

2. PURPOSE OF THE UNDERTAKING

Chapter 2 provides a description of the purpose of the SWP. The description is framed in terms of both the problems and the opportunities that the SWP presents. This discussion is grounded in a planning context created by past studies and decisions.

2.1 Planning Context

There is a long history of planning, public engagement and scientific studies with respect to the Scarborough waterfront. Many documents describing issues and opportunities along the Lake Ontario shoreline and *nearshore* areas have been developed for Toronto and Lake Ontario as a whole, and are applicable to the SWP. These documents are listed in **Table 2-1** and **Table 2-2**, and some of the key studies are discussed in **Section 2.2**.

Table 2-1 List of Background Studies.

Title	Year	Author(s)
The Waterfront Plan for the Metropolitan Toronto Planning Area	1967	Metropolitan Toronto Planning
The Waterfront Plan	1972	Metropolitan Toronto and Metropolitan Toronto and Region Conservation Authority
Vegetation and Erosion on Scarborough Bluffs	1978	York University, Department of Biology (Collishaw, Lewis, and Fowle) for Metropolitan Toronto and Region Conservation Authority
A Volumetric Analysis of Erosion	1979	Research and Development Division, Ocean and Aquatic Sciences, Central Region, Fisheries and Oceans (Weaver, RK)
Lake Ontario Waterfront Development Program	1980	Toronto and Region Conservation Authority
Erosion Control Study, Scarborough Bluffs	1982	Geocon Inc. for Metropolitan Toronto and Region Conservation Authority
Waterfront Erosion Control Site Report, Scarborough Sector	1987	Metropolitan Toronto and Region Conservation Authority
Slope Stabilization Study: Greyabbey Trail, Scarborough Bluffs	1988	Terraprobe Ltd. for Toronto and Region Conservation Authority
Investigation and Phase I Remediation of the Brimley Road Landslide, Scarborough, Ontario	1991	Golder Associated, for the City of Scarborough

Title	Year	Author(s)
Regeneration: Toronto's Waterfront and Sustainable City	1991	Royal Commission on the Future of the Toronto Waterfront (Canada), David Crombie
Metropolitan Waterfront Plan	1994	Metropolitan Toronto Planning
Integrated Shoreline Management Plan	1996	Fenco MacLaren Inc.; Shoreplan Engineering Ltd.; EDA Collaborative Inc.; Tarandus Associates Ltd.; and Ecorp Inc. for Metropolitan Toronto and Region Conservation Authority
Technical Guide: River & Stream Systems: Erosion Hazard Limit	2002	Ontario Ministry of Natural Resources (OMNR), Water Resources Section
Wet Weather Flow Master Management Plan	2003	Toronto Water
City of Toronto Accessibility Design Guidelines	2004	City of Toronto
Accessibility for Ontarians with Disabilities Act (AODA), and the associated OREG 191/11 (Integrated Accessibility Standards)	2005	Province of Ontario
Toronto Waterfront Aquatic Habitat Restoration Strategy	2007	Aquatic Habitat Toronto for Waterfront Toronto
The Beautiful Lake: A Binational Biodiversity Conservation Strategy for Lake Ontario	2009	Lake Ontario Biodiversity Strategy Working Group with US – Canada Lake Ontario Lake-wide Management Plan
Toronto Beaches Plan	2009	City of Toronto
Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario	2011	MOECC
Environmentally Significant Areas in the City of Toronto	2012	North-South Environmental Inc., Dougan and Associates, Beacon Environmental Ltd for City of Toronto Planning
Bikeway Trails Implementation Plan, and the subsequent 2016 10-year Bike Plan	2012	City of Toronto
Fish Community Objectives for Lake Ontario	2013	Great Lakes Fishery Commission
Parks Plan 2013-2017	2013	City of Toronto
Sustaining and Expanding the Urban Forest: Toronto's Strategic Forest Management Plan.	2013	City of Toronto
Multi-use Trail Design Guidelines	2014	City of Toronto

Title	Year	Author(s)
Pathways to Recreation: Ontario's Accessibility Standard for the Design of Public Spaces Guidebook	2014	Parks and Recreation Ontario
Management Plan for Guild Park and Gardens	2014	City of Toronto and TRCA
Slope Stability Analysis and Slope Monitoring Brimley South Slope Landfill (West Slope), Toronto, Ontario	2015	LVM for the City of Toronto
Excess Soils Management Guidelines	2016	MOECC

Table 2-2 List of Erosion Protection Projects previous undertaken by TRCA.

Title	Year
Shoreline Protection Project: South Marine Drive	1983
Environmental Study Report: Guildwood Parkway Erosion Control Project	1988
Environmental Study Report: Sylvan Avenue Shoreline Regeneration Project	1994
Environmental Study Report: The Guild Inn Shoreline Regeneration Project, City of Toronto	2004
Environmental Study Report: Guildwood Parkway Erosion Control Project – Phase 2	2004
Environmental Study Report: Meadowcliffe Drive Erosion Control Project	2010

In addition to the shoreline protection projects undertaken by TRCA (**Table 2-2**), some private shoreline protection has been implemented along the Greyabbey Trail shoreline.

2.2 Key Studies and Plans

The SWP is being studied as a result of recommendations of previous planning processes and City of Toronto Council direction (Resolution EX36.17, adopted on December 16, 2013, and resolution PW31.14, adopted on June 10, 2014). These resolutions prioritized TRCA's erosion control strategy and projects, including the EA for the Scarborough Waterfront Project, and provided direction for considering public access in tandem with erosion control.

Key studies and plans providing relevant background information are summarized below.

City of Toronto Official Plan

The City of Toronto Official Plan sets out the vision for where and how Toronto will grow to the year 2031 (City of Toronto, 2002; consolidated 2015). The Official Plan is intended to ensure that the City of Toronto evolves, improves and realizes its full potential in areas such as transit, land use development, and the environment. As part of the 5 year review, portions of the Official Plan have been updated.

