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Natural environment assessment (existing conditions):

Airport Road Study Area

September 2011

Natural environment assessment (existing
conditions): Airport Road Study Area,
Peterborough, Ontario

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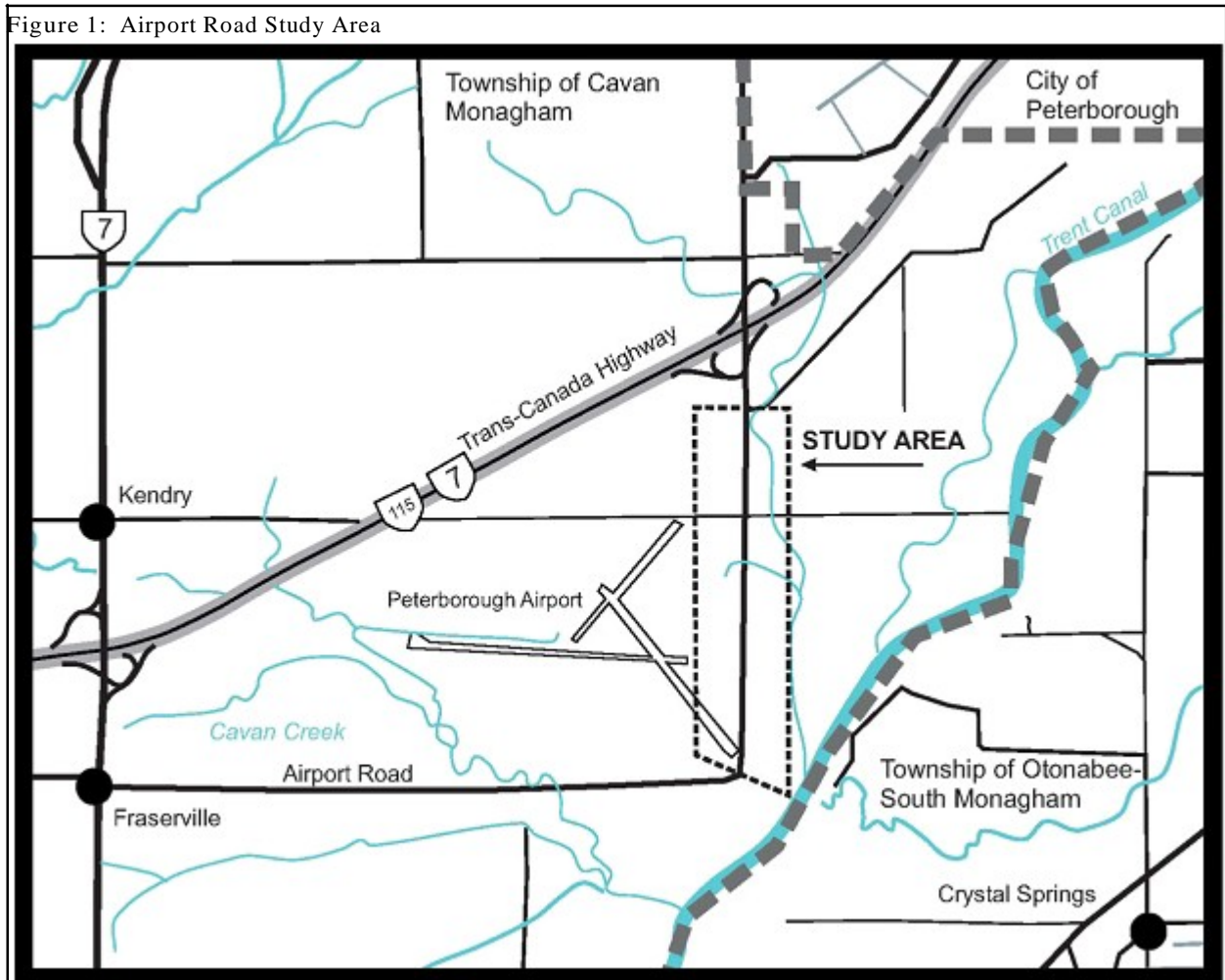
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Prepared for:
Genivar Inc.,
Ottawa, Ontario

1. Introduction

A natural environment assessment was undertaken of those lands affected by the closure or realignment of portions of Airport Road resulting from the runway extension at the Peterborough Airport in the Township of Otonabee - South Monaghan, Peterborough County (Figure 1). On-site investigations were conducted within or adjacent to the study area on 6 and 7 September 2010, 1 November 2010 and 14 April 2011. More seasonally appropriate (prime season) field

Figure 1: Airport Road Study Area



investigations were conducted 29 June 2011. All field investigations were undertaken by Daniel F. Brunton.

The assessment of ecological features and function potential was undertaken in natural habitats in the area extending westward to CR 28 (Fraserville) and northward to Highway 115, to address the natural environment implications of possible alternatives for Airport Road and associated transportation developments.

The purposes of the investigation were as follows:

- 1) to evaluate natural environment conditions and ecological significance within the study area;
- 2) to identify potential impacts of the roadway realignment on the apparent and potential natural environment values within and/ or in adjacent to the study areas; and
- 3) to identify ecologically appropriate mitigation opportunities.

Particular attention was paid to wildlife movement considerations and for the potential presence of Species At Risk (SAR), especially to the potential presence of Butternut (*Juglans cinerea*). Butternut is a federally (SARA) and provincially (SARO) designated Endangered Species (Canada 2003, Ontario 2007, respectively) that occurs commonly in southern Ontario.

All major habitats in the study area were examined on foot and from the existing roadways, with aerial photography at hand. Field notes were taken during these investigations and photographic documentation was obtained for some features and landscapes. Where possible (i.e. technically possible and with no negative impact), voucher specimens were secured and processed to permanently document suspected or known populations of significant plant species. Reviews of local and regional literature and natural environment data sources were conducted during and after the on-site investigations, as noted below.

