FLESHERTON WIND FARM PROJECT

VISUAL ANALYSIS
AND
SHADOW FLICKER REPORT

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for

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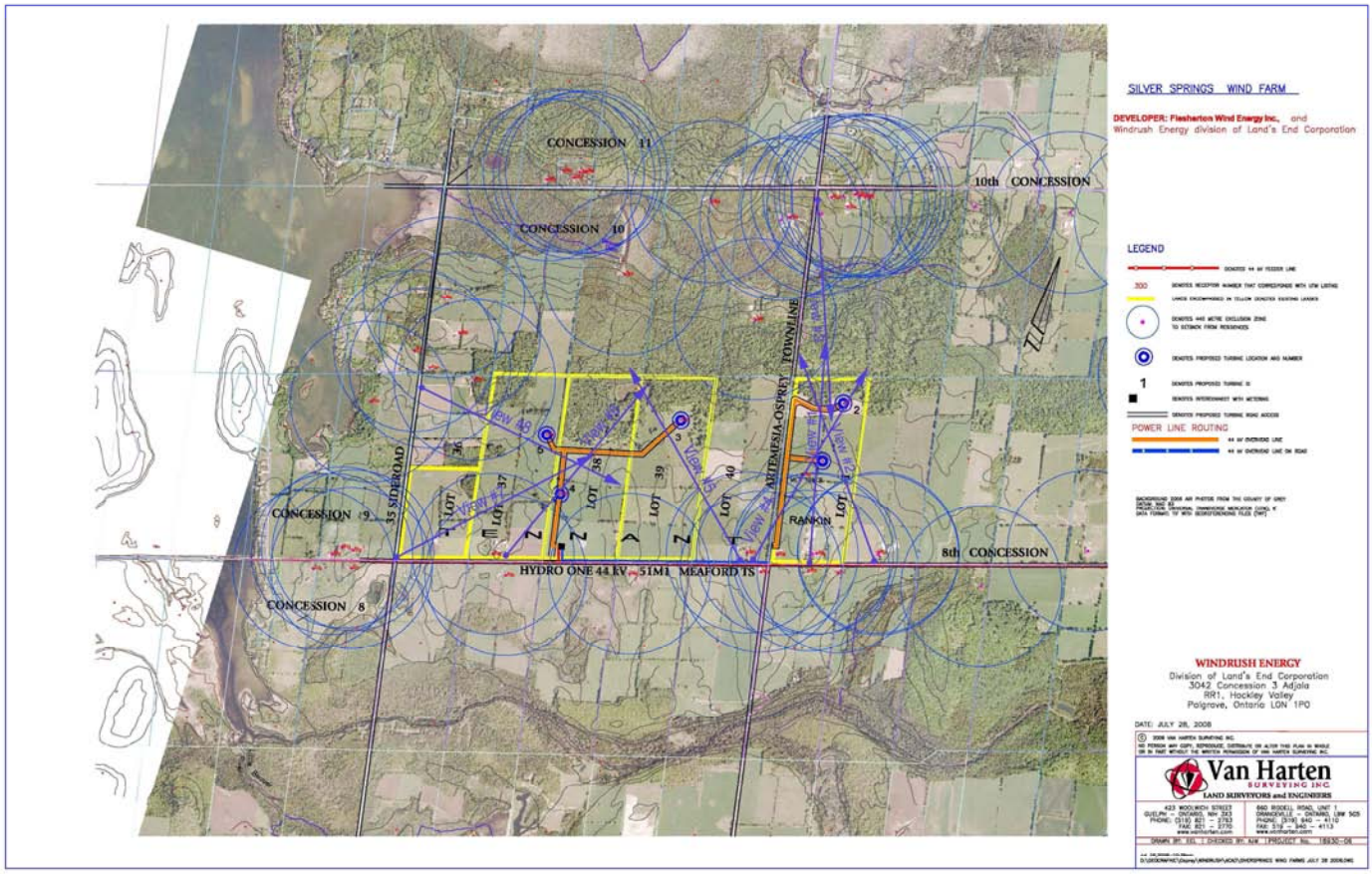
1 INTRODUCTION

Flesherton Wind Energy Inc. is in the development stage of establishing a wind energy facility (wind farm) in Grey County, near the community of Flesherton. If successful the undertaking will consist of 5 wind turbines strategically positioned on the proposed site as per visual zone map below. Figure 1 below shows the location of the purposed wind turbines and the view angles for visual simulation.

Figure 1 – View Angles for Visual Simulation



2 METHODOLOGY

To determine the visual impact of the proposed wind farm, Environmental Business Consultants ("EBC") selected a general planning approach and graphic communication techniques supported by the *Guidelines for Landscape and Visual Impact Assessment* (1st Edition, The Landscape Institute, Institute of Environmental Management and Assessment, 2002). In addition the visual analysis was generally based on the methodology established by the United States Forest Service Landscape Management Branch.

Assessing visual impact can be subjective. To obtain the most relevant data from which opportunities and challenges can be reviewed, the assessment team organized the Primary Study Area onto a visual zone map (Figure 1).

