Hamilton

INFORMATION REPORT

TO: Mayor and Members General Issues Committee	**WARD(S) AFFECTED:** CITY WIDE
COMMITTEE DATE: August 12, 2013	
SUBJECT/REPORT NO: Enbridge Pipelines Inc. Line 9B Reversal and Line 9 Capacity Expansion Project (PED12160(b)/LS12022(b)) (City Wide)	
SUBMITTED BY: Tim McCabe General Manager Planning and Economic Development Department Janice Atwood-Petkovski City Solicitor Legal Services Division City Manager's Office	**PREPARED BY:** Guy Paparella (905) 546-2424 Ext. 5807 Lindsay Lee (905) 546-2424 Ext. 3663
SIGNATURE:	

Council Direction:

On March 27, 2013, City Council approved Item 19 of the General Issues Committee (GIC) Report 13-007, which authorized and directed staff to apply to participate in the National Energy Board (NEB) Hearing for the Enbridge Line 9B Reversal and Line 9 Capacity Expansion Project through a written Letter of Comment and only seeking Intervenor status if there are unresolved issues of municipal concern which no other Intervenor has put forward for consideration by the NEB.

Information:

Staff has reviewed Enbridge's evidence in the Hearing to date, as well as information requests (IRs) to Enbridge from government Intervenors, and Enbridge's responses to these IRs. Enbridge's final responses to the IRs were due to the NEB on July 23, 2013. With no GICs scheduled between this date and the deadline to submit the City's Letter of Comment to the NEB of August 6, 2013, an Information Update, including a draft of the City's Letter of Comment, was provided to members of Council on August 1, 2013 in advance of the NEB deadline. The signed Letter of Comment was submitted to the NEB on August 6, 2013. Both documents, Appendices "A" and "B", are attached to this Report and can also be accessed at the following link: www.hamilton.ca/EnbridgeInfoReportAug2013

GP:LL
Attachs. (2)

Hamilton

INFORMATION UPDATE

TO: Mayor and Members City Council	**WARD(S) AFFECTED:** CITY WIDE
DATE: August 1, 2013	
SUBJECT: Enbridge Pipelines Inc. Line 9B Reversal and Line 9 Capacity Expansion Project (City Wide)	
SUBMITTED BY: Tim McCabe General Manager Planning and Economic Development Department Janice Atwood-Petkovski City Solicitor Legal Services Division City Manager's Office	**SIGNATURE:**

Council Direction:

On March 27, 2013, City Council approved Item 19 of the General Issues Committee Report 13-007, and thereby adopted the following motion:

19. Enbridge Pipelines Inc. Line 9B Reversal and Line 9 Capacity Expansion Project

Whereas Enbridge Pipelines Inc. ("Enbridge") has applied to the National Energy Board ("NEB") for the Line 9B Reversal and Line 9 Capacity Expansion Project (the "Project");

And Whereas the City of Hamilton General Issues Committee has received Report PED12160(a)/LS12022(a) from City Staff on the Line 9 Project Application.

Therefore be it resolved:

(a) That City staff be authorized and directed as follows:

(i) Submit comment to the NEB and Enbridge on the List of Issues attached as Appendix I to the NEB Hearing Order OH-002-2013 for the Project;

(ii) Continue to review the Enbridge application and any further supporting materials related to the Project and attempt to resolve any concerns by requesting additional information from Enbridge;

(iii) Continue to liaise with other municipalities and Conservation Authorities to discuss co-operation in the presentation of common issues of concern before the NEB;

(iv) On behalf of the City of Hamilton, apply to participate in the NEB Hearing for the Project through a written Letter of Comment and only seek Intervenor status if there are unresolved issues of municipal concern which no other Intervenor has put forward for consideration by the NEB;

(v) Provide assistance as required by the City Solicitor and the General Manager of Planning and Economic Development in the review of the Project application and presentation of any City issues to the NEB; and,

(vi) Report back to the General Issues Committee with the status of the City's issues and how those issues have or have not been addressed at the NEB Hearing;

(b) That the City of Hamilton request the National Energy Board to include the following concerns in the NEB's List of Issues or the Project:

(i) Consultation with local Source Water Protection staff including the Hamilton Conservation Authority, Conservation Halton, and City of Hamilton staff regarding the identification of potential threats to drinking water quality and how Enbridge plans to address any malfunctions of the pipeline or spills that threaten drinking water safety;

(ii) The need for pipeline isolation valves to be installed where the pipeline crosses the Sheffield-Rockton Complex and other provincially-significant wetlands and environmentally-sensitive areas;

(c) That Enbridge Pipelines Inc. be advised that the City of Hamilton has requested that the National Energy Board include the additional concerns noted in sub-section (b) within the List of Issues as noted in Appendix I of Hearing Order OH-002-2013.

Information:

City of Hamilton and Municipal Liaison Group Update

In accordance with the above motion, on March 21, 2013, City staff submitted a letter to the NEB suggesting amendments to the List of Issues to be considered by the NEB in the hearing for the Enbridge Project. A copy of the City's letter can be accessed at the following link:
https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=937079&objAction=browse.

On April 18, 2013, the City of Hamilton, along with several other municipalities and other interested persons, applied to participate in the proceeding through a Letter of Comment. The City's application was accepted by the NEB. A copy of the application can be accessed at the following link:
https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=945266&objAction=browse.

City staff have also continued to liaise with other municipalities and a number of conservation authorities. In particular, several municipalities have formed a municipal liaison group ("MLG") which is composed of the following municipalities including the City of Hamilton: the Town of Ajax, the City of Burlington, the City of Kingston, the City of Mississauga, and the City of Toronto. The MLG, in consultation with conservation authorities, has been working cooperatively to provide the NEB with a consistent municipal position in raising issues and concerns with respect to Enbridge's application. The majority of municipalities in the MLG have also applied for and been granted status to submit a Letter of Comment, with the exception of Toronto and Mississauga, who have applied for and been granted Intervenor status.

NEB Procedural Update No. 2 and Updated Timetable of Events

Procedural Update No. 2 and and Updated Timetable of Events was released by the NEB on May 22, 2013 (see Appendix "A" for a copy of the Updated Timetable of Events).

The City of Toronto, as an Intervenor, submitted information requests ("IRs") to Enbridge with input from the MLG, including the City of Hamilton, which were submitted to Enbridge on June 11, 2013 (link to Toronto IR No. 1: https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=962204&objAction=browse).

Enbridge responded to those IRs, as well as IRs from all Intervenors on June 25, 2013 (link to Enbridge response to Toronto IR No. 1: https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=964209&objAction=browse).

Enbridge also provided several revised responses to Toronto IR No. 1 based on concerns raised by Toronto regarding some of the initial responses provided by

Enbridge (link to Enbridge's revised responses to Toronto IR No. 1: https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=972894&objAction=browse).

The second round of IRs were due to Enbridge on July 9, 2013. The City of Toronto, again with input from the City of Hamilton and the other municipalities in the MLG, submitted additional questions to Enbridge.

Enbridge responded to these follow-up IRs on July 23, 2013 (link to Enbridge response to Intervenor Follow-up Information Requests: https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=976803&objAction=browse).

Hamilton Conservation Authority

At the April 4, 2013 Hamilton Conservation Authority ("HCA") Board of Directors meeting, the following motion was adopted:

> THAT the Board of Directors approve the following recommendation:
>
> THAT staff provide mapping and catalogue sensitive locations, such as watercourse crossings, wetland areas, and wells across our watershed; and further,
>
> THAT this information be forwarded to the City of Hamilton so it can be forwarded to the National Energy Board and to incorporate this into Enbridge's emergency response protocol.

The HCA has been supporting the City staff in providing comments to the MLG.

Other Government Participants

The Ontario Ministry of Energy and Environment Canada are also actively participating in the hearing for the proposed Project. A number of Ontario's IRs to Enbridge highlighted some key issues, such as payment of clean-up costs, reimbursement of first responder costs, and compensation for damages for leaks and ruptures, which are of concern to the City of Hamilton and the MLG.

Links to the Ontario Ministry of Energy and Environment Canada filings in the proceeding are provided below:

Ontario: https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=956943&objAction=browse&sort=name

Environment Canada: https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=956942&objAction=browse&sort=name

Enbridge Open Houses

Enbridge held numerous open houses, including one in Rockton on June 20, 2013. Enbridge staff were on hand to answer questions from the public, and general information, as well as handouts relating to the Application were made available to the public. The information was essentially the same material presented to Hamilton City Council earlier this year.

City of Toronto Request for Funding and Contribution from Other Municipalities

The City of Toronto has played a key role in organizing and coordinating the MLG's participation in the hearing. They have organized conference calls, coordinated MLG subgroups for emergency response and sourcewater protection, disseminated and distilled relevant information provided by participants of the MLG, and allowed other members of the MLG without Intervenor status to provide input on IRs. In addition, the City of Toronto has retained experts who have reviewed and assessed a number of issues, particularly those related to integrity of the pipeline, and raised concerns as an Intervenor on behalf of the MLG. As such, the City of Hamilton will be contributing a total amount of approximately $10,000, a small but equitable portion of the overall costs incurred by the City of Toronto for coordinating the MLG and in retaining experts for the hearing.

Next Steps

Written evidence from Intervenors is due to the NEB by August 6, 2013. Letters of Comment are also due to the NEB on the same date. IRs to Intervenors on their evidence are due on August 20, 2013 and Intervenors must respond by September 3, 2013. Enbridge will have an opportunity to file reply evidence by September 17, 2013. The dates for Written Final Argument, Oral Final Argument, and the Board Decision have yet to be determined. However, staff expect that arguments will be heard by the Board sometime in late September, early October. The deadline for the NEB to issue its decision is March 19, 2014.

After all of the exchange of information between participants in the hearing, including the municipalities part of the MLG, City staff wish to highlight their concerns to the NEB in the City's Letter of Comment, which will submitted to the NEB on August 6, 2013, a draft of which is attached as Appendix "B". In summary, the letter highlights specific and general municipal concerns regarding the proposed Project:

- Pipeline integrity and Financial assurance concerns
- Emergency response and prevention concerns
  - Provision of relevant detailed information to local first responders that would enable them to properly plan and prepare
  - Training of local first responders
  - Contingency plans in case of spills

    - Evacuation issues
  - Sourcewater protection issues
  - Municipal approvals required (building permits/site plans/development charge payments and applicable integrity dig permits from the HCA)
  - Pipeline enhancements, including but not limited to installation of shut-off valves to protect environmentally significant areas

Staff will provide an update to Council once the written and oral arguments have concluded and the Board has issued its decision with respect to Enbridge's application.

LL:GP
Attachs. (2)

Hamilton Conservation Authority

Healthy Streams...Healthy Communities!

APR 2 5 2013

April 23, 2013

GC FLAM 2012 - Enbridge

Mr. Guy Paparella
Director of Growth Planning
Planning & Economic Development
City of Hamilton
71 Main Street West, 6th Floor
Hamilton, Ontario
L8P 4Y5

RECEIVED
MAY 0 1 2013
LEGAL SERVICES

Dear Mr. Paparella:

Re: Enbridge Line 9 Reversal Project

At the April 4, 2013 Hamilton Conservation Authority Board of Directors meeting, the following motion was adopted:

> THAT the Board of Directors approve the following recommendation:
>
> THAT staff provide mapping and catalogue sensitive locations, such as watercourse crossings, wetland areas, and wells across our watershed; and further
>
> THAT this information be forwarded to the City of Hamilton so it can be forwarded to the National Energy Board and to incorporate this into Enbridge's emergency response protocol.

In this regard, we are providing the attached information relating to Enbridge's Line 9 project as it relates to the Hamilton Conservation Authority watershed.

The attached map shows the Line 9 pipeline in our watershed. The map highlights the watercourses that the pipeline crosses and these watercourses are identified by name. These watercourses are all cool water fisheries.

