

Docket EL18-053

Garrett Homan

5669 Maple Grove Rd.

Hermantown, MN, 55811

515-360-3368

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**Exhibit
G18**

South Dakota Public Utilities Commission,

I'm asking you to deny the Deuel Harvest North Wind project as is, since the project as planned poses a substantial threat of serious injury or death. Our family is currently constructing a 2,350 foot long turf runway, named Homan Field, on the western half of section 32 in the Glenwood township of Deuel County. There are wind turbines sited in close proximity to my family's airstrip that will create significant risks to my life and the lives of my family, friends, and any other pilots that use the airstrip. The associated risks are not only from the turbines being dangerous obstacles to flight at low altitudes but also because of the unsafe wake turbulence and wind shear effects that affect the safe use of airspace above our property, the runway, and the approach and departure paths.

This issue has been brought before the Deuel County Board of Adjustment in the form of verbal and written statements submitted to the record, but the safety issues presented have been completely ignored with no reason given. In fact, during the Special Exception Permit hearing for the Deuel Harvest Wind Projects, I was forcibly told to sit down and not given a real chance to explain how this project negatively affects the safety of airspace over our property. The Board never expressed any interest in hearing my concerns, nor did they ask any questions to educate themselves on the issues. I sincerely ask the Public Utilities Commission to

not dismiss these concerns as the Deuel County Board of Adjustment has, as these turbines present a very real threat of serious injury or death.

I've attached the reports previously submitted to the Deuel County Board of Adjustment to this statement for your reference.

Homan Field is a private-use airport consisting of one 2350 ft (long) x 100 ft (wide) grass surface runway oriented north/south (runway 36/18). The runway is located in section 32 and is centered at 44°48'33.80" N, 96°29'55.75"W. Construction is currently underway, but has been paused due to frozen ground during winter. Operations are planned to range from ultralight aircraft up to 4+ seat general aviation airplanes (e.g. Cessna 182, Cirrus SR20, etc.). Public use will be allowed with prior approval from the airport owner.

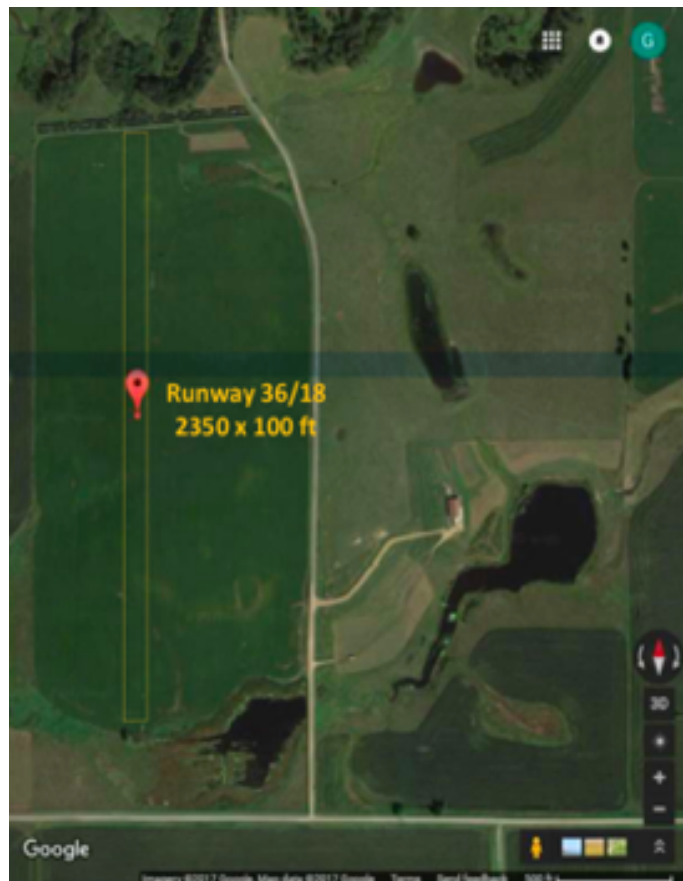


FIGURE 1 - HOMAN FIELD

The construction and operation of Homan Field Airport provides a benefit to South Dakota and the general aviation community in the form of a charted navigational aide and, more importantly, a safe landing site in the event of an in-flight emergency.

Notice of approval to establish a private use airport from the FAA was signed on June 12, 2017 for Homan Field. The special exception permit to construct a private airstrip (Homan Field Airport) in an Ag District was approved by the Deuel County Board of Adjustment on September 11, 2017.

