Lake Iroquois Beach Securement Strategy

July 2015

In partnership with:

Central Lake Ontario Conservation

DURHAM REGION

Conservation ONTARIO
Natural Champions

Introduction

Glacial Lake Iroquois was a larger version of Lake Ontario that existed over 13,000 years ago. If you think of the shoreline of Lake Ontario today with its beaches (sand and stone), its coastal wetlands and bluffs, those same features were prevalent along the shoreline of Glacial Lake Iroquois. Like any shoreline, the Lake Iroquois Beach (LIB) zone exhibits bluffs, outwash areas, gravel, stone, sand, silt, and clays that were deposited thousands of years ago. Today, the beach of Lake Iroquois lies approximately 13 km inland from the north shore of Lake Ontario and is noticeable in the rural landscape as a band of wetlands and forests crossing through CLOCA's watershed from west to east. At points across the landscape, the remnant bluffs of the LIB are visible as a ridge or height of land, and the shallow deposits of sand and gravel have been the focus of past and continuing small scale aggregate operations.

The LIB in the eastern half of Durham Region has in part been built upon; however, there are portions that have not been subject to urbanization. Why is it important to protect what is left of the LIB? Well, the combination of gravels and sands filters precipitation quickly until halted by the underlying tight tills and clays. These shallow aquifers support vast wetland areas and provide important baseflow to local creeks, sustaining cold water fisheries. This complex substrate of the LIB contributes to groundwater recharge and discharge, playing a critical role in water storage that helps to maintain baseflow, water quality, downstream ecological health, and flood attenuation. Seeps, springs and vernal pools can be found throughout the LIB, supporting habitat important to many sensitive and threatened plant and wildlife species, including amphibians and reptiles. Large tracts of forested swamps and associated upland habitat cover this area and provide a connected habitat for sensitive bird and mammal species. These core habitat areas connect east-west and north-south wildlife corridors; facilitating and enhancing a range of wildlife movement opportunities.

The Lake Iroquois Beach in CLOCA

CLOCA has 2 conservation areas essentially "bookending" the west and east ends of the LIB. In the west is Heber Down Conservation Area and in the east is Stephen's Gulch Conservation Area. Just west of Heber Down is Audley Woods, lands owned by the Authority but not accessible to the public. Located in and around Audley Woods exist many of the natural heritage features and functions associated with the LIB, and protecting these lands is crucial in supporting connectivity across the watershed divide, towards Greenwood Conservation Area in Toronto and Region Conservation's watershed.

The Town of Whitby, in recognizing the environmental importance of the LIB has been securing, into public ownership, ecologically significant lands on the Beach when opportunities arise. Most of the LIB through the City of Oshawa has long been built upon, yet there are a couple of areas where the natural features of the LIB persist; notably the area west of Durham College/UOIT and Harmony Creek Park.

In Clarington, portions of the Courtice and Bowmanville Urban Areas creep northward into the LIB, but for the most part, the LIB does not fall within urban or urbanizing areas. In fact, much of the LIB in Clarington lies within the Greenbelt Planning Area and as such, is protected from urbanization. However, the LIB and the significant natural features and functions concentrated in this area are at increased risk from disturbance and other growth related impacts including more traffic, future infrastructure improvements, increased water usage, changes in property ownership and changing land uses on the rural/urban fringe.

The Central Lake Ontario Conservation Authority Land Acquisition Strategy, 2012, recognized the concentration of environmentally significant features and functions in this area and the increased growth pressures that will be experienced. Public land securement is the best way to protect significant natural heritage features and functions for the long term and the CLOCA 2012 Strategy identified the Black/Harmony/Farewell Wetland Acquisition Target Area as a new acquisition focus area. The next best thing to public land securement are "compassionate" land owners who understand and appreciate the values of natural features and the important relationship these have with overall watershed health. It is important to cultivate this appreciation and understanding, CLOCA has, and will continue, to offer services to landowners; educating them about watershed health and advocating good land stewardship practices.

The Lake Iroquois Beach Target Area

The LIB Target Area combines the Black/Harmony/Farewell Wetland Acquisition Target Area and the secondary land acquisition target area of the Hwy 418 Link into one large target area with a focus on the LIB and the features and functions which make this area ecologically significant (Figure 1). The high concentration of significant natural features and functions including PSWs, largely intact forest, core habitat areas, coldwater streams and refuge for coldwater fish species, significant diversity of plant and animals species including species at risk and locally rare species, and important groundwater recharge and discharge functions, make this an ecologically important area worthy of protection and preservation.

Although the LIB is present in both the Bowmanville and Courtice Urban Areas, the focus of this securement strategy is on the non-urban lands between these urban areas. As identified in

