

Stantec

**OSTRANDER POINT WIND ENERGY PARK
NATURAL HERITAGE ASSESSMENT**

Appendix D1

Blanding's Turtle Habitat Assessment



**BLANDING'S TURTLE HABITAT
ASSESSMENT
OSTRANDER POINT WIND
ENERGY PARK**

DRAFT FOR DISCUSSION

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Prepared by:

Stantec Consulting Ltd.
70 Southgate Drive, Suite 1
Guelph ON N1G 4P5

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1.0 Introduction

1.1 OVERVIEW

Gilead Power Corporation is proposing a 20 MW wind power facility in southeastern Prince Edward County. The Ostrander Point Wind Energy Park will consist of twelve 1.65 MW turbines located on provincial Crown land along the Lake Ontario shoreline. Blanding's turtles are known to occur in the vicinity of the site, and several Blanding's turtles were observed in the study area during field studies conducted in support of the wind energy facility environmental assessment.

The Blanding's turtle is ranked S3 (vulnerable) in Ontario and is globally considered G4 (common). Blanding's turtle is currently designated as a Threatened species on Schedule 1 of Ontario's *Endangered Species Act (2007)* (ESA) and the federal *Species At Risk Act (2002)* (SARA). For reptile species on provincially-owned Crown land, only the provincial ESA applies. The ESA prohibits the killing, harming, harassing or capturing of Blanding's turtles. Habitat regulations for the Blanding's turtle are not yet in effect under the ESA (2007). However, once habitat regulations have been finalized, the damage or destruction of Blanding's turtle habitat will be prohibited.

In correspondence dated March 10, 2009, the Ministry of Natural Resources (MNR) recommended specific additional field studies to identify important habitats for Blanding's turtles, to inform the identification of potential impacts and mitigation measures. Stantec Consulting Ltd. prepared a work program for Blanding's turtle surveys in 2009 (dated May 11, 2009; **Appendix B**) which was approved by the MNR on May 25, 2009. This discussion document outlines the results of the 2009 field surveys with the objective of initiating consultation with the MNR regarding potential impacts and mitigation measures.

1.2 BLANDING'S TURTLE BACKGROUND

1.2.1 Habitat Requirements

Blanding's turtle habitat is comprised of a mosaic of aquatic and terrestrial components. Aquatic habitat consists of ponds, lakes, streams, swamps and marshes, often with soft substrates and usually shallower than 2 m in depth (COSEWIC 2005). Terrestrial habitat consists of upland forests and meadows. However, Blanding's turtles will travel through other upland areas such as agricultural field and roadways while moving between habitats.

Blanding's turtles overwinter in permanent water bodies (ponds, lakes, slow-moving streams) up to 1.5 metres or less in depth (Sajwaj and Lang 2000). They appear to have a preference for shallower waters where temperatures remain colder, around 1°C, potentially a strategy to slow metabolism in low oxygen environments (R. Brooks, pers. comm., 2009). However, suitable overwintering habitats must have sufficient depth to maintain open water under the ice.

Overwintering habitats generally have substrates of soft mud or detritus into which the turtles will burrow (COSEWIC 2005). Overwintering of hatchlings is poorly understood. As hatchlings do not immediately seek water after emergence and have been shown to survive freezing temperatures in laboratory studies, it has been proposed that some hatchlings may overwinter terrestrially or in temporary wetlands, assuming the habitat stays moist enough to avoid dehydration (Dinkelacker et al. 2004). However, as there are no actual reports of hatchlings overwintering in terrestrial environments, it is likely an uncommon occurrence (COSEWIC, 2005).

Blanding's turtles usually emerge from their overwintering habitat in late March and April. During their active season in spring and summer months, adult Blanding's turtles may use multiple water bodies, traveling long-distances overland between them; maximum seasonal movements are known to reach 7000 m (Edge et al. 2007).

Oviposition (laying of eggs) takes place in sparsely vegetated areas with loose substrates of organic soils, sand, gravel or cobblestone, located up to 410 m from the nearest water source (COSEWIC 2005). Blanding's turtles typically choose oviposition sites with little tree cover where the substrate will receive warmth from the sun (COSEWIC 2005) as incubating eggs have a specific thermal tolerance of 22°C to 32°C (Ewert and Nelson 1991). The eggs are not highly susceptible to drowning (Packard et al. 1982), however they are unlikely to survive being submerged for extending periods (i.e. over 7 days) (COSEWIC 2005). Therefore, areas prone to flooding may be avoided. Oviposition typically occurs in June, a time of year in which females are reported to be most active (Innes et al. 2008). Females usually begin nesting during daylight and continue into the evening (Erb and Bol 2006).

Hatchling Blanding's turtles emerge in late summer and fall. Hatchlings move into aquatic habitats, although it is possible that some individuals spend their first fall and rarely winter terrestrially, as discussed above. Nursery habitat for the hatchlings consists of permanent water bodies with dense aquatic vegetation or cover such as submerged logs (COSEWIC 2005). Juvenile Blanding's turtles (ages 1-7 years) almost exclusively occupy marsh habitat, rarely straying from permanent water bodies (COSEWIC 2005). Juvenile Blanding's turtles prefer habitats with abundant vegetation cover that offers sufficient refuge.

During summer heat waves, adult Blanding's turtles may enter a state of aestivation as a strategy to avoid overheating or dehydration. Aestivation occurs in terrestrial habitat including forest or forest edge habitat under leaf litter, grassy vegetation, logs or brush (Erb and Bol 2006). Typically, aestivation occurs within 110 m of wetland areas (Joyal et al. 2001). Within its Ontario range, Blanding's turtles are rarely observed aestivating, suggesting it may not be a critical component of its life strategy (R. Brooks, pers. comm., 2009).

1.2.2 Distribution

In Canada, the main distribution of Blanding's turtles occurs in south and south-central Ontario as far north as Chippewa River and extending east in to extreme southwestern Quebec. A smaller disjunct population occurs in Nova Scotia (COSEWIC 2005).

The southern Ontario population is not continuous, with gaps in the Bruce Peninsula, Grey and Bruce counties and in southeastern Ontario (COSEWIC 2005 and NHIC 2009). There appeared to be a particular concentration of Blanding's turtles in Prince Edward County with numerous sightings identified in the Ontario Herpetofaunal Summary Atlas. The extensive Prince Edward County Reptile and Amphibian Surveys were conducted in 1979. These surveys found particularly high concentrations of Blanding's turtles in two locations within the county, within the Fish Lake Wetlands in the northeastern portion of the county and in the Soup Harbour Wetland in the southwest corner of the county. Other populations have been recorded by MNR in Big Island Marsh, East Lake, Lake-on-the-mountain, Lake Consecon, near Muscote Bay, near Petticoat Bay (just west of Study Area) and near Prince Edward Point (east of Study Area) (Christie, 1997). Although many of these sightings are dated, they are likely still representative of populations of Blanding's turtles in Prince Edward County as this is a long-lived species and suitable habitat in each of these locations is still present.

In the vicinity of the Study Area, along the southern shoreline of Prince Edward County from Point Petre to Prince Edward Point, Blanding's turtles were somewhat commonly encountered by Stantec during fieldwork between 2007 and 2009.