What is the traffic pattern airspace required in order to use Homan Field? Since the Deuel Harvest North Wind project layout has changed since the Special Exception Permit approval, wind turbines to the northeast of Homan Field have been removed by the developer. This allows for a one-sided traffic pattern to be flown without flying over any wind turbines, except turbine number 108 which is under the margin the FAA standards establish on the far side of the runway. The dimensions of the traffic pattern airspace for Homan Field, as defined by FAA standards established in FAA order JO 7400.2L, are 1.5 nautical miles (1.73 statute miles) from each end and the east side of the runway and .25 nautical miles (.29 statute miles) from the west side of the runway. Figure 2 illustrates the airport environment around Homan Field superimposed over an section of the project layout map. The yellow dashed line illustrates the traffic pattern airspace boundary.

Title 14 of the Code of Federal Regulations Part 77 defines the federal regulations for the Safe, Efficient Use, and Preservation of the Navigable Airspace. The standards used to define approach surfaces for runways are defined per section 77.19. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end. For Homan Field, a preliminary assessment of the approach surfaces shows

the approach surfaces are sized as follows. The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of 1,250 feet. The approach surface extends for a horizontal distance from the ends of the runway of 5,000 feet at a slope of 20 to 1. In Figure 2, purple lines sketch the dimensions for the approach surfaces.

Research has shown that industrial wind turbines create wake vortex turbulence and wind shear downwind of them. The wind project developers know this and account for it in their siting because the wake turbulence and wind shear from upwind turbines affects the performance and structural fatigue life of downwind turbines. But what effects does this have on the safety of low flying aircraft in and around the project area?

A review of the research conducted studying the aerodynamics associated with wind turbines demonstrates that industrial wind turbines can have a negative effect on aviation safety if not located properly, as obstacles and sources of wake turbulence and wind shear. An example of this research is provided in the Vermeer report (see references). Additionally, SMS Report No. 1101, Aviation Safety-risk Assessment of the Effect of Wind Turbines on General Aviation Aircraft (see references), summarizes the results and determinations of a 9-member panel that consisted of experts representing pilots COPA (the Canadian Owners and Pilots Association, a group representing airplane owners and pilots), aviation safety (SMS Aviation Safety Inc.), the Canadian civil aviation authorities (Transport Canada and Nav Canada), and a wind energy consulting engineering firm (Genivar). The report was produced with the intent of being used by policy makers, industrial wind turbine project developers, and pilots to manage the risks imposed on aviation by industrial wind turbines.

What are safe setback distances from wind turbines for general aviation operations? The expert panel reviewed the available research and addressed numerous potentially catastrophic risks associated with wind turbines, as obstacles for low flying aircraft and sources of

wake turbulence and wind shear. The expert panel made recommendations for minimum setback standards for industrial wind turbines near airports and airstrips should include:

- a restriction on constructing wind turbines within the distance equal to 7-10 rotor diameters from the runway or approach surfaces and
- the area of land under the traffic pattern airspace is free of wind turbines.

In Figure 2, red lines are used to show the a 10x rotor diameter setback from the runway and approach surfaces. As shown above, the wind turbines numbered 106, 107, 108, 117, 123, and 124 from the application layout maps do not meet the recommended setback standards for wake turbulence and wind shear and therefore pose a substantial risk to serious injury or death for those flying into or out of Homan Field.