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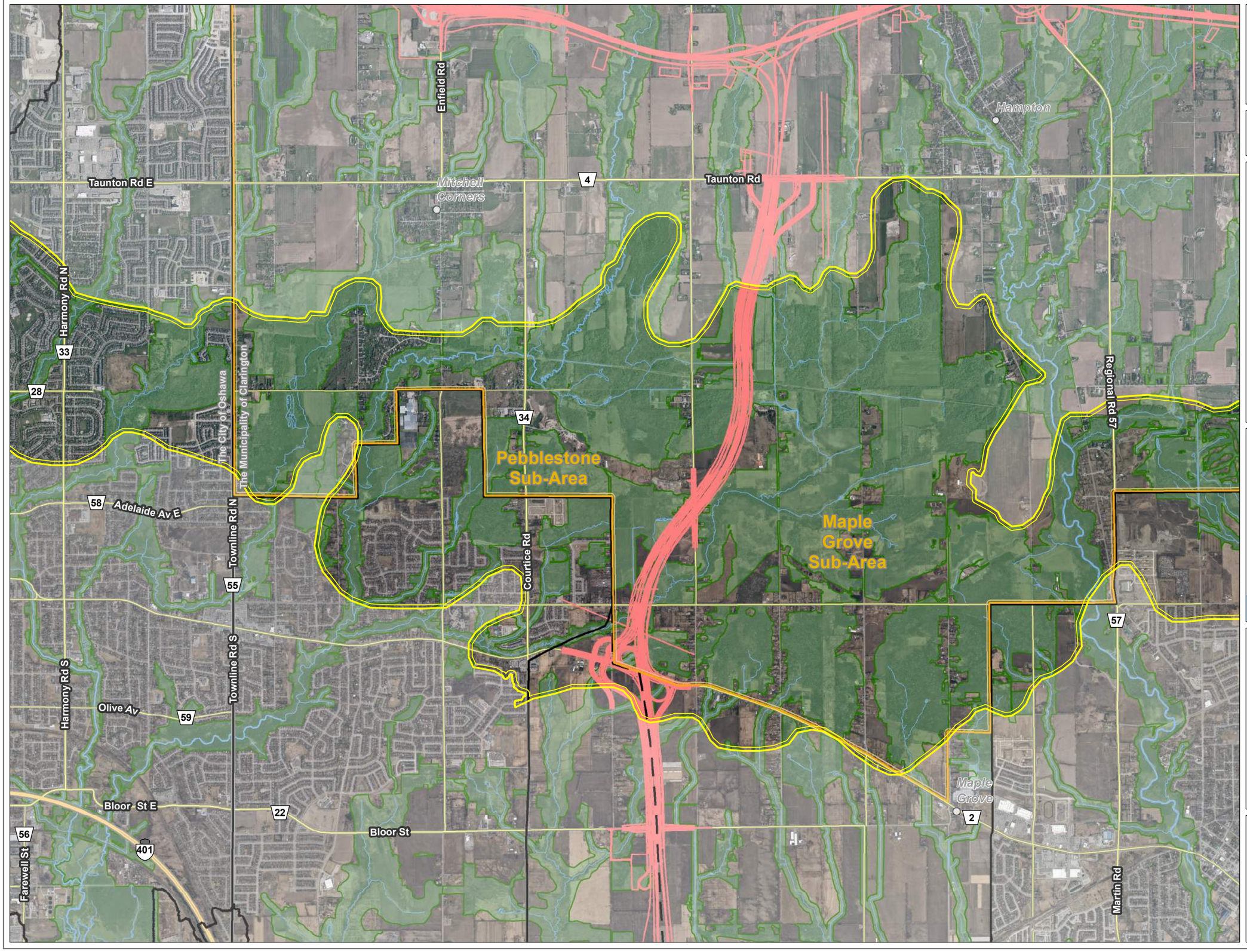
FIGURE 1

Lake Iroquois Beach - West Clarington Regional Perspective



Legend

- Town (Hamlet)
- Drainage
- Highway 407 (TPR)
- Lower Tier Municipality
- Lake Iroquois Beach
- Greenbelt Boundary
- CLOCA Natural Heritage System
- Current Urban Boundary
- Future Urban Boundary

0.5 0.25 0 0.5 1 1.5

Kilometres

Map Compiled by the Central Lake Ontario Conservation Authority,
100 Whiting Ave., Oshawa, Ontario, L1H 3T3

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R:\Projects_Corporate\Land_Acquisition_Strategy\Land_Securement\Figure 1 - RegionalPerspective.mxd

CLOCA's Land Acquisition Strategy, CLOCA looks to our municipal partners to secure ecologically sensitive lands in the urban areas.

The approved alignment of Hwy 418 passes through this target area. The EA approval of the highway identified the need for a long, low, span bridge to facilitate movement of wildlife and limit disruption to shallow aquifers and groundwater resources in the LIB. The lands directly adjacent to the highway will be an important linkage area worthy of long term protection through public land securement. In addition, MTO will be focusing some restoration efforts adjacent to the Highway just west of Rundle Road in Concession 4. In the event that MTO may dispose of surplus lands, CLOCA would be interested in securing these lands in public ownership to further advance restoration and connectivity within the LIB Target Area. The alignment of Hwy 418 has been used to divide this LIB Target Area into east and west sub areas called Maple Grove Sub Area and Pebblestone Sub Area. More discussion and details regarding the priorities within these sub areas is provided later in this report.

Ecological Significance of the Lake Iroquois Beach Target Area

An extensive band of forests and wetlands dominate the LIB Target Area. The beach sands, gravel and tills provide a complex substrate which support shallow aquifers and contributes to groundwater recharge and discharge. The hydraulic connectivity between the groundwater and surface water regime is particularly evident as seeps, springs, discharge and recharge zones. It is the groundwater which sustains the wetlands and provides much needed baseflow to the creeks. The cold, clean water released from the shallow aquifers enables the thermal regime of the watercourses to re-establish, providing the habitat needed to sustain the cold water fishery. The LIB's groundwater resources support downstream ecological health, maintain the watershed's hydraulic regime, protect water quality and quantity, and provide critical habitat for many species. Equally important is the water storage and flood attenuation function that the wetlands provide, a highly valuable quality in light of anticipated climate changes.

The LIB deposits and adjacent Glaciolacustrine Sands underlie most of the LIB Target Area (Figure 2). In 2014, CLOCA undertook a project to map groundwater recharge areas that are of importance to wetlands and streams (Ecologically Significant Groundwater Recharge Area Delineation in the Central lake Ontario Conservation Authority Area). Using particle tracking models, groundwater contribution to wetlands and streams were tracked back to their source recharge areas. This work revealed that significant areas within the LIB Target Area are Ecologically Significant Groundwater Recharge Areas (ESGRA) (Figure 3). Further, the ESGRA report found that the recharge areas of the LIB and Glaciolacustrine Sands are locally important as they support adjacent wetlands and streams (Figure 4). Groundwater discharge from these shallow aquifers to these streams is vital in maintaining baseflow and regulating stream

