SUN
Sustainable Urban Neighbourhoods

In association with:

Sustainable Neighbourhood Action Program | Toronto and Region Conservation Authority

Kawartha Heights Neighbourhood Action Plan: Toward an active, greener future

GreenUP

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We respectfully acknowledge that GreenUP is located on Treaty 20 Michi Saagiig territory and in the traditional territory of the Michi Saagiig and Chippewa Nations, collectively known as the Williams Treaties First Nations, which include: Curve Lake, Hiawatha, Alderville, Scugog Island, Rama, Beausoleil, and Georgina Island First Nations.

GreenUP respectfully acknowledges that the Williams Treaties First Nations are the stewards and caretakers of these lands and waters in perpetuity, and that they continue to maintain this responsibility to ensure their health and integrity for generations to come.

How to use this document

The Kawartha Heights Neighbourhood Action Plan is a collaborative ten-year vision and guide for achieving greater sustainability and resilience to the impacts of climate change.

This accessible document is intended for municipal staff, partners, neighbourhood residents, schools, businesses, and community and faith groups who wish to review a detailed version of the Plan. A summary version of the Action Plan is available on the SUN website.

Unless otherwise indicated, all maps in this report were generated by the author using QGIS 3 and use a NAD83 UTM 17N projection. Aerial imagery and data layers courtesy of the City of Peterborough unless stated otherwise. Consult References for a complete list of shapefiles used.

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Executive summary

Toward an active, greener future

Kawartha Heights is a large, suburban neighbourhood at the westernmost edge of the city of Peterborough. Residents appreciate its spacious feel, nearby schools, and quiet atmosphere. Yet, like many urban communities today, the neighbourhood is characterized by declining biodiversity, underused green space, and car dependency. As climate change intensifies, it is more important than ever that we reverse these trends and adapt to a warmer and less predictable environment.

In 2017, Kawartha Heights was chosen as one of two pilot neighbourhoods for the GreenUP Sustainable Urban Neighbourhoods program (SUN), a three-year initiative that offers an innovative way of making the places we live, work, play, and learn more sustainable and resilient to climate change.

The SUN approach builds widespread support for neighbourhood action by bringing together residents, the municipality, and partners such as Otonabee Conservation, Nourish, and others, to create an Action Plan tailored to each community. Since 2017, our partners and hundreds of Kawartha Heights residents and community members have identified local needs and shared their ideas for neighbourhood projects and programs.

The Plan represents a collective vision of what the neighbourhood can become by 2030 if actions are implemented swiftly and collaboratively, and provides a roadmap for how to get there. Actions are grouped into four focus areas:

1. **Transform grey into green** enhances residential, institutional, and commercial properties through retrofits designed to increase biodiversity and urban forest canopy, improve stormwater management, support local food production, and reduce our collective carbon footprint.

2. **Build local capacity** increases the ability of residents and community groups to undertake action at home and in their neighbourhood through education, incentives, and more.

3. **Enhance local parks** maximizes the neighbourhood's ample green space for multiple benefits, including more sustainable stormwater management, increased biodiversity and urban forest canopy, and greater opportunities for healthy recreation and community building.

4. **Travel sustainably** improves pedestrian and cycling infrastructure and connectivity, encourages residents to choose active transportation options, and maximizes proposed capital projects for additional outcomes like sustainable stormwater management.

Each recommended action aligns with SUN's core principles and supports the long-term outcomes for two or more of the sustainability themes in Kawartha Heights: water; habitat and urban forest; healthy and active transportation and recreation; community building; energy and climate; and local food security. The themes and outcomes align as much as possible with local, regional, federal, and international plans, policies, and goals.

With the planning phases of the project complete, SUN and its partners will be developing an implementation framework that identifies lead stakeholders, supporting partners, and next steps for each action. To get involved, visit the SUN website.

What is SUN?

Introduction

The Sustainable Urban Neighbourhoods program is a three-year initiative funded by the Ontario Trillium Foundation and led by GreenUP. It offers an innovative and collaborative way to transform the places we live, work, play, and learn, making them more sustainable and resilient to the impacts of climate change. SUN brings together local residents, municipal staff, community groups, and other key partners to identify ideas and opportunities for change.

In addition to planning, SUN undertakes 'Quick-start' demonstration projects that inspire residents, community groups, and partners to take action by showcasing possibilities for change. Quick-starts are also opportunities for SUN to engage with the wider community and build capacity amongst residents to support the implementation of the Action Plan.

There are two kinds of Quick-starts: high intensity and low intensity actions. The five kinds of high intensity planting options include urban tree planting, pollinator gardens, rain gardens, food gardens, and native species plantings. Low-intensity retrofit actions include removing invasive species, and providing rain barrels, composters, bat houses, and birdhouses.

Sustainable Urban Neighbourhoods (SUN) is modelled after Toronto and Region Conservation Authority's Sustainable Neighbourhood Action Program (SNAP). SNAP is a collaborative, neighbourhood-based solution for advancing sustainable urban renewal and climate action in older urban areas. For more information, visit TRCA's SNAP website.

Governance structure

SUN's work is supported and directed by the SUN advisory committee, which consists of representatives from the following groups and institutions:

- GreenUP
- City of Peterborough
- Otonabee Conservation
- Toronto and Region Conservation Authority (TRCA)
- Nourish Project
- Peterborough Utilities Group (PUG)
- Peterborough Public Health (PPH)
- Peterborough Pollinators
- Transition Town Peterborough
- Fleming College
- Trent University
- The Canadian Canoe Museum

- Kawartha Heights resident representative
- East City-Curtis Creek resident representative

The advisory committee has met six times to review program progress and advise on community engagement strategies, Quick-start and educational events, and the proposed content and format of the Neighbourhood Action Plan.

In addition to the advisory committee, the following local groups and organizations have supported and participated in SUN Kawartha Heights:

- Local residents
- Schools (Holy Cross Secondary School, Crestwood Secondary School, James Strath Public School, and Kawartha Heights Public School)
- Churches and faith groups (Westdale United Church and Calvary Church)
- APEX Cardiology
- Applewood Retirement Residence
- Mapleridge Recreation Centre

Program background and neighbourhood selection

SUN is modelled after the Toronto and Region Conservation Authority's Sustainable Neighbourhood Action Program (SNAP). SNAP is a collaborative, neighbourhood-based solution for advancing sustainable urban renewal and climate action in older urban areas. In 2017, GreenUP received a three-year Grow Grant from the Ontario Trillium Foundation to bring the SNAP approach to Peterborough, a mid-sized municipality outside the Greater Toronto and Hamilton Area.

In 2017, GreenUP consulted with the City of Peterborough, Sustainable Peterborough, Otonabee Conservation, the County of Peterborough, and Nourish to identify priority areas for each partner. Next, GreenUP developed a neighbourhood selection process adapted from the SNAP model, shortlisted five neighbourhoods, and selected the final two pilot neighbourhoods. The criteria used to select pilot neighbourhoods included:

- A minimum area of $1.5km^2$
- Known vulnerabilities to future climate change impacts (e.g. flood risk)
- Mixed land uses (residential, commercial, institutional, etc.)
- Existing participation in other community projects or initiatives
- Distinctive characteristics from other shortlisted neighbourhoods (e.g. differences in demographics, density, rates of home ownership, etc.)
- Alignment with local and regional plans and priorities
- Potential to address multiple partner priorities within the neighbourhood
- Sufficient community readiness

Kawartha Heights and East City–Curtis Creek were selected from a shortlist of five potential neighbourhoods within the City limits, which also included Bonaccord, Talwood, and the Downtown area. A separate report outlining the neighbourhood selection process is available upon request.

Engagement process

The Neighbourhood Action Plan is based on input from local residents and other community members, and aligned with the plans and priorities of partners such as the City of Peterborough, Otonabee Conservation, and others. Overall, GreenUP staff have recorded 1037 engagement interactions with people who live, work, play, and learn in Kawartha Heights neighbourhood, and held twenty-two meetings with partner representatives. There have been two phases of engagement toward the Action Plan.

Phase 1 (2017–2018)

From late 2017 to late 2018, SUN program staff undertook extensive partner and resident engagement to expand knowledge on local baseline conditions and learn about opportunities and priorities in each neighbourhood. Partners were engaged through five joint advisory committee meetings, a partner questionnaire completed by seven partner representatives, and a series of one-on-one meetings and phone calls between SUN program staff and partner representatives.

An important component of the SUN model is identifying alignments between municipal capital projects and planning opportunities and the needs and interests of the local community. In Kawartha Heights, the following municipal and/or joint stakeholder projects and initiatives have been identified as opportunities to pursue long-term sustainability objectives identified in this Action Plan.

Capital projects

- **Brealey Drive reconstruction:** Pending budget approval, this future project will continue the reconstruction of Brealey Drive between Lansdowne Street West and Sherbrooke Street. It will install and improve cycling and pedestrian infrastructure, and install additional stormwater management infrastructure in the form of curbs and gutters.
- **Lansdowne Street West improvements:** This future project will improve traffic capacity between Clonsilla Avenue and Spillsbury Drive, and construct a centre turning lane.
- **Holy Cross Field Rehabilitation Project (2019):** This project is a collaborative effort between the City of Peterborough and the Peterborough Victoria Northumberland and Clarington Catholic District School Board to upgrade the existing natural sports fields to an artificial turf at Holy Cross Secondary School for community and school board use.

- **Sherbrooke Street reconstruction and widening:** This future project will install and improve pedestrian and cycling infrastructure and stormwater management infrastructure from Glenforest Boulevard to the western city limit.

Planning and policy projects

- **Municipal Parks and Open Space Review (2018–2019):** The key objectives of this review are to establish planning and design guidelines for parks, evaluate existing parks and identify those requiring improvement, and identify and address gaps in access to neighbourhood parkland (City of Peterborough, 2019).
- **Our Watershed, Our Blueprint (2019–2021):** The key objective of this municipal project is to provide a framework to assist the City in the protection and management of water resources.
- **City of Peterborough Official Plan (2020**): In 2011, the City of Peterborough began preparing a new Official Plan to direct municipal growth and operations until 2041. At the time of writing, the draft Official Plan was made available to the public for review.
- **Transition 2050 (2019–2021):** In 2019, TRCA received funding from the Federation of Canadian Municipalities to work with nine municipalities, including Peterborough, as they develop residential- and/or business-focused climate action plans at the neighbourhood level. The lessons learned from this collaborative initiative will help to refine, mainstream, and scale TRCA's neighbourhood model as a means of implementing climate action plans and achieving other municipal and regional objectives. There may be opportunities to connect this initiative with the work already underway in the SUN neighbourhoods.

GreenUP staff engaged the neighbourhood in five main ways during Phase 1: (1) one-on-one meetings; (2) online surveys; (3) Quick-start garden installation events; (4) outreach and educational events organized through the SUN program (such as 'planning potlucks' and 'kitchen table conversations'); and (5) tabling at events organized by others in the community.

Notes from these engagement opportunities were coded using tags such as 'flooding,' 'biodiversity,' or 'pedestrian safety'. These codes were then used to determine the top sustainability themes or priorities for each neighbourhood, which are outlined in Sustainability Themes and Long-Term Outcomes.

Phase 2 (2019)

In 2019, SUN shifted from general engagement about sustainability priorities, needs, and opportunities in Kawartha Heights to soliciting specific action and program suggestions for the Action Plan.

SUN organized two Action Plan Gatherings in early 2019 to solicit input from residents and partners. The first of these took place on January 23 2019 at the McDonnel Street Activity Centre. This event brought together 45 participants who represented partners and residents from both SUN neighbourhoods. Nine attendees were residents and/or community representatives from Kawartha Heights. Ideas for the Action Plans were generated through a series of interactive, small-group activities designed by Christie Nash, a local consultant with expertise in conducting community engagement and event facilitation.

A second follow-up Gathering was held in the neighbourhood on March 22 2019. Twenty-two residents and community members attended. This event combined a free dinner, child-friendly entertainment, and drop-in style Action Planning activities. The goal was to build on the ideas identified during Phase 1 of engagement and at the Action Plan Gathering in January. GreenUP staff invited residents to provide feedback on proposed ideas, and to suggest additional ones. Data was captured using modified versions of the activities developed for the first Gathering.

A full report on data collected at these two Gatherings is available upon request.