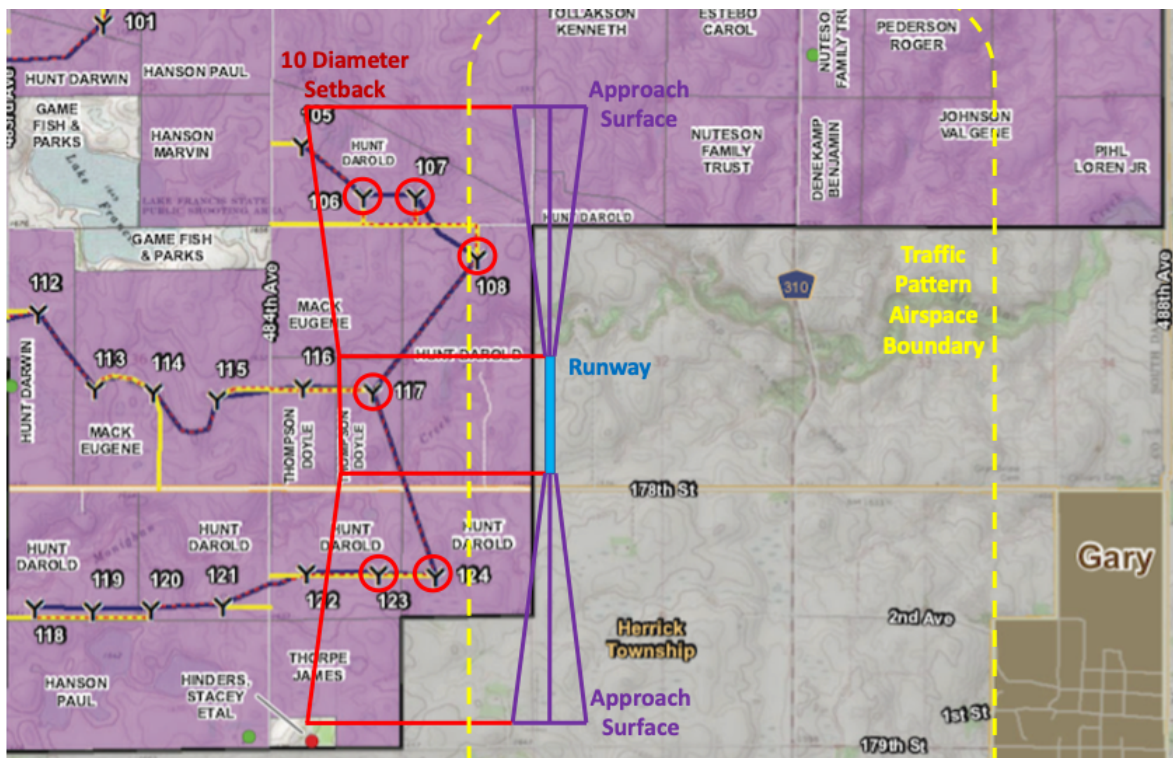


FIGURE 2 - HOMAN FIELD AIRPORT ENVIRONMENT

Some aerial applicators, who are commercial pilots highly experienced in flying at low altitudes and close to obstacles, are refusing to fly in and around wind turbines due to the significant risk they pose as obstacles and because of wake turbulence and wind shear effects. I spoke with one aerial applicator, Denny Meyer from Steier Ag Aviation in Whittemore, IA, that has experienced severe turbulence from flying downwind of turbines stating it will “shake the hell out of you.” Spray planes are more heavily wing loaded than the small general aviation airplanes or ultralight aircraft that will fly into and out of our airstrip, so they are less affected by turbulence. If wind turbines “shake the hell” out of a spray plane, what would they do to an ultralight flown by a less experienced pilot?

During the Special Exception Permit hearing, the applicant stated that they could not move or remove any turbines. They have demonstrated that was a false statement by removing approximately 30 turbines between the layout included in the Special Exception Permit application and the layout included in the PUC application. A review of the proposed project layout maps identifies numerous alternate sites that would be located on planned transmission line routes and close to existing roads or planned access roads, both of which minimizes the construction costs and impact of these sites. In the figures below, I have identified 26 possible alternate sites (green circles) for the 6 turbines not meeting the SMS/COPA proposed setbacks from our runway and its approach surfaces (red circles). Also, it’s evident from the maps themselves that there are more possible alternate sites.

Why does this project have to sacrifice the safety of me and my family, friends, and other pilots using our airstrip? As currently planned, the project does not meet the requirement to not impair health and safety. Also, the project as planned would greatly interfere with the use of our airstrip because the significant reduction in safety would render the runway useless.

The permit for our runway was applied for and approved by the Deuel County Board of Adjustment prior to any wind project applications being submitted. To subsequently approve a project (this wind energy project) that would in essence negate the previous permit approval (our runway) would be an unjust use of authority and flagrant abuse of existing property rights and due process.