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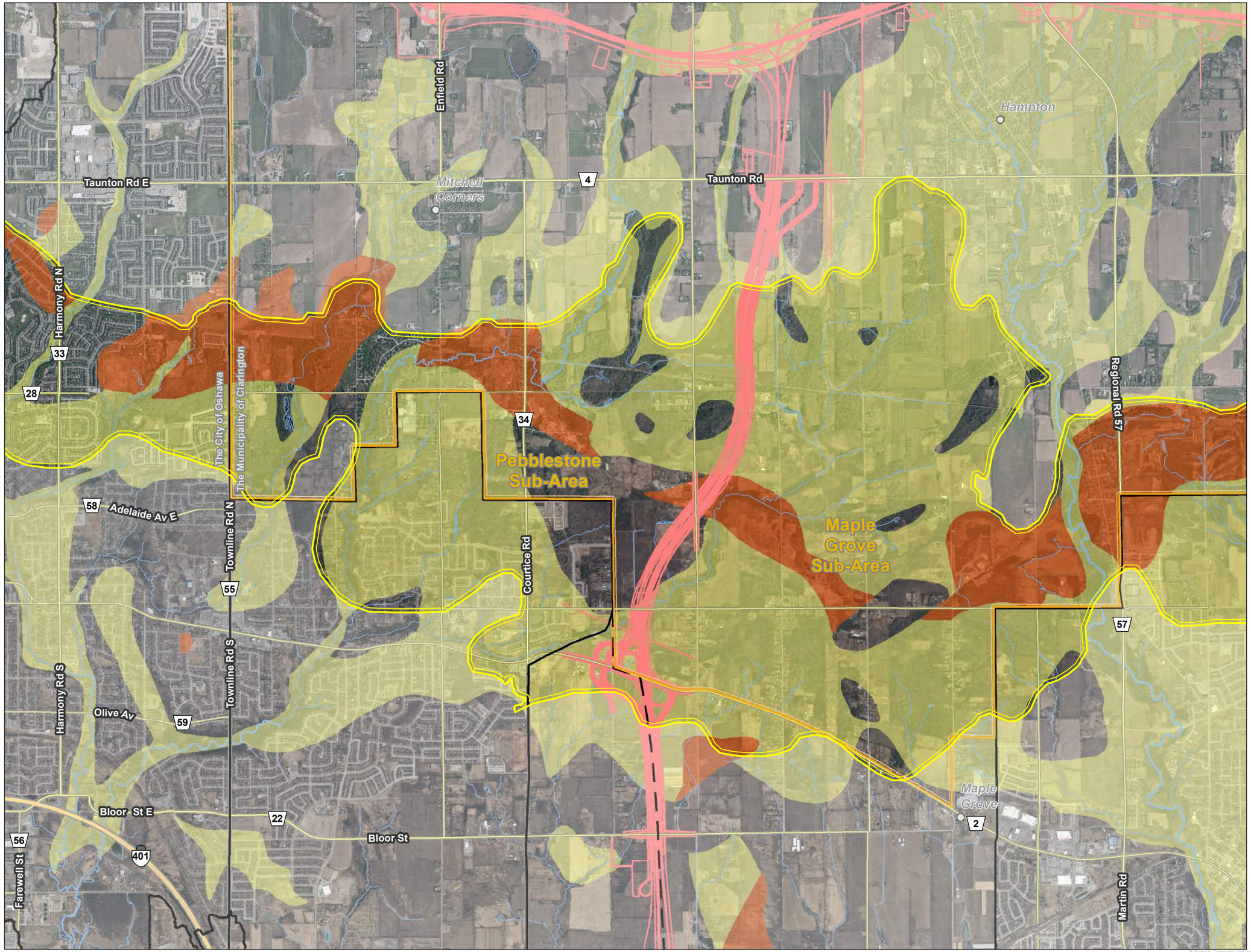
FIGURE 2

Lake Iroquois Beach - West Clarington
Iroquois Beach Deposits and other
Glaciolacustrine Sands



Legend

- Town (Hamlet)
- Drainage
- Highway 407 (TPR)
- Lower Tier Municipality
- Lake Iroquois Beach
- Greenbelt Boundary
- Current Urban Boundary
- Future Urban Boundary
- Iroquois Beach Deposit
- Glaciolacustrine Sands

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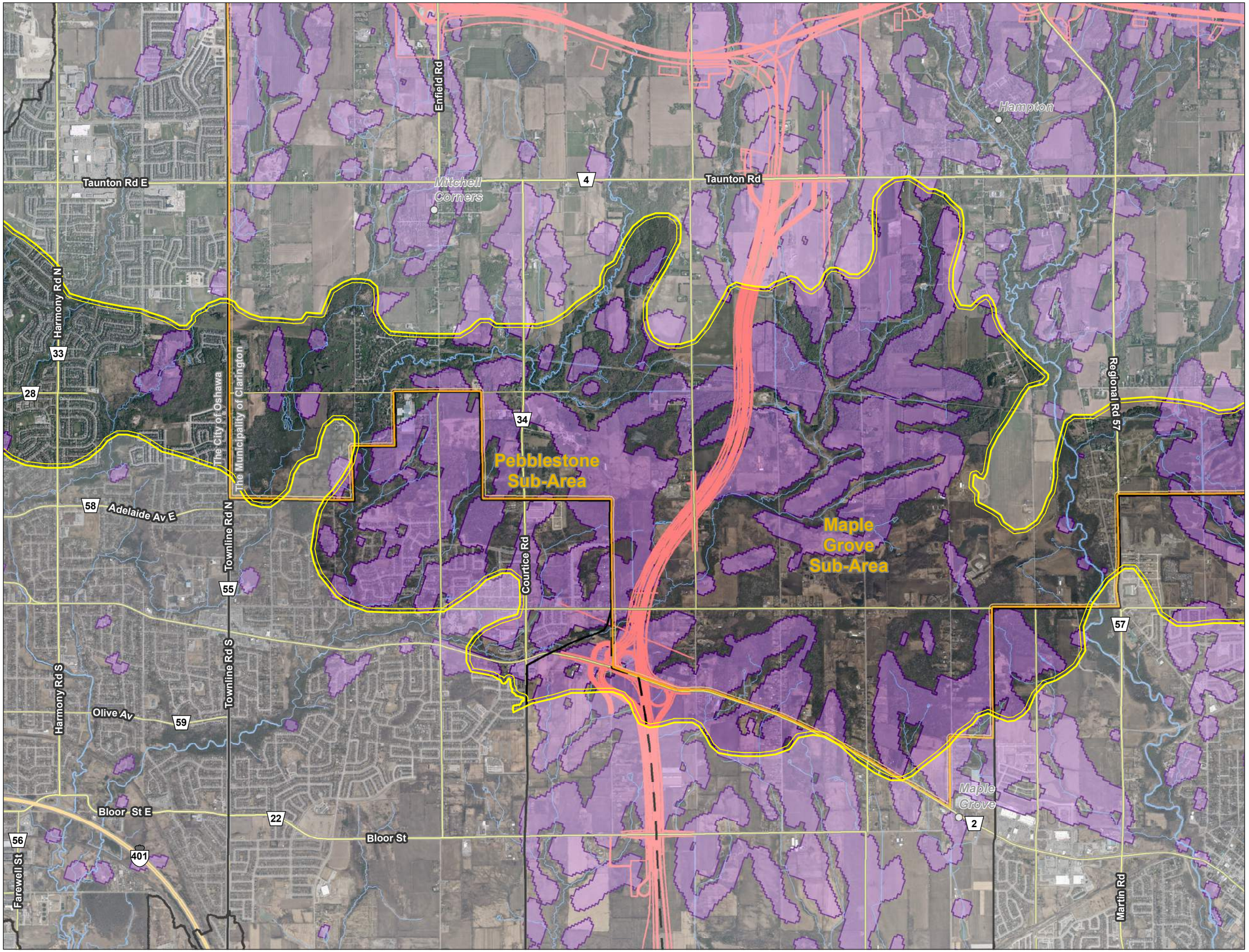
FIGURE 3

