PRELIMINARY BAT LIKELIHOOD ASSESSMENT STUDY REPORT ENVIRONMENTAL SCREENING STUDY

CONESTOGO WIND FARM

prepared for

GENIVAR ONTARIO INC.
AND
FPL ENERGY

by

environmental research associates

JUNE 2007
LGL PROJECT TA4493

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EXECUTIVE SUMMARY

Conestogo Wind, ULC, a wholly owned subsidiary of FPLE Canadian Wind ULC is proposing to develop a wind farm near Arthur, Ontario in Wellington and Dufferin Counties. The study area of the wind farm encompasses an area that extends south (west and east of Highway # 6) and east of Arthur (between Arthur and Grand Valley along County Road 109). The construction is scheduled to commence in spring 2008 with an in-service date of November 2008.

In recent years, there has been some evidence of bat mortalities at wind power facilities, although little is known how bats interact with wind turbines. As part of an Environmental Assessment, wind power projects are required to address how the development of these facilities could potentially affect bat populations. This report provides a screening level assessment to provide an overview of the project sites considered for the Conestogo Wind Farm and their potential for impacting bat resources. The screening level assessment includes a literature review, consulting with knowledgeable individuals, aerial photography interpretation, classification of vegetation, wetlands and topography and local hydrology. The screening level assessment was also based on the potential for bat roosting and foraging habitat at the landscape level. Criteria from the Ontario Ministry of Natural Resources (MNR) and from FPL Energy were used to determine the likelihood for bats within the study area. Based on the screening level assessment, a ranking of Low, Medium, or High was provided. In this study, we have referred to the MNR's preliminary draft document "Guideline to Assist in the Review of Wind Power Proposals". It is our understanding that this document has been developed for crown land projects, but MNR staff may use it for reference for private sector projects.

For this study, the following levels of screening were utilized:

- Background Literature Reviews of landscape specific to the study area and known bat literature;
- MNR Draft Screening Criteria from the MNR Technical Workshop in January 2006; and
- Screening Criteria Developed by FPL Energy for Wind Farm Bat Likelihood Assessment.

Based on the preliminary bat likelihood assessment study, it was concluded that:

- the study area in general, appears to have low likelihood for bat potential – there are no caves, hibernacula or swarming sites, or other areas identified as significant bat habitat; and
- based on the above, further field studies for bats are not warranted within the study area.

Based on a review of available literature, and criteria developed by MNR and FPL Energy, sites within the study area appear to have low likelihood for bat potential. FPL Energy criteria suggest that all sites are similar in terms of resident bat use (Low), and there is no indication that the study area supports significant wildlife habitat for bats. Field investigations of some of the largest woodlots in the study area resulted in the finding that woodlots appear to be of similar age and composition throughout the study area. No areas stood out as potential landscape features that may be suitable for bat use, other than expected local resident bats.

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1.0 INTRODUCTION

Conestogo Wind, ULC, a wholly owned subsidiary of FPLE Canadian Wind ULC is proposing to develop a wind farm near Arthur, Ontario in Wellington and Dufferin Counties. The study area of the wind farm encompasses an area that extends south (west and east of Highway # 6) and east of Arthur (between Arthur and Grand Valley along County Road 109). The construction is scheduled to commence in spring 2008 with an in-service date of November 2008.

The proposed FPL Conestogo Wind Farm Project will be placed within existing agricultural lands of the area around Arthur, Ontario. It is possible that turbines may be placed within woodland areas and other minor headwater tributaries and wetlands. The study area for the proposed Conestogo Wind Farm project is located near the headwater tributaries of the Conestogo River and Grand River, and contains approximately 8000 ha of primarily row-crop farmland to the southwest, southeast and east of Arthur in north Wellington County, Ontario. The southwestern and southeastern portions of the study area lie east and west of Highway 6, which runs southeast from Arthur to Fergus. The eastern portion of the study area parallels County Rd 109 on the north side from about Green Park in the west almost to Grand Valley in the east.

In recent years, there has been some evidence of significant bat mortalities at wind power facilities, although little is known how bats interact with wind turbines. As part of an Environmental Assessment, wind power projects are required to address how the development of these facilities could potentially affect bat populations. This report provides a screening level assessment to provide an overview of the project sites in relation to the potential for impacting bat resources. The screening level assessment includes a literature review, consulting with knowledgeable individuals, aerial photography interpretation, classification of vegetation, wetlands and topography and local hydrology. The screening level assessment was also based on the potential for bat roosting and foraging habitat at the landscape level. Criteria from the Ontario Ministry of Natural Resources (MNR) and from FPL Energy were used to determine the likelihood for bats within the study area. Based on the screening level assessment, a ranking of Low, Medium, or High was provided.

2.0 STUDY METHODOLOGY

Relatively little information is known about bat populations in Ontario (MNR, 2006). Because of their nocturnal habitats and elusive nature, collection of population level data is generally lacking, and little is known about their long-term population trends and the location of critical habitat. Based on this lack of information, a screening level assessment was conducted based on the likelihood or potential for bat collisions within the proposed wind farm locations, as a preliminary indicator of bat risk. The likelihood of bat potential can be estimated based on the presence of landscape features and known information on bat behaviour, habitat use, mortality data, and migration routes. The primary objective of the screening level study is to assess the sensitivity of the proposed wind energy project sites and is the first step in determining the kinds of studies required to adequately evaluate impacts to bats. The screening level analysis allows for data and information gathering early in the siting and development process, and also allows time to seek a different site if unavoidable significant impacts seem likely (despite careful site selection for turbine placements).

For this study, the following levels of screening were utilized:

- Background Literature Reviews of landscape specific to the study area and known bat literature;
- MNR Draft Screening Criteria from the MNR Technical Workshop in January 2006; and
- Screening Criteria Developed by FPL Energy for Wind Farm Bat Likelihood Assessment.

The development of a screening level methodology was developed and refined, based on the existing Geographical Information Systems (GIS) data layers. During the development of risk based criteria which can be used in the screening process, the results of a recent workshop on bats by the Ministry of Natural Resources provided initial guidance on what factors are considered important at the landscape level, in gauging the known bat potential within the Southern Ontario landscape.

Background Literature Review

- Identification of natural heritage features;
- Assessment of landscape component features;
- Data base query on all known records of bats from the Natural Heritage Information Centre, MNR Guelph Office and Conservation Authority records;
- A literature review of relevant bat species research compilations including Ontario Bat species geographic range, roosting habitat preferences/uses and densities, and distance from site to known bat concentrations (usually mines or caves);
- Proximity of potential wind power locations to known bat roosting sites;

- Assessment of potential impacts associated with turbine placements i.e. . Does the site or adjacent areas include habitat features (for example, riparian habitat, water bodies that might attract birds or bats for foraging, roosting, breeding, or cover and/or Does the site contain topographical features that could concentrate bird or bat movements (for example, ridges, peninsulas, or other landforms that might funnel bat movement)?

Screening Level Assessment also included proximity to Karst topography, riparian cover, and open water areas, which are known to contain areas of relatively high bat potential. The significance of hibernacula and maternal roost sites are defined in MNR's Significant Wildlife Habitat Technical Guide (2000).

