

Appendix C2

Environmental and Socio-Economic Setting Text



**APPENDIX C2 – NORTHLAND
PIPELINE PROJECT ~
ENVIRONMENTAL AND SOCIO-
ECONOMIC SETTING TEXT**

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1.0 Physical Features

1.1 PHYSIOGRAPHIC CHARACTERISTICS AND RESOURCES

1.1.1 Physiography and Surficial Geology

The Study Area is within the Haldimand clay plain physiographic region of Southern Ontario (Chapman and Putnam, 1984). Lying between the Niagara Escarpment and Lake Erie, the Haldimand clay plain covers most of the Niagara Peninsula. It is characterized by intermixed stratified clay and till deposits in the north and level relief lake plains in the south. The Study Area is characteristic of the southern level clay plains. The relatively flat topography of the Study Area lies at approximately 180 m above sea level.

The underlying bedrock consists of series of Paleozoic beds that slope under Lake Erie (Chapman and Putnam, 1984). The Paleozoic beds are sedimentary limestones, shales and sandstones that overlie the more ancient Precambrian bedrock. They originated as marine sediments of marl, clay and sand and are the oldest rocks to harbour the petrified remains of saltwater organisms.

Based on the data provided by water well records (MOE, 2005), the overburden profile is composed primarily of approximately 1 m to 5 m of clay, either brown or yellow, 5 m to 13 m of blue, brown, grey or occasionally red or regular clay, and 8 m to 15 m of material with either sand or gravel mixed in.

1.1.2 Bedrock

The Study Area consists of Paleozoic bedrock of the Lockport Formation from the Silurian period, which consists of various forms of dolostone. There are four different members of the Lockport Formation within the Study Area. These are the Goat Island Member, light brown dolostone, the Gasport Member, blue-grey dolostone and limestone, the Eramosa Member, dark brown or black bituminous dolostone and an unnamed member, (Vinemount shale beds) argillaceous dolostone and shale (Ontario Geological Survey, 2006). Interpretation of the reported water well logs within the Study Area, the depth to bedrock varies in depth from 12 to 27 m (MOE, 2005).

1.1.3 Surficial Deposits

Soils within the Study Area are a reflection of their geology and physiography. The Study Area is part of the Haldimand Clay Plain as classified by Chapman and Putnam (1984). Soils are glaciolacustrine clays over till with relatively poor drainage. The relatively poor drainage is a result of the soil texture combined with gently sloping lands of the area. Four soil types are found within the Study Area, as identified in the Soils of The Regional Municipality of Niagara (Ontario Institute of Pedology, 1989). These are Alluvium, Beverly, Niagara, and Toledo. The characteristics of these soil types are summarized in **Table 1.1**.

Table 1.1 Soil Characteristics and Agricultural Capability

Symbol	Soil Series Name	Surface Texture	Parent Materials/ Drainage	Capability Class
ALU	Alluvium	Silty Clay	Variable floodplain deposits on an active floodplain/ Variable	2d
BVY	Beverly Soil	Silty Clay	Mainly lacustrine silty clay/Imperfect	2d
NGR	Niagara Soil	Silty Clay	Mainly reddish-hued lacustrine heavy clay/Imperfect	2d
TLD	Toledo Soil	Silty Clay	Mainly lacustrine silty clay/Poor	2d

Alluvium

Alluvium is a soil type that is created by alluvial processes which are silts and clays deposited from flowing water. They have various drainage conditions, but most are imperfectly or poorly drained because of the close proximity of the water table to the ground surface for long periods each year (Kingston and Presant, Vol. 1, 1989). Approximately 0.8% of the Study Area is Alluvium.

A typical profile of Alluvium contains the following composition over the various soil horizons:

Ah 0-16 cm	horizon consists of silty clay with 3.9 % partially decomposed organic matter and an average pH of 6.6. The soil structure is granular;
Bg 16-63 cm	horizon consists of silty clay with 2.7% organic matter and an average pH of 6.7. The soil structure is columnar;
IIAb 63-80 cm	horizon consists of clay with 4.0% organic matter and an average pH of 7.1. The soil structure is subangular blocky; and,
IICkg 80-100cm	horizon consists of silty clay loam and has an average pH level of 7.7. The soil structure is subangular blocky.

Alluvium soils are commonly more prone to flooding than those found within the Study Area. The CLI rating of 2d displays that they are potentially productive soils with low permeability as a constraint.

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Beverly

Approximately 39.5% of the Study Area consists of Beverly soil (including the Beverly – Loamy Phase). This soil is the imperfectly drained member of the Gleyed Brunisolic Gray Brown Luvisol Great Soil Group and occurs on nearly level till plains (Kingston and Presant, Vol. 1, 1989).

The Beverly soil profile typically includes:

Ap 0-17 cm	horizon consists of silty clay loam with 3.6% organic matter and an average pH of 6.2. The soil structure is granular;
Bmgj 17-42 cm	horizon consists of silty clay loam with 1.4% organic matter and an average pH of 6.3. The soil structure is subangular blocky;
Btgj 42-45 cm	horizon consists of silty clay with 1.1% organic matter and an average pH of 6.3. The soil structure is columnar; and,
Ckgj 45+ cm	horizon consists of silty clay with 0.1% organic matter and an average pH of 7.6. The soil structure is granular.

The CLI rating of 2d describes potentially productive soils with low permeability as a constraint.

Niagara

The Study Area has approximately 13.2% Niagara soil. It is the imperfectly drained member of the Gleyed Gray Brown Luvisol Great Soil Group that occurs on nearly level lacustrine clay plains. The water table associated with this soil is likely at or close to the surface until late spring (Kingston and Presant, Vol. 1, 1989).

The Niagara soil profile typically includes:

Ap 0-18 cm	horizon consists of silty clay loam with 3.8% organic matter and an average pH of 6.1. The soil structure is columnar;
Btgj1 18-42 cm	horizon consists of hard clay with 1.2% organic matter and an average pH of 6.3. The soil structure is prismatic;
Btgj2 42-57 cm	horizon consists of hard clay with 0.8% organic matter and an average pH of 6.7. The soil structure is prismatic; and,
Ckgj 57+ cm	horizon consists of hard clay with an average pH of 7.7. The soil structure is prismatic.

The CLI rating of 2d describes potentially productive soils with low permeability as a constraint.

Toledo

The Study Area has approximately 13.8% Toledo soil (including the Toledo – Loamy Red Phase). It is the poorly drained member of the Orthic Humic Gleysol Great Soil Group that occurs on nearly level to gently sloping lacustrine clay plains. The water table associated with

this soil typically requires tile drainage to be useful for agriculture (Kingston and Presant, Vol. 1, 1989).