A preliminary assessment was prepared (Brunton 2011) to provide the project study team with sufficient natural environment information to enable ecologically informed decisions to be made during the Technically Preferred Alternative (TPA) selection process. The review of roadway Alternatives and selection of the TPA occurred on 23 March 2011. A final on-site natural environment assessment was undertaken in June 2011 primarily to address native biodiversity, potentially significant features and ecological function representation in the TPA area.

2. Site context

The landscape in the Airport Road Study Area is relatively level, especially adjacent to the airport itself, being within the extensive post-glacial sand plain that developed adjacent the Otonabee River Valley in the western portion of the Peterborough Drumlin Field (Chapman 1984; Chapman & Putnam 1984). The underlying Ordovician limestone bedrock (Freeman 1979) is deeply buried, with no outcropping being evident.

Cavan Creek crosses the study area, draining from west to east and into the Otonabee River. No extensive open water bodies occur here, although the high water table in the east and north result in numerous small, seasonal and semi-permanent shallow pools. These are particularly numerous north of Mervin Line Road (Niblett 2005).

Much of the upland landscape has been substantially impacted by land clearance, initially for agricultural and later for airport development. Natural forest now covers a minority of the study area (ca. 40%), typically represented by young forest and scrub in upland areas. Agricultural activity continues in the western portion of the study area near CR 28.

3. Natural Habitats

As noted above, the diversity of natural habitat is limited in the Airport Road Study Area as a result of a long history of disturbance. The vegetation represented in these habitats compares closely to common vegetation types described in the Southern Ontario Vegetation Classification system (Lee et al. 1998). The broadly defined habitat types found here include the following:

1) Low Upland Coniferous Forest - young to submature White Cedar, forming either pure groves or mixed with Balsam Fir, Trembling Aspen, White Spruce and White Elm, commonly dominates the low landscape north of Mervin Line Road. These groves occur within a forested area also including deciduous woodland and frequently are interrupted by small, linear (north-south trending) wetland swales. Ground vegetation is depauperate in this habitat.

2) Low Upland Deciduous Forest - young deciduous forest dominated by Trembling Aspen, Red

Maple, Green Ash and White Elm is more widespread than coniferous forest in the low ground north of Mervin Line Road (Figure 2) and eastward along the Otonabee River. The more open canopy and less acidic soil of the deciduous woodland supports a diversity of common woodland herbaceous species with greater representation by grasses, ferns and sedges.

Figure 2: Low Upland Deciduous Forest along Mervin Line Road



3) Deciduous Swamp Forest - this wetland habitat is surprisingly uncommon given the extent of semi-permanently flooded and saturated ground in the study area, but is represented by young to submature Green Ash, White Elm and Red Maple Forest along the Otonabee River and, to a much smaller extent, north of Mervin Line Road. Submature to mature Silver Maple (and/ or hybrid maple) are locally common around and over wetland swales north of Mervin Line Road and east along the Otonabee River floodplain as well. The undergrowth in this forest cover is composed largely of common native and non-native wetland herbaceous and shrubs.

4) Deciduous Swamp Thicket - Field Willow and Speckled Alder thickets dominate open scrubby wetland along the inland portion of the Otonabee River flood plain and to a much smaller degree north of Mervin Line Road. Herbaceous undergrowth is predominately composed of species dominant in the marsh habitat (see Open Marsh, below).

5) Open Marsh - Cat-tail (*Typha latifolia*) dominates extensive open areas along the Otonabee River flood plain as well as more deeply flooded open swales north of Mervin Line Road. It is heavily infested by non-native Canary-grass (*Phalaris arundinacea*) and, north of Mervin Line Road, Giant Manna-grass (*Glyceria maxima*). Small pools of open water within the marsh vegetation, especially north of Mervin Line Road, are covered by a dense growth of common aquatic species such as Duckweed (*Lemna minor*).

6) Cultural Meadow and scrub - a wide variety of common native and non-native shrubs and herbaceous species are present in the regenerating field, rough pasture, hedge rows and roadsides

that dominate most of the non-forested uplands of the study area.

4. Native Biodiversity

4.2 Floristic diversity

Native flora and fauna appear to be representative of similar disturbed low upland areas in Peterborough County and across southern Ontario (pers. obs.), with all native species observed (154 taxa) being found commonly over this larger area as well. The naturalness of this flora, with an average Coefficient of Conservation (CC) rating of 4.06, is representative of moderately disturbed woodlands across southcentral and southeastern Ontario. The total list of native vascular plant species observed in the Airport Road Study Area and their CC ratings are reported in Appendix 1.

4.2 Breeding migratory birds

The dominance of young, disturbed and fragment forest habitat is reflected by a preponderance of common species of woodland edges occurring throughout the uplands habitats of the study area. Species observed here in 2010 and 2011 include the following:

Canada Goose	flying over
Wood Duck	
Mallard	
Turkey Vulture	flying over
Red-tailed Hawk	
Killdeer	
American Woodcock	
Ring-billed Gull	flying over
Mourning Dove	
Great Horned Owl	feather

Downy Woodpecker	
Northern Flicker	
Eastern Wood Pewee	
Eastern Kingbird	
Red-eyed Vireo	
Blue Jay	
American Crow	
Barn Swallow	
Black-capped Chickadee	
White-breasted Nuthatch	

House Wren	
American Robin	
Gray Catbird	
Cedar Waxwing	
Yellow Warbler	
Common Yellowthroat	
Chipping Sparrow	
Song Sparrow	

Northern Cardinal	
Rose-breasted Grosbeak	
Bobolink	
Red-winged Blackbird	
Common Grackle	
American Goldfinch	

4.3 Other fauna

Common mammals species observed either directly or by signs (tracks, droppings, etc.), include Raccoon, American Beaver, White-tailed Deer (commonly associated with the coniferous forest area), Red Squirrel, Eastern Chipmunk and Striped Skunk. Mink and Muskrat were also reported by Huizer et al., (1995a and 1995b).