Lake Iroquois Beach - West Clarington
Ecologically Significant
Groundwater Recharge Areas



Legend

- Town (Hamlet)
- Drainage
- Highway 407 (TPR)
- Lower Tier Municipality
- Lake Iroquois Beach
- Greenbelt Boundary
- Ecologically Significant Groundwater Recharge Area
- Current Urban Boundary
- Future Urban Boundary

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K:\Projects_Corporate\Land_Acquisition_Strategy\Land_Securement\Figure 3 - Earthfx Report Map 29 - ESGRA.mxd

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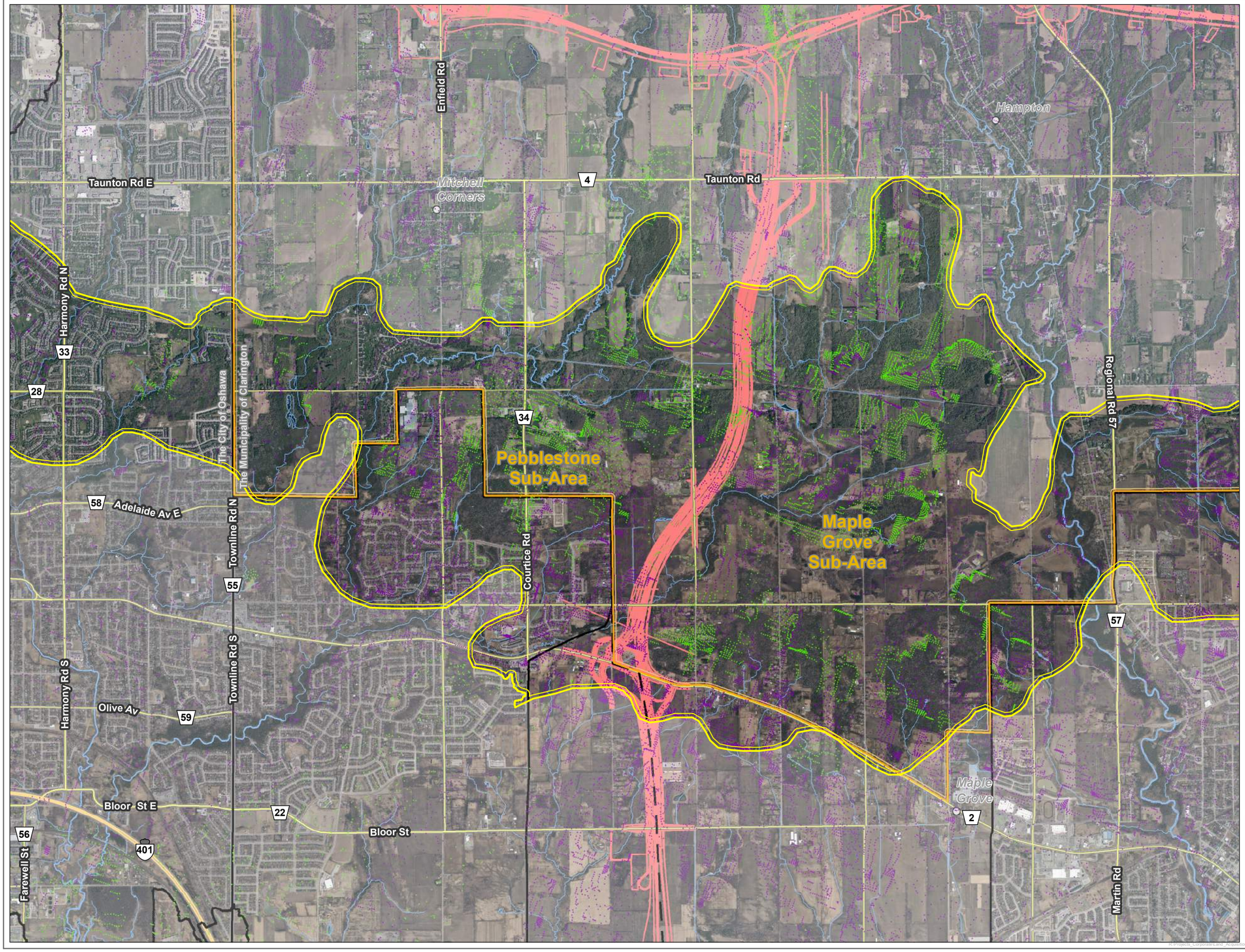
FIGURE 4

Lake Iroquois Beach - West Clarington
Particle Endpoint Locations
from Streams and Wetlands



Legend

- Particle Endpoints (25m release) from Wetlands
- Particle Endpoints (25m release) from Streams
- Town (Hamlet)
- Drainage
- Highway 407 (TPR)
- Lower Tier Municipality
- Lake Iroquois Beach
- Greenbelt Boundary
- Current Urban Boundary
- Future Urban Boundary

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temperatures; crucial in protecting the cold water resident fish. Further, it was also determined that the groundwater resources and wetlands on the LIB support Provincially Significant Oshawa Second Marsh and McLaughlin Bay (Figure 5).

Wetlands cover vast portions of the LIB Target Area (2,220 ac) and include two Provincially Significant Wetland complexes; the Harmony-Farewell Iroquois Beach Wetland Complex and the Maple Grove Wetland Complex which "sustain the largest wetlands and the largest swamps on the Iroquois Plain in the GTA" (OMNR, 2004). In addition to the almost 1,680 acres of PSW, there are an additional 540 acres of wetlands that have been mapped by CLOCA, but not included in the PSW complexes. These wetlands are characterized by swamps, (deciduous, conifer and mixed swamps); with open water and marshes comprising less than 3% of the wetland communities across the study area.