The relevant policies are presented in the order that they appear in the Official Plan:

- 3.1.1.4 The natural features of the City, such as the Lake Ontario shoreline, the Lake Iroquois escarpment, woodlots, ravines and valley lands, will be connected to the surrounding city by improving physical and visual access from adjacent public spaces and by designing these into a comprehensive open space network.
- 3.4.1b) protecting, restoring and enhancing the health and integrity of the natural ecosystem, supporting bio-diversity in the City and targeting ecological improvements, paying particular attention to:
 - i) habitat for native flora and fauna and aquatic species;
 - ii) water and sediment quality;
 - iii) landforms, ravines, watercourses, wetlands and the shoreline and associated biophysical processes; and
 - iv) natural linkages between the natural heritage system and other green spaces;
- 3.4. 1e) Reducing the risks to life, health, safety, property, and ecosystem health that are associated with flooding, unstable slopes and erosion and contaminated lands and considering the potential impacts of climate change that may increase the risk associated with natural hazards.
- Section 2.3.2, Policy 3: The Green Space System will be expanded by:
 - a. Acquiring linkages between existing parks and open spaces, where feasible; and
 - b. Acquiring lands, or easements over lands, associated with private development which can be connected to the System for the extension of recreational trails, or which have important natural heritage value.
- Section 2.3.2, Policy 6: Increased public enjoyment and use of lands along the water's edge will be promoted by ensuring that future development and actions on the part of [...] and the Toronto and Region Conservation Authority, will help to achieve the following objectives:

- a. Minimize the physical and visual barriers between the City and Lake Ontario;
- b. Increase and improve public access to lands along the water's edge and between parts of the waterfront;
- c. Improve water quality and the quality of beaches;
- d. Protect, improve and where possible extend the Martin Goodman/Waterfront Trail as a continuous waterfront route for cyclists, pedestrians and people with disabilities; and
- e. Maintain and enhance the natural heritage value of lands near or along the water's edge by protecting existing habitat and, where appropriate, restoring and enhancing habitat.

The SWP supports and advances the City of Toronto policies laid out in the Official Plan by addressing the existing risk to public safety and public infrastructure due to shoreline erosion along the shoreline, providing for increased public space while improving and enhancing the natural heritage system.

The following Official Plan policies may also apply:

- 3.1.5.42 The City may require an Archaeological Assessment for marine archaeological remains and artifacts, to be conducted by a licensed marine archaeologist, when a development is proposed in the water or along the waterfront and/ or shoreline.
- 3.4.16. **Lakefilling** projects in Lake Ontario will be supported only where:
 - a. the land created will be used for natural habitat, public recreation or essential public works;
 - b. the project has been the subject of an Environmental Assessment which ensures that water quality and quantity and terrestrial and aquatic habitats will be protected or enhanced; and
 - c. the project does not create new or aggravate existing natural hazards.
- 3.4.17. Minor lakefilling activities will only be supported for the purposes of:
 - a. stabilizing slope and shoreline to protect existing development and not to facilitate new development, or intensification or alteration of existing development;
 - b. creating or enhancing aquatic habitat;
 - c. naturalizing the shoreline;
 - d. improving water quality; or
 - e. where appropriate, providing public access to the water's edge.

TRCA Living City Policies

The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority (LCP) is a conservation authority policy document that guides the implementation of TRCA's legislated and delegated roles and responsibilities in the planning and development approvals process.

Comparable to a combined municipal official plan and zoning by-law, the LCP represents a compilation of existing plan and permit review policies and practices that have evolved over time. It also contains new policies related to TRCA programs, scientific research, and external planning and development initiatives. The purpose of The Living City Policies is:

1. To guide TRCA review of planning applications and environmental assessments.
2. To provide the basis for approving permit applications under Section 28 of the Conservation Authorities Act.
3. To inform TRCA's advocacy role for The Living City in the planning and development process.
4. To assist and enable our partners' and stakeholders' contributions to building The Living City.

Specific to the SWP, the following policies have direct relevance:

- 7.2.4 It is the policy of TRCA:
 - a. To prevent, eliminate or reduce the risk of flood and erosion hazards to life and property through:
 - i. Appropriately planned development, site alteration, recreational use, and infrastructure;
 - ii. Shoreline protection works that are undertaken on a comprehensive reach basis and naturalized to the extent possible; and,
 - iii. The conveyance of hazards lands into public ownership, where feasible.
 - b. To promote an integrated approach to revitalization of the waterfront that:
 - i. Provides for increased public access, recreational opportunities and continuous trail system;
 - ii. Preserves and enhances public views of the Lake and its shoreline features;
 - iii. Improves or restores the quality of water, beaches and terrestrial and aquatic natural habitats of the shoreline; and,
 - iv. Connects and links waterfront habitats and amenities to the valley and stream corridors.

TRCA recognizes the need to balance waterfront revitalization/redevelopment, public access, and an open space “aesthetic” with natural heritage and natural hazard protection and management. Public ownership of waterfront lands is a key means to managing natural hazards, while providing accessible open space integrated with opportunities for public enjoyment and aquatic and natural heritage restoration.

Accessibility for Ontarians with Disabilities Act (2005)

The AODA, and associated OREG 191/11 (Integrated Accessibility Standards), identifies minimum technical requirements for trails [s.80.9(1)], including clear width, clearance height, and maximum running slope (ramps).

Technical Guide: River & Stream Systems: Erosion Hazard Limit (OMNR, 2002)

The Technical Guide identifies minimum **Factors of Safety**, on the basis of land-use above or below a slope, recognizing the consequences or risks to land-use or life by the occurrence of a slope slide. Based on these minimums, a Factor of Safety of 1.3 (Land Use B) is identified as appropriate for a recreational park with a formal trail at the base and/or top of the bluffs.