The Toledo soil profile typically includes:

Ap 0-18 cm	horizon consists of silty clay loam with 4.8% organic matter and an average pH of 6.2. The soil structure is subangular blocky;
Bg1 18-43 cm	horizon consists of silty clay with 1.3% organic matter and an average pH of 6.3. The soil structure is columnar;
Bg2 43-59 cm	horizon consists of silty clay with 1.0% organic matter and an average pH of 6.6. The soil structure is columnar;
Ckgj 59+ cm	horizon consists of silty clay with 0.1% organic matter and an average pH of 7.6. The soil structure is subangular blocky;

The CLI rating of 2d describes potentially productive soils with low permeability as a constraint.

Appendix C-1, Figure C1-1, shows the type and location of soils within the Study Area.

1.2 SEISMICITY

The probability of seismic activity (i.e. earthquakes) in the Study Area is extremely low. Seismic activity and risk is recorded and estimated by Natural Resources Canada. Zone maps describe relative risk on a scale of 0 to 6. The probability of exceeding specific acceleration (Z_a) and velocity (Z_v) values by ten percent over 50 years is described as well.

The Study Area is located in risk zone 1 for ground acceleration and risk zone 0 for ground velocity. The probability of exceeding 0.04 to 0.08 times the force of gravity during horizontal ground acceleration is ten percent in fifty years (Natural Resources Canada, 2005a). The probability of exceeding 0 to 0.04 metres per second horizontal ground velocity is also ten percent in 50 years (Natural Resources Canada, 2005b).

1.3 CLIMATE

The climate of southern Ontario is moderated by the proximity of the Great Lakes, which differs from location to location and from one year to another. The climate of the Study Area is influenced by its proximity to Lakes Erie and Ontario, which moderate temperatures and provide moisture-laden air to adjacent lands. Flows of cold dry air from the Arctic, moist warm air from the Gulf of Mexico and dry prevailing winds from the Pacific are the resulting air masses that affect the climate in this area. Weather statistics for the area are displayed in **Table 1.1**.

On the Niagara Peninsula, prevailing trends produce humid and warm to hot summers, with winters being relatively mild and snowy. There are four weather stations in Hamilton, Ontario. The station at a location and elevation most similar to the Study Area is at the Hamilton Psychiatric Hospital. The statistics are compared below:

Table 1.2 Weather Site Comparison

Location	Latitude	Longitude	Elevation (metres)
Hamilton Psychiatric Hospital	43°13'N	79°54'W	198
Thorold, Ontario	43°07'N	79°12'W	180

The mean annual temperature, taken from the Hamilton Psychiatric Hospital, is 8.4 degrees Celsius. Average temperatures above the freezing mark occur during the majority of the year (March through November). Precipitation, in the form of rain and snow, occurs throughout the year. Mean monthly precipitation varies between a high of 94.7 millimetres in September to a low of 58.1 millimetres in February.

Table 1.3 Weather Statistics from the Hamilton Psychiatric Hospital^{1,2}

	J	F	M	A	M	J	J	A	S	O	N	D
Average Temperature (°C)	-5.3	-4.3	0.1	7	13.6	18.6	21.7	20.7	16.4	9.7	4.1	-2
Average Rainfall (mm)	26.2	32.2	59.9	69.3	80.3	81	76.5	91.7	94.7	77.7	80.1	52.2
Average Snowfall (cm)	38.8	26.0	14.4	3.2	0.0	0.0	0.0	0.0	0.0	0.0	5.7	31

¹ Source: Environment Canada, 2004

² Years of record: 1971 to 2000

1.4 HYDROLOGY

1.4.1 Surficial Hydrology

The Study Area is located within the Beaver Dams Creek Subwatershed (NPCA, 2007) which is part of the Lake Ontario Waterfront Watershed. As can be seen on **Appendix C1, Figure C1-2**, within the Study Area, Beaver Dams Creek is in the north with three unnamed tributaries flowing northward into it. A fourth connected creek flows out of Beaver Dams Creek. It flows southwest toward the canal where it is reportedly pumped under the canal to maintain flow into Lake Gibson west of the Study Area. In the south, two unnamed tributaries flow directly into the Welland Canal. Beaver Dams Creek itself serves as a displacement basin for the Welland Canal, in that it receives water being displaced from the canal by the freight ships as they pass.

There are numerous storm sewers located in the Study Area. Storm water runoff during rainfall events enters into these storm sewers, most of which directly discharges into the Welland Canal.

The Study Area falls under the jurisdiction of the Niagara Peninsula Conservation Authority (NPCA). The NPCA manages watercourses and natural habitat and reviews development proposals within or adjacent to natural areas. It also regulates construction in valley and stream corridors. Issues relating to flooding and erosion are also managed by the NPCA.

1.4.2 Groundwater

Water well records obtained from the Ontario Ministry of the Environment (MOE) (2005) indicate that approximately 20 wells have been drilled in the Study Area. Groundwater is found at an average depth of 11.7 m ranging from 4.9 m to 23.8 m. Thin localized gravel and sand pockets also act as a discontinuous conduit for groundwater (MOE, 1988). Static water levels are variable but average 5.3 m and range between 3 m to 10.7 m.

The well water supply is predominantly fresh and potable. Well water quality is summarized in **Table 1.4**.

Table 1.4 Well Water Quality

Water Quality	Fresh	Sulphur	Unknown/Not Recorded
Number of Wells	10	2	8

(Source: MOE, 2005).

Susceptibility of groundwater to contamination in the area is generally low (MOE, 1980). The deep bedrock-overburden aquifer is protected from surface contamination by a thick layer of finely textured clay materials that has a low permeability and a high capacity for attenuation of contaminants. The low relief and low permeability of the overburden prevent contaminants from moving in the groundwater to deeper depths.

2.0 Agricultural Features

Information about agricultural features in the Study Area is derived from the Canada Land Inventory (CLI) Capability for Agriculture, and data from the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA).

2.1 CANADA LAND INVENTORY CAPABILITY FOR AGRICULTURE

The Soil Capability Classification for Agriculture also known as the CLI is an interpretative classification that groups mineral soils with similar limitations or similar productivities into seven classes. Classes 1 to 3 soils are considered to be suitable for sustained productions of common field crops, hay and pasture. Class 4 soils are marginal for sustained production of common field crops but capable of use for hay and pasture. Class 5 soils are capable for use only for permanent pasture and hay, whereas Class 6 soils can be used only for wild pasture. Class 7 soils have no capability for agriculture.

Applying the CLI system of soil classification, the entire study area is classed 2d. The number 2 implies that soils have moderate limitations that restrict the range of crops or require moderate conservation practices. The letter “d” indicates that undesirable soil structure and/or low permeability are limitations for agriculture (OMAFRA, 1983).

2.2 ARTIFICIAL DRAINAGE

None of the agricultural properties in the Study Area are reported to have been artificially tile drained, random or systematic, for agricultural use (OMAFRA, 1981).

