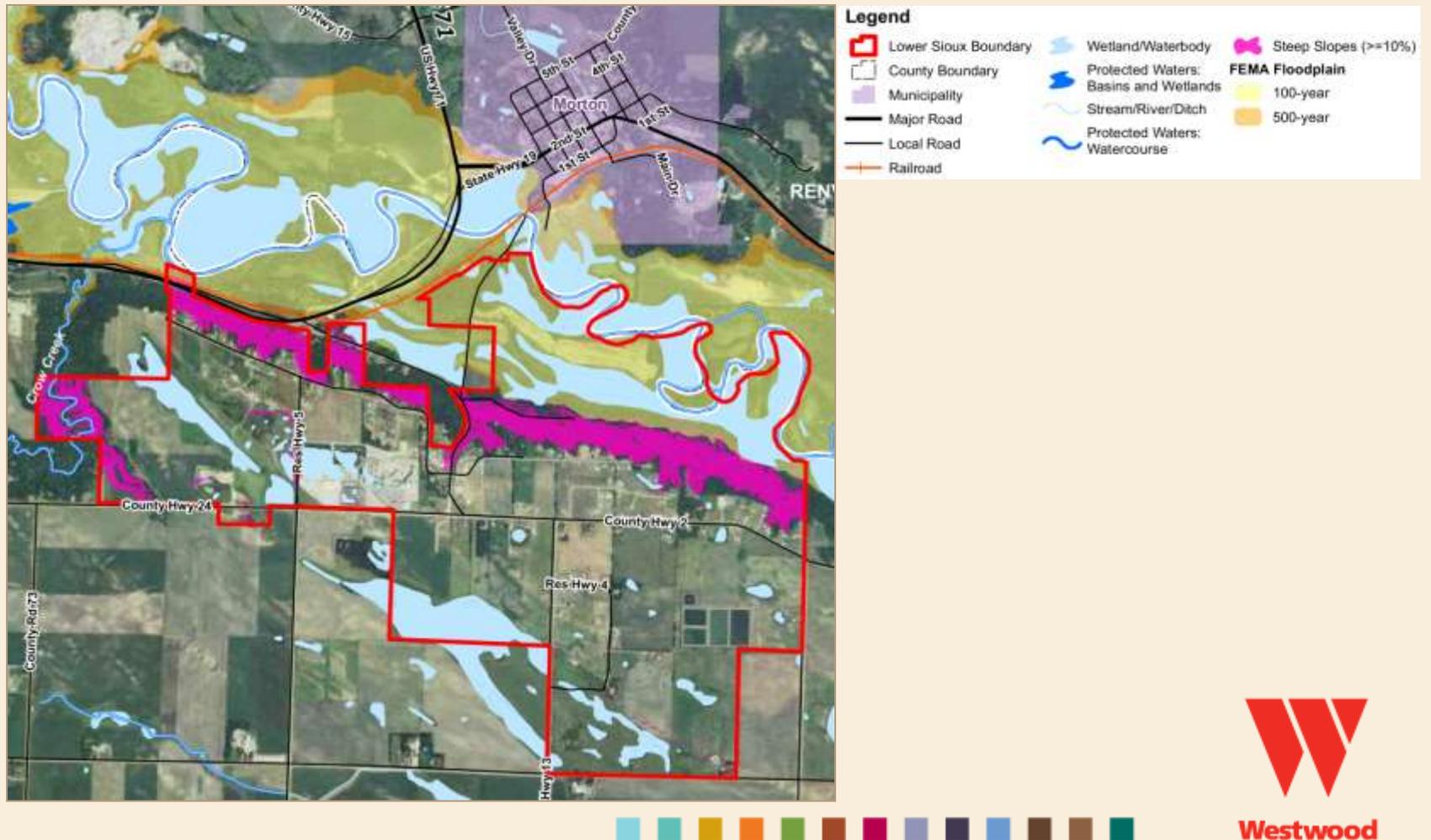
- The intent of this GIS is to:
  - Reveal encumbrances and physical constraints to project development
  - Highlight areas best suited for further evaluation
  - Create maps to better understand resources and constraints
  - Identify preliminary permitting requirements



