SNAP
Sustainable Neighbourhood
Retrofit Action Plan

Lake Wilcox SNAP

Embracing Nature in the Community

Richmond Hill

York Region

Oak Ridges Friends of the Environment

York Region Environmental Alliance

Oak Ridges Trail Association

Toronto and Region Conservation for The Living City

Lake Wilcox SNAP

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Sustainable Neighbourhood Retrofit Action Plans (SNAPs) help established communities improve environmental conditions, reduce resource use and prepare for climate change, while meeting important objectives of their residents. The Lake Wilcox SNAP aims to motivate local stewardship of unique natural features. It is the product of an innovative, integrated approach to urban and suburban retrofit challenges in existing neighbourhoods. One of five pilots in the Greater Toronto Area (GTA), the Lake Wilcox SNAP was developed by Toronto and Region Conservation (TRCA) in partnership with the Regional Municipality of York, Town of Richmond Hill, Oak Ridges Friends of the Environment (ORFE) and other community stakeholders (Box 1).

Lake Wilcox is a unique local treasure – the largest kettle lake on the ecologically significant Oak Ridges Moraine. The surrounding neighbourhood has evolved from a 1940s cottage community to a growing suburban community in the GTA (Figure 1, Box 2). Located in the headwaters of the historic Humber River watershed, the community of Oak Ridges is surrounded by provincially significant wetlands and stands of forest, home to sensitive plant, bird, amphibian and fish species. Lake Wilcox and the Lake Wilcox Park draw visitors from near and far. Residents and visitors have been drawn to live and play here since Aboriginals inhabited the area 10,000 years ago. However, ongoing residential development and growing numbers of visitors to the area stress its highly-valued natural features.

A wetland at Ashfield Drive.

Elevated phosphorus levels in the Lake are an ongoing concern. The Town of Richmond Hill is updating its lake remediation strategy and looking to complement extensive municipally-led actions to date, with additional actions taken on private lots. A network of established local environmental groups have been effective at raising local environmental awareness and are eager to work with newcomers and longtime residents to improve neighbourhood conditions.

The Lake Wilcox SNAP identifies the most strategic actions needed to protect natural features, reduce the population's ecological footprint and improve overall neighbourhood sustainability. The Action Plan proposes solutions that will help attain environmental goals along with the other important interests of the community. SNAP will help further objectives of the Town's *Lake Wilcox Remediation Strategy* (Gartner Lee Ltd, 1995) and Official Plan, the Humber River Watershed Plan *Pathways to a Healthy Humber* (TRCA, 2008), York Region's *Long Term Water Conservation Strategy* (York Region, 2011), and ORFE's *Oak Ridges on the Moraine: A guide to the natural environment and the community* (ORFE, 2007), among others.

Box 1: Who's involved?

Lead Partners

Toronto and Region Conservation
Regional Municipality of York
Town of Richmond Hill

Local Partners

Water for Tomorrow (York Region)
Healthy Yards (Town of Richmond Hill)
Oak Ridges Friends of the Environment
Oak Ridges Trail Association
York Region Environmental Alliance
LEAF
Enbridge
Transition York

Major Landowners

Homeowners & businesses
Town of Richmond Hill

Research Partners

Massachusetts Institute of Technology (MIT)
York University

Box 2: Neighbourhood Profile

Study Area

643 ha

Demographics

Population : > 7,000 (approx. 3,700 households)
2001-2006 population growth : 84%
Median age : 36.1
Median income : $97,208
Recent immigrants (1991-2006) : 17%
Employed outside of Richmond Hill : 63%

Land Use

50%	Residential
27%	Natural cover
9%	Open water
3%	Institutional & commercial
11%	Other

Figure 1: The Lake Wilcox SNAP neighbourhood, in the community of Oak Ridges, Town of Richmond Hill, Regional Municipality of York.

The many interviews, survey findings, engagement events and feedback sessions held throughout development of the SNAP (Box 3) reinforced that residents come to live in the Lake Wilcox area to be close to nature. Environmental awareness is relatively widespread, but greater adoption of sustainable practices is needed to meet targets. Retrofit actions must be convenient and be presented with a deeper understanding of the anticipated environmental benefits and any associated cost savings. Residents' top-of-mind concerns are community growth and identity, local access to amenities and services, and a mixed response to recent shoreline naturalization initiatives.