MNR Screening Level Criteria

Site sensitivity and risk factors considered by the MNR in determining the potential for bat is listed as follows:

- VH – known presence of significant hibernacula/swarming site (<10 km)
- VH - known presence of significant maternal roost sites (<10 km)
- VH – Species at Risk (recognizing that currently there are no listed bats in Ontario but this could change with increased concern about bats)
- H – coastlines of the Great Lakes and other large bodies of water (<10 km)
- H – potential significant hibernacula sites (mines, caves, limestone plains or bluffs, Karst topography)
- M – landscape-level linear features that may direct bat activity (natural or otherwise)
- L – Absence of above criteria.

Where VH- very high risk H- high risk, M- medium risk, L- low risk for bat potential (MNR Technical Workshop, January 2006)

FPL Energy Screening Level Criteria

Site sensitivity and risk factors considered by FPL Energy, as an integral part of their corporate environmental program, in determining the potential for bats is listed as follows:

- Bat species geographic range;
- Roosting habitat preferences/uses and densities;
- Distance from site to known bat concentrations (usually mines or caves);

- Nightly foraging distance from roost;
- Foraging habitat preferences;
- Foraging strategies and habits and heights;
- Habitats present on the Wind Resource Area (WRA);
- Presence of suitable drinking water source on or proximate to the WRA;
- Proximity of the WRA to known bat suitable habitat; and,
- Species roosting behaviour (solitary or colonial).

3.0 BACKGROUND REVIEW

3.1 LITERATURE REVIEW OF BATS IN ONTARIO

The Ontario Ministry of Natural Resources (2006) summarizes the bat species of Ontario and provides a thorough overview of their biology and available background literature in the document entitled Wind Turbines and Bats: Bat Ecology Background Information and Literature Review of Impacts. This document was prepared in response to, and in prediction of growth expected in, the wind power facilities. The MNR is responsible for the protection of bat species under the *Fish and Wildlife Conservation Act* (FWCA 1997). In total, there are 8 bat species that occur in Ontario, and these are listed as protected species under Schedule 6 of the Act. In addition, the MNR is responsible for protecting bat habitat, including significant habitat such as maternity sites and hibernaculae. Based on the literature review, a summary of bat species and their known status in Ontario are listed in Table 1 as follows:

Table 1 Summary of Bat Species and Status in Ontario.

Species	Scientific Name	S-Rank*	G-Rank*	MNR Status*	COSEWIC Status*	Ontario General Status*
Big Brown Bat	*Eptesicus fuscus*	S5	G5	No status assigned	No status assigned	Secure
Silver-Haired Bat	*Lasionycteris noctivagans*	S4	G5	No status assigned	No status assigned	Secure
Eastern Red Bat	*Lasiurus borealis*	S4	G5	No status assigned	No status assigned	Secure
Hoary Bat	*Lasiurus cinereus*	S4	G5	No status assigned	No status assigned	Secure
Eastern Small-footed Bat	*Myotis leibii*	S2S3	G3	No status assigned	No status assigned	May be at risk
Little Brown Bat	*Myotis lucifugus*	S5	G5	No status assigned	No status assigned	Secure
Northern Long-eared Bat	*Myotis septentrionalis*	S3?	G4	No status assigned	No status assigned	Sensitive
Eastern Pipistrelle	*Pipistrellus subflavus*	S3?	G5	No status assigned	No status assigned	Sensitive

**Natural Heritage Information Centre, Ontario Ministry of Natural Resources.*

GRANK	Definition
G3	Rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4	Common; usually more than 100 occurrences; usually not susceptible to immediate threats.
G5	Very common; demonstrably secure under present conditions.

SRANK	Definition
S2	Imperilled—Imperilled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3	Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4	Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure—Common, widespread, and abundant in the nation or state/province.
S#S#	Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

There are no species of bat considered to be at risk according to the Committee on the Status of Endangered Wildlife in Canada, nor are there species listed under the federal *Species at Risk Act* or provincially under the *Endangered Species Act*. The MNR considers the status of two species (Northern Long-eared Bat and the Eastern Pipistrelle) to be sensitive, and one species (Eastern Small-footed Bat) possibly at risk. All bats found in Ontario are insectivorous (MNR 2006). Most commonly encountered bats include the Little Brown Bat and the Big Brown Bat. Reported distribution of the Silver-Haired Bat, Eastern Small-footed Bat, Northern Long-eared Bat and Eastern Pipistrelle is sparse throughout southern Ontario (Dobbyn 1994). In all cases, bat biology is not well studied, and there is a lack of information on long-term population trends and location of critical habitat (MNR 2006). The status of bat populations in Ontario is thought to be in decline, but with little evidence available, all generalizations about bat populations should be made with great caution.

On April 16, 2007, a request was made at the Natural Heritage Information Centre of the Ministry of Natural Resources for records of any known bat hibernaculae within the study area. On April 19, 2007, a response was received from Ms. Cathy Darevic, NHIC Biodiversity Information Biologist, that no records of bat hibernaculae were present within the study area (Cathy Darevic pers.comm via email).

3.2 EXISTING CONDITIONS

To provide an overview of existing conditions, data from recent ortho-airphotography, and GIS data layers from the Grand River Conservation Authority (GRCA) and Lands Information Ontario (LIO) was plotted with reference to the study area in conjunctions with reviews from the following sources:

- Abandoned Mines Information System Ministry of Northern Development and Mines http://www.geologyontario.mndm.gov.on.ca/
- Soil Survey of Wellington Country Ontario (Hoffman et al 1963)
- Chapman and Putnam (1984)

- Ecological Survey of the Niagara Escarpment Biosphere Reserve (Riley et al 1996)
- Natural Heritage Information Centre (http://nhic.mnr.gov.on.ca/nhic_.cfm)
- Atlas of Mammals of Ontario (Dobbyn 1994)
- MNR. 2000. Significant Wildlife Habitat Technical Guide. 151p.
- Wind Turbines and Bats: Bat Ecology Background Information and Literature Review of Impact (MNR 2006)
- OMAFRA maps pertaining to watercourses, specifically first order streams arising within primarily agricultural use land.

The limit of the study area is shown in Figure 1. The major features of interest in this study include existing agricultural lands, remnant woodlots, wetlands and headwater streams and tributaries. According the GRCA GIS system, most of the tributaries south of Highway 109 are classified as "unknown", while those to the north are classified as "warm water" (GRCA, 2007).