The map shows the Provincially Significant Wetlands located within our watershed that are located in and adjacent to the pipeline corridor. Information relating to Provincially Significant Wetlands (PSW) is maintained by the Ministry of Natural Resources. The map also highlights environmentally significant lands as identified in the 2003 Natural Areas Inventory and these are shown as five separate areas. The natural area boundaries generally include the areas noted as PSW's. We have attached to this letter the Site Summaries for each of the natural areas. The site summaries provide a general summary, physical description, flora and fauna summaries for each natural areas. They serve as an excellent catalogue of the environmental significance of each

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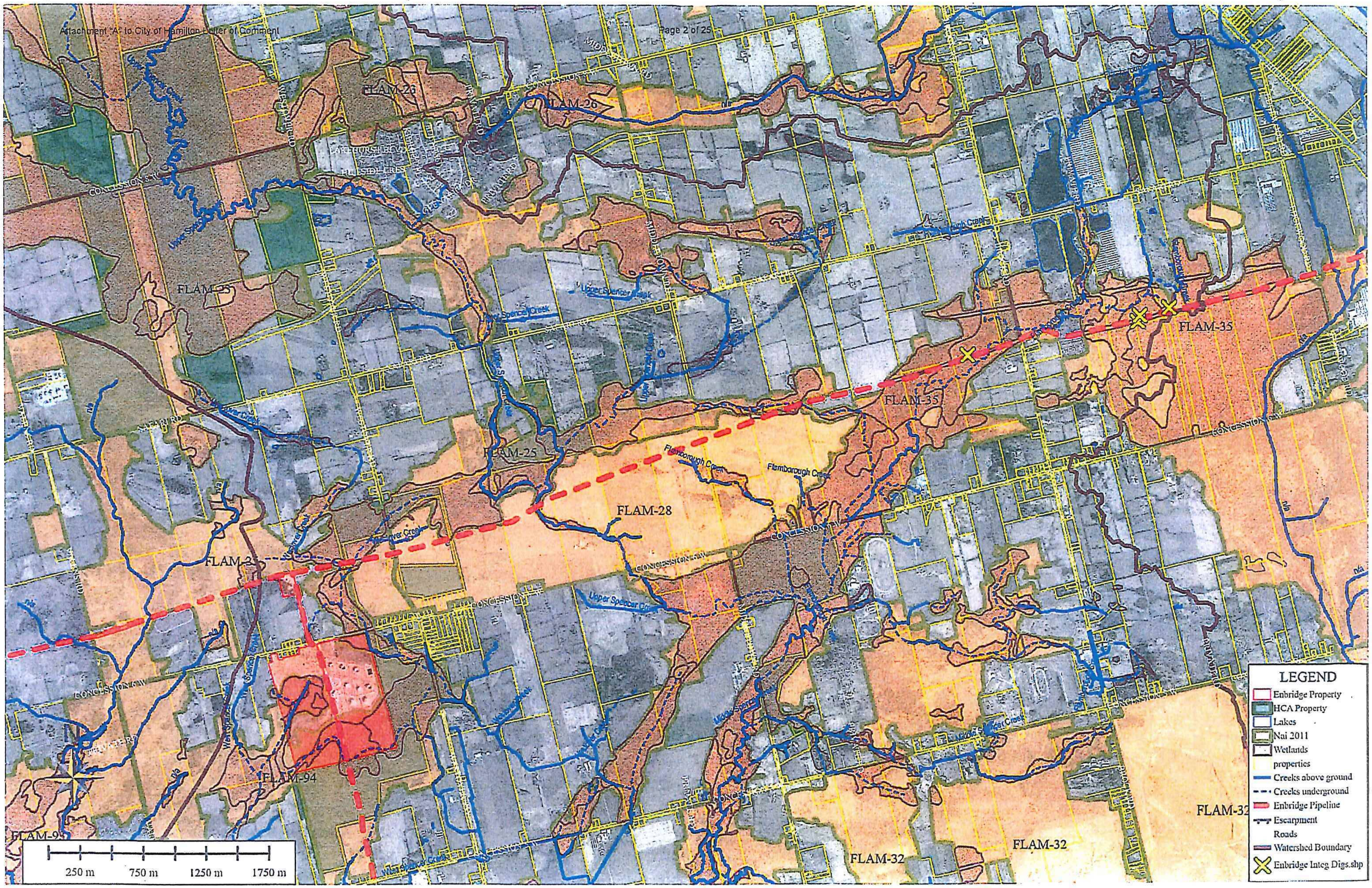
Office Fax: 905-648-4622 ♦ Shop Fax: 905-525-2214 ♦ E-mail: nature@conservationhamilton.ca ♦ Website: www.conservationhamilton.ca


FLAM-23
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FLAM-94
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FLAM-32
FLAM-32
CONCESSION 8 W
CONCESSION 6 W
SAFARI RD
Upper Spencer Creek
Flamborough Creek
Flamborough Creek
LEGEND
Enbridge Property
HCA Property
Lakes
Nai 2011
Wetlands
properties
Creeks above ground
Creeks underground
Enbridge Pipeline
Escarpment
Roads
Watershed Boundary
Enbridge Integ Digs.shp
250 m
750 m
1250 m
1750 m

HAYESLAND SWAMP

Municipality	ESA #	Conservation Authority
City of Hamilton	13	Halton/Hamilton
Formerly	Lot	Watershed
Town of Flamborough	32-36/1-17	Grindstone, Flamborough, & Spencer Creeks
Approximate Area	Concession	Ownership
1200 hectares	4-6	Private/Public

GENERAL SUMMARY

The Hayesland Swamp study area consists of a large, crescent-shaped, forested wetland that straddles the Grindstone Creek and Spencer Creek watershed boundary. The site is situated along the transition between the Flamborough Plain and Norfolk Sand Plain physiographic regions. Geologically, this area is characterized by southwards-thickening deposits of outwash sands overlying a dolomite bedrock plain. Groundwater is discharging into the stream systems that arise in this headwaters wetland complex. These headwater streams include significant coldwater fish habitat[459].

The study area is mostly comprised of extensive swamps with scattered patches of marsh, wet meadow, and tall, shrub thicket swamp communities. The extensive forested area provides a refuge for species requiring large tracts of undisturbed forest, and also includes a small heronry and deeryard. As an aftermath of peat extraction activities, the southeastern portion of the wetland includes a large area of open ponds and marsh habitats, both of which are uncommon communities in the City of Hamilton and support rare and uncommon species[459].

This area was included in both the 1976 study and the 1991 NAI. Nature Counts surveyors collected data on birds, butterflies, herpetofauna, and plants during the summers of 2001 and 2002. Extensions to the northeast, south of the western arm, and east of the eastern arm have been added to the area. The function of these extensions is to keep the area boundary consistent with the OMNR Provincially Significant Wetland boundary[401].

HISTORICAL EVALUATION

1976 Study[56]-

Identified the following significant features:

- serves a vital ecological function such as maintaining the hydrologic balance over a widespread area
- unusual habitat with limited representation in the municipality, Ontario, or Canada
- provides habitat for rare or endangered species that are endangered regionally, provincially, or nationally
- area is large and undisturbed, potentially affording a sheltered habitat for species which are intolerant to human disturbance

NAI[459]

Significant Natural Area

- performs significant ecological functions
- performs significant hydrological functions
- includes significant communities
- provides habitat for significant species

OMNR- Provincially Significant Wetland

PRESENT EVALUATION

ESA Criteria

- Significant Ecological Function
  - the area contains significant species
  - the area contains interior forest habitat (at least 100-200m from forest edge)
  - the area provides a migratory stopover area for waterfowl and a deer yard
  - the area serves as a link between other natural areas in Flamborough[528]
- Significant Hydrological Function
  - the large headwaters wetland helps to maintain surface water quality and regulate stream flow

PHYSICAL DESCRIPTION

Physiography and Topography

This crescent-shaped natural area is situated on the Flamborough Plain, an extensive tableland of dolostone bedrock with shallow soils. The study area lies along the northern edge of a low dome of bedrock centred in the Hayesland area. To the north, numerous drumlins overlie the gently south-sloping bedrock plain. The study area straddles the Grindstone Creek and Spencer Creek watershed. Surface elevations range from approximately 254 m at the divide in the hinge area south of Gulliver's Lake, to about 249 m at either extremity[459].

Bedrock Geology

Bedrock is at or near surface in the Hayesland Alvar area immediately south of this study area. To the north, the bedrock surface is generally at a 1 to 6 m depth. The west leg of this area coincides with a narrow linear bedrock valley that extends from the Bronte Creek valley east of Strabane, to the Dundas Valley just west of Peters Corners[202]. Elevations along the segment of the bedrock valley in the study area range from 250 to 230 m. In the eastern leg, the bedrock surface slopes south to southeast[459].

The contact between the upper member of the Amabel Formation and the overlying Guelph Formation crosses diagonally through this crescent-shaped area. Bituminous dolostone of the Eramosa Member underlies the western and southeastern sections; massive dolostone of the Guelph Formation is present in the middle section. Both of these units are presently quarried near Hayesland, and much of the study area falls within an extensive selected bedrock resource area identified by the Ontario Geological Survey[203].

Overburden Geology
During the last glacial retreat, this area was located near the northern margin of a sequence of glacial lakes. Meltwater streams entering the lake from the north and east resulted in the deposits of deltaic outwash sands present in the study area. Immediately north of the centre segment of the study area, coarser gravely outwash deposits have been exploited, resulting in Gulliver's Lake and other open pits. A drumlin composed of Wentworth Till is present in the north-central portion of the study area. This drumlin formed an island in these glacial lakes, and shoreline features at three elevations can be distinguished[202]. Overburden depth in the study area increases from a few metres in the northern area, to over 15 metres in depth at either extremity[459].

Soils
Most of the study area is poorly-drained and underlain by organic deposits described as muck and peat, except for the area along the southeastern arm where Jeddo loam soils occur. Small patches of well-drained Grimsby sandy loam and Guelph loam, imperfectly-drained Vineland sandy loam, and poorly-drained Flamboro sandy loam are also present in this vicinity[459].

Hydrogeology
Over 90 water wells are located in and around this area. A few wells tap aquifers within the sandy overburden, but most wells tap confined aquifers located anywhere from 2 to 21 m into the bedrock[459].

The piezometric surface (237 – 245 m) indicates that groundwater is generally flowing southerly and is discharging into the Spencer Creek system to the southwest, and the Grindstone Creek system to the southeast. Groundwater movement within the permeable overburden appears to be of local extent. Bedrock recharge areas are also located nearby, including the extensive bedrock plain to the northwest and the smaller alvar area to the south. Groundwater discharge and natural cover combine to maintain water temperatures in Flamboro Creek within the tolerance of coldwater fish species[459].

Hydrology and Surface Drainage
The Hayesland Swamp study area encompasses a very large headwaters wetland that regulates water flow and water quality in two stream systems. The western leg of the study area encompasses Flamborough Creek, a headwaters tributary of Spencer Creek. The central and eastern portions of the study area follow the course of Grindstone Creek, which arises in the Harper Corners East wetland immediately to the north across Highway 6. The main tributary of Grindstone Creek flows south through the peat pits area, and then swings sharply northeast towards Millgrove[459].

ECOLOGICAL LAND CLASSIFICATION
Not surveyed due to lack of access.

PLANT COMMUNITIES[459]
Summary
The Hayesland Swamp study area is mostly comprised of Silver Maple Swamp with scattered patches of marsh, wet meadow, and tall shrub thicket swamp communities. Terrestrial habitat in this study area is restricted to small upland ridges within the wetland; larger upland areas within the wetland have been cleared.

As an aftermath of peat extraction activities, the southeastern portion of the wetland includes a fairly large area of shallow open water interspersed with islands and ridges of unexcavated organic soils. Open water and marsh habitats are uncommon in Hamilton-Wentworth and the abandoned extraction area provides habitat for several regionally rare and uncommon species. Moreover, the size and condition of this large natural area provides a refuge for species requiring extensive tracts of relatively undisturbed forested habitat.

Community Description

AQUATIC
- POND
  - Macrophytes
    - Open water area bordered by marsh. Floating plants include pondweeds (*Potamogeton amplifolius* and *P.natans*) and duckweed (*Lemna* sp.); submergent plants include water-milfoil (*Myriophyllum spicatum*) and Common Bladderwort (*Utricularia vulgaris*). This is an anthropogenic feature resulting from peat extraction activities from 1951 to 1988.

WETLAND
- MARSH
  - Narrow-leaved Cattail – Common Cattail – Reed Canary Grass – Sedges (*Carex* and *Scirpus* spp.) / Wet to Wet-Mesic.
- WET MEADOW
- TALL SHRUB THICKET SWAMP
  - **Willow** / Wet to Wet-mesic.
    - Willow – Red-osier Dogwood / Wet to Wet-mesic. Includes open areas dominated by cattails, grasses and sedges
- BROADLEAF SWAMP
  - **Silver Maple** – Red Maple – White Elm – Black Ash / Wet to Wet-mesic.
    - Extensive broadleaf swamps dominated by Silver Maple in association with Red Maple, White Elm and Black Ash. Other associated species include: Willow sp., Balsam Poplar, Speckled Alder, Eastern White Cedar, Red Ash.

White Birch – Balsam Poplar – Cottonwood – Black Ash / Wet to Mesic.
Late successional community. Many White Elm, Cedar and Black Ash saplings.

TERRESTRIAL
BROADLEAF UPLAND WOODS
Willow – Trembling Aspen – Balsam Poplar – Cottonwood / Mesic.
OLD FIELD
TALL SHRUB THICKET

FLORA AND FAUNA SUMMARY

Vascular Plants

Adequate coverage for sections where access was granted. Nature Counts botanists recorded 136 species in 2001. Of these, three are locally uncommon species, one hybrid is provincially rare, and 10 (7%) are non-native species. A total of 279 species were observed here during field visits in 1976 and 1991 including 14 locally uncommon species and six locally rare species[58, 116, 1000].

Butterflies

Inadequate coverage during Nature Counts project. During field surveys in 2002, 13 species were recorded. Of these, four are locally uncommon[1001]. Surveyors documented 45 species during the 1991 NAI and other field visits including 10 locally uncommon species[998, 1000].

Fish

Grindstone Creek, Flamborough Creek and Spencer Creek flow through this natural area. Fish communities have been assessed in the watercourses of Hayesland Swamp between 1970 and 2000 [134, 236, 251, 282, 283, 238, 427, 442, 507, 508]. In total, 29 species have been collected with 24 species recorded since 1990. Fathead minnow (*Pimephales promelas*), finescale dace (*Phoxinus neogaeus*), mimic shiner (*Notropis volucellus*), and redside dace (*Clinostomus elongatus*) have not been recorded in the 1990s, while blackside darter (*Percina maculata*), blacknose dace (*Rhinichthys atratulus*), bluegill (*Lepomis macrochirus*), brook trout (*Salvelinus fontinalis fontinalis*), brown bullhead (*Ameiurus nebulosus*), emerald shiner (*Notropis atherinoides*), golden shiner (*Notemigonus crysoleucas*), largemouth bass (*Micropterus salmoides*), northern pike (*Esox lucius*), and smallmouth bass (*Micropterus dolomieu*) were found in the 1990s but not recorded before that decade.

A portion of this natural area features a large open marsh that is associated with an abandoned peat extraction area within the Hayesland Swamp (Provincially Significant Wetland, Significant Natural Area). The stream channel is not defined through the marsh and substrates consist of organic matter, silty marl, and mucky peat. Much of the wetland freezes to the bottom in the winter.