1.2.3 Threats to the Species

Predation of adult Blanding's turtles is relatively low as their strong carapace provides good protection from predators (COSEWIC 2005). However, predation of nests, hatchlings and juvenile turtles is significantly higher. Predations of eggs can often be extremely high, with annual survival rates as low as 1-3% within populations in some years (Congdon et al. 1993; Gillingwater and Brooks 2002). Nest predation is a significant limiting factor to most Blanding's turtle populations (COSEWIC 2005). The majority of nest predators in the Great Lakes area are raccoons, striped skunks, red foxes or coyotes (COSEWIC, 2005). Hatchlings and juveniles have higher predation rates than adults due to their small size. Hatchlings are particularly susceptible to predation during their overland movements between nesting sites and permanent water bodies. Hatchlings and juveniles within their nursery habitat are provided more protection by concealing themselves in dense vegetation.

Accidental mortality to adult Blanding's turtles can be a significant threat to populations. Since Blanding's turtles travel long distances overland to nesting sites and between wetlands, they are more susceptible than other turtle species to vehicle strikes, especially because this species tends to travel along roadways (COSEWIC 2005). As Blanding's turtles are long-lived (in excess of 75 years), late in reaching sexual maturity (approx. 25 years) and have low annual

reproductive rates, populations are vulnerable to any chronic increase in adult mortality (Congdon et al. 1993; Samson 2003).

Other threats to the Blanding's turtle can come from loss of wetland or the surrounding terrestrial habitat. Capture of turtles for the pet trade can deplete populations. Some studies suggest that cool summer temperatures can lead to male-biased populations (COSEWIC 2005); sex is determined by incubation temperatures, with eggs incubated at 28°C or lower resulting in male embryos. Flooding of nesting sites has been identified as a potential limiting factor to some Nova Scotia populations. Flooding may also be a concern within the Ostrander Study Area, given its tendency to flood after major rain events.

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2.0 Methods

2.1 BACKGROUND DATA REVIEW

The following data sources were reviewed to obtain information regarding birds in the Study Area:

- Natural Heritage Information Centre database including the Ontario Herpetofaunal Summary Atlas (accessed 2009)
- COSEWIC Assessment and Update Status Report on the Blanding's Turtle (2005)
- Reptile and Amphibians of Prince Edward County (Christie 1997)
- Discussions with experts (R. Brooks, pers. comm., 2009)

2.2 FIELD SURVEYS

Field surveys were conducted from May to August 2009, to observe Blanding's Turtles during their active periods and to map habitat features. A total of six surveys were conducted with two in May, two surveys in June and single surveys in each of July and August.

Blanding's turtle surveys consisted of two qualified biologists walking wandering transects through the Study Area. The two biologists spread out to allow full coverage of the Study Area. Although during each survey a specific habitat type was targeted (i.e. oviposition sites during the June surveys) effort was made on all visits to cover the entire Study Area to increase the potential to observe Blanding's turtles.

When Blanding's turtles were observed their location was recorded using a GPS and notes were taken on its behavior and the habitat in use. No turtles were handled during the surveys and observers maintained a distance of approximately 15 m to minimize disturbance to the animals. Signs of Blanding's turtles such as footprints in mud or egg fragments were also recorded with notes on habitat present and locations GPS'ed.

In addition to the spring and summer surveys, notes on the extent of surface water were taken from winter wildlife studies conducted from January to March, 2009. Incidental Blanding's turtle observations made during other fieldwork by Jacques Whitford in 2006 and Stantec in 2008 were also considered in the analysis of habitat.

The following sections describe how each habitat component was identified. Date, times and weather conditions during each surveys are provided in **Table 2.1**.

Table 2.1 Survey Conditions

Survey Date	Time	Weather Conditions*
May 13, 2009	10:30-18:00	15°C, with a wind of 2, 0% cloud cover and no precipitation.
May 28, 2009	10:00-17:15	18°C, with a wind of 0, overcast skies and showers
June 11, 2009	13:00-20:00	17°C, with a wind of 0, 50% cloud cover and no precipitation.
June 25, 2009	13:30-20:45	26°C, with a wind of 3, 5% cloud cover and no precipitation
July 16, 2009	14:00-20:00	27°C, with a wind of 3-4, 30% cloud cover and no precipitation
August 25, 2009	11:00-16:30	25°C, with a wind of 3, 75% cloud cover and no precipitation.

* Wind conditions expressed using Beaufort Scale:

0 – calm, <2km/hr	2 – light, 7-12 km/hr	4 – moderate, 20-30 km/hr	6 – strong, 41-51 km/hr
1 – light, 2-6 km/hr	3 – moderate, 13-19 km/hr	5 – fresh, 31-40 km/hr	

2.2.1 Overwintering Habitat

Given the observation of Blanding’s turtles within the Study Area in early spring, it is assumed overwintering is occurring in the vicinity of the site. The identification of potential overwintering sites was based on a habitat assessment alone. Presence of turtles in winter can not be determined without use of radio telemetry.

Blanding’s turtles require permanent standing water through the winter, deep enough to maintain water below the ice. During extensive winter fieldwork in 2009, communities that contained deeper (i.e. greater than 30 cm) standing water were noted as potential overwintering habitat.

2.2.2 Spring and Early Summer Habitat

In spring and early summer, seasonal flooding occurs in portions of the Study Area, which appear to provide foraging habitat for Blanding’s turtles. Two surveys were conducted in May to focus on identifying the areas of seasonal flooding. Given the shallow water in these communities, turtles were easily detected with the top of their domed shells protruding from the water’s surface. However, the dense thicket nature of some flooded communities hindered the ability to detect all turtles. Therefore, efforts were made to conduct the surveys on sunny days with lower ambient temperatures, when the turtles were likely to be basking. Potential basking areas such as roadways or patches of open cobble substrate were searched in the vicinity of flooded thickets.

2.2.3 Potential Oviposition Habitat

Two surveys were conducted in June to characterize and map potential oviposition habitat. The June surveys took place in mid to late afternoon in an attempt to observe nesting females. It was recognized that it can be difficult to observe females in the act of nesting/egg laying. Therefore a habitat assessment was also undertaken to identify potential oviposition habitat. Blanding's turtles typically avoid nesting in grassy vegetation, choosing instead to use sparsely vegetated areas. Within the Ostrander Point study area, sparsely vegetated areas consisting of a cobblestone substrate occurred in pockets throughout the site. Areas with a concentration of potential oviposition habitat were mapped during the June surveys.

2.2.4 Aestivation

One survey was conducted in July. The focus on this survey was to identify potential aestivation habitat. Given that Blanding's turtles uncommonly aestivate, and that when they do the turtles are very difficult to detect, it was not possible to make actual observations to confirm aestivating sites. Therefore, a habitat assessment was completed to identify areas with higher probability of supporting aestivating Blanding's turtles. Factors that were used to assess aestivating habitat included extent of tree cover, extent of grassy vegetation or leaf litter and present of structure that provide shelter such as logs or thick brush. Proximity to wetlands was also considered, as Blanding's turtles prefer to aestivate near wetlands.