Integrated Shoreline Management Plan (1996)

The ISMP provided “an ecosystem-based framework to ensure that shoreline management activities result in a clean, green, accessible, diverse, connected, open, affordable, attractive and useable waterfront.” The ISMP set out recommendations for shoreline regeneration, public access and safety, natural heritage targets, aquatic habitat restoration, and public use for the shoreline area between Tommy Thompson Park and Frenchman’s Bay and provides the foundation for addressing multiple objectives along stretches of the waterfront.

Bikeway Trails Implementation Plan (City of Toronto, 2012)

Adopted by City of Toronto Council on July 6, 2012, the City of Toronto Bikeway Trails Implementation Plan identified 26 Projects, which combined provide for 77 km of new bikeway trails. The Plan identifies the Scarborough waterfront as a long-term objective for trail development.

Multi-use Trail Design Guidelines (City of Toronto, 2014)

The City of Toronto Multi Use Trail Guidelines assist in the development and ongoing maintenance of multi-use trails throughout the city. The guidelines respond to the urban context of Toronto's trails and their varied locations in the city ravines, parkland, boulevards and rail and hydro corridors. These guidelines are consistent and in some cases exceed current, relevant City and Provincial guidelines and policy documents.

The Guidelines provide guidance on trail design including trail configuration (trail and corridor width, trail surface, slopes, and radii). Minimum to exemplary configurations for Secondary, Primary, and High-capacity trail classifications are defined and detailed.

The Guidelines identify that waterfront sites, such as the Waterfront Trail, will be subject to high seasonal use of a specific nature, and identifies that following key considerations in determining the appropriate trail classification:

- c. The proportion of pedestrians can be predicted to be very high, and they can be expected to mainly use the water-side of the trail;
- d. The widest range of ages and abilities should be expected; and,
- e. The presence of many distractions and crossing movements along the trail can also be foreseen.

Considered together, the range of users and expected usage of a Waterfront Trail indicate the need for an appropriate space that will serve to resolve or minimize the potential conflicts that may arise.

Scarborough Shoreline Terrestrial Biological Inventory and Assessment (TRCA, 2012)

The Lake Ontario shoreline extending from Bluffer's Park to East Point Park was inventoried to characterize the terrestrial natural heritage features, both locally and within the larger regional context of TRCA's Terrestrial Natural Heritage Program. The study considered the existing conditions within the context of the terrestrial natural heritage system, and recommended a number of site-specific management strategies. The SWP revisited these recommendations within the comprehensive context of the area, including:

- Protecting and enhancing existing habitats and features;
- Managing public use through careful trail planning and strategic use of infrastructure (e.g., fences to direct trail use);
- The control of *invasive species*; and,
- Further assessment and monitoring.

Fish Community Objectives for Lake Ontario

The MNRF Fish Community Objectives for Lake Ontario (2013) were created to advance the goals and objectives of the Lake Ontario Lakewide Management Plan (LaMP). The document identified broad targets and indicators for the fish community of Lake Ontario, including:

- Maintaining, enhancing and restoring self-sustaining Walleye, Yellow Perch, Northern Pike, and Bass fisheries, populations and recruitment in the nearshore;

- Maintaining, restoring, and increasing the richness and diversity of native fish species in nearshore areas and **embayments**; and,
- Maintaining or increasing populations and increasing species diversity of pelagic prey fish including introduced species (Alewife, Rainbow Smelt) and selected native prey fish species (Threespine Stickleback, Emerald Shiner, Lake Cisco).

Toronto Waterfront Aquatic Habitat Restoration Strategy (TRCA, 2003)

The Strategy strives to create a more sustainable waterfront by using an ecosystem approach to increase ecological integrity, to provide suitable conditions for the maintenance of self-sustaining aquatic communities and to improve ecological connectivity. The Strategy emphasizes conservation design based on native and naturalized species. It takes into account human uses of the shoreline and nearshore waters and it was developed using a consultative, consensus-based approach involving stakeholders and the general public. The overall goal of the Strategy is "to develop and achieve consensus on an aquatic habitat restoration strategy that will maximize the potential ecological integrity of the Toronto waterfront." Aquatic Habitat Toronto is the implementing body for this Strategy. The geographic extent of this Strategy encompasses the SWP Study Area.

TRCA and City of Toronto's Management Plan for the Guild Park and Gardens

The Management Plan for Guild Park and Gardens was developed to provide TRCA and the City of Toronto with a comprehensive framework to guide the management of the Guild Park & Gardens site. Four key management themes are identified and include natural heritage, cultural heritage, horticulture, and trails.

Priority actions that may relate to the SWP include:

- Natural Heritage actions: manage impacts from ash tree mortality, improve trails; and,
- Trails actions: coordination of trails management, management of hazardous trails, connectivity to future waterfront trail, safe waterfront vista.

Metrolinx Lakeshore East Rail Corridor Expansion (Guildwood to Pickering) Environmental Assessment Process

To support long-term plans to introduce regional express rail services, frequent, all-day, two-way service along GO Transit lines, Metrolinx intends to improve the Lakeshore East rail corridor. The section of the corridor between the Guildwood and Pickering GO Stations has two tracks between Galloway Road in Scarborough and Frenchman's Bay in Pickering (Durham Junction). Metrolinx is proposing to add a third track in this section of the corridor, and has conducted an EA under a streamlined process (the "Transit

Project Assessment” Process) to evaluate expanding and improving the corridor between Scarborough Golf Club Road in the City of Toronto and Pickering GO Station in the Region of Durham. Changes to the corridor will constrain the off-road portion of the existing Waterfront Trail, and increases in service will constrain the on-road portion, within the eastern portion of the SWP Project Study Area.