3.2.1 Landscape Features

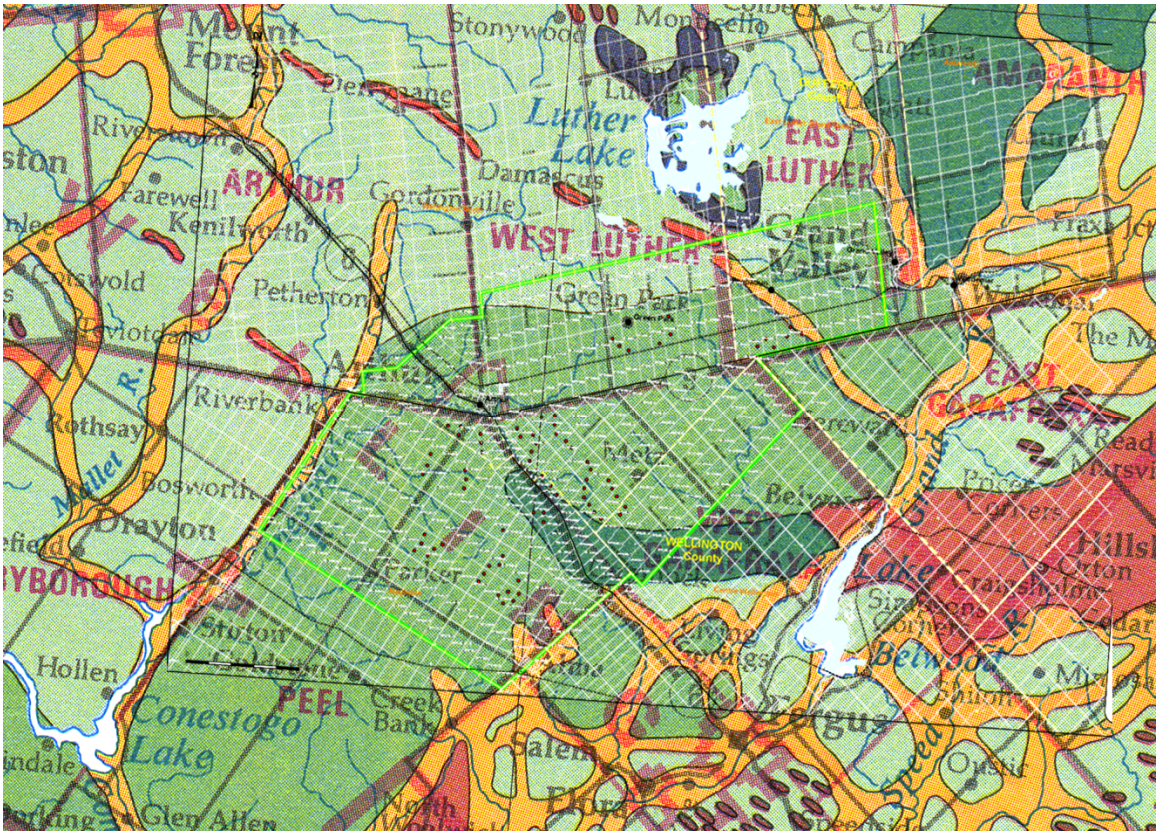
Landscape features and physiography can identify areas with habitat characteristics that are particularly important to bats (MNR 2006). Background literature was reviewed to identify the landscape features and physiography associated with the study area.

Physiography

The study area lies within predominantly undrumlinized Till Plain physiographic region. The northern edge of the study area includes Till Plain (drumlinized), although no drumlins are documented within the study area boundaries (Chapman and Putnam 1984). A lobe of till moraine exists along the southern limits of the study area along Highway 6. Stream corridors exist within shallow spillways along the northwestern edge, southern corner and northeastern portion of the study area. Spillways were not present in the centre portion of the study area. The Conestogo River arises on the Till Plain north of Arthur as small streams and follows shallow spillways (Chapman and Putnam 1984). Despite the presence of a lobe of moraine at the southern limits of the study area, the topography is devoid of ridgelines and shorelines that would provide a potential concentration of migratory bats. A majority of the moraine within the study area limits is under agricultural use based on analysis of orthophotography. A map showing physiography, with the olive shaded area depicting the Till Plain, and the dark green depicting the Till Moraine, is shown in Figure 1.

At Grand Valley located within the easterly limits of the study area, there exists exposed limestone at a depth of approximately 75 feet (23m) below the level of the adjacent plain (Chapman and Putnam 1984). Luther Marsh, situated north of the study area, and above Grand Valley, is situated upon a plain with very poor drainage (Chapman and Putnam 1984). Numerous swamps are present in this area. The Luther Marsh also serves as the reservoir behind the Luther Dam (Chapman and Putnam 1984).

The Soil Survey of Wellington County (Hoffman et al 1963) lists location and extent of different soils in Wellington County. North of Arthur, north of Highway 9/109 the following soils are listed, coverage is approximated based on mapping includes with the soils report (Hoffman et al 1963): 75% Perth silt loam (poor drainage), 2-3% Huron loam (good drainage), 5% Toledo clay loam (poor drainage), 5% Huron silt loam (good drainage), 2% muck (very poor drainage), 5% Peat (very poor drainage), 1% Brookston silt loam (poor drainage), 3% Burford loam (good drainage), 3% Listowel loam (imperfect drainage), 2% of fox sandy loam (good drainage) at Highway 9/109 west of Arthur.



Source: Figure 1 Physiography map of the study area, modified from Chapman and Putnam (1984). (Area encompassed by the green area represents the limits of the study area). Area shaded in olive represents Till Plain, darker green represents Till Moraine.

South of Arthur, soils are comprised of approximately 40% Huron loam (good drainage) and 30% Perth loam (imperfect drainage) predominates, with areas of 5% muck (very poor drainage), 5% Brookston loam (poor drainage), and smaller lobes of 5% Brookston silt loam (poor drainage) and 5% Donnybrook sandy loam (good drainage). Defined stream channels of the Conestogo Subwatershed and Central Grand River cut through the town of Arthur and west of Arthur.

The study area is generally flat to gently rolling, there are no significant ridgelines or areas of physiography that would indicate a high likelihood for bat habitat or bat use.

Caves and Karst Topography, Niagara Escarpment

In Southern Ontario, most caves and Karst topography are found along the Niagara Escarpment, upper Ottawa Valley and Bruce Peninsula (MNR 2000). No areas of outcropping or exposed limestone or Karst topography are present within the study area limits, according to mapping by Chapman and Putnam (1984). Exposed limestone cliffs exist within the Elora Quarry Conservation Area southeast of the study area. This area is 32.0ha in size and is formerly a quarry, encircled by sheer vertical limestone cliffs (nhic.mnr.gov.on.ca). The Elora Gorge (Life Science ANSI and Conservation Area) is located to the southwest of this area, where the Grand River flows through a bedrock gorge for approximately 2km.

The Dufferin Section of the Niagara Escarpment is situated east of the study area. The Niagara Escarpment is recognized as a World Biosphere Reserve. The Dufferin Section extends from the Forks of the Credit north to the Devil's Glen area. Due to its high elevation and distance from large bodies of water to moderate temperature, this section of the Escarpment tends to exhibit northern characteristics in both vegetation and species composition (Riley et al 1996). Six of the province's eight bat species have been recorded in this section of the Escarpment (Riley et al 1996). However, the technical appendices of the Ecological Survey of the Niagara Escarpment Biosphere Reserve list only five species: Little Brown Bat, Northern Long-eared Bat, Small-footed Bat, Eastern Pipistrelle and Big Brown Bat (Riley at al 1996).

Within the study area, caves and karsts are not identified. There are no known areas that would be likely to act as significant bat habitat or areas that indicate a high likelihood for bat habitat or bat use.

3.2.2 Abandoned Mines

Abandoned Mines and rehabilitated mines may serve as significant wildlife habitat for bats. The website of the Ministry of Mines and Northern Development was reviewed for information pertaining to abandoned mines or open pits in the study area. No abandoned mines or open pits are reported within the study area limits.