Grindstone Creek, within the southeast portion of the ESA, is characterized as a small, low gradient watercourse that is associated with low-lying forest/swamp habitat and surrounded by agricultural lands. Dredging and channelization have altered the watercourse here as landowners have attempted to drain their lands. It is intermittent through the ESA and the open marsh itself is restricted to a small number of refuge pools during periods of extreme drought. The upstream section of the main branch of Grindstone Creek is a small, poorly defined, relatively well-shaded section in a soft maple swamp.

The headwaters of Flamborough Creek are fed by springs to the south of Gulliver's Lake Trailer Park. Brook trout were found in the 1990s in this area upstream of Brock Road. Downstream of the road, the creek widens out in the swamp. It joins Spencer Creek just east of Middletown Road. Downstream of this confluence, the gradient is steeper. These are coolwater to coldwater reaches.

Of all species recorded in this natural area, one species – redside dace – is considered to be of special concern in Canada, and threatened in Ontario. Of the 24 recorded since 1990, six are considered to be uncommon in the City of Hamilton.

Herpetofauna

Adequate coverage during the Hamilton Herpetofaunal Atlas. A total of 15 species were recorded from 1984 to 1995 including two locally uncommon species and a COSEWIC special concern species[999,1000]. Three common species, all previously known to the area, were recorded in 2002[1001].

Breeding Birds

Adequate coverage of sections where access was granted. Nature Counts surveyors recorded 56 species. Of these, 16 are locally uncommon species, two are locally rare species, and six are interior forest species. The least bittern (*Ixobrychus exilis*), a locally, provincially, and nationally rare species, was also recorded here in 2002[1001]. A total of 85 species were observed here from 1976 to 1998 including 29 locally uncommon species, nine locally rare species, one locally, provincially, and nationally rare species, and one locally rare, nationally endangered species, and 13 interior forest species [21, 83, 116, 334, 393, 500, 997, 1000].

Heagy (1993) reported the presence of a small heronry in the eastern section of the swamp. Moreover, species requiring large tracts of land, open water or marsh habitat, or have a limited distribution in the Hamilton area have been observed in this area[459].

Mammals

Inadequate coverage. The Nature Counts project did not conduct trapping in this area. An incidental sighting of one common species was recorded in 2002[1001]. During field surveys from 1976 to 1995, including small mammal trapping in 1991, surveyors documented 11 species[58, 116, 384, 1000].

SIGNIFICANT SPECIES

Species (Year Found)	COSEWIC	MNR	SRank	City of Hamilton
Vascular Plants				
Marsh-bellflower, *Campanula aparinoides* (1991)[1000]			S5	rare
Carex x *subviridula* (2002)[1001]			S2	
Showy Lady's-slipper, *Cypripedium reginae* (1976, 1991)[58, 1000]			S4	rare
Small Purple Fringed Orchid, *Platanthera psycodes* (1976, 1991)[58, 1000]			S5	rare
American Bulrush, *Scirpus pungens* (1991)[116]			S5	rare
Shining Ladies'-tresses, *Spiranthes lucida* (1991)[1000]			S4	rare
Violet, *Viola septentrionalis* (1991)[1000]			SU	rare
Butterflies				
Monarch, *Danaus plexippus* (1990, 1991)[998, 1000]	SC	NIAC	S5	
Herpetofauna				
Eastern Milk Snake, *Lampropeltis triangulum triangulum* (1987, 1991)[999]	SC		S4	
Breeding Birds				
Acadian Flycatcher, *Empidonax virescens* (1976)[500]	END		S2B, SZN	rare
Blue-winged Teal, *Anas discors* (1991)[116, 1000]			S5	rare
Canada Warbler, *Wilsonia canadensis* (1991, 1988, 1989, 1990, 1991, 1992, 1995, 1998,)[393, 500, 1000]			S5	rare
Common Moorhen, *Gallinula chloropus* (1992, 1996)[393]			S4	rare
Green-winged Teal, *Anas crecca* (1991, 2002)[1000, 1001]			S4	rare
Least Bittern, *Ixobrychus exilis* (2001, 2002)[1001]	THR	VUL	S3	rare
Northern Harrier, *Circus cyaneus* (1991, 1992)[393, 1000]	NAR		S4	rare
Pied-billed Grebe, *Podilymbus podiceps* (1992, 2002)[393, 1001]			S4	rare
Sharp-shinned Hawk, *Accipiter striatus* (1991)[1000]	NAR	NIAC	S5	rare
Upland Sandpiper, *Bartramia longicauda* (1991)[1000]			S4	rare
Yellow-billed Cuckoo, *Coccyzus americanus* (1991)[1000]			S4	rare

LAND USE AND LINKAGES

Present Land Use

Most of this natural area consists of forested wetlands. An oil pipeline and a hydro transmission line run across the northern edge of the study area. A second oil pipeline runs through the southeast leg of the area. Drumlins within the northeastern section of the wetland have been cleared for agricultural and residential purposes. Peat extraction formerly occurred over a large area in the southeastern arm of the study area, but this activity ceased in 1988. Other minor land uses within the study area include several farm ponds, aggregate extraction pits, a junkyard, a trailer park, and a closed landfill site[459].

Land use in the surrounding area is predominantly agricultural. Immediately north of the narrow hinge between the western leg and centre section of the study area, gravel extraction has occurred. The old pits extend below the water table and contain open water. The southern pit, known as Gulliver's Lake, has been developed as a recreational park. Large quarries have been developed in the area of shallow bedrock (Hayesland Alvar), which lies between the western and southeastern arms of the study area. Residential and industrial development along Highway 6 is increasing, particularly near Millgrove and Strabane[459], and along Concession 5 West, Concession 6 West, and Brock Roads that all bisect the area.

Linkages with Other Natural Areas

Several other natural areas are located in the vicinity of the Hayesland Swamp study area; however, ecological linkages with these other areas are varied. The Harper Corners East Wetlands (FLAM-42) site, on the east side of Highway 6, is physically continuous and hydrologically upstream (and is also part of the Hayesland Swamp wetland complex). The Waterdown North Wetlands (FLAM-37) and Grindstone Valley (FLAM-50) study areas are several kilometres downstream along Grindstone Creek: riparian vegetation along this stream system is discontinuous, and these areas are only weakly linked. The western portion of the Hayesland Swamp includes a segment of the natural riparian corridor extending along the Spencer Creek system from the Beverly Swamp to the Dundas Valley[459].

The neighbouring segments of this corridor system are also study areas; the Westover Lowland Forest (FLAM-25) is upstream, and the Donald Farm Wetland (FLAM-33) is immediately downstream. The Hayesland Alvar Complex (FLAM-33) lies between the western and southern legs of the study area, but vegetative connections are weak. The Millgrove South Woodlot (FLAM-45), 1.5 km southeast, and the Strabane Southwest Drumlins (FLAM-26) are weakly connected to this natural area via hedgerows. The Westover Drumlin Field (FLAM-28) and Harper Corners Drumlins (FLAM-37) are also proximate to this area, but do not provide ecological linkages[459].

RECOMMENDATIONS

1. The area should be protected from development or other impacts, particularly the narrow hinge areas where the continuity of the natural vegetation is most vulnerable to fragmentation.
2. Existing linkages with other natural areas should be enhanced and maintained.
3. Environmental impact statements should be required for any development proposals on the upland areas within and adjacent to the wetland complex.

4. Future field work should include areas where access was denied during 2001 and 2002, and focus on the monitoring of significant species.

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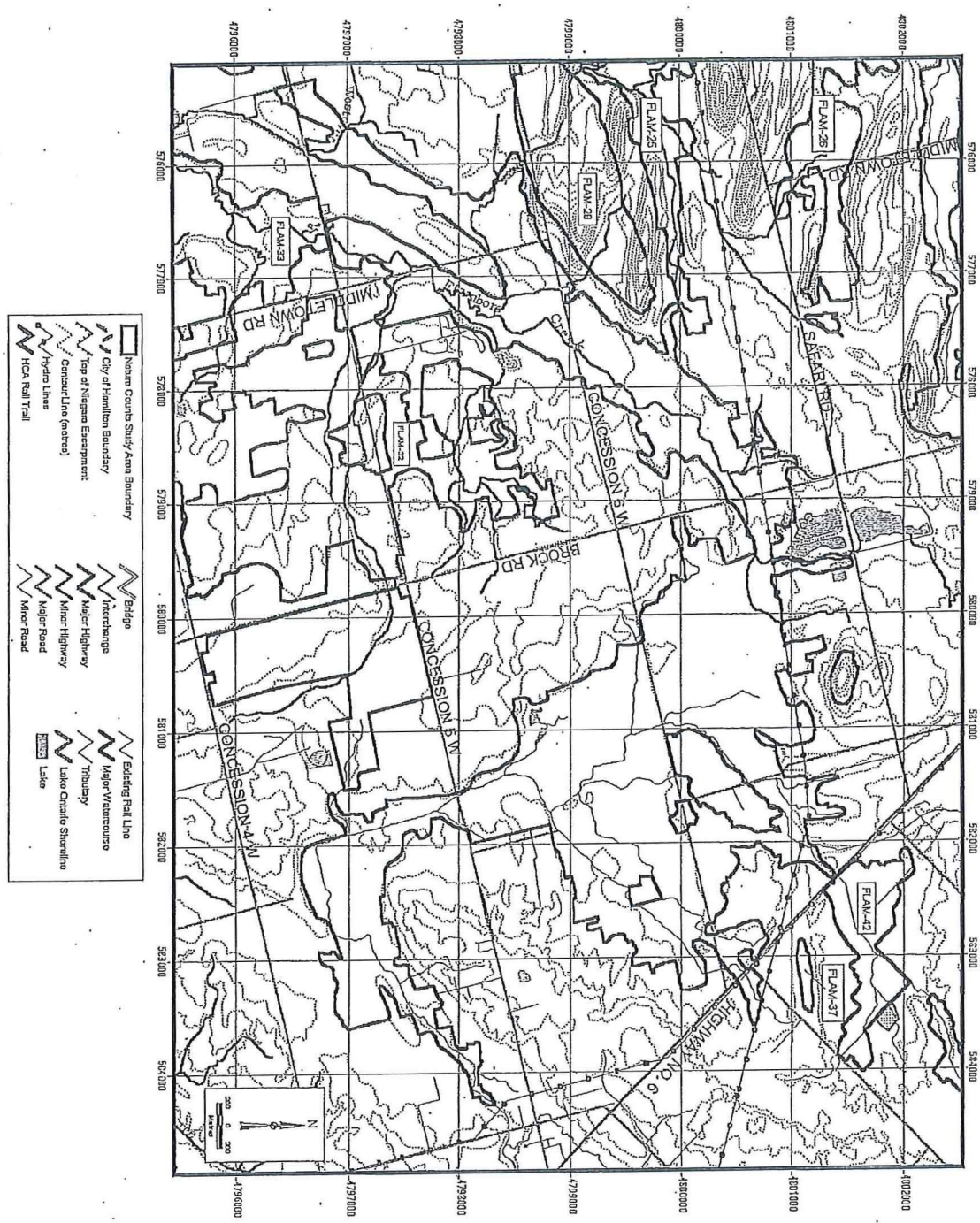
SITE VISITS

Date	Duration	Purpose	Observers
14-July-1990	-	Birds	L. Burr
08-May-1991	5.0 h	Flora	A. Goodban
14-May-1991	0.8 h	Birds	A. Wormington
21-May-1991	3.0 h	Flora	A. Goodban
22-May-1991	4.3 h	Flora	A. Goodban
13-June-1991	4.0 h	Birds/Butterflies	A. Wormington
13-June-1991	4.5 h	Bird	B. Lamond
21-June-1991	2.0 h	Butterflies	A. Wormington
21-June-1991	7.5 h	Birds/Butterflies	B. Lamond
25-June-1991	4.3 h	Birds/Butterflies	B. Lamond
30-Aug-1991	3.0 h	Butterflies	B. Lamond
Aug-1991	Small mammal trapping; 15 traps for 2 nights.		
24-July-2001		Flora	A. Goodban
28-May-2002	4.0 h	Fauna	B. Curry
15-July-2002	1.25 h	Fauna	B. Curry

Map 42. Hayesland Swamp (FLAM-35)



WESTOVER DRUMLIN FIELD

Municipality	ESA #	Conservation Authority
City of Hamilton	27	Hamilton
Formerly	Lot	Watershed
Town of Flamborough	30-36/1-2	Spencer Creek
Approximate Area	Concession	Ownership
250 hectares	6	Public/Private

GENERAL SUMMARY

The Westover Drumlin Field study area encompasses a group of drumlins that have been modified by wave-action in glacial Lake Whittlesey and Lake Warren[459]. Athough these rounded hills have been mostly cleared of natural vegetation, the area does support a number of faunal species including a significant snake species. Also included within this area are significant earth science features.

This area was included in both the 1976 study and the 1991 NAI. Nature Counts surveyors collected data on birds, butterflies, herpetofauna, mammals, and ELC.

HISTORICAL EVALUATION

1976 Study[56]

Identified the following significant features

- the drumlins represent a distinctive and unusual landform within municipality, Ontario, or Canada
- unusual habitat (a coldwater stream) with limited representation in the municipality, Ontario, or Canada

NAI[459]

Significant Site

- encompasses a provincially significant earth science feature

OMNR- Provincial Earth Science ANSI

PRESENT EVALUATION

ESA Criteria

- Significant Earth Science Feature
  - the area encompasses distinctive drumlin landforms
- Significant Ecological Function
  - the area provides habitat for significant species

Significant Site Criteria

- Restoration Potential
  - the segment of Spencer Creek within this area has potential to be restored and would therefore re-establish the continuity of the Spencer Creek riparian corridor upstream of the Hayesland Swamp
- Educational or Research Value
  - the unusual features of this area make it suitable for educational purposes

PHYSICAL DESCRIPTION

This study area encompasses a group of five large drumlins in the Westover-Strabane drumlin field section of the Flamborough Plain physiographic region. The drumlins, comprised of Wentworth Till, rise to an elevation of some 295 m, 40 m above the inter-drumlin valleys. During two stages of the last glaciation, these high hills formed islands in proglacial lakes. Wave-action in these lakes modified the drumlins adding distinctive shoreline features, including wave-cut benches and wave-built gravel bars[459].