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3.0 Biophysical Features

3.1 WATERCOURSES AND FISHERIES

Water quality and fisheries data were obtained through discussions with the NPCA (2007), analysis of aerial photography, and relevant background documents.

As mentioned in **Section 1.4.1**, the Study Area is located within the Beaver Dams Creek Subwatershed (NPCA, 2007). Beaver Dams Creek itself serves as a displacement basin for the Welland Canal, in that it receives water being displaced from the canal by the freight ships as they pass. Within the Study Area, Beaver Dams Creek is in the north with four unnamed tributaries flowing northward into it. In the south, two unnamed tributaries flow directly into the Welland Canal. The Final Route crosses four watercourses: Beaver Dams Creek twice and two unnamed tributaries to Beaver Dams Creek.

The Ontario Ministry of Natural Resources (MNR) has classified the majority of the watercourses in the Niagara area into three types, and each type has a respective setback requirement for development projects. This setback is necessary to protect fish habitat from being degraded due to development. All of the watercourses in the Study Area have been designated as Type 2: Important. Type 2, important habitats are moderately sensitive to development and, although important to the fish population, are not considered critical (e.g. feeding areas and open water habitats of lakes). For Type 2 - Important watercourses, a minimum of 15 m of buffer is recommended.

Beaver Dams Creek is known to support the following species: alewife; Bigmouth Buffalo; Black Crappie; Bluegill; Bluntnose minnow; Brook silverside; Brown Bullhead; Freshwater drum; gizzard shad; white sucker; Channel Catfish; Common carp; Common Shiner; Cyprinidae, Golden shiner; Goldfish; Green Sunfish; Johnny darter; Largemouth bass, Log perch; Northern pike; Emerald shiner; Pumpkinseed; Quillback; Rock bass; Round Goby; Smallmouth bass; Spottail shiner; Spotted gar; White crappie; White perch; White sucker; and Yellow perch (Stantec, 2000, 2004). All of these fish are commonly found in appropriate environments within the Great Lakes except the Spotted gar. The Spotted gar is classified, by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), as threatened. Beaver Dams Creek contains fish habitat; however, the two unnamed tributaries only flow when they receive surface flows from agricultural lands.

3.2 FORESTRY

The Study Area is within the Deciduous forest region. This region lies along the northern shores of Lake Erie and Ontario, and the southeastern shore of Lake Huron. The Deciduous region is a mixed forest influenced by the mild, lake moderated climate (MNR, 2003). Characteristic species include Black walnut (*Juglans nigra*), Butternut (*Juglans cinerea*), Cucumbertree (*Magnolia acuminata*), Tulip tree (*Liriodendron tulipifera*), Sassafras (*Sassafras albidum*), Eastern redbud (*Cercis canadensis*), and several species of oaks (*Quercus sp.*) (Armson, 2001).

Within Canada, southern Ontario is the only area where the Deciduous region is found. It contains virtually all of the main species found in the Great Lakes – St. Lawrence Region; however, in the south there exist broadleaved species that occur nowhere else in Canada (Armson, 2001).

There are many factors that have resulted in a lack of forested areas in the Study Area; however, numerous smaller plots of treed areas remain. The majority of the Study Area is agricultural land with the exception of the northwest portion that is a residential subdivision. Most of the trees found in the Study Area have been left due to nonproductive agricultural land or they stand on parks and vacant lots resulting from successional processes.

3.2.1 Wetlands

The Welland Canal Turn Basins are identified as Provincially Significant Wetlands (PSW) by the MNR. Within the Study Area, a very small portion this PSW exists on the northeast corner of Abitibi Consolidated Inc.'s property along Beaver Dams Creek (MNR, 2007).

3.3 WILDLIFE

Wildlife depends on specific habitat types for survival, but some species are more sensitive to disturbance than others. For example, raccoons are highly adaptable to urban environments while grey wolves are usually found in large tracts of relatively undisturbed forest. Species that are less adaptable may experience a population decline if habitat is lost or if major artificial disturbance occurs. Usually, habitat type is indicative of the types of species that occur in the area.

Table 3.1 lists species that are commonly found in the vicinity of the Study Area. Common wildlife species were determined through the use of the *Atlas of the Mammals of Ontario* and the *Ontario Herpetofaunal Summary Atlas* (Dobbyn, 1994; MNR, 2002).

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Table 3.1 Common Species Found in the Vicinity of the Study Area¹

Common Name	Scientific Name
Bats	
Big Brown Bat	<i>Eptesicus fuscus</i>
Little Brown Bat	<i>Myotis lucifuga</i>
Silver-haired Bat	<i>Lasionycteris noctivagans</i>
Carnivores	
Coyote	<i>Canis latrans</i>
Long-tailed Weasel	<i>Mustela frenata</i>
Raccoon	<i>Procyon lotor</i>
Red Fox	<i>Vulpes vulpes</i>
Mink	<i>Mustela vison</i>
Striped Skunk	<i>Mephitis mephitis</i>
Deer	
White-tailed Deer	<i>Odocoileus virginianus</i>
Opossum	
Virginia Opossum	<i>Didelphis virginiana</i>
Rabbits and Hares	
Eastern Cottontail	<i>Sylvilagus floridanus</i>
European Hare	<i>Lepus europaeus</i>
Rodents	
Eastern Chipmunk	<i>Tamias striatus</i>
Woodchuck	<i>Marmota monax</i>
Gray Squirrel and Grey and Black Phases	<i>Sciurus carolinensis</i>
Red Squirrel	<i>Tamiasciurus hudsonicus</i>
Southern Flying Squirrel	<i>Glaucomys volans</i>
White-footed Mouse	<i>Peromyscus leucopus</i>
Meadow Vole	<i>Microtus pennsylvanicus</i>
Muskrat	<i>Ondatra zibethicus</i>
Norway Rat	<i>Rattus norvegicus</i>
Shrews and Moles	
Northern Short-tailed Shrew	<i>Blarina brevicauda</i>
Star-nosed Mole	<i>Condylura cristata</i>
Salamanders	
Common Mudpuppy	<i>Necturus maculosus</i>
Red-Spotted Newt	<i>Notophthalmus viridescens viridescens</i>
Blue-spotted Salamander	<i>Ambystoma laterale</i>
Jefferson-Blue Spotted Salamander Complex	<i>Ambystoma jeffersonianum – laterale “complex”</i>
Jefferson-Blue Spotted Salamander Polyploids	<i>Ambystoma jeffersonianum – laterale polyploids</i>
Spotted Salamander	<i>Ambystoma maculatum</i>
Four-toed Salamander	<i>Hemidactylium scutatum</i>
Northern Redback Salamander	<i>Plethodon cinereus</i>
Frogs and Toads	
Eastern American Toad	<i>Bufo americanus americanus</i>
Northern Spring Peeper	<i>Pseudacris crucifer</i>
Western Chrous Frog	<i>Pseudacris triseriata</i>
Grey Treefrog	<i>Hyla versicolor</i>
Wood Frog	<i>Rana sylvatica</i>