Once a list of potential actions and program ideas was established, GreenUP staff grouped them into focus areas using an inductive approach, and compared these with categories recommended by the consultant in her final report. Next, each action was assessed according to SUN advisory committee criteria to determine whether it should be included in the Action Plan. Ideas that met the greatest number of criteria were included. In some cases, actions were merged and/or modified to better suit local conditions and opportunities, reflect best practices and scientific knowledge, or better align with partner priorities in the neighbourhood. See Appendix B: Guidelines and Criteria for Selecting Recommendations for the SUN Action Plans for further details.

Since June 2019, GreenUP staff have been soliciting resident and partner feedback on the first draft of the Neighbourhood Action Plan. For an extended summary of the engagement results, see Appendix A: Engagement Summary for Kawartha Heights.

Neighbourhood overview

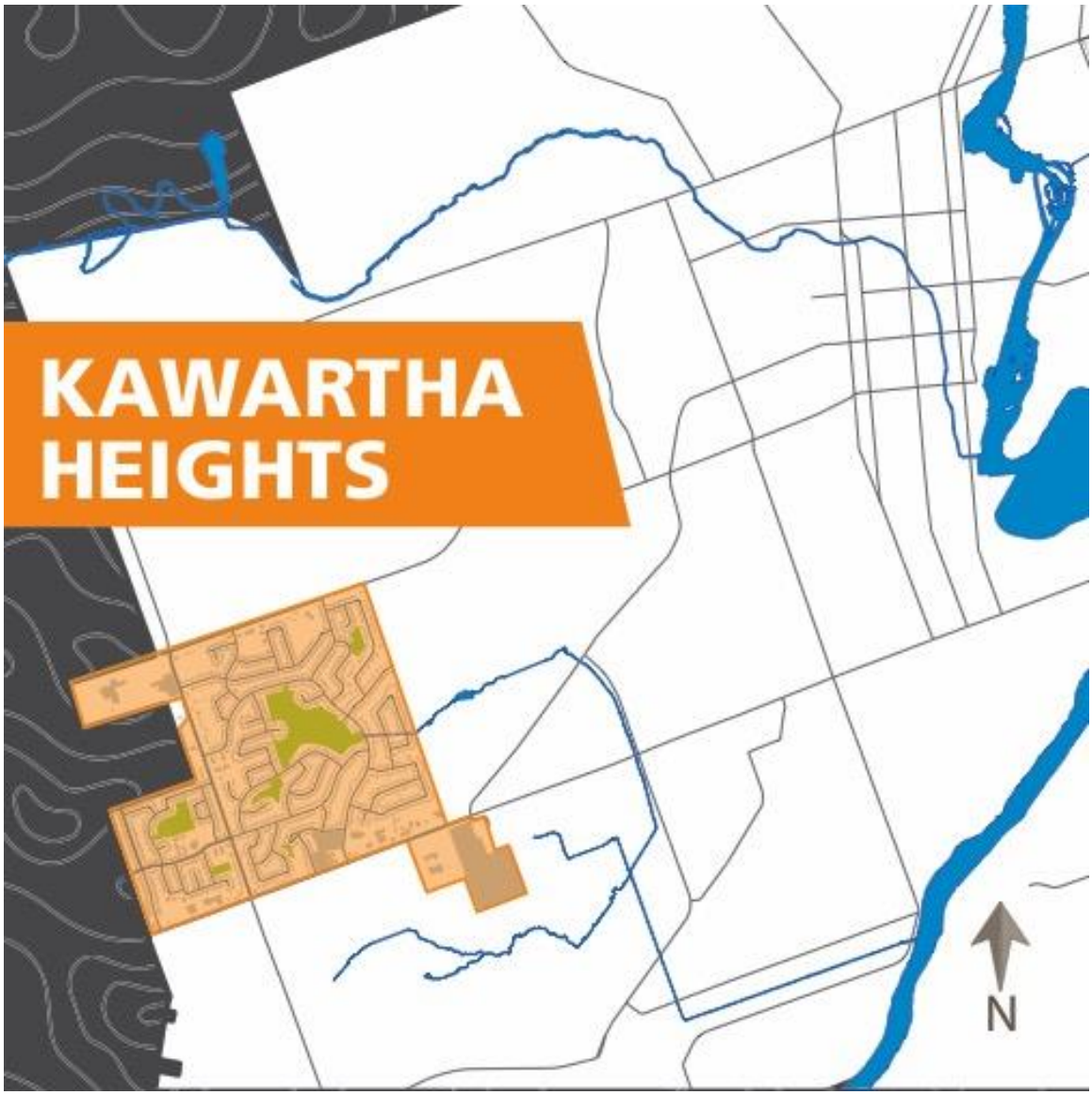

Figure 1. Location and boundaries of Kawartha Heights. Image by GreenUP.

Introduction

Kawartha Heights is a large suburban neighbourhood at the westernmost edge of the city. It is bounded by Sherbrooke Street in the north, Kawartha Golf and Country Club in the east, Lansdowne Street West in the south (including Holy Cross Secondary School and Calvary Church), and Westridge Boulevard and Brealey Drive in the west (including James Strath Public School and Crestwood Secondary School).

The area was once a diverse landscape of forests and wetlands that were shaped and cared for by the Michi Saagiig Nishnaabeg. In the nineteenth century, European settlers took the land and cleared it for agriculture, especially dairy and fruit production. The neighbourhood was established after the area was annexed by the City of Peterborough in 1963. Seventy-five per cent of the homes were constructed between 1961 and 1990 (Government of Canada, 2016).

Today, the neighbourhood boasts six parks. The largest of these, spanning an impressive eleven hectares, is Kawartha Heights Park, which residents describe as a 'neighbourhood gem.' Most of the neighbourhood falls within the Byersville-Harper Creek watershed, which is home to one of the city's last remaining provincially-significant wetlands. Because of the neighbourhood's size, position, and topography, it has an important role to play in maintaining the ecological well-being of the watershed, reducing flooding in neighbourhoods downstream, and expanding the urban forest.

Summary of neighbourhood baseline conditions

Soil, topography, and water

The 248-hectare neighbourhood of Kawartha Heights is located at one of the highest points in the City. It has a peak elevation of approximately 270–280m above sea level in the north end, falling to approximately 200m above sea level near Lansdowne Street West.

The predominant soil types found around the Byersville-Harper Creek watershed are Otonabee loam and Bondhead sandy loam, both of which are fast draining soil types that minimize run-off and support the growth of a wide variety of plant and tree species (Gillespie and Acton, 1981, cited in XCG Consultants, 2009).

Nearly the entire neighbourhood falls within the Byersville-Harper Creek watershed, a 1,200 hectare area that encompasses a provincially significant wetland in Harper Park.[1] The majority of Byersville Creek lies beyond the Kawartha Heights neighbourhood, except for a section of the west branch that originates in present day Kawartha Heights Park, and flows eastward underneath residential streets before continuing above ground through the Kawartha Golf and Country Club property.

[1] The only exceptions are part of the property of James Strath Public School and the entirety of Crestwood Secondary School, in the western section of the neighbourhood.

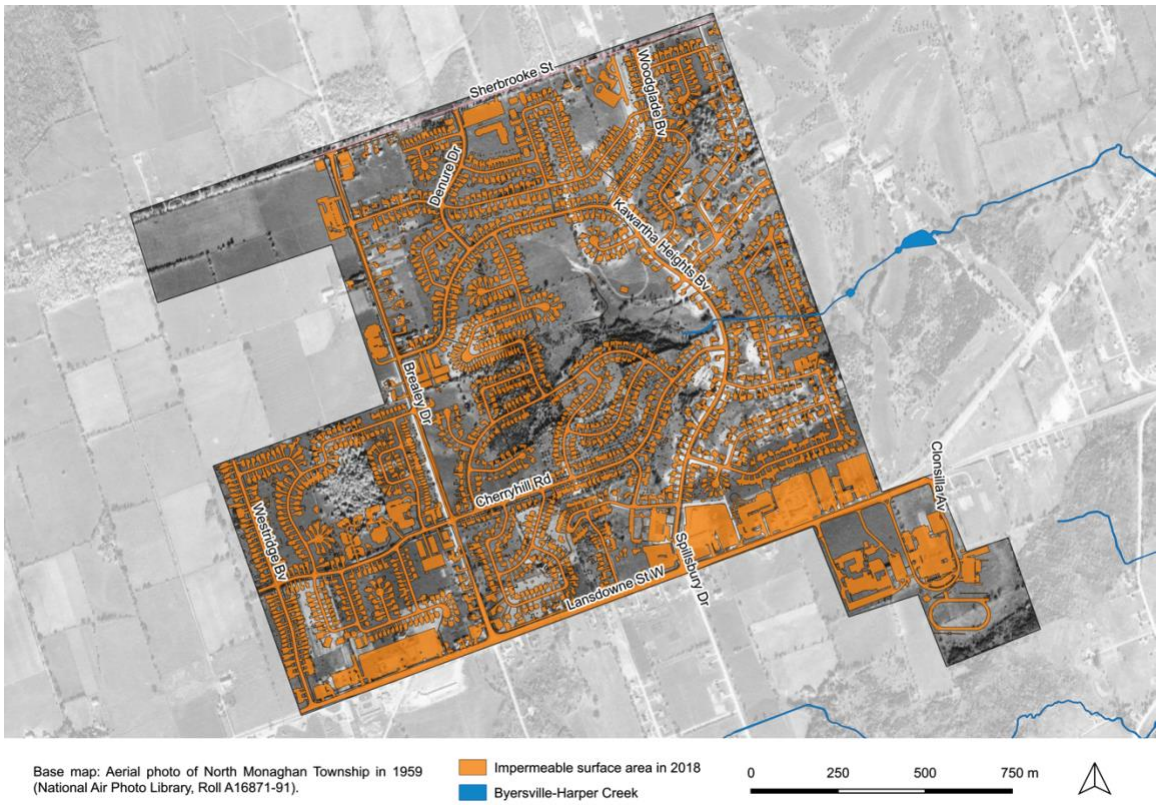

Figure 2. Map showing aerial imagery of Kawartha Heights in 1959 with 2018 impermeable surface area overlay.

Due to extensive suburban and commercial development, approximately 44% of the total surface area in Kawartha Heights is now impermeable (Figure 2), while imperviousness for the entire Byersville-Harper Creek watershed is estimated at 37.5% (XCG, 2009). Both values exceed the recommended maximum of 10% imperviousness in urbanized watersheds; stream quality is typically “severely impaired” once an urban watershed exceeds 30% (Environment Canada, 2013, p. 53).

Impermeable surfaces do not absorb rainwater, which becomes run-off that must be managed through the municipal stormwater system. Too much run-off disrupts the natural water balance, reduces water quality, and can cause localized urban flooding. The City of Peterborough’s *Stormwater Quality Master Plan Project Report* found that Byersville Creek experiences higher than recommended levels of aluminium, copper, iron, lead, zinc, total phosphorous, *E. coli*, and total suspended solids during wet weather events, which suggests that urban stormwater run-off is having a negative impact on water quality (XCG Consultants, 2014). During the 2004 flood, the culvert inlet in Kawartha Heights Park backed up, which redirected run-off onto Kawartha Heights Boulevard and caused flood damage on nearby private properties.

Urban forest, habitat, and wildlife

Urban forest canopy in Kawartha Heights neighbourhood is estimated at 28% based on 2015 aerial analysis, which is less than the estimated citywide coverage of 29% in 2011. Canopy cover levels differ by land use type. Canopy cover in local parks and other open spaces is estimated at 68%, and 24% in residential and commercial areas (Sandanayake, 2019). Kawartha Heights Park contains some unique heritage trees, including a large red oak near the Byersville Creek culvert (Loucks, 2013).

The municipality recommends that no single genus represent more than 20% of the urban forest canopy (City of Peterborough, 2011). Maples make up 57% of the existing City-owned trees in the neighbourhood, with the ash genus being the next most common at 9.55%. Although this data does not include privately owned trees, it is safe to assume that biodiversity in the Kawartha Heights urban forest can be improved, which will make it more resilient to the impacts of climate change and destructive pests and diseases. Many City-owned ash trees are already threatened by the emerald ash borer; of the 191 local ash trees inventoried by the municipality in 2019, 58% (n=110) are being treated for ash borer, 3% (n=6) are being monitored for size, structure, and health, and 39% (n=75) are slated for removal and replacement with non-ash species (City of Peterborough, 2019c).