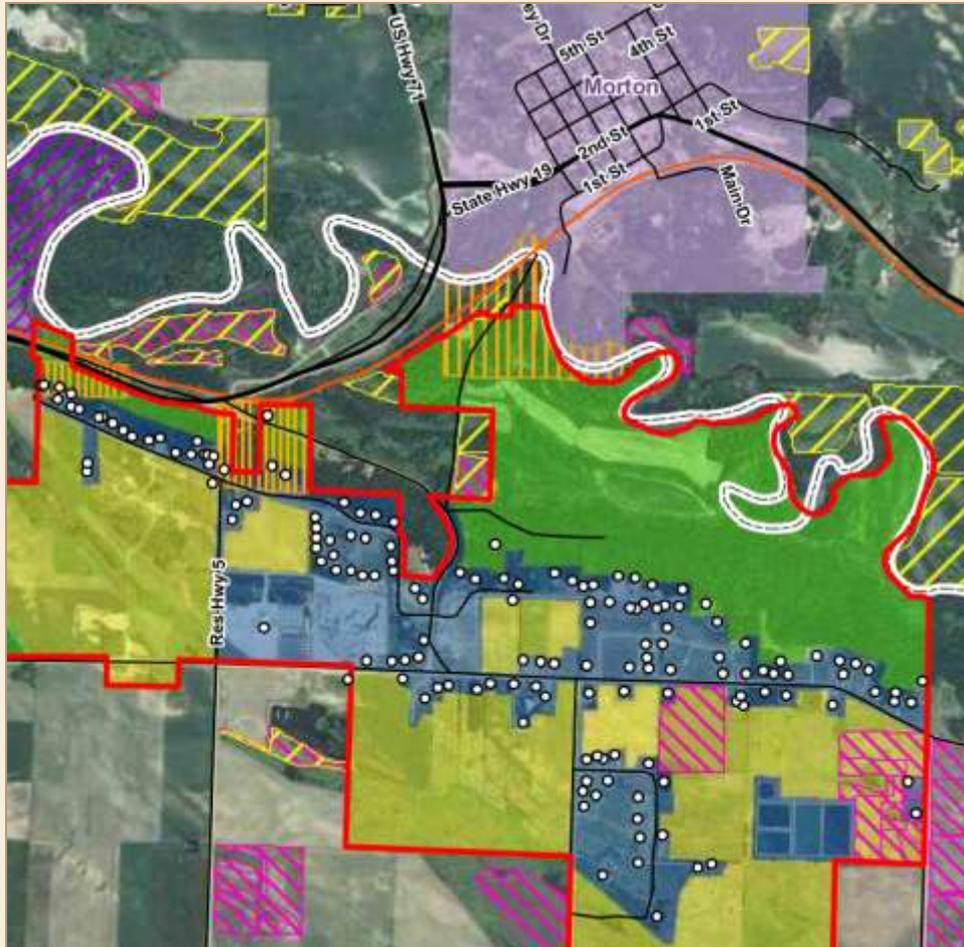
# GIS - Infrastructure



# GIS – Water Resources



# GIS – Land Use



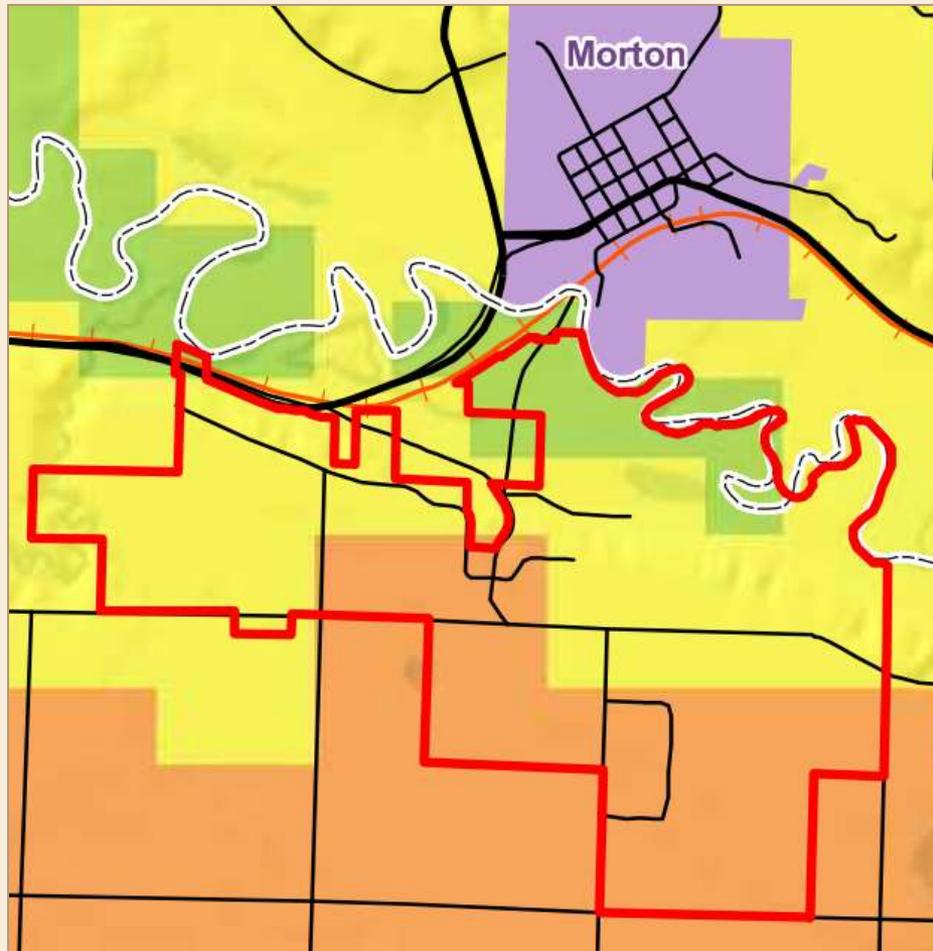
## Legend

- |  |                              |                 |   |
|--|------------------------------|-----------------|---|
|  | Lower Sioux Boundary         |                 | Local Road  |
|  | County Boundary              |                 | Railroad  |
|  | Municipality                 |                 | State Funded Conservation Easement (e.g. WRP, RIM, CRP) |
|  | Major Road                   |                 |   |
|  | MnDNR Land                   |                 |   |
|  | Wildlife Management Area     |                 |   |
|  | Conservation Reserve Program |                 |   |
|  | Structure/Residence          |                 |   |
|  |                              | <b>Land Use</b> |   |
|  |                              |                 | Open Space  |
|  |                              |                 | Developed   |
|  |                              |                 | Trees   |



