



RIVERBEND WIND – QUESTIONS AND ANSWERS

Environmental	
Question	Answer
Will the project contaminate groundwater?	Riverbend Wind will complete geotechnical studies, and groundwater levels will be confirmed during detailed design work; foundations are only approximately 15-feet deep (similar to a large house basement) and are constructed of inert concrete and rebar, no groundwater impacts are expected.
Will there be damage to soil?	Any soil work (e.g., access roads, turbine pads) will ensure topsoil and subsoil are separated such that intermixing is avoided.
Will wildlife be killed or injured?	Wildlife studies are being completed as part of the pre-construction technical studies following the U.S. Fish & Wildlife Service Land-Based Wind Energy Guidelines. Mitigation measures during construction (e.g., habitat avoidance, etc), post-construction mortality monitoring, and operation (monitoring and mitigation for bat activities) will be implemented as needed to avoid and minimize impacts to wildlife.
What impact will the project have on wildlife habitat?	Wildlife studies are being completed as part of the pre-construction technical studies following the U.S. Fish & Wildlife Service Land-Based Wind Energy Guidelines. The project will be designed in way to reduce and minimize direct removal of aquatic and terrestrial habitat identified during the pre-construction habitat studies to reduce potential impact to existing wildlife habitat.
Will the project impact soil and water quality?	<p>Any soil work (e.g., access roads, turbine pads) will ensure topsoil and subsoil are separated such that intermixing is avoided.</p> <p>Watercourses and wetlands were identified and mapped as part of project siting process in order to minimize potential impacts and avoid whenever practicable. Soil Erosion and Sedimentation Control permit will be obtained from the county for construction activities and a Stormwater Pollution Prevention Plan (SWPPP) will be utilized during the operation phase of the project.</p> <p>A Spill Prevention, Containment and Countermeasure (SPCC) plan will be in place during construction and operation.</p> <p>No emissions from project will affect soil or water quality.</p>



<p>Will the area become uninhabitable, and unlivable?</p>	<p>The only areas that will be unavailable to users during life of project are direct footprint of project infrastructure (turbine access roads, turbine pads, substation, and operating facility office (O&M building)). No affect to use of other areas.</p>
<p>What about animals that cannot sleep and are dying?</p>	<p>This is not true. There is no evidence that animals (wild or domestic) are negatively affected in this way. There have been pre-construction studies for birds and bats, and there will be post construction monitoring for any significant, unanticipated impacts.</p>
<p>Will cement impact groundwater? Cement is highly acidic, it will leak into groundwater and contaminate it.</p>	<p>This is incorrect. Cement is largely made up of calcium oxide and silica. It has a pH higher than 7 (alkaline or basic not acidic), which is caustic. Once cured, cement is benign, like a house foundation, and will not contaminate drinking water.</p>
<p>What effects will there be on the water table? -could wells drain? -could sediment rise?</p>	<p>Wetland and watercourse studies have been undertaken for the project. No springs are known to occur in the vicinity of the turbine locations. Geotechnical studies will be undertaken to confirm site-specific conditions. Any site-specific construction techniques will protect groundwater.</p> <p>No water wells are known to be in the vicinity of turbine locations. Construction is not expected to interfere or affect water wells within the Township.</p>
<p>How will introduction of solid surfaces affect the surface to groundwater pathway?</p>	<p>Geotechnical studies will be done and groundwater levels will be confirmed during detailed design work. Foundations are only about 15-feet deep (similar to a large house basement) and are constructed of inert concrete and rebar, no groundwater impacts are expected.</p>
<p>How will you prevent contamination of surface and groundwater caused of leakage and spills of chemical from vehicle use</p>	<p>Projects do not cause contamination. Designs as well as construction and operating protocols ensure that no contamination occurs. In the event of an unlikely accident (eg. Vehicular fuel spill), contingency plans will be in place to ensure prompt, appropriate response and clean up. Specifically, in accordance with Michigan Rule 324.2001 through R 324.2009 the project will likely require the creation, implementation, and regular evaluation of an Integrated Spill Prevention Control Countermeasure (SPCC)-Pollution Incident Prevention Plan (PIPP) that is certified by a Professional Engineer. The SPCC-PIPP will outline the requirements for environmentally responsible oil storage, incorporate regulatory requirements, best management practices, and the specific needs of the project during both construction and operations.</p>