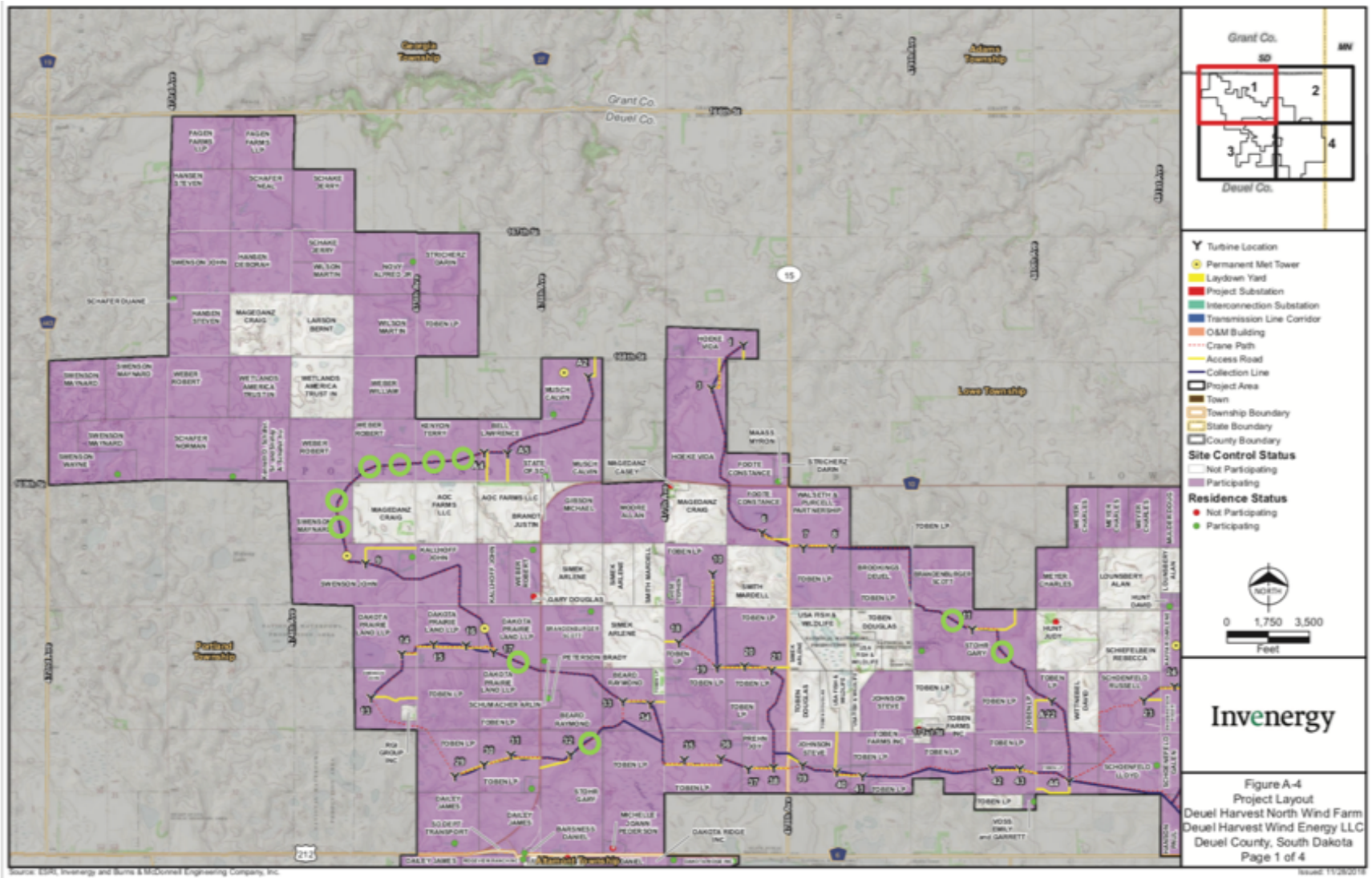
The applicant's aviation study included in the application docket does not address all the impacts wind turbines have on aviation and the navigable use of airspace. The applicant's aviation study does not mention wind shear, wake turbulence, or safety effects of wind turbines that occur downwind. If these issues have not been researched and found to be positively safe with respect to existing airports and airstrips, with objective evidence to such, then the project should be denied. The FAA regulations are minimum requirements, and the state or local municipalities may impose more stringent requirements to promote safety.