Technical analysis of environmental conditions in the neighbourhood helped characterize priority areas and identify strategic retrofits. Community response to these strategic actions was explored through community events and social market research. Building on knowledge of the residents' appreciation for local natural features and their desire to be environmentally friendly, the Action Plan is centered on actions that start at home – embracing nature within the community.

Box 3: How we're listening...

Research Tools

Door-to-door surveys (149)
Key informant interviews (15)

Fun Informative Events

Homeowners Learning Centre
Family Hike
Gardening Workshop
SNAP booth at community events and meetings

Feedback Sessions

Meetings with community leaders
Connections with local initiatives
Homeowner interviews (8)
Municipal workshops

A Closer Look at the Lake Wilcox SNAP

The Lake Wilcox SNAP focuses on Embracing Nature in the Community through 3 primary action areas: residential eco-landscaping, visitor stewardship, and green renovations and energy (Figure 2). Demonstration projects targeting residential homeowners, commercial property owners, and public lands play a key role in demonstrating new ideas and fostering discussion among newcomers and longtime residents. This integrated Action Plan addresses local needs for reduced storm runoff and improved lake water quality, stewardship and enhancement of natural areas, and reduced water use (Box 4). Implementation will realize added social benefits by serving to unite residents in a shared experience of neighbourhood and environmental improvement. Other considerations, such as transportation, waste management, urban design, health and wellbeing were found to be adequately addressed by other existing plans and programs or not a top priority in the neighbourhood.

