



February 9, 2016

ENVIRONMENTAL STUDY REPORT

CITY OF SARNIA

Municipal Class Environmental Assessment for the Proposed Protection of Centennial Park along the Sarnia Bay Harbour Front

Submitted to:
City of Sarnia
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Sarnia, Ontario
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EXECUTIVE SUMMARY

In June 2012, a tar-like substance breaking out at ground level was identified at various locations within Centennial Park (the Park) in Sarnia, Ontario. Environmental studies were completed between the Fall of 2012 and Fall of 2013, which determined that the reported contamination was the result of fill used to construct the Park. A Remedial Strategy Plan was proposed and included the recommendation to place a clean soil cap at the Park. Placement of a clean soil cap requires an overall increase in site grading, which necessitates the installation of shoreline protection at the Park's southern waterfront along Sarnia Bay. Existing boat ramps located along the waterfront of the Park will be removed and replaced closer to the Sarnia Bay Marina.

The City of Sarnia (the City) conducted a Municipal Class Environmental Assessment (EA) study to investigate options for shoreline protection and replacement of the boat ramps. The classification schedules for municipal wastewater projects in Appendix 1 of the Municipal Class EA document were reviewed and the Schedule 'C' process was determined to be most appropriate for the Project. The EA study confirms the project need and justification, documents the existing conditions, examines alternatives and potential impacts, and recommends mitigating measures.

Baseline studies to characterize the existing conditions of the study area were completed. Results of the studies were used to identify constraints to the Project and develop alternative shoreline and boat ramp alternatives. Natural environment, surface water, geotechnical, archaeological, built and cultural heritage and sediment studies were completed. Sarnia Bay within the study area is primarily a permanent open water system of uniform morphology. Water depths vary by location and riparian vegetation consisted primarily of manicured lawns and a small meadow. Sarnia Bay within the study area provides habitat to a fish community composed of generalist species that are generally widespread in distribution and somewhat sensitive to environmental change. No Areas of Natural and Scientific Interest, Environmentally Sensitive Areas or Provincially Significant Wetlands are located within the study area, and no significant trees were discovered during the tree inventory. The study area was found to have low to no archaeological potential and no built or cultural heritage resources were identified.

The Class EA process provides a mechanism through which the City can evaluate a reasonable range of options for proposed municipal infrastructure. Solutions to the identified problem / opportunity have been identified as part of previous studies and are documented in the City's plans for the rehabilitated Park design. To develop a range of alternative designs that would be appropriate for the unique characteristics of the shoreline, it was necessary to review all background documents available, hold discussions with City staff, and solicit feedback from local residents and stakeholders. Alternative designs were considered in two parts:

- 1) Shoreline protection along the Sarnia Bay harbour front within the study area:
 - a. Alternative 1 – Do Nothing;
 - b. Alternative 2 – Vertical Armour Stone Wall; and
 - c. Alternative 3 – Tiered Armour Stone Wall.



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2) Boat ramps:

- a. Alternative 1 – Do Nothing;
- b. Alternative 2 – Remove and Build a Replacement Boat Launch with Two Ramps; and
- c. Alternative 3 – Remove and Built a Replacement Boat Launch with Four Ramps.

To evaluate the alternative designs for shoreline protection and boat ramp replacement, an evaluation matrix approach was used based on identified issues and constraints. The issues and constraints were sorted into the categories of social and economic environment, natural environment, cultural environment, and technical considerations. Evaluation criteria for each category were developed based on the legislation, policy, and design guidelines that apply to this Project. Each of the evaluation criteria were then screened against the results of the existing conditions studies to determine whether they were relevant to the Project. The evaluation of alternative designs for both the shoreline protection and boat ramps determined that Alternative 2 is the preferred alternative design.

Throughout the planning and design process, the evaluation of alternatives focused on eliminating impacts wherever possible. Where the selection of the preferred alternative cannot entirely eliminate potential environmental impacts, mitigation measures will be implemented to limit, minimize or eliminate effects.

The City recognizes the importance of consulting with potentially affected and interested stakeholders. A project contact list was compiled for the Project and comprised members of the general public, government review agencies, municipal staff, First Nations, and any other organizations or individuals that expressed an interest in the Project. Two Public Information Centres (PICs) were held to provide information and obtain feedback on the Project.



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1.0 IDENTIFICATION OF PROBLEM OR OPPORTUNITY

1.1 Need and Justification

In June 2012, a tar-like substance breaking out at ground level was identified at various locations within Centennial Park (the Park) in Sarnia, Ontario. Phase I Environmental Site Assessment (ESA), Phase II ESA and Risk Assessment studies were completed between the Fall of 2012 and Fall of 2013. These studies determined that the reported contamination was the result of fill used to construct the Park, which opened in 1967. A Remedial Strategy Plan was proposed in December 2013, which included the recommendation to place a clean soil cap at the Park. Council and public review of the Remedial Strategy Plan occurred between December 2013 and June 2014, and determined that the City should proceed with implementation of the clean soil cap.

The proposed solution (i.e., the placement of a clean soil cap at the Park) to contain contaminants requires an overall increase in site grading by approximately 0.5 metres (m), which necessitates the installation of shoreline protection at the Park's southern waterfront along Sarnia Bay. The Project also includes removal of the existing boat ramps and installation of new ramps closer to the Sarnia Bay Marina.

Therefore, the City of Sarnia (the City) conducted a Municipal Class Environmental Assessment (EA) study to investigate options for shoreline protection and replacement of the boat ramps. The EA study confirms the project need and justification, documents the existing conditions, examines alternatives and potential impacts, and recommends mitigating measures.

1.2 Study Area

The study area for the Municipal Class EA is located within the City of Sarnia, south of Exmouth Street along the Sarnia Bay harbour front (**Figure 1**). The area of focus in this EA is the Park area within 30 m of the shoreline and extending into Sarnia Bay between the Sarnia Bay Marina and Front Street, as shown on **Figure 2**.

The City's Adopted Official Plan (2014) designates the study area as Park and Natural Hazards land use. Within the study area is the waterfront of the Park, which includes the children's play area, the Bluewater Bike Path (a multi-use walking / bicycling corridor), active boat ramps and a pleasure craft fueling station.



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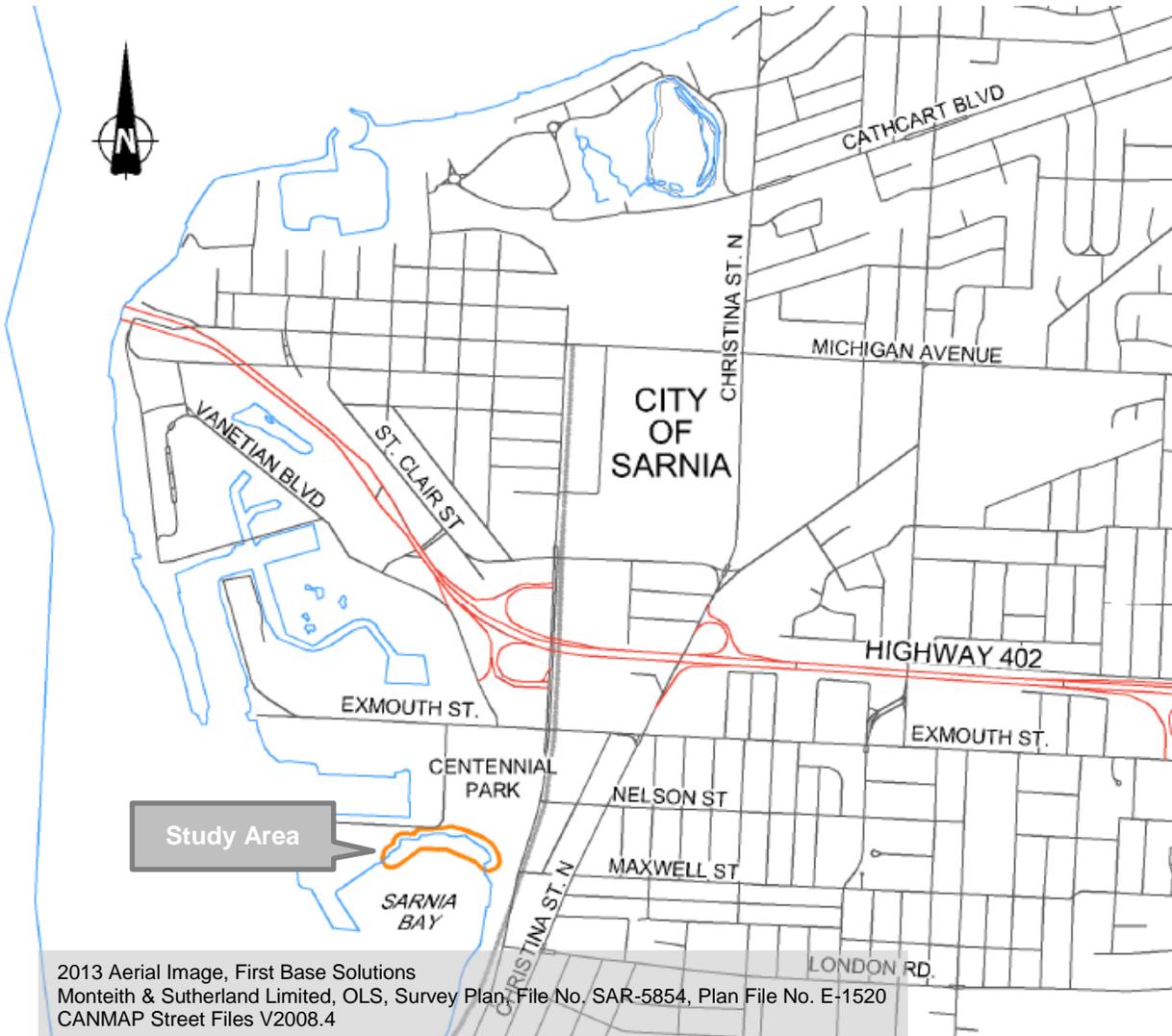


Figure 1: Project Location



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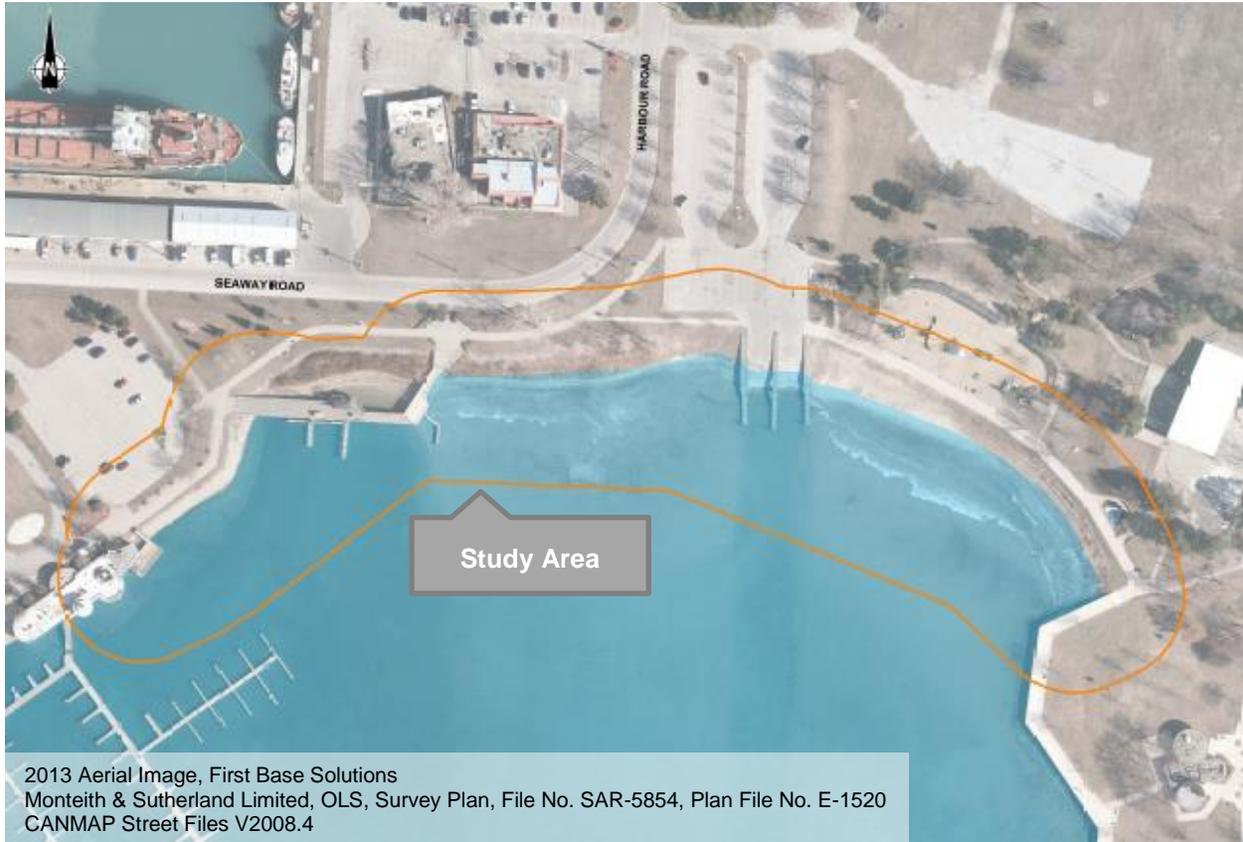