2.2.5 Nursery Habitat

One survey was conducted in late August to focus on hatchling emergence. Young Blanding's turtles are very rarely seen, so observations of hatchlings were not anticipated. The August survey therefore focused on mapping the extent of standing water in the study area during late summer (i.e. potential habitats of Blanding's turtle hatchlings). The habitat assessment also considered areas of permanent wetland, which would provide potential habitat for juvenile Blanding's turtles.

3.0 Results

3.1 HABITAT OVERVIEW

The Ostrander Point Wind Energy Park Study Area is situated along the southern shore of Prince Edward County, an area characterized by limestone bedrock which is covered by a shallow layer of unconsolidated loam soil. Due to the shallow soils, the area generally experiences flooded conditions in spring with dry, drought-like conditions during the heat of the summer. These conditions create limited agricultural potential in the area. As a result, the area predominately consists of fallow thicket and meadow habitat with some low density pasture. Several wetlands, consisting of marsh and swamp habitat, occur along the south shore of Prince Edward County.

From the perspective of Blanding's turtle habitat, the majority of the Study Area can generally be divided into 3 habitat types:

- Grassy meadow with scattered shrubs and trees;
- Patches of exposed cobble with poorly developed ground layer vegetation. These areas were often associated with red cedar stands; and,
- Seasonally moist depressions with thickets of dogwood, ninebark and prickly ash with scattered red ash, bur oak and shagbark hickory.

These 3 habitat types occurred as a mosaic throughout the Study Area. Vegetation community mapping is provided in **Figure 1 (Appendix A)**. One additional type of habitat feature that was present was the numerous flooded roadways. Past land use of the Study Area included military training, during which time a network of roads was constructed by scraping away the soil down to the bedrock. Many of these roadways are no longer in use and have experienced naturalization, but still contain areas of exposed bedrock. As the areas of exposed bedrock are below grade, they experience flooding after snow melt or major rain events. In some locations, pools of water in the roadways are maintained through spring into early summer, providing habitat for early breeding amphibians. These flooded roadways also appear to be used regularly by Blanding's turtles.

Two permanent wetlands occurred on site, outside of the area of proposed wind turbines, in the southeast corner of the Study Area. One of these wetlands occurs along the lakeshore, separated from the lake by a pebble and stone bar along the shoreline. This wetland consisted of sedge marsh with channels of open aquatic and bordered by thicket swamp. It was relatively shallow, averaging approximately 1 m in depth. The other permanent wetland was located east of and drained into the sedge marsh (**Figure 1, Appendix A**). It consisted of swamp habitat of red ash, black ash and swamp maple. More open portions of this swamp had thickets of

dogwood and willow. Average water depth in the swamp was approximately 30 cm, with pools up to 1 m deep.

The South Bay Coastal Provincially Significant Wetland is to the north and west of the site, extending into the extreme northern end of the Study Area. In the vicinity of the Study Area the wetland is comprised of swamp habitat, dominated by red and black ash. Along the shoreline, west of the Study Area, the South Bay Coastal wetland opens up into graminoid marsh and thicket swamp. This marsh and thicket habitat, which appears to be suitable for Blanding's turtles, occurs approximately 1 km to the west of the Study Area.

3.2 BLANDING'S TURTLE SIGHTINGS

During the 6 surveys in 2009, a total of 5 Blanding's turtle observations were made, 3 of which were of the turtles themselves and 2 of which were tracks at the edge of flooded depressions. In addition to these 5 observations, 2 Blanding's turtles were observed by Stantec during fieldwork in 2008 and 4 observations were made by Jacque Whitford during fieldwork in 2006. The locations of all observations are provided in **Figure 1 (Appendix A)**. A summary of the observations by date is provided below.

- April 22, 2008 – A Blanding's turtle was observed along a flooded roadway through a wet thicket/treed community in the western portion of the site.
- June 12, 2008 – A Blanding's turtle was observed basking on Helmer Rd, adjacent to the thicket swamp habitat.
- May 13, 2009 – Two Blanding's turtles observed. one in the southeast portion and one in the northern portion of the Study Area. Both turtles were observed in flooded roadway with approximately 10cm of water, the top of their domed shells exposed above the water surface. One turtle appeared to be basking while in the pool. The second turtle was observed actively hunting tadpoles.
- June 11, 2009 – Two sets of Blanding's turtle tracks were observed, one at the north boundary of Study Area along Helmer Rd. and the other at the western boundary along Petticoat Point Rd. Both sets of tracks were observed entering/exiting flooded pools along roadways. Tadpoles were abundant in both pools. Tracks were followed along Petticoat Point Rd. for approximately 100 m, indicating Blanding's turtles used the existing roadways to travel through the site.
- June 25, 2009 – A single Blanding's turtle was observed basking on Ostrander Point Rd. along the eastern boundary of the Study Area.

During Jacques Whitford's 2006 site work, two Blanding's turtles were seen together in a flooded area approximately 500 m to the southeast of the intersection of Helmer Road and Babylon Road, and a third was seen in a pond 100 m south of this intersection. A fourth

Blanding's turtle was observed crossing Ostrander Point Road at the crossing of the deciduous swamp.

Evidence of 2 oviposition sites, in the form of egg fragments, was observed by Stantec on June 10, 2008 and February 24, 2009. The location of the oviposition sites is shown on **Figure 1 (Appendix A)**.

3.3 ASSESSMENT OF HABITAT COMPONENTS

Figure 1 (Appendix A) provides a depiction of the Blanding's turtle habitat components identified within the Ostrander Point Study Area. A description of each habitat component is provided below.

3.3.1 Overwintering Habitat

Blanding's turtles overwinter in the shallow waters of wetlands, typically less than 1 m deep, but with sufficient depth to maintain open water under the ice. Two wetlands within the Ostrander Point Study Area were identified as potential overwintering habitat: the MAS 2-4 and SWD2-2a, both in the southeastern portion of the Study Area. Both wetlands appear to have parts that vary from approximately 30 cm to 1 m in depth. Water depths were not measured throughout the wetlands, but pools deeper than 1 m may occur. The substrates in both wetlands contained deposits of soft organic matter.

Although other areas experience significant flooding during mid-winter snowmelts, no other areas maintained levels deep enough to provide open water under the ice throughout the winter months.

As discussed in **Section 1.3**, some literature suggests that hatchlings may occasionally overwinter terrestrially or in temporary pools, if the habitat stays moist enough to avoid dehydration. Temporary pools that hold shallow, frozen water occur throughout the Study Area and may offer such moist habitat. However, as discussed in **Section 1.3**, no actual records of Blanding's turtle hatchlings using terrestrial overwintering sites exist. Therefore, use of such shallow pools by hatchling during summer months is likely rare, if at all.

