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# Pontiac Pumping Station Capacity Upgrades – Schedule 'C' Municipal Class Environmental Assessment

Environmental Study Report

August 22, 2022

Prepared for:
City of Windsor

Prepared by:
Stantec Consulting Ltd.

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**PONTIAC PUMPING STATION CAPACITY UPGRADES – SCHEDULE 'C' MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT**

Executive Summary
August 22, 2022

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# EXECUTIVE SUMMARY

## GENERAL

The City of Windsor (City), like many other municipalities, has experienced an increase in significant storm events in recent years. Basement, coastal, and surface level flooding has occurred across the City, particularly in the Riverside area. In response, the City undertook a comprehensive study in the Spring of 2018. This study looked to understand the causes of the widespread flooding; identify areas and locations in which the severe flooding occurs, evaluate high-level alternative solutions to address this flooding, complete high-level designs and cost estimates; and provide an implementation strategy and timing for the proposed solutions. This comprehensive study was adopted by the City as the Sewer & Coastal Flood Protection Master Plan (SMP) in July of 2020.

The SMP identified the need for expansion of the Pontiac drainage area and hydraulic capacity upgrades at the Pontiac Pumping Station. The Pontiac Pumping Station, which is located on the site of the Little River Pollution Control Plant (LRPCP), is a stormwater pumping station that services the Pontiac drainage area and acts as an emergency bypass for the LRPCP in the case of a severe storm event. The SMP identified the need for a new wet well structure to house three (3) new stormwater pumps, which will increase the level of service in the expanded Pontiac drainage area and provide capability for a controlled bypass of the LRPCP in the case of a severe storm event.

The purpose of this study is to identify, evaluate and report on the alternative design concepts for the Pontiac Pumping Station. This evaluation will include the conceptual design of the proposed Pontiac Pumping Station including the site layout and pumping technology. The project objective is to identify the recommended pumping station design to meet flood mitigation objectives in the Pontiac drainage area. This Environmental Assessment report is the documentation of the Class Environmental Assessment (Class EA) process outlined by the Municipal Engineers Association (MEA) for the Pontiac Pumping Station upgrades.

This report comprises **Sections 1 to 9** inclusive and **Appendices A to C** inclusive. A brief description of each section follows.

# SECTION 1: INTRODUCTION

This section provides background information and a description of the Class EA process. The Class EA process is comprised of five phases.

- Phase 1 includes identification of the problem or opportunity and discretionary public consultation.

- Phase 2 includes identification and evaluation of alternative solutions to the problem, identification of environmental impacts of the alternative solutions, consultation with the public and review agencies, selection of the preferred solution and determination of the project schedule. Projects are classified as Schedule A, B or C depending on their complexity and potential for environmental impact.

- Phase 3 includes identification and evaluation of alternative design concepts, identification of environmental impacts and mitigating measures with respect to the design concepts, further consultation with the public and review agencies, and selection of the preferred design.

- Phase 4 includes the completion of the ESR and placing it on the public record, notification to the public and review agencies of completion of the Class EA and a 30-day review period providing the opportunity to request the Minister to require a proponent to comply with Part II of the EA Act (which addresses individual EAs) before proceeding with the project. The Minister determines whether this is necessary.

- Phase 5 includes the implementation of the recommended design.

The SMP was prepared in accordance with Phases 1 and 2 of the Class EA process and identified this project as Schedule C. This Class EA has been carried out in accordance with Phases 3 and 4.

# SECTION 2: STUDY AREA CONDITIONS

Projects identified through this Class EA process must be evaluated based on the potential impact on the existing environmental conditions of the study area. This section provides a general description of the existing natural, social, and economic environmental conditions in the study area.

# SECTION 3: PROBLEM STATEMENT

This section provides an overview of the existing stormwater pumping station and nearby wastewater treatment facility, identifies the problem statement, and establishes the project objective.

## SECTION 4: DESIGN SOLUTION FOR PONTIAC PUMPING STATION AS OUTLINED IN THE SMP

This section presents the details of the work undertaken under Phase 2 of the Class EA process, which was completed as a part of the SMP study. Phase 2 involves the identification and evaluation of various conceptual alternatives with the objective of determining alternative solutions which best address the identified problems and needs based on the potential impact to the natural, social, and economic environments.

## SECTION 5: DESIGN CONCEPTS AND RECOMMENDATIONS FOR PONTIAC PUMPING STATION

This section presents the details of the work undertaken to support Phase 3 of the Class EA process, which was completed as a part of this study. In this section of the ESR, alternative design concepts are presented and evaluated leading to the selection of the recommended design, which satisfies the overall preferred solution identified under Phase 2. The evaluation of alternative designs includes consideration of potential environmental, social, and economic impacts and recognizes the need to design the facilities in such a way that they will be as unobtrusive as possible and blend in with existing and proposed uses in the Little River Pollution Control Plant.

## SECTION 6: ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section identifies the environmental impacts of the preferred solution and describes the recommended mitigation measures.

## SECTION 7: PUBLIC CONSULTATION

This section documents agency and public consultations that occurred during Phases 2 and 3 of the process. This section includes documentation of consultation with the public and review agencies. In order to complete Phase 4 of the Class EA process, this report will be made available for review and comment by the public and review agencies as a part of the consultation process.

## SECTION 8: OPINION OF PROBABLE COST

This section summarizes the opinion of probable cost for the recommended solution and anticipated phasing. The estimated total capital cost for this project is approximately $7,950,000.00 (in 2022 dollars).

## SECTION 9: SUMMARY

This section summarizes recommendations that are made with respect to this study.

# 1.0 INTRODUCTION

## 1.1 BACKGROUND

### 1.1.1 General

The City of Windsor (City) has experienced an increase in significant storm events in recent years as well as record-high water levels in Lake St. Clair and the Detroit River. These hydrological factors have resulted in significant basement, coastal, and surface level flooding throughout the city and surrounding municipalities. Coastal zones and low-lying areas, which includes Riverside and a majority of East Windsor, are at considerable risk for flood events that can negatively impact the community and cause damage to municipal infrastructure, residential / commercial properties, and local transportation networks.

The Intergovernmental Panel on Climate Change (IPCC) noted that it is increasingly clear climate change has influenced several variables, including precipitation and snowmelt, which may contribute to localized flooding. Climate change and more specifically anthropogenic influence has contributed to the intensification of extreme precipitation events worldwide. In North America, the likeliness of heavy precipitation events is set to increase in the future resulting in more frequent, intense, and unpredictable precipitation events. The Windsor Climate Change Adaptation Plan (2020) outlines the local data regarding climate change and projects that an increase in severe precipitation events is to be expected in the future. In addition, high water levels in Lake St. Clair and the Detroit River are putting a strain on the municipal storm sewer systems and poses a risk to property owners in coastal and low-lying areas.