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# GIS – Wind Resource



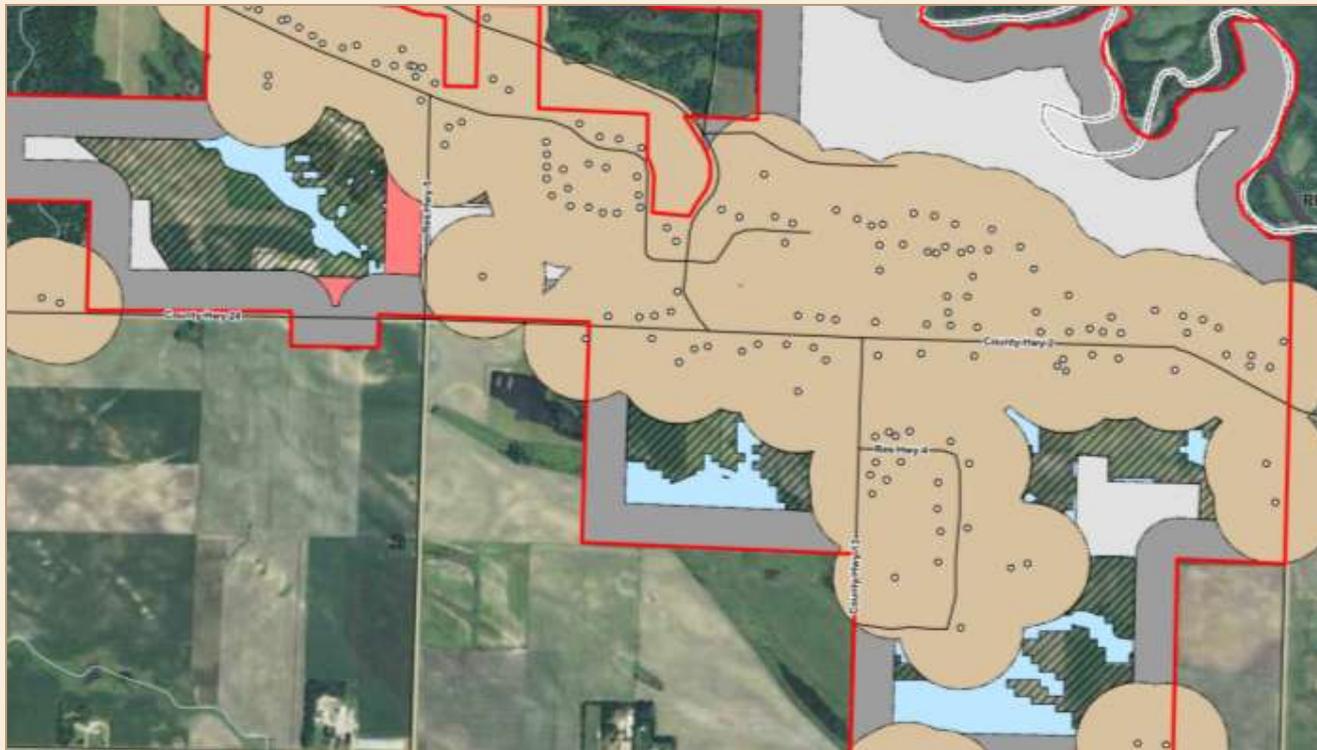
## Legend

- |                      |  |
|----------------------|--|
| Lower Sioux Boundary | <b>Wind Speeds (80m height in m/s)</b> |
| County Boundary      | 6.0 - 6.5                              |
| Municipality         | 6.5 - 7.0                              |
| Major Road           | 7.0 - 7.5                              |
| Local Road           | 7.5 - 8.0                              |
| Railroad             | 8.0 - 8.5                              |



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# GIS – Preliminary Site Identification



## Legend

- |                      |                             |  |
|----------------------|-----------------------------|--|
| Lower Sioux Boundary | Railroad                    | Approximate Road Setback = 500 Feet              |
| County Boundary      | Structure/Residence         | Approximate Residence Setback = 750 Feet         |
| Municipality         | Wetland/Waterbody           | Approximate Adjacent Property Setback = 500 Feet |
| Major Road           | Stream/River/Ditch          | Preliminary Developable Area (About 190 Acres)   |
| Local Road           | Land Use: Developed & Trees |  |