3.3.2 Spring and Early Summer Habitat

The majority of Blanding's turtle observations occurred during the spring and early summer, possibly because of higher activity levels and basking behavior during this time of year. However, the high observation rate also coincides with a time of year when the Blanding's turtles frequent the seasonal, shallow and sparsely vegetation pools, habitats where they are more easily detected. The attraction to these pools appeared to be for foraging. Although many of these pools were dry by mid-June, they contained abundant tadpoles through the spring, which apparently served as prey for Blanding's turtles. All of the Blanding's turtle observations

were either within, or in close proximity to, amphibian breeding pools. On one occasion, a Blanding's turtle was observed actively foraging on tadpoles.

Flooded areas were present throughout the Study Area following snowmelt or major rain events. However, only the deeper or more extensive of these pools, located in depressions or along roadways, retained water long enough to support breeding amphibians and therefore a significant food source for Blanding's turtles. Areas with concentrations of such seasonal pools are shown as "Spring Foraging Area" on **Figure 1 (Appendix A)**. The polygons outlined on **Figure 1 (Appendix A)** do not flood in their entirety, but were identified as they contained a mosaic of flooded depressions within drier upland. The most extensive flooding occurred in the spring foraging areas identified along the northern border and in the western portion of the Study Area. As the majority of Blanding's turtle observations were in these two areas, they may offer particularly high quality foraging habitat.

3.3.3 Potential Oviposition Habitat

Blanding's turtles oviposition in sparsely vegetated, sunlit areas. Within the Ostrander Point Study Area, suitable substrate consisted of cobblestone with sparse vegetation. Egg fragments at two old Blanding's nest sites were identified within the Study Area, both in cobblestone substrate.

The cobblestone oviposition habitat was present across the site in small pockets to larger extensive patches. For the purposes of the habitat assessment, areas that contained higher concentrations or more extensive cobblestone habitat were mapped in an effort to identify the majority of potential oviposition sites. The areas identified on **Figure 1 (Appendix A)** do not represent solid areas of cobblestone, but were comprised of a mosaic of cobblestone with other more vegetated habitats. In addition, portions of the cobblestone habitat may be unsuitable for oviposition due to persistent flooding or shade from dense juniper cover. However, results of the extensive on-site habitat assessment suggest that the areas shown in **Figure 1 (Appendix A)** represent the most extensive areas of oviposition cobblestone habitat within the Study Area.

3.3.4 Aestivation

Blanding's turtles are known to aestivate terrestrially in forests or forest edge habitat under leaf litter, grassy vegetation, logs or brush. Due to the open and sparsely vegetated nature of the Study Area, potential aestivation habitat was limited. The habitat assessment identified two areas potentially suitable for aestivating Blanding's turtles (**Figure 1, Appendix A**).

The most extensive aestivation site occurred within the SWD2-2a community in the southeastern portion of the Study Area. This community contained a relatively open canopy of red ash with thickets of dogwood and ninebark and pockets of dense ground layer vegetation. This community may also be attractive to aestivating Blanding's turtles as it is in close proximity to permanent marsh habitat.

A second area of potential aestivating habitat was located in the western portion of the Study Area. This area was contained within a wet depression. It has similar structure with red ash and thickets of dogwood and ninebark. In places, dense grassy ground cover was present.

3.3.5 Nursery Habitat

The habitat assessment aimed to identify areas of standing water in late summer which may be used by Blanding's turtle hatchlings. The on-site surveys found that, by late summer, standing water within the Study Area was restricted to the two permanent wetlands in the southeastern portion of the Study Area (**Figure 1, Appendix A**). These two permanent wetlands were the only habitat within the Study Area that provided suitable habitat for juvenile Blanding's turtles. Habitat within the wetlands included dense sedge marsh and swamp thicket; it appeared to be ideal nursery habitat and was very likely to support hatchling and juvenile Blanding's Turtles.

3.4 OTHER REPTILE AND AMPHIBIAN OBSERVATIONS

Observations of other reptile and amphibians were made during the Blanding's turtle surveys. Other reptile observations included three species of snakes:

- Brown snake observed on May 13, basking on Babylon Rd.
- Smooth green snakes with two observations on May 13 and one on June 25. All were observed basking on roadways throughout the site.
- Eastern gartersnake with observations on May 13 and June 25.

Amphibian larvae were common during the surveys in May and early June within flooded roadways. The Spring Foraging Areas on **Figure 1 (Appendix A)** generally contain the areas with higher concentrations of flooded roadways. Spring peeper, western chorus frog and American toad appeared to be the most common tadpoles. Northern leopard frog tadpoles were observed during the June 25 survey, in the few pools with water remaining. In one pool along the western boundary of the Study Area, spotted salamander larvae were observed. This pool was almost dry during the June 25 survey, with the salamander larvae metamorphosis nearly complete.

All reptile and amphibian species observed, aside from Blanding's turtles, are ranked S5 (Secure—Common, widespread, and abundant) or S4 (Apparently Secure—Uncommon but not rare) in Ontario.

4.0 Discussion

When discussing Blanding's turtle habitat in the context of the Ostrander Point Study Area, it is important to acknowledge that the Study Area is not an isolated patch of habitat, but is part of a much larger landscape of similar habitat. Although potential habitat for each season and each life stage is present within the Study Area, it is likely that some Blanding's turtles utilize the Study Area for only part of the year or for only a portion of their life span. When assessing critical habitat and potential impact, consideration was made to the population of Blanding's turtles within the greater landscape, including the Study Area.

4.1 EXTENT OF LOCAL POPULATION

Prince Edward County appears to support numerous populations of Blanding's turtles. Along the southern shores of Prince Edward County, including the Study Area, Blanding's turtles have been commonly encountered by Stantec during fieldwork between 2007 and 2009.

It is very difficult to estimate the size of the population using the Study Area. Without tagging or radio telemetry it not known if observations on different days are of different turtles or the same individual. The percentage of the turtles within the Study Area that would be discovered on the average survey is also an unknown. As discussed above, it is likely that some Blanding's turtles utilize the Study Area for only part of the year. Therefore, the number of turtles using the Study Area may vary depending on season.

Overall, it can be concluded from the results of the field surveys that the Ostrander Point Study Area and surrounding landscape support a healthy and viable population of Blanding's turtles, but the population size is unknown.

4.2 IDENTIFICATION OF CRITICAL HABITAT

An exercise was undertaken to identify "critical habitat" for the Blanding's turtle within the Ostrander Point Study Area. For the purposes of this assessment, "critical habitat" means the habitat which is essential for the survival of the species and which if altered by the proposed Project could result in a significant negative impact to the population within the Study Area and surrounding landscape. When considering which habitat features should be included within the critical habitat, several factors were considered:

- Is the habitat essential to the maintenance of the local population?
- Does the habitat provide a specific characteristic that is crucial to a component of the Blanding's turtle life history (i.e. oviposition substrate, specific water depth for overwintering)?
- Is the habitat rare or uncommon at the landscape level? and,
- Is the habitat sensitive to disturbance and/or likely to be impacted by the Project?

4.2.1 Overwintering Habitat

Overwintering habitat within the Ostrander Point Study Area was restricted to the two permanent wetlands in the southeastern portion of the site. Other overwintering habitat in the landscape occurs in the South Bay Coastal Provincially Significant Wetland, with marsh and thicket habitat approximately 1km to the west of the Study Area and potentially some limited habitat along the watercourse located approximately 500m north of the Study Area. However, it is likely that most Blanding's turtles that use the Study Area would overwinter within one of the two on-site permanent wetlands, as this is the most extensive overwintering habitat in the immediate vicinity.