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Table 3.1 Common Species Found in the Vicinity of the Study Area¹

Common Name	Scientific Name
Northern Leopard Frog	<i>Rana pipiens</i>
Pickereel Frog	<i>Rana palustris</i>
Green Frog	<i>Rana clamitans melanota</i>
Bullfrog	<i>Rana catesbeiana</i>
Lizard	
Five-Lined Skink	<i>Eumeces fasciatus</i>
Turtles	
Common Snapping Turtle	<i>Chelydra serpentina</i>
Midland Painted Turtle	<i>Chrysemys picta marginata</i>
Snakes	
Eastern Garter Snake	<i>Thamnophis sirtalis sirtalis</i>
Northern Water Snake	<i>Nerodia sipedon sipedon</i>
Northern Redbelly Snake	<i>Soreria occipitomaculata occipitomaculata</i>
Brown Snake	<i>Storeria dekayi</i>
Northern Ringneck Snake	<i>Diadophis punctatus edwardsi</i>
Eastern Milk Snake	<i>Lampropeltis triangulum triangulum</i>

¹Source: Dobbyn, 1994; MNR, 2002.

Bird species that were commonly recorded within the Study Area included mourning dove, American kestrel, American crow, song sparrow, black-capped chickadee, red-winged blackbird, and European starling (Ontario Breeding Bird Atlas, 2001-2005). See **Attachment 1** for a full list of birds common to the Study Area. Due to the relatively small size of the fragmented woodlots, the avifauna is likely dominated by edge species that are relatively tolerant of some disturbance. Species requiring larger and more continuous forest tracks (forest interior and area sensitive species) will tend to concentrate in the more extensive forests, Environmentally Sensitive Areas (ESA), and river valleys that are not common to the Study Area.

The MNR has indicated the presence of deer wintering areas within the Study Area (MNR, 2007).

3.3.1 Rare, Threatened, or Endangered Species

Rare and at-risk species may be determined at national, provincial, and municipal levels. Species that have been determined to be at risk by COSEWIC are rare or threatened throughout Canada. COSEWIC ranks species as endangered, threatened, or special concern. The provincial Committee on the Status of Species at Risk in Ontario (COSSARO) identifies endangered, threatened or special concern species in Ontario. Additionally, the MNR assigns "S-Ranks" to species based on rarity, from extremely rare (S1) to very common (S5). A review of the National Species at Risk (Environment Canada, 2006) and provincial Natural Heritage Information Centre databases (NHIC, 2005) identified eighteen vulnerable or rare species whose habitat ranges overlap with the Study Area. Other species of local concern may also be present.

Designated species at risk that could be found within the Study Area include:

Table 3.2 Species at Risk¹

Common Name	Scientific Name	National Status	Provincial Status
Carnivores			
Grey Fox	<i>Urocyon cinereoargenteus</i>	Threatened	Threatened
Woodland Vole	<i>Microtus pinetorum</i>	Special concern	Special concern
Turtles			
Northern Map Turtle	<i>Graptemys geographica</i>	Special concern	Special concern
Blanding's Turtle (Great Lakes/St. Lawrence Population)	<i>Emydoidea blandingii</i>	Threatened	Threatened
Snakes			
Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>	Threatened	Threatened
Eastern Ratsnake	<i>Elaphe obsoleta</i>	Threatened	Threatened
Eastern Ribbonsnake (Great Lakes population)	<i>Thamnophis sauritus</i>	Special concern	Special concern
Milksnake	<i>Lampropeltis triangulum</i>	Special concern	Special concern
Birds			
Acadian Flycatcher	<i>Empidonax virens</i>	Endangered	Endangered
Barn Owl (Eastern population)	<i>Tyto alba</i>	Endangered	Endangered
Cerulean Warbler	<i>Dendroica cerulea</i>	Special concern	Special concern
Hooded Warbler	<i>Wilsonia citrine</i>	Threatened	Threatened
Least Bittern	<i>Ixobrychus exilis</i>	Threatened	Threatened
Peregrine Falcon anatum subspecies	<i>Falco peregrinus anatum</i>	Special concern	Endangered
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Threatened	Special concern
Yellow-breasted Chat virens subspecies	<i>Icteria virens virens</i>	Special Concern	Special concern
Plants			
American Ginseng	<i>Panax quinquefolius</i>	Endangered	Endangered
Butternut	<i>Juglans cinerea</i>	Endangered	Endangered
Red Mulberry	<i>Morus rubra</i>	Endangered	Endangered
Round-leaved Greenbrier (Great Lakes Plains population)	<i>Smilax rotundifolia</i>	Threatened	Vulnerable
Butterflies			
Monarch	<i>Danaus plexippus</i>	Special Concern	Not in any category of risk

¹ Source: Environment Canada, 2006.

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Species in the Study Area that are extremely rare and very rare in Ontario:

Table 3.3 Species of Provincial Concern¹

Common Name	Scientific Name	Rank
Birds		
Northern Bobwhite	<i>Colinus virginianus</i>	S1S2 – Critically Imperiled to Imperiled
Plants		
Southern Tickseed	<i>Bidens coronata</i>	S2 – Imperiled
Round-leaved Greenbrier	<i>Smilax rotundifolia</i>	S2 – Imperiled
Swamp Rose-mallow	<i>Hibiscus moscheutos</i>	S3 – Vulnerable
Longleaf Dropseed	<i>Sporobolus asper</i>	S1S2 – Critically Imperiled to Imperiled

¹ Source: NHIC, 2005.

3.4 ENVIRONMENTALLY SENSITIVE AREAS

ESAs are areas of land and water that require special protection because of natural landscapes, wildlife or historical value. There are no ESA's in the Study Area (NHIC, 2005).

4.0 Socio-Economic Features

The Study Area is located in the City of Thorold, which straddles the Welland Canal, and is a relatively small community that has the benefits of both an urban centre and rural land uses. The City of Thorold is within the Regional Municipality (RM) of Niagara. It lies approximately 2 km west of the City of Niagara Falls, 5.5 km north of the City of Welland, 7 km east of the Town of Pelham and 2.5 km south of the City of St. Catharines. The main city centre is north-west of the Study Area. The Study Area is located in a neighbourhood called Thorold South. Information collected from Statistics Canada's 2001 census and 2006 census, used for portions of the following Socio-Economic Analysis, will be for the entire City of Thorold.

4.1 MUNICIPAL STRUCTURE

The City of Thorold is an incorporated municipality, responsible for providing road networks, waste and sewage services, planning, and so on for its citizens. The provincial highways (20, 58 and 406) are patrolled by the Niagara Detachment of the Ontario Provincial Police based in Niagara Falls. Fire protection is provided by the City of Thorold Fire and Emergency Services through four stations. One station is located within the Study Area, Fire Station 2, located at 701 Allanburg Road in Thorold South.