To address widespread basement and surface level flooding during extreme storm events, the City carried out a comprehensive study known as the SMP. The SMP study identified the Pontiac stormwater drainage area and LRPCP sanitary collection area as areas of concern. These areas are at high risk for basement and surface level flooding during a significant storm event because the Pontiac Pumping Station does not have adequate capacity to remove water from the stormwater system or sanitary system (in the case of a bypass event at the LRPCP). Further, the SMP identified that the hydraulic grade line (HGL) in the stormwater collection system did not meet the recommended level of service for a 1 in 100-year storm event. These findings are consistent with observed and reported data during severe storm events. Failure to have adequate infrastructure in place will negatively impact the community and may cause damage to infrastructure, properties, and local transportation networks. The LRPCP will be expanded in the future to provide wastewater treatment capacity for anticipated development throughout East Windsor and Tecumseh. However, to reduce the risk of backups and provide flood relief, the SMP recommended an expansion of the Pontiac drainage area and capacity upgrades at the Pontiac Pumping Station.

The Pontiac Pumping Station, which is located on the site of the LRPCP, is a stormwater pumping station that services the Pontiac drainage area and acts as an emergency bypass for the LRPCP in the case of a severe storm event. The SMP identified the need for a new wet well structure to house three (3) 1.25 $m^3/s$ pumps to lower the HGL in the stormwater collection system and increase capacity to provide a 1:100-year storm level of service for the extended Pontiac drainage area. The upgrades completed as a part of this project will increase the level of service in the expanded Pontiac drainage area and provide capability for a controlled bypass of the LRPCP in the case of a severe storm event.

The Pontiac Pumping Station generally services the East Riverside area and is bounded by Tecumseh Road East in the south, the Detroit River in the north, Lauzon Road on the west and Chateau Avenue on the east. The existing infrastructure in the Pontiac drainage area consists of separate sanitary and stormwater collection systems as well as two (2) stormwater management ponds. The existing stormwater infrastructure and boundaries of the Pontiac drainage area are shown in **Figure 1.1** of **Appendix A**. The proposed Pontiac Pumping Station project will modify the service areas for the Pontiac drainage area and the nearby East Marsh drainage area. This will include redirecting a portion of the East Marsh drainage area to the Pontiac Pumping Station. The following sections of storm collection system will be redirected from the East Marsh Pumping Station to the Pontiac Pumping Station:

- Riverside Drive East between Bertha Avenue and Adelaide Avenue;
- Adelaide Avenue between Riverside Drive East and Wyandotte Street East;
- Clover Street between Riverside Drive East and Wyandotte Street East;
- Elinor Street between Riverside Drive East and Wyandotte Street East;
- Florence Avenue between Riverside Drive East and Wyandotte Street East;
- Menard Street and John Street between Elinor Street and Florence Avenue;

The proposed drainage area and modifications identified in the SMP study are shown in **Figure 1.2** of **Appendix A.**

### 1.1.2 Sewer & Coastal Flood Protection Master Plan (SMP)

To address widespread basement and surface level flooding issues during extreme storm events, the City carried out a comprehensive study known as the Sewer & Coastal Flood Protection Master Plan (SMP). The SMP study was initiated in the Spring of 2018 and was completed in July of 2020. The purpose of the SMP study was to understand the causes of flooding; identify locations of basement, surface, and coastal flooding; evaluate alternative solutions; complete high-level design and cost estimates for proposed infrastructure improvements; and provide an

implementation strategy for the recommended solutions. The SMP report can be accessed through the following weblink: Sewer and Coastal Flood Protection Master Plan (citywindsor.ca).

The SMP study was carried out under the direction of a Technical Advisory Committee (TAC) that included representatives from the Essex Regional Conservation Authority (ERCA), the City of Windsor, Aquafor Beech Ltd. (Aquafor), and Dillion Consulting Ltd (Dillion). The engineering and planning team assembled to complete the study included Dillion as lead consulting firm, partnered with Aquafor and AMG Environmental Inc.

Although not undertaken specifically as a Class EA project, development of the SMP Study was carried out generally in accordance with the Class EA planning and design process and included public open house consultation sessions to provide information on the study findings and solicit input on preferred control options.

As a part of the SMP, the City considered shorter-term and longer-term solutions. Shorter-term solutions were defined as those which can be implemented relatively quickly (ex. 0 to 10 years) and do not need significant capital investment. These include measures to reduce the quantity of precipitation and lake water getting into the sewer system through municipal policies, subsidy programs, and collaborative improvements. Municipal policies include mandatory use of sewage ejector pumps, mandatory downspout disconnection, stormwater surcharges and green infrastructure credits, sanitary rain catchers and maintenance hole sealing, infrastructure maintenance and assessment, design standards, and sewer network backflow prevention devices.

Longer-term solutions were defined as those which will require a longer period of time to implement (ex. greater than 10 years) and may involve a significant capital investment. These include measures to improve the sewer systems by increasing downstream outlet capacity through increased treatment capacity or enlarging outlets to receiving water bodies, source control and private property measures, coastal protection through overland flood barriers and backflow prevention, and improving sewer system conveyance and storage capacity through enlarging sewer pipes and storage facilities.

Longer-term solutions identified in the East Windsor Area, near the proposed Pontiac Pumping Station, include the following improvements:

- Construct 40 km of new storm sewers in East Windsor;
- Improve existing sewer pipes by upgrading from 300 mm diameter circular pipes to 4200 mm x 1800 mm box culverts in certain regions of East Windsor;
- Design and install five (5) underground stormwater storage facilities at the following locations with the corresponding storage volumes:
    - Brumpton Park → 4,725 $m^3$

  - Wyandotte Street East at Watson Avenue → 7,000 $m^3$
  - 8380 Wyandotte Street East → 5,000 $m^3$
  - Meadowbrook Park → 5,000 $m^3$
  - Roseville Garden Park → 31,625 $m^3$

- Design and construct a new stormwater surcharge storage pond in the Little River Golf course with a storage volume of 20,000 $m^3$;
- Design and construct a new storm water pumping station at the following locations with the corresponding pumping capacity:
  - St. Rose Pumping Station in St. Rose Park with a pump rate of 13.5 $m^3/s$
- Upgrades and modifications to existing pumping stations:
  - St. Paul Pumping Station capacity upgrade for a new pump rate of 18.2 $m^3/s$
  - Ford Pumping Station pump replacement with a new pump rate of 0.5 $m^3/s$
  - Pontiac Pumping Station capacity upgrade with a new pump rate of 2.5 $m^3/s$ (Overflow at the LRPCP)
  - East Marsh Pumping Station pump replacement with a new pump rate of 1.7 $m^3/s$
- Upgrade Lakeview Pumping Station to increase pump rate to 0.65 $m^3/s$. Improve the outlet pipe to Detroit River by replacing the existing 300 mm diameter outlet pipe with a 600 mm diameter outlet pipe;
- Construct 2.7 km of landform barriers and improve the existing landform barrier along Riverside Drive to meet the flood protection elevation of 176.50 m;
- Install backflow prevention measures for sewers crossing the proposed landform barrier;
- Design and install local storm sewers adjacent to the landform barrier ranging in size from 450 mm to 525 mm in diameter; and
- Provide emergency infill areas where temporary flood protection measures are required to provide continuous barrier.

The Class EA for the proposed Pontiac Pumping Station started in February of 2022. The City of Windsor has initiated this Class EA for the Pontiac Pumping Station capacity upgrades as the next step in implementing the SMP.