<p>How will you prevent groundwater contamination from concrete pouring for turbine foundations within excavated areas near groundwater linked to potential pathways linking the source of the pollution with the receptor?</p>	<p>Cement is largely made up of calcium oxide. It has a pH higher than 7, which is caustic. Once cured, cement is benign, like a house foundation, and will not contaminate drinking water.</p> <p>As part of the pouring of each turbine foundation, the project will implement the use of concrete truck wash-out containment structures near each turbine foundation to ensure the proper containment, management, and disposal of any concrete waste.</p>
<p>What is the potential for erosion and sedimentation pollution into surrounding watercourses during construction? What about during rainfall events from exposed ground or pit excavation?</p>	<p>Potential for sedimentation and erosion will be considered in the design of the project and in the techniques that will be used to construct and operate the project. Pursuant to Part 91 of NREPA, the project will prepare and obtain approval of the required Erosion and Sediment Control Plan/Permit (construction) and SWPP (operation) will avoid impacts to surface water. Additionally, the project will obtain and comply with an ESC, and SWPP permit from the appropriate local authority.</p> <p>Project will have a spill control plan in place for construction and operation. No emissions from project will affect water quality.</p>
<p>How much deterioration of sub surface water quality will be caused by ground disturbance in the proximity of emergent springs?</p>	<p>Wetland and watercourse studies have been undertaken for the project. No springs are known to occur in the vicinity of the turbine locations. Geotechnical studies will be undertaken to confirm site-specific conditions. Any site-specific construction techniques will protect groundwater.</p>
<p>What is the potential for the collapse of existing wells and water courses from large machinery creating excessive vibrations during construction?</p>	<p>No water wells are known to be in the vicinity of turbine locations. Construction is not expected to interfere or affect water wells within the Township.</p>



Sound	
Question	Answer
Do turbines cause Infrasound? What impact will infrasound have on my health?	<p>Measurements of low-frequency sound, infrasound, and amplitude-modulated sound show that infrasound is emitted by wind turbines. The levels of infrasound at customary distances to homes are typically well below audibility thresholds.</p> <p>Based on over 100 research studies reviewed, there is no clear or consistent association between wind turbine noise and any reported disease or other indicator of harm to human health.</p> <p>Components of wind turbine sound, including infrasound and low frequency sound, have not been shown to present unique health risks to people living near wind turbines.</p>
Is noise produced by turbines?	<p>Based on over 100 research studies reviewed, there is no clear or consistent association between wind turbine noise and any reported disease or other indicator of harm to human health.</p> <p>Components of wind turbine sound, including infrasound and low frequency sound, have not been shown to present unique health risks to people living near wind turbines.</p> <p>Annoyance associated with living near wind turbines is a complex phenomenon related to personal factors. Noise from turbines plays a minor role in comparison with other factors in leading people to report annoyance in the context of wind turbines.</p>
Is turbine noise louder in the winter?	<p>Project will meet or exceed the sound emission requirements for the local ordinance . These are similar to other jurisdictions to prevent any affects associated with the project.</p>