4.2 POPULATION

In 2006, Thorold's population was 18,244. The population change from 1996 (18,048) to 2001 was only a 1% increase (Statistics Canada, 2006). Therefore, it can be assumed that in the near future, the number of people living in the Study Area is likely to remain at about the same level it is now.

4.3 INSTITUTIONAL CHARACTERISTICS

Institutional characteristics (e.g. schools, churches, hospitals, community centres, detention centres) are an important part of a community's social fabric. The Study Area contains three churches, one school, one community centre, and the Niagara Detention Centre.

4.4 PARKS AND RECREATION

The closest Conservation Area lies northeast of the Study Area. It is named Shriner's Creek Conservation Area and it is run by the NPCA. It is a 32 ha Conservation Area managed as a Nature refuge Area and it also serves a storm water management role in the community. No Public Access is permitted on this property (NPCA, 2007).

There are no provincial parks in the Study Area.

4.5 CULTURE AND TOURISM

There are no major tourist attractions in the Study Area, although, there are attractions close to the Study Area. The Study Area is adjacent to the Welland Canal and Niagara Falls is approximately 8 km east.

Thorold is located at Lock 7 of the Welland Canal, the highest and last lift up the escarpment. The canal serves as a recreational feature where people can watch large cargo ships pass through a series of locks, as well as fish, hike, bike or rollerblade on the multi-use trail that parallels the canal.

4.6 ECONOMY AND EMPLOYMENT

4.6.1 Economy

The Study Area is located in South Thorold which is a neighbourhood within the City of Thorold, Ontario. Thorold supports a diversified economic base with a range of manufacturing, industry, service, government and tourism activities. Major employers include the RM of Niagara, Dana Canada Corp., ACCC, E. Spencer Fox, Lafrate Machine Works and Georgia-Pacific Canada Inc. Industries within the Study Area include the Abitibi-Consolidated – Thorold Division recycled paper mill, and several mechanic and scrap metal shops.

4.6.2 Employment

The City of Thorold had an employed labour force (15 years and over) of 9,560 in 2001. It was composed of 5,065 males and 4,495 females. The unemployment rate for Thorold is 6.2% (6.8 male/5.5 female), which is slightly higher than the provincial average of 6.1% (5.8 male/6.5 female) (Statistics Canada, 2001). Refer to **Figure 4.1** to see the experienced labour force categorized by sex and occupation.

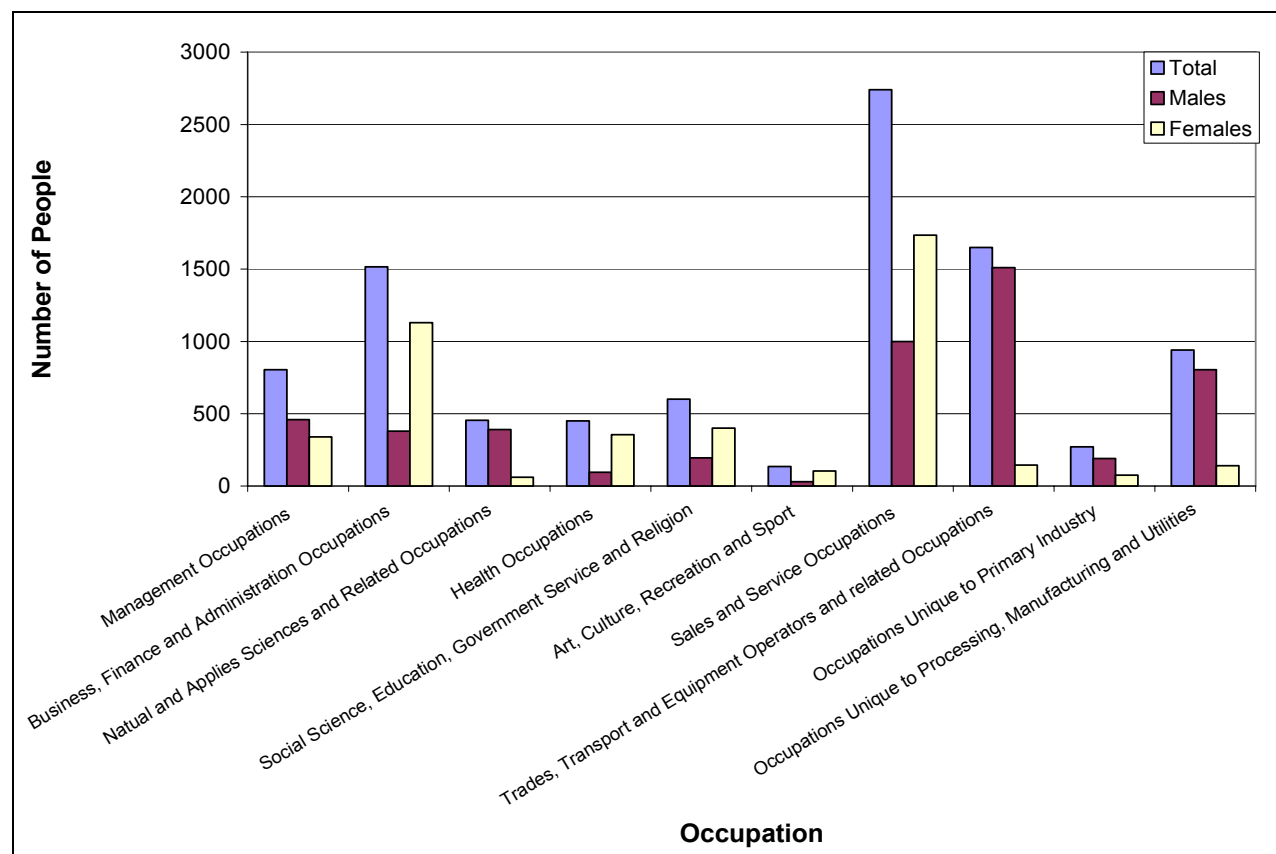
The main occupation that employed people in Thorold is “sales and service occupations”, followed by “trades, transport, and equipment operators and related occupations”.

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Socio-Economic Features

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Figure 4.1 Thorold Labour Force by Occupation, 2001



Source: Statistics Canada, 2001

4.7 LAND USE

The majority of the population of the City of Thorold is concentrated within several neighbourhoods, including; Old Town, Confederation Heights, Thorold South, Allanburg, and Port Robinson East and West (City of Thorold, 2007). Land use designations and policies are derived from topographic maps, aerial photographs, and the Official Plan of the City of Thorold Planning Area, and the Amended Official Plan of the City of Thorold. **Appendix C1 Figure C1-3**, shows land use.

Planning responsibilities including the preparation and adoption of an Official Plan for the City of Thorold falls upon the Council of the City of Thorold. This was established in "The Regional Municipality of Niagara Act R.S.O. 1980" (City of Thorold, 2005).