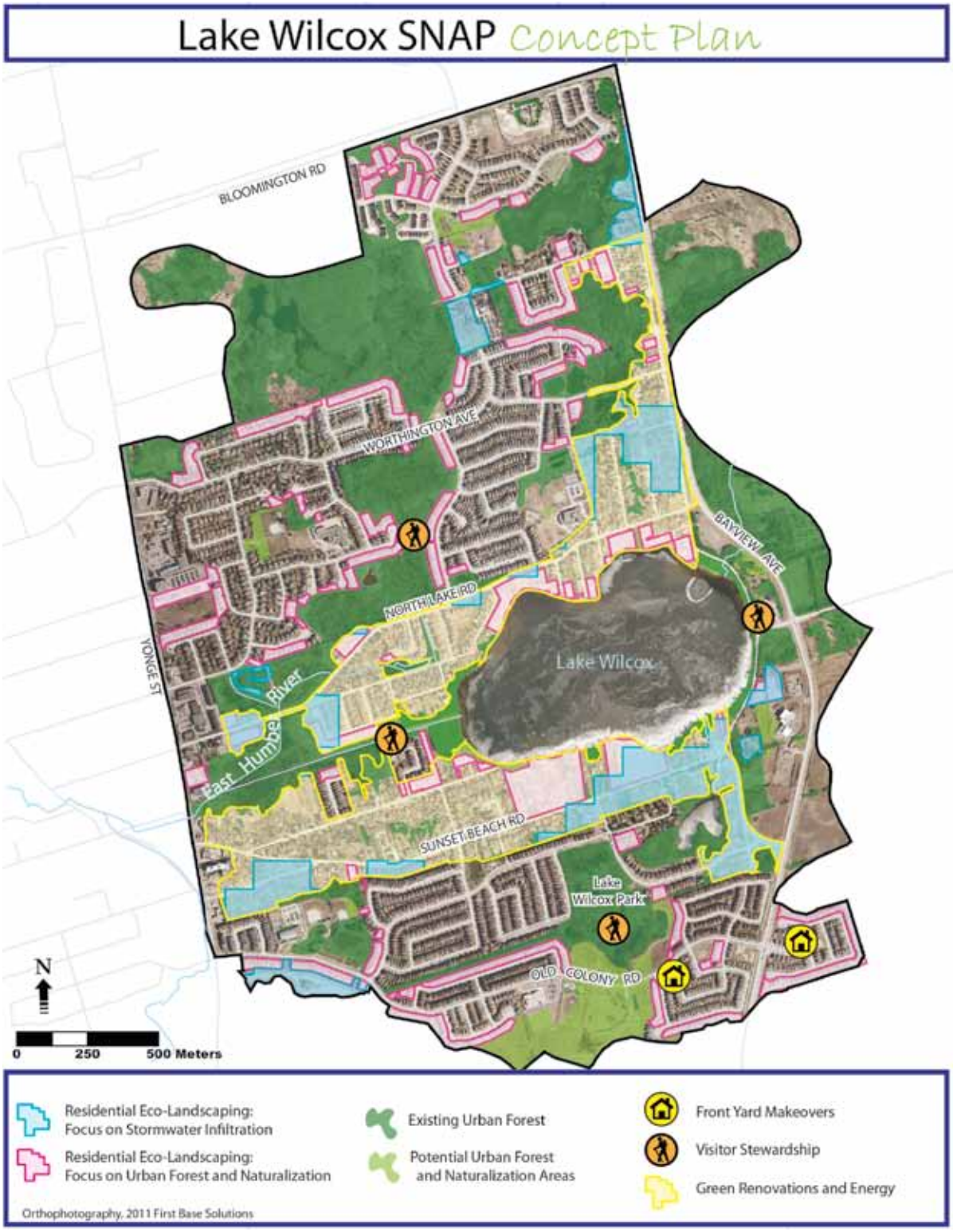

Figure 2: The Lake Wilcox Sustainable Neighbourhood Retrofit Action Plan.

A description of the primary components of the Action Plan is presented here, followed by an overview of the next steps involved in refining the Plan and developing the implementation program.

Box 4: Key Outcomes

Stormwater Management / Improved health of Lake Wilcox

Achieve Humber River Watershed Plan and Lake Wilcox Remediation Strategy objectives for stormwater runoff reduction and improved water quality (40-50% phosphorus removal) through adoption of eco-landscaping on 46% of residential lots in priority areas – those not served by stormwater ponds and where soil and groundwater conditions are appropriate for stormwater infiltration.

Water Conservation

Contribute to achieving York Region's Long Term Water Conservation Strategy aspirational target of no new water by 2051, or 150 L per capita daily water use, by reducing outdoor water use through rain harvesting and replacement of water-intensive lawns and gardens with water efficient plantings. Current average per capita daily water use in the neighbourhood is 214 L (2009).

Urban Forest

In the long term, exceed Humber River Watershed Plan target for the neighbourhood by expanding the urban forest from 27% to 35% through residential eco-landscaping of a portion of all front and rear yards. In the short term, double tree cover in residential areas by eco-landscaping 55% of residential lots.

Ecoservices

After 50 years of growth, the expanded urban forest will remove 25,000 kg of air pollution annually (service valued at $218,000 annually) and will sequester, or remove, 1,212,000 kg of carbon annually (valued at $27,000 annually).

Residential Eco-landscaping

Opportunities to influence private residential lot landscaping design and maintenance to further ecological objectives emerged as a strategic component of the Action Plan. Door-to-door survey results, interviews and casual conversations at events showed most residents already are taking steps to reduce water and energy use inside the home, but know little about landscaping practices that would help conserve resources and support local ecosystem functions.

While the older part of the neighbourhood generally is well planted, many homeowners in the newer areas have settled in and are looking to landscape their properties for the first time over the next couple of years. A common desire to spend less time and money on landscape maintenance (especially grass) is a key motivator to adopt "eco-landscaping" designs and practices. Feeling they are contributing to protecting local nature could be an additional motivator, particularly for those residents living close to the Lake or a natural area. Residents told us they want convenient how-to instructions and the "business case" for adoption – both environmental and economic. Promotion of eco-landscaping needs to showcase a range of contemporary landscaping aesthetics to overcome commonly held beliefs that "naturalized" landscapes are unattractive.

One of two Front Yard Makeovers – an eco-landscaping design for a family friendly garden featuring soakaways, a high-capacity rain barrel, permeable pavers, and native and water efficient plantings intermixed with edible berries and vegetables.