These characteristics are best developed on the southern drumlins, which were exposed to waves generated across the open water to the south. Erosion attributes on the southern side of the drumlins include wave-cut benches and bluffs. Depositional features consist of wave-built sand and gravel bars and cones[459].

The most interesting feature is a tombolo, which is a gravel bar created between two islands. This feature was created by a combination of erosion of material from the exposed southern drumlin, and deposition of this re-worked material on the sheltered northern side. The result of this process is a bevelled drumlin joined to a second drumlin by a tombolo bar[459].

Mapping of the present elevations of the stranded shoreline features on these and other drumlins scattered throughout northern Hamilton area and vicinity permits scientists to unravel the chronology of events in this region during part of the last glaciation period[459].

The highest shoreline features, at a present elevation of 275 to 277 m, have been attributed to Lake Whittlesey, an extensive lake formed between the Ontario ice lobe and the Paris Moraine some 13,000 years B.P. (Port Huron Stadial). A second set of shoreline features, at about 265 m elevation, have been assigned to Lake Warren, which existed about 12,700 years ago and reached its northern limit near this site. A third set of shoreline features at about 262 m elevation, may represent a lower Lake Warren strand line[126,127,202].

The unique combination of features at this site has been identified as representative of Lakes Whittlesley and Warren in the Erie basin. This area has been used as an earth science interpretative site by universities and various geological organizations[459].

ECOLOGICAL LAND CLASSIFICATION

Summary

Working agricultural fields make up most of this study area. Meadow species and small-scattered hawthorns (*Crataegus* spp.), however, are reclaiming the abandoned agricultural field on the western most drumlin (Map 98, Polygon 1).

Spencer Creek flows across the center of this site. The floodplain along this meandering creek (Map 98, Polygon 2) is dominated by bur-reed (*Sparganium eurycarpum*), reed-canary grass (*Phalaris arundinacea*), jewelweed (*Impatiens capensis*), and riverbank grape (*Vitis riparia*). Tall willows (*Salix* spp.), white elm (*Ulmus americana*), and Manitoba maple (*Acer negundo*) edge the creek.

Surrounded by agricultural fields and between drumlins is a remnant silver maple (*Acer saccharinum*) swamp. Associates include black walnut (*Juglans nigra*), red maple (*Acer rubra*) and white elm. Red-oiser dogwood (*Cornus stolonifera*), riverbank grape, and thicket creeper (*Parthenocissus inserta*) dominate the understory. The herbaceous layer consists of jewelweed, grasses, and sedges. A jewelweed meadow marsh is associated with an intermittent stream.

Other communities include coniferous plantations, old fields, and a successional black walnut forest (Map 98, Polygon 4). Associates in the successional forest community include Manitoba maple, eastern cottonwood (*Populus deltoides* ssp. *deltoides*), sumac (*Rhus typhina*) and hawthorns. Riverbank grape, thicket creeper, raspberry (*Rubus* ssp.), grasses, and goldenrod (*Solidago* ssp.) dominate the understory and ground layer.

Community Descriptions[460]

Polygon 1- Dry – Moist Old Field Meadow Type (CUM1-1)

Polygon Description	Environmental Characteristic
Topographic Features	Rolling Upland
Community	Pioneer Meadow
Ranking	None

Polygon 2- Bur-reed Mineral Shallow Marsh Type (MAS2-7)

Polygon Description	Environmental Characteristic
Topographic Features	Bottomland
Community	Mature Marsh
Ranking	G4G5, S4

Polygon 2 Complex- Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2)

Polygon 3- Silver Maple Mineral Deciduous Swamp Type (SWD3-2)

Polygon Description	Environmental Characteristic
Topographic Features	Bottomland
Community	Mature Swamp
Ranking	G4?, S5

Polygon 3 Inclusion- Jewelweed Mineral Meadow Marsh Type (MAM2-9)
Ranking- G?, S4

Polygon 3 Inclusion- Fresh – Moist Aspen Deciduous Forest Type (FOD8-1)
Ranking- G4?, S5

Polygon 4- Dry-Fresh Black Walnut-White Ash Succesional Forest Type (FOD4-4)

Polygon Description	Environmental Characteristic
Topographic Features	Valley Slope
Community	Mid-Aged Forest
Ranking	None

FLORA AND FAUNA SUMMARY

Vascular Plants

Adequate coverage in 2002. Nature Counts ELC surveyors recorded 48 taxa including 13 (27%) introduced species[1001]. Plant surveys were not conducted at this site during the 1991 NAI.

Butterflies

Adequate coverage. Nature Counts surveyors recorded 11 common species in 2002[1001]. Butterflies were not surveyed during the 1991 NAI.

Fish

Spencer Creek flows southerly through the Westover Drumlin Field and Westover Lowland Forest (FLAM-25). It is a coldwater system with groundwater inputs throughout the area. A great deal of stream assessment and rehabilitation has been done since 1993 by a local fishing club in cooperation with the Hamilton Conservation Authority. Two major stream barriers were removed, cattle access was eliminated, and streamside buffers established.

Fish have been assessed in watercourses running through the Westover Drumlin Field between 1986 and 1998[134, 282, 283; 341, 405, 440]. In total, 28 species have been collected with 10 species recorded since 1990. Finescale dace (*Phoxinus neogaeus*), rosyface shiner (*Notropis rubellus*), largemouth bass (*Micropterus salmoides*), and golden shiner (*Notemigonus crysoleucas*) have not been recorded in the 1990s. Blacknose dace (*Rhinichthys atratulus*), blacknose shiner (*Notropis heterolepis*), blackside darter (*Percina maculata*), brassy minnow (*Hybognathus hankinsoni*), brown bullhead (*Ameiurus nebulosus*), common shiner (*Luxilus cornutus*), creek chub (*Semotilus atromaculatus*), hornyhead chub (*Nocomis biguttatus*), Johnny darter (*Etheostoma nigrum*), longnose dace (*Rhinichthys cataractae*), mottled sculpin (*Cottus bairdi*), northern pike (*Esox lucius*), rainbow darter (*Etheostoma caeruleum*), and river chub (*Nocomis micropogon*) were found in the 1990s, but not recorded before that decade.

Of the 28 species of fishes recorded, redside dace (*Clinostomus elongatus*) is of special concern in Canada. Of the 10 species recorded since 1990, four are uncommon in the City of Hamilton and two are rare.

Herpetofauna

Adequate coverage during the Hamilton Herpetofaunal Atlas. A total of six species were recorded from 1985 to 1991 including one locally uncommon snake, northern water snake (*Nerodia sipedon sipedon*) and Eastern Milk Snake (*Lampropeltis triangulum triangulum*), a

COSEWIC special concern snake[999]. Nature Counts surveyors documented one common species[1001].

Breeding Birds

Adequate coverage. Nature Counts surveyors recorded 39 species in 2002. Of these, six are locally uncommon[1001]. Birds were not surveyed in this area during the 1991 NAI.

Mammals

Inadequate coverage. The Nature Counts project did not conduct trapping in this area. Incidental sightings of two common species were recorded in 2002[1001]. Mammals were not surveyed in this area during the 1991 NAI.

SIGNIFICANT SPECIES

Species (Year Found)	COSEWIC	MNR	SRank	City of Hamilton
Fish				
Hornyhead Chub, *Nocomis biguttatus* (1998)[341]			S4	rare
Redside Dace, *Clinostomus elongates* (1995)[283]	SC	THR	S3	rare
Herpetofauna				
Eastern Milk Snake, *Lampropeltis triangulum triangulum* (1985)[999]	SC		S4	

LAND USE AND LINKAGES

Present Land Use

Land use on the drumlins and in the vicinity consists of agricultural and rural development. The community of Westover abuts the southwest corner of the site along Concession 6 Road West, which runs along the southern boundary of the area[459].

Linkages with Other Natural Areas

This area is flanked by the Westover Lowland Forest (FLAM-25) study area on the north and west, and by the Hayesland Swamp (FLAM-35) study area to the southeast. The segment of Spencer Creek in this area forms a hydrological linkage between these sites; the attenuated riparian habitat along this segment provides a weak link in the riparian corridor along Spencer Creek[459].

RECOMMENDATIONS

1. The area should be protected from development or other impacts.
2. The riparian habitat along this segment of Spencer Creek should be enhanced and maintained to restore the continuity of the riparian corridor along Spencer Creek and to improve fish habitat

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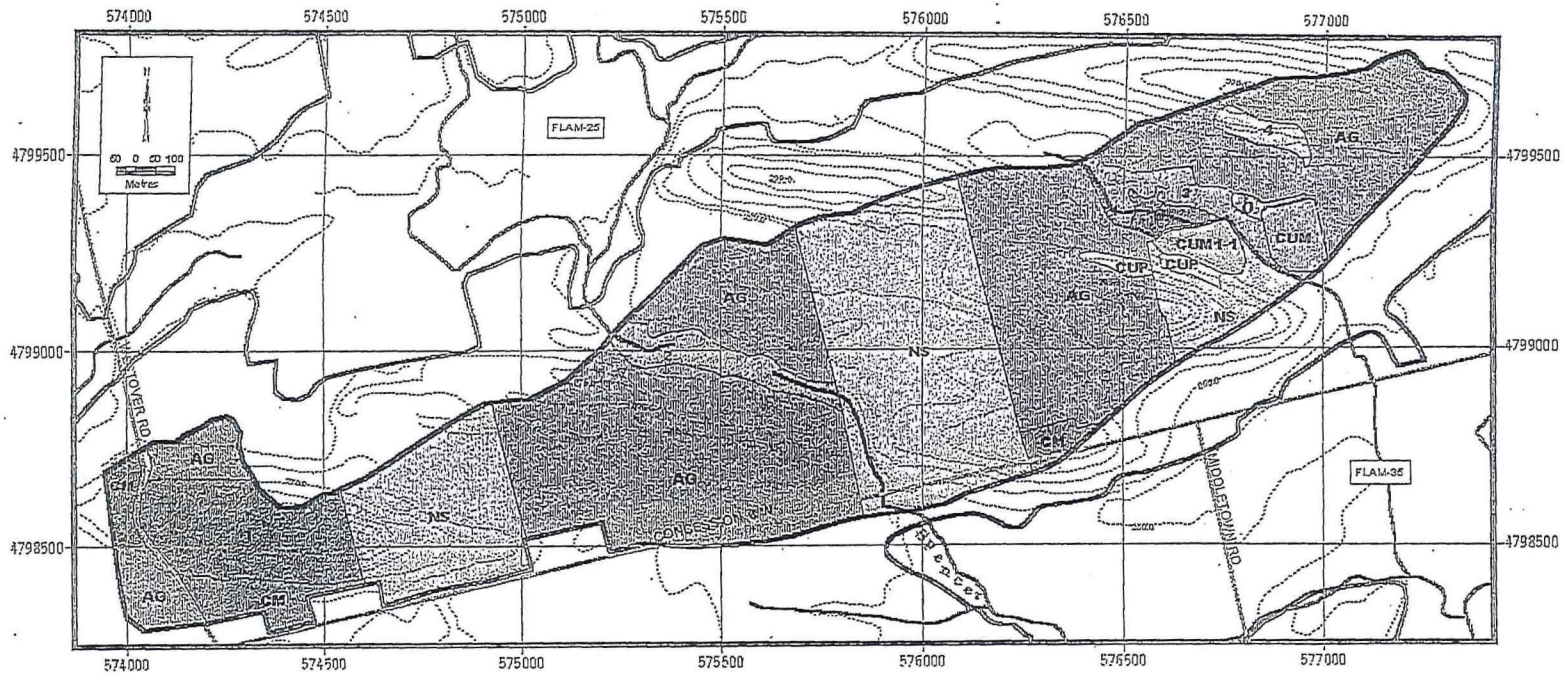
SITE VISITS

Date	Duration	Purpose	Observers
19-July-2002	5.0 h	ELC	B. Bullough, T. Lanthier, M. Ogilvie
24-July-2002	2.0 h	Fauna	B. Curry

Map 98. Westover Drumlin Field (FLAM-28) ELC mapping.



FLAM-28 VEGETATION TYPES
- 1 CUM1-1 Dry – Moist Old Field Meadow Type
- 2 MAS2-7 Bur-reed Mineral Shallow Marsh Type
- 3 SWD3-2 Silver Maple Mineral Deciduous Swamp Type
- 4 FOD4-4 Dry-Fresh Black Walnut-White Ash Successional Forest Type
- AG Agricultural Lands
- CM Culturally Maintained
- CUM Cultural Meadow
- CUM1-1 Dry – Moist Old Field Meadow Type
- CUP Plantation
- NS Not Surveyed

FLAM-28 INCLUSIONS
- a. MAM2-9 Jewelweed Mineral Meadow Marsh Type
- b. FOD8-1 Fresh – Moist Aspen Deciduous Forest Type

FLAM-28 COMPLEXES
Polygon 2 MAM2-2 Reed Canary Grass Mineral Meadow Marsh Type

- Nature Counts Study Area Boundary
- Contour Lines (metres)
- Proposed ESA Extension
- Minor Highway
- Major Road
- Minor Road
- Major Watercourse
- Tributary
- Lake

DATE(S) SURVEYED:	SURVEYORS:	MAP PROJECTION:	DATUM:
07/19/02	MO BB TL	UTM Zone 17	NAD 83

BASE MAPPING SUPPLIED BY THE CITY OF HAMILTON ROADS TECHNOLOGY DEPARTMENT

WESTOVER LOWLAND FOREST

Municipality	ESA #	Conservation Authority
City of Hamilton	25	Grand River, Hamilton
Formerly	Lot	Watershed
Town of Flamborough	25-36/1-5	Spencer, Westover, & Fairchild Creeks
Approximate Area	Concession	Ownership
350 hectares	6	Private

GENERAL SUMMARY

The Westover Lowland Forest study area consists of a narrow east-west strip of natural vegetation extending for over 6 km in the 6th Concession of the former municipality of Flamborough. This study area is located in a drumlin field situated on a bedrock plain, and includes segments of several streams including Barlow Creek (a tributary of Fairchild Creek), Spencer Creek, and two unnamed tributaries of Spencer Creek.