Similarly, common species of amphibians (Green Frog, American Toad and Leopard Frog) were noted here. Wood Frogs, a species of more extensive woodlands and wetlands, was noted in wetlands north of Mervin Line Road. Painted Turtle were seen (rarely) in the woodland swales north of Mervin Line Road. Snapping Turtle was reported from the Otonabee River wetland and the wetland complex north of Mervin Line Road (Huizer et al., 1995a and Huizer et al., 1995b) but was not observed in either area during the present study. Eastern Garter Snake was observed in the low woodlands north of Mervin Line Road during this study.

5. Ecological Function Representation

5.3.1 Representation and Condition

Due to a long history of habitat fragmentation and site disturbances, the study area offers limited representation of intact, native habitats. The upland forest north of Mervin Line Road could be considered representative of similarly disturbed low woodlands found commonly across south-central and southeastern Ontario. Similarly, the extensive wetland along the Otonabee River also provide a

measure of representation of wetland habitats found commonly in south-central and southeastern Ontario (Lee et al. 1998).

5.3.2 Wildlife Corridor and Ecological Linkages

The study area is located within a larger area of the more or less continuous upland and swamp forest extending northward - albeit, significantly interrupted by the Highway 115 corridor. Local wildlife movement south of Highway 115 is facilitated by the continuous woodland cover north of Mervin Line Road, and along the Otonabee River, but that function largely ceases west of CR 28. North - south movement is significantly hampered by the wide barrier presented by Highway 115 corridor, although a degree of sub-roadway wildlife passage is achieved at the Cavan Creek bridge (Figure 3).

Essentially continuous natural habitat along the Otonabee River provides an important corridor for local plant and animal movement. Recent clearing of forest cover between the end of the extended runway and the rivershore (Figure 4) presents at least a partial interruption to upland and riparian wildlife corridor functions, however.

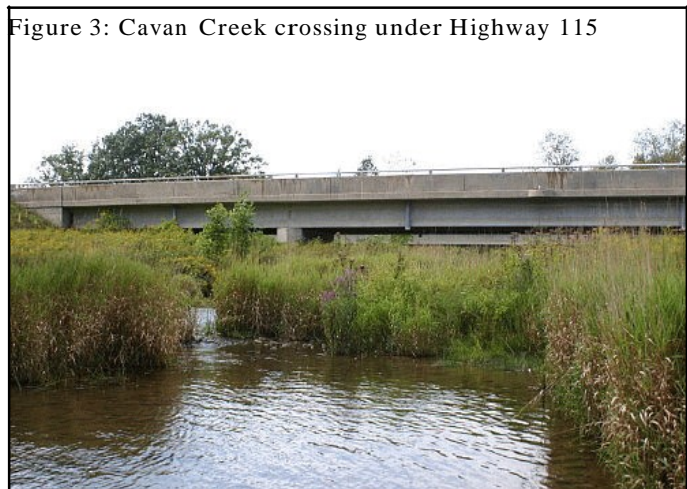


Figure 3: Cavan Creek crossing under Highway 115

5.3.3 Wildlife Concentration Areas

No areas of significant wildlife concentration are reported or evident within the study area, although Huizer et al (1995a) suggest that waterfowl concentrations may occur in the Otonabee River Wetland. The predominantly forested nature of the Otonabee River Floodplain Wetland in the vicinity of the proposed roadway Alternatives (Figure 6) substantially reduces this potential in the study area.



Figure 4: cleared riparian forest east between extended runway and Otonabee River shore

6. Ecological significance

6.1 Significant Flora (see also 8.0 Additional TPA Existing Condition Considerations)

No vascular plant Species At Risk (SAR) were noted or are reported from the study area, nor were any provincially rare taxa (Oldham and Brinker 2009) noted or reported. Large populations of Mermaid-weed (*Proserpinaca palustris*) (Figure 5), and Arrow-leaved Aster (*Symphyotrichum urophyllum*) found by the marshy pond on the east side of Airport Road opposite the airport complex represent uncommon species in Peterborough County and may constitute Regionally significant values. The same could be said for Gray Sedge (*Carex grisea*) found on the Otonabee River shoreline levee east of the runway extension.

Figure 5: potentially Regionally Significant Mermaid-weed (*Proserpinaca palustris*) at Peterborough Airport pond



6.2 Significant Fauna

Two designated bird SAR, Least Bittern and Bobolink, are reported from the vicinity of the Airport Road Study Area.

The Least Bittern is reported from some time prior to 1995 from wetland habitat between Mervin Line Road and areas north of Highway 115 (Huizer et al. 1995b). No suitable habitat exists for this species in the vicinity of the roadway alternatives considered in study area portion of this wetland, however.

Two Bobolink were observed flying over open agricultural land near CR 28 in September 2010. This post breeding season observation likely represented migratory individuals. This recently designated SAR breeds only in transformed, non-natural agricultural habitats in southern Ontario (Gahbauer 2007). None were noted in suitable habitat during the 2011 breeding season.

Habitat for a designated SAR reptile (Blanding's Turtle) is known from the larger Peterborough area and also exists in the wetlands north of Mervin Line Road. Similarly, habitat for a recently federally

designated and potentially provincially designated SAR amphibian, the Western Chorus Frog, occurs along the Otonabee River wetland and adjacent to the airport. A survey was specifically conducted for this spring-calling species in the study area on 14 April 2011. Neither Blanding's Turtle nor Western Chorus Frog have been detected within the study area, however.