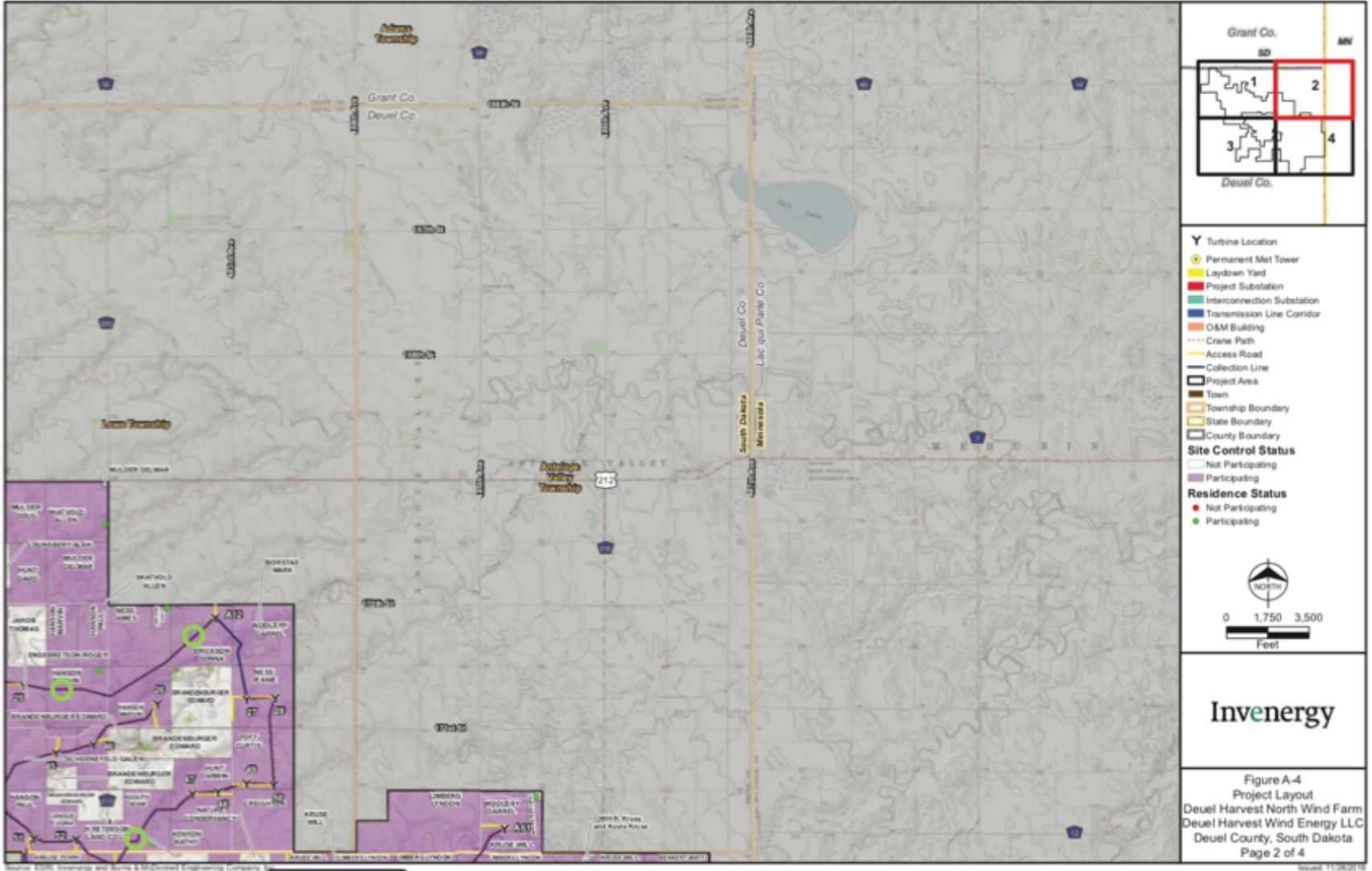
The scope of the report was limited to how wind turbines may effect airspace as obstacles only. Again, wake turbulence and wind shear downwind from turbines are well known issues, and the developers account for those effects on turbine performance and fatigue life for downwind turbines. But the applicant did not address their effects on aviation safety in or around airports. Clear Lake Airport (FAA identifier 5H3) is in close proximity to the project boundaries as well (.56 nautical miles). But the report doesn't address any affects from How will wake turbulence and wind shear affect Clear Lake Airport?