### 1.1.3 The Windsor Climate Change Adaptation Plan

The City of Windsor has a long-standing commitment to both Climate Change Mitigation and Adaptation Planning. This corporate environmental commitment was made through the development of an Environmental Master Plan in 2007 which was further developed through the Climate Change Adaptation Plan in 2020. The Windsor Climate Change Adaptation Plan was developed by the City of Windsor and ICLEI Canada Project Staff working closely with a Community Task Force and various City of Windsor departments.

In the Windsor Climate Change Adaptation Plan, the City determined that average precipitation values are expected to increase in the future, particularly in the seasons of winter and spring. The summer months may see a slight decrease in precipitation coupled with increasingly warm seasonal temperatures. In terms of extreme precipitation, the intensity and frequency of events is expected to increase in the future corresponding to 25% increase in 10-year storm events and 40% increase in 100-year storm events. For example, the City of Windsor has already experienced two 100-year storms between 2018 and 2020. On average more rain is expected to fall (in terms of mm/hr) during these periods of extreme precipitation. The water levels in Lake Erie and Lake St. Clair have been above average values since 2013. In 2019, the Detroit River reached a high-water level of 176.08 metres. In the near climate future water levels are expected to continue to be high. In the distant climate future, the water levels are projected to decrease in the Great Lakes partially due to warmer temperatures and changing precipitation patterns.

The City will continue to prepare for the climate future by creating a more climate resilient city. The City will continue to minimize climate change risks to the community through the advancement of sustainable policies, infrastructure investment, and public education. Forward thinking and proactive actions will benefit the community health, environment, and economy. The climate change mitigation and planning objectives for the City of Windsor include:

1. Integrate Climate Change Thinking and Response
2. Protect Public Health and Safety
3. Reduce Risk to Buildings and Property
4. Strengthen Infrastructure Resilience
5. Protect Biodiversity and Enhance Ecosystem Functions
6. Reduce Community Service Disruptions
7. Build Community Resilience

The Class EA for the proposed Pontiac Pumping Station will improve capacity and provide flood relief to the extended Pontiac drainage area. This project will address the City's climate change

adaptation plan objectives by strengthening the infrastructure resilience, reducing risk to buildings and property, and protecting public health and safety.

### 1.1.4 Disaster Mitigation and Adaptation Fund

Communities throughout Canada are actively experiencing the negative impacts of climate change, including significant weather events and natural disasters. In 2018, the Government of Canada launched the Disaster Mitigation and Adaptation Fund (DMAF) to assist communities with flooding issues, capacity concerns and improve overall community resilience. This project is one of the many that will benefit from Federal Government Funding to make necessary capacity upgrades. The DMAF involves a series of projects, including studies, environmental assessments, road works, sewer works, stormwater management works, and pumping station works to address areas in the City prone to flooding, drainage complications and overall storm sewer capacity issues. These projects seek to reduce future flooding risks in the City of Windsor.

### 1.1.5 Purpose of Report

This is an Environmental Study Report (ESR) for the Pontiac Pumping Station capacity upgrades. This ESR presents the completed planning and decision-making process for the recommended design of the proposed Pontiac Pumping Station. This ESR includes a general introduction, review of existing conditions, problem statement, presentation of design solution identified in the SMP, identification and evaluation of alternative design concepts, and recommendations.

Alternative design approaches are presented and evaluated leading to the selection of a preferred design for proposed new Pontiac Pumping Station and outlet structure. The decision-making process is based upon minimizing undesirable impacts on the natural, social, and economic environments and the ESR presents the rationale for decisions made. Where impacts on the environment are unavoidable, proposed mitigating measures are presented for consideration to minimize those impacts.

## 1.2 CLASS ENVIRONMENTAL ASSESSMENT PROCESS

### 1.2.1 General

The Environmental Assessment Act (the Act) was passed in 1975 by the Province of Ontario to provide a mechanism for public participation in public projects.

The Act provides a means for the public or interested groups to receive the needed assurances that the environment is being protected from adverse effects on any significant public project. If there are necessary adverse effects on the environment, the public also needs assurances that all essential measures are being taken to minimize these impacts. The proponent is to weigh the impacts of several possible alternative ways to achieve the desired objective and to select the best alternative based on a thorough examination of each.

The Act recognized that certain municipal undertakings occur frequently, are small in scale, have a generally predictable range of effects or have relatively minor environmental significance. To ensure that a degree of standardization in the planning process is followed throughout the Province, the Act contemplated the use of the Class EA procedure for projects which require approval under the Act but which are not considered to be major environmental works. The work undertaken in preparation of this study report follows the planning and design process of the Municipal Engineers Association (MEA) Class EA, October 2000, as amended in 2007, 2011, and 2015.

This report also serves as a statement for public use in the decision-making process under the Act. Municipal staff and consultants can use the Class EA process in planning, design and construction of projects to ensure that the requirements of the Act are met. As part of the Class EA procedure, the proponent is required to state how the project is to proceed and gain approval under the Act. There are four approval mechanisms available to the proponent under the Class EA:

- **Schedule A** projects are limited in scale, have minimal adverse environmental affects and include several normal or emergency municipal maintenance and operational objectives. These projects are pre-approved and can proceed directly to implementation without following the full Class EA planning process.
- **Schedule A+** projects are a new sub-class of activities introduced as part of the 2007 MEA Class EA amendments. Schedule A+ projects are also pre-approved similar to Schedule A, however; the public is to be advised prior to project implementation. Advising the public of the project implementation is a means to inform the public of what is being undertaken in their local area. The manner in which the public is advised is to be determined by the proponent.
- **Schedule B** projects generally include improvements and minor expansions to existing facilities. In these cases, there is a potential for some adverse environmental impacts and therefore the proponent is required to proceed through a screening process including consultation with those who may be affected.
- **Schedule C** projects generally include the construction of new facilities and major expansions to existing facilities. These projects proceed through the environmental assessment planning process outlined in the Class EA and require preparation of an Environmental Study Report (ESR) to document the planning process.

The preferred solution has multiple activities identified under multiple Class EA schedules. Therefore, this project is being completed under the Municipal Class EA as a **Schedule C** activity, which is the highest identified schedule. Upon completion of Phase 1, Phase 2, Phase 3 and Phase 4 for Schedule C projects, the Owner may proceed directly to Phase 5 and implement the preferred solution.

## 1.2.2 Phases in Municipal Class EA Process

**Figure 1.3** in **Appendix A** illustrates the steps followed in the planning and design of projects covered by the Municipal Class EA. The Class EA for municipal projects follows a five phase planning process that can be summarized as follows:

Phase 1 – Identification of the problem

Phase 2 – Identification of alternative solutions to the problem, consultation with review agencies and the public, selection of the preferred solution, and identification of the project as a Schedule A, A+, B or C activity.

Phase 3 – Identification of alternative design concepts (technical alternatives) for the preferred solution, evaluation of the alternative designs and their impacts on the environment, consultation with review agencies and the public and selection of the preferred design.

Phase 4 – Preparation of an Environmental Study Report (ESR) to document the planning, design and consultation process for the project. The ESR is placed on the public registry for scrutiny by review agencies and the public.

Phase 5 – Final design, construction and commissioning of the selected technical alternative. Monitoring of construction for adherence to environmental provisions and commitments.