6.3 Significant Ecological Functions (see also 8.0 Additional TPA Existing Condition Considerations)

The study area does not appear to support more than locally significant ecological functions (biodiversity representation, significant wildlife concentrations, wildlife corridors). The latter is potentially of a higher level of significance, as study area woodlands provide a link between natural habitat to the north with the Otonabee river corridor. The barrier presented by the Highway 115 corridor between the study area natural habitats and those to the north lessens this potential, however.

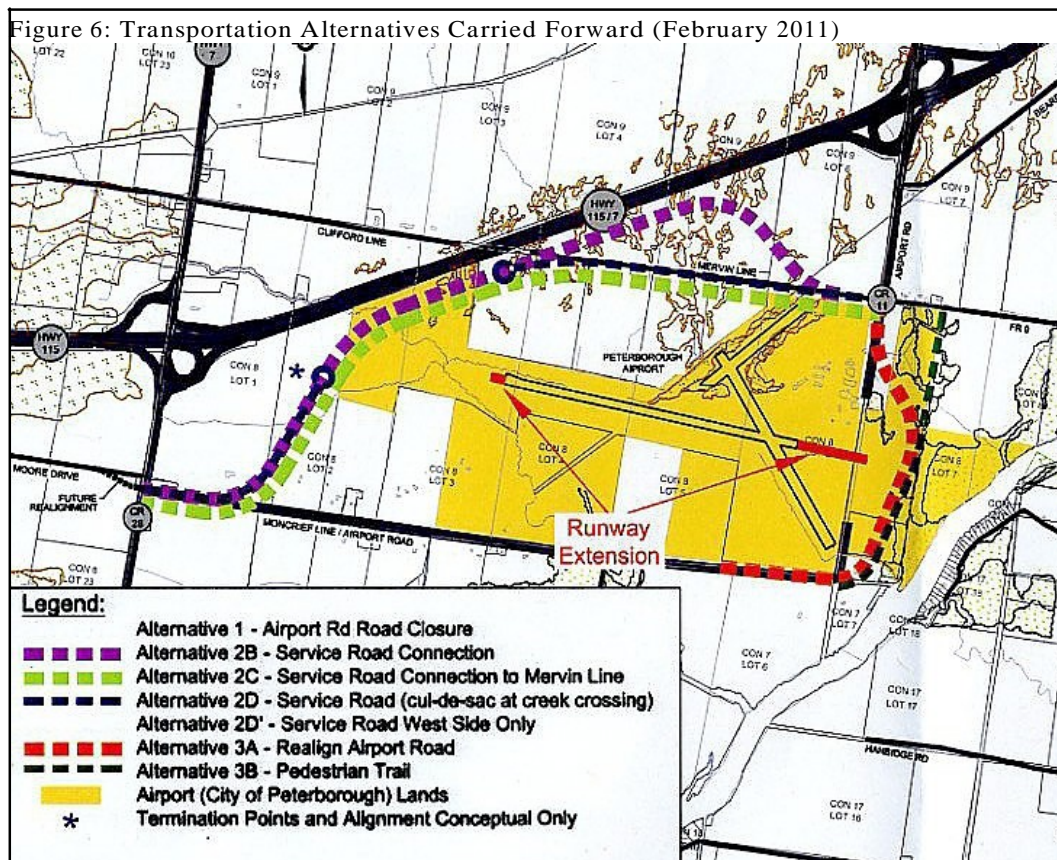
6.4 Significant Areas (see also 8.0 Additional TPA Existing Condition Considerations)

While no Areas of Natural and Scientific Interest (ANSI) have been designated in or adjacent to the Airport Road Study Area, two classified wetlands are present. The Otonabee River Floodplain Swamp Complex (Huizer et al. 1995a) marking the eastern boundary of the study area is not a Provincial Significant Wetland (PSW) protected under the terms of the Provincial Policy Statement (Ontario 2005) but is considered to be of Regional significance (Otonabee Regional Conservation Authority, in lit).

The Peterborough Airport Wetland Complex, containing 101 individual wetland components extending from the vicinity of the airport runways northward across Mervin Line Road and beyond Highway 115, is a designated PSW (Huizer et al. 1995b). Each of these wetland components is located within 750 m of at least one other component with which it is believed to maintain an ecological connection. The total size of the PSW Complex is 107 ha, 35- 40% of which is within the Airport Road Study Area.

7. Development implications

Overall, the negative natural environment implications of potential roadway alterations in the Airport Road Study Area, appear to be minor. There is a significant relative difference between the impact of particular potential roadway alternatives (Figure 6). The natural environment impact implications of the suggested alternatives carried forward for the TPA selection process can be summarized as follows:



Alternative 1 - Airport Road Closure

- no further habitat alteration; no net loss of significance within the study area.

Alternative 2B - Service Road Connection

- significant impact (ca. 20 elements) on the PSW complex; severe fragmentation of the core of woodland north of Mervin Line; significant crossing of Cavan Creek required and negative impact on wildlife corridor capacity results.

Alternative 2C - Service Road Connection to Mervin Line Road

- minor impact (ca. 5 elements) on the PSW complex; significant fragmentation of woodland north of Mervin Line Road; significant crossing of Cavan Creek required and negative impact on wildlife corridor capacity results.

Alternative 2D -Service Road (cul-de-sac at creek crossing)

- minor impact (fewer than 5 elements) on the PSW complex; minor loss of woodland habitat along Mervin Line Road results.