3.2.3 Watercourses and Waterbodies

The study area is situated within the Grand River Watershed. The western portion of the study area includes the Conestogo River subwatershed, and the eastern limits of the study area are within the Central Grand River subwatershed. The Luther Marsh (PSW) is situated at the southern limits of the Upper Grand River subwatershed. Numerous first order/headwater streams arise in the study area.

3.2.4 Significant Natural Areas

Luther Marsh PSW, Life Science ANSI and Conservation Area

The Luther Marsh is situated north of the study area. It is a 3953ha Provincially Significant Wetland, made up of 6 individual wetlands of 4 wetland types (13% bog, 1% fen, 55% swamp and 31% marsh, and associated upland features. Luther Marsh is considered a significant habitat for waterfowl, and is a large, diverse and significant headwater wetland associated with upland features of esker and till plain. It is also considered to be a highly productive inland marsh. The Luther Marsh is also designated as a Provincially Significant Life Science Area of Natural and Scientific Interest (ANSI) and contains the Luther Marsh Conservation Area. It forms a major headwater reservoir for the Grand River. An artificially created lake and reservoir serves to regulate water levels within this marsh. In addition, there is the presence of an esker with a bog feature, which is unusual (GRCA and OMNR 2007).

Luther Marsh Eskers, Earth Science Site

Portions of the Egerton and Mount View Eskers are located within the Luther Marsh Conservation Area, including esker ridges and an esker outwash delta.

Alma Wetland Complex, Provincially Significant Wetland

The Alma Wetland Complex is a 263 ha Provincially Significant Wetland situated within the north western portion of the study area at 10th Line and north of Wellington Road 17. It is comprised of 39 individual wetland units, comprised of two wetland types (80% swamp and 20% marsh).

Ritch Tract Swamp Non-provincially Significant Wetland

The Ritch Tract Swamp non-PSW is situated along 16th Line in the central portion of the study area. It is a 259 ha locally significant wetland, comprised of two wetland types (99% swamp and 1% marsh).

North Cumnock Complex-Wetland, Provincially Significant Wetland

The North Cumnock PSW Complex is situated at the southern limits of Highway 6 within the study area. It is a 187 ha PSW, comprised of two wetland types (86% swamp and 14% marsh).

3.3 SUMMARY

Based on the review of existing conditions, the physiography of the study area, and other landscape features, there are no areas identified within the study area boundary that would be considered of high bat potential. Some landscape features such as woodlands and watercourse features were noted within the study area, and these may provide potential habitat for resident bat species. These finer level landscape features will be discussed in the next sections.

4.0 SCREENING LEVEL LANDSCAPE ASSESSMENT

As part of the landscape level screening analysis, the study area was subdivided into 6 sites, based on similar characteristics from a landscape level, geographical location and the existing road network. The areas situated west of Arthur were subdivided into 4 site units (Sites 1A, 1B, 2A, and 2B), while the areas on the east side of Arthur were subdivided into 2 site units (Sites 3 and 4). The boundaries of these site units considered for the landscape assessment study are shown in Figure 2. The site units within the study area exhibit varying degrees of landscape cover that may be considered potential bat habitat, but the extent of agricultural and urban land uses in these areas generally range from 83 to 96%. A summary of land use features within the site units is shown in Table 2.

Based on Table 2, Site 4 contains the greatest wetland cover, comprising nearly 4 million square meters, or 7% of the land area. This area coincides with the presence of Luther Marsh, just north of the study area boundary. Sites 1B, 2A, and Site 4 appear to contain the most forest cover, ranging from 9% to 11%, while Site 1A contains more watercourses in relation to other sites (71,707 m). With the exception of Site 4, which can be distinguished by its wetland cover, most sites contain remarkably similar percentages of landscape cover, apart from woodlands.

Table 2 Summary of Landscape Level Characteristics within Individual Study Area Site Units

Land Use Summary (m^2)	Site 1A	Site 1B	Site 2A	Site 2B	Site 3	Site 4
Total area	64,340,056	48,541,997	48,212,570	27,721,214	59,488,928	53,085,221
Hedgerow	96,231 <1%	127,151 <1%	103,408 <1%	32,214 <1%	83,334 <1%	79,567 <1%
Plantation	182,862 <1%	376,904 <1%	149,599 <1%	40,344 <1%	168,230 <1%	416,424 <1%
Treed (treed areas excluding hedgerow and plantation)	3,888,528 6%	5,532,914 11%	4,164,052 9%	916,437 3%	2,567,623 4%	4,990,050 9%
Wetland	0	2,234,068 5%	344,914 <1%	0%	0%	3,800,600 7%

Land Use Summary (m^2)	Site 1A	Site 1B	Site 2A	Site 2B	Site 3	Site 4
Watercourse Length in meters	71,707	51,869	26,709	44,549	68,426	51,879
Remaining land use including agricultural, residential, and urban land uses	60,172,435 94%	40,270,960 83%	43,450,597 90%	26,732,219 96%	56,669,741 95%	43,798,580 83%

Further analysis was completed using the criteria developed by MNR and FPL Energy for ranking sites based on known bat habitat; and, a summary of current land uses.

4.1 MNR CRITERIA

The MNR criteria screens for landscape level features and known significant wildlife habitat for bats. These features include the presence of significant bat hibernacula/swarming sites (abandoned mines or pits, caves, Karsts), presence of significant maternal roosting sites, presence of species at risk, presence of coastlines of Great Lakes or large bodies of water, and the presence of landscape-level linear features that may indicate bat activity. The results of screening level analysis using MNR criteria are shown in Table 3.

Table 3 Screening Level Assessment of Bat Likelihood Using MNR Criteria

Study Area Sites	Site 1A	Site 1B	Site 2A	Site 2B	Site 3	Site 4
Site Description	Site 1A is situated southwest of Arthur, and is bounded by Wellington Road 11 to the north, 12th Line to the west, Sideroad 12 to the south, and by Wellington Road 109/Highway 6 to the east.	Site 1B is situated south of Arthur, and is bounded by Sideroad 12 to the north, 12th Line to the west, Highway 6 to the east and Wellington Road 17 to the south.	Site 2A is situated south of Arthur, east of Highway 6. It is bounded to the north by County Road 109, to the east by Wellington Road 16, to the south by 20 Sideroad and to the west by Highway 6.	Site 2B is situated southeast of Arthur. It is bounded to the north by County Road 109, to the east by East-West Garafraxa Trail, to the south by 20 Sideroad and to the west by Wellington Road 16.	Site 3 is included Arthur and extends East to the west edge of Grand Valley. Is bounded to the north by Concession Road 2-3, to the east between Sideroad 27-28 and Country Road 25, to the west by Wellington 109 Road and to the south by County Road 109.	Site 4 is immediately north of Site 3. Is bounded to the south by Concession Road 2-3, to the east by between Sideroad 27-28 and Country Road 25, to the north by 4th Line, and to the west by 10th Sideroad East.
Caves and Abandoned Mines	None in study area, according to the Ontario Ministry of Northern	None in study area, according to the Ontario Ministry of Northern	None in study area, according to the Ontario Ministry of Northern	None in study area, according to the Ontario Ministry of Northern	None in study area, according to the Ontario Ministry of Northern	None in study area, according to the Ontario Ministry of Northern