# 2.0 STUDY AREA CONDITIONS

The following sections provide an overview of background information and a description of existing conditions within the study area as a basis for comparison. Alternative design solutions and concepts must be evaluated based on their potential impact to existing natural environment, social, and economic factors.

## 2.1 GENERAL DESCRIPTION OF THE STUDY AREA

The City of Windsor is located in Southwestern Ontario on the south shore of the Detroit River and Lake St. Clair directly across from the City of Detroit, Michigan. The population of Windsor is approximately 230,000 with a total land area of approximately 145.3 square kilometers (12,063 hectares). Settlement in the Windsor area dates to the 1700's with a population of 200 being reported in 1836 and 2,500 in 1892. Development generally started along the riverfront and progressed southernly away from the river as the population increased. More recently, the Canadian Census Program shows the population of the City increased from 217,188 in 2016 to 229,660 in 2021. The Windsor Census Metropolitan Area (which includes the Towns of Amherstburg, LaSalle, Lakeshore, and Tecumseh) is the 14$^{th}$ largest metropolitan area in Canada.

The riverfront area of the City extends from Lake St. Clair approximately 22.5 km downstream to the west limit of the City. The long-term average discharge of the Detroit River is 5,200 m$^3$/s with mid-channel surface currents of 1 to 1.2 m/s at the Ambassador Bridge. Flow travel time along the riverfront study area from Lake St. Clair to the western City limit is approximately 8 to 9 hours. There are numerous existing uses of the Detroit River as described in the "Detroit River Remedial Action Plan, Stage 1" dated 1991.

- The river is heavily used for commercial navigation as part of the Great Lakes-St. Lawrence Seaway system with Detroit being the busiest port on the Great Lakes.
- The river is used as a source of cooling water supply for several industries.
- There are five municipal drinking water intakes in the river including the City of Windsor intake and the Town of Amherstburg intake in the lower reaches of the river near Lake Erie.
- The river supports over sixty species of resident and migratory fish with an associated strong sport fishery.
- The river provides habitat for many resident and migratory birds.
- The Detroit River is an important recreational resource used for activities such as swimming, water skiing, jet skiing, scuba diving, fishing, boating, waterfowl viewing and waterfowl hunting.

- The two bathing beaches on the Canadian shore are located upstream of the study area (Sand Point Beach and Stop 26).
- The river serves as a receiving water for municipal and industrial discharges.
- There are extensive park areas in the City of Windsor bordering on the river.

Riverside, Ontario is a neighbourhood located in the eastern section of the City of Windsor. The Riverside area is characterised by its waterfront road, Riverside Drive, which follows the southern shoreline of the Detroit River. The neighbourhood of Riverside extends generally from Westminster Boulevard to the Windsor/Tecumseh town borderline. The Pontiac drainage area, which is the focus of this study, is located in the Riverside neighbourhood of the City of Windsor. The drainage area considered in the study is shown in **Figure 1.2** of **Appendix A** and is generally described as the lands lying between Tecumseh Road East and the Detroit River extending from Lauzon Road on the west and Chateau Avenue on the east. The topography of the land in the study area is relatively low lying and flat with a fall of 2 to 2.5 metres per kilometre from the south limit of the study area to the river.

## 2.2 LAND USE

The study area for this project is the Pontiac drainage area as shown in **Figure 1.2** of **Appendix A**. The Pontiac drainage area is located on the east end of Windsor, otherwise known as East Riverside. The study area is mostly composed of residential dwellings and parkland with some small areas with industrial and commercial establishments. All the developed lands within this area are serviced with separate sanitary sewers and storm sewers.

## 2.3 EXISTING FACILITIES AND INFRASTRUCTURE

### 2.3.1 Existing Pontiac Pumping Station

The Pontiac Pumping Station is adjacent to the Little River Pollution Control Plant which is located at 9400 Little River Road. The Pontiac Pumping Station is primarily a stormwater pumping station that services the Pontiac drainage area and acts as an emergency bypass for the LRPCP in the case of a severe storm event. The stormwater from the drainage area flows by gravity to the stormwater inlet chamber and further to the Pontiac Pumping Station where it is lifted and discharged to the Little River. The station receives water from a 1950 mm diameter storm sewer incoming from the LRPCP bypass chamber.

The Pontiac Pumping Station generally services the East Riverside area and is bounded by Tecumseh Road East in the south, the Detroit River in the north, Lauzon Road on the west and Chateau Avenue on the east. The existing infrastructure in the Pontiac drainage area consists of separate sanitary and stormwater collection systems as well as two (2) stormwater management ponds. The existing stormwater infrastructure and boundaries of the Pontiac drainage area are shown in **Figure 1.1** of **Appendix A**.

The Pontiac Pumping Station was constructed in 1977 and has been in operation since then. The station has a firm capacity of 4812 L/s and a total capacity of 6935 L/s. It is equipped with four (4) screw pumps, three at 2123 L/s (each) and one at 566 L/s. The pumps are electrically driven. The station is equipped with a 1320 HP diesel driven generator that provides power in an emergency when the normal electrical feed is interrupted. There are several subsystems required to keep the generator functioning, including a fuel oil feed system, a cooling water feed system, an air start system and an oil lubrication system. There are also several ancillary systems within the building that are required to support the pumping operation.

Pontiac Pumping Station is primarily a stormwater pumping station which provides flood relief to the Pontiac drainage area. In a severe storm event, where the capacity of the LRPCP is exceeded, the Pontiac Pumping Station acts as an emergency bypass for wet weather flows to prevent basement flooding. However, the existing pumping station does not have the hydraulic capacity to meet the required level of service and reduce the risk of basement flooding. The SMP identified that the HGL in the LRPCP stormwater collection system did not meet the recommended level of service for a 1 in 100-year storm event. This results in increased risk of basement and surface flooding in the Pontiac drainage area, which is consistent with observed and reported data during severe storm events. Failure to have adequate infrastructure in place will negatively impact the community and may cause damage to infrastructure, properties, and local transportation networks. To reduce the risk of backups and provide flood relief, the SMP recommended an expansion of the Pontiac drainage area and capacity upgrades at the Pontiac Pumping Station.

### 2.3.2 Little River Pollution Control Plant

The LRPCP, is located on a 16.2-hectare (40 acres) site at the intersection of Little River Road and Little River Access Drive at 9400 Little River Road. The plant treats sanitary and industrial wastewater from the portion of the City of Windsor east of Pillette Road, and the nearby Town of Tecumseh. The LRPCP receives wastewater from the 1200mm diameter Little River Sanitary Trunk Sewer, servicing the south-eastern section of the City of Windsor. It also receives wastewater from the 1500mm diameter Windsor-Tecumseh Sanitary Sewer, presently servicing East Windsor and the Town of Tecumseh. LRPCP receives wastewater from the 900mm diameter Edgar Avenue – Riverside Sandwich East Trunk Interceptor Sewer. An oval 940 x 990mm combined trunk sewer from Wyandotte Street, and a 690mm diameter Clairview Avenue sanitary interceptor sewer serve the areas West of LRPCP to Pillette Road and Westminster Boulevard and North of Little River Boulevard to Detroit River.