Data on wildlife and vegetation within the neighbourhood is limited. However, Gray Owl Environmental Inc. undertook wildlife surveys and vegetation community mapping in 2007 in connection with the Flood Reduction Master Plan for Byersville-Harper Creek (XCG Consultants, 2009). In Kawartha Heights Park they observed three dragonfly species, eight butterfly species (including monarchs, a species of special concern in Ontario), three frog species, eight mammals, and thirty-five bird species. One of the bird species observed was the eastern wood peewee, which was not considered a species at risk at the time but was listed as a species of special concern in 2014 (MNRF, 2018). The XCG study also found a total of 171 species of vegetation, 107 of which (63%) were native species (Gray Owl Environmental Inc., cited in XCG Consultants, 2009). Seventeen of the species recorded have high potential invasiveness. Overall, the plant community in Kawartha Heights Park had a mean coefficient of conservatism of 3.2, and a Floristic Quality Index (FQI) value of 32 (Gray Owl Environmental Inc., cited in XCG Consultants, 2009). The report explains: “the flora indicates an area that is moderately disturbed, but generally of much higher quality than most urban parks” (Gray Owl Environmental Inc., cited in XCB Consultants, 2009).

Demographics and community values

In 2016, there were 5434 people living in Kawartha Heights. The age distribution is similar to the City of Peterborough, with a slightly higher proportion of seniors living in Kawartha Heights (see Table 1).

Table 1. Percentage of residents in Kawartha Heights by age group, compared to City of Peterborough.

Neighbourhood	0 to 14 years old	15 to 64 years old	65 years and over	**Total %**
Kawartha Heights	14	61	25	**100**
City of Peterborough	15	63	22	**100**

Source: Government of Canada, 2016.

Kawartha Heights is a relatively high-income area, with 65% of households earning $60,000 or more, compared to just 49% of households in the city as a whole (see Table 2). Seventy-nine per cent of households in Kawartha Heights owned their homes in 2016. The remaining 21% rented (Government of Canada, 2016). People who rent likely include predominantly post-secondary students given the proximity of the neighbourhood to Fleming College.

According to Manifold Data Mining Inc. (2019), a data analysis firm that provides neighbourhood data, nearly one-fifth of the families living in Kawartha Heights are characterized as 'Nest Builders,' white-collar families with an interest in home and garden renovations. Another 20% of families work in the skilled trades and have interests in natural health, renovations, hunting, and fishing. These two types of households may take an interest in home and garden retrofit projects proposed by SUN.

Table 2. Percentage of households in Kawartha Heights by income bracket, compared to city of Peterborough.

Neighbourhood	Under 20k	20k–39k	40k–59k	60–79k	80–99k	100k and over	**Total %**
Kawartha Heights	4	14	16	18	13	34	**99**
City of Peterborough	12	21	18	14	11	24	**100**

Source: Government of Canada, 2016. Note: percentages may not equal 100 due to rounding.

Built environment

Land use in Kawartha Heights consists of residential areas (88.6%), commercial areas (6.8%), and major open space and protected natural areas (4.6%).

The majority of residences in the neighbourhood are detached, single-family dwellings, 75% of which were constructed between 1961 and 1990 (Government of Canada, 2016). There are also low-rise residences in the form of apartment buildings, condominiums, and retirement residences. See Table 3 for a breakdown of dwellings by type.

Table 3. Percentage of dwellings by type

Single detached	**Semi-detached**	**Row house**	**Apartment in a flat or duplex**	**Apartment in building more than five storeys**	**Apartment in a building less than five storeys**
73%	5%	4%	6%	2%	11%

Source: Government of Canada, 2016.

Many residences in the neighbourhood reflect the typical aesthetic of a maturing suburban neighbourhood, with multi-car garages, large lawns, and well-kept ornamental landscaping. The average lot size in Kawartha Heights is 721m2. While researching the neighbourhood during the summer and fall of 2017,

GreenUP staff noted the presence of several landscaping company vehicles within the neighbourhood. Due to the neighbourhood's topography, low canopy cover in residential areas, and quick-draining soil, many residents have difficulty maintaining their lawns and gardens during summer droughts, and as a result, increase outdoor potable water use.

Transportation

Kawartha Heights is a car-dependent neighbourhood. Only 7% of people aged 15 years and over with a usual place of work use active transportation methods to commute to work (Government of Canada, 2016). Fifty-two per cent of residents (n=1340) report commute times of less than fifteen minutes, which suggests that a greater number could likely walk, cycle, or take transit to work (Government of Canada, 2016). There are two Fleming Express bus routes that service the area and three regular City bus routes. Residents report that the most frequent users of public transit are Fleming College students, people with disabilities, and seniors who do not drive.

Segments of major transportation corridors, including Sherbrooke Street, Brealey Drive, and Kawartha Heights Boulevard, lack consistent, accessible sidewalks, although the municipality improved the accessibility of bus stops and curbs along Kawartha Heights Boulevard in 2018. At the time of writing, bike lanes exist along Lansdowne Street West between Spillsbury Drive and Brealey Drive, and the sidewalk along the south side of Lansdowne Street West between Spillsbury Drive and Clonsilla Avenue is a shared pedestrian-bicycle pathway. However, there are no bicycle lanes on other streets in the neighbourhood. Other barriers to choosing active transportation include the distance of Kawartha Heights from downtown Peterborough, the neighbourhood's topography, and cultural factors such as the prevalence of car travel in suburban society.

Parks and other community services

Kawartha Heights neighbourhood (KH) contains six parks: Kawartha Heights, Mapleridge, Dainard, Applewood, Redwood, and Oakwood. The largest of these, Kawartha Heights Park, is appreciated by residents for its size and informal forested walking trails. Mapleridge Park is designated as a natural protected area by the municipality. Despite significant access to parkland for recreational purposes, residents note that some parks lack vibrancy and are underused due to lack of shade or amenities.

Commercial businesses are concentrated along the Lansdowne Street West corridor, which is one of the busiest streets in the city. There are large box stores, car dealerships, and strip mall plazas with ample parking lots. There is a smaller pocket of commercial development along Sherbrooke Street in the north end of the neighbourhood.

There are four schools located within the neighbourhood, including Crestwood Secondary School, James Strath Public School (K–8), and Kawartha Heights Public School (K–6) in the Kawartha Pine Ridge District School Board (KPRDSB), and Holy Cross Secondary School in the Peterborough Victoria Northumberland and Clarington Catholic School Board (PVNCCDSB). Residents have identified the proximity of schools as a significant asset to the neighbourhood, including Fleming College, a post-secondary institution located just south of the neighbourhood.

There are two recreational facilities or community centres located within or near the neighbourhood: Mapleridge Recreation Centre for seniors, located on the west side of Brealey Drive, and the Peterborough Sport and Wellness Centre, just south of Lansdowne Street West.

Additionally, there are several faith institutions in the neighbourhood: Westdale United Church, Ferndale Bible Church, and Calvary Church. Sherbrooke Heights Alliance Church is located just north of the neighbourhood on Sherbrooke Street West.

Sustainability themes & long-term outcomes

SUN identified the following sustainability priorities for partners and residents during Phase 1 of the engagement process. There are five priority themes and one secondary theme in Kawartha Heights. The themes are described below, along with long-term outcomes for each. As much as possible, these outcomes align with municipal and regional level goals, plans, and targets. All targets are set for 2030, unless otherwise indicated. An explanation of how each target was generated is available in Appendix D: Determining Long-Term Outcomes.

Water

The water theme includes water conservation, riverine and urban flooding, management of the municipal stormwater system, and the ecological well-being of the Byersville-Harper Creek watershed. Long-term outcomes include:

Improvements to permeability, watershed health, and local flooding by:

- Reducing paved surface area by 1750m^2 (0.175ha), from the 2018 baseline of 101.1ha impermeable surface area (44% of total area);
- Increasing the amount of rainwater managed where it falls on residential, institutional, and commercial properties. Work toward the 90% runoff volume control target recommended by the Ministry of Environment and Climate Change (now Ministry of the Environment, Conservation, and Parks) in 2016, which equals the first 27mm of an average rain event in Peterborough;
- Improvements to water quality in Byersville Creek from baseline reported in the City of Peterborough's *Stormwater Quality Master Plan* (2014).

Habitat and urban forest

Habitat and urban forest includes the biodiversity and well-being of natural ecosystems in the neighbourhood. Long-term outcomes include:

- Expansion and diversification of the urban forest canopy by planting 1279 new trees, with 685 on residential properties. Prioritize, where appropriate, underrepresented species recommended by the municipality;
- Greater biodiversity, by creating 2500 square metres of habitat for pollinators and other wildlife, which is equivalent to 5.7 NBA basketball courts.

Healthy, active transportation and recreation

Healthy, active transportation and recreation includes the ways we travel to and through the neighbourhood, the kinds of recreation activities that are available to local residents, and the growth and development of healthy people. Long-term outcomes include:

- Twelve per cent of Kawartha Heights residents commuting by public transit, walking, or cycling (from 7% in 2016), by enhancing active transportation infrastructure and supporting residents to choose active transportation options;
- Enhancement of local outdoor spaces for inclusive and healthy recreation, with 100% of local parks meeting or exceeding the minimum required design features for each park type as identified in the Municipal Parks and Open Space review.

Community building

Community building includes connections between community members (including local institutions like schools and faith groups), and general neighbourhood identity. Long-term outcomes include:

- Greater sense of community belonging among residents, measured through qualitative feedback and/or survey data, where available;
- Greater environmental awareness and capacity for local environmental action, to be achieved by increasing the number of environmental events, initiatives, and participants each year.

Energy and climate

Energy and climate includes how we heat and power our homes, schools, and businesses on a daily basis, and the greenhouse gases (GHGs) we produce through travel and waste. Long-term outcomes include:

Progress toward the *Climate Change Action Plan* target of reducing community greenhouse gas emissions 30% by 2031 (Sustainable Peterborough, 2016), to be achieved by:

- Implementing energy efficiency and conservation retrofits at 40% of residences (approximately 800 dwellings);
- Implementing energy efficiency and conservation retrofits in 60% of industrial, commercial, and institutional facilities in the neighbourhood.

Local food (secondary theme)

Local food refers to food that is produced and consumed locally. To ensure greater food security, local food should be widely available, affordable, nutritious, and culturally appropriate. Long-term outcomes include:

- Greater number of residents producing some of their own food at home or through community gardens.

A vision for Kawartha Heights

Toward an active, greener future – introduction

The year is 2030. Kawartha Heights has been transformed into a sustainable and resilient urban neighbourhood that maximizes its ample space and people power to achieve its goals. Residents are confident in their ability to weather the storms created by climate change—both literal and figurative—and quick to implement projects that improve their resiliency. Their success has inspired other neighbourhoods, and helped the municipality and other partners achieve their climate change targets too.

Swift collective action has changed what it means to live, work, play, and learn in Kawartha Heights. Urban nature is treated as a friend, an ethic demonstrated by the richness and diversity of neighbourhood forests and gardens, the health of the local watershed, the number of people who cycle and walk on a daily basis, and residents' knowledge and connection to their local environment.

Vision components

Over the next ten years, residents, community groups, partners, and the municipality can make this vision a reality by concentrating on four focus areas:

1. **Transform grey into green** transforms residential, institutional, and commercial properties through retrofits designed to increase biodiversity and urban forest canopy, improve stormwater management, support local food production, and reduce our collective carbon footprint.

2. **Build local capacity** increases the ability of residents and community groups to undertake action at home and in their neighbourhood through education, incentives, and more.

3. **Enhance local parks** maximizes the neighbourhood's ample green space for multiple benefits, including more sustainable stormwater management, increased biodiversity and urban forest canopy, and greater opportunities for healthy recreation and community building.

4. **Travel sustainably** improves pedestrian and cycling infrastructure and connectivity, encourage residents to choose active transportation options, and maximize proposed capital projects for additional outcomes like sustainable stormwater management.

The actions recommended in the four focus areas reflect the following principles:

- **Collaborative:** they rely on and benefit from involvement of multiple stakeholders.

- **Multipurpose:** they connect to multiple sustainability themes.
- **Measurable:** their impact on the environment and/or community is measurable
- **Innovative:** they build on the natural assets, local character, and unique opportunities available in the neighbourhood.
- **Inspirational:** they inspire others to take action.

Figure 3. Visualization of the overall vision for Kawartha Heights. Icons and text by Frolic Design.