A diversity of vegetation communities exist within this natural area including swamps, upland woods, shrub thickets, and riparian meadows located on shallow, wet, and/or stony soils in valleys and on the bedrock plain between the drumlins. The cleared drumlins are excluded from the study area[459]. Because this area is hydrologically and physically connected to a network of natural areas, it provides ecologically important linkages, both along riparian corridors and across watershed divides.

This area was included in both the 1976 study and the 1991 NAI. During the summer of 2001, Nature Counts surveyors collected data on birds, butterflies, herpetofauna, and plants including several significant and interior forest species.

HISTORICAL EVALUATION

1976 Study[56]

Corresponds to the Westover Wetland (Area No.7)
Identified the following significant features
- provides habitat for regionally, provincially, or nationally rare or endangered species

NAI[459]

Significant Natural Area
- serves an important ecological function
- serves an important hydrological function
- provides habitat for significant species

OMNR

Provincially Significant Wetland

PRESENT EVALUATION

ESA Criteria

- Significant Ecological Function
  - the riparian areas serve as a link between many natural areas
  - the area provides habitat for significant species
  - the area provides a wintering area for deer
  - the area contains interior forest habitat (100-200m from forest edge)
- Significant Hydrological Function
  - the wetlands in the area help to maintain surface water quality and regulate stream flow

PHYSICAL DESCRIPTION

Physiography and Topography

The Westover Lowland Forest study area is located in the Flamborough Plain physiographic region. Specifically, this area is located at the transition of the extensive Rockton-Kirkwall-Westover bedrock plain, and the Westover-Strabane drumlin field. The well-drained drumlins are generally cleared of natural vegetation and excluded from this study area. The natural area includes tracts of shallow, wet, and/or stony soils in valleys and bedrock plain between the drumlins. This elongate study area trends across the regional slope and includes short segments of several streams including Barlow Creek (a tributary of Fairchild Creek), the main channel of Spencer Creek, and two unnamed tributaries of the Spencer Creek system. The maximum surface relief within this site is 12 m but elevations throughout most of the wetlands of this study area range between 260 and 265 m[459].

Bedrock Geology

This area is underlain by a south-sloping bedrock plain comprised of Guelph Formation dolostone. North-trending, rocky ridges mark resistant reef structures. Bedrock is at or near the surface throughout this area except where the lower slope of the adjoining drumlin is included in the study area[459].

Overburden Geology

Overburden within the study area consists of a discontinuous veneer of sandy Wentworth Till and glaciolacustrine and outwash sands. A short esker is included in the eastern tip of this area. Recent peat and muck deposits have accumulated in the swamps. In many places the study area is bounded by 35 m high drumlins of the Westover-Strabane drumlin field[459].

Soils

Organic, muck soils have developed in the wetlands in this area; Farmington loam has developed where less than 30 cm of well-drained overburden overlie the bedrock plain. Other major soils in this area include imperfectly-drained London loam, poorly-drained Toledo silt loam,

and poorly-drained Flamboro sandy loam. Well-drained Guelph loam soils are present on the drumlins which surround this study area[459].

Hydrogeology
Water wells in the vicinity of this study area tap an aquifer found 6 to 9 m into the bedrock. The elevation of the confined aquifer is about 250 m. The south-sloping piezometric surface is generally coincident with the topographic surface, suggesting that some groundwater discharge may be occurring along fracture zones[459].

Hydrology and Surface Drainage
Several south-flowing streams cross this elongate study area. The western end lies in the headwaters zone of the Fairchild Creek watershed, and is drained by Barlow Creek. Most of this area lies in the Spencer Creek watershed. The main channel of Spencer Creek flows through this area east of Westover Road, and two unnamed tributaries of this system drain the eastern tip and the section immediately west of Westover Road[459].

The wetlands in this area serve an important hydrological function by retaining runoff, contributing to stream baseflow, and maintaining surface water quality in the headwaters zone of two watersheds. The upland natural areas buffer the wetlands from the impact of runoff from the cleared drumlins and adjacent residences[459].

An interesting feature of this area is a 1 km long diversion channel occupied by Spencer Creek for a short time in 1949, after a bedrock movement blocked the stream channel just upstream of this study area. A new channel was blasted to restore the creek to its former route[202].

ECOLOGICAL LAND CLASSIFICATION
Not surveyed due to lack of access.

PLANT COMMUNITIES
Summary
The Westover Lowland Forest is composed of an elongate system of natural areas along the lowlands in a drumlin field. The core of the area consists of two Silver Maple swamps. The study area also includes adjoining riparian habitat, upland woods, shrub thickets, and old fields. Some of the upland communities appear to have alvar characteristics but have not been adequately described.

Community Description
AQUATIC
SHALLOW WATER STREAM
Permanent coldwater streams.

WETLAND
BROADLEAF SWAMP
Silver Maple – Black Ash – White Elm / Wet to Wet-Mesic.
Mature stand. A few windfalls have created openings in the canopy resulting in a rich herb layer.
Silver Maple – Black Ash – White Elm – Yellow Birch – Eastern White Cedar / Wet to Wet-Mesic.
Open broadleaf swamp with a few dense patches of Cedar. Many Cedar windfalls. Some permanent pools.
Silver Maple – Yellow Birch – Black Ash / Wet.
Mix of age classes. Relatively undisturbed; a few trees have been cut in the past.
RIPARIAN WET MEADOW

TERRESTRIAL
BROADLEAF UPLAND WOODS
Sugar Maple – White Ash – Black Cherry – White Elm / Mesic.
Small area dominated by large maples.
MIXED UPLAND WOODS
CONIFEROUS UPLAND WOODS
Eastern White Cedar / Mesic to Dry-Mesic.
Small stand.
TALL SHRUB THICKET
Hawthorn (*Crataegus dodgei*) – Eastern White Cedar – White Ash – White Pine / Dry-Mesic.
A tall shrub thicket on a dry, sandy ridge dominated by the nationally rare *Cratagus dodgei* and Cedars.
OLD FIELD
Old Field / Open Alvar
Alvar species present; requires additional documentation.
MAINTAINED SITES
Agricultural lands.
Hydro right-of-way.
Pipeline.

FLORA AND FAUNA SUMMARY
Vascular Plants
Inadequate coverage in 2001 and 2002. Nature Counts botanists did not survey this area; only three incidental sightings of common species were recorded[1001]. From 1976 to 1991, 218 species were recorded from this area including nine locally uncommon species, four locally rare species, and one locally and provincially significant species[58, 479, 1000].

Butterflies
Adequate coverage. Nature Counts surveyors recorded 33 species in 2001. Of these, four are locally uncommon and one is a COSEWIC special concern species[1001]. In 1991, 45 species were observed including 13 significant species[998, 1000].

Fish
Spencer Creek flows through the Westover Lowland Forest natural area, as well as portions of Fairchild Creek (Grand River Conservation Authority [GRCA]) and Flamboro Creek (Conservation Halton). The area is forested and contains several groundwater sources, both of which reduce water temperatures and improve water quality. The stream in the southern half of this area was the focus of substantial rehabilitation efforts in the 1990s by a local fishing club in cooperation with the Hamilton Conservation Authority.

Fish have been assessed in the Westover Lowland Forest between 1993 and 2000 [235, 282, 283, 341, 427, 441]. In total, 31 species have been collected, all which have been recorded since 1990.

Of the 31 species of fishes recorded, redside dace (*Clinostomus elongatus*) is considered a species of special concern, and is threatened in Ontario. Six of these significant species are considered uncommon, and three rare in the City of Hamilton.

Herpetofauna

Adequate coverage during the Hamilton Herpetofaunal Atlas. A total of eight species were recorded in 1984 and 1991 including two locally uncommon species[999, 1000]. Nature Counts surveyors documented five common species, two of which are new records for the area[1001].

Breeding Birds

Adequate coverage. Nature Counts surveyors recorded 10 species in 2001. Of these, six are locally uncommon, one is locally rare, and three are interior forest species[1001]. A study conducted in 2000 documented an additional 19 species including five locally uncommon species and two interior forest species[412]. From 1976 to 1993, 60 species were documented including 24 significant species and eight interior forest species[58, 393, 500, 1000].

Mammals

Inadequate coverage. The Nature Counts project did not conduct trapping in this area. Incidental sightings of two common species were recorded in 2002[1001]. During field surveys in 1976 and 1991, surveyors documented nine species[58,1000].

SIGNIFICANT SPECIES

Species (Year Found)	COSEWIC	MNR	SRank	City of Hamilton
Vascular Plants				
Marsh-bellflower, *Campanula aparinoides* (1991)[1000]			S5	rare
Downy Willow-herb, *Epilobium strictum* (1991)[1000]			S5	rare
Autumn Willow, *Salix serissima* (1991)[1000]			S5	rare
Long-styled Canadian Sanicle, *Sanicula canadensis* var. *grandis* (1991)[1000]			S2	uncommon
Dwarf Vervain, *Verbena simplex* (1991)[1000]			S4	rare
Butterflies				
Giant Swallowtail, *Papilio cresphontes* (1991)[998, 1000]			S2	uncommon
Monarch, *Danaus plexippus* (1991, 2001)[998, 1000, 1001]	SC	NIAC	S5	
White Admiral, *Basilarchia arthemis arthemis* (1991)[998, 1000]			S5	rare
Fish				
Hornyhead Chub, *Nocomis biguttatus* (1998)[341,441]			S4	rare
Redside Dace, *Clinostomus elongatus* (1998)[341,441]	SC	THR	S3	rare
Breeding Birds				
Acadian Flycatcher, *Empidonax virescens* (1976)[500]	END		S2B, SZN	rare
Canada Warbler, *Wilsonia canadensis* (1991)[1000]			S5	rare
Clay-colored Sparrow, *Spizella pallida* (1993)[393]			S4	rare
Golden-winged Warbler, *Vermivora chrysoptera* (1991)[1000]			S4	rare
Henslow's Sparrow, *Ammodramus henslowii* (1976)[500]	END	END-R	S1B, SZN	extirpated
Sharp-shinned Hawk, *Accipiter striatus* (1991, 2001)[1000, 1001]	NAR	NIAC	S5	rare
Upland Sandpiper, *Bartramia longicauda* (1991)[1000]			S4	rare
Yellow-bellied Sapsucker, *Sphyrapicus varius* (1976)[58]			S5	rare

LAND USE AND LINKAGES

Present Land Use

This elongate study area stretches across 16 lots within Concession 6. Westover Road runs north-south through the area; Valens Road to the west, Safari Road to the north, and Concession 6 West Road to the south all bound the study site. Land uses within the study area include cattle grazing and selective tree cutting[459].

Due to the prevalence of shallow soils and thus limited agricultural potential, the surrounding rural area is comprised of alternating agricultural and natural areas. Livestock farms, row crops, and conifer plantations are some of the immediate land uses[459]. There are some scattered rural residences and other buildings in the area adjacent to the Westover Lowland Forest site, but none exist within the area.

Linkages with Other Natural Areas

This natural area is part of the interconnected network of natural areas on the Flamborough Plain. The Spencer Creek riparian corridors hydrologically connect the Strabane Southwest Drumlins (FLAM-26) study area, located to the north, with the Westover Lowland Forest. The Hayesland Swamp (FLAM-35) study area is physically continuous at the eastern tip of the study area and intersects the main channel of Spencer Creek, 1 km below this area. The Westover Drumlins (FLAM-28) study area adjoins the southern boundary of the eastern arm of the Westover Lowland Forest study area, but is significant for its earth science features only and contains no natural communities. The Westover Southwest Wetland (FLAM-94) lies immediately south of this site and is hydrologically and physically linked[459].

Along the Barlow Creek riparian corridor, the western arm of the study area is linked with the Beverly Swamp (FLAM-23) study area to the north, and the Rockton North Wetland (FLAM-93) to the southwest. Less than 1

km of open fields with only weak connections along hedgerows separate this area from the Hyde-Rockton-Beverly Complex (FLAM-85) to the west[459].

This linear natural area serves an important ecological function by providing linkages both along riparian corridors and across watershed divides. Many of these linkages, however, are both tenuous and vulnerable because they include narrow necks, road and utility crossings, and disturbed habitats[459].

RECOMMENDATIONS

1. The area should be protected from development or other impacts.
2. Existing linkages with other natural areas should be maintained and enhanced.
3. A buffer zone adjacent to the wetlands and along riparian corridors should be created and maintained.
4. Future field work should include areas where access was denied during 2001 and 2002, and include monitoring of significant species and communities.