Study Area Sites	Site 1A	Site 1B	Site 2A	Site 2B	Site 3	Site 4
	Development and Mines.	Development and Mines.	Development and Mines.	Development and Mines.	Development and Mines.	Development and Mines.
Buildings	The study area is within an agricultural landscape, where barns and buildings that may serve as potential roost sites are present. However, most buildings appear to be of modern structure where likelihood of bat roosting would be low.	The study area is within an agricultural landscape, where barns and buildings that may serve as potential roost sites are present. However, most buildings appear to be of modern structure where likelihood of bat roosting would be low.	The study area is within an agricultural landscape, where barns and buildings that may serve as potential roost sites are present. However, most buildings appear to be of modern structure where likelihood of bat roosting would be low.	The study area is within an agricultural landscape, where barns and buildings that may serve as potential roost sites are present. However, most buildings appear to be of modern structure where likelihood of bat roosting would be low.	The study area is within an agricultural landscape, where barns and buildings that may serve as potential roost sites are present. However, most buildings appear to be of modern structure where likelihood of bat roosting would be low.	The study area is within an agricultural landscape, where barns and buildings that may serve as potential roost sites are present. However, most buildings appear to be of modern structure where likelihood of bat roosting would be low.
Snags	The site contains woodlots, hedgerows, and plantations where there may be snags present. The presence of the types of snags may need to be confirmed through ground-truthing.	The site contains woodlots, hedgerows, and plantations where there may be snags present. The presence of the types of snags may need to be confirmed through ground-truthing.	The site contains woodlots, hedgerows, and plantations where there may be snags present. The presence of the types of snags may need to be confirmed through ground-truthing.	The site contains woodlots, hedgerows, and plantations where there may be snags present. The presence of the types of snags may need to be confirmed through ground-truthing.	The site contains woodlots, hedgerows, and plantations where there may be snags present. The presence of the types of snags may need to be confirmed through ground-truthing.	The site contains woodlots, hedgerows, and plantations where there may be snags present. The presence of the types of snags may need to be confirmed through ground-truthing.
Riparian and Aquatic Habitat	The site contains various small watercourse features. The watercourses are headwater tributaries of the Conestogo River subwatershed which function as agricultural drains.	The site contains various watercourse features. The watercourses are headwater tributaries of the Conestogo River subwatershed which function as agricultural drains.	The site contains various watercourse features. The watercourses include headwater tributaries of the Central Grand River subwatershed which function as agricultural drains.	The site contains various watercourse features. The watercourses include headwater tributaries of the Central Grand River subwatershed which function as agricultural drains.	The site contains various watercourse features. The watercourses include headwater tributaries of the Central Grand River subwatershed which function as agricultural drains. (Luther Marsh is identified north of the study area, on the north side of Site 4.	The Luther Marsh is situated immediately north of Site 4. The site also contains various watercourse features. The watercourses include headwater tributaries of the Central Grand River subwatershed.
Significant Wildlife Habitat - hibernacula, swarming site	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)

Study Area Sites	Site 1A	Site 1B	Site 2A	Site 2B	Site 3	Site 4
Significant Wildlife Habitat - maternal roosting site	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)	No areas identified as significant wildlife habitat for bat are identified (Cathy Darevic, MNR, pers. comm.)
Landscape-level Linear Features (ridgelines, Great Lake shorelines)	No significant landscape-level linear features are identified	No significant landscape-level linear features are identified	No significant landscape-level linear features are identified	No significant landscape-level linear features are identified	No significant landscape-level linear features are identified	No significant landscape-level linear features are identified
Overall Site Sensitivity Rank (L, M, H, VH)	L - Based on the absence of known risk factors for bats in the study area	L - Based on the absence of known risk factors for bats in the study area	L - Based on the absence of known risk factors for bats in the study area	L - Based on the absence of known risk factors for bats in the study area	L - Based on the absence of known risk factors for bats in the study area	L - Based on the absence of known risk factors for bats in the study area

VH- very high risk H- high risk, M- medium risk, L- low risk for bat potential (MNR Technical Workshop, January 2006)

Results from Table 3 generally indicate a low level of risk to bats, based on the lack of known sites that would increase the likelihood of bats frequenting the study area. The general agricultural land uses, with no distinguishing areas of surficial relief or dramatic changes in topography supports this conclusion. However, there are wetlands such as Luther Marsh and woodlands that may serve as localized areas where there may be a higher likelihood for bats. Relative to other sites, Site 4 would likely show a greater potential for bats due to its proximity to Luther Marsh, although this is not reflected in the overall site rankings.

4.2 FPL ENERGY CRITERIA

The FPL Energy criteria screens for a finer level of features in comparison to MNR Criteria and was developed by FPL Energy using experience on other projects. The criteria focuses on known biological relationships such as roosting habitat preferences for bats whose geographic ranges are present within the study area, foraging habits, strategies, and known foraging habitat, as well as proximity to known bat attractants such as suitable drinking water, caves or mines. The results of screening level analysis using FPL Energy criteria are shown in Table 3.