2.3 Study Areas

For the purposes of the Project, three study areas were considered: the Project Area; the Project Study Area; and Regional Study Areas.

Project Area

Project works (e.g., development of Alternatives, or physical works) will be focused along the shoreline area, including both the toe and top of the Bluffs, and will include any identified access routes. This area is referred to as the Project Area (**Figure 2-1**). To help facilitate the Alternatives development and evaluation process, the Project Area has been divided into three Shoreline Segments, recognizing the distinct characteristics along each Shoreline Segment:

1. **West Segment: Bluffer’s Park to Meadowcliffe:** Bluffer’s Park is located at the foot of Brimley Road and provides a range of active and passive recreational opportunities. A sand beach extends along the eastern portion of the Segment, but stops approximately 320 m west of the Meadowcliffe Drive Erosion Control Project to the east.
2. **Central Segment: Meadowcliffe to Grey Abbey:** Shoreline protection works exist along the length of this Segment. There is no formal public access along the base of the Bluffs, although it is frequently used.
3. **East Segment: Grey Abbey to East Point Park/Highland Creek:** While some shoreline protection works exist, the majority of the shoreline consists of a sandy shoreline, a cohesive profile overlain by a veneer of sand. East Point Park is located along the tablelands near the eastern portion of the Segment and provides a range of active and passive recreational opportunities.

Project Study Area

The Project Study Area (**Figure 2-1**) denotes the area where potential Project effects are assessed for many of the technical disciplines. The Project Study Area extends along the Lake Ontario shoreline from Bluffer’s Park in the west to the mouth of the Highland Creek in the east (approximately 11 km in length). The northerly boundary is Kingston Road/Lawrence Avenue and the southern boundary is Lake Ontario to a

maximum of 1 km **offshore**. This study area includes the access routes and any potential effects to adjacent communities.

Regional Study Areas

For certain technical disciplines, larger “Regional Study Areas” were used to identify and assess potential effects at the appropriate scale (e.g., **sediment** transport and coastal processes, water quality modelling, socio-economic assessment, **archaeology**).

Any Regional Study Areas are discussed in **Chapter 3**, as part of the relevant technical discipline.

2.4 Temporal Boundaries

Temporal boundaries (e.g., Project schedule) were used for the basis of the effects assessment. The temporal boundaries established for the EA include the construction and operation phases of the Project, and are explained below.

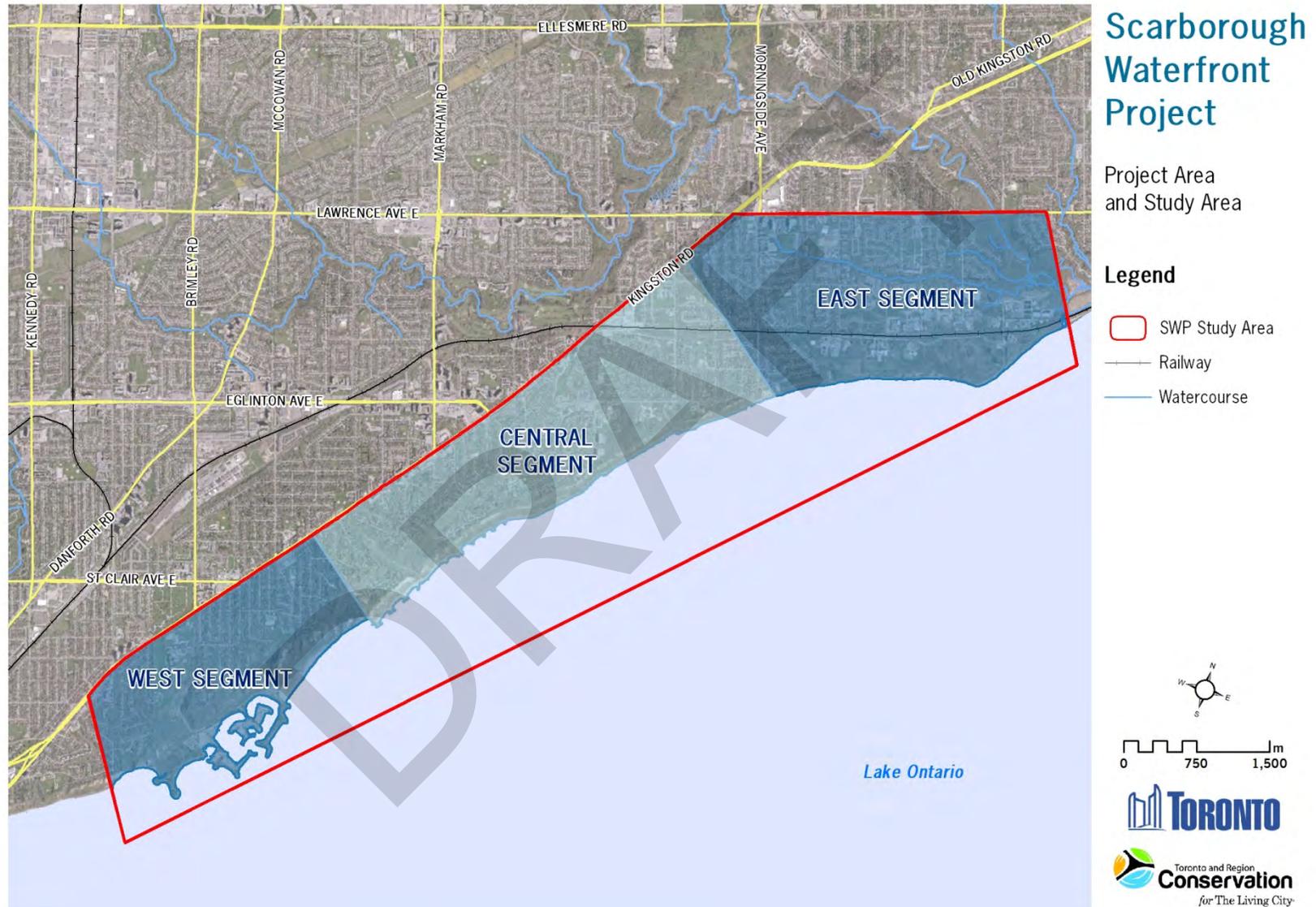
The **construction phase** of the Project is anticipated to commence following receipt of required approvals, permits, and funding. The construction phase, including time for permitting and **detailed design**, is expected to take approximately 12 years. It is anticipated that as sections of proposed works are completed, shoreline areas will be opened for public use (see **Chapter 7**). The anticipated EA decision date is late-2018.