The LRPCP was originally constructed in 1965 and has undergone several expansions, most recently the upgrades completed in 1993. The original plant began its operation in 1966 as a primary treatment plant with a rated capacity of 18,000 $m^3$/d. In 1974, it was upgraded and expanded to 36,000 $m^3$/d providing secondary treatment using activated the sludge process and phosphorous removal. The plant was expanded again in the early 90's to a rated capacity of 73,000 $m^3$/d. The major unit operations at the LRPCP include fine bar screening, raw wastewater pumping station, grit removal, primary clarifiers, aeration tanks (activated sludge process), final

clarifiers (activated sludge process), UV disinfection and sludge dewatering by centrifuges. In the case of a significant wet weather event where the capacity of the LRPCP is exceeded, the Pontiac Pumping Station acts as an emergency bypass for wet weather flows to prevent basement flooding.

# 2.4 NATURAL ENVIRONMENT

## 2.4.1 Climate

The climate in Essex County is classified as modified humid continental, which has hot and humid summers with mild winters and adequate precipitation. In comparison with the other areas in the Province, Essex County's southerly latitude and proximity to the lower Great Lakes provides for warmer summer and winter temperatures with a longer growing season. Because the area is also on one of the major continental storm tracks, it experiences wide variations in day-to-day weather including severe summer thunderstorms. The normal minimum and maximum temperatures are $-9^0$ C and +28 $^0$C respectively and the mean daily temperature is above 6 $^0$C, which tends to increase temperatures in surface waters.

## 2.4.2 Geology and Physiography

The City of Windsor is located in the physiographic region of Southwestern Ontario known as the St. Clair Clay Plains. As the name suggests the area is covered with extensive clay plains. The topography of the area is extremely flat with elevations ranging from 175 to 204 meters above sea level.

Most of the bedrock under the region is sedimentary limestone of the Devonian age which has a high calcium and magnesium content. The bedrock in the majority of Essex County is covered by glacial drift with a thickness ranging from 3 m to 45 m from west to east. The parent soil material is a heavy ground moraine and lacustrine deposition containing a considerable amount of limestone, appreciable amounts of shale and some igneous rock.

## 2.4.3 Soils and Subsurface Conditions

Soils within the County of Essex were formed from heavy ground moraine which has been altered by glacial lake wave action and lacustrine deposition. The majority of the area is part of a smooth clay plain and the predominant soil types are Perth and Brookston clays and their associated clay loams. Developed from dolomitic limestone intermixed with shale, the imperfectly drained member is the Perth clays and the poorly drained member is the Brookston clays.

The clay deposits found in the majority of the Windsor area consist of a stiff silty clay to clayey silt deposited without significant stratification and possessing a distinctively till-like structure with a small fraction of sand and gravel sized particles distributed randomly throughout. In the west end of Windsor, this till-like deposit is overlain by a lacustrine deposit of soft to firm, layered silty clay. This deposit was laid down in the glacial lakes in front of the ice sheet during their retreat in the

post glacial period, when the level of Lake Erie was considerably higher than it is at present. These layered strata, of varying thicknesses and strengths, are known to exist up to 30 meters in total depth.

Geotechnical investigations at this site were carried out by Golder Associates for the City of Windsor. To evaluate the site conditions, historical geological and geotechnical information in the site were reviewed. There are six (6) geotechnical reports in Golder's records for lands at or adjacent to the Pontiac Pumping Station site. The borehole investigations on the site determined the general subsurface conditions on site consist of existing fill, topsoil, and pavement structures underlain by extensive deposits of native silty clay to sandy silty clay.

Further there are three (3) soil layers on the site: (i) topsoil, (ii) sandy silty clay fill, (iii) native sandy silty clay. The depth and thickness of the three soil layers is anticipated to vary slightly throughout the site. At the borehole locations the subsurface conditions consisted of surficial topsoil of approximately 150 to 240 mm in thickness underlain by sandy silty clay fill of approximately 0.8 m to 1.3 m in thickness. Beneath the sandy silty clay fill was an extensive deposit of native sandy silty clay. Borehole investigations were terminated in this soil layer after exploring the stratum for depths ranging from about 11.7 m to 14.4 m. During the borehole investigations no seepage into the open boreholes was observed and boreholes were dry upon completion of drilling. No obvious staining or odours indicative of potentially significant chemical impacts were observed in the soil samples for the boreholes. It should be noted that groundwater conditions vary dependent on precipitation, site grading, and other factors; therefore, some groundwater seepage should be anticipated during construction. Inflows may be controlled by pumping with filtered sumps and are anticipated to be sufficiently low such that a Permit to Take Water (PTTW) should not be required.

### 2.4.4 Natural Vegetation

The County lies completely within the Niagara section of the Deciduous Forest Region of Ontario. Favourable soil and climatic conditions have allowed for the extension of many species of Carolinian and Prairie flora which makes the region unique in Canada.

The study area within the LRPCP consists mainly of walking paths, paved parking lots and green space around the facilities and infrastructure. Stantec completed a site investigation on April 13th, 2022, to document existing natural heritage conditions in the Study Area. Surveys included Ecological Land Classification (ELC) of vegetation communities, a species at risk (SAR) habitat assessment of terrestrial features, and a fish habitat assessment of the shoreline. The natural heritage features that were identified through the background review were confirmed during the field surveying. The natural heritage impact assessment report is included in **Appendix C**.

Potential impacts associated with the construction of the proposed building and connecting infrastructure include soil compaction, siltation of adjacent natural communities, vegetation disturbance, spills of deleterious substances into the Little River, noise disturbance and encounters with wildlife. The impacts are considered short term, localized to the construction area during

construction activities, and will be mitigated through the application of appropriate construction techniques and mitigation measures. Climbing prairie rose is a species of conservation concern (SOCC) that may be present within the impacted thicket community. A site visit to look for this species is recommended prior to vegetation removal. If the species is present, relocation may be needed.

### 2.4.5 Terrestrial Animal Life

The study area within the LRPCP consists mainly of walking paths, paved parking lots and green space around the facilities and infrastructure which are not anticipated to support a wide diversity of terrestrial animal life. Impacts from construction of the proposed building and connecting infrastructure will primarily be limited to anthropogenic habitats that do not support wildlife. Construction of the outlet sewer may result in a small, short-term impact to terrestrial communities.

Eight (8) SAR have the potential to be present in the Study Area: Barn Swallow, Chimney Swift, bat SAR (4 different species), Butler's Gartersnake and Eastern Foxsnake. Of these, Butler's Gartersnake and Eastern Foxsnake are the only SAR that have potential to be present within the work zone. Mitigation measures for SAR snakes are discussed in **Section 6**. No permanent impacts to breeding birds, reptiles or other wildlife species, is expected as a result of the construction of the proposed building and connecting infrastructure provided mitigation measures recommended in **Section 6** are implemented.

### 2.4.6 Marine Life

The Study Area includes the Little River and the embayment connecting the Little River and the Pumping Station, which serves as the outlet for the proposed pumping station and supports a limited variety of marine and aquatic species. As many as 8 species of fish have been documented in the Little River. Installation of the Pontiac Pumping Station will result in a short-term impact to fish habitat as a result of the temporary isolation and dewatering of the work area. No permanent impacts to fish and fish habitat are expected as a result of the installation of the Pontiac Pumping Station provided mitigation and contingency measures are followed.