Table 4 Screening Level Assessment of Bat Likelihood Using FPL Energy Criteria

Study Area Sites	Site 1A	Site 1B	Site 2A	Site 2B	Site 3	Site 4
Bat Species Geographic Range	Potential for all 8 bat species in Ontario (Big Brown Bat, Silver-haired Bat, Eastern Red Bat, Hoary Bat, Eastern Small-footed Bat, Little Brown Bat, Northern Long-eared Bat, Eastern Pipistrelle)	Potential for all 8 bat species in Ontario (Big Brown Bat, Silver-haired Bat, Eastern Red Bat, Hoary Bat, Eastern Small-footed Bat, Little Brown Bat, Northern Long-eared Bat, Eastern Pipistrelle)	Potential for all 8 bat species in Ontario (Big Brown Bat, Silver-haired Bat, Eastern Red Bat, Hoary Bat, Eastern Small-footed Bat, Little Brown Bat, Northern Long-eared Bat, Eastern Pipistrelle)	Potential for all 8 bat species in Ontario (Big Brown Bat, Silver-haired Bat, Eastern Red Bat, Hoary Bat, Eastern Small-footed Bat, Little Brown Bat, Northern Long-eared Bat, Eastern Pipistrelle)	Potential for all 8 bat species in Ontario (Big Brown Bat, Silver-haired Bat, Eastern Red Bat, Hoary Bat, Eastern Small-footed Bat, Little Brown Bat, Northern Long-eared Bat, Eastern Pipistrelle)	Potential for all 8 bat species in Ontario (Big Brown Bat, Silver-haired Bat, Eastern Red Bat, Hoary Bat, Eastern Small-footed Bat, Little Brown Bat, Northern Long-eared Bat, Eastern Pipistrelle)
Roosting habitat preferences/uses and densities	Primarily trees. May include buildings, tree cavities, rock crevices, in trees, under bark, in foliage.	Primarily trees. May include buildings, tree cavities, rock crevices, in trees, under bark, in foliage.	Primarily trees. May include buildings, tree cavities, rock crevices, in trees, under bark, in foliage.	Primarily trees. May include buildings, tree cavities, rock crevices, in trees, under bark, in foliage.	Primarily trees. May include buildings, tree cavities, rock crevices, in trees, under bark, in foliage.	Primarily trees. May include buildings, tree cavities, rock crevices, in trees, under bark, in foliage.
Species roosting behaviour	Species include those that form nursery colonies (small to large), colonial summer roosts, solitary summer roosts.	Species include those that form nursery colonies (small to large), colonial summer roosts, solitary summer roosts.	Species include those that form nursery colonies (small to large), colonial summer roosts, solitary summer roosts.	Species include those that form nursery colonies (small to large), colonial summer roosts, solitary summer roosts.	Species include those that form nursery colonies (small to large), colonial summer roosts, solitary summer roosts.	Species include those that form nursery colonies (small to large), colonial summer roosts, solitary summer roosts.
Presence of suitable drinking water source on or proximate to the WRA	Yes	Yes	Yes	Yes	Yes	Yes
Nightly foraging distance from roost	Unknown, no areas of large bat concentrations identified in study area. This would be limited to resident bats.	Unknown, no areas of large bat concentrations identified in study area. This would be limited to resident bats.	Unknown, no areas of large bat concentrations identified in study area. This would be limited to resident bats.	Unknown, no areas of large bat concentrations identified in study area. This would be limited to resident bats.	Unknown, no areas of large bat concentrations identified in study area. This would be limited to resident bats.	Unknown, no areas of large bat concentrations identified in study area. This would be limited to resident bats.
Foraging habitat preferences/Foraging strategies and habits and heights	For resident bats, a range of habitat would be used, including: open spaces, streams, treetops, over surface waterbodies, in forests, in the open and up high, around lights, lawns, pastures.	For resident bats, a range of habitat would be used, including: open spaces, streams, treetops, over surface waterbodies, in forests, in the open and up high, around lights, lawns, pastures.	For resident bats, a range of habitat would be used, including: open spaces, streams, treetops, over surface waterbodies, in forests, in the open and up high, around lights, lawns, pastures.	For resident bats, a range of habitat would be used, including: open spaces, streams, treetops, over surface waterbodies, in forests, in the open and up high, around lights, lawns, pastures.	For resident bats, a range of habitat would be used, including: open spaces, streams, treetops, over surface waterbodies, in forests, in the open and up high, around lights, lawns, pastures.	For resident bats, a range of habitat would be used, including: open spaces, streams, treetops, over surface waterbodies, in forests, in the open and up high, around lights, lawns, pastures.

Study Area Sites	Site 1A	Site 1B	Site 2A	Site 2B	Site 3	Site 4
Distance from site to known bat concentrations (mines/caves)	No areas of known concentrations identified within or adjacent to the study area, therefore it is estimated to be greater than 10km away.	No areas of known concentrations identified within or adjacent to the study area, therefore it is estimated to be greater than 10km away.	No areas of known concentrations identified within or adjacent to the study area, therefore it is estimated to be greater than 10km away.	No areas of known concentrations identified within or adjacent to the study area, therefore it is estimated to be greater than 10km away.	No areas of known concentrations identified within or adjacent to the study area, therefore it is estimated to be greater than 10km away.	No areas of known concentrations identified within or adjacent to the study area, therefore it is estimated to be greater than 10km away.
Habitat present on the Wind Resource Area (WRA).	Limited to use by resident bats, no areas of known concentrations, or significant wildlife habitat for bats identified.	Limited to use by resident bats, no areas of known concentrations, or significant wildlife habitat for bats identified.	Limited to use by resident bats, no areas of known concentrations, or significant wildlife habitat for bats identified.	Limited to use by resident bats, no areas of known concentrations, or significant wildlife habitat for bats identified.	Limited to use by resident bats, no areas of known concentrations, or significant wildlife habitat for bats identified.	Limited to use by resident bats, no areas of known concentrations, or significant wildlife habitat for bats identified.
Overall Ranking	Low – site does not appear to contain known significant bat habitat resources. There are woodlots and watercourse features noted, but their likelihood for supporting bats remains unknown.	Low – site does not appear to contain known significant bat habitat resources. There are woodlots and watercourse features noted, but their likelihood for supporting bats remains unknown	Low – site does not appear to contain known significant bat habitat resources. There are woodlots and watercourse features noted, but their likelihood for supporting bats remains unknown	Low – site does not appear to contain known significant bat habitat resources. There are woodlots and watercourse features noted, but their likelihood for supporting bats remains unknown	Low – site does not appear to contain known significant bat habitat resources. There are woodlots and watercourse features noted, but their likelihood for supporting bats remains unknown	Low – site does not appear to contain known significant bat habitat resources. There are woodlots and watercourse features noted, but their likelihood for supporting bats remains unknown

Results from Table 4 generally indicate a low level of risk to bats, based on the lack of known sites that would increase the likelihood of bats frequenting the study area. Relative to other sites, Site 4 would likely show a greater potential for bats due to its proximity to Luther Marsh, although this not reflected in the overall site rankings.

4.3 SUMMARY

Based on a review of available literature, and criteria developed by MNR and FPL Energy, sites within the study area appear to have low likelihood for bat potential. FPL Energy criteria suggest that all sites are similar in terms of resident bat use (Low) and there is no indication that the study area supports significant wildlife habitat for bats. The land use analysis indicates that Site 4 may exhibit a greater likelihood for bats due to the high forest and wetland cover, relative to the other sites.

5.0 FIELD INVESTIGATIONS AND MAPPING

Analysis of the landscape features indicated that the overall general character of the study area is agricultural, with few natural heritage features that would be considered important in terms of supporting a large bat population, which in turn, would lead to increased bat mortalities. From the larger perspective of the landscape, the sites being considered for turbine placements are within an area of low topographic relief and are away from areas with high bat potential such as Karst areas, the Niagara Escarpment, or lakefronts, or ridgelines that would serve to concentrate bat movements. Notwithstanding, the site contains poorly drained wetland pockets, agricultural drains and minor drainage tributaries, and remnant woodlands which may contain some likelihood of bat potential. A search of available database records did not reveal the presence of any hibernacula, maternal roosts, caves, abandoned mines, and other features in the landscape which would suggest an elevated risk for bats using the area, relative to other sites.

Based on literature reviews of known bat biology and movement patterns, a map has been provided based on known landscape features within the study area, and this is shown in Figure 3. The map has been provided based on the following:

Woodlands and Plantations Supporting Interior Habitat- literature reviews suggest that bats prefer to forage along forest edges and roost in forests which typically contain stands of larger trees which contain hollows, peeling bark, and snags. Bats also prefer to hunt within forest openings. In order to define forest stands where bats may be present within the landscape, forested areas containing "interior" habitat conditions were delineated using GIS. Woodlands containing interior habitat can be defined as woodland patches containing 100m of habitat measured from the edge to the center. Interior woodlands provided some shelter from light, wind, moisture, predation rates and composition that may be more favourable for some bats for roosting. The increased likelihood of bats using these areas is based on the relative scarcity of these features within the open agricultural setting. Where feasible, turbines should be situated away from woodlots as a mitigation measure to reduce potential impacts to local resident bats.