The **operations phase** will commence once the overall project construction is complete. The new greenspace and trail system is anticipated to exist indefinitely into the future; however, monitoring and adaptive management will only occur for the first 15 years after construction.

2.5 Problem/Opportunity Assessment

The SWP is an opportunity to comprehensively plan for improvements to and management of the Scarborough Waterfront between Bluffer’s Park and East Point Park, given the pressures on the recreational use of the area, and the limited access to and along the waterfront, while also providing an opportunity to manage and where possible, enhance habitat integrity. Some of these problems could be solved or managed on a piecemeal or ad hoc basis but this would not permit a holistic and integrated solution.

Figure 2-1 Project Area and Study Area.



2.5.1 Project Vision Element: Erosion and Risk to Public Safety and Property

2.5.1.1 Key Problems

The erosion processes along the Bluffs is complex and is related to the nature of the soil types in contact with the lake and both wave conditions and water levels. When water levels are high, waves attack the vertical face of the toe of the bluff, causing the toe to recede back, which in turn steepens the bluff face and leads to slope failures. When water levels are low wave action on the face of the bluff is less, but the vertical (downward) erosion of the sloped nearshore profile is increased. That vertical erosion process is referred to as **downcutting**, which increases the water depth offshore of the bluff, and which in turn allows higher waves to strike the bluff when water levels rise again. Long-term erosion of the bluff occurs when the nearshore profile is downcut. For example, shoreline erosion at Bluffer's Park has stopped as a result of the sand beach, which has accumulated since the construction of Bluffer's Park in the 1970s and has halted downcutting of the nearshore profile in front of those Bluffs.

Cobble and boulder deposits along the shore and nearshore originated from both erosion of the bluffs and glacial outwash during formation of rivers. Slabs of limestone eroded from the regional bedrock were also found to line the nearshore lakebed environment. These deposits, when they existed, formed hard natural armouring protection against erosion and against the natural process of downcutting. They were removed by humans in a process called "**stonehooking**", and were processed into building materials to feed local development. As a result of stonehooking operations, the natural erosion protection was also removed, allowing accelerated downcutting of the nearshore which in turn led to higher recession rates along the Bluffs. Although this practice was known and identified in the past, its significance to coastal processes and shoreline development was not fully understood until recently. Records indicate that approximately 1,850,000 m³ of stone materials were removed from the shore for construction and development purposes in Toronto between 1830 and 1930 (Royal Commission, 1992). Although details of locations where material was removed are lacking, there was a reported concentration of activity in Port Credit and along the Scarborough Bluffs. Materials removed from the beach and out to depths of 4 m ranged from gravel to boulders, with boulders of 450 mm to 600 mm preferred by trades (ISMP, 1996).

It is believed that the Bluffs eroded at a slower rate prior to commencement of the practice of stonehooking, although they were still undergoing and subject to erosional processes. Recognizing the continuously eroding shoreline, located in close proximity to a highly developed urban area, shoreline protection has been implemented along portions of the Study Area. This **shoreline treatment** addresses the primary erosion mechanism of wave action acting on the Bluffs directly. Approximately 72% of the

shoreline between Bluffer's Park and East Point Park/Highland Creek has some form of shoreline erosion protection works, which were installed between the 1970s and 2012 (about 85 ha of land area has been created). These structures can be categorized as:

- major lakefilling projects (Bluffer's Park, constructed in the 1970s);
- **revetments** constructed close to the toe of the Bluff; and,
- **armourstone headlands** with naturally accreting or artificially filled sand, gravel or cobble beaches.