The overwintering sites provide an essential component to the Blanding's turtle habitat and has specific characteristics (e.g. appropriate depth) required for the turtles to survive the winter. These wetlands would also be sensitive to disturbance or encroachment.

Overall, the overwintering habitat within the Study Area should be considered critical habitat for the Blanding's turtle.

4.2.2 Spring and Early Summer Habitat

The spring and early summer habitat within the Study Area consists of the flooded depressions and roadways used for foraging and the terrestrial habitat used to travel around the site. Terrestrial areas traveled through do not provide any particular essential habitat, nor are they sensitive to disturbance. Blanding's turtles have been known to travel along roadways, so it is possible the network of abandoned roadways through the Study Area may act as movement corridors. However, it is unlikely that the proposed upgrading and addition of roadways would impact this function; it may in fact improve Blanding's turtle's ease of movement around the site. Terrestrial habitat, as a movement corridor, has not been considered critical habitat.

The various flooded depressions and roadways, used by Blanding's turtles for foraging, are common throughout the Study Area. Although not an essential component of the Blanding's turtle life history, flooded pools with breeding amphibians appear to be an important resource for the local population.

The flooded depressions and roadways are unlikely to be significantly impacted by the project. Although a small proportion the pools may be impacted by direct loss of habitat, it is unlikely to impact the overall amphibian productivity and thus the Blanding's turtle food sources. Pools adjacent to access roads should remain productive. For example, the ditches along Helmer Rd currently provides ample habitat for breeding amphibians and Blanding's turtles.

Although an important resource to the Blanding's turtles, the spring and early summer foraging habitat has not been considered critical habitat as it is common in the landscape and not likely to be significantly impacted by the Project.

4.2.3 Oviposition Habitat

Oviposition habitat is very common throughout the Study Area. The locations of two old nesting sites were identified in cobblestone substrates during the field surveys. However, there is no reason to believe that the two observed sites are more important to Blanding's turtles than other areas of sunlit cobblestone substrate.

The areas identified as oviposition sites in **Figure 1 (Appendix A)** represent an essential component to the Blanding's turtle's habitat and have specific characteristics (i.e., exposed cobblestone substrate) that are crucial to a part of the turtle's life history. The oviposition habitat is not sensitive to disturbance, nor is it likely to be negatively impacted by the Project. Although a small proportion of the cobblestone habitat will be covered by access roads and gravel pads, it will have a negligible impact on the availability of this habitat. In fact, the edges of access roads and gravel pad are likely to provide additional oviposition habitat, resulting in a net gain.

Although oviposition habitat is an essential habitat for Blanding's turtles, it is abundant throughout the study area and does not appear to be a limiting factor to the local population. In addition, this habitat type is unlikely to be impacted by the proposed project. Therefore, oviposition habitat has not been considered critical habitat within the Ostrander Point Study Area.

4.2.4 Aestivation

Potential aestivation habitat is uncommon within the Ostrander Point Study Area, restricted to the two areas shown in **Figure 1 (Appendix A)**. Additional aestivation habitat appears to occur within the forest and swamp communities the run along the watercourses north and east of the Study Area.

Aestivation habitat would be sensitive to disturbance, in particular if vegetation is removed. However, as aestivation appears to be an uncommon behavior for Blanding's turtles in Ontario, the importance of aestivation habitat is unclear.

Overall, as the aestivation sites do not appear to be an essential habitat for Ontario Blanding's turtles and as more extensive potential habitat appears to occur on lands adjacent to the Study Area, aestivation habitat within the Ostrander Point Study Area has not be considered critical habitat.

4.2.5 Nursery

Within the Study Area, nursery habitat is limited to the two permanent wetlands in the southeastern portion of the Study Area. Within the local landscape, other potentially suitable nursery habitat appears to occur within the marsh and thicket swamp of the South Bay Coastal Provincially Significant Wetland, approximately 1 km west of the Study Area. As the South Bay wetland nursery habitat is beyond the range of hatchlings, it is likely that most, or all, of the

Blanding's turtle hatchlings that emerge within the Study Area use the two on-site wetlands as a nursery site. As such, these habitats would be considered essential to the local population.

As these wetlands are considered essential and would also be sensitive to disturbance or encroachment, they should be considered critical habitat within the Ostrander Point Study Area.

4.2.6 Summary of Critical Habitat

Figure 2 (Appendix A) summarizes the critical habitat for Blanding's turtles within the Ostrander Point Study Area. The critical habitat is comprised of the overwintering and nursery habitat, both located within the two permanent wetlands in the southeastern portion of the Study Area. A 120 m setback around these habitats has been added to the critical habitat, as a buffer to avoid disturbance or encroachment.

The results of the field surveys found that spring and early summer foraging and oviposition habitats to be abundant and not a limiting factor within the Study Area. In addition, foraging and oviposition sites are unlikely to be significantly impacted by the Project. Therefore, these habitats were not considered critical habitat, within the context of the Ostrander Point Study Area.

Potential aestivation habitat was limited within the Study Area and could be negatively impacted by the proposed project through vegetation removal. However, aestivation habitat may not be critical for Blanding's turtles in Ontario, whom appear to rare aestivate. In addition, more extensive potential aestivation habitat occurs in the surrounding landscape. Therefore, this habitat was not considered critical habitat within the context of the Ostrander Point Study Area. It should be noted that considerable aestivation habitat is captured within the 120 m setback surrounding the permanent wetland habitat in the southeastern portion of the Study Area.

4.3 POTENTIAL IMPACTS

4.3.1 Construction

The final site layout has minimized disturbance to the most important habitat features on the Study Area. The length of new access roads, which typically are responsible for the largest amount of disturbed footprint during construction, have been minimized to reduce habitat loss.

Clearing or filling of flooded areas by construction of access roads would result in loss of amphibian breeding habitat. To limit this loss, the layout of the access roads minimizes the distance through areas of seasonal flooding, in particular those areas in the north and western portion of the Study Area that appear to be more commonly used by Blanding's turtles in spring and early summer.

Water quality within the seasonally flooded depressions and roadways could be degraded though increase sedimentation or spills of hazardous materials (i.e. gasoline). Degradation of

water quality could result in decreased amphibian breeding productivity and therefore decreased food sources for Blanding's turtles.

Loss of potential nesting sites for Blanding's turtles is not anticipated to be a significant concern. Construction of gravel access roads will likely increase the availability of nesting sites.

There are no turbines or infrastructure within 120 m of the permanent wetlands that provide critical habitat for overwintering and juvenile turtles. It is believed that the setbacks to these areas are sufficient that the disturbance due to construction activity, such as increased traffic, noise, or dust, will be negligible in scale.

Blanding's turtles are likely to be at an increased risk of accidental injury or mortality during construction. In particular, equipment moving through flooded pools in the spring and early summer may result in injury to Blanding's turtle. Turtles using access roads as basking sites or for movement are also likely to be at an increased risk. Loss of adult Blanding's turtles, due to accidental mortality, could have a significant negative impact on the local populations.