Literature sources reveal that bats tend to forage along forest edges and riparian corridors, due to presumed higher levels of insect activity within these areas. Based on initial assessment of ortho-airphotography and GIS, it was assumed that the majority of the headwater tributaries that exist within the study area are comprised primarily of agricultural drainage systems which arise in the middle of agricultural fields and do not appear to be associated with vegetated riparian buffers. Based on this assumption, it is unlikely that these areas would serve as primary foraging areas for bats, and it is possible that these systems are closed drainage systems, grassed waterways, or swale areas where seasonal or intermittent drainage is present throughout the year. On the other hand, forest edges outside of the woodlands and plantations supporting interior habitat have greater likelihood of being used as foraging sites, and bat use is likely to decrease with increasing distance from the edge of the forest (MNR, 2006).

5.1 SUPPLEMENTAL FIELD INVESTIGATIONS

The screening level analysis was aimed at providing an approximation of bat likelihood in any given site, and was used as a predictive tool to determine where bat habitat was likely to exist within the study area. In areas where turbine placements were proposed within close proximity to natural heritage features, confirmatory ground-truthing was conducted to determine the composition of the woodlots, plantations, and watercourse features to determine the potential for bats in these locations.

Screening level analysis generally reveal that woodlots and watercourses may be the only remnant features that may be of interest in terms of wind turbine placement. A field investigation was conducted in May 10, 2007 in areas where land access was permitted. Landowner contact was arranged through Elexco, to gain access to areas where land access is permitted. In areas where land access was not obtained, preliminary assessment was completed by roadside observations. A total of 5 areas were visited. These areas are referred to as Field Map 1 (FM1) through FM5, and are shown in Figure 3. Representative photos are presented in Appendix A.

FM 1

FM1 is situated at Highway 6 near 30 Sideroad. Woodlots associated with Lots 12, 13 and 14, Con B are comprised of even aged deciduous stands of predominantly trembling aspen, white birch, and dominated by mature silver maple. Areas of scrub are noted near woodlot edges. At the margin of Lots 13 and 14, there is a pronounced mound that provides a good vantage point to view the surrounding woodlots.

Across Highway 6, Lots 12, 13 and 14, Con A were investigated. A portion of the most southern edge of the woodlot is comprised of a coniferous plantation. Further northwest, the woodlot is mesic, dominated by silver maple (widely scattered), trembling aspen, and black ash within the overstorey. The understory is dominated by low shrub growths of choke cherry. Openings are present within the stands that also serve as pathways. There is considerable die off of black ash noted in this area. Small snags are present, ranging in size from 20 to 50cm dbh (diameter breast height).

FM2

FM2 is situated at 16th Line southeast of Sideroad 15. A woodlot extends from the south side of 16th Line to the north side, and extends to Lot 16, Con 16; Lot 17, Con 16; Lot 16 Con 17; Lot 17, Con 17; Lot 18, Con 17, Lot 19, Con 17; Lot 8 Con B, Lot 9 Con B. The mesic woodlot is comprised of silver maple swamps (some dead) with some specimens up to 60-70cm dbh (diameter breast height) approximately. Edge vegetation and understory consists of chokecherry, red osier and gray dogwood, Choke Cherry, and common raspberry in drier sites. Silver maple and elm (*Ulmus* sp.) were noted in areas along 16th Line. An even aged, black ash swamp with a scrubby understory is noted further southwest.

Further southeast on 16th Line, the woodlot associated with Lot 19 Con 17 appears to be an evenly aged stand, comprised of mixed successional deciduous stands such as trembling aspen, black ash, and silver maple. Connecting hedgerows and open fallow fields are common throughout the landscape. Some dead trees were noted along woodlot edges.

Wellington Country Forest "Ritch Tract" is situated within Lot 18 Con 17. It is a mixed woods, comprised of Scots Pine (*Pinus sylvestris*), White Pine (*Pinus strobus*), Red Pine (*Pinus resinosa*), White Spruce (*Picea glauca*), Trembling Aspen, Black Cherry (*Prunus serotina*), White Ash (*Fraxinus americana*), and white birch with a predominantly Choke Cherry understory. Some areas were dominated by coniferous species.

FM3

FM 3 is situated at Lot 8 Con 17 and a smaller woodlot at Lot 8, Con 18. No land access was permitted for this area. Weather conditions did not permit viewing of this site from roadside.

FM4

This area is comprised of a woodlot associated with Lot 20, Con 1. Viewed from roadside, this woodlot appeared to have similar size and composition as other stands investigated. Some areas of scrubby vegetation were noted near the edges, and an area dominated by Reed Canary Grass (*Phalaris arundinacea*) separated this woodlot from the road.

FM5

From the roadside, the woodlot appeared to be a young deciduous stand, dominated by Poplar and Birch, with a Poplar dominated edge. It appeared similar in structure and age to other stands investigated. West of Wellington Road 16, the area is comprised of predominantly coniferous plantation, in areas adjacent to the road edge.

5.2 FIELD INVESTIGATIONS SUMMARY

Field investigations were used to assess the potential for significant bat habitat within individual woodlots where the potential exists for turbine placement. The suitability of natural features for bat habitat was assessed based on the quality and structure of the woodlot and the presence of other features such as open water, and areas of potential food supply (where swarms of insects may be present), and snags.