Land use designations within the Study Area include; Dry Industrial, Employment (Highway Industrial, Light Industrial, Prestige Industrial), Environmental Protection Area, General Agriculture, Highway Commercial, Institutional, Natural Environment, Open Space and Recreation, Residential, Rural Residential, Serviced Industrial, Stormwater Management Facility, Village Square Industrial (City of Thorold, 2005, 2007).

4.7.1 Land Use Planning and Policy Affecting Pipelines

Pipelines must meet Ontario Pipeline Coordinating Committee (OPCC) standards, guidelines, and policy. The City of Thorold Official Plan (2005) outlines requirements for gas and oil pipelines within the Planning Area's boundaries. Pipelines are encouraged to be located within existing easements, provided that obligations to the Environmental Assessment Act are met, impacts to adjacent land uses are considered throughout the development stages, and lastly, for safety purposes, significant works will not be permitted within a working strip falling on either side of the pipeline right-of-way, and TransCanada and Inter-Provincial Pipelines will be consulted on proposed developments adjacent to pipelines.

4.8 FIRST NATIONS INTERESTS

Indian and Northern Affairs Canada (INAC) were contacted on June 12, 2007 to seek information regarding the status of lands within the Study Area. INAC replied to Stantec's letter request on July 11, 2007. The letter notified Stantec that INAC no longer responds to these types of letters by providing contact information for Aboriginal groups who may have interest in the project. They now ask that potentially interested Aboriginal groups are identified and notified by the proprietor of the project. Stantec followed up with this request by investigating if there are any First Nations interests in the Study Area.

An email with a map showing the Study Area was sent to INAC's Litigation Management and Resolution Branch on July 12, 2007, INAC's Comprehensive Claims Branch on July 13, 2007, and INAC's Specific Claims Branch on July 17, 2007. A response from INAC's Specific Claims Branch was received on July 19, 2007 indicating that there are no land claims in the Study Area that they are aware of. A response from INAC's Comprehensive Claims Branch was received on July 23, 2007 indicating that there are no lands claims in the Study Area that they are aware of. A response from INAC's Litigation Management and Resolution Branch was received on July 30, 2007 indicating that their inventory does not include active litigation in the Study Area.

A fax was received from the Association of Iroquois and Allied Indians (A.I.A.I.) on September 6, 2007 stating that they do not have any information to provide to us regarding site selection or technological alternatives and that the existence of land claims and other First Nation activities should be sought. This information has been collected; therefore no further action is required.

A summary of agency correspondence is included in **Appendix B1** and copies of this correspondence are included in **Appendix B3**.

4.9 HERITAGE AND ARCHAEOLOGICAL RESOURCES

D.R. Poulton & Associates Inc. (DPA) conducted a Stage 1 Archaeological Assessment under Archaeological Consulting License #P053, issued by the Province of Ontario. The Stage 1 assessment consisted of background research to identify known or potential archaeological planning constraints within the Study Area. A variety of sources were consulted in the course of this work. These included a thorough review of published and unpublished reports on past

archaeological surveys and excavations, a review of the history of land-use in the area, and an examination of archaeological site inventories and archival materials.

It was indicated in this report that 60% of the Preferred Route will be placed in previously disturbed areas, and therefore is unlikely to retain potential for extant archaeological remains. The 800 m portion of the route that travels adjacent to the south side of Beaverdams Road is considered to have some potential for archaeological remains. DPA also expressed concern with regards to the lands where the excavated materials from the directional drilling operation will be placed. Recommendations were made by DPA to perform a Stage II Archaeological Assessment.

If any significant sites are found during construction of the pipeline, the archaeological staff of the Ontario Ministry of Culture should be notified immediately. It is similarly recommended that if any human remains are encountered, John MacDonald, Heritage Planner, Ontario Ministry of Culture (519-675-7742) and Michael D'Mello, the Registrar of the Cemeteries Section of the Ministry of Consumer and Business Services (416-326-8404).

The full Archaeological Assessment can be found in **Appendix E**.

4.10 EXISTING LINEAR CORRIDORS

Linear corridors include road networks, hydrocarbon transmission lines, hydroelectric transmission lines, telephone lines, and railways.

4.10.1 Roads

The Province of Ontario is responsible for maintenance of major highways in the City of Thorold. There are two provincial highways within the Study Area: Davis Road (Highway 58) and Lundy's Lane (Highway 20). The municipality is responsible for maintaining the other roads within the city including Niagara Falls Road, Beaverdams Road, Allanburg Road, and Thorold Townline Road. **Appendix C1, Figure C1-2** displays major roadways.

4.10.2 Hydrocarbon Transmission Lines

Enbridge operates and maintains a network of natural gas transmission and distribution pipelines throughout the Study Area. As well, there is a TransCanada Pipeline natural gas pipeline flowing west to east through the approximate middle of the Study Area.

4.10.3 Electricity Transmission Lines and Facilities

There are approximately 11 major electrical transmission lines within the Study Area. Generally, they lie in a west to east orientation. Since they are considered high voltage, metal towers are used and corridors are comparatively wide. Other corridors may also exist that operate below 115 kilovolts, using metal, concrete, or wooden poles. These service local communities, industry, and residential neighbourhoods (Hydro One, 2005).

4.10.4 Railways

Canadian National Railway (CNR), a major Canadian railway company, has rail lines, running north/south on the west side of the Study Area. These lines exist to serve the industrial businesses in the Study Area. There are several railway spurs throughout the Study Area.

4.11 WASTE DISPOSAL

The location and classification of active and closed landfill sites in the Study Area was determined through a site visit and search of appropriate background information. The location and type of waste disposal site is used to identify potentially contaminated areas that may be disturbed during pipeline construction.

There are no known registered active or closed landfills in the Study Area (MOE, 1991).