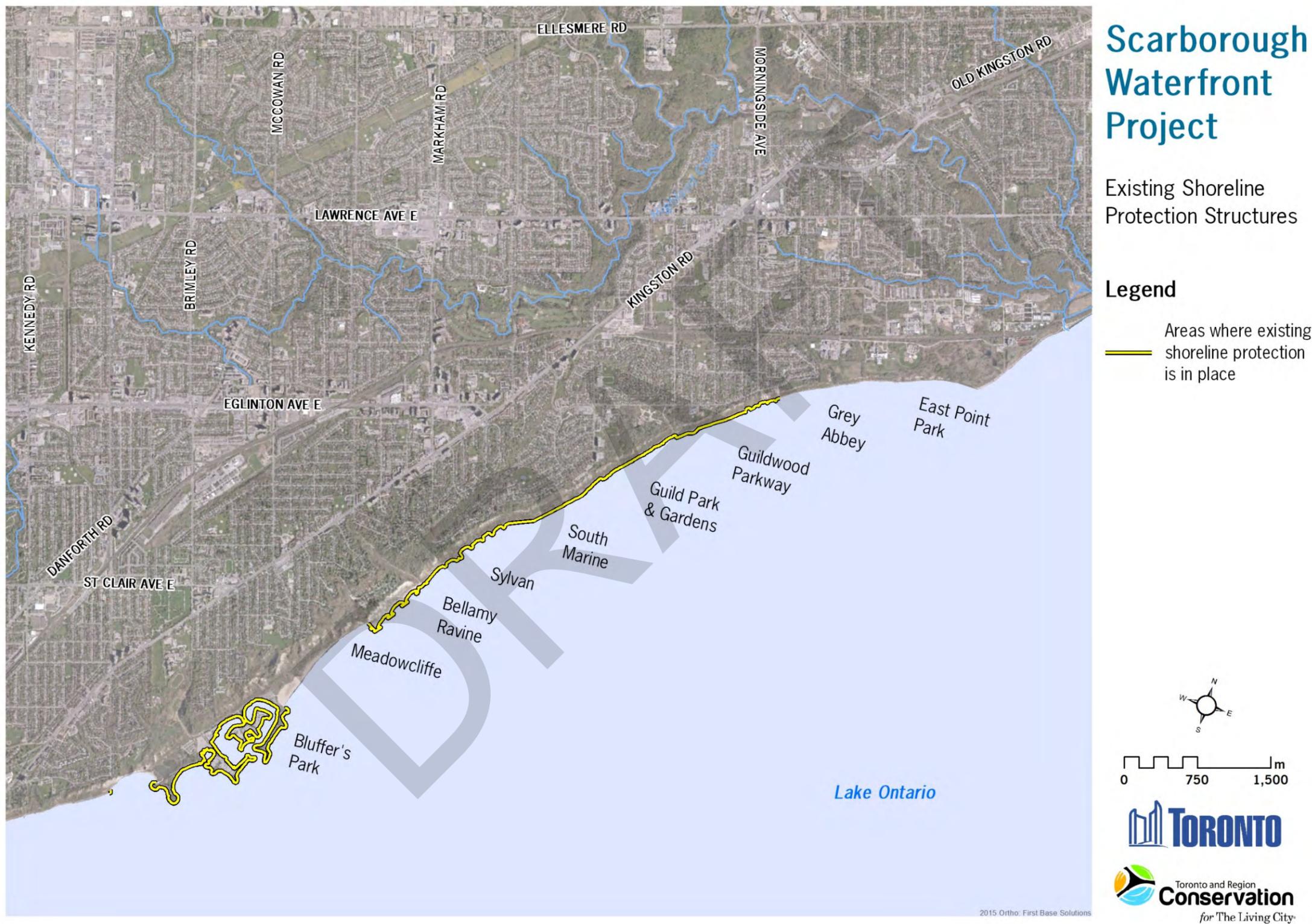
Shoreline protection activities and features have resulted in changes to shoreline erosion rates, as compared to post-stonehooking rates. The areas which currently contain shoreline protection measures include Bluffer's Park, and from Meadowcliffe to south of Morna Avenue (**Figure 2-2**). These shoreline protection measures have been put in place at varying times in the last 50 years. Some of these shoreline protection structures require maintenance, modifications, or repair, which has been considered as part of this Project. The unprotected sections include Cudia Park, Grey Abbey Park and East Point Park, as well as some publicly inaccessible shoreline (e.g., privately-owned or restricted public access) to the west of East Point Park.

Alleviation of, and protection against erosion processes at the slope toe (shoreline protection), permit long-term slope self-stabilization (e.g., crest migration) and subsequent natural revegetation. When properly designed, shoreline protection reduces the toe erosion recession rate to 0 m per year over at least the design life of the toe erosion protection measures (approximately 20 to 50 years). During this period of self-stabilization, landslides will continue as the crest migrates until a long term stable slope is achieved.

With other site conditions being equal, the amount of self-stabilization observed can be correlated to the amount of time in which shoreline protection measures have been in place. The slopes that have a shallower inclination and more highly vegetated, and are thus less prone to slope failures, are in areas where the toe erosion protection measures have generally been in place for longer periods of time (decades).

In the remaining areas where there is no protection along the shoreline, long-term average toe recession rates are equal to bluff crest migration rates, and can be as high as 1 m per year. The recession rates vary year to year because of the **episodic** nature of erosion. Short-term erosion rates at any location along the bluff vary depending on Lake Ontario wave and water level conditions, and other minor factors. Variations in bluff crest migration rates over time could be explained through more evident and frequent occurrence of extreme climatic events and weather pattern changes, such as unusually heavy rainfall, thick long-lasting snow pack, additional freeze-thaw cycles throughout the winter months, and more severe droughts.

Figure 2-2 Existing shoreline protection structures within the Project Study Area.



2.5.1.2 Project Opportunities

Although shoreline protection works have been undertaken along the toe of the Bluffs for some portions of the shoreline (**Figure 2-3**), there are many areas of the Bluffs (with and without toe protection) that are prone to both toe erosion and crest migration, and which poses risks to public safety and property. These risks are to users along the base and top of the Bluffs, as well as risks to public property and infrastructure located along the top of the Bluffs. The SWP provides an opportunity to reduce the risk to users. It should be noted that risk to users cannot be fully eliminated. Shoreline protection works can be implemented or retrofitted along the shoreline between Bluffer's Park and East Point Park in a manner which provides safer formal public access along the shoreline.

2.5.2 Project Vision Element: Limited Access to and Along the Waterfront

2.5.2.1 Key Problems

The shoreline of the Project Study Area is characterized by steep Bluffs which create challenging access to the water's edge. While approximately 90% of the water's edge within the Project Study Area is publicly owned, there are few formal public access points to the shoreline through most of the length of the Project Study Area.

In addition, there is no continuous trail providing access along the waterfront through the SWP area. Within the City of Toronto, the Waterfront Trail is intended to provide a recreational amenity and active transportation corridor that connects waterfront parks, destinations, and communities. Throughout its length, the Waterfront Trail includes a combination of "off-road" and "on-road" routes along both residential streets and major arterial roads. Within the Project Study Area the Waterfront Trail is located inland and away from the shoreline and mainly along residential streets and some major arterials (Kingston Road).