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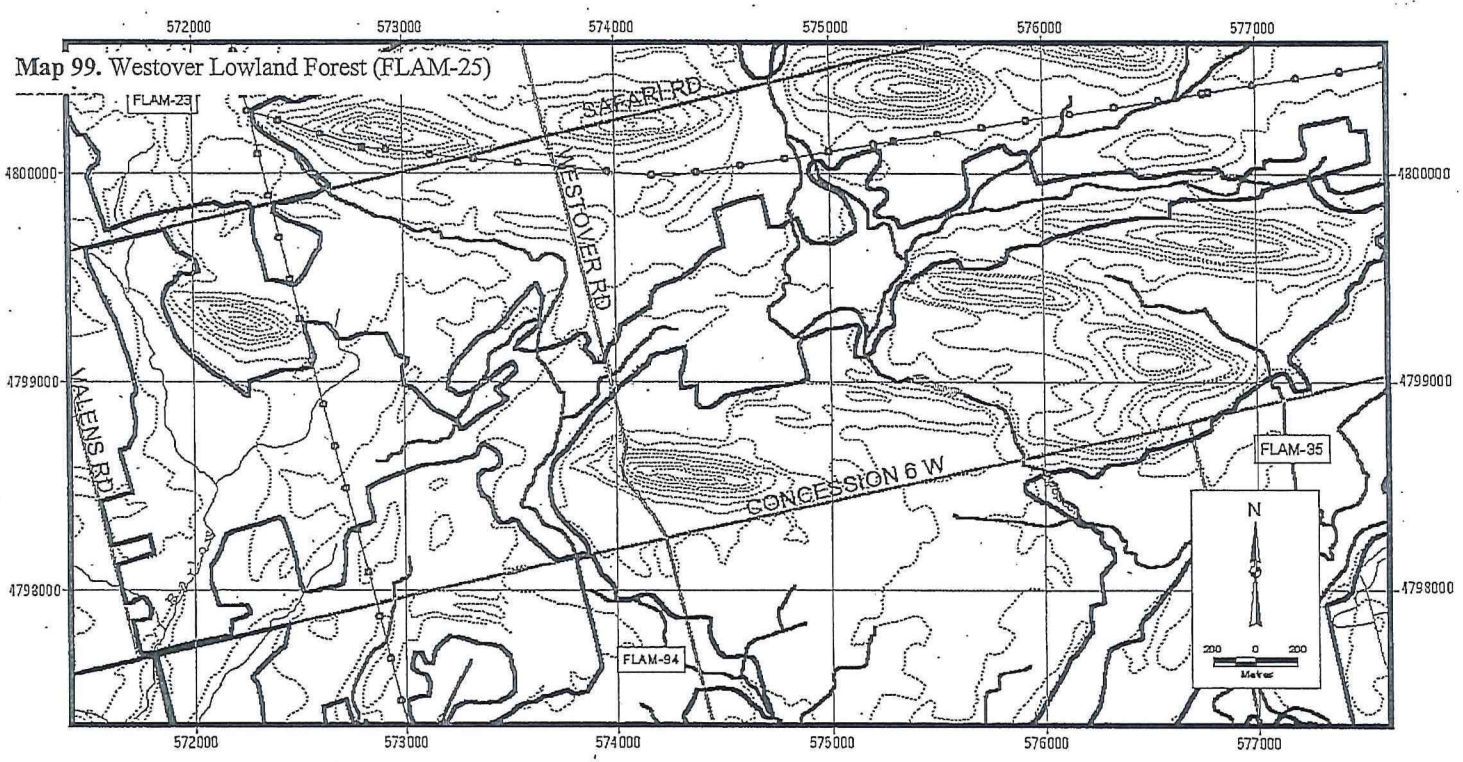
SITE VISITS

Date	Duration	Purpose	Observers
05-June-1991	5.7 h	Biological	A. Wormington G. Tako
05-June-1991	4.8 h	Flora	A. Goodban
18-June-1991	2.0 h	Biological	A. Wormington
06-July-1991	2.0 h	Biological	A. Wormington
07-Aug-1991	3.5 h	Biological	A. Wormington B. Lamond
22-Aug-1991	3.5 h	Biological	A. Wormington B. Lamond
16-Aug-1991	3.0 h	Biological	B. Lamond
14-Aug-1991	3.0 h	Flora	A. Goodban
05-July-2001	2.5 h	Fauna	A. Wormington
06-July-2001	1.0 h	Fauna	A. Wormington

Map 99. Westover Lowland Forest (FLAM-25)



- Nature Counts Study Area Boundary
- City of Hamilton Boundary
- Top of Niagara Escarpment
- Contour Line (metres)
- Hydro Lines
- HCA Rail Trail
- Bridge
- Interchange
- Major Highway
- Minor Highway
- Major Road
- Minor Road
- Existing Rail Line
- Major Watercourse
- Tributary
- Lake Ontario Shoreline
- Lake

BASE MAPPING SUPPLIED BY THE CITY OF HAMILTON ROADS TECHNOLOGY DEPARTMENT

MAP PROJECTION:	MAP DATUM
UTM Zone 17	NAD 83

WESTOVER SOUTHWEST COMPLEX

Municipality	ESA #	Conservation Authority
City of Hamilton	24	Hamilton
Formerly	Lot	Watershed
Town of Flamborough	25-31	Westover Creek, Barlow Creek
Approximate Area	Concession	Ownership
350 hectares	5	Private/Public

GENERAL SUMMARY

The Westover Southwest Complex is located southwest of Westover, in central Flamborough. This area encompasses a mix of previously disturbed terrestrial communities and wetland areas in the southeast corner of the large bedrock plain located in the Westover-Rockton-Kirkwall district. Extending across the divide between the Grand River and Spencer Creek watersheds, this study area provides a continuous greenspace corridor linking other natural areas.

As a result of surveys conducted by Nature Counts naturalists, an extension has been added to this natural area that includes regenerating field habitat (Map 100, Proposed ESA Extension). This addition, located to the north of the area, is important for species that utilize this habitat. Moreover, the extension serves as a link between the main section of this site and the Westover Lowland Forest study site.

This site was included in the 1991 NAI and was also surveyed in 1997[285, 1000]. The Nature Counts project collected data on birds, butterflies, and herpetofauna. Additional ELC community mapping is needed to fully evaluate the biological significance of this area.

HISTORICAL EVALUATION

1976 Study[56] - none

NAI[459]

Significant Site
- serves an important ecological function
- provides habitat for significant species

OMNR- Provincially Significant Wetland

PRESENT EVALUATION

ESA Criteria
- Significant Ecological Function
  - the riparian area serves as a link between natural areas in Flamborough
  - the area provides habitat for significant species
  - the area contains interior forest habitat (100-200m from forest edge)

PHYSICAL DESCRIPTION

Physiography and Topography

This area is situated at the southern edge of the Flamborough Plain physiographic region in the southeast corner of the large bedrock plain, which extends from Westover to Rockton and Kirkwall. The topography is generally flat (258 m elevation) with a few higher knolls (to 265 m). A drumlin (271 m) is located immediately north of the study area, along the 6th Concession Road[459].

Bedrock Geology

The bedrock, consisting of Guelph Formation dolostone, forms a gently southwest-sloping plain, which is at or near the topographic surface throughout this study area[459].

Overburden Geology

The shallow overburden within the natural area is comprised of sandy Wentworth Till, as in the drumlin, and glaciolacustrine sand deposits[459].

Soils

Soils are mostly shallow, wet, imperfectly- to poorly-drained silt loam and loam soils of the Colwood, Toledo, London, Parkhill, and Tuscola series, with patches of well-drained Farmington loam and Grimsby sandy loam[459].

Hydrogeology

Water wells in the vicinity tap one or more confined aquifers from 6 to 18 m below the bedrock surface. The piezometric surface (255 m) is generally coincident with the topographic surface[459].

Hydrology and Surface Drainage

The wetlands in the northwestern corner drain southwest into Barlow Creek, which flows into Fairchild Creek, a tributary of the Grand River. The majority of the area drains south and southeast into tributaries of West Spencer Creek. The watercourses and wetlands at this site are supported primarily by surface runoff, consequently, stream flow is intermittent[459].

ECOLOGICAL LAND CLASSIFICATION

Not surveyed due to lack of access.

PLANT COMMUNITIES[459]

Summary

The Westover Southwest Complex study area supports a variety of wetland and terrestrial communities. Most of the terrestrial systems consist of early successional communities and young conifer plantations. Given the shallow soils in this area, open and treed alvar communities may be more widespread than indicated by the NAI community mapping. More detailed community descriptions are needed to assess the local significance of the plant communities in this study area, particularly the alvar and marsh components.

Community Description

WETLAND
- MARSH
- TALL SHRUB THICKET SWAMP
  - **Buttonbush** / Wet to Wet-Mesic.
- BROADLEAF SWAMP
  - **Silver Maple** / Wet to Wet-Mesic.
  - **Red Ash** / Wet to Wet-Mesic.

TERRESTRIAL
- MIXED UPLAND WOODS
- BROADLEAF UPLAND WOODS
- OPEN ALVAR
- CONIFEROUS PLANTATION
- MIXED PLANTATION
- OLD FIELD
- TALL SHRUB THICKET
- MAINTAINED SITES
  - Hydro right-of-way.
  - Pipeline right-of-way.

FLORA AND FAUNA SUMMARY

Vascular Plants

Inadequate coverage in 2001 and 2002. Nature Counts botanists did not survey this site. From 1991 to 1997, botanists recorded a total of 291 species including 12 locally uncommon species, two locally rare species, and a locally uncommon and provincially rare species. Moreover, eight Carolinian species and 65 (22%) introduced species were also found here[285, 479].

Butterflies

Adequate coverage. A total of 22 species were recorded by Nature Counts surveyors in 2002. Of these, three are locally uncommon species, one is locally rare, and one is a COSEWIC special concern species[1001]. Surveyors observed 43 species in 1991 including nine locally uncommon species, two locally rare species, and one COSEWIC special concern species[998, 1000].

Fish

Due to the seasonality of watercourses in this area, permanent fish habitat is not available.

Herpetofauna

Adequate coverage during the Hamilton Herpetofaunal Atlas. During 2002, Nature Counts surveyors documented two common species, one of which is a new record for the area[1001]. Hamilton Herpetofaunal Atlas and 1991 NAI surveyors recorded 13 species including three uncommon species[999, 1000].

Breeding Birds

Adequate coverage. This area contains a rich diversity of bird species. Nature Counts surveyors recorded 42 species in 2001 and 2002. Of these, 10 species are locally uncommon, two species are locally rare, and six are interior forest species[1001]. A total of 61 species have been documented from 1991 to 1997 including 25 locally uncommon species, one locally rare species, one locally, provincially, and nationally rare species, and 10 interior forest species[285, 367, 1000].

Mammals

Inadequate coverage. The Nature Counts project did not conduct trapping at this site. Surveyors recorded one common species in 2002[1001]. In 1991, six species were documented[1000]; one additional species was reported in 1997[285].

SIGNIFICANT SPECIES

Species (Year Found)	COSEWIC	MNR	SRank	City of Hamilton
Vascular Plants				
Leather-leaved Grape Fern, *Botrychium multifidum* (1991)[1000]			S5	rare
Long-styled Canadian Sanicle, *Sanicula canadensis* var. *grandis* (1991)[1000]			S2	uncommon
Witherod, *Viburnum cassinoides* (1997)[285]			S5	rare
Butterflies				
Aphrodite Fritillary, *Speyeria aphrodite* (1991)[998, 1000]			S5	rare
Arctic Skipper, *Carterocephalus palaemon* (2002)[1001]			S5	rare
Monarch, *Danaus plexippus* (1991, 2002)[998, 1000, 1001]	SC	NIAC	S5	
Breeding Birds				
Golden-winged Warbler, *Vermivora chrysoptera* (1991)[1000]			S4	rare
Hooded Merganser, *Lophodytes cucullatus* (1997)[367]			S5	rare
Red-headed Woodpecker, *Melanerpes erythrocephalus* (1991)[1000]	SC	VUL	S3B, SZN	rare
Sharp-shinned Hawk, *Accipiter striatus* (2002)[1001]	NAR	NIAC	S5	rare
Whip-poor-will, *Caprimulgus vociferus* (2001)[1001]			S4	rare

LAND USE AND LINKAGES

Present Land Use

The Westover Southwest Complex is situated in central Flamborough immediately southwest of the hamlet of Westover. Much of this study area consists of young conifer plantations and young successional communities on abandoned farmlands. A hydro corridor and oil

pipeline run north-south through the centre of this study area. The pipeline appears to have altered the surface drainage in the eastern wetland[459].

Land use in the general vicinity of this study area is a patchwork of cleared agricultural land and undeveloped greenspace including plantations, abandoned farmlands, natural areas, and wetlands. The high proportion of greenspace reflects the generally poor soil conditions. Oil storage tanks are present on the drumlin adjacent to the northern site boundary. Scattered rural residences are present on the peripheral roads and a trailer park is present on the west side of Valens Road[459].

Linkages with Other Natural Areas

The Westover Southwest Complex is part of the extensive network of natural areas in the Rockton – Kirkwall – Westover district. The study area is continuous with the Rockton North (FLAM-93) study area to the west across Valens Road, abuts the Rockton Northeast Woodlot (FLAM-97) study area to the southwest, and the Westover Lowland Forest (FLAM-25) study area to the north[459].

The present study area boundaries are based largely on the existing vegetation and roads rather than hydrological considerations. An alternative configuration would be to include the northwestern area with the Rockton North area, and the eastern wetlands and adjoining natural areas with the Westover Lowland Forest area[459].

RECOMMENDATIONS

1. The area should be protected from development or other impacts.
2. The new extension should be included as part of ESA 24 in the City of Hamilton's Official Plan.
3. The continuity of this area and existing linkages with other natural areas should be maintained and protected.
4. A buffer strip should be maintained or created around the wetland areas.
5. Additional floral and plant community surveys are needed to adequately assess this area, particularly the alvar and marsh components.