## 2.5 CULTURAL, SOCIAL AND ECONOMIC ENVIRONMENT

### 2.5.1 Study Area

The study area, within the boundaries of the Pontiac drainage area, can be described as a residential community. The study area contains a mixture of residential, parkland, and commercial/industrial developments.

Air quality in the area is poor which has been partially attributed to heavy industry on the American side of the Detroit River. Noise levels are typical of City settings.

The study area is well served with a good road system and a full range of utilities including electrical power, water, natural gas and telephone.

### 2.5.2 Official Plan

The City of Windsor has an Official Plan and zoning by-laws that regulate and control development and planning policies in the service area. These documents are revised from time to time as necessary to take into account physical and social changes affecting the City.

Based on the Official Plan and zoning by-laws, the study area consists of mainly three zones. The area north of Riverside Drive East is zoned Waterfront Residential, the central part of the study area between Riverdale Avenue and Clover Avenue is mostly Open Space and the remainder of the area is zoned as Residential. The study area does not include any of the City's designated special policy areas.

### 2.5.3 Archaeological

Windsor is an area rich in cultural heritage resources, and diversified cultural traditions. **Figure 2.1** of **Appendix A**, which is adapted from Figure 4: 'Archaeological Potential' of the City of Windsor Archaeological Master Plan, shows land containing archaeological resources or areas of archaeological potential within the City of Windsor. There are eighteen (18) registered archeological sites within the Windsor city limits and five (5) additional registered sites in the immediate environs of the City. In addition, there are several dozen unregistered archeological finds. Registered sites in Windsor include five (5) Native sites, nine (9) Euro-Canadian sites and four (4) sites with both cultural components. A majority of the registered and unregistered archeological sites within the City of Windsor are located in the Central and West end particularly in the Old Sandwich Town region.

In accordance with the Checklist for Determining Archaeological Potential from the Ministry of Tourism and Culture, a Stage 1 Archaeological Assessment is to be conducted for lands impacted by this project. If the Stage 1 Archaeological Assessment concludes that these areas have moderate to high potential for the discovery of Indigenous or Euro-Canadian resources, a further Stage will be conducted to determine if any archaeological resources are on the property using either pedestrian survey or test pit survey.

A Stage 1 Archaeological Assessment was undertaken by Fisher Archaeological Consulting (FAC) for the study area. The Stage 1 Archaeological Assessment consists of a review of geographic, land use, and historical information for the property and the relevant surrounding area, a property visit to inspect its current condition and contacting MHSTCI to find out whether there are any known archaeological sites on or near the property. Its purpose is to identify areas of archaeological potential and further archaeological assessment (e.g. Stage 2-4) as necessary.

The Stage 1 Archaeological Assessment indicated that there was one registered archaeological site within a one-kilometer radius of the study area and there were no previous archaeological

reports for work within fifty meters of the study area. The Pontiac Pumping Station study area is located between Little River and the 'Old' Little River. The historic NTS map from 1912 shows some channelization of the 'Old' Little River. The archaeological potential for Indigenous and Euro-Canadian sites is high based on the study area's proximity to this watercourse. Although the archaeological potential is high, there have been obvious disturbances to parts of the study area during the construction of the existing pumping station. Due to the potential for discovery of Aboriginal or Euro-Canadian resources, FAC recommended that the small portion of the study area indicated as having high archaeological potential undergo a Stage 2 Archaeological Assessment by a test pit survey at five metre intervals.

The Stage 2 Archaeological Assessment to determine if any archaeological resources are on the property using test pit survey was carried out by Stantec on May 19th, 2022. No archaeological resources were identified during the Stage 2 Archaeological Assessment at the site. Therefore, no further land-based archaeological assessment of the study area is required. The archaeological assessment carried out as a part of this study is included in **Appendix C**.

### 2.5.4 Built Heritage and Cultural Heritage Landscapes

The heritage resources around the proposed work area were identified based on the Windsor Municipal Heritage Register provided by the City of Windsor. The City of Windsor's Planning and Building Services Department was also consulted to determine the location and details of Built Heritage and Cultural Heritage Landscapes.

**Figure 2.2** of **Appendix A** is an aerial plan showing the built heritage and cultural heritage landscapes around the potential proposed work area. As shown, there are no built heritage resources and/or cultural heritage landscapes in proximity to the location of proposed work area.

The Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)'s "Screening for Impacts to Built Heritage and Cultural Heritage Landscapes" checklist was completed for this project. The completed checklist is included in **Appendix C**. The proposed work is located away from built heritage and cultural heritage landscapes, the proposed work is not expected to impact heritage resources in the area.

# 3.0 PROBLEM STATEMENT

## 3.1 PROBLEM IDENTIFICATION

The City of Windsor has experienced several significant storm events in recent years that have resulted in widespread basement, coastal, and surface level flooding. Through the comprehensive SMP study the Pontiac stormwater drainage area and LRPCP collection area were identified as areas of concern. These areas are at high risk for basement and surface level flooding during a significant storm event because the Pontiac Pumping Station does not have adequate capacity to remove water from the stormwater system or sanitary system (in the case of a bypass event at the LRPCP). Further, the SMP identified that the HGL in the stormwater collection system upstream of the LRPCP did not meet the recommended level of service for a 1 in 100-year storm event.

In addition, the Riverside area between Ford Boulevard and the east City limits (which includes the Pontiac drainage area) was identified as a coastal flood risk area. A coastal flood risk area is defined as those areas that are at risk of flooding due to overtopping of the existing shoreline from unusually high lake/river level conditions or storm surges. During the SMP study, it was confirmed that basement and surface level flooding was observed throughout the drainage area during storm events.

Failure to have adequate infrastructure in place will negatively impact the community and may cause damage to infrastructure, properties, and local transportation networks. The LRPCP will be expanded in the future to provide wastewater treatment capacity for anticipated development throughout East Windsor and Tecumseh. However, to reduce the risk of backups and provide flood relief, the SMP recommended an expansion of the Pontiac drainage area and capacity upgrades at the Pontiac Pumping Station. This design solution will reduce the HGL within the storm sewer system, allow LRPCP emergency bypass to minimize sanitary sewer surcharge during severe storm events, mitigate the risk of basement flooding, and provide flood resiliency for the 1 in 100-year storm event.

## 3.2 PROJECT OBJECTIVE

The City of Windsor, with funding from the Federal Government's Disaster Mitigation and Adaptation Fund, has initiated this Class EA for the design of the new Pontiac Pumping Station as recommended in the Sewer & Coastal Flood Protection Master Plan. The purpose of this EA study will be to investigate and report on the design and site layout alternatives for the Pontiac Pumping Station capacity upgrades to reduce the risk of flooding in the Pontiac drainage area during major storm events.