The steep terrain (Bluffs) and lack of shoreline continuity limit the ability to extend the Trail along the shoreline in the Project Study Area (Waterfront Regeneration Trust, 2014). Provision of this access has been constrained by slope stability/public risk, lack of land base and land ownership issues. With the future implementation of the Metrolinx corridor expansion, the existing location of off-road portions the Waterfront Trail in the vicinity of Grey Abbey Ravine and Copperfield Road will be constrained, and relocation of the trail may be desirable. In addition, the on-road portion will be further constrained as Metrolinx moves towards trains crossing Manse Road every seven minutes, which will affect both Waterfront Trail and road traffic.

Access opportunities and issues to the shoreline are largely limited to the following, described from west to east:

- Vehicular and pedestrian access in the west is limited to Brimley Road, which runs south from Kingston Road into Bluffer's Park. Brimley Road south of Barkdene Hills has no sidewalks, with a poor line of sight due to the curving nature of the road, steep slopes, and shared pedestrian and cyclist access along the road with vehicles.
- Parking at Bluffer's Park is limited, and parking may be at capacity by mid-day during peak use periods.
- Traffic congestion down Brimley Road towards Bluffer's Park is a major complaint for the local residents and for the park users during peak use periods.
- Once at Bluffer's Park, there are many trails that provide access to the water's edge.
- Doris McCarthy Trail provides some (or limited) pedestrian access to the shoreline, from just south of Kingston Road and south along Bellamy Ravine towards the water's edge. Limited nearby on-street parking is available along the **tablelands**. The trail is steep in sections with a slope that exceeds 10% and thus limits users. The trail is mainly surfaced with soil or gravel, and not suitable for most cyclists and users.
- The TRCA Guild construction access route starts at Guildwood Parkway and runs south towards the shoreline at the Guild Park and Gardens, and is used informally for access by the public. Access from the Guild Park and Gardens property includes an informal pedestrian trail down the ravine to connect with the Guild construction access route. The Guild construction access route contains steep grades, and while it is not a formal public access route to the shoreline, it is used by pedestrians and even cyclists to access the route along the water's edge. Anecdotal evidence indicates that there is moderate usage of this route by the public, despite the no access signs at the entrance.
- Beechgrove Drive runs south from Lawrence Avenue East and terminates at Copperfield Road and the east parking lot at East Point Park. A former construction road is currently used as an informal trail and extends from the terminus of Beechgrove Drive almost to the shoreline and contains steep grades and eroded sections near the base. Several informal trails in very poor condition extend down the steep slope from the Beechgrove Drive informal trail to the sand shoreline.
- Aside from the informal access provided by the Guild construction access route and the Beechgrove Drive extension, there is no formal access to the shoreline east of Doris McCarthy Trail within the Project Area. As a result, there are numerous informal paths down the bluff face at East Point Park. These are very

steep (greater than 10% grade) and unwalkable for all but the most able users. Most cyclists are also unable to take advantage of these paths. Safety concerns here include erosion and stability of the informal paths. In addition, these informal paths are resulting in the trampling of sensitive vegetation, amongst other impacts to vegetation and wildlife.

Given the limited access to the shoreline, City of Toronto Emergency Services are called upon every year to rescue people trying to access the shoreline using informal paths down the bluffs face, or trying to make their own paths. These rescues require considerable time and resources due to the difficulties emergency services have accessing these locations. This puts rescue crews at risk and diverts resources from tending to other emergencies. Recently, Toronto Fire reported that in 2016, they had 19 bluffs calls with 135 units dispatched and 15 persons rescued, and, as of July 10, 2017, so far in 2017, 7 bluffs calls with 46 units dispatched and 3 persons rescued. Some of these events occur on private property which may create issues for the property owner.

In addition to the limited access to the shoreline, continuous public access along the shoreline is constrained by the following, described from west to east:

- East of Bluffer's Park, access along the shoreline is restricted east of the public beach area, where the Cudia Park Bluffs are steep and come down to the water line.
- While there is no formal access along the shoreline between Meadowcliffe and below Grey Abbey Park, a construction access route exists along this length to provide access for maintenance of the shoreline protection works, and is used informally by the public for access.
- The existing construction access route along the shoreline ends approximately south of Morna Road. Access along the sandy shoreline east of this point is restricted by private property and critical public infrastructure.

2.5.2.2 Project Opportunities

The SWP is an opportunity to identify and implement a comprehensive solution to access to and along the waterfront including the relocation of the Waterfront Trail closer to the water's edge. By examining opportunities for shoreline protection, access and habitat improvements in a holistic manner, solutions to meet long term needs can be identified.

Creating and improving existing access points to the waterfront is a major opportunity. In particular:

- Formalizing access for pedestrians and cyclists at Brimley Road could address longstanding issues with both the community and users. This, in conjunction with

other City of Toronto initiatives (e.g., offsite parking), has the potential to also contribute in a small way towards the alleviation of parking and traffic complaints.

- Enhancing pedestrian access while formalizing cyclist access at Doris McCarthy Trail could provide alternate access points to Bluffer's Park.
- Enhanced pedestrian and cyclist access to the waterfront at Guild Park and Gardens could provide formal access to the shoreline.
- Enhanced access for East Segment will address the problem of safety, while providing formal access (and the east terminus) for cyclists to access the formal portion of the Waterfront Trail.

2.5.3 Project Goal Element: Habitat Integrity

2.5.3.1 Key Problems

Certain areas of the shoreline lack habitat integrity. Prior to European settlement, it is estimated that approximately 80% to 95% of the southern Ontario landscape contained natural forest and wetland cover (Butt et al., 2005; TRCA, 2012). Following colonization in the 18th and 19th Centuries, trees and other vegetation were cleared from the landscape, and wetlands were drained, with the purpose of preparing the land for agriculture (Butt et al., 2005). With continued population growth and subsequent land development over time, approximately 20% of the original natural cover remains in southern Ontario (Butt et al., 2005), with less than 17% natural coverage remaining in the Project Study Area.