2.1 Defining and Ranking Visual Zones

Visual Zones are separated spatially due to unique land use and physiographic characteristics. The visual impression of a landscape is based on topography, texture, color and form coming together to form a scene which appears to possess common characteristics. These visual zones are then ranked according to their scenic quality from a point of reference. Landscape zones containing bold topographic landform, vegetation and color with enhance cultural amendments are classified as *distinguished.* Landscapes exhibiting mundane topography with some variety and interest are considered *moderately scenic.* Zones with very little visual strength or variety are considered *minimal scenic distinction.* To provide an example of minimal scenic distinction, industrial development would fall within this ranking.

2.2 Visual Sensitivity

After identifying the visual zones and associated scenic distinction, the visual sensitivity of the zones regarding the introduction of wind turbines from relevant locations is assessed. Four factors determine how visually fragile or robust the Primary Study Area appears.

- Slope – the more significant slope the more vulnerable the landscape as it can be seen from a greater distance.
- Superficial Pattern – landforms exhibit either obvious or hidden patterns based on physiography and tree cover. Obvious landforms have extensive patterns of high contrast and more visually vulnerable to man made development. Hidden landforms posses indistinct surface patterns due to uniformity of vegetation or low contrast in vegetation.
- Feature – landscapes having man-made or natural (waterfall) features. Should be avoided to maintain scenic integrity.
- Observer Position/Distance – The scope and distance the proposed development can be clearly viewed from transportation routes, recreation areas, settlement and scenic view points. The sensitivity of the viewer and level of use of the various viewing positions are other important considerations in viewer position.

An evaluation of the potential visual impact of the proposed five wind turbines was completed using eight viewpoints in proximity to the Primary Study Area.

3 INVENTORY AND VISUAL ANALYSIS

This section of the report focuses on the characteristics of the visual zones and potential visual impact of the wind turbines from the twelve points of reference.

Visual Zones

The Primary Study Area was assessed by summarizing the visual simulations from 8 viewpoints (receptors). The majority of the proposed site can be categorized as Agricultural Visual Zone; however it's important to review all points of reference to ensure all possible receptors have been assessed.

View 1 – Looking North from 8th Concession at Turbines #1 and #2

The old barn from this viewpoint breaks the mundane topography and adds variety and interest. This landscape zone could be considered moderately scenic.

View 2 – Looking Northwest from 8th Concession, east of Artemesia-Osprey Townline at turbines #1 and #2

The type of visual zone referenced in View 2 (see above) is predominately flat topography used almost exclusively for agriculture. Vegetation consists of buffer strips established for soil erosion and property line identification. Limited agricultural related structures exist sporadically and appear abandoned or designated for limited seasonal use. There are no outstanding features in this visual zone. It is considered to be minimal scenic distinction.

View 3 – Looking southeast from 10th Concession and Artemesia-Osprey Townline at Turbines #1 and #2

View 3 (see above) has the most pleasing topographic landscape. It is the result of the unpaved road in the foreground and forested lands in the background. The slight slope-like effect also adds to the landscape view. However, there is a low contrast in vegetation. The view from this receptor could be considered moderately scenic.

View 4 – Looking Northeast from the corner of 8th Concession and Artemesia-Osprey Townline at Turbines #1 and #2

The type of visual zone referenced in View 4 (see above) is predominately flat topography used almost exclusively for agriculture. It is similar to View 2. There are no outstanding features in this visual zone. It is considered to be minimal scenic distinction.

View 5 – Looking Northwest from the corner of 8th Concession and Artemesia-Osprey Townline at Turbine #3 and #5

The old barn in the foreground of View 5 (see above) breaks up the mundane vegetative pattern and fence line. The slope adds visual characteristics. The view from this receptor could be considered moderately scenic.

View 6 – Looking Northeast from 8th Concession at Turbines #3 (right), #4 (middle), and #5 (left)

The type of visual zone referenced in View 6 (see above) is predominately flat topography used almost exclusively for agriculture. It is similar to View #2 and #4. There are no outstanding features in this visual zone. It is considered to be minimal scenic distinction.

View 7 – Looking Northeast from the corner of 8th Concession and 35 Sideroad at Turbines #3, #4, and #5

The type of visual zone referenced in View 7 (see above) is predominately flat topography used almost exclusively for agriculture. It is similar to View #2, #4, and #6. There are no outstanding features in this visual zone. It is considered to be minimal scenic distinction.

View 8 – Looking Southeast from 35 Sideroad at Turbines #3, #4 and #5

The type of visual zone referenced in View 8 (see above) is predominately flat topography used almost exclusively for agriculture. It is similar to View #2, #4, and #6, and #7. The utility poles and fence line also add mundane overtones to the landscape. There are no outstanding features in this visual zone. It is considered to be minimal scenic distinction.

4 SHADOW FLICKER

Wind turbines will cast a shadow on the neighbouring area when the sun is visible. The rotor blades chopping the sunlight cause a flickering or blinking effect while the rotor is in motion. Measuring the amount of flicker is easily done using WindPro software.

The software calculates the flickering effects in terms of hours per year during which a receptor or an area would be exposed to flickering from nearby turbines. The calculation predicts real expected values based on assumptions on solar statistics and operating hours divided by wind direction.