Figure 2: Municipal Class EA Study Area



2.0 BROADER PLANNING CONTEXT

2.1 Centennial Park Investigations

In June 2012, City Staff responded to a reported spill in the Park and found a tar-like substance breaking out at ground level at various locations in the Park. A Phase I ESA was completed to review historical ownership and land uses of the Park to determine potential contaminants.

Further studies (i.e., Phase II ESA) to identify and quantify the contaminants was completed in May 2013. The Phase II ESA discovered contaminants (e.g., lead, hydrocarbons, asbestos) at varying depths and concentrations in the Park, which led to fencing off the Park. The City also proceeded with a Risk Assessment (RA) investigation to address potential health impacts, risk management measures and remediation options associated with the Park.

City Council was presented with the findings of the ESA and RA investigations, as well as available remedial measures for the Park. Development of a Remedial Strategy Plan for the Park was approved by City Council, which was released for public review and comment. The Remedial Strategy Plan was approved and determined that the City should proceed with implementation of the clean soil cap. Placement of a clean soil cap at the Park requires an overall increase in site grading by approximately 0.5 m, which necessitates the installation of shoreline protection at the Park's southern waterfront along Sarnia Bay.

2.2 Official Plan

The City's Adopted Official Plan (2014) was approved by the County of Lambton in February 2015. The Official Plan outlines the objectives and policies to guide the short-term and long-term physical development of all lands within the City, as well as six guiding principles for building a vibrant / sustainable City:

- strengthen the existing city structure;
- encourage inclusive and stable neighbourhoods;
- enhance the protection of the environment;
- pursue economic retention and diversification;
- implement good community design; and
- improve accessibility and connectivity.

The City's development is guided by these principles and the existing city structure. The study area is designated as Park land use and is therefore categorized as a Stable Area Element that is to be preserved and enhanced. These lands are also designated as Natural Hazards land use because the study area is located within both the St. Clair River Shoreline Management Area and a One Zone Floodplain Policy Area. Shoreline management of the St. Clair River permits minor land filling and modifications for the purpose of stabilizing and naturalizing shorelines. Furthermore, waterfront development of public docking / mooring facilities and boat ramps for pleasure crafts is supported by the City. Within one-zone floodplain policy areas, no buildings or structures are permitted except where necessary for flood / erosion control or for conservation and public recreation.



2.3 Sarnia Waterfront Master Plan

The City prepared a Waterfront Master Plan to guide the development of waterfront lands within the City of Sarnia. Specifically, waterfront development should enhance public enjoyment and community cohesion, preserve history and the natural environment, and maximize the potential for economic development and tourism. The plan recognizes that some waterfront areas must be developed to achieve this.

To determine which areas should remain as green space or be developed, the Plan divided the City's waterfront into six waterfront sections. The study area is located within Waterfront Section 3: George Street to Exmouth Street (Bayshore / Centennial Park Area) and Waterfront Section 4: West of Harbour Road (Point Lands / Harbour). Although development is recommended for portions of these waterfront sections, green space within the study area has been identified for protection. Specifically, the long-term plan for the Park's waterfront is for the land to remain as green space but undergo improvements to enhance public use and enjoyment.



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3.0 CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The Municipal Class EA process was developed by the Municipal Engineers Association (MEA 2000, amended 2007, 2011 and 2014) to streamline the EA process for recurring municipal projects that are similar in nature, usually limited in scale, and with a predictable range of environmental effects that are responsive to mitigating measures. The Municipal Class EA process is outlined on **Figure 3**.

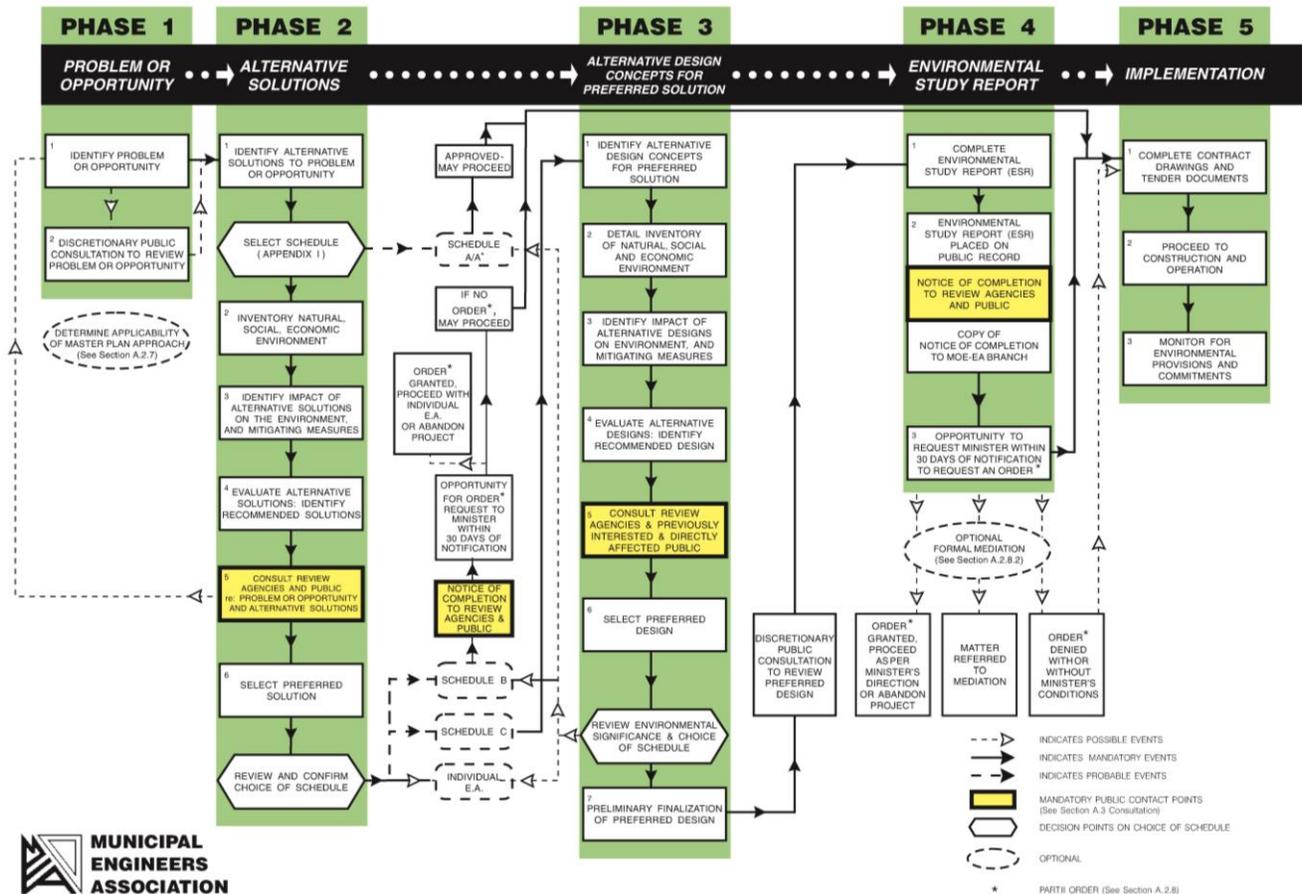


Figure 3: Municipal Class Environmental Assessment Process

In Phase 2 of the process, the proponent is required to examine the range of alternatives that are being considered, and select the appropriate 'schedule' to follow. Projects are classified according to their potential for adverse environmental effect. The classifications are:

Schedule A

These projects are limited in scale, have minimal adverse environmental effects, and typically consist of normal maintenance and operational activities. These projects are considered pre-approved and may proceed without following the full Class EA planning process.



Schedule A+

These projects are also limited in scale, have minimal adverse environmental effects, and are considered pre-approved, but there is a requirement for public notification prior to construction or implementation of the project. The purpose of the notification is to inform the public of projects occurring in their local area. Although the public is informed of the project, there is no appeal mechanism to the Ministry of the Environment and Climate Change (MOECC); concerns are addressed at municipal council.

Schedule B

These projects have the potential for some adverse environmental effects, thus requiring a screening process involving mandatory contact with directly affected public and relevant review agencies. If all concerns can be adequately addressed, the project may proceed. These projects generally include improvements and minor expansions to existing facilities.

Schedule C

These projects have potential for significant environmental effects and are subject to the full planning and documentation procedures specified in the Class EA document. An Environmental Study Report (ESR) must be prepared and submitted for review by the public and relevant review agencies. If all public and agency comments and issues are resolved during the public review period, the project may proceed. These projects generally include construction of new facilities or major expansions to existing facilities.

3.1 Selection of Class Environmental Assessment Schedule

The classification schedules for municipal wastewater projects in Appendix 1 of the MEA document were reviewed to determine the appropriate categorization of the Project. Item 9 in Schedule 1 states that construction of "...new shore line works, such as off-shore breakwaters, shore-connected breakwaters, groynes and sea walls", is classified as Schedule 'C' (subject to full planning process). In consultation with the MOECC, it was also confirmed that removal of the existing boat ramps and construction of the replacement boat ramps are considered shoreline works that are subject to the Class EA process. Therefore, the selection of the Schedule 'C' process was determined to be most appropriate for the Project.



4.0 SUMMARY OF EXISTING CONDITIONS

An integral part of the Class EA process is the review and inventory of the environmental features to support the evaluation of potential project effects. The following sections provide an overview of environmental conditions that were considered for this Project.

4.1 Natural Environment Conditions

An investigation was conducted to document natural environment conditions in the study area and to identify potential environmental constraints to the Project. Existing information was obtained through consultation with the St. Clair Region Conservation Authority (SCRCA) and the Ministry of Natural Resources and Forestry (MNRF). Site specific information was obtained through field surveys completed on June 29, 2015. The site reconnaissance was carried out to ground-truth findings of the desktop investigation, and to assess communities and look for habitat that could be used by rare species. The results of the investigation are detailed in **Appendix A** and summarized below.

During the field survey aquatic habitat features (e.g., substrate composition, morphology, and riparian vegetation) were documented in order to identify critical habitat within the study area such as spawning, nursery, feeding and migratory habitat. Sarnia Bay within the study area is primarily a permanent open water system of uniform morphology. Substrates are predominantly sand with small areas of sparse gravel and cobble deposits near the eastern sheet pile seawall, existing boat ramps and adjacent to the Sarnia Bay Marina. Water depths vary by location, with a typical range of 1.3 m to 2.8 m in depth. Aquatic vegetation is limited to sparse patches of Coontail (*Ceratophyllum demersum*) and Canadian Waterweed (*Elodea canadensis*), with overhanging riparian vegetation occurring at the eastern extent of the study area. Riparian vegetation consisted primarily of manicured lawns and a small meadow.