Shadow Flicker	
Question	Answer
What are health effects from shadow flicker?	<p>The Shadow Flicker report is included in the SLUP application (Appendix E in Speaker application, Appendix F in Fremont application).</p> <p>There are no known health effects associated with shadow flicker from wind turbines. Shadow flicker is not a risk to health, including photo epileptic seizures.</p> <p>The majority of habitable structures in Fremont and Speaker Townships are expected to receive less than 10 hours of annual shadow flicker and no shadow flicker on most days of the year, under each of the proposed scenarios. In cases where the annual shadow flicker limits exceed 30 hours per year at non-participating homes, Riverbend Wind will work with non-participating landowners, as needed, to identify, manage and mitigate shadow flicker overages using commercially reasonable mitigation measures.</p>
What problems are there with shadow flicker?	Shadow flicker is not a risk to health, including photo epileptic seizures
Will shadow flicker cause migraines?	<p>The Shadow Flicker report is included in the SLUP application (Appendix E in Speaker application, Appendix F in Fremont application).</p> <p>There are no known health effects associated with shadow flicker from wind turbines. Shadow flicker is not a risk to health, including photo epileptic.</p>

Property Value	
Question	Answer
<p>Will there be a decrease in property values?</p> <p>Will property taxes decrease?</p>	<p>Property tax payments are set by local governments; Liberty does not play a role in this process. However, the project will contribute approximately a minimum of \$54M in tax revenue over its lifespan.</p> <p>Multiple studies have found wind farms have no significant long-term impacts on property values. While some potential property purchasers may be hesitant to purchase land near wind turbines, academic studies show that the positive impacts of a wind energy project either balance or outweigh any negative impacts. A study of more than 50,000 home sales among 27 counties in 9 states found no statistical evidence that home prices near wind farms were affected by the wind farm. (Wind Farm Proximity and Property Values: A Pooled Hedonistic</p>



	Regression Analysis of Property Values in Central Illinois. Jennifer L. Hinman, (May 2010))
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Economics	
Question	Answer
How will this benefit everyone?	Local tax revenue helps fund roads, police and public safety, recycling and more. The project will also bring economic benefits in form of donations, and the creation of new jobs locally. The Riverbend Wind Project will generate clean, renewable power with no atmospheric carbon emissions (combats climate change)
Do windmills create an increased cost to the consumer?	Onshore wind projects have been shown as producing some of the lowest levelized cost electricity in recent years. https://www.energy.gov/sites/prod/files/2015/08/f25/LCOE.pdf

Health Concerns	
Question	Answer
What effects do wind turbines have on people (eg. headaches, vertigo, sleeping complications, anxiety, depression)?	Health and safety studies have demonstrated that these are not caused by wind turbines. A Health and Safety Report is included in the SLUP application (Appendix G in Speaker application, Appendix C in Fremont application)

Public Safety	
Question	Answer
What happens when ice and debris fly off blades?	This is an infrequent condition when ice builds up on turbine blades during certain weather conditions. During incidents of high icing, turbines are generally shut down until ice sheds to prevent damage to equipment. During operation, any ice thrown from rotating blades is generally confined to an area equal to the turbines max height which fits into the confines of the current ordinance setbacks. There are no known incidents of injury to people from ice throw.
What will happen if there are turbine fires?	Training of local emergency responders is undertaken during project development or initial operation so emergency responders are prepared in the unlikely event of a turbine fire. Proper siting and setback ensure that no



	external impacts would result from such an uncommon occurrence.
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Project Specific Questions	
Question	Answer
<p>How many total acres of prime farmland will be displaced by:</p> <ul style="list-style-type: none"> - Base of each tower? - Access Road to each tower? - Widening of roads to accommodate construction and maintenance vehicles? 	<p>Each turbine will occupy, as a general average, about 1-2 acres including turbine pad and access road.</p>
<p>What is width and depth of each foundation for each wind turbine?</p>	<p>Spread foundation is typically 15-20 feet deep, and about 60 – 86 feet diameter (to be confirmed). Foundations are designed based on several engineering design factors</p>
<p>How many square feet/yard/acres of impervious surface will be introduced underground, in the form of steel and concrete and other manmade structure?</p>	<p>Concrete is generally limited to the foundations themselves. Size of foundation is determined based on several engineering factors and will be designed later in the project process.</p>
<p>How many acres of land will be destroyed to widen roads? How will this impact:</p> <ul style="list-style-type: none"> - Prevention of stream bank and sedimentation of water courses - Maintenance of shade producing stream bank vegetative cover - Minimizing the discharge of pollutants into surface waters - Minimizing impervious surfaces 	<p>Each turbine will occupy, as a general average, about 1-2 acres including turbine pad and access road. The project will avoid impacts to wetland and watercourses to the extent possible.</p>