5.0 Bibliography

- Armson, L.A. 2001. Ontario Forests: A Historical Perspective. Ontario Forestry Association. 233 p.
- Chapman, L.J. and D.F. Putnum. 1984. The Physiography of Southern Ontario. Ontario Geological Survey, Special Volume 2:270 p.
- City of Thorold. 2005. Official Plan of the City of Thorold Planning Area.
- City of Thorold. 2007. Official Plan Amendment NO. 59. The Neighbourhoods of Rolling Meadows Secondary Plan City of Thorold.
- Dobbyn, J. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists: Don Mills, Ontario.
- Environment Canada. 2004. Canadian Climate Normals 1971 to 2000. Reviewed March, 2007. Available: http://climate.weatheroffice.ec.gc.ca/climate_normals/results_e.html.
- Environment Canada. 2006. Geographic Query. Reviewed March 2007. Available: http://www.speciesatrisk.gc.ca/map/default_e.cfm.
- Hydro One. 2005. Transmission Solutions. Reviewed September 2005. Available: <http://www.hydroonenetworks.com/en/community/projects/transmission/>.
- Kingston, M.S. and E.W. Presant, 1989. The Soils of the Regional Municipality of Niagara, Volume 1. Report Number 60 of the OIP. Queen's Printer for Ontario. 138 pages.
- Ministry of Natural Resources. 2003. Overview of Ontario's Forests. Reviewed April, 2006. Available: <http://ontariosforests.mnr.gov.on.ca/forestoverview.cfm#regions>.
- Natural Heritage Information Centre (NHIC). 2005. Geographic Area Query. Reviewed November 2006. Available: <http://nhic.mnr.gov.on.ca/MNR/nhic/queries/geographic.cfm>.
- Natural Resources Canada. 2005a. SEISMIC ZONING MAP OF CANADA, 1985: ACCELERATION (NBCC). Reviewed November 2006. Available: http://earthquakescanada.nrcan.gc.ca/hazard/zoning/seismiczonea_e.php.
- Natural Resources Canada. 2005b. SEISMIC ZONING MAP OF CANADA, 1985: VELOCITY (NBCC). Reviewed November 2006. Available: http://earthquakescanada.nrcan.gc.ca/hazard/zoning/seismiczonev_e.php.

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Bibliography
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Niagara Peninsula Conservation Authority (NPCA), 2007. Subwatersheds Map. Available:

http://www.conservation-niagara.on.ca/water_management/pdf/NPCA_Subwatersheds.pdf

Ontario Breeding Bird Atlas internet database. Atlas records 2001 to 2005. Reviewed 2007 Available: <http://www.birdsontario.org/atlas>.

Ontario Division of Mines. 1976. Paleozoic Geology Niagara Southern Ontario. Map 2344. Scale 1:50,000.

Ontario Geological Survey. 2006. Draft version of the Paleozoic bedrock of southern Ontario compilation map (ZIP file); Ontario Geological Survey, unedited draft version, August 16, 2006, Reviewed March 2007. Available temporarily: http://www.mndm.gov.on.ca/mndm/mines/ogs/draftbedrock_e.asp.

Ontario Institute of Pedology. 1989. Soils of Pelham – Thorold – Welland. Regional Municipality of Niagara, Ontario. Sheet 4, Scale 1:25,000.

Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA). 1981. Agriculture Resource Inventory. Agriculture Drainage Systems Map. Scale 1:25,000.

Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA). 1983. Agriculture Resource Inventory. Agriculture Land Use Systems Map. Scale 1:50,000.

Ontario Ministry of Natural Resources (MNR). 2002. Ontario Herpetofaunal Summary Atlas. Reviewed March 2007. Available: <http://nhic.mnr.gov.on.ca/MNR/nhic/herps/ohs.html>.

Ontario Ministry of Natural Resources (MNR). 2007. Communication with Joad Durst, Niagara Area Supervisor.

Ontario Ministry of the Environment (MOE). 1980. Hydrogeological Environments and the Susceptibility of Groundwater to Contamination. Map S100, Water Resources Branch.

Ontario Ministry of the Environment (MOE). 1991. Waste Disposal Site Inventory. Queen's Printer for Ontario: Toronto.

Ontario Ministry of the Environment (MOE). 2005. *Water Well Records*. Groundwater Bulletin Report. Water Well Data System.

Stantec, 2000. Environmental Effects Monitoring Georgia-Pacific Canada Inc. Cycle 2 Final Report.

Stantec, 2004. Environmental Effects Monitoring Georgia-Pacific Canada Inc. Cycle 3 Final Report.

Statistics Canada. 2001. Work. Reviewed August 2007. Available: <http://www12.statcan.ca/english/Profil01/CP01/Details/Page.cfm?Lang=E&Geo1=CSD&Code1=3526037&Geo2=PR&Code2=35&Data=Count&SearchText=Thorold&SearchTyp>

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Bibliography

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e=Begins&SearchPR=01&B1=Work&Custom=.

Statistics Canada. 2006. Population. Reviewed August 2007. Available:

<http://www12.statcan.ca/english/census06/data/profiles/community/Details/Page.cfm?Lang=E&Geo1=CSD&Code1=3526037&Geo2=PR&Code2=35&Data=Count&SearchText=Thorold&SearchType=Begins&SearchPR=01&B1=All&GeoLevel=&GeoCode=3526037>.

Attachment 1

Region	Square	Species	Breeding Evidence			Point Counts			
			Max BE	Categ	#Sq	#PC	%PC	Abun	#Sq
11	17PH47	Pied-billed Grebe	FY	CONF	1				
11	17PH47	Double-crested Cormorant	X	OBS	1				
11	17PH47	American Bittern	H	POSS	1				
11	17PH47	Least Bittern	T	PROB	1				
11	17PH47	Great Blue Heron	H	POSS	1	1	3.57	0.0357	1
11	17PH47	Green Heron	T	PROB	1				
11	17PH47	Black-crowned Night-Heron	X	OBS	1				
11	17PH47	Turkey Vulture	NY	CONF	1				
11	17PH47	Canada Goose	NY	CONF	1	2	7.14	3.4286	1
11	17PH47	Mute Swan	P	PROB	1				
11	17PH47	Wood Duck	AE	CONF	1				
11	17PH47	Gadwall	X	OBS	1				
11	17PH47	Mallard	FY	CONF	1				
11	17PH47	White-winged Scoter	X	OBS	1				
11	17PH47	Hooded Merganser	H	POSS	1				
11	17PH47	Northern Harrier	H	POSS	1				
11	17PH47	Sharp-shinned Hawk	H	POSS	1				
11	17PH47	Cooper's Hawk	FY	CONF	1				
11	17PH47	Red-tailed Hawk	NE	CONF	1	1	3.57	0.0357	1
11	17PH47	American Kestrel	FY	CONF	1				
11	17PH47	Peregrine Falcon	NE	CONF	1				
11	17PH47	Ring-necked Pheasant	FY	CONF	1	1	3.57	0.0357	1
11	17PH47	Wild Turkey	FY	CONF	1				
11	17PH47	Virginia Rail	S	POSS	1				
11	17PH47	Sora	FY	CONF	1				
11	17PH47	Common Moorhen	FY	CONF	1				
11	17PH47	American Coot	FY	CONF	1				
11	17PH47	Am. Coot/C. Moorhen	S	POSS	1				
11	17PH47	Killdeer	FY	CONF	1	4	14.29	0.1786	1
11	17PH47	Spotted Sandpiper	FY	CONF	1	2	7.14	0.0714	1
11	17PH47	American Woodcock	T	PROB	1				