Calculations were made using the “green house” mode of WindPro version 2.5 such that each receptor (house) has the total shadow flicker accumulated from all turbines from all directions. The software performs a complete simulation of the sun path throughout a whole year. Solar statistics calculated based on weather data.

The Appendix contains the results the from the shadow flicker calculations. During the course of the year, the maximum amount of time the five wind turbines will cause shadow flicker is as follows:

Turbine 1: 9:26 hours

Turbine 2: 27:44 hours

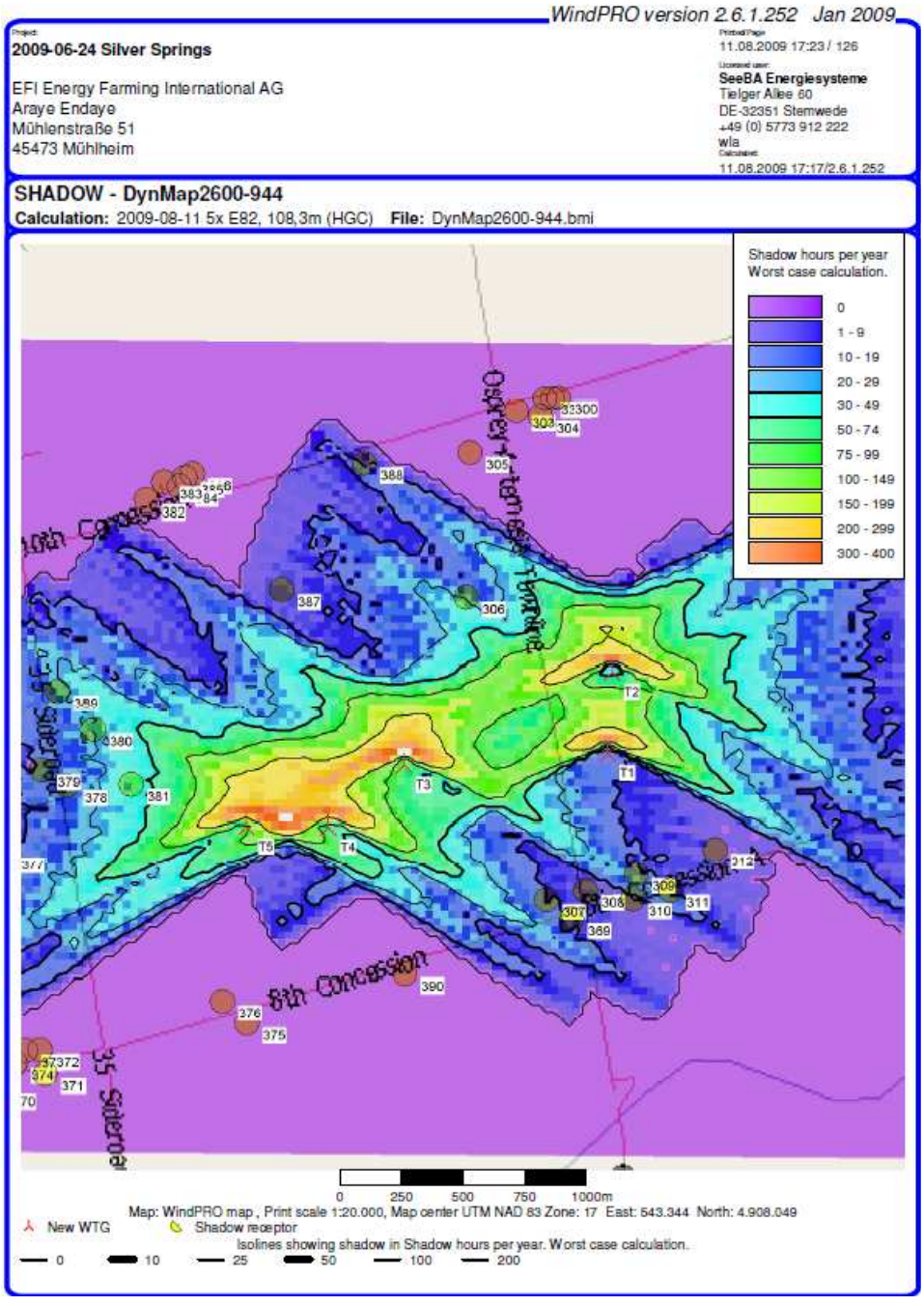
Turbine 3: 35:45 hours

Turbine 4: 51:38 hours

Turbine 5: 77:30 hours

During the time that shadow flicker could occur, the wind turbines will be shut down to avoid shadow flicker.

Figure 1: Visual Results from Shadow Flicker Calculations



5 CONCLUSION

Due to the limited number of residence, almost exclusive agricultural setting and minor topographic features, the wind farm would have a minimal visual effect on the Primary Study Area.

With respect to shadow flicker, the amount of time this occurs for each turbine ranges from 9:26 hours to 77:30 hours per year. During the times that shadow flicker occurs, the turbines will be programmed to shut down.

Appendix

Shadow Flicker Calculations