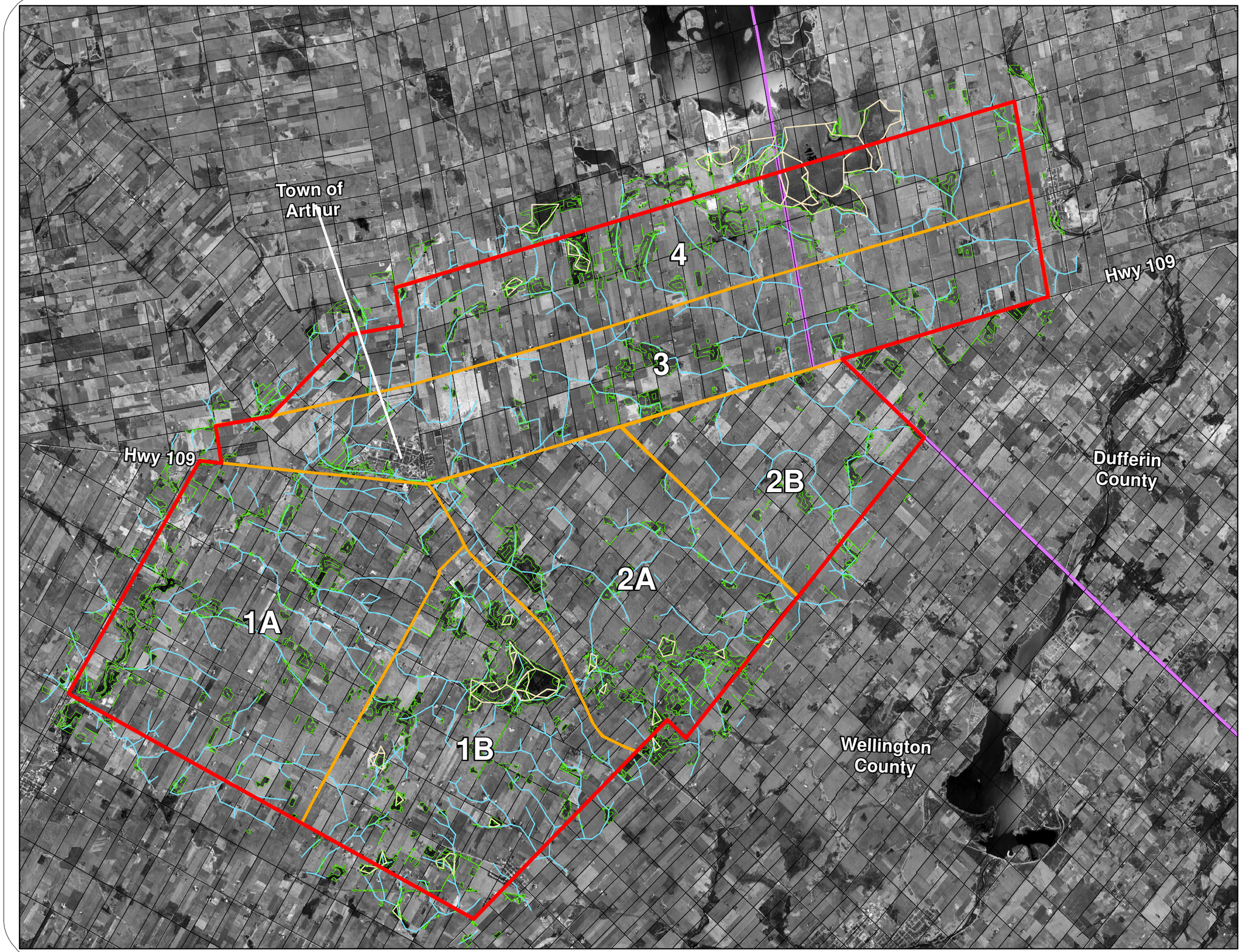
Field investigations of some of the largest woodlots in the study area resulted in the finding that woodlots appear to be of similar age and composition throughout the study area. Within these individual woodlands, there were no areas identified that would serve as a major habitat for bats, or would increase the likelihood of bats within a given area. These woodlands are comprised of individual patches that are not associated with river valleys, riparian corridors, shorelines or elevated ridges or scarps. Outside of these woodlots, the landscape is dominated by agricultural operations. No areas stood out as potential landscape features that may be suitable for bat use, other than expected local resident bats.

Based on the screening level assessment and supplemental field investigations, it was confirmed that bat potential within the study area considered for the proposed Conestogo Wind Farm is low.

6.0 CONCLUSIONS

The Conestogo Wind Farm project is proposed near Arthur, Ontario in Wellington and Dufferin Counties. This report presents the results of the desktop study to determine the likelihood of bat movements and habitat within the study area, and supported by reconnaissance field investigations.

Based on the preliminary bat likelihood assessment study, it was concluded that no further field studies for bats are warranted for the study area. This is because no features of significant bat habitat (ie: caves, abandoned mines, hibernacula, swarming sites or other areas identified as high bat potential) are identified in the study area. As a result, it is concluded that no features warrant further investigations to determine bat use. Notwithstanding, it was recognized that there are numerous woodlots and wetlands of varying sizes present within the study area where local resident bat activity may occur. Avoidance of these features will be addressed during the turbine site selection process to ensure that impacts to local bat habitat, wildlife habitat, and other natural heritage features are minimized.



LEGEND

- Study Area
- Study Subarea (1A, 1B, 2A, 2B, 3, 4)
- Lot
- Wooded Area
- Wetland
- Watercourse

Natural Heritage and Existing Conditions

LGL LIMITED
environmental research associates

Project	TA4493	Figure	2
Date	May 2007	Prepared By:	ARL
Scale	1:100,000	Verified By:	AHF

LEGEND

- Study Area
- Study Area with 1 km Buffer
- Lot
- Watercourse

Existing Features

- Woodlot
- Wetland

Woodlots and watercourses for screening turbine locations within the Conestogo Wind Farm Study Area

LGL LIMITED
environmental research associates

Project	TA4493	Figure	3
Date	May 2007	Prepared By:	ARL
Scale	1:100,000	Verified By:	AHF

7.0 REFERENCES

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APPENDIX A PHOTO APPENDIX

Table 1: Photo Appendix – Field Investigations May 10, 2007

Photo 1: Facing northwest near at the margin of Lots 13 and 14, Con B, May 10, 2007.

Photo 2: Facing northeast from the margin of Lots 13 and 14, Con B, May 10, 2007.

Photo 3: Facing southwest within Lot 13, Con B, May 10, 2007.

Photo 4 : Facing northwest on Lot 13, Con A towards plantation, May 10, 2007.

Photo 5 : Lot 14 Con A, May 10, 2007.

Photo 6: Lot 14, Con A May 10, 2007.

Photo 7: Lot 15, Con A, May 10, 2007.

Photo 8: FM 2, Facing north towards Lot 16, Con 16 from 16th Line, May 10, 2007.

Photo 9: FM2, Facing Lot 17 Con 17 from 16th Line, May 10, 2007.

Photo 10: Facing southeast along 16th Line at Lot 17, Con 17, May 10, 2007.

Photo 11: FM2, Facing northwest along 16th Line, at Lot 18 Con 17.

Photo 12: Facing northeast towards Lot 19, Con 17, May 10, 2007.

Photo 13: Ritch Tract, Lot 18, Con 17, May 10, 2007.

Photo 14: Ritch Tract, Lot 18, Con 17, May 10, 2007.

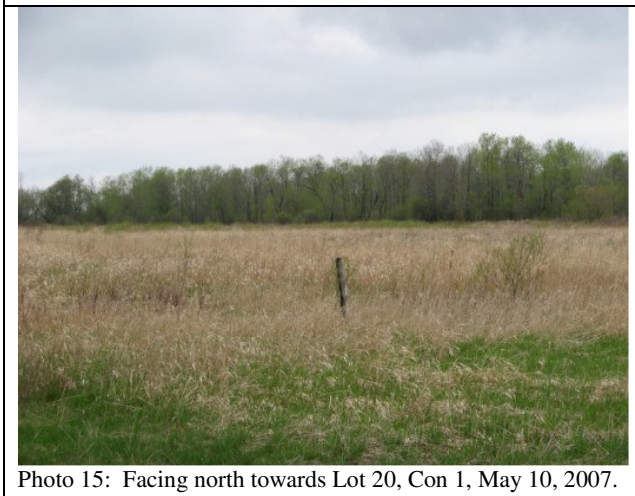

Photo 15: Facing north towards Lot 20, Con 1, May 10, 2007.

Photo 16: Facing north towards Lot 20, Con 1, May 10, 2007.

Photo 17: Facing east towards Lot 10, Con 4, May 10, 2007.

Photo 18: Facing north towards Lot 10, Con 4, May 10, 2007.

Photo 19: Facing northwest to Lot 9 Con 4, May 10, 2007.