Region	Square	Species	Breeding Evidence			Point Counts			
			Max BE	Categ	#Sq	#PC	%PC	Abun	#Sq
11	17PH47	Ring-billed Gull	X	OBS	1				
11	17PH47	Herring Gull	X	OBS	1				
11	17PH47	Caspian Tern	X	OBS	1				
11	17PH47	Rock Pigeon	NE	CONF	1	5	17.86	0.6786	1
11	17PH47	Mourning Dove	NE	CONF	1	14	50.0	0.9286	1
11	17PH47	Black-billed Cuckoo	H	POSS	1				
11	17PH47	Black/Yellow-billed Cuckoo	H	POSS	1	1	3.57	0.0357	1
11	17PH47	Eastern Screech-Owl	T	PROB	1				
11	17PH47	Great Horned Owl	NE	CONF	1				
11	17PH47	Common Nighthawk	T	PROB	1				
11	17PH47	Chimney Swift	AE	CONF	1				
11	17PH47	Ruby-throated Hummingbird	NY	CONF	1				
11	17PH47	Belted Kingfisher	CF	CONF	1	1	3.57	0.0357	1
11	17PH47	Red-headed Woodpecker	CF	CONF	1				
11	17PH47	Red-bellied Woodpecker	CF	CONF	1				
11	17PH47	Downy Woodpecker	AE	CONF	1	2	7.14	0.0714	1
11	17PH47	Hairy Woodpecker	T	PROB	1				
11	17PH47	Northern Flicker	AE	CONF	1	2	7.14	0.0714	1
11	17PH47	Eastern Wood-Pewee	FY	CONF	1	3	10.71	0.1786	1
11	17PH47	Acadian Flycatcher	S	POSS	1	1	3.57	0.0357	1
11	17PH47	Willow Flycatcher	T	PROB	1	2	7.14	0.0714	1
11	17PH47	Least Flycatcher	NB	CONF	1				
11	17PH47	Eastern Phoebe	AE	CONF	1				
11	17PH47	Great Crested Flycatcher	T	PROB	1	2	7.14	0.0714	1
11	17PH47	Eastern Kingbird	NE	CONF	1	1	3.57	0.0357	1
11	17PH47	Warbling Vireo	T	PROB	1	2	7.14	0.0714	1
11	17PH47	Red-eyed Vireo	T	PROB	1	4	14.29	0.25	1
11	17PH47	Blue Jay	AE	CONF	1	6	21.43	0.3929	1
11	17PH47	American Crow	NE	CONF	1	2	7.14	0.1071	1
11	17PH47	Horned Lark	CF	CONF	1	2	7.14	0.1071	1

Region	Square	Species	Breeding Evidence			Point Counts			
			Max BE	Categ	#Sq	#PC	%PC	Abun	#Sq
11	17PH47	Purple Martin	AE	CONF	1				
11	17PH47	Tree Swallow	NY	CONF	1	4	14.29	0.1429	1
11	17PH47	Northern Rough-winged Swallow	T	PROB	1				
11	17PH47	Bank Swallow	AE	CONF	1				
11	17PH47	Cliff Swallow	NB	CONF	1				
11	17PH47	Barn Swallow	NE	CONF	1	6	21.43	1.0357	1
11	17PH47	Black-capped Chickadee	FY	CONF	1	3	10.71	0.1786	1
11	17PH47	Tufted Titmouse	S	POSS	1	2	7.14	0.0714	1
11	17PH47	White-breasted Nuthatch	T	PROB	1				
11	17PH47	Carolina Wren	CF	CONF	1				
11	17PH47	House Wren	NE	CONF	1	1	3.57	0.0357	1
11	17PH47	Marsh Wren	S	POSS	1				
11	17PH47	Eastern Bluebird	AE	CONF	1				
11	17PH47	Wood Thrush	FY	CONF	1	3	10.71	0.1429	1
11	17PH47	American Robin	NY	CONF	1	15	53.57	0.9643	1
11	17PH47	Gray Catbird	CF	CONF	1	2	7.14	0.0714	1
11	17PH47	Northern Mockingbird	NY	CONF	1	4	14.29	0.1786	1
11	17PH47	Brown Thrasher	H	POSS	1				
11	17PH47	European Starling	NE	CONF	1	19	67.86	2.7857	1
11	17PH47	Cedar Waxwing	D	PROB	1	3	10.71	0.1071	1
11	17PH47	Yellow Warbler	CF	CONF	1	7	25.0	0.3214	1
11	17PH47	Chestnut-sided Warbler	H	POSS	1				
11	17PH47	American Redstart	T	PROB	1				
11	17PH47	Ovenbird	T	PROB	1				
11	17PH47	Common Yellowthroat	DD	CONF	1	1	3.57	0.0357	1
11	17PH47	Hooded Warbler	T	PROB	1				
11	17PH47	Scarlet Tanager	T	PROB	1	1	3.57	0.0357	1
11	17PH47	Eastern Towhee	T	PROB	1				
11	17PH47	Chipping Sparrow	NE	CONF	1	5	17.86	0.1786	1
11	17PH47	Field Sparrow	T	PROB	1				
11	17PH47	Vesper Sparrow	T	PROB	1	2	7.14	0.1071	1

Region	Square	Species	Breeding Evidence		Point Counts				
			Max BE	Categ	#Sq	#PC	%PC	Abun	#Sq
11	17PH47	Savannah Sparrow	FY	CONF	1	5	17.86	0.5	1
11	17PH47	Song Sparrow	FY	CONF	1	16	57.14	0.9643	1
11	17PH47	Swamp Sparrow	T	PROB	1				
11	17PH47	Northern Cardinal	FY	CONF	1	8	28.57	0.5357	1
11	17PH47	Rose-breasted Grosbeak	FY	CONF	1	3	10.71	0.1429	1
11	17PH47	Indigo Bunting	CF	CONF	1	2	7.14	0.1071	1
11	17PH47	Bobolink	S	POSS	1				
11	17PH47	Red-winged Blackbird	CF	CONF	1	12	42.86	1.0357	1
11	17PH47	Eastern Meadowlark	FY	CONF	1				
11	17PH47	Common Grackle	CF	CONF	1	18	64.29	1.0357	1
11	17PH47	Brown-headed Cowbird	FY	CONF	1	7	25.0	0.4286	1
11	17PH47	Orchard Oriole	T	PROB	1				
11	17PH47	Baltimore Oriole	AE	CONF	1	5	17.86	0.2857	1
11	17PH47	House Finch	FY	CONF	1	4	14.29	0.4643	1
11	17PH47	American Goldfinch	NY	CONF	1	16	57.14	1.0714	1
11	17PH47	House Sparrow	AE	CONF	1	16	57.14	1.5357	1

Disclaimer: Data contained in these summaries are provisional data that have not necessarily been reviewed or edited, and may be subject to significant change. These data have been released for public interest only. If you wish to use the data in a publication, research or for any purpose, or would like information concerning the accuracy and appropriate uses of these data, contact Nicole Kopysh, at telephone: 519-826-2092, e-mail: atlas@uoguelph.ca. **These data are current as of 14 May 2007 .**