Sensory disturbance to Blanding's turtles may occur during all phases of the Project as a result of increased on-site human activities (e.g. site preparation, turbine assembly, maintenance activities). However, sensory disturbances would be most intense during the construction period.

4.3.2 Operation

Given the minimum 120 m setback to Blanding's turtle critical habitat within the permanent wetlands, no appreciable potential indirect impacts to the physical or hydrological characteristics of the wetlands are anticipated.

As the Project will be situated in currently undisturbed areas, there are potential indirect disturbance effects to Blanding's turtles from the turbines or an increase in human activity. However, current recreational activities provide some disturbance, and the Blanding's turtles currently occupying the Study Area are not known to be particularly wary of human activity. It is anticipated that they will adapt to the presence of the operational facility.

Potential direct impacts include increased risk of mortality on new access roads, which may experience an increase in traffic over current conditions.

Predation of nests appears to be a limited factor to Blanding's turtle populations. If predators within the Study Area (i.e. coyotes, red fox) use access roads to traverse through the habitat, Blanding's turtles that oviposition in newly created habitat along the edges of these access roads may be at higher risk of nest predation.

Potential direct impacts may also arise from increased access and awareness of the local Blanding's turtle population, resulting in poaching for the pet trade.

4.4 RECOMMENDED MITIGATION

4.4.1 Construction

Efforts have been made to site the Project infrastructure along existing roadways to limit clearing of natural areas. However, limited clearing of natural vegetation will be required. As appropriate and prior to construction the limits of vegetation clearing will be staked in the field. The Construction Contractor will ensure that no construction disturbance occurs beyond the staked limits and that edges of sensitive areas adjacent to the work areas are not disturbed.

The final site plan incorporated changes to access road locations, resulting in disruption to only a small proportion of depressions and roadways that flood in the spring and early summer, leaving abundant amphibian breeding habitat. Overall, the total vegetation clearing will represent a very small proportion of the habitat in the Study Area, leaving adequate habitat for the Blanding's turtle population.

Where possible, road construction and site preparation should occur between October and late March, when Blanding's turtles are overwintering in the permanent wetlands. These areas are outside of the proposed work areas and have been afforded a minimum setback of 120 m. The implementation of the setback to critical wetland habitat will attenuate disturbance effects due to construction activity and facility operation.

If construction activities from April to September are unavoidable, every attempt must be made to avoid harassment or injury to Blanding's turtles to avoid contravention of the Ontario's *Endangered Species Act* (2007). Immediately prior to vegetation clearing or road construction and/or improvements, a qualified biologist should carefully search all work areas to identify the presence of Blanding's turtles. Where Blanding's turtles are observed, all construction activity would be halted until the Blanding's turtle vacates the construction area of its own accord.

Injury to Blanding's turtles on roadways while basking, nesting or terrestrial movement may occur during all phases of the Project. However, the potential for road kills will be minimized by instituting reduced speed limits for construction and maintenance vehicles and education of construction staff including turtle crossing signage.

Where necessary, the implementation of standard construction mitigation measures, as outlined in the ERR (Stantec 2008), to prevent soil erosion and sedimentation should be implemented to ensure that seasonally flooded areas of amphibian breeding habitat are not adversely affected.

Appropriate precautions and treatment of waste and hazardous material, as outlined in the draft ERR, is recommended to avoid accidental contamination of habitat.

4.4.2 Operation

Injury to Blanding's turtles on roadways while basking, nesting or crossing may occur during the operation of the Project. However, the potential for road kills will be minimized by instituting reduced speed limits for maintenance vehicles and education of maintenance staff including turtle crossing signage.

To minimize awareness to the presence of Blanding's turtles, in an effort to avoid poaching, on-site signage should be discreet about species presence. It is likely that the presence of the operating facility with surveillance and maintenance staff will deter illegal activity within the project area, thus discouraging poaching.

Indirect impacts to Blanding's turtle, including avoidance impacts, are not anticipated during the operations phase of the Project.

4.5 NET EFFECTS

There are no turbines within 120 m of the nearest permanent wetland of critical habitat. It is believed that the setback to these areas is sufficient that the disturbance due to construction activity with standard mitigation measures will be temporary in duration and negligible in scale.

Though the effects are anticipated to be minimal, there is some potential for disturbance of natural features and habitats during construction of the Project as a result of the limited removal of vegetation and increased human activity. However, these effects are expected to be short-term in duration and spatially limited to the work areas.

Loss of adult Blanding's turtles, due to accidental mortality, could have a significant negative impact on the local populations. However, current site activities (e.g. recreational vehicle use) have a similar potential effect, and through implementation of appropriate construction and post-development mitigation measures, the risk of accidental injury or mortality to Blanding's turtles can be significantly reduced.

4.6 SIGNIFICANCE OF NET EFFECTS

Installing the various Project components is anticipated to have limited effect on the Blanding's turtle habitat. The final Project layout will avoid critical Blanding's turtle habitat and result in minimal loss of other habitat features.

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DRAFT

Appendix A

Figures

DRAFT



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- Study Area
- Turbine
- Proposed Transmission Line
- Transformer Station
- MET Tower
- Proposed Access Road
- Existing Road
- Watercourse
- ELC Vegetation Community
- Blanding's Turtle Observation
- Indicates Approximate Blanding's Turtle Location
- Nest Observation
- Over Wintering and Nursery Area
- Oviposition Area
- Spring Foraging Area
- Aestivation

ALO1-4 Poverty Grass Open Alvar Meadow
 ALS1-1 Common Juniper Shrub Alvar

ALT/SWD Bur Oak Treed Alvar / Red Ash Deciduous Swamp Complex

FOC2-1 Red Cedar Coniferous Forest
 FOM Red Cedar / Bur Oak Mixed Forest

SWD2-2 Red Ash Mineral Deciduous Swamp
 SWD4-1 Crack Willow Mineral Deciduous Swamp
 SWT Mineral Thicket Swamp