The fish community distribution historically documented within Sarnia Bay and the general vicinity consists predominately of cool to cold water species. Based on the fish community assemblage documented in **Appendix A**, Sarnia Bay within the study area provides habitat to a fish community composed of generalist species that are generally widespread in distribution and somewhat sensitive to environmental change.

No Areas of Natural and Scientific Interest, Environmentally Sensitive Areas or Provincially Significant Wetlands are located within the study area. The study area consists predominately of manicured lawn with areas of deciduous meadow and cultural meadow vegetation communities as shown on **Figure 4**. In addition, existing trees with potential to be affected by the proposed shoreline protection and boat launch were documented. The Tree Inventory was completed during three separate visits on November 3, 2014, December 8, 2014 and June 11, 2015, and the technical memorandum is included in **Appendix B**. There were no listed or significant tree species found in the study area. The condition of existing trees range from 'fair' to 'good'.



Figure 4: Results of Natural Environment Existing Condition Study

4.1.1 Species at Risk

Four at risk species were identified as having potential suitable habitat to occur within or in the vicinity of the study area:

- Spotted Sucker (*Minytrema melanops*) – listed as a special concern species under both the *Species at Risk Act* and Ontario's *Endangered Species Act*;
- Greater Redhorse (*Moxostoma valenciennes*) – provincially listed by the Natural Heritage Information Center (NHIC) as S3 Rank of rare to uncommon, but it is not listed under either the *Species at Risk Act* or the *Endangered Species Act*;
- Snapping Turtle (*Chelydra serpentina*) – listed as a special concern species under both the *Species at Risk Act* and the *Endangered Species Act*; and
- Barn Swallow (*Hirundo rustica*) – listed as threatened under *Species at Risk Act*.



Under provincial *Endangered Species Act* and federal *Species at Risk Act*, killing or harming of species identified as endangered or threatened, such as Barn Swallow (Threatened) is prohibited. Species designated as special concern species (i.e., Spotted Sucker and Snapping Turtle) and their habitats do not receive protection under the *Endangered Species Act* and the *Species at Risk Act*. Endangered or threatened species under *Species at Risk Act* are afforded protection of critical habitat on federal lands but only aquatic species listed as endangered, threatened or extirpated under *Species at Risk Act* and migratory birds are protected on private or provincially-owned lands. Species listed by NHIC are not afforded protection under the *Endangered Species Act* and the *Species at Risk Act*.

There were no incidental observations of Barn Swallow noted during the field surveys, and no active or inactive nests were observed within the study area.

4.2 Surface Water Conditions

A desktop study was conducted to document surface water (hydrologic) environment conditions in the study area. The investigation consisted of a review of all pertinent background information associated with the surface water environment. The results of this desktop investigation are detailed in **Appendix C** and summarized below.

The area encompassed by the Park adjacent to the shoreline drains towards Sarnia Bay and surface water runoff does not discharge to the City’s stormwater collection system (i.e., street storm sewers). Sarnia Bay is hydraulically connected to the St. Clair River, which forms the outlet to Lake Huron a short distance (approximately 2.5 kilometres [km]) upstream of the Project. Consequently, the water level in Sarnia Bay and potential flood levels in the Park are directly affected by the water level and outflow from Lake Huron. Low water levels in Sarnia Bay would also affect the shoreline adjacent to the Park, as well as the functioning of the boat ramps. It is estimated (**Appendix C**) that the drop in water level between Lake Huron and Sarnia Bay would typically vary from about 25 millimetres (mm) to 50 mm. Static water levels in Sarnia Bay are provided in **Table 1**.

Table 1: Static Water Levels in Sarnia Bay

Condition	Water Level (m)
1:100 Year Water Level	177.6
Maximum Mean Monthly Water Level	177.5
Long Term Average Mean Monthly Water Level	176.5
Minimum Mean Monthly Water Level	175.5

Wind generated waves in Sarnia Bay and their potential to cause shoreline erosion was assessed using simplistic wave hindcasting approaches (**Appendix C**). The study area generally remains sheltered from direct wave attack due to its location within Sarnia Bay; however, waves generated by winds from the south-south west could potentially reach the study area and produce significant wave heights in the order of 0.8 m.

Much of Sarnia Bay is located within a depositional zone. With the exception of the area out from the south end of the sheet pile sea wall at the eastern extent of the study area, the entire inner bay lies in water less than about 2 m depth. Most of Sarnia Bay within 100 m of the shoreline along the Park is less than 1 m deep. The shape



and alignment of the bottom contours extending outwards from the existing boat launch suggests that periodic dredging has been necessary to maintain adequate depths for pleasure craft users.

No current data for Sarnia Bay was available. During periods of falling water levels in Lake Huron (and in the St. Clair River), there will be a very gradual outflowing of water from the bay into St. Clair River, resulting in a very small underlying current in that direction. Similarly, during periods when lake and river levels are rising, there will be a small current entering Sarnia Bay. It is expected that local currents generated by storms and pleasure craft wakes will dominate over any minor inflow / outflow currents, both in terms of magnitude and direction.

4.3 Geotechnical Investigation

A geotechnical investigation to characterize existing geotechnical conditions in the parking areas at the Sarnia Bay Marina, replacement boat launch location and shoreline of the Park was conducted to support Project design. The investigation consisted of drilling boreholes to assess the subsurface soil and shallow groundwater conditions.

The field investigation at the parking lot and boat ramp locations was carried out on September 10, 2015. The geotechnical investigation at these locations consisted of drilling 11 geotechnical augerholes. The field investigation along the shoreline was completed on September 9, 2015 and consisted of five boreholes to depths of about 5 m. Groundwater seepage conditions were noted in all of the augerholes and boreholes.

Soil samples obtained during the investigation were brought to Golder's laboratory for water content and soil classification testing. The results of the investigation and laboratory results for the parking area and boat launch area are provided in **Appendix D**. The results of the investigation along the shoreline will be reported under separate cover at a later date. The results of the investigation were used to provide engineering information for the geotechnical design aspects of the Project.

4.4 Archaeological Conditions

The *Ontario Heritage Act* provides the provincial government and municipalities power to preserve and protect heritage properties and archaeological sites. Under the *Ontario Heritage Act*, archaeological resources are defined as an object, material or physical feature that may have cultural heritage value or interest (i.e., resource), any property that contains an artifact or any other physical evidence of past human use or activity that is of cultural heritage value or interest (i.e., site), and any object, material or substance that is made, modified, used, deposited or affected by human action and is of cultural heritage value or interest (i.e., artifact).

Archaeological potential is established by determining the likelihood of the presence of archaeological resources within a study area through archaeological investigations (e.g., Stage 1 Archaeological Assessment). In accordance with the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists*, areas subject to extensive land disturbances, such as grading, possess low to no archaeological potential and are not recommended for survey. The *Criteria for Evaluating Archaeological Potential* checklist was completed by the City (**Appendix E**) and determined that an archaeological assessment



for the Project is not required since the study area has been subjected to “recent, extensive and intensive disturbance” and therefore was determined to have low to no archaeological potential.

In 2012 a land use history of the Park area during the time period of 1870 to 1970 was completed (**Appendix F**). The technical memorandum documents the land use and historical disturbance of the study area. The existing shoreline within the study area is man-made through dredging and infilling of Sarnia Bay between the 1920s and 1960s. The dredging and in-filling was undertaken to provide new harbour and rail transportation facilities. Infilling of Sarnia Bay is visible on aerial imagery shown in Plates 13 through 16 of **Appendix F**.

4.5 Built and Cultural Heritage Conditions

Under the EA process, a proponent is required to determine the potential impact(s) of a project on built and cultural heritage resources / landscapes. The *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Landscapes* checklist was completed by the City and determined that there is a low potential for built heritage resources and cultural heritage landscapes within the study area (**Appendix G**). In consultation with the MTCS, it was confirmed that further studies (i.e., Heritage Impact Assessment and / or Cultural Heritage Evaluation) are not necessary.

The City’s Waterfront Master Plan identifies the waterfront as an inappropriate location for memorials of any type with the exception of dedication benches. The City acknowledges that the following features located within the study area do not have built or cultural heritage value:

- 1) Victims of Chemical Valley Missing Worker Memorial, a sculpture to remember those who have died from asbestos-related disease;
- 2) Victorian Order of Nurses (VON) Memorial Garden fountain, a memorial to honour deceased loved-ones and donate to VON, a non-profit organization offering home care; and
- 3) Footsteps Tribute to Courage – Never Walk Alone, a series of flagstones created by abuse survivors to show courage and increase the community’s awareness of violence, sexual assault and sexual abuse.

The City has committed to maintaining and reinstating the features in the final design of the Park rehabilitation and shoreline protection. The reinstated location of these features is being planned in consultation with the affected stakeholders and Project landscape architects.

4.6 Sediment Investigations

The City retained Pollutech EnviroQuatics Limited (Pollutech) to conduct investigations within Sarnia Bay to characterize the environmental quality of sediment in areas targeted for dredging as part of regular maintenance activities completed by the City. An initial sediment investigation was completed in June 2013 and found, with the exception of sediment at one sampling location, that sediment quality is suitable for use as fill material for a parkland property use in a non-potable groundwater condition at a distance greater than 30 m from a water body. Contamination was detected at one sampling location within the approach way of the boat ramps, beyond the study area for this Project.



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Further sediment sampling was completed to delineate the extent of contamination in February 2014. Additional sampling at 25 m intervals in concentric triangles extending out from the point of contamination found during the June 2013 sampling program was undertaken for laboratory analysis. The laboratory results indicate that the approximate area of contamination is located within the approach way of the existing boat launch and east to the shoreline within the study area.

In June 2015 Pollutech collected sediment samples adjacent to the Sarnia Bay Marina where the replacement boat launch is proposed. The laboratory results confirmed that all sediment would be acceptable for use as fill material for a parkland property use in a non-potable groundwater condition at a distance greater than 30 m from a water body.



5.0 IDENTIFICATION OF ALTERNATIVE SOLUTIONS / DESIGNS

The Class EA process provides a mechanism through which the City can evaluate a reasonable range of options for proposed municipal infrastructure. In this case, the City identified the need to contain contamination and allow safe use of the Park. Solutions to the identified problem / opportunity have been identified as part of previous studies and are documented in the City's plans for the rehabilitated Park design.

As noted in Section 1.1, City Council approved a Remedial Strategy Plan for a clean soil cap at the Park, which requires shoreline protection along the Sarnia Bay harbour front at the Park, including the removal and need to replace the existing boat ramps. The studies completed to develop the rehabilitated Park design determined that shoreline protection in the form of a sea wall is necessary, as well as the location of the replacement boat ramps. These studies document the need and justification phases of the Project, which included analysis of existing conditions, project justification, and alternatives. Efforts to contain the contamination and reopen the Park before Canada's 150th anniversary as a nation guided the preferred alternative solution to the problem / opportunity that are subject of this Class EA.

Therefore, feasible alternative solutions were pre-screened as part of the Park rehabilitation design studies and the preferred alternative solution was pre-determined prior to initiation of this Class EA. These plans in combination with information obtained through stakeholder consultation on Park design guided the development of alternative designs.

To develop a range of alternative designs that would be appropriate for the unique characteristics of the shoreline, it was necessary to review all background documents available, hold discussions with City staff, and solicit feedback from local residents and stakeholders. Alternative designs were considered in two parts:

- 1) shoreline protection along the Sarnia Bay harbour front within the study area; and
- 2) boat ramps.