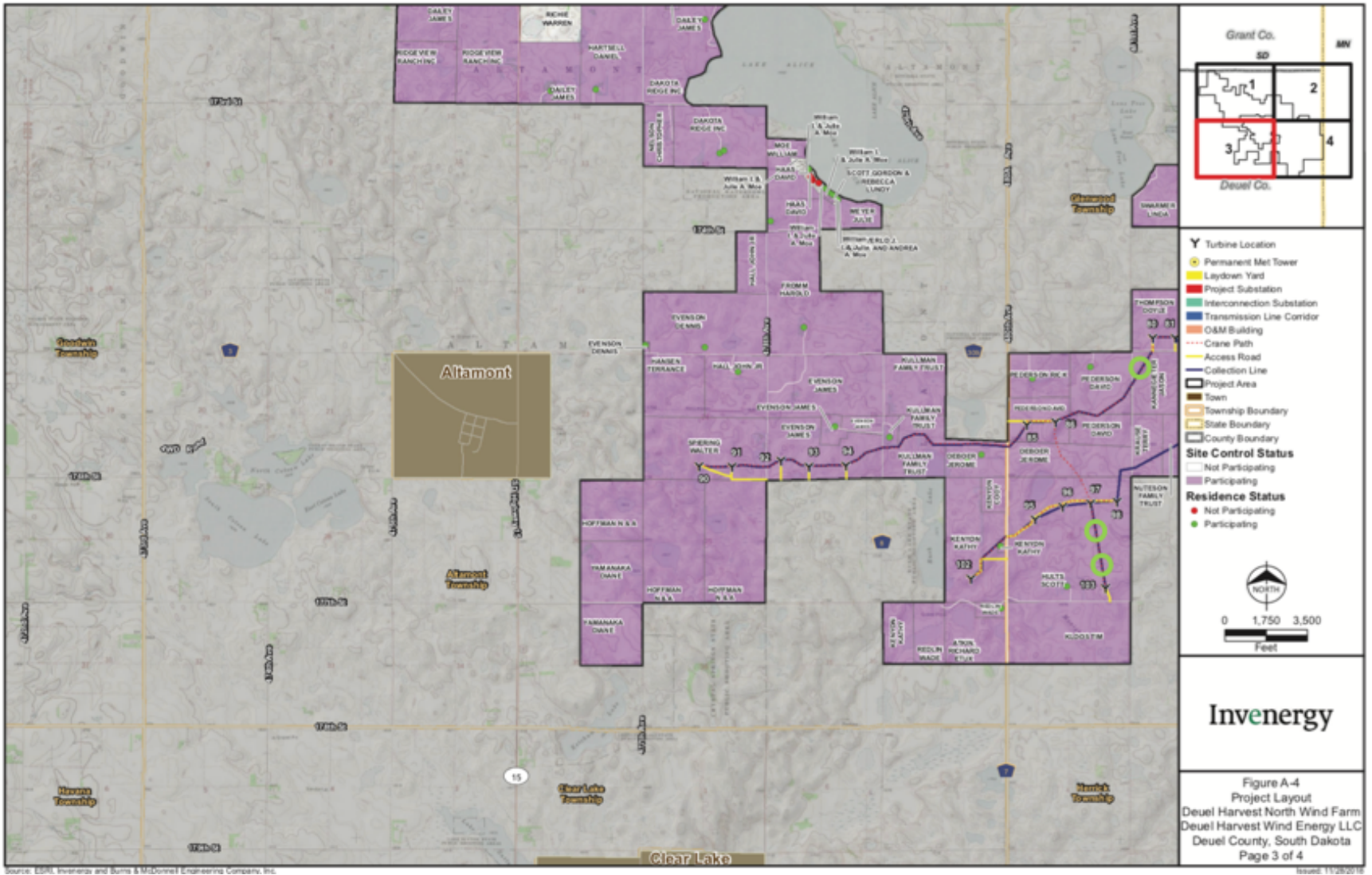
Also, the report states that electro-magnetic interference (EMI) effects on aviation communication and navigation systems was not addressed. What are the effects this wind energy project could have on aircraft communications and navigation, which are both critical to safe flying? How will the project affect the reception of VOR navigation aids in the area (such as Watertown VOR identifier ATY, Redwood Falls VOR identifier RWF)?