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SITE VISITS

Date	Duration	Purpose	Observers
12-June-1991	3.0 h	Birds	B. Lamond
13-June-1991	2.5 h	Birds/Butterflies	B. Lamond
15-July-1991	6.5 h	Birds/Butterflies	B. Lamond
23-Aug-1991	2.5 h	Birds/Butterflies	B. Lamond
29-Aug-1991	1.5 h	Butterflies	B. Lamond
14-June-2002	3.75 h	Fauna	A. Wormington
28-June-2002	1.25 h	Fauna	A. Wormington

Map 100. Westover Southwest Complex (FLAM-94) mapping.

Nature Counts Study Area Boundary
City of Hamilton Boundary
Top of Niagara Escarpment
Contour Line (metres)
Hydro Lines
HCA Rail Trail
Bridge
Interchange
Major Highway
Minor Highway
Major Road
Minor Road
Existing Rail Line
Major Watercourse
Tributary
Lake Ontario Shoreline
Lake
Proposed ESA Extension

BASE MAPPING SUPPLIED BY THE CITY OF HAMILTON ROADS TECHNOLOGY DEPARTMENT

MAP PROJECTION:	MAP DATUM:
UTM Zone 17	NAD 83

ROCKTON NORTH

Municipality	ESA #	Conservation Authority
City of Hamilton	24	Grand River
Formerly	Lot	Watershed
Town of Flamborough	19-24	Barlow Creek
Approximate Area	Concession	Ownership
210 hectares	4-5	Private

GENERAL SUMMARY

The Rockton North study area is located north of Highway 8, immediately north of the village of Rockton in west-central Flamborough. This area is situated on the southern margin of the extensive area of shallow bedrock, which extends north and east from Rockton to Kirkwall and Westover. Barlow Creek, a tributary of Fairchild Creek, flows southwest through the study area[459].

This natural area encompasses varied aquatic, wetland, and terrestrial systems including a maple-elm-ash swamp, mature upland woods, patches of marsh, riparian meadow, pond, open alvar[528], plantation, and old field communities. Although several of these communities have been previously disturbed, many rare and uncommon species are present. Furthermore, this study area is continuous with other natural areas and forms part of the extensive network of ecologically linked natural areas found on the Rockton-Kirkwall-Westover bedrock plain[459].

This site was included in both the 1976 study and the 1991 NAI. Nature Counts surveyors collected data on birds, butterflies, and herpetofauna.

HISTORICAL EVALUATION

1976 Study[56]

Identified the following significant features:

- provides habitat for rare or endangered species that are endangered regionally, provincially, or nationally (two rare birds)

NAI[459]

Significant Natural Area

- serves an important ecological function
- encompasses a significant biotic community
- provides habitat for significant species

OMNR- Provincially Significant Wetland

PRESENT EVALUATION

ESA Criteria

- Significant Ecological Function
  - the area contains significant species
  - the area contains interior forest habitat (100-200m from forest edge)
  - the area contains a rare alvar community
  - the area serves as a link between natural areas in the Rockton-Kirkwall-Westover bedrock plain area
  - the area is representative of the biotic communities found on the Rockton-Kirkwall-Westover bedrock plain

PHYSICAL DESCRIPTION

Physiography and Topography

The Rockton North study area is located on a bedrock plain in the southwestern portion of the Flamborough Plain physiographic region. The southern portion of the site consists of a broad level basin (253 to 255 m elevation), while low knolls and bedrock ridges (264 to 255 m) are present in the northern portion. Barlow Creek flows southwest through the length of this area[459].

Bedrock Geology

Dolostone of the Guelph Formation is at or near the surface throughout this study area. The bedrock surface forms a southwest-sloping plain with a few isolated ridges[459].

Overburden Geology

The thin overburden consists of sandy Wentworth Till and shallow water glaciolacustrine and outwash sand deposits. Overburden depth ranges from 0 to 6 metres, but is generally less than 1 metre thick[459].

Soils

The dominant soil in the upland portion of this area is the well-drained, shallow, Farmington loam. The poorly-drained soils in the lowland areas include Flamboro sandy loam in the southern area, and Colwood silt loam in the small northern swamps. Imperfectly-drained Tuscola silt loam is present in the northern area[459].

Hydrogeology

Water wells in the vicinity tap a confined bedrock aquifer. This aquifer is found at 6 to 11 m depth. It slopes southwards, as does the piezometric gradient. The piezometric surface is approximately coincident with the topographic surface. Groundwater discharge may contribute to the base flow of Barlow Creek and, in part, support the wetlands. In addition, the volume of groundwater recharge along fracture zones and porous reef structures in the otherwise impermeable bedrock surface may be significant. The shallow bedrock aquifer is vulnerable to contamination[459].

Hydrology and Surface Drainage
Barlow Creek, a permanent tributary of the Fairchild Creek system, flows southwest through the length of this study area. The wetlands in this area are supported, at least in part, by surface runoff[459].

ECOLOGICAL LAND CLASSIFICATION
Not surveyed due to lack of access.

PLANT COMMUNITIES[459]
Summary
The Rockton North natural area includes aquatic, wetland and terrestrial systems. The core of the southern portion of this area consists of a broadleaf swamp bordered by patches of marsh, ponds, upland woods, plantation, and old field communities. The northeastern corner of the site includes a variety of habitats including mature broadleaf woods, riparian meadows, small ponds, swamp, open alvar, and successional fields. The open alvar at this site supports several rare and uncommon species and is considered a locally significant community.

Community Description
AQUATIC
- POND
  - Macrophyte
    - Dug-out ponds and inline ponds, small stream.

WETLAND
- MARSH
- BROADLEAF SWAMP
  - Silver Maple – White Elm – Black Ash – Red Maple / Wet to Wet-Mesic.
- RIPARIAN WET MEADOW

TERRESTRIAL
- BROADLEAF UPLAND WOODS
  - Sugar Maple – American Beech – White Ash / Mesic. Mature, undisturbed stand. Rich herb layer. Rocky substrate.
- OPEN ALVAR
  - Species associated with alvar habitats include: False Pennyroyal (*Trichostema brachiatum*), Foxglove Beardtongue (*Penstemon digitalis*), Prickly-ash (*Xanthoxylum americanum*).
- CONIFEROUS PLANTATION
- OLD FIELD
- TALL SHRUB THICKET
- MAINTAINED SITES
  - Homestead, lawn.

FLORA AND FAUNA SUMMARY
Vascular Plants
Inadequate coverage. Nature Counts botanists did not survey this site during 2001 or 2002. A total of 190 species were recorded in 1991 including seven locally uncommon species and four locally rare species, 30 (16%) introduced species; and five Carolinian species[1000].

Butterflies
Adequate coverage. A total of 23 species were recorded by Nature Counts surveyors in 2002. Of these, five are locally uncommon species[1001]. Surveyors observed 46 species in 1991 including 11 locally uncommon species, two locally rare species, and one COSEWIC special concern species[998, 1000].

Fish
No fisheries data are available for this area.

Herpetofauna
Adequate coverage. During 2002, Nature Counts surveyors documented three common species, all of which are previously known to the area[1001]. Hamilton Herpetofaunal Atlas and 1991 NAI surveyors recorded seven species[999, 1000].

Breeding Birds
Adequate coverage. Nature Counts surveyors recorded 54 species in 2001 and 2002. Of these, 18 species are locally uncommon and six are interior forest species[1001]. A total of 34 species have been documented from 1991 to 1997 including eight locally uncommon species and two locally rare species[393, 1000].

Mammals
Inadequate coverage. The Nature Counts project did not conduct trapping at this site. Surveyors recorded three species in 2002, all of which are new records for the area[1001]. In 1991, four species were documented[1000].

SIGNIFICANT SPECIES

Species (Year Found)	COSEWIC	MNR	SRank	City of Hamilton
Vascular Plants				
Large Canadian St. John's-wort, *Hypericum majus* (1991)[1000]			S5	rare
White Water Crowfoot, *Ranunculus aquatilis* var. *diffusus* (1991)[1000]			S5	rare
Long-styled Canadian Sanicle, *Sanicula canadensis* var. *grandis* (1991)[1000]			S2	uncommon
Shining Ladies'-tresses, *Spiranthes lucida* (1991)[1000]			S4	rare
Dwarf Vervain, *Verbena simplex* (1991)[1000]			S4	rare
Butterflies				
Aphrodite Fritillary, *Speyeria aphrodite* (1991)[998, 1000]			S5	rare
Hickory Hairstreak, *Satyrium caryaevorum* (1991)[998, 1000]			S3	uncommon
Monarch, *Danaus plexippus* (1991)[998, 1000]	SC	NIAC	S5	
Two-spotted Skipper, *Euphyes bimacula* (1995)[397]			S3S4	rare
Breeding Birds				
American Bittern, *Botaurus lentiginosus* (1993, 1997)[393]			S4	rare
Sharp-shinned Hawk, *Accipiter striatus* (1991)[1000]	NAR	NIAC	S5	rare

LAND USE AND LINKAGES

Present Land Use

Rockton North is located in the south-central section of Flamborough, immediately north of the community of Rockton. A trailer park and pond have been developed within the most easterly wooded area and a few other rural estates are located on the periphery of the natural area. In 1991, a large tract of wooded swamp north of the Rockton fairgrounds was cleared[459].

This site is continuous with a network of natural areas but much of the site is bordered by active and inactive agricultural land. The eastern and northern boundaries were drawn along Valens Road and the 6th Concession Road. The Rockton fairgrounds and the settlement of Rockton, along Highway 8, abut the southern boundary[459].

Linkages with Other Natural Areas

The Rockton North study area is part of the network of natural areas on the Rockton – Kirkwall – Westover bedrock plain. This natural area is continuous with the Westover Southwest (FLAM-94) and Westover Wetland (FLAM-25) study areas to the east and northeast respectively. The large Hyde – Rockton – Beverly Complex (FLAM-85) study area lies to the northwest; these areas are linked via a loose network of hedgerows, wetland pockets and successional fields. The Rockton Northeast Woods (FLAM-97) and the Patterson Tract (FLAM-86) study areas are also located within 1 km, but existing linkages are very tenuous[459].

RECOMMENDATIONS

1. The area should be protected from development or other impacts.
2. The integrity of the study area, including the buffer strip of terrestrial habitat adjacent to the wetland areas and riparian habitat along Barlow Creek, should be maintained and enhanced.
3. Existing linkages to other natural areas in the vicinity should be maintained and protected.
4. Future field work should include areas where access was denied during 2001 and 2002, and focus on plants, mammals, and ELC.

LITERATURE CITED

56. Ecologistics Ltd. 1976. Hamilton-Wentworth Region Environmentally Sensitive Areas Study. Hamilton Region, Grand River, Halton Region, and Niagara Peninsula Conservation Authorities.

393. Dobos, R. 1999. Summary of Records of Regionally Significant Breeding Birds in Hamilton-Wentworth from *Wood Duck*, 1992 – 1999.

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528. Goodban, A. 1995. Alvar Vegetation on the Flamborough Plain: Ecological Features, Planning Issues, and Conservation Recommendations. Major paper submitted to the Faculty of Environmental Studies, York University, Toronto, Ontario. 83 p.

998. Hamilton Study Area: Butterfly Records. 1988-1992. Unpublished database. Hamilton Naturalists' Club. Hamilton, Ontario.

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1001. Nature Counts. 2001-2002. Unpublished database. Hamilton Naturalists' Club. Hamilton, Ontario.

SITE VISITS

Date	Duration	Purpose	Observers
17-April-1991	1.5 h	Flora	D. Bradley
12-June-1991	4.0 h	Biological	A. Wormington, B. Lamond
18-July-1991	3.3 h	Butterflies	A. Wormington, B. Lamond
07-Aug-1991	4.0 h	Flora	D. Bradley
05-Sept-1991	2.0 h	Butterflies	A. Wormington, B. Lamond
06-June-2002	3.5 h	Fauna	B. Curry
23-July-2002	2.5 h	Fauna	B. Curry

Map 66. Rockton North (FLAM-93) mapping.