The SCRCAs has identified that a more naturalized solution (i.e., armour stone wall, rip-rap structures) to shoreline protection is preferred from an environmental perspective. Although installation of a sheet pile sea wall would provide the necessary shoreline protection, it is not considered "natural" or socially favourable, and is therefore considered undesirable.

The rehabilitated Park design shows the southern portion of the parking lot that provides access to the existing boat ramps converted to green space. As a result, the boat ramps would no longer be usable because vehicle access is not provided. Unless replacement boat ramps are provided elsewhere, existing boat ramps available at alternate locations would have to be used. The City determined through consultation with stakeholders that replacement boat ramps are necessary and would be favourable located adjacent to the Sarnia Bay Marina, who manages boat ramp use. The removal and proposed location of the replacement boat launch was consulted with stakeholders during Park rehabilitation consultation.



5.1 Alternative Solutions to Shoreline Protection

A range of alternative designs were developed to address the identified problem / opportunity. As a requirement of the Municipal Class EA process, the first option must evaluate the 'Do Nothing' scenario as a baseline comparison to other alternatives developed in the study. The *Accessibility for Ontarians with Disabilities Act* (AODA), Crime Prevention Through Environmental Design (CPTED) principles, Fisheries and Oceans Canada's (DFO) Land Development Guidelines for the Protection of Aquatic Habitat, Ontario Building Code and Leadership in Energy and Environmental Design (LEED) were reviewed and incorporated into the range of alternative designs considered:

Alternative 1 – Do Nothing

Under this scenario, there would be no changes to the existing condition of the shoreline at the Park. The reliability and integrity of the soil cap without shoreline protection would be compromised due to the potential for erosion and stability issues. As such, a soil cap in the vicinity of the shoreline would not be a feasible since no shoreline protection would be provided.

Alternate 2 – Vertical Armour Stone Wall

Under this scenario, the armour stone wall would ensure shoreline stability and eliminate shoreline erosion, and retain the environmental cap required for rehabilitation of the Park. This alternative consists of three courses of vertically stacked armour stone set at a batter (i.e., a slight angle) to create a retaining wall along the shoreline of Sarnia Bay at the Park. The wall is set on a rip-rap base course, underlain with a geotextile fabric. The footprint of the wall is placed to limit disturbance and construction within the water and includes a planting bed located at the top of the wall. Aesthetically, the wall creates a uniform, visually continuous edge to the shoreline.

Alternate 3 – Tiered Armour Stone Wall

Under this scenario, the armour stone wall would ensure shoreline stability and eliminate shoreline erosion, and retain the environmental cap required for rehabilitation of the Park. This alternative uses two courses of armour stone tiered with a planting bed between to create a retaining wall along the shoreline of Sarnia Bay at the Park. The wall is set on a rip-rap base course, underlain with a geotextile fabric. The footprint of the wall is placed to limit disturbance and construction within the water and includes a second planting bed located at the top of the wall. Aesthetically, the wall creates a more naturalized looking shoreline and visually softens the hard edge of the armour stone.

5.2 Alternative Solutions to Boat Launch

A range of alternative designs were developed to address the identified problem / opportunity. In absence of local jurisdiction standards and guidelines for boat ramp design, the Virginia Department of Game and Inland Fisheries guidelines, and the United States National Park Service guidelines were reviewed and incorporated into the range of alternative designs considered:

Alternative 1 – Do Nothing

Under this scenario, there would be no changes to the existing condition of the boat ramps. As noted in Section 5, the boat ramps would no longer be usable because vehicle access is not provided in the rehabilitated



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Park design. Furthermore, a soil cap at the Park would not be feasible if the ramp were retained in its existing location since retaining vehicle access to the boat ramps would result in a loss of fill storage needed to rehabilitate the Park.

Alternative 2 – Remove and Build a Replacement Boat Launch with Two Ramps

Under this scenario, the existing boat ramps will be removed, and a replacement boat launch with two ramps will be provided adjacent to the Sarnia Bay Marina. This alternative is a “like-for-like” infrastructure replacement to maintain the level of service currently provided to pleasure craft users at the existing boat ramps. Access to the boat ramps is provided through the marina parking lots.

Alternative 3 – Remove and Build a Replacement Boat Launch with Four Ramps

Under this scenario, the existing boat ramps will be removed, and a replacement boat launch with four ramps will be provided adjacent to the Sarnia Bay Marina. This alternative provides an increased level of service to pleasure craft users when through the addition of third and fourth ramps. Access to the boat ramps is provided through the marina parking lots.



6.0 EVALUATION OF ALTERNATIVE SOLUTIONS

To evaluate the alternative designs for shoreline protection and boat ramp replacement, an evaluation matrix approach was used based on identified issues and constraints. The issues and constraints were sorted into the categories of social and economic environment, natural environment, cultural environment, and technical considerations. Evaluation criteria for each category were developed based on the legislation, policy, and design guidelines that apply to this Project. Each of the evaluation criteria were then screened against the results of the existing conditions studies to determine whether they were relevant to the Project. The results of the screening are provided in **Table 2**.

The evaluation of alternative designs for shoreline protection / boat ramps are discussed and summarized in the following sections. The detailed evaluations are provided in **Appendix H**.

6.1 Shoreline Protection

As identified in the summarized evaluation matrix (**Table 3**), the option to “Do Nothing” is not a feasible alternative. Although this alternative would result in the least amount of construction related impacts (e.g., clearing vegetation, in-water works), the contamination would not be contained and the Park along the shoreline would remain closed to recreational uses. A clean soil cap cannot be implemented along the shoreline if no shoreline protection is provided; therefore, the identified problem / opportunity would persist. Specifically, the Park would remain closed along the shoreline, limiting the enjoyment and use of the Park at the waterfront. Therefore, this alternative is not an acceptable option.

Alternatives 2 and 3 are anticipated to result in similar impacts to the natural and social / economic environment. Both alternatives will retain the environmental cap required for rehabilitation of the Park by protecting the shoreline and soil cap from stability and erosion processes. Both alternatives enhance the opportunity for public enjoyment of the waterfront through retaining the Bluewater Bike Path near the shoreline and providing power sources for recreational activities such as the Celebration of Lights. Additionally, the alternatives permit planting of native tree species that are suited to open spaces / park lands. Shoreline protection through either alternative under consideration will include the application of high standards of urban design by maintaining uniformity of City design elements, as well as adhering to AODA, CPTED principles, DFO guidelines, Ontario Building Code and LEED specifications, where applicable.

The natural environment investigation determined that Sarnia Bay is a cool / cold water fishery. Construction of shoreline protection is anticipated to take approximately 4 months to complete for both Alternatives 2 and 3. A portion of this construction period is planned during the general permissible cool / cold water fisheries window where in-water work is permitted between June 15 and September 15 only. Any works outside of the cool / cold water fisheries window would be negotiated with MNRF (Section 7.4). Alternatives 2 and 3 will both result in approximately 270 m² of direct permanent aquatic habitat loss.



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Table 2: Pre-screening of Project Evaluation Criteria

Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Screening of Targets Based on Known Conditions	Relevant to Project?
Natural Environment				
Compliance with natural heritage policies of the Provincial Policy Statement (2014)	Protection of significant wetlands	No development or site alterations in wetlands identified as Provincially Significant	No Provincially Significant Wetlands (PSWs) identified within or adjacent to the study area	No
	Protection of significant woodlands	No negative impact to significant woodlands from site alteration or development	No significant woodlands identified within or adjacent to the study area	No
	Protection of significant valley lands	No negative impact to significant valley lands from site alteration or development	No significant valley lands identified within or adjacent to the study area	No
	Protection of significant wildlife habitat	No negative impact to significant wildlife habitat from site alteration or development	No significant wildlife habitat identified within or adjacent to the study area	No
	Protection of Areas of Natural or Scientific Interest (ANSI)	No negative impact to ANSIs from site alteration or development	No ANSIs identified within or adjacent to the study area	No
	Protection of fish habitat	Minimize development or site alteration in fish habitat or riparian areas (defined as areas within 15 m from top of bank)	In water works will likely be required during construction	Yes
Compliance with the <i>Endangered Species Act</i> (2007)	Protection of species listed as threatened or endangered in Ontario	No killing, harming or harassing of species, or impacting the habitat of species identified as endangered or threatened	One threatened species (Barn Swallow) and two special concern species (Snapping Turtle and Spotted sucker) were identified with potential to occur within the study area	Yes



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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Screening of Targets Based on Known Conditions	Relevant to Project?
Compliance with the <i>Species at Risk Act</i> (2002)	Protection of species listed as endangered, threatened or extirpated in Canada, and migratory birds listed under the <i>Species at Risk Act</i>	No impact to critical habitat of endangered, threatened or extirpated aquatic species or habitat of migratory birds	Two special concern species (Snapping Turtle and Spotted sucker) were identified with potential to occur within the study area	Yes
Compliance with the <i>Migratory Birds Convention Act</i> (1994)	Protection of nesting habitat of migratory birds in Canada	No clearing of trees, shrubs, meadow grasses or existing structures that would result in the destruction of nests of migratory birds during the breeding season	Removal of trees and / or existing structures will likely be required	Yes
Compliance with Ontario Regulation 171/06 – SCRCA	Protection of public safety and property from natural hazards, and prevention of pollution and destruction of sensitive environmental areas such as wetlands, shorelines and watercourses	Minimize excavation, filling, site grading or development within the regulated limit	The study area is within the regulated limit	Yes
Consideration of best practices for watershed protection	Preservation of riparian zones adjacent to shorelines, minimization of shoreline erosion and sedimentation and maintenance of stormwater runoff at pre-development levels	Maintain natural drainage patterns and manage stormwater runoff	Grading along shoreline and in water works will likely be required during construction	Yes
Social and Economic Environment				
Compliance with the City of Sarnia Adopted Official Plan (2014)	Protection of lands designated as natural heritage systems (i.e., natural areas, parks, open space, natural hazards)	Protect, maintain, enhance and restore natural heritage systems where it is not feasible to direct development away from these areas	The study area is designated as park land use and a natural hazard area	Yes



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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Screening of Targets Based on Known Conditions	Relevant to Project?
Compliance with the City of Sarnia Adopted Official Plan (2014) (continued)	Avoidance of building / structure construction within identified one-zone floodplain policy areas	Allow construction in support of public recreation only where construction will not affect flood levels	The study area is within a one-zone floodplain policy area.	Yes
	Protection of groundwater to ensure safe drinking water supply	Protect or improve vulnerable water resources (i.e., aquifer and groundwater recharge areas)	Surficial groundwater flow is to / from Sarnia Bay and not the aquifer	No
	Consideration for public safety through protection of the St. Clair River waterfront and shoreline	Protect, maintain and enhance the waterfront through naturalization and improved stability of the shoreline	Grading along shoreline and in water works will likely be required during construction	Yes
	Provision for bicycle and pedestrian corridors and linkages within urban natural areas	Maintain or improve existing multi-use walking / bicycling corridor along Sarnia Bay shoreline at the Park	The Bluewater Bike Path transects the study area along the shoreline	Yes
	Protection of lands designated as park and open space	Protect, maintain, enhance and improve parks and open spaces	The study area is identified as park land use	Yes
	Consideration of cultural heritage resources in the undertaking of municipal public works	Identification, conservation, protection, rehabilitation, renovation, restoration, preservation and reuse of cultural heritage / archaeological sites	No cultural heritage resources were identified in the study area	No
	Application of high standards of urban design wherever possible	Maintain uniformity of design for elements such as benches, railings, lighting fixture, walkways and signs	The Bluewater Bike Path transects the study area along the shoreline; installation of illumination and railings may be required	Yes
	Consideration of the protection of urban City trees	Protect and preserve existing mature trees within the same site, or in an adjacent natural area or natural hazard lands, where possible	Removal of trees will likely be required	Yes