With sustained growth and urban development over time, significant portions of the **natural environment** have become fragmented or lost. As of 2015, the City of Toronto's total population was estimated at 2.83 million people (Ontario Ministry of Finance, 2016), with over 37, 600 people within the Project Study Area alone (Environics, 2014). It is projected that by 2041, 3.74 million people will be living in Toronto (Ontario Ministry of Finance, 2016). There are a number of proposals for developments along and in the vicinity of the Kingston Road corridor for denser residential development (**Section 3.3.1.1**). The City is moving towards **mainstreeting** and creating denser neighbourhoods to support the anticipated population increase.

As urban centres expand and the population continues to grow and diversify, such as in the Project Study Area, the demand for access to natural areas increases, putting pressure on both managed and unmanaged terrestrial areas that are already in limited supply (City of Toronto, 2013). The Scarborough Bluffs are a regional destination, which are anticipated to only increase in popularity, and will continue to place increasing pressures on the natural environment, unless this use is appropriately planned and managed for.

It has been shown that Torontonians are shifting towards informal and individualized activities, with a growing interest in the use of trails for recreation, exercise and activity transportation (City of Toronto, 2013). One such pressure, resulting from increased demand and changes in natural area usage, is the development of user-created (informal) trail systems.

Informal trail systems form for a number of reasons, including but not limited to:

- Currently implemented trail systems, if present, do not accommodate or anticipate the needs and desires of park users;
- Informal trails provide increased efficiency by creating a shortcut, or providing more direct access to a natural feature (Wimpey and Marion, 2011); and
- The existing system provides no or limited access to a desirable feature (e.g., a known viewpoint, a lake, a rock outcropping, etc.) (Dickens, Gerhardt, and Collinge, 2005; Walden-Schreiner and Leung, 2013).

The formation of informal trails occurs in stages: trampling of vegetation, loss of organic soil material, and the eventual compaction of soil. Once a discernable path has been formed, this often creates a “releaser cue” that causes others to follow the same route (Wimpey and Marion, 2011).

Within the Project Study Area, approximately 14 km of informal trails have been identified, the majority of which provide informal access to and along the waterfront, and with the greatest concentration of informal trails (~8 km) dissecting East Point Park. The effects from informal trails on natural areas tend to be localized, but they can also exacerbate disturbances and contribute to changes at the landscape level (Kuss, 1986; Wimpey and Marion, 2011). They can result in the loss of native vegetation, habitat fragmentation, displacement of wildlife, soil compaction and resultant erosion, altered **hydrology**, and spread of invasive species (Cole, 1995; Wimpey and Marion, 2011).

As with the terrestrial ecosystem, the aquatic ecosystem of Lake Ontario, including the Scarborough shoreline, has been impacted by human activities. The waterfront changed dramatically following the arrival of early European settlers in the late 18th Century, largely in part due to the historical practice of stonehooking.

Stone material is an important component of the physical structure of the shoreline. The movement of stone material along the shoreline forms bays, points and bars, which are critical elements of aquatic habitats providing for cover, shelter and foraging opportunities.

In addition, open coast shorelines such as those found along the waterfront in the Project Study Area, provided historical spawning and forage habitat for coldwater aquatic species such as Lake Trout (*Salvelinus namaycush*) and Lake Whitefish

(*Coregonus clupeaformis*) (Dietrich et al., 2008). The self-cleansing characteristics of the open coast shoreline exposed gravels, cobbles and boulders, which provided essential conditions for over-wintering eggs and larvae (Dietrich et al., 2008). However, past modifications, particularly the removal of this coarse substrate has significantly reduced the quality and diversity of habitat available in this area.

Shoreline erosion necessitated the need for the toe protection. Early protection works in the form of basic linear revetment features were implemented in the 1980s and 1990s along the Guild and South Marine Drive portions of the Project Study Area shoreline. As the primary focus of these works was **erosion control**, aquatic habitat enhancement features were not incorporated into their design. Extending parallel to the shoreline, these shoreline protection works have a simple linear profile and lack substrate diversity characteristic of historical Scarborough shoreline, or more modern headland-beach systems.

Improved shoreline protection techniques have since been employed, such as those near Sylvan Avenue and Meadowcliffe Drive, which included ecological components in their design. The Sylvan Avenue shoreline area, completed in 2000, features an **undulating shoreline** that increases habitat diversity and complexity which is beneficial for a variety of fish species. Similarly, a more advanced technique was implemented at Meadowcliffe between 2011 and 2012, where a headland retained artificial cobble beach was constructed that provides optimal cover, refuge and foraging opportunities for species utilizing the open coast areas.

2.5.3.2 Project Opportunities

Through implementation of the SWP, an opportunity exists to decommission much of the existing informal trail network with the provision of formalized access to and along the waterfront. By managing the existing users and anticipated increase in user volume through a formal trail system which better meets user needs, regeneration and enhancement of the terrestrial ecosystem within the Project Study Area may be achieved, as direct disturbance to the natural environment can be reduced. Additionally, the connective shoreline protection structures that could be a part of the SWP provide a number of opportunities for aquatic habitat enhancement and/or creation, particularly in areas where less advanced techniques were previously applied (e.g., Guild Inn and South Marine Drive) and where little to no work has yet been done (e.g., Grey Abbey Park).

The Project presents an opportunity to enhance terrestrial and aquatic natural features, while addressing erosion/risk prone areas, and improving access to, and along, the shoreline between Bluffer's Park and East Point Park.