Focus area 1: Transform grey into green

Vision

In 2030, diverse front yard gardens define this suburban neighbourhood. Regular tree planting connects formerly isolated pockets of trees into an urban forest that delights residents and visitors with its diversity of colours, shapes, sounds, and smells. Retrofits to buildings and open land have transformed Kawartha Heights into a model for managing rainwater and energy. The benefits of these changes to the Byersville-Harper Creek watershed are celebrated throughout the city.

How do we get there?

Recommended actions include:

1a. Delawn at homes, schools, churches, and businesses in favour of planting trees and installing pollinator, rain, drought-tolerant, and food gardens. This action should be led by residents, community and faith groups, schools, businesses, and non-governmental organizations.

Many residential, commercial, and institutional properties in Kawartha Heights have large lawns that could be planted with trees and gardens that provide greater ecological benefits, while also increasing aesthetic diversity in the neighbourhood. Delawning projects should be designed based on site conditions, resident or property owner interest and capacity, and their potential environmental impact. This action will continue the progress made through the SUN Quick-start demonstration gardens that were installed in 2018 and 2019.

For example, transforming lawns into drought tolerant gardens would address the challenge many Kawartha Heights residents face in maintaining healthy lawns during summer droughts. Currently, many residents rely heavily on potable water to water their lawns during the summer months. Converting all or part of a lawn into a drought tolerant garden can reduce residential water bills while helping rainwater soak into the ground and provide habitat for native pollinators and other wildlife.

Figure 4. Before and after photos of a Water Wise residential delawning project in Kawartha Heights. Drought tolerant gardens like this one, installed by SUN in 2018, can enhance the curb appeal of your property while creating significant environmental benefits. Photos by GreenUP.

Rain, pollinator, and food gardens are other lawn replacement possibilities in this neighbourhood. Rain gardens and soakaways are examples of green infrastructure that help slow and reduce stormwater run-off. They may be appropriate for sites that meet the minimum requirements in terms of space, soil type, and slope.

Pollinator gardens are designed to provide habitat and food for a range of native pollinator species such as bees and butterflies. These gardens are often colourful and vibrant. A pollinator garden inventory in the neighbourhood, similar to one conducted by Peterborough Pollinators and SUN in East City-Curtis creek in 2018, would identify areas of the neighbourhood with the greatest need for more pollinator habitat.

Food gardens are ideal for residents who wish to reduce the amount of food they need to purchase, or who want better access to fresh, nutritious, and culturally appropriate produce. While they typically require more labour and inputs than other types of landscaping, food gardens that are watered using rainwater, mulched to improve water conservation, and fertilized using compost can be quite environmentally sustainable. In general, food gardens require at least six to eight hours of sunlight a day, and may not be appropriate for residential properties with extensive shade.

Urban canopy cover outside parks and other open space is just 24% in Kawartha Heights. Many residential lots are of sufficient size to support one or more urban tree. SUN estimates that residential properties could support an additional 685 trees, but further technical analysis is required to refine these recommendations and identify ideal locations. For an explanation of how this number was calculated, see Appendix C: Determining Long-term Outcomes.

Delawning projects need not be limited to residential properties. There are schools, businesses, and churches in the neighbourhood with extensive grass areas that could also be transformed. In many cases, these types of properties have larger spaces than homeowners, which means their impact would be more significant.

1b. Transform the neighbourhood's pedestrian walkways into inviting green corridors using pollinator gardens, tree planting, stormwater bioswales, educational signage, seating, and art. This action could be led by the municipality, Otonabee Conservation, and non-governmental organizations.

Kawartha Heights neighbourhood has twenty pedestrian walkways that connect different residential areas in the neighbourhood (Figures 5). They are located:

- Between Sherbrooke Street and Sunnylea Street
- Between Sherbrooke Street and Ridgewood Road
- Between Ridgewood Court and Ridgewood Road
- Between Lynhaven Road and Woodglade Boulevard
- Between Lynhaven Road and Kawartha Heights Boulevard
- Between Oakwood Crescent and Ridgewood Road
- Between Bayleaf Court and Kawartha Heights Park
- Between Wintergreen Trail and Kawartha Heights Park
- Between Springwood Road (south branch) and Springwood Road (north branch)
- Between Springwood Road and Kawartha Heights Boulevard
- Between Beechwood Drive and Kawartha Heights Boulevard
- Between Renforth Court and Brealey Drive
- Between Redwood Drive and Redwood Court (through Redwood Park)
- Between Treetop Road and Cherryhill Road
- Between Applewood Court and Stewartcroft Crescent (through Applewood Park)
- Between Stewartcroft Crescent and Brealey Drive
- Between Mapleridge Drive and Mapleridge Park (east branch)
- Between Mapleridge Drive and Mapleridge Park (west branch)
- Between Brimwood Crescent and Mapleridge Park
- Between Clearview Drive and Lansdowne Street West

These walkways are typically asphalt paths edged with grass when they could be enhanced to fulfill a range of ecological and social needs (Figure 6). SUN recommends that the municipality collaborate with other organizations and the community to design retrofits that are appropriate to each site and reflect the interests of nearby residents, schools, or community groups, who could assist with maintenance of these spaces by 'adopting' them.

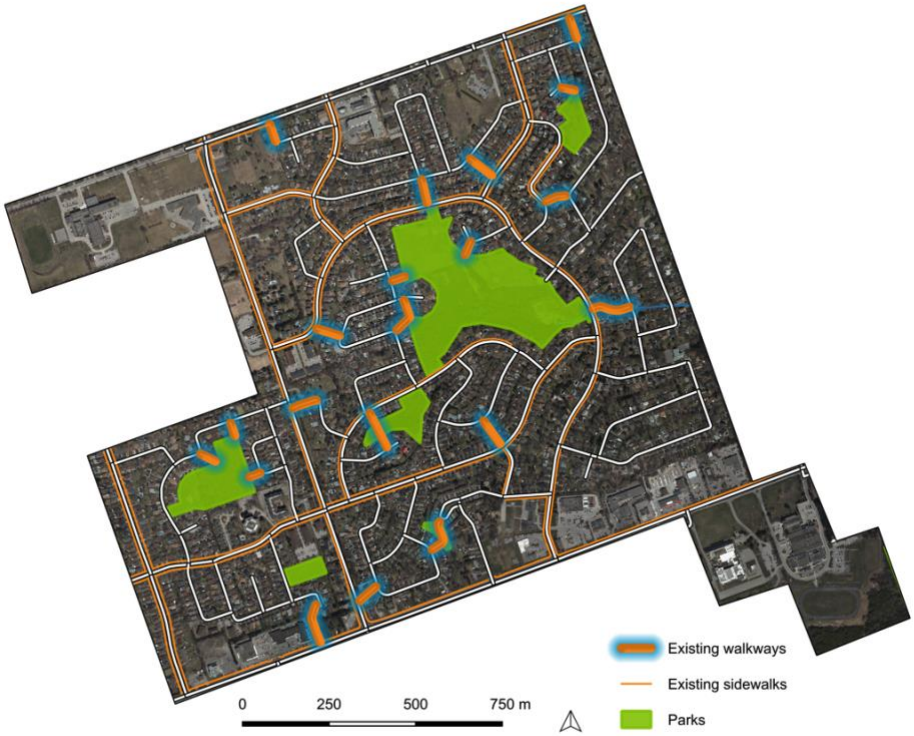

Figure 5. Map of walkway locations in Kawartha Heights.

Figure 6. Existing walkway between Redwood Drive and Redwood Court (top) and a concept design for a retrofit of this location (bottom). Rendering is for illustrative purposes only and subject to further design by lead stakeholders. Photo by GreenUP and illustration by Dawn Pond.

1c. Retrofit homes, schools, churches, and businesses for greater sustainability by improving insulation, installing new windows, installing rain barrels and grey water systems, and more. This action should be led by residents, the municipality, businesses, schools, community and faith groups, and non-governmental organizations.

Energy and water conservation are key goals for Sustainable Peterborough, the municipality, and local residents. Peterborough's *Climate Change Action Plan* has set a goal of a 30% reduction in community greenhouse gas emissions by 2031 (Sustainable Peterborough, 2016). Achieving this goal will require action on a number of fronts, including improvement of energy efficiency in homes and businesses.

Single, detached homes are the dominant type of residence in the neighbourhood. Many of them were constructed between the 1960s and the early 1990s. Typically, houses in climates similar to Peterborough benefit from improved insulation and draft proofing. However, further technical analysis is required to identify the greatest opportunities for improvements in energy efficiency and conservation in the average Kawartha Heights home.

One of the specific strategies identified in the *Climate Change Action Plan* is to retrofit 40% of homes by 2031, with an emphasis on older homes where potential gains are most significant (Sustainable Peterborough, 2016). In Kawartha Heights, 40% of homes constructed between before 1990 would equal nearly 700 dwellings. A dedicated home retrofit program operated by the municipality and/or a local non-profit organization would be an excellent way to encourage and support residents to take action on the scale required to reach this target.

1d. Transform commercial areas along Lansdowne Street West from grey to green with depaving projects, tree planting, permeable pavement, and/or other green infrastructure. This action should be led by businesses and non-governmental organizations.

Technical analysis shows that commercial properties along Lansdowne Street West have a total impermeable surface area of 77%, well above the 44% ratio for the neighbourhood as a whole (City of Peterborough, 2019). These properties present significant opportunities for increases in permeability, canopy cover, and biodiversity. The property on the northeast corner of Lansdowne Street West and Kawartha Heights Boulevard, where the parking lot is generally underused, could be a good candidate for replacing sections of asphalt with permeable pavement, rain gardens, bioswales, and trees, where appropriate. See Figure 7 for an example of a retrofit in a commercial parking lot.

Figure 7. Rain garden at corner of Brealey Drive and Lansdowne Street West. GreenUP, Green Communities Canada, and 100 volunteers depaved and planted this 250m2 area in 2015 as part of the Depave Paradise initiative. The rain garden diverts an estimated 89.06m3 of rainfall from the stormwater system annually and supports a diversity of plants and wildlife. Photo by GreenUP.

Sustainability themes addressed

Together, **Transform Grey into Green** addresses all six of the sustainability themes: water; habitat and urban forests; energy and climate; healthy, active transportation and recreation; community building, and local food.

Focus area 2: Build local capacity

Vision

In 2030, Kawartha Heights residents are known for making things happen. Neighbours ask one another for advice when they embark on home projects. Initiatives like the nature education space at Kawartha Heights Public School bring people from around the city to learn from their success. The community works together to monitor the improvement of the neighbourhood and steward their shared community spaces.

How do we get there?

Recommended actions include:

2a. Organize a collaborative, year-round, local education series to build knowledge and skills about sustainable retrofits and environmental stewardship within the community, drawing on the expertise of community members and other partners. This action should be led by residents, community and faith groups, schools, and non-governmental organizations.

Our experience with SUN Quick-start actions suggests that many residents are interested and enthusiastic about improving sustainability and resiliency at home, but frequently do not know where to begin. SUN recommends that a regular education series be created to address this barrier. In 2019, SUN hosted a five-part workshop series that modeled the sorts of educational events that could be offered on an ongoing basis, such as garden planning and design workshops, a seminar on waterproofing your home, and educational walks and tours around the neighbourhood. In the future, specific sessions can be delivered in response to needs identified by local residents, and draw on the expertise of residents within the neighbourhood where possible. In some cases, local partner organizations or community groups with relevant expertise could assist or deliver such workshops (e.g. the Calvary Church community garden volunteers offering a vegetable gardening workshop, or GreenUP leading a rain barrel installation demonstration).

2b. Establish a resident group to lead local environmental efforts. This action should be led by residents and community and faith groups.

Community members have identified a need for a local resident group to push forward neighbourhood projects, build a stronger community, and advocate for changes proposed in this Plan. Groups can be organized in a variety of ways, from an informal network that organizes occasional events to a formal neighbourhood association. Funding is available for community groups to support local projects and initiatives, including the United Way Peterborough & District's

Neighbourhood Fund, and the City of Peterborough's annual Community Grant program. Peterborough Horticultural Society offers grants for local garden projects specifically.

2c. Offer incentives like subsidies, fees, and pilot programs to encourage and assist residents undertaking energy retrofits, water conservation projects, and/or green stormwater infrastructure on their properties. This action should be led by the municipality, non-governmental organizations, and businesses.

There are various subsidy and incentive programs available to residents and homeowners in the neighbourhood, such as a low-flow toilet rebate operated by the City of Peterborough. Programs aimed at low-income households, such as Save on Energy's Home Assistance Program and the AffordAbility Fund, may not be applicable to many Kawartha Heights households, which had a median after-tax income of $79,488 in 2015 (Government of Canada, 2016). Enbridge Gas offers a Home Efficiency Rebate that provides homeowners with up to $5000 in rebates when they undertake two or more energy efficiency upgrades.