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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Screening of Targets Based on Known Conditions	Relevant to Project?
Compliance with the City of Sarnia Waterfront Master Plan (2005)	Enhance the opportunity for public enjoyment of the waterfront and waterfront character	Development consistent with land designations and plans of George Street to Exmouth Street and West of Harbour Road waterfront areas	The study area falls within a shoreline management area and construction along the waterfront will be required	Yes
	Protection of continuous public walkway at or near water edge	Maintain or improve continuous walkway	The Bluewater Bike Path transects the study area	Yes
Consideration of Public concerns identified for the project	Consideration of power sources for recreational uses, such as the Celebration of Lights	Maintain or improve adequate power source for recreational uses	Power sources are located along the existing shoreline ^(a)	Yes ^(a)
Cultural Environment				
Compliance with the <i>Ontario Heritage Act</i> (1990)	Protection of built heritage structures 40 years of age or older that have cultural heritage value or interest as per Ontario Regulation 9/06	No impact to property or structures of cultural heritage value that have a municipal heritage designation as determined by Heritage Sarnia or Council resolution	No cultural heritage resources were identified in the study area	No
	Protection of properties that are listed or designated under Part IV of the <i>Ontario Heritage Act</i>	No impact to property or structures with heritage designations under the <i>Ontario Heritage Act</i>	No properties designated under the <i>Ontario Heritage Act</i> are within or adjacent to the study area	No
	Protection of archaeological resources and historic sites	No ground disturbance in areas of archaeological potential	No areas of archaeological potential were identified in the study area	No
Technical Design				
Consideration of construction duration and timing	Efficient duration of construction that is protective of the natural heritage environment	Limit and reduce construction duration and timing within wildlife protection windows, as applicable	Sarnia Bay is designated as a cool / cold water fishery; species specific timing windows will apply to construction	Yes



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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Screening of Targets Based on Known Conditions	Relevant to Project?
Consideration of geotechnical factors and feasibility of implementation	Feasible design that can be implemented within existing geotechnical conditions	Provision of a feasible design that is compatible with existing geotechnical conditions	No geotechnical constraints were identified	No
Consideration for the protection of public safety	Safe separation of pedestrians from shoreline	Improve and protect public safety through provision for buffer between sidewalks and shoreline	The study area abuts the shoreline and adequate separation of pedestrians from the water will be necessary	Yes
Consideration of durability and life expectancy	Long-term solution to shoreline protection	Design that has long life expectancy and can withstand environmental factors	A long-term solution is required to protect Sarnia Bay and for rehabilitation of the Park	Yes
Consideration for flooding potential	Consideration of public safety against flood potential appropriate for an urban park environment (i.e., 10-year return period)	Provision of a feasible design that considers protection of the public against flood events having a return period of 10 years taking into account water levels, waves and wave run up	The study area abuts the shoreline and adequate protection of the public against flood events will be necessary	Yes
Consideration of coastal hydraulics and compliance with appropriate technical guidelines for shoreline protection in an urban park environment	Feasible design that can be implemented, given expected water level and wave conditions	Provision of a feasible design that considers the historic range of water levels in Sarnia Bay, including significant wave height and wave run up	A long-term solution is required to stabilize the Sarnia Bay shoreline to prevent erosion	Yes

(a) Consideration of power sources for recreational uses is applicable to the shoreline protection alternatives only. No power sources are available at the existing boat ramps.



A vertical armour stone wall (Alternative 2) would address the identified problem / opportunity. As noted above, similar impacts to the natural environment are anticipated for both Alternatives 2 and 3; however, Alternative 2 has a slightly smaller footprint (approximately 3,075 m²), resulting in a smaller disturbance to lands designated as natural heritage systems, one-zone floodplain policy areas and terrestrial vegetation. The design of this alternative includes one planting bed located at the top of the armour stone wall. The elevation of the planting bed is above both the average long-term water level and significant wave height water level. Therefore, the alternative is less likely to be vulnerable to sustained periods of high water, frequent wave action and ice damage when compared to Alternatives 1 and 3. As a result, greater durability and a longer life expectancy are expected through implementation of this alternative. In addition, this alternative provides greater public safety because the one planting bed will deter pedestrian access to the waters edge. Alternative 2 has a planting bed located at the top of the armour stone wall as well; however, pedestrians may use the lower-tier planting bed for water access.

Although Alternative 3, which is the tiered armour stone wall alternative, would address the identified problem / opportunity, this alternative has the largest footprint (approximately 3,535 m²) resulting in greater impacts to lands designated as natural heritage systems, one-zone floodplain policy areas and terrestrial vegetation. This alternative provides limited opportunities for naturalization or benefits to terrestrial species. The key naturalization feature is the proposed planting bed located between the two courses of armour stone. This area lacks ecological opportunity based on its size. In addition, the elevation of the planting bed is below the significant wave height water level but above the average long-term water level. Therefore, under sustained periods of high water, frequent wave action and ice damage, the lower-tier planting bed will be more vulnerable to erosion and sedimentation. The resulting durability and life expectancy of the wall is less in comparison to Alternative 2.

The evaluation of alternative designs under consideration for shoreline protection along the Sarnia Bay harbour front at Centennial Park determined that Alternative 2 is the preferred alternative design.

6.2 Boat Launch

The option to “Do Nothing” was also considered by the City for the boat ramp alternatives. Under this scenario, there would be the least amount of construction related impacts (e.g., clearing vegetation, in-water works), but the problem / opportunity, including public concerns, would remain unresolved. Currently, the existing boat ramps are accessed via the parking lot located at Harbour Road / Seaway Road. The rehabilitated Park design shows the southern portion of this parking lot converted to green space. As a result, the boat ramps would no longer be usable because vehicle access is not provided. Additionally, shoreline protection is proposed along the shoreline where the boat ramps are currently located. Therefore, this alternative is not an acceptable option.



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Table 3: Evaluation of Alternatives – Shoreline Protection

Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Natural Environment					
Compliance with natural heritage policies of the Provincial Policy Statement (2014)	Protection of fish habitat	Minimize development or site alteration in fish habitat or riparian areas (defined as areas within 15 m from top of bank)	●	●	●
Compliance with the <i>Endangered Species Act</i> (2007)	Protection of species listed as threatened or endangered in Ontario	No killing, harming or harassing of species, or impacting the habitat of species identified as endangered or threatened	●	●	●
Compliance with the <i>Species at Risk Act</i> (2002)	Protection of species listed as endangered, threatened or extirpated in Canada, and migratory birds listed under the <i>Species at Risk Act</i>	No impact to critical habitat of endangered, threatened or extirpated aquatic species or habitat of migratory birds	●	●	●
Compliance with the <i>Migratory Birds Convention Act</i> (1994)	Protection of nesting habitat of migratory birds in Canada	No clearing of trees, shrubs, meadow grasses or existing structures that would result in the destruction of nests of migratory birds during the breeding season	●	●	●

Notes:





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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Compliance with Ontario Regulation 171/06 – SCRCA	Protection of public safety and property from natural hazards, and prevention of pollution and destruction of sensitive environmental areas such as wetlands, shorelines and watercourses	Minimize excavation, filling, site grading or development within the regulated limit	●	●	●
Consideration of best practices for watershed protection	Preservation of riparian zones adjacent to shorelines, minimization of shoreline erosion and sedimentation and maintenance of stormwater runoff at pre-development levels	Maintain natural drainage patterns and manage stormwater runoff	●	●	●
Social and Economic Environment					
Compliance with the City of Sarnia Adopted Official Plan (2014)	Protection of lands designated as natural heritage systems (i.e., natural areas, parks, open space, natural hazards)	Protect, maintain, enhance and restore natural heritage systems where it is not feasible to direct development away from these areas	●	●	●
	Avoidance of building / structure construction within identified one-zone floodplain policy areas	Allow construction in support of public recreation only where construction will not affect flood levels	●	●	●

Notes:





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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Compliance with the City of Sarnia Adopted Official Plan (2014) (continued)	Consideration for public safety through protection of the St. Clair River waterfront and shoreline	Protect, maintain and enhance the waterfront through naturalization and improved stability of the shoreline	●	●	●
	Provision for bicycle and pedestrian corridors and linkages within urban natural areas	Maintain or improve existing multi-use walking / bicycling corridor along Sarnia Bay shoreline at the Park	●	●	●
	Protection of lands designated as park and open space	Protect, maintain, enhance and improve parks and open spaces	●	●	●
	Application of high standards of urban design wherever possible	Maintain uniformity of design for elements such as benches, railings, lighting fixture, walkways and signs	●	●	●
	Consideration of the protection of urban City trees	Protect and preserve existing mature trees within the same site, or in an adjacent natural area or natural hazard lands, where possible	●	●	●
Compliance with the City of Sarnia Waterfront Master Plan (2005)	Enhance the opportunity for public enjoyment of the waterfront and waterfront character	Development consistent with land designations and plans of George Street to Exmouth Street and West of Harbour Road waterfront areas	●	●	●

Notes:



Most preferred



Least Preferred



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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Compliance with the City of Sarnia Waterfront Master Plan (2005) (continued)	Protection of continuous public walkway at or near water edge	Maintain or improve continuous walkway	●	●	●
Consideration of Public concerns identified for the project	Consideration of power sources for recreational uses, such as the Celebration of Lights	Maintain or improve adequate power source for recreational uses	●	●	●
Technical Design					
Consideration of construction duration and timing	Efficient duration of construction that is protective of the natural heritage environment	Limit and reduce construction duration and timing within wildlife protection windows, as applicable	●	●	●
Consideration for the protection of public safety	Safe separation of pedestrians from shoreline	Improve and protect public safety through provision for buffer between sidewalks and shoreline	●	●	●
Consideration of durability and life expectancy	Long-term solution to shoreline protection	Design that has long life expectancy and can withstand environmental factors	●	●	●
Consideration for flooding potential	Consideration of public safety against flood potential appropriate for an urban park environment (i.e., 10-year return period)	Provision of a feasible design that considers protection of the public against flood events having a return period of 10 years taking into account water levels, waves and wave run up	●	●	●

Notes:





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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Consideration of coastal hydraulics and compliance technical guidelines for shoreline protection in an urban park environment	Feasible design that can be implemented, given expected water level and wave conditions	Provision of a feasible design that considers the historic range of water levels in Sarnia Bay, including significant wave height and wave run up	●	●	●

Notes:





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Alternatives 2 and 3 are anticipated to result in similar impacts to the social / economic environment. Both alternatives will equally meet the Project-specific target to maintain the waterfront. In addition, each alternative includes provision for the Bluewater Bike Path within the design. Under existing conditions, the multi-use pathway ends at the western extent of the Park along the shoreline requiring users to cross in front of the boat ramps through the parking lot. Both alternative designs are based on the Virginia Department of Game and Inland Fisheries guidelines and the United States National Park Service guidelines, and will maintain uniformity with City design. Both alternatives are equally preferred when considering the Project-specific targets for technical design. The alternatives are similar relative to construction methods and materials, resulting in both alternatives having equal life expectancy and ability to withstand environmental factors, such as frequent wave action and ice damage. Regardless of the alternative, including Alternative 1, the boat ramps will be flooded by events having a 10-year return period.

Construction of shoreline protection is anticipated to take approximately 2 months to complete for both Alternatives 2 and 3. A portion of this construction period is planned during the general permissible cool / cold water fisheries window where in water work is permitted between June 15 and September 15 only. Any works outside of the cool / cold water fisheries window would be negotiated with MNRF (Section 7.4).

A replacement boat launch with two ramps (Alternative 2) is anticipated to have the least amount of impact on the natural environment. This alternative has a slightly smaller footprint both onshore and in the water (total footprint of approximately 445 m²). Removal of existing boat ramps would result in a net gain of approximately 530 m² of fish habitat. This alternative is consistent with the configuration of the existing boat ramps (i.e., two ramps or similar width) that is able to accommodate similar pleasure craft sizes and the same level of service.