On the older lots, the main objective of the "eco-landscaping" is to infiltrate and evapotranspire as much stormwater on the lots as feasible, in areas where soil and groundwater conditions are appropriate (Figure 2). From these lots, untreated stormwater flows directly to the Lake, exacerbating water quality problems (notably phosphorus loading). Stormwater is a valuable resource that can offset use of treated municipal tap water for landscape irrigation. Key measures proposed are:

- Rain gardens, soakaways, infiltration trenches and permeable paving to promote stormwater infiltration;
- High-capacity (minimum 500 L) rain barrels for rain harvesting;
- Improved nutrient/fertilizer management to reduce sources of phosphorus (almost a third of residents use chemical fertilizers);
- An increased-depth of compost-amended topsoil to absorb nutrients from infiltrating water and improve growing conditions;
- Shoreline naturalization for lake shore properties; and
- Planting of canopy trees.

Lessons can be learned from past shoreline initiatives (e.g., Lake Wilcox Habitat Enhancement Program, recent naturalization of the publicly-owned eastern shoreline) to determine the best approach to promote shoreline stewardship.

Preliminary analysis suggests 46% of residential lots need to adopt "eco-landscaping" to meet water quality objectives for runoff from residential lands. Further analysis will develop typical lot designs and sizing, refine estimation of the potential benefits of these practices (water quality, flow and conservation) and set implementation targets for a neighbourhood-wide Residential Eco-Landscaping program. A complementary strategy for managing stormwater runoff from roads is needed.

On the newer lots, the main objective of the "eco-landscaping" is to buffer and bolster local natural areas and **expand the urban forest** in priority areas (Figure 2). Many of these lots generally have minimal plantings and the young street trees are not yet well established. While rear yards are small and homeowners value them for many uses (entertaining, active recreation), front yards are typically grassed and underutilized. These front yards in particular, offer an opportunity to showcase adoption of new techniques. Key measures proposed are partial naturalization, encroachment and invasive species control (for properties adjacent to natural areas), increased depth of compost-amended topsoil, native plant species (herbaceous and woody), canopy trees, nutrient/fertilizer management and rain gardens. Rain harvesting through high-capacity rain barrels can help offset outdoor use of treated tap water on these lots too.

Residents told us they love the forests, wetlands, meadows, and street trees in the neighbourhood (85% said they visit trails and natural areas). Opportunities exist to expand the urban forest cover from 27 to 35% of the land area through planting on public lands (3.24

ha in parks and open space) and private residential lots[1] (assuming 100% participation). When established, this expanded urban forest will help improve air quality by removing pollutants (an estimated 25,000 kg per year), and mitigate climate change locally by sequestering carbon (1,212,000 kg per year), at a combined economic value of $246,000 per year. Notably, the tree cover in the residential area (excluding natural areas) could be doubled if 55% of homeowners planted a portion of their yards[1]. These objectives could be met by continuation of the Town of Richmond Hill's public lands greening initiatives and implementation of the Residential Eco-landscaping component of the SNAP. Further analysis will quantify the number of trees to be planted per lot to meet these targets, and the species of trees most appropriate to maximize canopy size and survivability, given the restrictions of small lot sizes and poor growing conditions in the newer areas.

Visitor Stewardship

Visitors are drawn to the natural resources of the neighbourhood. Hiking, dog walking and recreational angling are common activities. Visitors should be encouraged to become stewards of the natural areas they've come to visit. In particular, simple practices that help minimize the spread of invasive species need to be profiled in locations where visitors congregate (e.g., avoid baitfish release to the lake and tributaries, clean hiking boots to curtail spread of dog strangling vine along trails) (Figure 2). Key locations could include the fishing pier, access points to the Lake Wilcox Park and a trail head near Yonge Street and King Side Road proposed by Oak Ridges Friends of the Environment. Trampling, compaction and unauthorized trail creation have impacted newly restored shoreline areas, and should be addressed through signage and creation of appropriate access points.

Before (2008) and after (2011) shoreline restoration along the eastern shore of Lake Wilcox.

Green Renovations and Energy

Infill construction and re-built homes are common in the neighbourhood, as many older cottages are being replaced with new houses. Survey results show at least 20% of homeowners are planning home renovations in the next 2 years. The neighbourhood has high levels of adoption of basic energy and water efficiency retrofits in the home (50-85% adoption rate for low flow and energy saving fixtures and appliances), and interest remains high in green building techniques and solar energy. Further exploration of "next steps" retrofits (e.g., insulation, window and door improvements) and the potential for solar power generation on residential rooftops are key follow-up actions. Erosion and sediment control best practices at infill and renovation sites will help reduce nutrient loading to Lake Wilcox.