Alternative 2D' - Service Road West Side only

- no natural habitat alteration; no net loss of significance within the study area.

Alternative 3A - Realign Airport Road

- minor negative impact along disturbed edge of Otonabee River floodplain vegetation (Figure 7).

Figure 7: extension of runway towards edge of Otonabee River floodplain (Nov 2010)



Alternative 3B - Pedestrian Trail

- significant terrestrial intrusion into the Otonabee River floodplain wetland.

8.0 Additional TPA Existing Condition Considerations

As noted above, the prime season 2011 on-site investigation focused on the TPA that had been identified in the March 2011 evaluation of roadway Alternatives. The resulting TPA favours a roadway realignment that would parallel the Otonabee River east of the extended airport runway and south of Mervin Line Road.

8.1 Habitats

The landscape in the TPA area is predominately low deciduous forest, composed of both Low Upland Forest and Deciduous Swamp Forest. Trembling Aspen and Red Maple dominated low upland forest in the northern portion of the woodland towards Mervin Line Road (Figure 8) and towards the higher land adjacent the airport runway.

Green Ash, Silver Maple and Red x Silver Maple, with Black Ash occurring locally, dominate the swamp forest southward to and beyond the runway (Figure 9). A large portion of this area has been clear cut for airport sight-line purposes and is no longer treed (Figure 3).

Figure 8: Trembling Aspen dominated upland forest south of Mervin Line Road



Figure 9: Green Ash - maple Swamp forest by Otonabee River east of the airport



A narrow band of mature Red x Silver Maple with Basswood and Green Ash dominate the slightly elevated shoreline levee along the river shore over dense growths of Ostrich Fern (*Matteuccia struthiopteris*).

8.2 Native Biodiversity

The predominantly forested character, similar topography and alluvial substrate of the river side habitats results in a relatively homogeneous ground vegetation with a more or less homogeneous flora and fauna throughout. Although non-native influences such as Buckthorn (*Frangula alnus*) are locally substantial, the ground vegetation is composed largely of native species. Ostrich Fern is especially dominant in the lower, wetter areas of the flood plain. There is representation of typically more

southern flora along the rivershore, including such species as the sedge *Carex grisea*, Hackberry (*Celtis occidentalis*), Moonseed (*Menispermum canadense*), Climbing Poison-ivy (*Toxicodendron radicans*) (Figure 10) and Bristly Cat-brier (*Smilax hispida*). The native biodiversity here is otherwise very similar to elements noted throughout the low woodlands between Mervin Line Road and Highway 115.

Figure 10: Climbing Poison-ivy (*Toxicodendron radicans*) along Otonabee River shore levee



8.3 Significant Features and Functions

No SAR were noted in the TPA area. Butternut seedlings are apparently present south of the cleared area (beyond the reach of the TPA) (EcoTech tree planting crew, pers. comm), but were not observed in the vicinity of the roadway alternatives considered in study area. This designated SAR (Endangered) is possibly remains in small number along the rivershore levee in or near the study area, however, as it commonly occupies such habitat across southcentral and southeastern Ontario.

Buttonbush (*Cephalanthus occidentalis*) shrubs form dense swamp thicket stands in semi-permanently flooded areas of the swamp forest. When occurring in extensive stands, this constitutes a Provincially Rare vegetation type (Bakowsky 1996). Although robust and extensive (Figure 11), the stands in the study area appear to be too small to constitute stand-alone examples of this vegetation.

Figure 11: Buttonbush thicket swamp near Otonabee River



Hackberry (*Celtis occidentalis*) trees occur along the Otonabee River levee, extending north along the rivershore from the airport runway extension. This uncommon (Regionally Significant?) Tree was found in the Low Upland and Deciduous Swamp Forest habitat east of the runway in 2010 (H. Bickerton, pers. comm.). Most of these individuals were evidently destroyed when

that area was clearcut for runway clearance reasons. Several small trees remain here along the Otonabee river levee, however, and some very large individual Hackberry trees persist near riverside residences close to Mervin line Road (Figure 12).

As noted previously (see 6.3 Significant Ecological Functions and 6.4 Significant Areas, above), ecological functions and Significant Area values are notable here at a local level. No designated Regional or

Provincial level significant areas occur within or near the TPA area or the larger Airport Road Study Area. While the wildlife corridor function and native biodiversity representation of the TPA area contribute locally and would be negatively impacted, no higher level loss of ecological significance is implied by potential development of the TPA.

Figure 12: large Hackberry tree (between shed and building) along Otonabee River shore



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Appendix 1: Native vascular flora observed within the Airport Road Study Area (2010 - 2011)

The scientific names of the native vascular plant species, subspecies and hybrids observed in the study area are listed below in alphabetical order within plant families arranged in natural (checklist) order. This is followed by a common English name and the southern Ontario Coefficient of Conservatism (CC) value for this taxon. For taxa not provided with a southern Ontario CC value in Oldham et al. (1995), such as hybrids involving native species (and marked with an asterisk [*]), an estimated value has been assigned here. Species with a CC rating of 7 or better (CC number bolded) typically require sites with a relatively high level of ecological integrity. The unique accession number for vascular plant voucher specimens is recorded in the 'Notes' column, as appropriate.