MAS2-4 Broad-leaved Sedge Mineral Shallow Marsh

Sources: Ontario Ministry of Natural Resources 2009.
 Google Earth Pro 2009

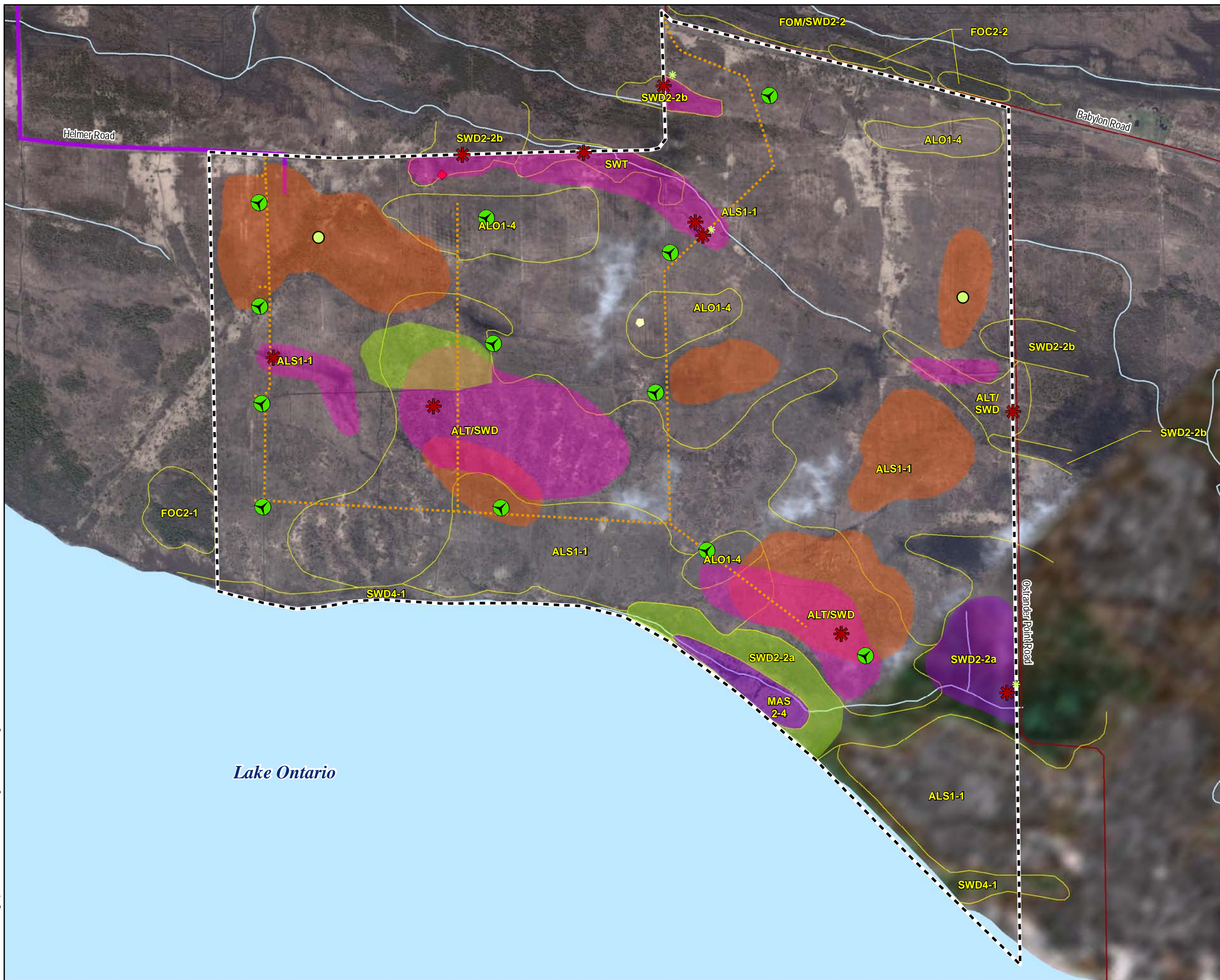
PREPARED FOR:
 GILEAD POWER
 OSTRANDER POINT WIND ENERGY PARK

FIGURE NO. 1

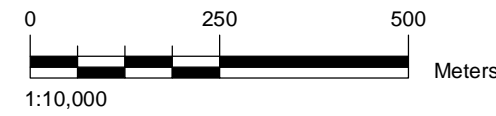
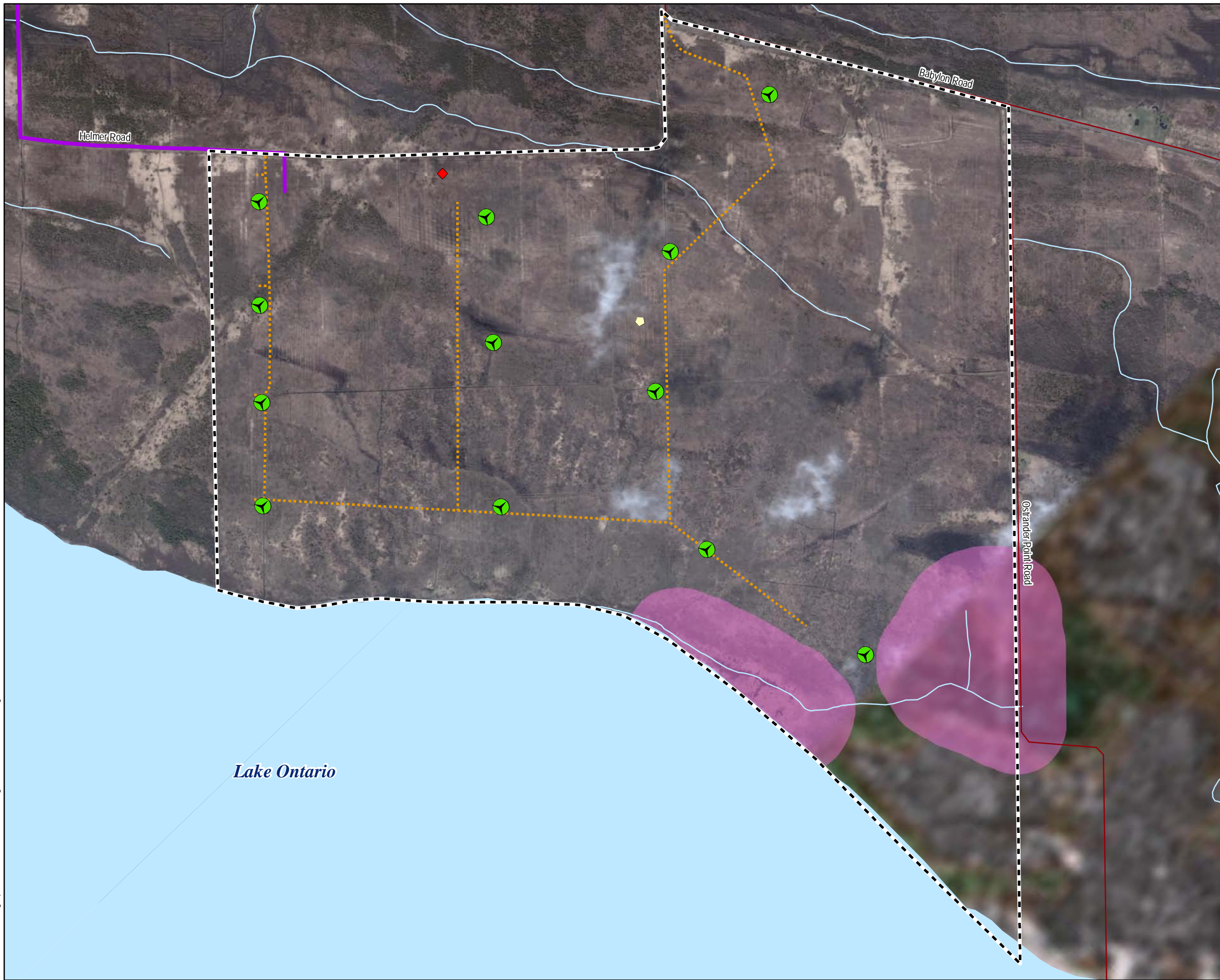
BLANDING'S TURTLE HABITAT