Site improvements at commercial properties, school yards, community centres and parks, and along road right of ways could play key roles in improving local conditions. Of particular value would be stormwater source and conveyance controls implemented in the older areas, where end-of-pipe stormwater controls are lacking (e.g., bioswales and infiltration trenches in parking lots).

[1] Proposed plantings range from 18 m^2 in the rear yard of a small lot to 90 m^2 in a large lot, and allow for typical front and rear yard uses including decks, lawns, walkways and driveways.

Conversation Starters – Demonstrating Retrofits

Demonstration projects play an essential role in communicating the SNAP and kick starting implementation. The Front Yard Makeover initiative is profiling many of the key practices for Residential Eco-Landscaping (and urban forest expansion) on two private residential lots in a newer part of the neighbourhood.

The demonstrations include soakaways, rain gardens, native plants, canopy trees, permeable paving and high-capacity rain barrels. The goals of the Makeovers are to give local homeowners first hand experience with these practices, get neighbours talking about the benefits of eco-landscaping, and demonstrate that environmentally friendly landscaping is adaptable to any aesthetic or style. Monitoring of the Makeovers will confirm the stormwater infiltration and water conservation benefits of the designs.

One of two Front Yard Makeovers – an eco-landscaping design for busy commuters featuring soakaways, a rain garden, a high-capacity rain barrel, permeable paving, and native and water efficient plants.

Heathwood Homes' Green Home in Oak Ridges showcases a newly built home, demonstrating technologies that could be adopted as retrofits during **green renovations and infill**, such as energy efficient windows and insulation, tankless water heaters, CFL and LED lighting, dual flush toilets and high efficiency furnaces. Landscaping at the Green Home incorporates permeable pavers, infiltration galleries, a rain barrel and water-efficient plants.

The Town of Richmond Hill's new **Oak Ridges Community Centre** on Bayview Avenue showcases technologies that could be incorporated as retrofits on commercial and other public properties (e.g., schools, community centres, private commercial parking lots). The Centre will pursue a LEED Silver designation, incorporating bioswales and cisterns, a section of green roof, and high efficiency mechanical and lighting systems.

Bioretention gardens in the parking lot of the Oak Ridges Community Centre.

Summary

The integrated Lake Wilcox SNAP capitalizes on residents' love of the natural areas that drew them to the neighbourhood, and encourages them to embrace nature on their own properties. Residential eco-landscaping, visitor stewardship, and green renovations and infill will help achieve locally and regionally identified targets for environmental improvement, and prompt both new and longtime residents to share the experience of neighbourhood transformation.

Next Steps

The partners will continue to refine components of the Lake Wilcox SNAP, through the development of implementation pilot programs and partnerships, installation of demonstration projects and monitoring uptake. In keeping with the highly collaborative and innovative process that was followed in development of the Action Plan, the project partners will continue to engage local groups, community leaders and other stakeholders in this work.

A pilot neighbourhood-wide Residential Eco-landscaping program is being led by TRCA. Implementation planning will consider key resident motivators and barriers identified during development of the SNAP. Key barriers for eco-landscaping adoption are lack of familiarity with the practices and their potential benefits, aesthetics, small yard sizes (in newer areas) and cost. Motivators that resonate with locals include cost and time savings, access to convenient how-to information, shared experiences with friends and neighbours, expert advice and improving the health of Lake Wilcox (for those living nearby). Implementation planning will consider building on existing relevant programs (e.g., Water for Tomorrow, Healthy Yards, LEAF) and forging new partnerships with the private sector.

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SNAP
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Retrofit Action Plan

Sustainable Neighbourhood Retrofit Action Plan (SNAP) projects develop an environmental improvement plan for existing urban neighbourhoods. The projects aim to accelerate implementation of sustainable practices through: (1) An integrated approach to urban retrofits that addresses a broad range of objectives (e.g., natural water cycle, water and energy conservation, urban forest, green building, community interests); and (2) Innovative stakeholder engagement and social marketing to increase the rate of private landowner uptake and secure local partnerships for implementation.

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