Alternative 3 consists of four ramps that are narrower than Alternatives 1 and 2. Therefore, only “smaller” pleasure craft sizes would be able to use the boat ramps. Under this scenario, removal of existing boat ramps would also result in a net gain of approximately 530 m² of fish habitat; however, it has the largest onshore and in water footprint (total footprint of approximately 460 m²). Implementation of this design results in the largest loss of potential nesting habitat for migratory birds; however, no nests were noted during field investigations (**Appendix A**).

The evaluation of alternative designs under consideration for the boat ramps determined that Alternative 2 is the preferred alternative design.



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Table 4: Evaluation of Alternatives – Boat Ramps

Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Natural Environment					
Compliance with natural heritage policies of the Provincial Policy Statement (2014)	Protection of fish habitat	Minimize development or site alteration in fish habitat or riparian areas (defined as areas within 15 m from top of bank)	●	●	●
Compliance with the <i>Endangered Species Act</i> (2007)	Protection of species listed as threatened or endangered in Ontario	No killing, harming or harassing of species, or impacting the habitat of species identified as endangered or threatened	●	●	●
Compliance with the <i>Species at Risk Act</i> (2002)	Protection of species listed as endangered, threatened or extirpated in Canada, and migratory birds listed under the <i>Species at Risk Act</i>	No impact to critical habitat of endangered, threatened or extirpated aquatic species or habitat of migratory birds	●	●	●
Compliance with the <i>Migratory Birds Convention Act</i> (1994)	Protection of nesting habitat of migratory birds in Canada	No clearing of trees, shrubs, meadow grasses or existing structures that would result in the destruction of nests of migratory birds during the breeding season	●	●	●

Notes:





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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Compliance with Ontario Regulation 171/06 – SCRCA	Protection of public safety and property from natural hazards, and prevention of pollution and destruction of sensitive environmental areas such as wetlands, shorelines and watercourses	Minimize excavation, filling, site grading or development within the regulated limit	●	●	●
Consideration of best practices for watershed protection	Preservation of riparian zones adjacent to shorelines, minimization of shoreline erosion and sedimentation and maintenance of stormwater runoff at pre-development levels	Maintain natural drainage patterns and manage stormwater runoff	●	●	●
Social and Economic Environment					
Compliance with the City of Sarnia Adopted Official Plan (2014)	Protection of lands designated as natural heritage systems (i.e., natural areas, parks, open space, natural hazards)	Protect, maintain, enhance and restore natural heritage systems where it is not feasible to direct development away from these areas	●	●	●
	Avoidance of building / structure construction within identified one-zone floodplain policy areas	Allow construction in support of public recreation only where construction will not affect flood levels	●	●	●

Notes:





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Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Compliance with the City of Sarnia Adopted Official Plan (2014) (continued)	Consideration for public safety through protection of the St. Clair River waterfront and shoreline	Protect, maintain and enhance the waterfront through naturalization and improved stability of the shoreline	●	●	●
	Provision for bicycle and pedestrian corridors and linkages within urban natural areas	Maintain or improve existing multi-use walking / bicycling corridor along Sarnia Bay shoreline at the Park	●	●	●
	Protection of lands designated as park and open space	Protect, maintain, enhance and improve parks and open spaces	●	●	●
	Application of high standards of urban design wherever possible	Maintain uniformity of design for elements such as benches, railings, lighting fixture, walkways and signs	●	●	●
	Consideration of the protection of urban City trees	Protect and preserve existing mature trees within the same site, or in an adjacent natural area or natural hazard lands, where possible	●	●	●
Compliance with the City of Sarnia Waterfront Master Plan (2005)	Enhance the opportunity for public enjoyment of the waterfront and waterfront character	Development consistent with land designations and plans of George Street to Exmouth Street and West of Harbour Road waterfront areas	●	●	●

Notes:



Most preferred



Least Preferred



MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR THE SHORELINE PROTECTION OF CENTENNIAL PARK ALONG THE SARNIA BAY HARBOUR FRONT

Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Compliance with the City of Sarnia Waterfront Master Plan (2005) (continued)	Protection of continuous public walkway at or near water edge	Maintain or improve continuous walkway	●	●	●
Consideration of Public concerns identified for the project	Consideration of power sources for recreational uses, such as the Celebration of Lights	Maintain or improve adequate power source for recreational uses	●	●	●
Technical Design					
Consideration of construction duration and timing	Efficient duration of construction that is protective of the natural heritage environment	Limit and reduce construction duration and timing within wildlife protection windows, as applicable	●	●	●
Consideration for the protection of public safety	Safe separation of pedestrians from shoreline	Improve and protect public safety through provision for buffer between sidewalks and shoreline	●	●	●
Consideration of durability and life expectancy	Long-term solution to shoreline protection	Design that has long life expectancy and can withstand environmental factors	●	●	●
Consideration for flooding potential	Consideration of public safety against flood potential appropriate for an urban park environment (i.e., 10-year return period)	Provision of a feasible design that considers protection of the public against flood events having a return period of 10 years taking into account water levels, waves and wave run up	●	●	●

Notes:





MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR THE SHORELINE PROTECTION OF CENTENNIAL PARK ALONG THE SARNIA BAY HARBOUR FRONT

Regulatory / Policy / Design Requirement	General Objectives	Project-specific Target	Alternative 1 – Do Nothing	Alternative 2 – Vertical Armour Stone Wall	Alternative 3 – Tiered Armour Stone Wall
Consideration of coastal hydraulics and compliance technical guidelines for shoreline protection in an urban park environment	Feasible design that can be implemented, given expected water level and wave conditions	Provision of a feasible design that considers the historic range of water levels in Sarnia Bay, including significant wave height and wave run up	●	●	●

Notes:



Most preferred



Least Preferred



7.0 PREFERRED ALTERNATIVE

Alternative 2 was selected as the preferred alternative design for both the shoreline protection and boat ramps. These alternatives were found to have the least amount of impact to the environment. The proposed design will require removal of some existing trees, but replacement trees will be incorporated into the detailed design. Replacement trees will be selected from appropriate native species with sizes so as not to impact overhead hydro lines or other utilities when they grow to maturity. Additionally, the detailed design will follow recommendations in the Geotechnical Investigation Report and Surface Water Environment technical memorandum. Plans for the preferred alternative design are illustrated in **Figures 5 and 6** and the preliminary design drawing is provided in **Appendix I**.



MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR THE SHORELINE PROTECTION OF CENTENNIAL PARK ALONG THE SARNIA BAY HARBOUR FRONT

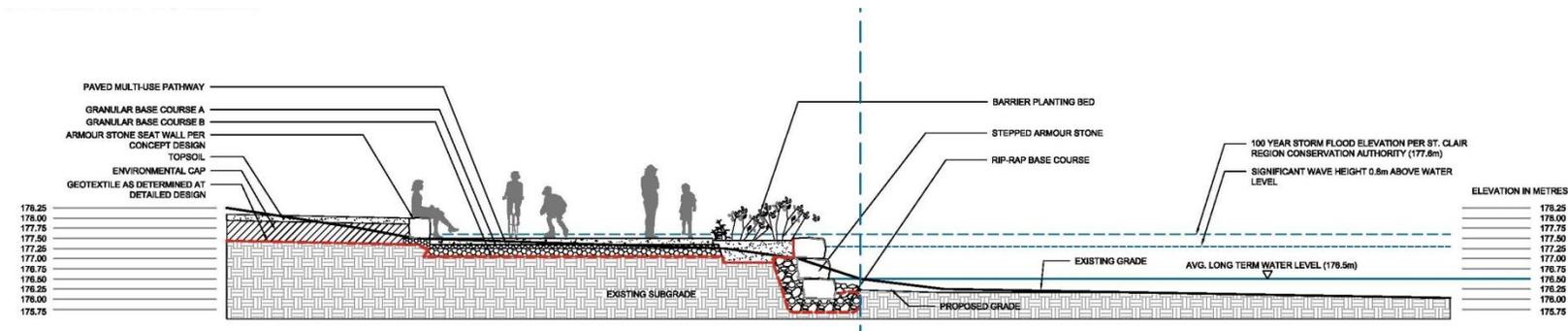


Figure 5: Preferred Alternative Shoreline Protection Design

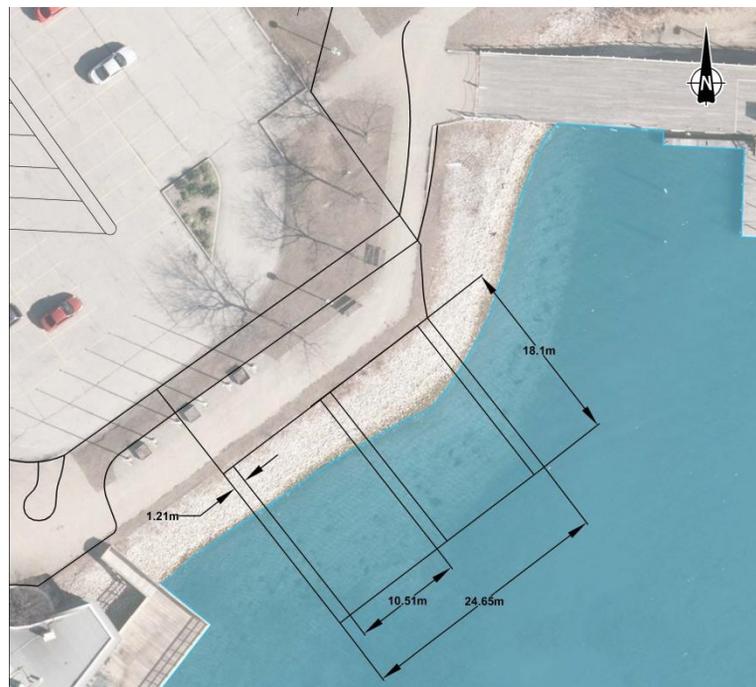


Figure 6: Preferred Alternative Boat Ramp Design



7.1 Conceptual Design of the Preferred Alternative

7.1.1 Shoreline Protection

The shoreline protection will be constructed in a sequential manner. Initially, a portable dam and silt screen will be installed along approximately 15 m to 18 m section of shoreline. A fisheries specialist will electro-fish and relocate all fish from the work zone. Following fish relocation, the following activities will occur:

- the shoreline area will be excavated (in the wet) to the depth where a geotextile material will be placed;
- a foundation of rip-rap limestone or dolomite will be carefully placed in the excavation and settled;
- a base coarse of armour stones will be placed and located to ensure proper position;
- additional rip-rap stone (approximately 600 mm of cross section) will be placed between the armour stone coarse of stones and the back side of the excavation which will be lined with geotextile material;
- a second coarse of armour stones will be placed over the first course with a planned set back of 100 mm to 150 mm; and
- additional rip-rap will be placed behind the second coarse of armour stones (about 600 mm cross section) between the armour stone and the geotextile lined excavation.

If a third coarse of armour stone is required, placement will be performed in the same manner as the second coarse of armour stone as described above. Once the section of armour stone wall has been placed, fill material will be placed carefully as needed to achieve a compaction density of approximately 95% Standard Proctor Maximum Dry Density, followed by the environmental cap, consistent with the rest of the Park. Finishes, pavements and plantings will be added as planned in the designs and specifications.

The preferred design requires relatively low maintenance once operational. Maintenance activities would be consistent with those previously required under existing conditions when the Park was open prior to June 2012. The design includes a planting bed located at the top of the armour stone wall that can be planted with woody vegetation. This planting bed may require periodic vegetation maintenance (e.g., weeding, trimming).

7.1.2 Boat Ramps

The boat ramps will be constructed following traditional Cast in Place concrete construction methods with steel reinforcement, foundations and footings provided, as appropriate. The boat ramps design consists of a 14% grade for vehicles to launch pleasure crafts into the water. Vehicle traction aide will be provided by 25 mm square traction grooves cast into the surface of the ramps.