# 4.0 DESIGN SOLUTION FOR PONTIAC PUMPING STATION AS OUTLINED IN THE SMP

This section presents an overview of the work undertaken for Phase 2 of the Class EA process. Phase 2 involves the identification and evaluation of various design solutions with the objective of determining which alternative best addresses the problem statement. Phase 2 for this project was completed as a part of the SMP, which can be accessed through the following weblink:

Sewer and Coastal Flood Protection Master Plan (citywindsor.ca)

In order to reduce the risk of flooding in the Pontiac drainage area, the SMP determined the following actions are required:

1. Redirect a portion of the East Marsh drainage area to the Pontiac drainage area to reduce the risk of inland coastal flooding. Improving the effectiveness of the Ganatchio Trail berm to provide inland drainage preventing coastal flood waters from entering the storm sewer system and reducing the risk of flooding in the Pontiac and East Marsh drainage areas;

2. Upgrade sewers along Cedarview Avenue, Riverside Drive, North Neighbourhood, and South Neighbourhood as well as provide off-line underground storage in Brumpton Park; and

3. Upgrade the hydraulic capacity of the Pontiac Pumping Station to effectively release stormwater to the Little River and reduce the HGL within the stormwater system to meet the appropriate level of service. This would be accomplished by redirecting flow from the existing stormwater inlet chamber to a new wet well structure proposed to be located south of the existing Pontiac Pumping Station. The wet well structure is to house three (3) 1.25 $m^3/s$ (each) pumps.

## 4.1 PROPOSED DRAINAGE AREA

The Pontiac Pumping Station generally services the East Riverside area and is bounded by Tecumseh Road East in the south, the Detroit River in the north, Lauzon Road on the west and Chateau Avenue on the east. The existing infrastructure in the Pontiac drainage area consists of separate sanitary and stormwater collection systems as well as two (2) stormwater management ponds. The existing stormwater infrastructure and boundaries of the Pontiac drainage area are shown in **Figure 1.1** of **Appendix A**. The proposed Pontiac Pumping Station project will modify the service areas for the Pontiac drainage area and the nearby East Marsh drainage area to reduce the risk of inland coastal flooding. The following sections of storm collection system will be redirected from the East Marsh Pumping Station to the Pontiac Pumping Station:

- Riverside Drive East between Bertha Avenue and Adelaide Avenue;
- Adelaide Avenue between Riverside Drive East and Wyandotte Street East;
- Clover Street between Riverside Drive East and Wyandotte Street East;
- Elinor Street between Riverside Drive East and Wyandotte Street East;
- Florence Avenue between Riverside Drive East and Wyandotte Street East;
- Menard Street and John Street between Elinor Street and Florence Avenue;

The Ganatchio Trail berm provides inland drainage preventing coastal flood waters from entering the storm sewer system and reduces flooding risk in the Pontiac and East Marsh drainage areas. However, the identified sections of storm sewers, which are currently directed to the East Marsh Pumping Station, are located inland (to the south) of the existing berm. In the event of a severe storm event, coastal flooding, pump failure, or other event where stormwater is not able to be effectively released at the East Marsh Pumping Station, these storm sewers may surcharge and cause inland flooding south of the Ganatchio Trail berm. Redirecting these storm sewers to the Pontiac drainage area would eliminate this pathway for inland flooding and improve the effectiveness of the Ganatchio Trail berm significantly reducing the risk to infrastructure. The proposed drainage area and modifications identified in the SMP study are shown in **Figure 1.2** of **Appendix A.**

## 4.2 PROPOSED PUMPING STATION CAPACITY

As outlined in the SMP, the Pontiac Pumping Station is proposed to be designed to provide the following level of service:

- Major System (Overland Drainage):
    - Provide service for the 1 in 100-year event and maintain the storm sewer HGL such that surface flooding is less than 0.30 m deep within the municipal right-of-way.
    - Ensure emergency access is available via main roadways and reduce the risk of property damage.
- Minor System (Underground Sewers):
    - Provide service for the 1 in 5-year event and maintain the storm sewer HGL at least 0.3 m below the ground level based on the available outlet receiving capacity.
    - No surface flooding in the case of a minor rainfall event.

The level of service provided by the Pontiac Pumping Station was established in the SMP study based on input from the Technical Advisory Committee, Essex Regional Conservation Authority, emergency services providers, internal departments at the City of Windsor, the public, and the Ministry of Environment, Conservation and Parks (MECP). In addition, the following documents were referenced to determine the level of service: Windsor and Essex Regional design guidelines, applicable City of Windsor Master Plan studies, and applicable Municipal Master Plan studies from likewise Municipalities (i.e., Toronto, London, and Hamilton). In addition to the recommendations for the pumping station level of service, the MECP recommends the use of Low Impact Development (LID) features such as infiltration trenches or bioswales to attenuate and infiltrate stormwater throughout the drainage area.

Due to the physical characteristics of the existing pumping station improving the hydraulic capacity through pump replacement or addition is not plausible. In the SMP study, the existing water levels in the Pontiac Pumping Station and the corresponding pumping capacities were evaluated. The sanitary trunk sewer immediately upstream of the LRPCP is connected to the Pontiac Pumping Station through an emergency bypass sewer which is only utilized during severe storm events. The overflow elevation of the emergency bypass sewer is 173.38 m and emergency bypass events are controlled by a sluice gate which opens when the water level in the LRPCP wet well reaches an elevation of 170.69 m. The filling point or water level elevation at which the screw pump is operating at its full capacity and maximum efficiency is 170.99 m. Therefore, when an emergency bypass event occurs the screw pumps are not operating at their full capacity and the existing pumping station is not able to lower the water level in the inlet chamber to facilitate an overflow.

In the SMP study (see Section 6.3 of Appendix F of the SMP), the overflow rate at the LRPCP was estimated to be approximately 2.5 m3/s. Further during the SMP study, the firm capacity of the proposed Pontiac Pumping Station, based on the desired level of service, was determined to be 2.5 m3/s. The proposed improvements will include expanding the existing pumping station by adding a new wet well structure to house the three (3) pumps. These pumps will operate in a two duty and one standby configuration with each pump having a capacity of 1.25 m3/s. As a result, the firm capacity of the proposed Pontiac Pumping Station will be 2.5 m3/s. The functional design of the pumping station and specific site features are to be determined throughout this Schedule C Class Environmental Assessment and refined based on further stakeholder input.

# 5.0 DESIGN CONCEPTS AND RECOMMENDATIONS FOR PONTIAC PUMPING STATION

## 5.1 PUMPING STATION TECHNOLOGIES

In this section of the report, alternative designs for the recommended solution are identified and evaluated leading to the selection of a preferred design for this application. The recommended design will include an evaluation of the following alternative pumping technologies :

- Centrifugal Flow Pump
- Axial Flow Pump
- Mixed Flow Pump
- Archimedean Screw Pump

The evaluation of alternative designs includes consideration of potential environmental, social and economic impacts and recognizes the need to design the facilities in such a way that maximizes performance and efficiency, reduces footprint a the LRPCP, and reduces operation and maintenance requirements.

### 5.1.1 Centrifugal Flow Pump

The Hydraulic Institute Standards (HIS) defines a centrifugal pump as a kinetic machine that converts mechanical energy into hydraulic energy through centrifugal activity. As fluid enters the pump it is directed to the center of a rotating impeller. The rotational movement of the impeller creates centrifugal force accelerating the fluid radially outward into the diffuser (volute chamber), from which the fluid exits with higher energy than when it entered. Centrifugal pumps are typically non-clog close-coupled pumps. Pumps which are designed for all electrical components to be watertight and submerged below the surface of the water are otherwise known as submersible centrifugal pumps. These pumps may be removed from the wet well for inspection and repair. This type of pump is typically used for raw sewage and other solids bearing fluids.