Peterborough Utilities, in partnership with GreenUP, offers a $25 rebate to customers who purchase a rain barrel for their property. This is a popular program that could be replicated for other retrofit products, such as outdoor clotheslines.

Fees and/or subsidies can also encourage residents to undertake landscaping retrofits. At the time of writing, the municipality is investigating the possibility of offering a rain garden subsidy for residential homeowners, an initiative that SUN supports.

SUN also recommends that a neighbourhood-specific resource be developed that brings together information about incentives and/or fee-based programs that are appropriate for the Kawartha Heights neighbourhood. This resource should identify opportunities for people who rent as well as homeowners, and should be made widely available in the neighbourhood.

2d. Support the continued development of outdoor community learning spaces, such as the Kawartha Heights Public School nature area and outdoor classroom. This action should be led by residents, community and faith groups, schools, and non-governmental organizations.

Dedicated outdoor learning spaces that combine educational signage with regular programming are an important part of increasing environmental awareness and stewardship in the community. Schools are particularly well-suited to create and provide such spaces, since they can be used by students during the day, and by the greater community at other times. Other sites that could support this kind of learning include local parks. This action can be pursued in connection with Action 2.a.

Spotlight: Kawartha Heights Public School outdoor classroom and community space

SUN has teamed up with Kawartha Heights Public School and the Ontario Federation of Anglers and Hunters' Invading Species Awareness Program to revitalize an overgrown area by turning it into an inviting outdoor classroom. Dozens of students, staff, and volunteers have removed invasive species, cleaned up garbage, created pathways, and replanted the area with native trees and perennials. This space, which is open to the whole community outside school hours, will educate many students and community members about the importance of biodiversity and nature in the years to come!

Figure 8. Students participating in the second annual invasive species removal event at Kawartha Heights Public School in April 2019. Photo by GreenUP.

Sustainability themes addressed

Together, **Build Local Capacity** addresses all six of the sustainability themes: water; habitat and urban forests; energy and climate; healthy, active transportation and recreation; community building, and local food.

Focus area 3: Enhance local parks

Vision

In 2030, all six parks in Kawartha Heights are vibrant, enjoyable places to visit throughout the year. The jewel in the crown is Kawartha Heights Park, which attracts visitors from the neighbourhood and beyond. Pedestrians and cyclists use the park's well-maintained trails, while shaded recreation and play areas bring friends and families together. The park is one of the City's foremost ecological gems, where all kinds of plant and animal species can be observed.

How do we get there?

Recommended actions include:

3a. Enhance play and recreation areas in local parks so they are accessible and inclusive to people of all ages. Possibilities include sensory and botanical gardens, naturalized playscape elements, access to drinking water, exercise equipment, seating, and trees for shade. This action should be led by the municipality and non-governmental organizations.

A 2017 report by Peterborough Public Health found a number of health benefits to outdoor play. Furthermore, they found that natural playscapes are more inclusive and accessible than traditional composite play structures, and allow for more creativity and diversity of play (Peterborough Public Health, 2017).

At present there are three parks in the neighbourhood with existing playgrounds that could be enhanced to support more outdoor play: Kawartha Heights, Mapleridge, and Applewood Park. Residents report that more shade around play areas would encourage them to use these spaces more frequently. There is limited shade around the perimeter of Mapleridge playground as well. Further tree planting in these areas would increase shade while also providing opportunities for unstructured play in natural areas.

In 2019, Applewood Park received accessibility upgrades as part of the City's ongoing project to enhance accessibility in municipal parks. SUN also enhanced the play and seating areas in this park by planting trees that will provide shade in the years to come. A sensory garden and/or naturalized playscape elements would further support the use of this space for healthy recreation by children of all ages.

The City of Peterborough is currently updating park planning and design guidelines for all park designations. 'Nature inspired play areas' are among the criteria being considered as a minimum requirement for neighbourhood parks. Implementing natural playscapes at parks in Kawartha Heights could be a good way for the City to pilot some of these features.

In addition to natural playscape elements, SUN recommends that other recreational areas be developed and/or enhanced to appeal to residents of all ages, including seniors. Ideas include exercise stations and equipment, and interactive gardens with shaded seating areas and access to drinking water.

3b. Promote regular use of parks through creative, year-round programming and the construction of a fully accessible, carbon-neutral shelter in Kawartha Heights Park. This action should be led by the municipality, residents, community and faith groups, and non-governmental organizations.

Ideas for events and programming that have been identified by residents include regular use by Scouts and Girl Guides groups, events for seniors, guided nature walks, and winter activities like snow sculpture contests.

Kawartha Heights Park is one of Peterborough's community-level parks. Community parks are meant to serve multiple neighbourhoods and accommodate intermediate- and higher-level facilities. Kawartha Heights Park could have an accessible shelter area that draws more people to the park and supports local community use and sporting events appropriate to this kind of recreational space. Building a new structure is also an opportunity to pilot a carbon-neutral build in collaboration with local partners like the Endeavour Centre for Sustainable Building, Construction, and Design.

3c. Improve the ecological health and function of all local parks by planting more trees and native species, and introducing green stormwater infrastructure such as drainage swales and berms, where appropriate. This action should be led by the municipality, Otonabee Conservation, and non-governmental organizations.

The City of Peterborough is currently updating park planning and design guidelines for municipal parks. The minimum required design features under consideration for neighbourhood parks include shade trees and low shrub plantings, and low impact design infrastructure. Shaped landforms, berms, and drainage swales are being considered as a variable requirement (Basterfield & Associates, 2019). In Kawartha Heights, neighbourhood parks include Applewood, Dainard, Mapleridge, Redwood, and Oakwood. Tree planting, other naturalization, and green stormwater infrastructure projects would help ensure each site is meeting the City's minimum standards for neighbourhood parks, and could be an opportunity for the City to pilot innovative projects.

Collectively, Dainard, Mapleridge, and Kawartha Heights Parks have approximately 25,000 square metres (2.5 hectares) of open grassy area not currently naturalized or under tree cover (this area does not include the soccer and softball fields in Kawartha Heights Park). These areas could be used to increase canopy cover and native species habitat. Drainage swales, berms, and rain gardens may also be appropriate in certain parks where pooling water has

been observed, or where run-off impacts nearby properties. Where appropriate, these projects can be combined with signage that educates residents and visitors about how they can replicate or adapt such projects (e.g. identifying plant species that they could plant at home).

3d. Enhance park trails and entrances with accessibility features, seating, plantings, bike racks, waste disposal units, community bulletin boards, and educational signage about native wildlife and plant species. This action should be led by the municipality, community and faith groups, and non-governmental organizations.

Parks provide significant opportunities to increase environmental awareness and stewardship while promoting healthy, active transportation and recreation amongst Kawartha Heights residents. There are approximately 700m of established trails in Kawartha Heights Park at present, plus a number of informal walking paths along the treeline and near the stormwater management pond that could be formalized and connected. Given Kawartha Heights' size and designation as a community-level park, signs that display maps of the local trails and information about the local ecology would be beneficial. Any sections of existing trail that do not currently meet provincial accessibility standards should be upgraded.

In Mapleridge Park, which is a protected natural area, there are informal paths through the forested area that could be enhanced with signage about local wildlife and plant species and their protected status.

Improving the entrances to all parks will improve their usability and make the parks more inviting. Signage welcoming visitors to each park could identify local trails and unique ecological assets, and provide the community with space to promote local events and initiatives. Bicycle racks would promote active transportation by users of the parks and playgrounds. Residents report that dogwalkers do not pick up after their pets at Kawartha Heights Park. Once the City's single source organics program has begun, waste disposal units near park entrances should include signage encouraging dogwalkers to dispose of dog waste through the green waste system rather than sending it to landfill where it produces greenhouse gases.

Sustainability themes addressed

Together, **Enhance Local Parks** addresses the following sustainability themes: water; habitat and urban forest; energy and climate; community building; and healthy, active transportation and recreation.

Figure 9. Suggested enhancements to Kawartha Heights Park, the largest of six parks in the neighbourhood. Map is for illustrative purposes only and subject to further design by lead stakeholders.

Focus area 4: Travel sustainably

Vision

In 2030, cars are no longer the go-to when it comes to getting around. Children walk or cycle to school, and everyone uses the neighbourhood's network of trails, sidewalks, and pathways to access restaurants and businesses along Lansdowne Street West. Although Kawartha Heights remains far from downtown, getting there by bike or bus is now comfortable, efficient, and easy.

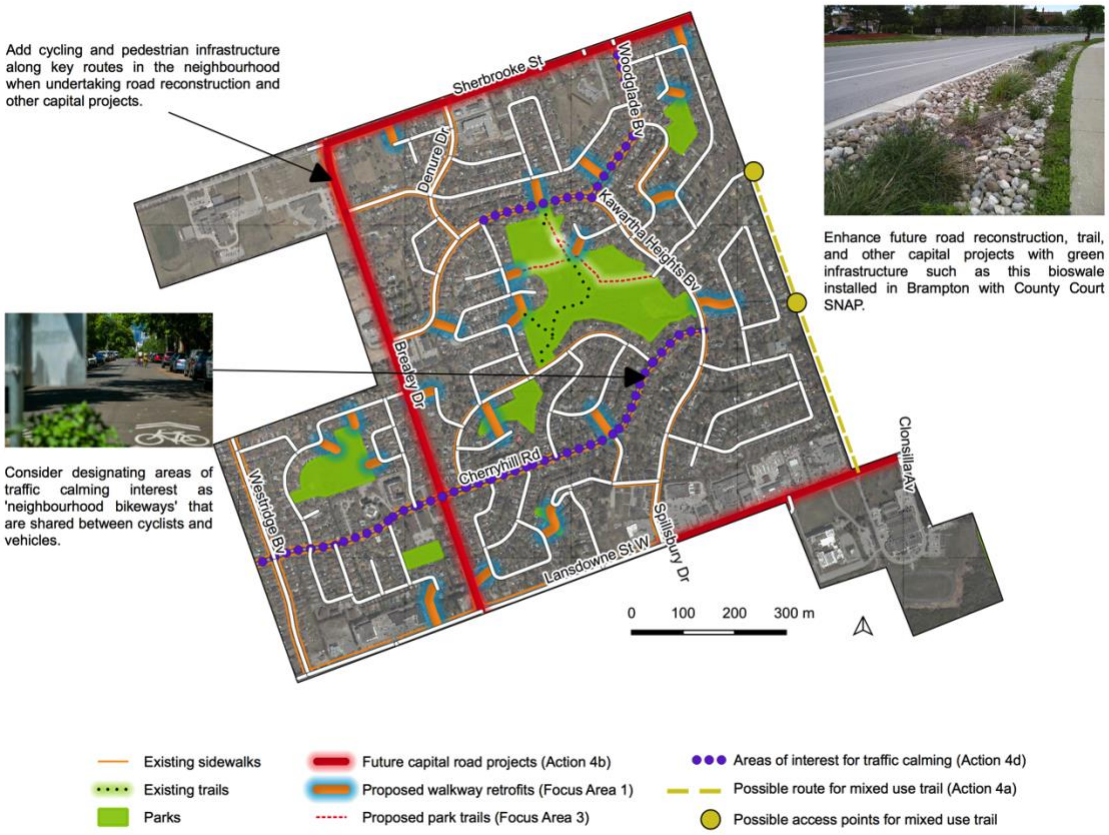

Figure 10. Map illustrating possible locations and inspirational examples for Travel Sustainably actions.

How do we get there?

Recommended actions include:

4a. Create pedestrian and cycling access between Lansdowne Street West and areas of the neighbourhood that are east of Kawartha Heights Boulevard. This action should be led by the municipality, Otonabee Conservation, and non-governmental organizations.

One possibility is a trail along the western boundary of the Kawartha Golf and Country Club, with multiple points of access to neighbourhood streets. Trails should include seating, naturalization, and green stormwater management elements where appropriate.

Residents in the southeastern section of the neighbourhood cannot access Lansdowne Street West efficiently by foot or bicycle and must instead travel westward to Kawartha Heights Boulevard and then south. In light of a proposed development node at Lansdowne and Clonsilla (Lett Architects, 2018), SUN recommends that pedestrian and cycling access be established along the eastern edge of the neighbourhood, potentially through an easement with the Kawartha Golf and Country Club. Possible points of access to the neighbourhood might include Larchwood Drive, where a buried section of Byersville Creek enters Kawartha Golf and Country Club, and Crestwood Avenue (see Figure 10). Further technical analysis may identify other possible routes.