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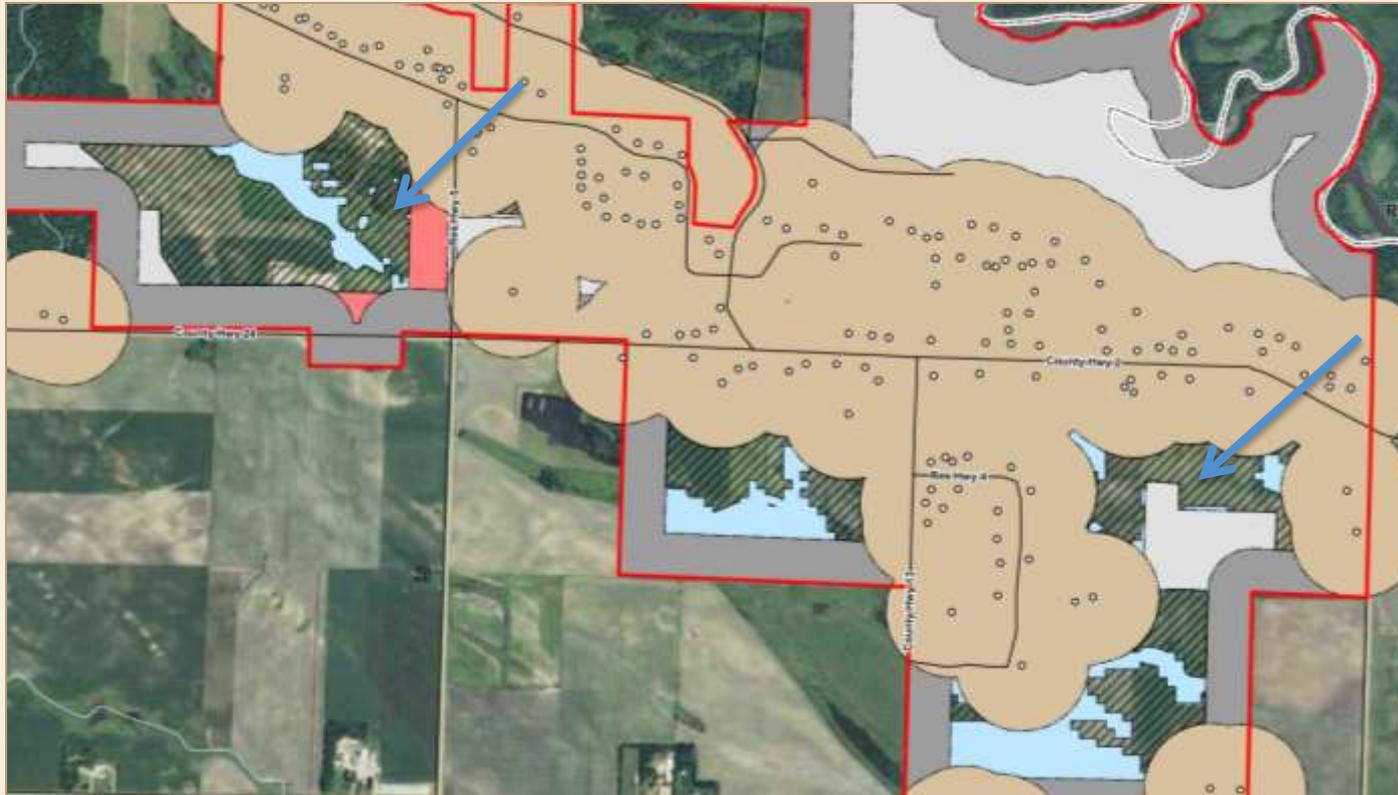
# Site Selection

- Our preliminary focus is on two sites, one near the Jackpot Junction Casino, and one in the southeastern area of the community.



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# Site Selection



# Interconnection

- With preliminary sites chosen, we applied for interconnection to Xcel Energy's distribution grid.
- We applied for a 2MW hybrid system:
  - 1.5MW wind turbine
  - 500kW solar farm
- This application triggers Xcel's process of evaluating the system and engineering the interconnection.



# Interconnection

- Xcel made a preliminary evaluation of the system for interconnection with their 23.9kV feeder that runs through the community.
- Xcel found that the size and type of system, along with the distance from the system to the substation, would have unfavorable effects on the local grid if connected directly.



# Interconnection

- Because of Xcel's initial findings, we have decided instead to move forward with a “behind the meter” application.
- Instead of connecting to the grid, this will feed power and energy from the system directly into the Jackpot Junction network, where it will be used locally.



# Interconnection



# Phase II

- In Phase II we will evaluate the site in greater detail with the following tasks:
  - One year local wind resource study with meteorological towers at sites with best potential
  - Site survey and geotechnical report
  - Cultural resource review
  - Major equipment selection
  - Final utility interconnection study
  - Financial analysis and economic modeling



# Conclusion

- This phase of the study will yield direct, detailed information about the site, and ultimately lead to the decision to move forward with the project at that location.
- This will allow us to further develop the project, with financial structuring and an RFP to potential contractors in later phases.



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