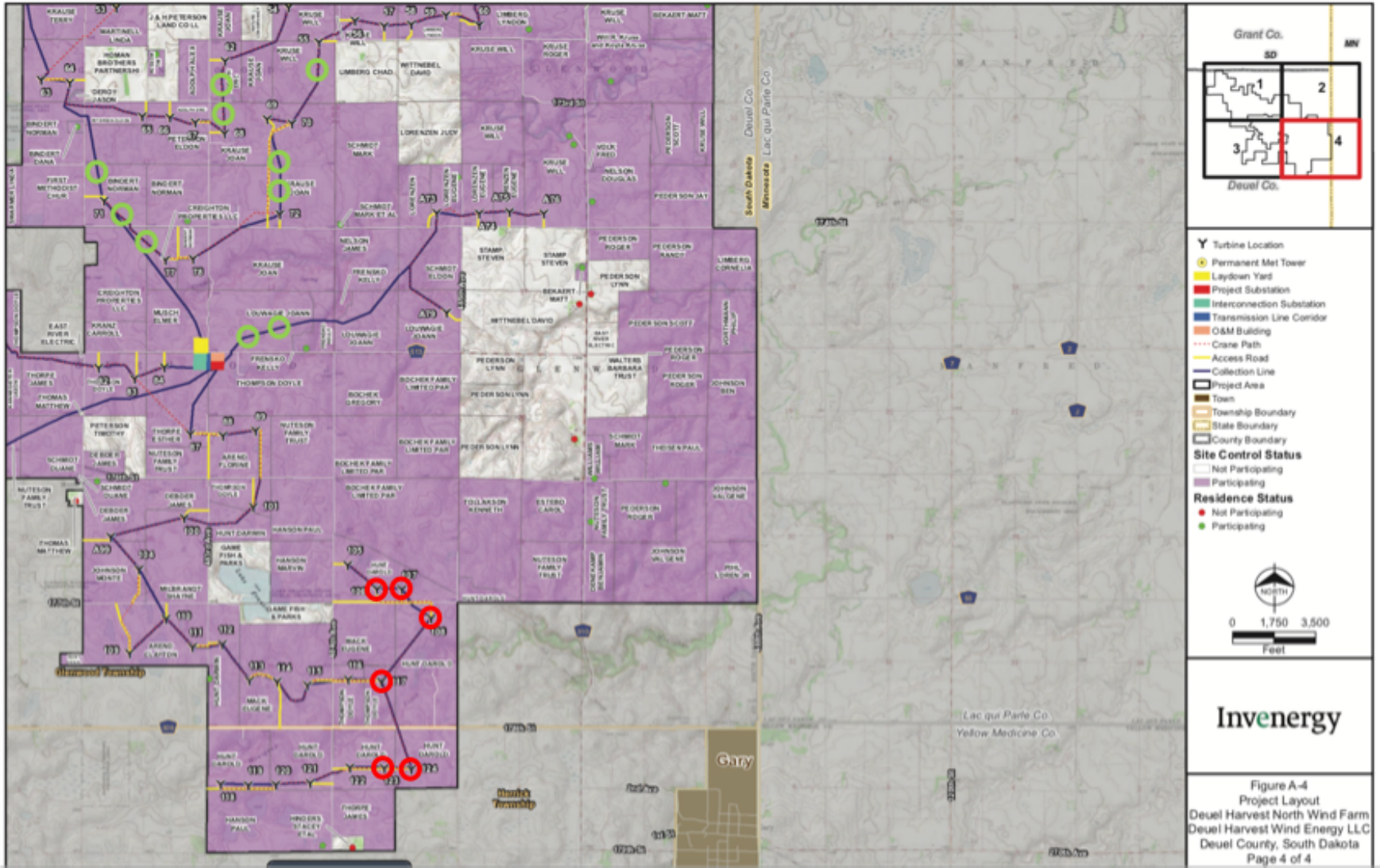
What about other aspects of aviation that are not covered by the applicants aviation report? How will this project affect the ability of helicopter ambulances to respond to emergencies in or around the project area? What risks are presented when the turbine lighting fails and is not fixed in a timely manner? An inoperative obstruction light on a wind turbine near Highmore, SD, contributed to a catastrophic accident that resulted in four fatalities in 2014, all because of a burned out lightbulb not being fixed. The risks associated with constructing wind turbines around airports and the effect they can have on navigation and airspace are real.

Please deny this project since it poses a substantial threat of serious injury or death.









References

- Aviation Systems Inc., "Invenergy Deuel Harvest North Project", ASI # 18-N-0437.030, 11/14/2018.
- SMS Aviation Safety Inc., "Aviation Safety-risk Assessment of the Effect of Wind Turbines on General Aviation Aircraft", SMS Report No. 1101, March 2011.
- Vermeer et al, "Wind Turbine Wake Aerodynamics", Progress in Aerospace Sciences, Volume 39, Issues 6 and 7, August to October 2003.
- Homan, "Deuel Harvest Proposal's Impact on Homan Field Airport", 1/15/18.