Date: October 14, 2009

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-  Study Area
-  Turbine
-  Proposed Transmission Line
-  Transformer Station
-  MET Tower
-  Proposed Access Road
-  Existing Road
-  Watercourse
-  Critical Blanding's Turtle Habitat Including 120m Set Back

Sources: Ontario Ministry of Natural Resources 2009.
Google Earth Pro 2009

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OSTRANDER POINT WIND ENERGY PARK

FIGURE NO. 2

CRITICAL BLANDING'S TURTLE HABITAT

Date: October 13, 2009

Appendix B

**Blanding's Turtle Survey Work Program,
2009**



Stantec

Stantec Consulting Ltd.
Suite 1 - 70 Southgate Drive
Guelph ON N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

May 12, 2009
File: 160960369

Ministry of Natural Resources
300 Water Street, P.O. Box 7000
Peterborough, ON K9J 8M5

Attention: Melissa Laplante, Species At Risk Biologist

Dear Ms Laplante:

**Reference: Ostrander Point Wind Energy Park
Blanding's Turtle Survey Work Program, 2009**

Presented below is the proposed work program for the Blanding's turtle habitat assessment of the Ostrander Point Wind Park study area. We are providing the work program at this time to obtain your input on the development of our survey methodology.

SUMMARY OF BLANDING'S TURTLE HABITAT AND BEHAVIOR

Blanding's Turtles are known to hibernate in aquatic habitats with organic substrates, typically in the deepest sections of marshes, ponds and creeks (Erb and Bol, 2006). They less commonly use vernal pools if they hold water through the winter months. Occasionally individuals will also overwinter under hummocks in maple swamps (Erb and Bol, 2006). They typically emerge from their hibernating habitat in April. Upon emerging from hibernation, Blanding's turtles typically leave permanent wetlands and move overland into vernal pools or thicket swamps (Erb and Bol, 2006). Within the Ostrander Point study area, this spring/early summer habitat consists of flooded shrubby alvar. Courtship and mating occurs in spring and early summer, typically taking place in standing water (Erb and Bol, 2006).

Nesting typically occurs in June, a time of year in which females are reported to be most active (Innes et al., 2008). The females usually begin nesting and egg laying during daylight and continue until into the evening (Erb and Bol, 2006). Eggs hatch in August and early September with the hatchlings moving into aquatic habitat. During the heat of summer months, adult Blanding's turtles may enter a state of estivation. Estivation sites are terrestrial, occurring in forest or forest edge habitat under leaf litter, grassy vegetation, logs or brush (Erb and Bol, 2006). Blanding's turtles typically move back to hibernating habitats in October.

WORK PLAN

Hibernating habitat

The identification of potential hibernating sites will be based on a habitat assessment. Blanding's turtles require permanent standing water through the winter, deep enough to maintain water below the ice. During extensive winter fieldwork in 2009, communities that contained deeper (i.e. greater than 30 cm) standing water were noted. These communities will be mapped as potential hibernating habitat of the Blanding's turtles.

**Reference: Ostrander Point Wind Energy Park
Blanding's Turtle Survey Work Program, 2009**

Spring and early summer habitat; including potential courtship/mating habitat

Two Blanding's turtle surveys are proposed for May, focused on identifying areas of vernal flooded alvar which are being used by Blanding's turtles. Flooded areas will be searched on foot to detect Blanding's turtles. Given the shallow water in these communities, turtles sitting on the bottom will be detectable. However, the dense thicket nature of some flooded communities will hinder the ability to detect all turtles. Therefore, effort will be made to conduct the surveys on sunny days with lower ambient temperatures, when the turtles are likely to be basking. Potential basking areas such as roadways or patches of open gravelly substrate will be searched in the vicinity of flooded areas. The May surveys will take place in mid-morning to early afternoon, when temperatures are cooler.

Nesting Habitat

Two surveys are proposed for June to characterize and map potential nesting habitat. The June surveys will take place in mid to late afternoon in an attempt to observe nesting females (should a nesting female be observed, the area will be left immediately as to not disturb her). It is recognized that it may be difficult to observe females in the act of nesting/egg laying. Therefore a habitat assessment will also take place to identify potential nesting locations. Blanding's turtles typically avoid nesting in grassy vegetation, choosing instead to use sparsely vegetated areas. Within the Ostrander Point study area, sparsely vegetated areas consisting of a gravelly/rubble substrate occur in small pockets throughout the site. During the fieldwork conducted to date in the Ostrander Point study area, two old Blanding's turtle nests have been found; both of which were located in such sparsely vegetated, gravelly/rubble pockets. Significant areas of this potential nesting habitat will be mapped during the June surveys.

As stated above, two old Blanding's turtle nests have been found within the Ostrander Point study area, the location of which will be used to help map nesting habitat. These nests consisted of egg shell remains in a shallow depression. There is potential to detect additional old nests during all future on-site fieldwork. Should more nests be located, their locations will be noted and used to map nesting habitat.

Estivation

One site visit is proposed for July. The focus on this site visit will be to focus on potential estivation habitat. Given the Blanding's turtle's secrecy during this time of year, it will be very difficult to make actual observations. Therefore, a habitat assessment will be completed to identify areas with higher probability of supporting estivating Blanding's turtles. Factors that will be used to assess estivating habitat will include % tree cover (give shade cover), extent of grassy vegetation or leaf litter and presence of structure that provide shelter such as logs or thick brush.

Hatchling Habitat

One site visit is proposed for August to focus on hatchling emergence. Young Blanding's turtles are very rarely seen, so observations of hatchlings are not anticipated. It is known that Blanding's hatchlings typically move from the terrestrial nesting sites into aquatic habitats. The August survey will therefore focus on mapping the extent of standing water in the study area during late summer (i.e. potential habitats of Blanding's turtle hatchlings).

May 12, 2009
Melissa Laplante
Page 3 of 3

**Reference: Ostrander Point Wind Energy Park
Blanding's Turtle Survey Work Program, 2009**

SUMMARY

It is our opinion that the above work program will identify areas within the Ostrander Point study area that are of higher importance to the Blanding's turtles. It is not anticipated that the number of Blanding's turtles using the study area will be accurately assessed. Turtles are very secretive and therefore, only a portion of the population is likely to be observed. In addition, some individuals may only use the study area for a portion of the year. However, the work program should give a general impression of the population in the area.

Thank you for your review of this work program. We would welcome any comments or suggestions you may have. Recognizing the survey period for Blanding's turtle has begun, we would appreciate comments at your earliest convenience. We anticipate the first survey to be conducted on May 13, 2009 (weather permitting); if comments pertaining to the spring surveys could be provided before this date it would be greatly appreciated.

Sincerely,

STANTEC CONSULTING LTD.



Andrew Taylor
Terrestrial Ecologist
Tel: (519) 836-6050
Fax: (519) 836-2493
andrew.taylor@stantec.com

c. Valerie Wyatt, Stantec Consulting Ltd.
Marnie Oliver, Gilead Power Corporation

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