SPECIES/ TAXON	COMMON NAME	NOTES	CC
EQUISETACEAE (Horsetail Family)			
<i>Equisetum arvense</i> L.	Field Horsetail		0
<i>Equisetum fluviatile</i> L.	Water Horsetail		7
<i>Equisetum hyemale</i> L.	Scouring Rush		2
<i>Equisetum scirpoides</i> Michx.	Dwarf Scouring-rush		7
<i>Equisetum variegatum</i> Schleich.	Variegated Scouring-rush		5
OSMUNDACEAE (Flowering-fern Family)			
<i>Osmunda cinnamomea</i> L.	Cinnamon Fern		7
<i>Osmunda regalis</i> L. var. <i>spectabilis</i> (Willd.) Gray	Royal Fern		7
DENNSTAEDTIACEAE (Bracken Fern Family)			
<i>Pteridium aquilinum</i> (L.) Kuhn var. <i>latiusculum</i> (Desv.) Underw.	Bracken		2
THELYPTERIDACEAE (Marsh Fern Family)			
<i>Thelypteris palustris</i> (Salisb.) Schott	Marsh Fern		5
DRYOPTERIDACEAE (Woodfern Family)			
<i>Athyrium filix-femina</i> (L.) Roth var. <i>angustum</i> (Willd.) Lawson	Lady Fern		4
<i>Dryopteris carthusiana</i> (Vill.) Fuchs (<i>D. spinulosa</i> (Muell.) Watt)	Spinulose Woodfern		5
<i>Dryopteris intermedia</i> (Muhl.) A. Gray	Evergreen Woodfern		5
<i>Dryopteris marginalis</i> (L.) A. Gray	Marginal Shieldfern		5
<i>Matteuccia struthiopteris</i> (L.) Todaro	Ostrich Fern		5

Natural Environment Assessment: Airport Road Study Area

<i>Onoclea sensibilis</i> L.	Sensitive Fern		4
PINACEAE (Pine Family)			
<i>Abies balsamea</i> (L.) Mill.	Balsam Fir		5
<i>Larix laricina</i> (Du Roi) K. Koch	Larch		7
<i>Picea glauca</i> (Moench) Voss	White Spruce		6
<i>Pinus strobus</i> L.	White Pine		4
<i>Tsuga canadensis</i> L.	Eastern Hemlock		7
CUPRESSACEAE (Cypress Family)			
<i>Juniperus communis</i> L.	Common Juniper		4
<i>Thuja occidentalis</i> L.	White Cedar		4
TYPHACEAE (Cat-tail Family)			
<i>Typha latifolia</i> L.	Common Cat-tail		3
SPARGANIACEAE (Bur-reed Family)			
<i>Sparganium emersum</i> Rehm. (<i>S. chlorocarpum</i> Rydb.)	Green Bur-reed		5
POTAMOGETONACEAE (Pondweed Family)			
<i>Potamogeton gramineus</i> L.	Grassleaf Pondweed		6
ALISMATACEAE (Water-plantain Family)			
<i>Alisma triviale</i> Pursh	Water-plantain		3
<i>Sagittaria latifolia</i> Willd.	Broad-leaved Arrowhead		4
ARACEAE (Arum Family)			
<i>Arisaema triphyllum</i> (L.) Schott	Jack-in-the-pulpit		5
<i>Lemna minor</i> L.	Small Duckweed		2
<i>Lemna trisulca</i> L.	Ivy Duckweed		4
LEMNACEAE (Duckweed Family)			
<i>Smilax hispida</i> Muhl.	Bristly Greenbriar	Dfb 17,912	5
HYDROCHARITACEAE (Frog's-bit Family)			
<i>Elodea canadensis</i> Michx.	Canada Waterweed		4
POACEAE (Grass Family)			
<i>Agrostis stolonifera</i> L. (<i>A. alba</i> L.; <i>A. palustris</i> Huds.)	Creeping Bent Grass		0
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	Canada Bluejoint		4
<i>Dichanthelium acuminatum</i> (Sw.) Gould & Clarke ssp. <i>fasciculatum</i> (Torr.) Freckmann & LeLong (<i>Panicum lanuginosum</i> Ell. var. <i>fasciculatum</i> Fern.; <i>P. acuminatum</i> auct., non Sw.)	Panic Grass		6
<i>Elymus virginicus</i> L.	Wild Rye Grass		5

Natural Environment Assessment: Airport Road Study Area

<i>Eragrostis frankii</i> C. Meyer	Frank's Love Grass	Dfb 17,821	3
<i>Glyceria grandis</i> S. Wats.	Large Manna Grass		5
<i>Glyceria striata</i> (Lam.) A. Hitchc.	Fowl Manna Grass		3
<i>Muhlenbergia mexicana</i> (L.) Trin.	Mexican Muhlenbergia		1
<i>Panicum capillare</i> L.	Witch Grass		0
<i>Poa palustris</i> L.	Swamp Meadow Grass		5
<i>Sporobolus vaginiflorus</i> (Torr. ex A. Gray) Wood (s.l.)	Ensheathed Dropseed		1
CYPERACEAE (Sedge Family)			
<i>Carex arctata</i> Boott	Compressed Sedge		5
<i>Carex brunnescens</i> (Pers.) Poir.	Brownish Sedge		7
<i>Carex communis</i> Bailey	Common Sedge		6
<i>Carex crinita</i> Lam.	Fringed Sedge		6
<i>Carex eburnea</i> Boott	Ivory Sedge		6
<i>Carex gracillima</i> Schw.	Filiform Sedge		4
<i>Carex granularis</i> Willd.	Granular Sedge		3
<i>Carex grisea</i> Wahl. (<i>C. amphibola</i> Steudel var. <i>turgida</i> Fern.)	Gray Sedge	Dfb 17,910	8
<i>Carex intumescens</i> Rudge	Bladder Sedge		6
<i>Carex peckii</i> Howe	Peck's Sedge		6
<i>Carex pellita</i> Muhl. (<i>C. lanuginosa</i> , auct.)	Woolly Sedge		4
<i>Carex radiata</i> (Wahl.) Small (<i>C. rosea</i> , auct., non Willd.)	Stellate Sedge		4
<i>Carex retrorsa</i> Schw.	Back-turned Sedge		5
<i>Carex tuckermanii</i> Boott ex Dew.	Tuckerman's Sedge		7
<i>Carex viridula</i> Michx.	Greenish Sedge		5
<i>Carex vulpinoidea</i> Michx.	Fox Sedge		5
<i>Cyperus bipartitus</i> Torr. (<i>C. rivularis</i> Kunth)	River Umbrella-sedge		4
<i>Scirpus atrovirens</i> Willd.	Blackish Bulrush		3
<i>Scirpus cyperinus</i> (L.) Kunth	Wool-grass		4
JUNCACEAE (Rush Family)			
<i>Juncus articulatus</i> L.	Jointed Rush		5
<i>Juncus brevicaudatus</i> (Engelm.) Fern.	Rush		6
<i>Juncus nodosus</i> L.	Knotted Rush		5
<i>Juncus tenuis</i> Willd.	Path Rush		0
LILIACEAE (Lily Family)			