With this concentration of natural heritage features and functions, a good portion of the lands in the LIB Target Area have been identified within CLOCA's Natural Heritage System (NHS). CLOCA's NHS is a connected system consists of PSWs, provincially significant ANSIs, important aquatic habitat, riparian corridors, core habitat areas and terrestrial corridors, woodlands >/= 0.5ha, wetlands >/= 0.5ha and areas identified for natural cover regeneration/restoration which will improve connectivity and habitat. The NHS is comprised of the functional NHS (FNHS) and the targeted NHS (TNHS). The area identified within the FNHS represents existing features and the TNHS are the lands adjacent to the FNHS which if restored, would improve overall quality of the NHS. The NHS is visually represented on Figure 1 and its significance is identified in Table 1 with over 65% of the land within the LIB Target Area lying within the NHS.

Table 1: Natural Heritage System Coverage in LIB Target Area

	Pebblestone Sub Area		**Maple Grove Sub Area**		**Totals**
CLOCA NHS	Area (ac)	%	Area (ac)	%	Acres
Functional NHS	1629.33	47.93	1860.89	50.08	3490.22
Targeted NHS	371.23	10.92	737.03	19.83	1108.26
Total	**2000.56**	**58.85**	**2597.92**	**69.91**	**4598.48**
Non – NHS	1398.93	41.15	1117.95	30.09	2516.88

The variety and size of the wetlands and upland forests maintain habitat for forest birds and other sensitive species. A high number of significant plants, including rare and locally rare species exist in these wetlands and upland forests. The upland forest is dominated by deciduous and coniferous communities, furthering the range of habitat diversity that exists in the LIB Target Area. These upland areas are critical for maintaining wetland hydraulic and

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FIGURE 5

Lake Iroquois Beach - West Clarington
Particle Tracks from Streams and Wetlands

Legend

- Town (Hamlet)
- Pathline from Forward Tracking Analysis from Wetlands
- Pathline from Forward Tracking Analysis from Streams
- Drainage
- Highway 407 (TPR)
- Lower Tier Municipality
- Lake Iroquois Beach
- Greenbelt Boundary
- Current Urban Boundary
- Future Urban Boundary

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Kilometres

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habitat functions. The wetlands and their adjacent areas, whether it is agricultural fields or woodlands provide habitats required during the various life stages of mammals, amphibians, reptiles and birds that use this area.

The high diversity found within these wetland and adjacent upland areas is in part a result of the connectivity that exists between these features. These linkages facilitate critical wildlife movement opportunities within and across the LIB. Wildlife movement north to core areas on the ORM and south to important migration stopover areas and coastal wetlands along the north shore of Lake Ontario is also supported by the LIB.

In CLOCA, the Lake Iroquois Beach provides significant resiliency to overall watershed health. Generally, conditions upstream of the LIB are heavily impacted by land uses, predominantly agricultural activities, and downstream the watersheds are dominated by urban uses. One example of the positive inputs of the LIB is the cooling effect the wetlands and groundwater discharge have on the thermal regime of the creeks. There are many tributaries upstream of the LIB which experience very low flows and warm-water conditions. These same streams, as they pass through the LIB, receive groundwater inputs which reinvigorate the stream by cooling the water, and providing significant baseflow. These inputs help sustain coldwater fishery habitat and provide both the hydraulic and thermal conditions that support migratory salmonids.

Some recognition of the important values the LIB possess and its significance in watershed health has been present in Ontario Planning Policy for a number of years with policies in municipal official plans and the provincial Greenbelt Plan. These policies recognized the important hydrological and connectivity values of the LIB and support the protection, maintenance, enhancement of these features and functions. An excerpt of these policies is found in Appendix 1.

Pebblestone Sub Area

The Pebblestone Sub Area (Fig. 6), which includes some land within Courtice, is almost 3,400 acres in size. The rural lands beyond the Courtice Urban Area comprise 2,143 acres and it is this area that is our focus. The parcel fabric in the rural area is quite variable with a mix of 1 – 10 acre lots, 10 and 20 acre lots and larger 50-100 acre parcels. Lots less than 10 acres in size are not shown on Figure 6. These smaller lots are predominantly found along Trulls Road, Courtice Road, Pebblestone Road, Townline Road and in the Prince Rupert Estate area just north and south of Pebblestone Road. The Pebblestone Sub Area is predominantly a rural residential landscape with the occasional hobby farm or home business/industry indicative of rural areas. On the larger tracts of land, agricultural operations exist which have in recent years been

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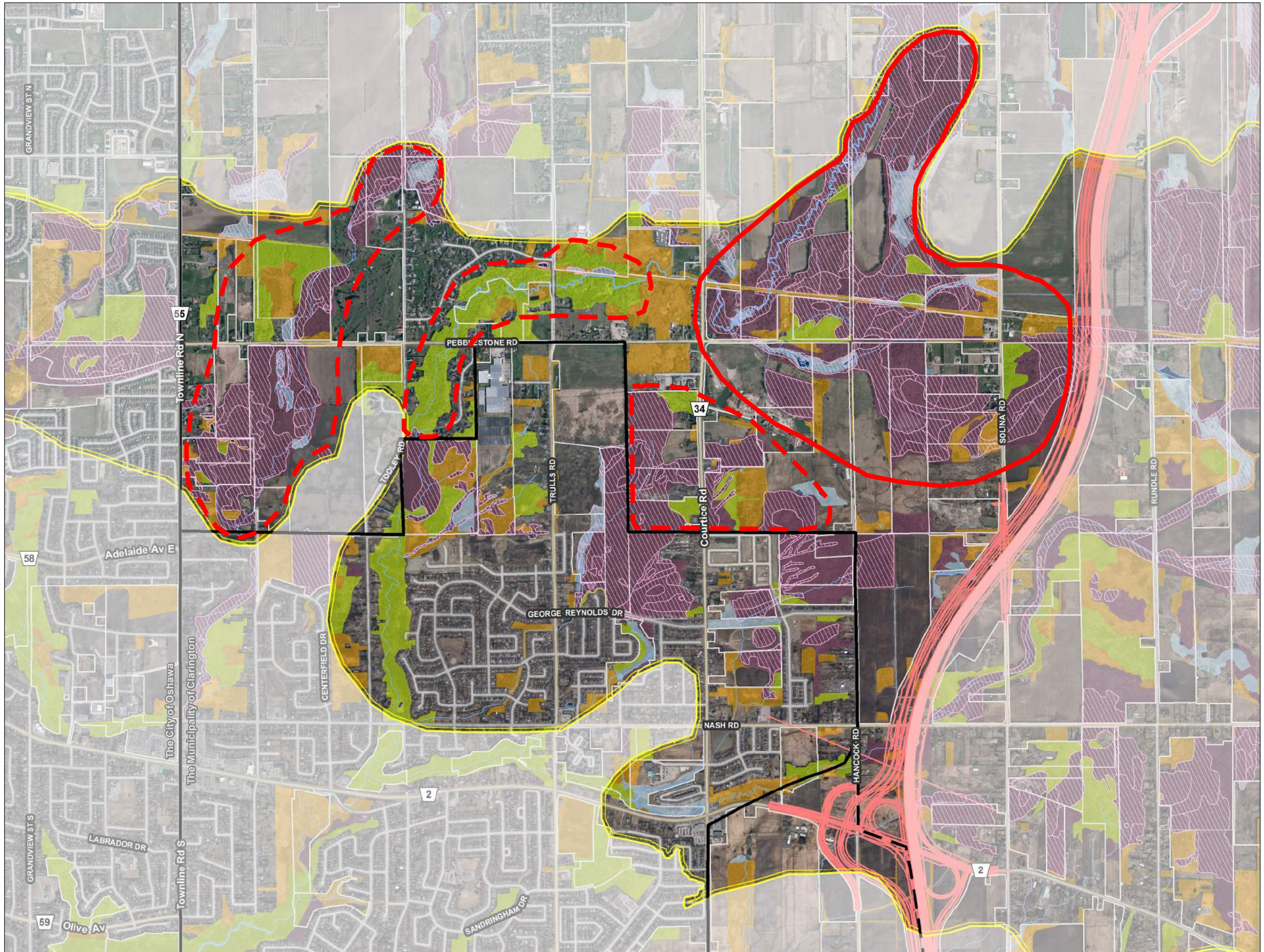
FIGURE 6