This corridor should be enhanced with naturalization and stormwater management elements like bioswales, pollinator plantings, and where possible, tree planting, to offset the increase in impermeable surface area and improve biodiversity.

4b. Extend and improve pedestrian and cycling infrastructure to better connect the neighbourhood with Fleming College, Jackson Park, and the downtown core. Key opportunities include the proposed Brealey Drive, Lansdowne Street West, and Sherbrooke Street road reconstruction and improvement projects. This action should be led by the municipality.

Some Kawartha Heights residents are interested in increasing their pedestrian and cycling activity but lack the infrastructure to do so safely. Many roads in the neighbourhood lack sidewalks, including some arterial roads, including sections of Sherbrooke Street and Brealey Drive. The City of Peterborough's *Sidewalk Strategic Plan* update (2016) reports that there are 521m of priority 2 sidewalk segments that have not been built in the neighbourhood (Sherbrooke Street and Cherryhill Road). There are numerous missing segments in the priority 3 to 5 categories, but the timelines for these projects are unclear.[2]

There are currently no bicycle lanes in the neighbourhood, which deters residents from choosing cycling as an option for work and recreation. The Brealey Drive reconstruction project is slated to extend the bicycle lanes already

[2] During the *Sidewalk Strategic Plan* update, municipal staff assessed each segment of missing sidewalk according to a list of thirteen criteria (such as type of road, proximity to school zones, and more). Segments receiving 145 points or greater were designated priority 1, and segments awarded 105–140 points were designated priority 2. The municipality estimates that it will take until 2024 to build "most of the remaining priority 1 and priority 2 sidewalks" (City of Peterborough, 2016, p.13).

constructed south of Lansdowne Street West. More broadly, SUN recommends that the City consider the needs of the Kawartha Heights community when revising the City's cycling network implementation plan by adding additional cycling routes and designating them as neighbourhood 'bikeways.' One route proposed by residents includes Cherryhill Road, Kawartha Heights Boulevard, and Woodglade Boulevard, which could continue north of Sherbrooke Street to eventually connect with the Trans-Canada Trail.

Wherever possible, these projects should be enhanced with naturalization and stormwater management elements like bioswales, pollinator plantings, and tree planting to offset any increases in impermeable surface area and improve biodiversity. For example, in 2014, the City of Brampton installed two biofilter swales of 70 and 85 metres in length on County Court Boulevard, in connection with County Court SNAP (see Figure 10). A subsequent two-year monitoring study found that "the biofilter swales have been effective in meeting their design objectives by reducing runoff volumes, attenuating peak flows, removing pollutants and reducing thermal loading relative to the control catchment" (Sustainable Technologies Evaluation Program, n.d.).

4c. Increase educational programming in the neighbourhood and develop signage and other local resources that encourage residents to choose active transportation options for commuting, going to school, and recreation. This action should be led by the municipality, schools, and non-governmental organizations.

In addition to enhancing and extending active transportation infrastructure in the neighbourhood, Kawartha Heights would benefit from greater access to educational programming and resources that encourage residents to choose active transportation options.

Signage in key areas around the neighbourhood could identify important connections and common cycling or pedestrian routes. Better signage on Lansdowne Street West to indicate that the sidewalk is a shared pathway would increase awareness that cyclists are permitted on the sidewalk along Lansdowne Street West in this area of the city.

There are many options for increasing educational programming and other resources to support active transportation in the neighbourhood. Active School Travel Peterborough (formerly Active and Safe Routes to School Peterborough) is a local partnership that delivers a range of educational programming at schools, including International Walk to School Day (iWALK), Car Free Wednesdays, On the Bus, and more.

SUN also recommends the development of neighbourhood-specific resources in print and digital form such as a neighbourhood active transportation guide. Organizations and partnerships such as GreenUP, B!KE, the Active and Safe Routes to School partnership, Shifting Gears, and the Peterborough Bicycle

Advisory Committee can work with the municipality and local residents to develop these materials. Resources could be circulated to local residents and made available at key locations like Fleming College and the Wellness Centre. This action could be combined with recommendations to create bulletin boards as community resources in local parks.

4d. Initiate traffic calming feasibility studies and/or temporary traffic calming actions along Kawartha Heights Boulevard, Cherryhill Drive, and Woodglade Boulevard. This action should be led by the municipality and residents.

Many residents are concerned about the speed of traffic along Kawartha Heights Boulevard, especially near the entrance to Kawartha Heights playground between Woodglade Avenue and Denure Drive. Other streets residents have identified where traffic calming might be desirable include Cherryhill Road and Woodglade Boulevard. As per the City's Comprehensive Transportation Plan (2012), traffic calming feasibility studies can be requested by residents or initiated by the City.

In addition to a traffic calming study, the entrance near the park could be a good candidate for temporary actions. For example, pylons can be used to create temporary chicanes in an existing road right-of-way, which slow traffic by requiring drivers to divert around them. These kinds of actions have the added benefit of raising awareness among drivers, cyclists, and pedestrians about traffic speed and active transportation. If permanent traffic calming is pursued along Kawartha Heights Boulevard, the municipality should consider, where possible, interventions that also allow for right-of-way greening, such as bioswales that slow and absorb stormwater runoff, or drought tolerant planters that add to the biodiversity of the neighbourhood.

Sustainability themes addressed

Together, **Travel Sustainably** addresses the following sustainability themes: water; habitat and urban forest; energy and climate; community building; and healthy, active transportation and recreation.

Successes to date

Summary

Residents, partners, and the municipality have already made progress toward a greener and more resilient Kawartha Heights. Highlights from each of our sustainability themes include:

- **Water:** SUN has distributed thirteen rain barrels in the neighbourhood since 2017, for an estimated 15,500 litres of stormwater diverted annually—enough water to fill 10 hot tubs! SUN also hosted a Ready for Rain educational workshop at Applewood Retirement Residence in 2019.
- **Habitat and urban forest:** Together with residents, schools, and community groups, SUN has planted 847 square metres of trees and gardens at private residences, businesses, and school grounds. This area is equivalent to two NBA basketball courts or half an NHL hockey rink!
- **Healthy, active transportation and recreation:** In 2019, Applewood Park was one of nine municipal parks selected for accessibility upgrades made possible through a $50,000 grant from the federal government. This project extended the accessible pathways leading to the playground, converted the playground safety surface from sand to engineered wood fibre, and installed two accessible benches in the park. Additionally, SUN planted eleven trees at the park to provide more shade, visual interest, and biodiversity.
- **Energy and climate:** In 2018, the City of Peterborough converted its cobrahead streetlights to LEDs, for an estimated neighbourhood energy savings in 2019 of 266,060 kWh, the same amount of electricity used by 29.4 average Ontario residential households for an entire year.
- **Community building:** 689 people have volunteered at neighbourhood planting and naturalization events since 2018.

For a complete list of actions undertaken through the SUN program in 2018 and 2019, see Appendix D: Summary of SUN Quick-Starts.

Spotlight: Pollinator garden at APEX Cardiology

In June 2018, students from James Strath Public School helped install a 55m^2 pollinator-friendly garden at APEX Cardiology on the northeast corner of Sherbrooke Street and Brealey Drive. This collaborative Quick-start project is providing important habitat for bees and other pollinators, while also providing clients of the clinic and local community members with a beautiful space to enjoy.

Owners of APEX Cardiology, Dr. Ardavan Mahim and Leslie Moxam, share their thoughts about the project:

“We are thrilled that students had the opportunity to build a beautiful, large pollinator garden on our business property. With bee populations dwindling,

gardens such as this one are vastly needed in our subdivisions….At APEX, we believe that healthy living begins with a healthy environment.”

Figure 11. A student from James Strath Public School plants a compass plant seedling in a 55m2 pollinator garden at APEX Cardiology. Photo by GreenUP.

Next steps

Implementation

Successful implementation of the Kawartha Heights Action Plan depends on strong collaboration between residents, community groups, the municipality, and other partners. In the fall of 2019 and spring of 2020, we will create an Implementation Framework and continue building teams to work toward specific actions and outcomes identified in the Plan.

For each action, the Framework will identify:

- Key partners for each action;
- Supporting partners and other stakeholders;
- Next steps with timelines identified for each;
- Funding options and/or opportunities for alignment with other projects;
- Interim targets and a plan for monitoring progress.

If you are interested in supporting or taking the lead on a specific action, please visit the SUN website for more information about how to get involved.

Are you a resident? You can find additional resources and tips for actions at home by visiting the SUN website.

Reporting

Have you or your organization completed an action? Visit the SUN website to share your achievements!

References

Aquafor Beech Ltd. and Earthfx Inc. 2016. Runoff Volume Control Targets for Ontario: Final Report. Prepared for the Ministry of the Environment and Climate Change. Retrieved 19 July 2019.

Basterfield & Associates. 2018–2019. Draft materials, Parks and Open Space Review meetings.

City of Peterborough, 2019. Impervious area shapefile. Used with permission.

City of Peterborough. 2019b. Draft Official Plan. Peterborough, ON: City of Peterborough.

City of Peterborough. 2019c. Ash Tree Inventory web mapping application. Accessed 11 September 2019.

City of Peterborough. 2018a. Contours data shapefile. Retrieved 6 June 2019.

City of Peterborough. 2018b. Pedestrian network line shapefile. Retrieved 1 April 2019.

City of Peterborough. 2018c. Hydrography polygon shapefile. Retrieved 1 April 2019.

City of Peterborough. 2018d. Roads shapefile. Retrieved 7 May 2019.

City of Peterborough. 2018e. Location of school properties shapefile. Retrieved 7 May 2019.

City of Peterborough. 2018f. Parks properties located within City of Peterborough shapefile. Retrieved 7 May 2019.

City of Peterborough 2018g. Parcel polygon shapefile. Retrieved 7 May 2019.

City of Peterborough. 2018h. 2018 Imagery tiles. Retrieved 8 May 2019.

City of Peterborough. 2016. Sidewalk Strategic Plan 2016 Update. Peterborough, ON: City of Peterborough.

City of Peterborough. 2012. Comprehensive Transportation Plan. Peterborough, ON: City of Peterborough.

City of Peterborough. 2011. Urban Forest Strategic Plan. Peterborough, ON: City of Peterborough.

Community Foundation of Greater Peterborough. 2017. 10 things to do to build a vital community. Peterborough, ON: Community Foundation of Greater Peterborough. Retrieved 27 August 2019.

Community Foundation of Greater Peterborough. 2016. Greater Peterborough's Vital Signs 2016. Peterborough, ON: Community Foundation of Greater Peterborough. Retrieved 27 August 2019.

Government of Canada. 2016. Census profiles for dissemination areas 35150141, 35150142, 35150143, 35150144, 35150145, 35150146, 35150147, 35150148, 35150149, 35150150, and 25150151.

Hambidge, Paul. Personal communication, 11 June 2019.

Lett Architects. 2018. Nodes, Corridors & Downtown: Urban Design Guidelines [Draft report].

Loucks, Sheryl. 2013. *Beneath the Canopy: Peterborough's Urban Forest and Heritage Trees.* Peterborough, ON: Peterborough GreenUP.

Manifold Data Mining, Inc. 2019. Overview report generated for Kawartha Heights trade area on 14 June 2019 at SuperDemographics.com.

Ministry of Natural Resources and Forestry. 2018. Species at risk in Ontario. Retrieved 30 January 2018.

Natural Resources Canada. 1959. Aerial photo of North Monaghan Township [digitized version]. National Air Photo Library, Roll A16871-91.

Peterborough Public Health. 2017. Outdoor Playspaces: An Evidence Review. Peterborough, ON: Monique Beneteau.

Sandanayake, Charmalee. Personal communication, 4 July 2019.

Statistics Canada. 2017. Table 38-10-0025-01; Homegrown fruit, herbs, vegetables and flowers.

Sustainable Peterborough. 2016. Greater Peterborough Area Climate Change Action Plan, Partners for Climate Protection Milestones 2 & 3 Report, Corporate and Community Sector GHG Emission Reduction Targets & Local Action Plans. Peterborough, ON: Greater Peterborough Area Economic Development Corporation.