The entire construction process will be conducted in the dry. It is anticipated that a temporary coffer dam will be installed by the contractor and that all excavation work, foundation and ramp construction will be conducted behind the coffer dam. A fisheries specialist will perform electro-fishing behind the coffer dam prior to the work zone dewatering.

The concrete to be used for construction of the ramps will be 32S2, which contains a protection package against any potential sulfides that may be present in the ground or water, and offers long-term performance and



durability. In addition, the boat ramps design includes provision for future small pleasure craft ramp, if necessary.

7.2 Estimated Construction Cost

Benchmark construction cost estimates were prepared for the preferred alternative design. The costs were divided into two parts to assist with the City's planning and budgeting process, and include allowances for construction contracts, utility relocations, design and inspection, as applicable.

Estimated construction costs are as follows:

1) Vertical Armour Stone Wall:	\$920,000
2) Boat Ramps:	\$165,000
Total of Items 1 and 2:	\$1,085,000

7.3 Proposed Construction Schedule

The City is committed to containing the contamination, and having the Park open and operational for Canada's 150th anniversary as a nation. A 6 month construction period is planned for the Project, with construction occurring in two phases. A portion of the construction period is planned during the general permissible cool / cold water fisheries window where in water work is permitted between June 15 and September 15 only. Any works outside of the cool / cold water fisheries window would be negotiated with MNRF.

The first phase of construction will be the installation of the replacement boat launch, which is planned to commence Spring 2017, pending necessary regulatory approvals. Construction of the boat ramps is expected to take approximately 2 months to complete. Upon completion of the boat ramps, the existing boat ramps will be taken out of service and removed.

Construction of the shoreline protection will begin adjacent to the existing fueling station, moving eastward. Shoreline construction activities may overlap slightly with boat ramp construction, and is expected to be completed within 4 months (i.e., completed Fall 2017).

7.4 Mitigating Measures

Throughout the planning and design process, the evaluation of alternatives focused on eliminating impacts wherever possible. For example, the extent of in water construction is limited by the placement of the armour stone wall toe (i.e., footprint of shoreline protection placed further inland to reduce in water footprint). In addition, natural materials are proposed for the construction of the armour stone wall (Section 7.1). Armour stone and rip-rap along the shoreline provides a natural material alternative compared with steel sheet pile alternatives. The complexity of the restored shoreline is also improved as natural stone materials offer a similar level of texture and appearance as natural shorelines. Normally occurring gaps in stone placements provide attachment locations for emergent and submergent vegetation and are attractive micro habitats for many aquatic organisms,



including benthics and small fish. The planting bed located at the top of the armour stone wall will provide some naturalization opportunity to support terrestrial species.

Where the selection of the preferred alternative cannot entirely eliminate potential environmental impacts, mitigation measures are recommended to limit the effect of the impacts. The following sections outline recommended mitigation measures to be incorporated at detailed design and implemented throughout the duration of construction.

7.4.1 Construction Activities

Project-related impacts are expected to be greatest during construction activities. Many of the anticipated impacts are tied to construction and will not persist once the shoreline protection is implemented and replacement boat ramps are operational. The mitigation measures to address the potential impacts are identified in **Table 5**.

Table 5: Planned Mitigating Measures

Potential Effects	Mitigation to be Implemented
Sedimentation and turbidity within Sarnia Bay	A portable dam / coffer dam will be installed within Sarnia Bay during construction to contain suspended sediment during construction activities. Once construction is complete, the portable dam / coffer dam will be removed once suspended sediment has settled. Sediment / turbidity monitoring will occur during construction to ensure measures are working correctly.
Ponding within the Park and adjacent areas	Existing surface water drainage will be maintained to the extent practicable. Appropriate runoff and erosion control measures will be in place during construction.
Shoreline erosion	A portable dam / coffer dam will be installed within Sarnia Bay during construction to contain suspended sediment during construction activities. A geotextile fabric will be installed to contain contamination and prevent erosion of the soil cap. Disturbed areas will be seeded and revegetated as soon as practicable following construction using native seed mixes. Temporary erosion measures will remain in place and maintained until permanent restoration measures are established and growing.
Contamination of water and soils through accidental spills and / or leaks	A spill control plan will be in place during construction. The contractor will be required to regularly inspect equipment to make sure it is in good working order and free of leaks. Refuelling and maintenance of machinery will occur at least 30 m away from waterbodies. Spill kits will be available at refuelling locations.
Can in flood storage capacity	A permit for construction within the regulated area will be obtained from the SCRCA prior to construction. Mitigation and conditions of the permit will be adhered to.



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Potential Effects	Mitigation to be Implemented
Removal of aquatic habitat and displacement of aquatic species	<p>Following portable dam / coffer dam installation, fish will be relocated into Sarnia Bay outside of the work area. A permit will be obtained from the MNRF prior to fish relocations.</p> <p>There will be a permanent loss of aquatic habitat. The shoreline protection will be constructed using natural materials that will provide shelter and habitat to aquatic species.</p> <p>The current project schedule requires works to be undertaken within the restricted construction timing window. An extension to the prescribed restricted timing window will be obtained from the MNRF prior to this work occurring.</p>
Construction during spawning, nesting and breeding periods	<p>Construction will occur during the breeding bird season (April 15 to July 31). If site clearing and / or removal of the existing boat ramps occur during this time, a qualified biologist will conduct a field investigation to confirm no active nests, breeding birds or Species at Risk birds are present.</p>
Tree removal	<p>Disturbed areas will be seeded and revegetated as soon as practicable following construction using native seed mixes. The location of replacement trees will be determined during detailed design. Only native species will be used.</p> <p>Tree removals will occur outside of the window with birds are nesting (April 15 to July 31).</p>
Introduction of invasive plant species	<p>Only clean fill and n approved native seed mixture will be used. Equipment and vehicles used on site will be washed prior to entering the site. If equipment is used at other locations it will be washed prior to re-entering the site.</p>
Disruption of quiet enjoyment	<p>Noise abatement equipment on machinery will be good working order. The Project will adhere to the City's by-law number 144 of 1998, <i>A By-Law to Control Noise</i>, for the operation of heavy equipment in connection with construction for Residential and Parks Area.</p>
Disruption of pedestrian movements between Front Street and the Sarnia Bay Marina	<p>Pedestrian access to the marina will be maintained through the northern section of the park during construction.</p>
Disruption of the Sarnia Bay Marina	<p>The replacement boat ramps will be completed and operational prior to removal of the existing boat ramps.</p>
Temporary disruption to users of adjacent properties	<p>The public and adjacent landowners will be notified of construction scheduling and equipment access route(s).</p>

7.4.2 Protection of Trees to be Retained

Any trees on public or private property (e.g., adjacent to the study area) to be retained, shall be protected to the satisfaction of the City's Arborist. A tree protection plan shall be prepared for the written approval of the City's Arborist prior to the commencement of construction activities. Trees to be retained shall be protected with tree protection fencing that is at least 1.2 m in height and consisting of orange plastic snow fencing on a wood frame made of 2-inch x 4-inch boards. Tree protection fencing shall be placed, at a minimum, 1 m beyond the limit of the extent of the canopy for all trees to be retained. Construction activities, grade changes, surface treatment or excavations of any kind shall not be permitted within this tree protection zone.



7.5 Permitting and Approval Requirements / Guidelines

Throughout the planning and design process of this Class EA, and through consultations with review and approval agencies, a number of legislative and policy guidelines were identified as being relevant to the Project. Each of the following permits and / or approvals applies to the implementation process for the Project.

City of Sarnia Official Plan

The Official Plan of the City of Sarnia was adopted by City Council in June 2014 and approved in February 2015 by the County of Lambton. The Official Plan provides the vision for all lands within the City until the planning horizon year of 2031 and includes provisions for comprehensive, community-based planning policy framework for consistency in decision-making. Policies for the human, built, economic and natural environments are outlined in the plan, as well as policies for City systems, such as water resources, and water and wastewater infrastructure. Site- and area-specific policies for individual locations are also included in the Official Plan; however, none are application the study area. The City recognized the importance of their open spaces and parks, and identifies these land uses are areas to be protected and improved upon for respite and recreation.

The Plan, through its policies, links economic growth with environmental sustainability in order to guide land use changes and development trends in the future. Specifically, Sections 4.0, 5.0 and 6.0 of the Plan set out considerations for the provisions of infrastructure and community development, and City systems. Application of the Plan to infrastructure development is not limited to the listed sections; the listed sections were identified as most relevant to this Project. Proposed developments must comply with polices of the Plan and are subject to the requirements of the Class EA process and the *Planning Act*. Specific objectives pertaining to land use planning, community design and improvement, cultural heritage, archaeology, natural environment and water resources were reviewed in the context of this Project. It was determined that the Project as proposed meets all requirements.

Planning Act

Under the authority of Section 3 of the *Planning Act*, the Provincial Policy Statement provides policy direction on matters of Provincial interest related to land use planning and development. Specific policies pertaining to infrastructure, natural heritage, water, and cultural heritage were reviewed, and it was determined that the Project as proposed meets all requirements.

- The Project will allow safe use of the Park (i.e., Park contamination will be remediated through placement of a clean soil cap prior to any activity on the site associated with the proposed use).
- Where possible, impacts to natural heritage features and functions of the area will be protected, maintained, restored and / or improved.
- The Project involves site alteration within fish habitat. Project development will be in accordance with provincial and federal requirements (see *Fisheries Act* and MNRF Approval below).
- No Areas of Natural and Scientific Interest, Environmentally Sensitive Areas or Provincially Significant Wetlands are located within the study area.



- No archaeological potential or built / cultural heritage resources are located within the study area.

The Provincial Policy Statement also includes policies related to protecting public health and safety. The study area is located within lands designated in the City's Adopted Official Plan as Natural Hazards land use and a One Zone Floodplain Policy Area. No alteration and / or placing or removal of fill is allowed on natural hazard lands unless approved by the City and SCRCA (see Ontario Regulation 171/06 below). Furthermore, the City's Official Plan supports minor infilling and modifications to the configuration of the shoreline for the purpose of stabilizing slopes and shorelines. Within one-zone floodplain policy areas development necessary for flood and / or erosion control and public recreation are permitted. The principal goals of shoreline management, including the shoreline protection proposed by this Project, are to protect ecological functions, prevent risks to human life and minimize property damage.

Environmental Protection Act

The *Environmental Protection Act* requires that disposal of waste, including contaminated soils, be consistent with the policies of Ontario Regulation 153/04. If excavated soils are to be disposed of off-site, they must meet criteria under the MOECC's Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*.

Fisheries Act

The purpose of the *Fisheries Act* is to maintain healthy, sustainable and productive fisheries through the prevention of pollution, and the protection of fish and their habitat. In 2012, the *Fisheries Act* was updated to enhance the Department of Fisheries and Oceans' (DFO) ability to manage threats to Canada's commercial, recreational and Aboriginal (CRA) fisheries. These changes were also intended to enhance compliance and protection tools, and to make regulatory requirements clear and consistent through the expanded use of standards.

Projects that have potential to cause serious harm to fish require an authorization from DFO in order to comply with the provisions of the *Fisheries Act*. The proponent is responsible for determining if the project is likely to cause impacts to CRA fish, if these impacts can be avoided or mitigated, and determine if the impacts will result in serious harm to fish. Serious harm to fish is defined as fish death and / or any permanent alteration to, or destruction of, fish habitat. If it is determined that the impacts cannot be avoided or mitigated and will result in serious harm to fish, an application for authorization must be made to the DFO. The DFO has produced standard guidance tools and documents to assist the proponent in determining the potential impacts on fish or fish habitat. These include the Fisheries Protection Policy Statement and Pathway of Effects Diagrams among others.

Construction of the boat ramps and armour stone wall will require in water work within Sarnia Bay. Therefore, at the time of detailed design, the DFO's Self-Assessment should be completed to determine if additional review by the DFO is required for the Project to confirm compliance with the *Fisheries Act*.