Pebblestone Sub-Area



Legend

- Priority Area
- Important Area
- Lake Iroquois Beach
- Highway 407 (TPR)
- Assessment Parcel (Lot > 10 ac)
- Provincially Significant Wetland
- Current Urban Boundary
- Future Urban Boundary

Ecological Land Classification

- Cultural
- Forest
- Marsh
- Open Water
- Swamp

250 125 0 250 500 750 1,000

Metres

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N:\Projects_Corporate\Land_Acquisition_Strategy\Land_Securement\Figure 6 - Pebblestone Grouppped Sub-Area.mxd

transitioning from traditional farm operations to equine, nursery and sod farm operations. Not many of the properties are vacant and there are no public land holdings in this Sub Area.

Natural heritage features are abundant in the area beyond the urban limits of Courtice. Significant portions of the Harmony-Farewell Iroquois Beach Provincially Significant Wetland Complex fall within this area (969 ac) and there are 278 acres of ELC wetlands, and supporting forested areas. In addition there is a large core wildlife habitat area which includes both interior forest and deep interior forest habitat. The main branches of both the Farewell and Black Creeks flow through this Sub Area as does a tributary of the Harmony Creek. The concentration of these natural features is represented by the amount of area identified in CLOCA's NHS. Table 2 provides an indication of the amount of significant natural heritage features on rural lands in the Pebblestone Sub Area.

Table 2: Acres of Natural Heritage Features in the Rural Portion of the Pebblestone Sub Area

PSW	ELC Wetlands(1)	Forests(1)
714.63 ac	277.75ac	259.22ac

(1) Excludes PSW wetlands (2) includes PSW forest

There is one significant priority area in the Pebblestone Sub Area where it is recommended that CLOCA focus securement measures. This area (Figure 6) is removed from the urban area, contains a large concentration of significant natural heritage features including PSW, ELC wetlands, upland forests, some interior forest and deep interior forest conditions, and the Iroquois Beach core habitat area including. There is limited interruption by roads, particularly since Pebblestone and Hancock Roads are not open through this area. A greater level of success in securing large portions of ecologically significant areas is achieved when there are fewer land owners and large parcels.

There are 3 other important areas which lie within the rural area of the Pebblestone Sub Area. Due to the proximity of these areas to the urban area and the opportunity to expand potential municipal leisure trail systems, other agencies, including the Municipality of Clarington could target the 3 areas listed below for securement.

- the concentration of PSW and adjacent lands between Townline and Tooley Road, on both sides of Pebblestone;
- the Farewell Creek Valley through Prince Rupert Estates; and
- the concentration of PSW and adjacent lands on both sides of Courtice Road just beyond the Courtice urban area

CLOCA will work with, and support where possible, acquisition of important ecological areas by any of the many environmental agencies and organizations interested in securing ecologically significant areas in this Sub Area. **All properties brought forward to CLOCA for acquisition will be considered on their own merits, and not just on the basis of whether or not they have specifically been identified or prioritized for securement within this report.**

Maple Grove Sub Area

The Maple Grove Sub Area (Figure 7) is larger, being 3,715 acres in area. Only 106 acres of this Sub Area falls within the urban limits of Bowmanville, resulting in a larger area of focus (3,609 acres); 1,466 acres larger than the focus area of the Pebblestone Sub Area.

Like the other Sub Area, the parcel fabric is quite variable with a mix of 1 – 10 acre lots, 10 and 20 acre lots and larger 50-100 acre lots. Lots less than 10 acres in size are not shown on Figure 7. These smaller lots are predominantly found along Highway 2, Nash Road, Maple Grove Road and Rundle Road south of Nash. Unlike the other Sub Area, there are many more 10-25 acre lots in the Maple Grove Sub Area. Not many of the lots are vacant and there are no public land holdings. This is predominantly a rural residential area with the occasional hobby farm or home business/industry indicative of rural areas. On the larger tracts of land, agricultural operations exist which have in recent years been transitioning from traditional farm operations to equine, orchards, nursery and sod farm operations.

This Sub Area includes lands within the following 4 different watersheds; Black Creek, Tooley Creek, Darlington Creek and Bowmanville Creek. Almost 965 acres of PSW is identified within this Sub Area which includes wetlands within both the Harmony - Farewell Iroquois Beach Provincially Significant Wetland Complex and the Maple Grove Provincially Significant Wetland Complex. The headwaters of Tooley and Darlington Creek originate in the Maple Grove Sub Area and as such, it is important that the hydrologic regime continues to be protected in order to sustain flows, regulate thermal regimes and provide downstream nutrients, all very important for fisheries resources in these watersheds. Tributaries to the main branch of Bowmanville Creek drain the most eastern portion of this Sub Area. These minor tributaries provide nutrients and important flows to Bowmanville Creek, particularly during the freshet. The main branch of the Black Creek also flows through this Sub Area, providing refuge for resident Brook and Brown Trout. In addition to the wetlands, there are 277 acres of coniferous, deciduous and mixed forest, providing supporting habitat for wetland species. Concentrations of wetlands and forest provide many core habitat areas; some providing forest interior habitat and very limited deep forest interior habitat. The vast amount of natural heritage features within this Sub Area is reflected in CLOCA's FNHS (Figure 1). Table 3 provides an indication of the amount of significant natural heritage features on rural lands in the Maple Grove Sub Area.