Sustainable Technologies Evaluation Program. n.d. Effectiveness of Retrofitted Roadside Biofilter Swales – County Court Boulevard, Brampton. Retrieved 8 July 2019.

XCG Consultants. 2014. Stormwater Quality Management Master Plan: Final Project Report. Prepared for the City of Peterborough.

XCG Consultants, 2009. Byersville/Harper Creek Detailed Flood Reduction Study: Project File Report. Prepared for the City of Peterborough.

Appendices

Appendix A: Summary of engagement results for Kawartha Heights

Phase 1 engagement process

Between late 2017 and the end of 2018, SUN had **689 engagement interactions** within the Kawartha Heights neighbourhood. See Table 3 for a breakdown of the number of engagements at each event or engagement method. These interactions have been with people who live, work, play, and learn in Kawartha Heights.

Typical questions posed to community members in the first phase of engagement included:

- Tell us a bit about your neighbourhood.
- Specific neighbourhood questions: Where do you go to relax in the neighbourhood? How do you get to work/school? What is your favourite spot in the neighbourhood, and why?
- What do you value about your home and neighbourhood?
- If you could change something about your home and neighbourhood to make it a better place to live, work, and play, what would it be?
- If you could change something about your home and neighbourhood to make it more sustainable, what would it be?
- With school groups: What is something you value about your school environment? If you could change one thing about your school building or playground to make it more sustainable, what would it be?

The most commonly mentioned locations and/or land use types identified as desirable for action or improvement included private residential properties, especially where lawns are doing poorly; school grounds, specifically at Kawartha Heights PS, James Strath PS, and Holy Cross Secondary School; Kawartha Heights Park, including the open green space and forested trail areas, followed by Applewood Park; and various church and community centre spaces, such as Westdale United Church.

The following demographic groups and/or geographic locations are not well represented in the engagement data. We may want to consider directing more attention/focus to these groups in the future:

- People who rent (in single-family houses, duplexes, and low-rise buildings)
- People of colour
- Post-secondary students (esp. Fleming students)

- Commercial enterprises and community services (businesses, commercial plazas, Legion, etc.)
- Mapleridge residents (who were added to the neighbourhood in 2018)

Table 4. Interactions with Kawartha Heights by Type of Engagement in 2017 and 2018

Engagement method or event	**Number of engagement interactions**
Online survey respondents – survey #1 (2017–2018)	10
Early interviews and meetings with residents (before July 2018)	11
Wellness Centre event in January 2018	6
Fleming College Sustainability Fair (2018)	5
Snofest contacts living in Kawartha Heights (2018)	1
Mapleridge Plant and Trunk Sale (2018)	1
Kawartha Heights School invasive species removal (2018)	25
Commercial property pollinator garden planting (2018)	150
Holy Cross Secondary School ceremonial tree planting (2018)	50
Trent M.Ed. day of learning in Kawartha Heights (2018)	16

Engagement method or event	**Number of engagement interactions**
Summer/fall site visits and resident meetings (after 1 July 2018)	20
Planning potluck at home of community champion (2018)	28
Community clean-up at Kawartha Heights PS nature area (August 2018)	9
Fall 2018 Quick-start garden installation events	263
Kawartha Heights Public School open house (fall 2018)	34
Presentation at Applewood Retirement Residence (fall 2018)	11
Kawartha Heights Tree Giveaway and Pop-up (fall 2018)	20
Kawartha Heights Neighbourhood Tour w/ INTACT/Fleming Home Flooding (fall 2018)	6
Respondents to Neighbourhood Priorities Poll (summer/fall 2018)	19
2018 engagement interactions with Kawartha Heights residents at non-neighbourhood events (Pulse, Purple Onion, Wellness)	4
Total	**689**

Engagement results by sustainability theme

Emerging core themes have been identified by coding the results and feedback from each engagement opportunity, and categorizing those codes into categories ("sustainability themes"). The themes are broken down in greater detail below:

Core theme 1: Habitat and urban forest development

Kawartha Heights community members value areas of the neighbourhood that are heavily treed, and often identify tree planting as an action that can be taken to improve overall sustainability of the neighbourhood. There is a general awareness and concern about sustaining habitat for pollinators and other wildlife and increasing the presence of native species locally. School greenspace is frequently identified as an ideal site for habitat and urban forest development. Some residents are confused and/or frustrated with the lack of clarity about the municipal tree bylaw.

- **74% of respondents** to the Neighbourhood Priorities Poll (n=14) ranked habitat and urban forests as 'very important' to their vision of a more sustainable neighbourhood.
- **Urban forest canopy** was identified as an issue at **nineteen** events and meetings;
- **School planting projects** were identified as an issue at **fifteen** events and meetings;
- **Native species (plants)** were identified as an issue at **fourteen** events and meetings;
- **Pollinator habitat** was identified as an issue at **twelve** events and meetings;
- **Wildlife habitat** was identified as an issue at **nine** events and meetings;
- The **municipal tree bylaw** was identified as an issue at **six** events and meetings;
- **Invasive species** were identified as an issue at **five** events and meetings;
- **Plant diseases** were identified as an issue at **one** event and/or meeting.

Core theme #2: Healthy, active transportation and recreation

Kawartha Heights community members see an increase in healthy, active transportation and recreation as an important part of a more sustainable neighbourhood. Most residents depend on car travel to get around, and the neighbourhood's distance from downtown (combined with slower public transit service) and its topography further contribute to vehicle use. The speed of traffic on Kawartha Heights Boulevard is frequently identified as a concern. Kawartha Heights Park is valued as a key potential location for better recreational

opportunities. The children's play area is not shaded, which is a challenge for families.

- **74% of respondents** to the Neighbourhood Priorities Poll (n=14) ranked healthy, active transportation and recreation as 'very important' to their vision of a more sustainable neighbourhood.
- **Lack of shade in recreational areas** was identified as an issue at **fifteen** events and meetings;
- **Parks as key recreational spaces** was identified at **fourteen** events and meetings;
- **Pedestrian safety and walkability** was identified as an issue at **twelve** events and meetings;
- **Cycling safety** was identified as an issue at **five** events and meetings;
- **Public transit** was identified as an issue at **three** events and meetings;
- **Trail development** was identified as an issue at **three** events and meetings;
- **Trail signage** was identified as an issue at **two** events and meetings;
- **Trails as a local asset** was identified as an issue at **two** events and meetings

Core theme #3: Water

Water management concerns in Kawartha Heights differ depending on where people live, work, and play. For example, the topography of the neighbourhood is such that some people experience drought while others experience localized flooding. Sustained drought, and its impact on lawn and gardens is the dominant water issue in the neighbourhood. There is interest among residents in water conservation landscaping and habits. Residents are typically aware of Byersville Creek, but do not always know its name or much about it.

- **58% of respondents** to the Neighbourhood Priorities Poll (n=11) ranked water management as 'very important' to their vision of a more sustainable neighbourhood.
- **Drought and/or water conservation** was identified as an issue at **fifteen** events and meetings;
- **Localized flooding and stormwater** was identified as an issue at **ten** events and meetings;
- The **ecological well-being of Byersville Creek** was identified as an issue at **four** events and meetings;
- **Erosion and/or steep slopes** were identified as an issue at **four** events and meetings;

- **Depaving and/or increasing permeability** was identified as an issue at **three** events and meetings;
- **Local wetlands** were identified as an issue at **two** events and meetings.

Core theme #4: Community building

Community building is a frequently raised theme but its importance to residents varies. Some residents want to see more community-based events and space for community activities that can be enjoyed by the whole neighbourhood, while others feel the level of community connectedness is satisfactory. The schools, churches, and Mapleridge Recreation Centre are currently the main hubs for most community events in the neighbourhood. Some residents are quite close with their immediate neighbours, while others don't know their neighbours at all. Kawartha Heights residents typically find the neighbourhood safe, sometimes contrasting it with other parts of the city, but there is occasional crime (theft). Kawartha Heights Park is identified as a key site for increasing community activity.

- **33% of respondents** to the Neighbourhood Priorities Poll (n=6) ranked community building as 'very important' to their vision of a more sustainable neighbourhood.
- **Community space** was identified as an issue at **twelve** events and meetings;
- **Community events** were identified as an issue at **six** events and meetings;
- Developing or valuing **community identity** was identified as an issue at **four** events and meetings;
- **Community safety** was identified as an issue at **three** events and meetings.

Core theme #5: Energy and climate

Energy was initially identified as a priority by partners. When asked explicitly about energy use (in relation to their homes and/or transportation), residents indicate that it is an important issue. At Quick-start planting events with schools, students frequently identify renewable energy generation as a way to make their schools more sustainable.

- **58% of respondents** to the Neighbourhood Priorities Poll (n=11) ranked energy (mostly in terms of conservation) as 'very important' to their vision of a more sustainable neighbourhood.
- **Energy needs and usage at home and/or school** was identified as an issue at **five** events and meetings.

Secondary theme: Local food

Some residents in Kawartha Heights grow food on their properties, especially backyards. The large lot sizes in the neighbourhood allow for this, so there has been less appetite for community gardening in Kawartha Heights than East City-Curtis Creek, the other SUN neighbourhood. Nevertheless, **local food** was mentioned at **fourteen** events and meetings, and a community garden has been mentioned a couple times specifically.

Phase 2 (2019)

In 2019, SUN had **348 engagement interactions** with Kawartha Heights residents and other community members. See Table 4 for a breakdown of the number of engagements at each event or engagement method used during Phase 2. These interactions have been with people who live, work, play, and learn in Kawartha Heights. The focus of Phase 2 engagement has been refining the priority themes and action ideas to include in the Neighbourhood Action Plan.

Table 5. Interactions with Kawartha Heights by Type of Engagement in 2019

Engagement method or event	Number of engagement interactions
Action Plan Gatherings (January and March 2019)	31
April Showers: Ready for Rain education event (2019)	29
Kawartha Heights Public School second annual invasive species removal (24 April 2019)	25
Peterborough County Stewardship meeting (2 May 2019)	6
Kawartha Heights Public School wood chip project (6 May 2019)	22
Mapleridge Plant and Trunk Sale (May 2019)	30

Engagement method or event	**Number of engagement interactions**
Quick-start plantings on Kawartha Heights Boulevard (2019)	15
Quick-start planting on Wintergreen Court (2019)	10
Applewood Park tree planting event (2019)	25
Kawartha Heights Public School Quick-start planting (19 June 2019)	25
Quick-start planting on Denure Drive and Lynhaven Road	16
Quick-start planting on Inglewood Road	7
Quick-start planting on Ridgewood Court	9
Quick-start planting on Daleview Court	2
Kawartha Heights Feedback Gathering and Action Plan Feedback Survey	16
Kawartha Heights Park BioBlitz (5 October 2019)	80
Total	**348**

Appendix B: Guidelines and criteria for selecting recommendations for the SUN Action Plans

Step 1. Assess whether actions meet at least three of the four 'Tier A' criteria:

- **Frequency:** Has the action been suggested more than once, or by more than one individual or stakeholder?
- **Consensus:** To the best of our knowledge, is there consensus around the action within the community? Have we heard strong opposing opinions?
- **Feasibility:** Is the action free of significant barriers to implementation (e.g. technology doesn't currently exist; environmental conditions not suitable; existing land uses in conflict and unlikely to change, etc.)? If there are barriers, is it likely they can be overcome?
- **Opportunities and alignment:** Does the action align well with existing plans, policies, and guidelines of partners? If there is a significant opportunity for implementation, such as a related municipal capital project, award two points.

Step 2: Next, assess each action against six SNAP/SUN principles ('Tier B'):

- **Scale:** Is the action neighbourhood-scaled?
- **Multipurpose:** Does the action support three or more core and/or secondary sustainability themes identified in Phase 1 of the SUN engagement process?
- **Science-based**: Is the impact of this action measurable? Does it connect with indicator(s) for one of the long-term outcomes?
- **Demonstrative:** Does the action have potential to demonstrate possibility to the wider community?
- **Collaborative:** Is the action likely to involve multiple residents and/or partners?
- **Innovative:** Does the action promote sustainability and/or behavioural change in an innovative, creative way?

Step 3. Classify each action into one of three assessment categories:

- **LOW:** Does not meet Tier A minimum (Step 1), or there is insufficient detail to assess its feasibility.
- **MED:** Meets Tier A but only meets half or less of Tier B criteria (Step 2)
- **HIGH:** Meets Tier A and meets more than half of Tier B criteria (Step 2)

Step 4. Transfer all actions ranked MED and HIGH to a shortlist for each focus area. If warranted, combine and/or amend actions (including select LOW actions) to better suit local conditions and opportunities, and/or better align with partner plans and priorities.