Natural Environment Assessment: Airport Road Study Area

<i>Maianthemum canadense</i> Desf. var. <i>canadense</i>	Canada Mayflower		5
<i>Trillium grandiflorum</i> (Michx.) Salisb.	White Trillium		5
AMARYLLIDACEAE (Amaryllis Family)			
<i>Iris versicolor</i> L.	Blue Flag		5
SALICACEAE (Willow Family)			
<i>Populus balsamifera</i> L.	Balsam Poplar		4
<i>Populus deltoides</i> Marsh.	Eastern Cottonwood		4
<i>Populus tremuloides</i> Michx.	Trembling Aspen		2
<i>Salix bebbiana</i> Sarg.	Bebb's Willow		4
<i>Salix discolor</i> L.	Pussy Willow		3
<i>Salix lucida</i> Muhl.	Shining Willow		5
<i>Salix nigra</i> Marsh.	Black Willow		6
<i>Salix petiolaris</i> Sm.	Meadow Willow		3
JUGLANDACEAE (Hickory Family)			
<i>Juglans cinerea</i> L.	Butternut		6
BETULACEAE (Birch Family)			
<i>Alnus incana</i> (L.) Moench ssp. <i>rugosa</i> (Du Roi) Clausen (<i>A. rugosa</i> (Du Roi) Spreng.)	Speckled Alder		6
<i>Betula alleghaniensis</i> Britt.	Yellow Birch		6
<i>Betula papyrifera</i> Marsh.	White Birch		2
<i>Carpinus caroliniana</i> Walt.	Blue-beech		6
FAGACEAE (Oak Family)			
<i>Quercus macrocarpa</i> Michx.	Bur Oak		5
ULMACEAE (Elm Family)			
<i>Celtis occidentalis</i> L.	Hackberry	Dfb 17,913	8
<i>Ulmus americana</i> L.	White Elm		3
<i>Boehmeria cylindrica</i> (L.) Sw.	False Nettle		6
<i>Laportea canadensis</i> (L.) Wedd.	Canada Wood-nettle		4
<i>Urtica dioica</i> L. ssp. <i>gracilis</i> (Ait.) Selander	Slender Stinging Nettle		2
POLYGONACEAE (Knotweed Family)			
<i>Persicaria lapathifolia</i> (L.) Gray (<i>Polygonum lapathifolium</i> L.; <i>P. scabrum</i> Moench)	Dock Knotweed		2
RANUNCULACEAE (Crowfoot Family)			
<i>Caltha palustris</i> L.	Marsh-marigold		8
<i>Clematis virginiana</i> L.	Virgin's-bower		5
GROSSULARIACEAE (Currant Family)			

Natural Environment Assessment: Airport Road Study Area

<i>Ribes americanum</i> Mill.	Black Currant		4
ROSACEAE (Rose Family)			
<i>Agrimonia gryposepala</i> Wallr.	Hooked Agrimony		2
<i>Fragaria virginiana</i> Duchesne	Common Strawberry		2
<i>Geum aleppicum</i> Jacq.	Yellow Avens		2
<i>Geum laciniatum</i> Murr.	Slashed Avens		4
<i>Prunus virginiana</i> L.	Choke Cherry		2
<i>Rubus pubescens</i> Raf.	Dwarf Raspberry		4
<i>Rubus strigosus</i> Michx. (<i>R. idaeus</i> L. var. <i>strigosus</i> (Michx.) Max.)	Common Raspberry		0
<i>Spiraea alba</i> Du Roi var. <i>alba</i>	Meadowsweet		3
FABACEAE (Bean Family)			
<i>Amphicarpaea bracteata</i> (L.) Fern.	Hog-peanut		4
RUTACEAE (Rue Family)			
<i>Zanthoxylum americanum</i> Mill.	Prickly-ash		3
ANACARDIACEAE (Cashew Family)			
<i>Rhus hirta</i> (L.) Sudworth (<i>R. typhina</i> L.)	Staghorn Sumac		1
<i>Toxicodendron radicans</i> (L.) Kuntze (<i>Rhus radicans</i> L. ssp. <i>negundo</i> (Greene) McNeill)	Climbing Poison-ivy		5
<i>Toxicodendron rydbergii</i> (Rydb.) Greene (<i>Rhus radicans</i> L. var. <i>rydbergii</i> (Sm.) McNeill)	Poison-ivy		0
ACERACEAE (Maple Family)			
<i>Acer ×freemanii</i> E. Murray (<i>A. rubrum</i> L. x <i>saccharinum</i> L.)	United Maple		4*
<i>Acer rubrum</i> L.	Red Maple		4
<i>Acer saccharinum</i> L.	Silver Maple		5
BALSAMINACEAE (Touch-me-not Family)			
<i>Impatiens capensis</i> Meerb.	Spotted Touch-me-not		4
VITACEAE (Grape Family)			
<i>Parthenocissus vitacea</i> (Knerr) Hitchc.	Virginia Creeper		3
<i>Vitis riparia</i> Michx.	River Grape		0
TILIACEAE (Linden Family)			
<i>Tilia americana</i> L.	Basswood		4
VIOLACEAE (Violet Family)			
<i>Viola sororia</i> Willd. var. <i>sororia</i> (<i>V. septentrionalis</i> , auct.)	Woolly Blue Violet		4