Ministry of Natural Resources and Forestry Approval

To protect local fisheries, the MNRF and DFO designate construction timing window restrictions (TWR) for periods when work is not permitted to occur near or within water. The MNRF is responsible for administering TWRs in Ontario, as well as permitting projects where TWRs must be amended. A portion of the construction period for this Project is planned during the general permissible cool / cold water fisheries window where in water work is permitted between June 15 and September 15 only. Any works outside of the cool / cold water fisheries window requires a TWR amendment from MNRF prior to construction. This approval would be obtained during the detailed design stage.

A scientific collectors permit will be obtained from the MNRF to allow fish relocations, as required, during the course of Project construction.

Species at Risk Act

The *Species at Risk Act* protects species designated as endangered or threatened and their critical habitat on federal lands. On private or provincially-owned lands, only aquatic species listed as endangered, threatened or extirpated and migratory birds are protected under *Species at Risk Act*, unless ordered by the Governor in Council. Where disturbance and impacts to designated species are unavoidable, consultation with Environment Canada will be undertaken to identify approaches for reducing any negative effects. Although no species or habitat protected under the Act were identified during preparation of this ESR, permits and / or authorizations from Environment Canada will be required if endangered or threatened aquatic or migratory bird species and / or their habitats are identified,.

Endangered Species Act

The *Endangered Species Act* protects species designated as endangered, threatened or extirpated and their general habitat in Ontario. General habitat includes the areas that designated species depend directly or indirectly on in order to carry out life processes such as reproduction, rearing, hibernation, migration and feeding. Where disturbance and effects to designated species are unavoidable, consultation with the MNRF should be undertaken to identify approaches for reducing any negative effects. Although no species or habitat protected under the Act were identified during preparation of this ESR, permits and / or authorizations from the MNRF will be required if habitats of species protected by the *Endangered Species Act* are identified.

Ontario Regulation 171/06 – Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses

The Project is located along the shoreline of Sarnia Bay at Centennial Park. The Project as proposed will result in excavation and infilling along the shoreline, within the area regulated by the SCRCA. Under Section 28 of the *Conservation Authorities Act*, each Authority has the ability to regulate alterations or interference with watercourses or wetlands in the area over which it has jurisdiction. During the detailed design stage, a permit under Ontario Regulation 171/06 will likely be required from SCRCA prior to construction.



8.0 PUBLIC CONSULTATION SUMMARY

8.1 Stakeholders

A project contact list was compiled for the Project, representing all parties that could have an interest or regulatory authority over some portion of the Project. The project contact list was comprised of members of the general public, government review agencies, municipal staff, First Nations, and any other organizations or individuals that expressed an interest in the Project. The project contact list is provided as **Appendix J**.

8.2 Notices and Advertisements

As part of the public consultation process, several formal notices and advertisements were published and distributed to the Project stakeholders. Specifically, Notices of Study Commencement, Public Information Centre (PIC) #1, PIC #2 and Study Completion were circulated to all stakeholders and published in the Sarnia Observer (online and in print). The date each notice and advertisement was issued is listed in **Table 6**. Copies of the notices and advertisements are provided in **Appendix K**.

Table 6: Notices and Advertisements

Notice	Issued
Notice of Study Commencement	May 23, 2015 May 27, 2015
Notice of PIC #1	September 19, 2015
Notice of Public Comment Invited	October 29, 2015
Notice of PIC #2	October 31, 2015 November 4, 2015
Notice of Study Completion	February 12, 2016

Notices of PIC #1 and #2 were also advertised on the City’s website (www.sarnia.ca) at least one week prior to meetings and on all local radio stations.

8.3 Consultation with Review Agencies

In response to the project notices, comments were received from review and approval agencies, indicating their particular interests in the Project. All EA-related Project correspondence is provided as **Appendix L**. **Table 7** summarizes the issues that were raised by review agencies, and the approach to address each of the concerns.

Table 7: Comments Received from Review Agencies and Resulting Response

Comment	Response / Action
Ministry of the Environment and Climate Change (MOECC)	
Provided information on consultation with First Nation and Métis communities	Requests to the MOECC, Ministry of Aboriginal Affairs (MAA) and Aboriginal Affairs and Northern Development Canada (AANDC) were made to confirm those First Nation and Métis communities and / or groups to be consulted with throughout the Project, as



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Comment	Response / Action
	well as information on agency expectations with respect to the consultation process. The identified communities and groups were added to the project contact list (Appendix J) for distribution of Project notices. In addition, all identified First Nation and Métis communities were provided with copies of PICs display boards following each event, as well as the choice to attending in person meeting(s) or telephone communication(s) to discuss the Project, raise concerns, if any, and to obtain information.
Identified First Nation communities to be consulted with.	All identified First Nation communities were added to the project contact list (Appendix J).
The ESR should include information shared with First Nations and a summary of responses received, including dates	Consultation with First Nations is summarized in Section 8.4. Correspondence with First Nation communities is include in Appendix L .
Confirmation that the removal and replacement of the boat ramps is subject to the Class EA process.	The boat ramps are included and assessed within this ESR.
Guidance regarding notification requirements for PIC 1	A Notice of Public Comment Invited was published following the first PIC. The notice provided an overview of the proposed project and EA phase, and included a link to the City's website where detailed information about the Project is available. The materials provided at PIC 1 (i.e., display boards and comment sheet) were available at the link provided.
Ministry of Natural Resources and Forestry (MNR)	
Request that the MNR Make a Map: Natural Heritage Areas tool and Lane Information Ontario be used to gather natural heritage information prior to submitting a data request through MNR.	A review of available information was reviewed to characterize the existing environment and identify information gaps for data requests and field investigations.
Confirmation that the removal and replacement of the boat ramps is subject to the Class EA process.	The boat ramps are included and assessed within this ESR.
Ministry of Tourism, Culture and Sport (MTCS)	
Request that the City screen the project using the MTCS checklists <i>Criteria for Evaluating Archaeological Potential</i> and <i>Criteria for Evaluating Potential for Built Cultural Heritage Landscapes</i> . The completed checklists are to be included with the supporting documentation of the ESR. Should the checklists determine that technical heritage studies (i.e., archaeology and / or built and cultural heritage landscapes) be required, the studies are to be provided to the MTCS before issuing the Notice of Completion.	The City complete both the MTCS checklists <i>Criteria for Evaluating Archaeological Potential</i> (Appendix E) and <i>Criteria for Evaluating Potential for Built Cultural Heritage Landscapes</i> (Appendix G) for the Project. The results of the checklists indicate that the study area is free of heritage potential. In addition, a conference call was held with the MTCS on November 12, 2015 and confirmed that neither a Cultural Heritage Evaluation nor Heritage Impact Assessment is required for the Project.



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Comment	Response / Action
Ministry of Aboriginal Affairs (MAA)	
Identified First Nation communities to be consulted with.	All identified First Nation communities were added to the project contact list (Appendix J).

In addition, a site meeting was held on June 11, 2015 with the SCRC to review the scope of the Project and to discuss the site features and issues for shoreline protection at the Park. A subsequent conference call was held with the SCRC on October 6, 2015 to solicit feedback on the alternatives proposed and permitting requirements.

A conference call was also held with the MTCS to discuss built and cultural heritage for the Project. The conference call was held on November 12, 2015 to confirm the EA process meets the MTCS requirements.

8.4 Consultation with First Nations

In an effort to identify which First Nations would have a local interest in the Project, the MOECC, Ontario MAA, and AANDC were included as part of the list of stakeholders to be consulted with. Previous EAs were also used to identify First Nations routinely contacted for City projects. Upon identification of the First Nations with potential interest in the Project, individual mailings of Project notices were provided. Full correspondence details are provided in **Appendix L**.

The Chippewas of Kettle and Stony Point First Nation responded that they do not have comments of concerns regarding the Project other than welcoming consultation with the City should the City propose activities within their traditional territory. The Aamjiwnaang First Nation Environment Committee responded and invited the City to attend an environment committee meeting to share information on the Project. The Chippewas of the Thames First Nation responded indicating that the Project work will be conducted in the Sombra Treaty area, to which Chippewas of the Thames are a signatory. They asked to be informed of the Project details and expected outcome. No other communities responded to the notices or letters distributed throughout the EA.

The City attended an Aamjiwnaang First Nation Environment Committee on December 1, 2015. Information about the Project, Class EA process and construction activities was provided. The City responded to questions and comments raised by the nine committee members in attendance. Questions and comments raised included inquiries regarding the natural environment, boat ramp design and opportunities for their involvement (e.g., seed collection). Further information about the meeting is provided in **Appendix L**.

8.5 Public Information Centres

Two PICs in open house format were held at the City Hall to inform the public about the Project. After the completion of baseline studies to characterize the existing environment in the area of the Project, PIC #1 was held on October 14, 2015. The purpose of the first PIC was to communicate the planning process to date and receive feedback on the evaluation criteria proposed. Following the development and evaluation of a range of



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alternative designs, a second PIC was held on November 25, 2015. The purpose of the second PIC was to provide information on alternatives considered, and to receive feedback on the preferred alternatives.

PIC notices were directly mailed to all stakeholders including local residents, and were advertised in the Sarnia Observer, as noted in Section 8.2. A copy of each notice is provided in **Appendix K**.

The PIC #1 displayed information summarizing the problem / opportunity statement for the Project, the Municipal Class EA process, the findings of the background studies, and the evaluation criteria to be used to assess alternative designs. The second PIC presented the alternative designs considered in the assessment. A summary of the evaluation was provided and the preferred alternatives were identified. The panels displaying information at PIC #1 and PIC #2 were posted on the City's website for public review. Fourteen people attended PIC #1 and three people attended PIC #2. Comment sheets were available to all attendees. Two and three comment sheets were returned at PIC #1 and PIC #2, respectively. A summary of each PIC, and a copy of the information panels, sign-in sheet and comments received are provided in **Appendix M** and **Appendix N**.



9.0 ENVIRONMENTAL STUDY REPORT AND NOTICE OF STUDY COMPLETION

At the conclusion of the Class EA process, and Environmental Study Report is prepared, a Notice of Study Completion is filed. The Notice was mailed directly to all stakeholders, and advertised in the Sarnia Observer, on February 10, 2016 and February 12, 2016. A copy of the notice is provided in **Appendix K**.

This Environmental Study Report is available for public review and comment for thirty (30) calendar days from February 12, 2016. Copies of the report are available for reviewing at www.city.sarnia.on.ca and during normal business hours at the following location:

City Hall
Third Floor, Engineering Department
255 Christina Street North,
Sarnia, ON
N7T 5S7

If concerns regarding the Project cannot be resolved in discussion with the City of Sarnia, a person or party may request that the Minister of the Environment and Climate Change make an order for the Project to comply with Part II of the *Environmental Assessment Act* (referred to as a Part II Order), which requires an Individual Environmental Assessment. Requests must be received by the Minister within the 30-day review period following issuance of the Notice of Study Completion. If no new or outstanding concerns are brought forward during the review period, the City may complete the detailed design and construction of the Project.

Anyone wishing to request a Part II Order must submit a written request, by the end of the thirty (30) calendar day review period, to the Minister of the Environment and Climate Change at the following address, with copies sent to the Director of the Environmental Approvals Branch, and the City's Project Manager.

Hon. Glen Murray
Ministry of the Environment and
Climate Change
77 Wellesley Street W, Floor 11
Toronto, ON, M7A 2T5

Kathleen Hedley
Director, Environmental Approvals
Branch
Ministry of the Environment and
Climate Change
135 St. Clair Ave W, Floor 1
Toronto, ON, M4V 1P5

Joe Boothe
Superintendent, Environmental
Services
City of Sarnia
255 North Christina Street
PO Box 3018
Sarnia, ON, N7T 7N2
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