Appendix C: Determining long-term outcomes

As much as possible, long-term outcomes identified in each SUN Action Plan are evidence-based, measurable, and align with targets at the municipal and/or regional levels.

Water

Improvements to permeability, watershed health, and local flooding by:

- **Reducing paved surface area by 1750m^2 (or 0.175ha), from the 2018 baseline of 101.1ha impermeable surface area;**

The total impermeable surface area in Kawartha Heights in 2018 was 101.1 hectares (excluding Crestwood Secondary School and parts of James Strath Public School, which are outside the city limits). This represents approximately 44% of the surface area in Kawartha Heights.

In communication with municipal staff, and in the absence of specific impermeable surface area targets at the municipal level, GreenUP staff developed the goal to reduce paved surface area by 1750m^2. We arrived at this number by taking the average size of a Depave Paradise project across Canada (approximately 175m^2) and assumed that one similarly sized project—or a greater number of smaller projects—could be realistically achieved in the neighbourhood each year until 2030, either through Depave Paradise or other partnerships. This target may need to be adjusted once further information is available about the possible increases to impermeable surface area from the proposed capital projects for Kawartha Heights.

- **Increasing the amount of rainwater managed where it falls on residential, institutional, and commercial properties. Work toward the 90% runoff volume control target recommended by the Ministry of Environment and Climate Change (now Ministry of the Environment, Conservation, and Parks) in 2016, which equals the first 27mm of an average rain event in Peterborough.**

In addition to changes in total impermeable surface area, SUN has adopted the proposed runoff volume control target of 90% that was recommended by Aquafor Beech to inform the development of a provincial *Low Impact Development Stormwater Management Guidance Manual*. This target has been widely accepted by municipalities, conservation authorities, and other organizations, although it has not been formally adopted as a provincial guideline to date.

Improvements to water quality in Byersville Creek from baseline reported in the City of Peterborough's *Stormwater Quality Master Plan* (2014).

In 2011, XCG Consultants undertook sampling to determine water quality in each of the creeks within the city, and determined to what extent higher than recommended levels were attributable to urban runoff. SUN recommends that follow-up monitoring continue to be conducted by and shared between the municipality, Otonabee Conservation, other program partners, and citizen science initiatives, where appropriate. We have not established specific targets for each of the contaminants measured in the Stormwater Quality Master Plan, including aluminium, cadmium, chromium, copper, iron, lead, zinc, total phosphorous, *E.coli*, and total suspended solids. These could be established at a later date.

Habitat and urban forest

Expansion and diversification of the urban forest by planting 1279 new trees, with 685 on residential properties. Prioritize, where appropriate, underrepresented species recommended by the municipality.

The municipality is considering adopting a 34–35% canopy cover target for the city. In connection with objective 4.6 of the *Urban Forest Strategic Plan*, municipal staff will set specific targets for different land use classifications, since some areas can sustain a higher percentage than the overall canopy target, and some less (Hambidge, 2019). The municipality continues to work toward a full inventory of the urban forest and setting these targets.

In the absence of full inventory data, GreenUP staff used the following method to set neighbourhood tree planting targets, with the expectation that these will be refined as more data becomes available.

First, the total planting area within each neighbourhood was calculated by merging the existing urban canopy area and total impermeable surface area. The merged area was then subtracted from the total neighbourhood area, on the assumption that the difference between the two is hypothetically space where trees could be planted. The hypothetical planting area was divided into two categories: city-owned planting area, and non-city owned planting area. The latter category was further divided into residential, public service, development, open space, and commercial categories. In all categories, the area of ‘plantable’ land was reduced by 90% to account for the following factors:

- Competing uses for some areas (e.g. dedicated sports fields where trees would be inappropriate), the use of gardens for growing food, etc.;
- The fact that some areas may not be suitable for planting an average, full-grown tree (due to considerations like soil volume limitations, and insufficient sun).

The reduced possible planting areas are presented in Table 6.

Table 6. Estimated planting area in Kawartha Heights

Property Type	Municipal	Residential	Commercial	Development	Open Space	Public Service
Hectares	2.0	4.5	.2	.5	0	1.2

Source: Sandanayake, 2019.

Next, we determined the number of trees that could be planted in the remaining area. Since a healthy urban forest should contain a diversity of species, we had to find a way of generalizing across size differences between species. We calculated the average size of a mature canopy of all the tree species and cultivars recommended for planting through the GreenUP SUN program and the City of Peterborough Recommended Species List (n=84). The average canopy size was 65.7m^2. To identify a tree planting target, we then divided the reduced possible planting area number (in square metres) by the average canopy size (65.7m^2), to obtain a rough estimate of the number of trees that can be added to the neighbourhood. See Table 7 for recommended minimum tree planting targets in Kawartha Heights.

Table 7. Recommended tree planting targets in Kawartha Heights

Property Type	Municipal	Residential	Commercial	Development	Open Space	Public Service
Trees	304	685	30	76	0	183

During fall 2019, GreenUP staff will work with the appropriate SUN implementation working group(s) to continue refining targets, and calculate the impact that achieving them would have on the overall canopy cover percentage in each neighbourhood by 2030, taking into consideration the age and health of the existing urban forest.

Greater biodiversity, by creating 2500 square metres of habitat for pollinators and other wildlife by 2030, which is equivalent to 5.7 NBA basketball courts or 1.5 NHL hockey rinks.

In 2018 and 2019, GreenUP staff installed a series of pollinator and naturalization demonstration Quick-start gardens on residential, commercial, and institutional properties. Using the average area of these projects (50.11m^2), we set a goal of creating five additional 50m^2 pollinator and/or naturalization projects

per year, for a total of 2500 square metres by 2030. These gardens could be completed by residents on their own properties and/or as collaborative neighbourhood projects.

Healthy, active transportation

Twelve per cent of Kawartha Heights residents commuting by public transit, walking, or cycling (from 7% in 2016), by enhancing active transportation infrastructure and supporting residents to choose active transportation options.

GreenUP staff chose to use baseline data from the Census of Canada when developing an active transportation target, rather than the mode share indicator measured by the Transportation Tomorrow Survey (TTS), which is also used by the municipality in its *Comprehensive Transportation Plan*. Beginning in 2016, TTS stopped collecting and reporting mode share data at the sub-municipal level, which makes it difficult to monitor progress for the neighbourhood using this indicator.

Census data indicates that 7% of Kawartha Heights residents who were employed outside the home in 2016 commuted primarily by public transit, walking, or cycling. A 5% increase from 2016 census levels would require an additional 130 residents to adopt active transportation methods for commuting, which realistically be drawn from the 52% (n=1340) of residents who report commute times of less than fifteen minutes. These numbers do not take into account any projected increases in population for the Peterborough region.

Enhancement of local outdoor spaces for inclusive and healthy recreation, with 100% of local parks meeting or exceeding the minimum required design features for each park type as identified in the Municipal Parks and Open Space review.

As part of its Municipal Parks and Open Space review, the municipality is developing minimum and variable requirements for parks of different types. For example, required design features for neighbourhood parks might include low impact design infrastructure, accessible seating and benches and well-shaded play and seating areas, among others. Once these requirements are identified, municipal staff will assess the condition of existing parks and identify those that require enhancements or upgrades. The outcome and target identified for Kawartha Heights neighbourhood was chosen to align with the evaluation system being adopted by the municipality. The target of 100% can be adjusted once the Municipal Parks and Open Space review is completed in 2019, and a baseline for the neighbourhood’s parks is available.

Community building

Greater sense of community belonging amongst residents, measured through qualitative feedback and/or survey data where available.

In 2017, the Community Foundation of Greater Peterborough's Vital Conversations initiative collected information from more than 700 people about the Peterborough community and its future, and compiled these into ten community priorities. The number one priority identified was to strengthen community connections and belonging. SUN has adopted a greater sense of community belonging as a thematic outcome, which could be assessed at the neighbourhood level using the Vital Conversations model and/or other participatory action research tools, depending on the interest and capacity of neighbourhood residents and other partners.

Greater environmental awareness and capacity for local environmental action, to be achieved by increasing the number of environmental events, initiatives, and participants each year.

In its 2016 *Vital Signs Report*, the Community Foundation of Greater Peterborough noted that, "approximately 1 in 3 people in Greater Peterborough participated in voluntary activities to conserve or protect the environment in 2013." Unfortunately, data on voluntary environmental action does not exist at the level of individual neighbourhoods, which makes it difficult to define a specific target for Kawartha Heights. SUN recommends that, where feasible, data be collected from organizers of local environmental events about participation rates.

Energy and climate

Progress toward the *Climate Change Action Plan* target of reducing community greenhouse gas emissions 30% below 2011 levels by 2031 (Sustainable Peterborough, 2016), to be achieved by:

- **Implementing energy efficiency and conservation measures at 40% of homes built between 1961 and 1990 (approximately 630 dwellings);**

The City of Peterborough *Climate Change Action Plan* (Sustainable Peterborough, 2016) confirmed a community target to reduce community greenhouse gas emissions 30% below 2011 levels by 2031. To achieve this goal, their report recommends that "deep energy retrofits" be implemented in 40% of the residential housing stock by 2031, which equals approximately 800 dwellings in Kawartha Heights.

- **Implementing retrofits in 60% of industrial, commercial, and institutional facilities in the neighbourhood;**

The City of Peterborough *Climate Change Action Plan* (Sustainable Peterborough, 2016) confirmed a community target to reduce community greenhouse gas emissions 30% below 2011 levels by 2031. To achieve this goal, the CCAP recommends that “deep energy retrofits” be implemented in 60% of industrial, commercial, and institutional facilities by 2031. SUN has adopted this target since it aligns well with the goals and indicators used in the *Climate Change Action Plan*.

Local food security (secondary theme)

Greater number of residents producing some of their own food at home or through community gardens.

Statistics Canada (2017) reports that 58% of households in the Peterborough census metropolitan area grew fruit, herbs, vegetables or flowers for personal use in the previous year, primarily in their own yards. However, there is no equivalent baseline data at the neighbourhood level, which makes it difficult to set a measurable target for Kawartha Heights. For the time being, SUN recommends that self-reported data be collected on the number of neighbourhood residents who continue and/or begin to produce food at home or at community gardens. More specific targets can be set pending the collection of reliable neighbourhood baseline data.

Appendix D: Summary of SUN Quick-Starts

In 2018 and 2019, the SUN program undertook a series of demonstration Quick-start actions to demonstrate possibilities for change, build local capacity for the Action Plan, and have a tangible environmental impact.

High intensity Quick-start actions

High intensity Quick-start actions include full garden and tree planting installations undertaken by SUN program staff in connection with site hosts. Between 2018 and 2019, SUN installed 847.3m^2 of gardens and 1243 plants.

Table 8. High intensity Quick-starts by property type, type of installation, and size

Property type	**Type of installation**	**Size (in m^2)**	**Number of plants**
Commercial	Pollinator	55	202
Municipal	Tree planting	44	11
Municipal	Tree planting	92	23
Residential	Drought tolerant (Water Wise)	75.5	95
Residential	Pollinator, naturalization	56.5	101
Residential	Pollinator, naturalization	99.7	83
Residential	Pollinator, naturalization	33.4	15
Residential	Pollinator, naturalization	15.5	31

Property type	Type of installation	Size (in m^2)	Number of plants
Residential	Pollinator	47.3	216
Residential	Pollinator	91.2	154
Residential	Naturalization	10	5
Residential	Pollinator	6.3	48
Residential	Naturalization	65	120
Residential	Pollinator	10	17
School	Tree planting	4	1
School	Rain garden; naturalization	82.4	80
School	Pollinator, naturalization	59.5	41

Low intensity Quick-start actions

Low intensity Quick-start actions include the distribution of plants, equipment and other resources to residents, business, and community groups in order to improve sustainability and resiliency. Since 2017, SUN has:

- Removed invasive species from an 830m^2 site and revitalized 100m^2 of pathways at Kawartha Heights Public School
- Distributed 7 trees to residents in the neighbourhood for them to plant
- Providing plants and garden designs to 5 residents in the neighbourhood for them to plant
- Distributed 13 rain barrels and 4 composters in the neighbourhood
- Distributed 2 birdhouses and 2 bat houses in the neighbourhood
- Distributed 4 TRCA *Greening Your Grounds* guides to residents in the neighbourhood.