General, or Other Questions	
Question	Answer
Will there be technical problems with my: TV, cell phone, radio reception?	Signal Interference Reports are included in the SLUP application (Appendix F in Speaker Application, Appendix D in Fremont Application)
Will there be damage to roads?	Riverbend Wind Project will enter into a road use agreement will be with the County. Pre- and post-condition road surveys will ensure roads used will be in at least as good shape following construction
Will ground vibration cause cracks in building vibrations?	Turbines are precision machines designed to minimize vibration. Operating systems can detect abnormal vibrations and shut down the turbine in cases of vibration. Turbines emit negligible vibration and are set back at an appropriate distance from homes to further mitigate any safety concerns to homes.
Will the turbines leak oil, hydraulic fluid?	<p>Turbines are designed to prevent any leaks from the lubricating system contained within the gearbox. If any develop, they are generally identified during routine maintenance and repaired. If a sudden, significant leak to occur, any spill oil is contained within the nacelle and/or tower unit for clean-up.</p> <p>Additionally, in accordance with Michigan Rule 324.2001 through R 324.2009 the project will likely require the creation, implementation, and regular evaluation of an Integrated Spill Prevention Control Countermeasure (SPCC)-Pollution Incident Prevention Plan (PIPP) that is certified by a Professional Engineer. The SPCC-PIPP will outline the requirements for environmentally responsible oil storage, incorporate regulatory requirements, best management practices, and the specific needs of the project during both construction and operations.</p>
Who will pay for cleaning up contamination?	<p>Projects do not cause contamination. Designs and construction and operating protocols ensure that no contamination occurs. In the event of an unlikely accident, contingency plans will be in place to ensure prompt, appropriate response and clean up.</p> <p>As the owner and operator, Riverbend Wind is responsible.</p>
Will vibration from turbines crack foundation?	Turbines are precision machines designed to minimize vibration. Operating systems can detect abnormal vibrations and shut down the turbine in cases of vibration.
Setbacks should be ½ mile	Project will adhere to Fremont and Speaker Township setback requirements, which are similar to many other townships in Michigan and US.



Does Speaker Township have contracts with Liberty? Can public obtain copies of contracts?	Riverbend Wind does not have “contracts” with Speaker Township. There will be items such as Road Use Agreements, which are designed to benefit the Township.
What is the lifespan of these turbines?	The lifespan of the Riverbend Wind Project is anticipated to be 40 years.
How is the decision to decommission turbines made?	The decision to decommission turbines is made at the end of the usable life of the asset, which is anticipated to be 40 years for Riverbend Wind.
After the decision to decommission: -How long until turbines are removed? -How are turbines disposed of? -Will the structure (pad, etc.) the turbine is on be removed and also the equipment and any lines that run underground? -Will the land be restored to pre-turbine conditions?	Decommissioning Plans were included with the SLUP application (Appendix J in Speaker application, Appendix G in Fremont application)
Does Liberty remove the turbines, or will that job be contracted out?	Removal of turbines will be completed by qualified professionals.
What provisions and protections will be made if Liberty goes out of business, files for bankruptcy, or sells to another entity?	In the event the project were to be sold, any financial obligations automatically transfer to any new owners of the project.
What homes will receive power from the Riverbend project?	Power generated from the Riverbend Wind project will be integrated into the MISO grid, and provide power to areas serviced by MISO.