Nature Counts Study Area Boundary
City of Hamilton Boundary
Top of Niagara Escarpment
Contour Line (metres)
Hydro Lines
HCA Rail Trail
Bridge
Interchange
Major Highway
Minor Highway
Major Road
Minor Road
Existing Rail Line
Major Watercourse
Tributary
Lake Ontario Shoreline
Lake
Proposed ESA Extension

BASE MAPPING SUPPLIED BY THE CITY OF HAMILTON ROADS TECHNOLOGY DEPARTMENT

MAP PROJECTION:	MAP DATUM:
UTM Zone 17	NAD 83

Appendix I – Updated Timetable of Events

Events	Reference	Person Responsible	Deadline
Hearing Order issued		Board	19 February 2013
Serve Hearing Order and/or Notice on the persons listed in Appendix V and affected landowners	paragraph 61 (a) and (b)	Enbridge	28 February 2013
Publish Notice of Public Hearing (Appendix III)	paragraph 61 (c)	Enbridge	14 March 2013
Deadline for Requesting Information Sessions	paragraph 23	Interested Persons	21 March 2013
Comments on the List of Issues	paragraph 25	Interested Persons	21 March 2013
Revised List of Issues released, if warranted	paragraph 26	Board	After receiving Comments on the List of Issues
Application to Participate	paragraph 30	Interested Persons	11 April 2013
Additional Written Evidence	paragraph 45	Enbridge	30 April 2013
List of Parties and List of Commenters issued	paragraph 34	Board	After receiving the Applications to Participate 22 May 2013
Application Served on List of Parties	paragraph 44	Enbridge	Immediately after receiving the List of Parties
Applications to Participate served on List of Parties	paragraph 35	Intervenors and Government Participants	Immediately after receiving the List of Parties
Information Requests to Enbridge	paragraph 48	Intervenors and Government Participants	11 June 2013

APPENDIX "A" to Information Update

Events	Reference	Person Responsible	Deadline
Enbridge Responses to Information Requests	paragraph 49	Enbridge	25 June 2013
Follow-up Information Requests to Enbridge Seeking Clarification on Enbridge Responses to Round 1 Information Requests	paragraph 50	Intervenors and Government Participants	9 July 2013
Enbridge Responses to Follow-up Information Requests	paragraph 51	Enbridge	23 July 2013
Intervenor and Government Participant Written Evidence	paragraph 52	Intervenors and Government Participants	6 August 2013
Letters of Comment	paragraph 34	Commenters	6 August 2013
Information Requests to List of Parties	paragraph 53	Board and other Parties	20 August 2013
List of Parties Responses to Information Requests	paragraph 54	Intervenors and Government Participants	3 September 2013
Enbridge Reply Evidence	paragraph 55	Enbridge	17 September 2013
Written Final Argument	paragraph 59	Board and all Parties	To be determined
Oral Final Argument	paragraph 60	Board and all Parties	To be determined
Board Decision		Board	To be determined

APPENDIX "B" to Information Update

Hamilton

City Hall, 71 Main Street West
Hamilton, Ontario,
Canada L8P 4Y5
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Guy Paparella, Director of Growth Planning
Planning and Economic Development Department
Growth Management Division
71 Main Street West, 6th Floor, Hamilton, ON L8P 4Y5
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Email: guy.paparella@hamilton.ca

< Insert Date >, 2013

National Energy Board
444 7th Avenue SW
Calgary, AB T2P 0X8

Attention: Sheri Young, Secretary of the Board

Dear Ms. Young:

RE: City of Hamilton ("COH") Letter of Comment
Enbridge Pipelines Inc. ("Enbridge") Application for the Line 9B Reversal and Line 9 Capacity Expansion Project ("Application")
National Energy Board ("Board") File: OF- Fac-Oil-E101-2012-10 01

The COH appreciates the opportunity to provide its comments with respect to the above-noted Application. The COH's interest in the Application relates to how the proposed project may impact the environmental and financial well-being of the municipality, as well as the health, safety and well-being of its inhabitants.

This Letter of Comment was prepared with input from staff of other municipalities sharing similar concerns. Specifically, a municipal liaison group was established and met regularly to discuss a coordinated approach to raising issues regarding the Application. The municipal liaison group was attended by staff from the COH, as well as the Town of Ajax, the City of Burlington, the City of Kingston, the City of Mississauga, the City of Toronto, and other municipal representatives. The COH shares the concerns raised by participants of the municipal liaison group, and wishes to highlight some specific concerns below.

PIPELINE INTEGRITY AND FINANCIAL ASSURANCE CONCERNS

The COH shares the concerns raised by municipal Intervenors relating to pipeline integrity and financial assurance. It is the COH's view that there are legitimate concerns related to pipeline integrity that Enbridge must address if the Board approves the Application, including but not limited to issues relating to system operations, amendments to Line 9 Rules and Regulations, pipeline construction, integrity management and integration of threats, and the Enbridge Integrity Management Program raised by municipal Intervenors. The COH also reiterates its concerns relating to allocation of financial responsibility for costs that may be incurred for emergency response, clean-ups and other required action, such as evacuation in the event of a spill, particularly costs which may be in excess of Enbridge's commercial liability insurance coverage limits.

EMERGENCY RESPONSE CONCERNS

The Hamilton Fire Department ("Hamilton Fire") has raised numerous concerns with Enbridge respecting emergency response issues. Based on Enbridge's responses to questions raised by Intervenors, particularly the City of Toronto, the City of Mississauga, and the Ontario Ministry of Energy, it is the view of Hamilton Fire that Enbridge is not prepared to provide municipal emergency responders with the level of information that would enable these first responders to properly plan and prepare for the most effective coordinated response in the event of a pipeline related emergency.

Pipeline Performance: Leakage, Rupture and Replacement

It is Hamilton Fire's view that Enbridge should be required to cooperate fully with local first responders in providing relevant details with respect to number of staff, equipment and timelines that will be deployed in the event of issues relating to the leakage or rupture of Line 9. Without the appropriate level of detail and consultation, local first responders are faced with the challenge of gauging the level of response that is required during an incident without knowing full details of when Enbridge personnel will be on scene and actively engaged.

Municipalities need to know that caches of equipment are positioned in such a manner as to allow a timely and effective response to events. This will allow municipalities to better plan and respond to the initial stages of an event (with a better idea as to the amount and type of equipment available to them, and the personnel they will have to commit to an incident and for what duration).

The Incident Action Plan software that has been prepopulated with Enbridge's response plan information should be shared with appropriate municipal personnel who can best evaluate and plan their organization's response accordingly.

Enbridge Safety Initiatives

At a minimum, it is Hamilton Fire's position that trusted municipal emergency response personnel should be permitted to meet with Enbridge officials and go over site/response specific plans, even if those plans are of a security-sensitive nature, in order to assess whether they meet local needs and to work together in identifying gaps that may need to be addressed. Hamilton Fire should also be provided with access to online and in-person training as part of Enbridge's Public Awareness Program or through other means.

Enbridge's Emergency Response Book

Hamilton Fire has concerns that municipal emergency responders may not be included in Unified Command Structures that are established by Enbridge. Enbridge indicates that municipal emergency responders (such as fire services) would be included in the Unified Command Structure if warranted by the specific situation. Given the role that Hamilton Fire would have relative to the protection of life and property in the COH, it is imperative that they are directly included in any Unified Command Structure that is established.

With respect to evacuations in the event of an incident relating to Line 9, Hamilton Fire would emphasize the critical role of local emergency response agencies in the decision process leading to evacuations. The decision to initiate an evacuation is a crucial one and in many instances needs to be timely.

Enbridge must be forthcoming in sharing with municipal emergency responders the details of initial response equipment caches available which may be required to construct underflow and culvert weir dams in the event of an incident involving Line 9 in and around wetlands and/or watersheds. This information is required to assist local emergency responders who will likely be first on scene to plan adequately for resources. Local emergency responders may already be deploying containment measures in advance of Enbridge's arrival in an effort to minimize the spread of product. If Enbridge has identified spill collection points along their route it would be extremely helpful for the local responders to incorporate this information into planning in the early stages of an incident.

Emergency Response and Control Measures

Allowing local emergency responders an opportunity to become familiar with the details of Enbridge's specific emergency plans in advance and having an opportunity to integrate Enbridge's plans into the local operations can only help in effectively managing any situation that may arise.

Lessons Learned from Recent Failures

Given what transpired in Marshall MI, Hamilton Fire is of the view that it is not unreasonable to solicit information on Enbridge's recent pipeline failures. Such information would allow municipalities an opportunity to assess what Enbridge has done in practice, not theory, and would better allow the municipalities to plan their response based on the actions of Enbridge to date.

Emergency Response Spending

Hamilton Fire is pleased to see that Enbridge is expending funds towards the development of detailed site-specific Tactical Response Plans and would welcome the opportunity to view Tactical Response Plans to enable a coordinated and efficient response to a pipeline emergency. Hamilton Fire does have concerns that tactical response plans are only being developed for key rivers flowing into Lake Ontario and not for other watercourses. Municipalities also require detailed information on the locations of equipment available for emergency response in order to identify what resources are in close proximity and to adequately plan their response and exercise their responsibilities in performing due diligence on behalf of their citizens regarding the effectiveness of Enbridge's preparations.

Spill Prevention, Response, Management, Monitoring

A major pipeline event will require large numbers of trained personnel along with large amounts of equipment. This is a large and time consuming logistical challenge. Municipalities will be forced to "take up the slack" as best as they can until help arrives in sufficient numbers to free up some of their resources. Enbridge must provide adequate detailed information in terms of identifying how many "on the ground" responders Enbridge has in Ontario to enable municipalities to adequately plan for these types of events.

SOURCEWATER PROTECTION CONCERNS

The City's Sustainable Initiatives & Source Protection Planning Section has concerns with respect to Enbridge making assurances in maintaining pipeline integrity and the impact that any potential for product release may have at pipe crossings at waterways and subsequent compromise of present or future sourcewaters.

The conveyance of crude oil in the Enbridge Line 9 pipeline is a threat to drinking water sources where the pipeline crosses open water. However, the focus of the source protection policies in the proposed source protection plan is on present municipal drinking water sources and there are none in the vicinity of the pipeline within the Hamilton Conservation Authority boundaries.

A recently-completed event-based modelling scenario in western Lake Ontario suggested that a release into the Sixteen Mile Creek of benzene could reach the municipal water intakes of Halton Region, the Woodward intake in Hamilton, and the Lorne Park intact in Mississauga at significant threat levels. This activity was determined to be a significant threat during the delineation of the intake protection zone three modelling and is only a significant threat for those areas that have been modelled. Although dilbit as a whole does not have the characteristics of benzene alone, there is a benzene fraction contained within the dilbit product. It is of worthy consideration to plan for the pro-active mitigation of a rupture given the uncertainty and lack of precedence of the dilbit initiative.

In order to protect the sources of municipal drinking water, the proposed policies in the Source Protection Plans to deal with the distribution of hydrocarbons through a pipeline include the following:

- Request Energy Boards in their consideration of any new or expanded pipelines to include appropriate design standards, monitoring and maintenance practices to prevent a pipeline from becoming a significant drinking water threat;
- Request fuel pipeline owners to conduct inline pipeline integrity testing and visual inspections every three years where pipelines cross open water bodies;
- For significant threats to Lake Ontario request that the Ministry of the Environment protect drinking water sources through provision of threat mapping to the Spills Action Centre for notification;
- Provide notifications to the Source Protection Department of the Conservation Authorities a report of the findings and actions taken.

Enbridge should strive to convey a higher confidence to municipalities that their spill response programme is better developed and subject to continual improvement, given historical events and future potentials in that this is an older pipeline with unproven expectations as to its abilities to convey a product with characteristics much different from original intended use.

Finally, although private wells are not yet covered under the *Clean Water Act*, those in proximity to the pipeline and particularly those that are shallow and extend only into the overburden, may be subject to short-term product inundation. The impacts are two-fold: firstly, there may be a total loss-of-use for which the owner should compensated; secondly, shallow wells may quickly become conduits for dilbit fractions to reach and compromise the quality of shallow aquifer waters, rendering many wells in proximity to any rupture unusable and heightening the risk to shallow overburden water quality and potability. Enbridge should document and prepare materials for distribution to response teams to reduce the risk and time required to prevent or mitigate water quality impacts. Enbridge should also clearly communicate to any impacted well owners that all costs for clean-up and, if necessary, replacement of privately-sourced potable water will be Enbridge's sole responsibility.

HAMILTON CONSERVATION AUTHORITY (HCA)

The HCA provided the COH with information relating to Enbridge's Line 9 Application as it relates to the HCA watershed (Attachment "A" to this letter). The information provided by the HCA shows the Line 9 pipeline in the HCA watershed, and highlights provincially significant wetlands and watercourses located in and around the pipeline corridor.

ENHANCEMENTS TO ADDRESS SAFETY CONCERNS

Based on the foregoing, the COH requests that the Board impose conditions upon Enbridge if the Application is approved, which addresses the following:

- Adequate emergency response measures, including but not limited, to training of local first responders, and specific plans for how Enbridge will deal with diluted bitumen in the case of a spill;
- Coordinating and sharing of all relevant and up-to-date emergency response and maintenance and repair information with local first responders on a regular basis, as part of Enbridge's Public Awareness Program or otherwise, to ensure the most effective response to an incident or leak;
- Adequate assurance from Enbridge regarding financial responsibility for costs related to emergency response, clean-ups and any other required action in the event of a spill;
- Regular consultation with local Source Water Protection staff, including the HCA, Conservation Halton, and City of Hamilton staff to identify potential threats to drinking water quality, and sharing of Enbridge's plans or opportunity to participate in the development of plans which address any malfunctions of the pipeline or spills that may threaten drinking water safety;
- Adequacy of current pipeline isolation valves in the COH and sharing of relevant information respecting valve operation with local first responders;
- Installation of pipeline isolation valves, if not already installed, where the pipeline crosses watersheds in the COH, including the Sheffield-Rockton Complex and other provincially-significant wetlands and environmentally-sensitive areas.

In addition to the above, if the Application is approved, the COH requests that the Board require Enbridge to obtain any applicable municipal or conservation authority approvals, including building permits and site plans, and also require Enbridge to pay applicable fees, including development charge payments in undertaking any work with respect to the Project in the City of Hamilton.

Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

Guy Paparella
Director of Growth Planning

c.c.

Ms. Chantal Robert
Supervisor Regulator Affairs
Enbridge Pipelines Inc.
425-1st Street S.W.
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Ms. Margery Fowke
Senior Regulatory Counsel
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Calgary, AB T2P 0R8
Facsimile: 403-268-3100

Appendix "B" to Information Report PED12160(b)/LS12022(b)

Attachment "A" to City of Hamilton Letter of Comment are the same as provided with City's Draft Letter of Comment attached to Information Update dated August 1, 2013.

City Hall, 71 Main Street West
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Hamilton

Guy Paparella, Director of Growth Planning
Planning and Economic Development Department
Growth Management Division
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Phone: 905.546.2424 Ext. 5807 Fax: 905.540-5611
Email: guy.paparella@hamilton.ca

August 6, 2013

SENT VIA FAX (1-877-288-8803) & SUBMITTED ELECTRONICALLY

National Energy Board
444 7th Avenue SW
Calgary, AB T2P 0X8

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Guy Paparella
Director of Growth Planning

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