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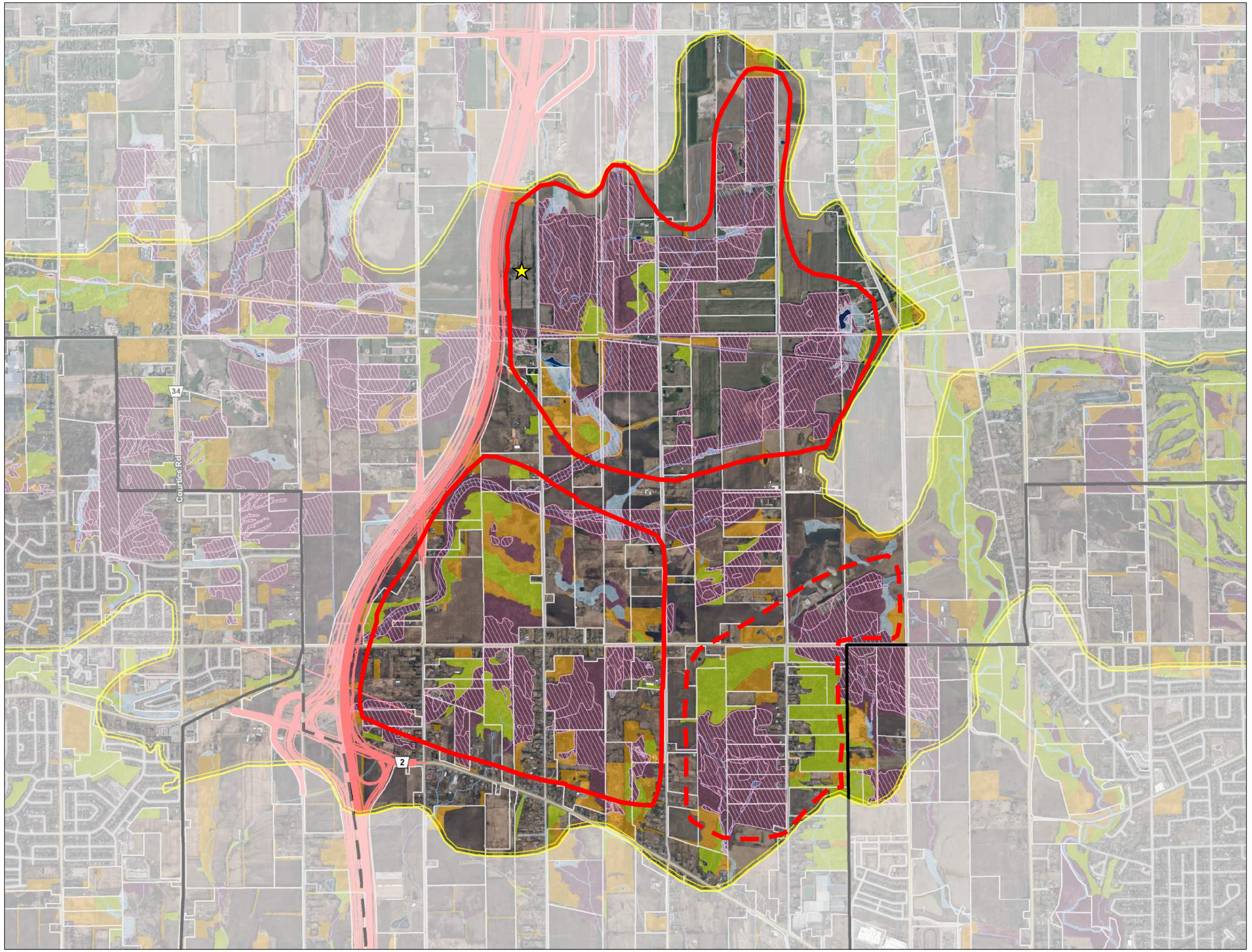
FIGURE 7

Maple Grove Sub-Area



Legend

- Hwy 407/418 Compensation Area
- Priority Area
- Important Area
- Lake Iroquois Beach
- Highway 407 (TPR)
- Assessment Parcel (Lot > 10 ac)
- Provincially Significant Wetland
- Current Urban Boundary
- Future Urban Boundary

Ecological Land Classification

- Cultural
- Forest
- Marsh
- Open Water
- Swamp

250 125 0 250 500 750 1,000

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N:\Projects_Corporate\Land_Acquisition_Strategy\Land_Securement\Figure 7 - Maple Grove Grouped Sub-Area.mxd

Table 3: Acres of Natural Heritage Features in the Rural Portion of the Maple Grove Sub Area

PSW	ELC Wetlands[(1)]	Forests[(2)]
964.61ac	262.4ac	277.66ac

(1) Excludes PSW wetlands (2) includes PSW forest

There are 2 significant priority areas where CLOCA will focus securement efforts in this Sub Area (Figure 7); one in the north, the other in the south west. Within the northerly priority area, the Pebblestone Road Allowance continues to be unopened and the north portion of Maple Grove Road is also unopened, reducing the amount of wetland and forest fragmentation in this area. A significant concentration of the Harmony-Farewell Iroquois Beach Provincially Significant Wetland Complex is present and the upper reaches of the Black Creek drain this area, mostly through the PSW furthering the importance of hydraulic connectivity between the wetland and coldwater stream habitat. This priority area abuts the future Hwy 418, and includes lands identified by the Ministry of Transportation for compensation. Restoration of these lands will improve habitat and diversity by increasing the size of the existing forest/wetland area with wetland and upland vegetation plantings. Just south of this compensation area is the planned location of a long (300m) bridge span for Hwy 418. This long, low span will maintain PSW hydraulic connectivity and provide for wildlife passage. This priority area also includes lands within the LIB Wetland ELC Project conducted by CLOCA in 2013 and 2014. This is a private land stewardship program providing land owners with information about the vegetation communities on their property, the importance of these areas in overall watershed health, and tips on caring for their lands. The site visits conducted through this program enabled CLOCA staff to further refine the Authority's ELC database and mapping. In all, a total of 8 properties have been visited in this priority area with this program is continuing in 2015. This type of outreach is important in conveying the importance of protecting these lands and CLOCA's overall interest in protecting natural areas.