Natural Environment Assessment: Airport Road Study Area

ONAGRACEAE (Evening-primrose Family)			
<i>Circaea lutetiana</i> L. ssp. <i>canadensis</i> (L.) Asch. & Magnus	Enchanter's-nightshade		3
<i>Epilobium ciliatum</i> Raf. (<i>E. adenocaulon</i> Haussk.; <i>E. glandulosum</i> , auct., non Lehm.)	Willow-herb		3
<i>Oenothera biennis</i> L.	Evening-primrose		0
<i>Proserpinaca palustris</i> L.	Mermaid-weed	Dfb 17,820	7
ARALIA CEAE (Ginseng Family)			
<i>Aralia nudicaulis</i> L.	Wild Sarsaparilla		4
APIACEAE (Carrot Family)			
<i>Cicuta bulbifera</i> L.	Bulblet Water-hemlock		4
<i>Sium suave</i> Walt.	Water-parsnip		4
CORNACEAE (Dogwood Family)			
<i>Cornus alternifolia</i> L.f.	Alternate-leaved Dogwood		6
<i>Cornus canadensis</i> L. var. <i>canadensis</i>	Bunchberry		7
<i>Cornus sericea</i> L. (<i>C. stolonifera</i> Michx.)	Red-osier Dogwood		2
PRIMULACEAE (Primrose Family)			
<i>Lysimachia terrestris</i> (L.) BSP.	Swamp Candles		6
OLEACEAE (Olive Family)			
<i>Fraxinus nigra</i> Marsh.	Black Ash		7
<i>Fraxinus pennsylvanica</i> Marsh.	Green Ash		3
GENTIANACEAE (Gentian Family)			
<i>Gentianopsis crinita</i> (Froel.) Ma	Fringed Gentian	Dfb 17,819	8
APOCYNACEAE (Dogbane Family)			
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane		3
ASCLEPIADACEAE (Milkweed Family)			
<i>Asclepias incarnata</i> L.	Swamp Milkweed		6
<i>Asclepias syriaca</i> L.	Common Milkweed		0
VERBENACEAE (Vervain Family)			
<i>Verbena hastata</i> L.	Blue Vervain		4
LAMIACEAE (Mint Family)			
<i>Lycopus uniflorus</i> Michx.	Northern Bugleweed		5
<i>Mentha canadensis</i> L. (<i>M. arvensis</i> auct., non L.)	Wild Mint		3
<i>Scutellaria galericulata</i> L.	Marsh Skullcap		6
<i>Scutellaria lateriflora</i> L.	Mad-dog Skullcap		5
RUBIACEAE (Bedstraw Family)			

Natural Environment Assessment: Airport Road Study Area

<i>Galium palustre</i> L.	Marsh Bedstraw		5
<i>Galium trifidum</i> L.	Small Bedstraw		5
CAPRIFOLIACEAE (Honeysuckle Family)			
<i>Lonicera oblongifolia</i> (Goldie) Hook.	Swamp Fly-honeysuckle		8
<i>Sambucus racemosa</i> L. ssp. <i>pubens</i> (Michx.) House (<i>S. pubens</i> Michx.)	Red Elderberry		5
ASTERACEAE (Aster Family)			
<i>Achillea millefolium</i> L.	Yarrow		0
<i>Ambrosia artemisiifolia</i> L.	Ragweed		0
<i>Bidens cernuus</i> L.	Nodding Beggar-ticks		2
<i>Bidens frondosa</i> L.	Large-leaved Beggar-ticks		3
<i>Conyza canadensis</i> (L.) Cronq.	Horseweed		0
<i>Erigeron strigosus</i> Muhl.	Spreading Fleabane		0
<i>Eupatorium perfoliatum</i> L.	Boneset		2
<i>Eurybia macrophylla</i> (L.) Cass. (<i>Aster macrophyllus</i> L.)	Large-leaved Aster		5
<i>Euthamia graminifolia</i> (L.) Nutt. (<i>Solidago graminifolia</i> (L.) Salisb.)	Narrow-leaved Goldenrod		2
<i>Solidago altissima</i> L. ssp. <i>altissima</i> (<i>S. canadensis</i> L. var. <i>scabra</i> (Muhl.) Torr. & Gray)	Tall Goldenrod		1
<i>Solidago nemoralis</i> Ait. ssp. <i>nemoralis</i>	Old-field Goldenrod		2
<i>Solidago rugosa</i> Mill. ssp. <i>rugosa</i>	Rough Goldenrod		4
<i>Symphyotrichum lateriflorum</i> (L.) A. & D. Love (<i>Aster lateriflorus</i> (L.) Britt.)	Calico Aster		3
<i>Symphyotrichum novae-angliae</i> (L.) Nesom (<i>Aster novae-angliae</i> L.; <i>Virgulus novae-angliae</i> (L.) Rev. & Keen)	New England Aster		2
<i>Symphyotrichum urophyllum</i> (Lindl.) Nesom (<i>Aster urophyllum</i> Lindl.)	Arrow-leaved Aster	Dfb 17,823	6
Total: 154 taxa	Average CC value: 4.06	CC Aggregate	625