The priority area in the south west portion of the Maple Grove Sub Area includes areas identified as the Harmony-Farewell Iroquois Beach Provincially Significant Wetland Complex, approximately 2 km stretch of the main branch of the Black Creek in addition to 1st and 2nd order tributaries, portions of the Iroquois Beach habitat area, including forest interior and deep forest interior habitat and the headwater drainage area of Darlington Creek. There has been 1 property that CLOCA has visited through the LIB Wetland ELC Project. The forest and wetland areas south of Nash Road are important in maintaining and regulating flows, contributing headwater drainage to the Darlington Creek watershed. There are large parcels within this area and limited public roads improving the potential for securing large non-fragmented forest and wetland areas. There is one large parcel that currently exhibits pockets of PSW, cultural

vegetation communities and 2 forested areas, that if restored could significantly improve watershed conditions.

There is one large area that surrounds the Bowmanville Urban boundary which possesses large portions of the Maple Grove Provincially Significant Wetland Complex and associated forested areas. But in this area are a number of 10 acre parcels which make consolidation of the significant natural heritage areas through securement challenging for CLOCA. The Authority will work with, and support where possible, agencies interested in securing these important ecological areas. **All properties brought forward to CLOCA for acquisition will be considered on their own merits, and not just on the basis of whether or not they have specifically been identified or prioritized for securement within this report.**

Conclusion and Recommendations

That portion of the Lake Iroquois Beach between Bowmanville and Courtice in the Municipality of Clarington possesses a significant concentration of natural heritage features and functions including; PSWs and ELC wetlands, large forest blocks, core wildlife areas and important groundwater discharge and recharge functions. The local significance of the LIB is recognized in this strategy and the natural areas and vast wetlands can help to offset some of the anticipated impacts of climate change. Located between these growing urban areas the LIB and its features and functions will be impacted by growth, which will result in impacts overall watershed health.

Long term protection is best served through acquisition, but unlike other areas of the LIB in CLOCA's jurisdiction, there are no public land holdings within the LIB Target Area from which to prioritize securement. This strategy, when used in conjunction with the 2012 Central Lake Ontario Conservation Authority Land Acquisition Strategy, will help focus natural heritage protection efforts on this portion of the Lake Iroquois Beach. Although priority areas have been identified, **any property within the LIB Target Area that is brought forward to CLOCA for acquisition will be considered on their own merits, and not just on the basis of whether or not the lands have specifically been identified or prioritized for securement within this report.**

CLOCA will continue to build relationships with landowners in the LIB Target Area sharing best management practices, wetland facts and healthy watershed practices while continuing to update our ELC mapping and database.

Partnerships are important and CLOCA will work with the Municipality of Clarington, the Region of Durham, and other organizations, agencies and groups to find various means and ways to protect the significant natural heritage features and functions of the LIB. Obtaining municipal support in advancing the goal of this strategy is important. For the Municipality of Clarington to

prioritize this strategy through policy and action would provide the support needed to implement this strategy.

References

CLOCA, "Central lake Ontario Conservation Authority Land Acquisition Strategy – 2012", updated January 2015

Durham Region, "Durham Regional Official Plan", Office Consolidation, 2013

Earthfx Incorporated, "Ecologically Significant Groundwater Recharge Area Delineation in the Central lake Ontario Conservation Authority Area", 2014

Ministry of Municipal Affairs and Housing, "Greenbelt Plan", Feb 2005

Municipality of Clarington, "Municipality of Clarington Official Plan", Office Consolidation, 2014

Ontario Ministry of Natural Resources, "Provincially Significant Maple Grove Wetland Complex Summary", February 2004

Ontario Ministry of Natural Resources, "Provincially Significant Harmony-Farewell Iroquois Beach Wetland Complex Summary", September 2005

Appendix 1: Relevant Planning Policy

Greenbelt Plan

The LIB is identified as a feature of hydrologic significance in Section 3.2.1 and in Section 3.2.5 – External Connections, the following text is provided recognizing that even in urban areas, the features and functions of the LIB needs to be improved and connectivity of the system continue.

> *"In addition to the urban river valleys, portions of the former Lake Iroquois shoreline, particularly within Durham Region, traverse existing or approved urban areas. Municipalities should consider planning, design and construction practices that maintain or where possible enhance the size, diversity and connectivity of key natural heritage features and key hydrologic features and functions of those portions of the Lake Iroquois shoreline within their approved urban boundaries."*

Durham Region Official Plan Policies

Section 10.3.5 states that:

> *"The maintenance and enhancement of the size, diversity and connectivity of key natural heritage and hydrologic features within the Lake Iroquois Shoreline in accordance with the policies of Sub-Section 10A, is encouraged."*

Municipality of Clarington Official Plan Policies

The Municipality of Clarington understood early that the LIB is an important ecological area and this is reflected in the number of official plan policies that reference the LIB, even including a specific section dedicated to the LIB and identifying it on Map C – Natural Heritage System.

> ***Section 4.2.6*** *"To recognize and protect the Lake Iroquois Beach for its significant function of groundwater recharge and discharge, its significant natural heritage features and their ecological functions, and its aggregate resources."*
>
> ***Section 4.4.11*** *"The following areas in the Municipality are particularly important to the natural heritage system of the Municipality:*
> - *The Oak Ridges Moraine*
> - *The Lake Iroquois Beach*
> - *The Lake Ontario Waterfront"*
>
> ***Lake Iroquois Beach***
>
> ***Section 4.4.28*** *"The Lake Iroquois Beach, as identified on Map C, is an important landform within the Municipality's landscape. The extensive forested areas and wildlife habitat of the Beach*

provide an east-west natural corridor across the Municipality. This landform is also valued for its groundwater recharge and discharge functions, its landscape features and its aggregate resources. 4.4.29 Except for aggregate extraction, Council shall endeavour to maintain the form, character and variety of landscapes within the Lake Iroquois Beach by encouraging only minimal modification to the natural contours of the land and the retention of natural landscape features, including woodlands and wetlands. In the case of an Aggregate Extraction Area, the extraction and rehabilitation plans for the pit shall seek to create compatible landforms and provide continuous forest cover where reasonably practicable."

Section 4.4.35 *"An Environmental Impact Study shall be undertaken for development applications located on lands within or adjacent to any natural heritage feature including the Lake Iroquois Beach…"*