Centrifugal flow pumps can be used for high head – low flow applications or can be designed to meet a wide range of head and flow requirements making them functional for a variety of applications. Centrifugal pumps can be arranged in a variety of configurations including coupled so that the discharge from one pump feeds the intake of subsequent pumps, thereby increasing the delivery head. In this way it is possible to design centrifugal pumping systems which can meet head requirements in the of hundreds of metres. Centrifugal pumps are also able to operate a higher speed than the other types of pumps especially when higher pressures are required.

However, matching the pump operating speeds with the application is crucial to maximizing pump efficiency, as high operating speeds usually require more power and need to be controlled to avoid losses. Centrifugal pumps tend to be less tolerant of solid material entering the stream and while they can be designed to be tolerant of solid material, it is usually at considerable expense to efficiency.

### 5.1.2 Axial Flow Pump

The Hydraulic Institute Standards (HIS) defines an axial flow pump as a kinetic machine that converts mechanical energy into hydraulic energy. For axial flow pumps the fluid enters the pump cavity parallel to a central rotating impeller. The rotational movement of the impeller creates a force accelerating the fluid axially outward as a result the fluid exits with higher energy than when it entered. A similar analogy to an axial flow pump is a boat motor or propeller which pushes the water in a single direction to create movement or thrust. Of the various pump types, axial flow pumps are considered to have the highest efficiency; however, the use of this pump type is limited due to inability to use in high head applications.

Axial flow pumps are high-capacity pumps that are typically used for low head - high flow applications such as stormwater pumping stations. These pumps can be mounted at any angle, although in stormwater applications they tend to be almost universally mounted in the vertical orientation. Typically, axial flow pumps are driven by means of a vertical shaft attached to an external motor which is mounted on the top of the pumping chamber structure. Axial flow pumps tend to be more tolerant of solid material entering the stream; however, large debris should be screened as the propellers may bend or break if they strike a relatively large or hard object. In addition, as with centrifugal pumps, fibrous materials may wrap themselves around the propellers causing maintenance and operational impacts.

### 5.1.3 Mixed Flow Pump

Mixed flow pumps are high-capacity pumps that are typically used for high flow – medium head applications. The mixed flow pump impellers are designed uniquely such that the vanes sweep backwards and the pump functions as a compromise between axial flow pumps and centrifugal pumps. In mixed flow pumps the flow is directed radially and axially along the shaft centerline. As a result, mixed-flow pumps are able operate at higher head than axial-flow pumps while delivering higher flow rates than centrifugal-flow pumps. Like axial-flow pumps, mixed-flow pumps can be mounted at any angle; however, they are typically mounted in a vertical orientation in stormwater applications. Mixed flow pumps are commonly used for the following applications: transferring water from rivers to canals, flash mixers, filter-to-waste, or intermediate pumping stations.

### 5.1.4 Archimedean Screw Pump

An Archimedean screw pump is a type of positive-displacement pump which provide lift by carrying fluids in the spaces between the screw threads. Screw pumps utilize the Archimedes

principle of a rotating shaft to displace the fluid axially as the screws rotate. An inclined screw pump has a continuous spiral vane attached to a central shaft, mounted in a trough or pipe. When the screw is rotated, the spiral vane scoops water from the free water surface at the entrance of the pump and discharges it at a higher elevation. It is a continuous propeller pump and flows are axial, with no centrifugal action. The primary advantage of an inclined screw pump is that it is a natural variable flow pump which operates at a constant speed. As the free water surface at the suction rises, the submergence of the inlet increases, and the pump is able to scoop more liquid.

The Archimedes screw pump is usually large capacity low head, non-clogging and therefore advantageous in raw sewage and wastewater applications. As a result of the pumping mechanism, screw pumps can provide constant flow rates and pressures and have a relatively high tolerance for solids entering the flow stream. Screw pumps are commonly used in applications where low heads are required (i.e., less than 10 meters). The main disadvantage of screw pumps is the difficulty to increase the pumping head without considerable physical modifications to the structure, whereas this is easy with other types of pumps. Also, since the design is dependent upon minimal leakage from between the flights and the channel, any wear over time significantly reduces efficiency.

### 5.1.5 Evaluation of Alternative Pump Technologies

Four alternatives, which include the centrifugal flow pumps, axial flow pumps, mixed-flow and screw pumps were evaluated based on the following evaluation criteria:

- Performance or Effectiveness
- Space Required
- Capital and Construction Cost
- Operation & Maintenance
- General Concerns

Each pump technology was reviewed and summarized in **Table 5.1**.

### Table 5.1: Evaluation of Alternative Pump Technologies

| Evaluation Criteria | Centrifugal - Flow Pump | Axial - Flow Pump | Mixed - Flow Pump | Screw Pump |
|---|---|---|---|---|
| **Performance & Effectiveness** | •Lower efficiency, shorter lifetimes | •Very efficient in high flow, low head applications | •Efficient in high flow, low head applications | •Wide range of flow, Difficult to increase head |
| **Space Required** | •Low space requirements | •Low space requirements | •Low space requirements | •Relatively high space requirements |
| **Capital / Construction Cost** | •Relatively low to medium | •Relatively low to medium | •Relatively low to medium | •Relatively high equipment and construction cost |
| **O&M Requirements** | •Low to medium O&M requirements | •Low O&M requirements | •Low to medium O&M requirements | •Medium O&M requirements |
| **General Concerns** | •Loss of efficiency should solids enter the flow | •Performance is very dependent upon providing good inlet flow, Loss of efficiency should solids enter the flow | •Performance is very dependent upon providing good inlet flow, Loss of efficiency should solids enter the flow | •Difficult to modify, Requires enclosing |



Based on a detailed review of the four alternative pump technologies, the axial flow type of pump was identified as the preferred alternative for this stormwater pumping station application. This is due to the pump's high efficiency in high flow – low head applications, relatively low space requirement, and relatively low capital cost. These benefits are of particular importance for this application as reducing the size of the pumps and pumping station will minimize the space utilized at the LRPCP site. This will result in more space for future expansions of the UV disinfection facilities as well as improved access for vehicles to the northwest side of the site and minimal structural impact for the proposed expansion of the administration building.

The simple and proven operation of this axial flow pump technology makes this the preferred alternative for this project. The typical concerns associated with axial flow pumps are the loss of efficiency caused by solids entering the wet well and the need to provide adequate inlet flow conditions. In the final design of the Pontiac Pumping Station these issues will be addressed by

implementing a bar screen at the pumping station inlet to minimize solids entering the pumping chamber and configuring the wet well to reduce the turbulent flow conditions.

## 5.2 PUMPING STATION SITE LAYOUT

In this section of the report, alternative design concepts for the site layout are identified and evaluated leading to the selection of a recommended design for this application. The evaluation of alternative layouts included consideration of potential environmental, social, technical, and economic impacts. However, due to the isolated location of the study area and the nature of this application, the social, natural environmental, and economic impacts are anticipated to be similar regardless of the layout chosen for the site. As a basis for comparison, it is assumed that all of the site layout alternatives will: be able to meet flood mitigation objectives; provide an enhanced level of service for the Pontiac drainage area; and have comparable capital, operations, and maintenance cost/requirements.

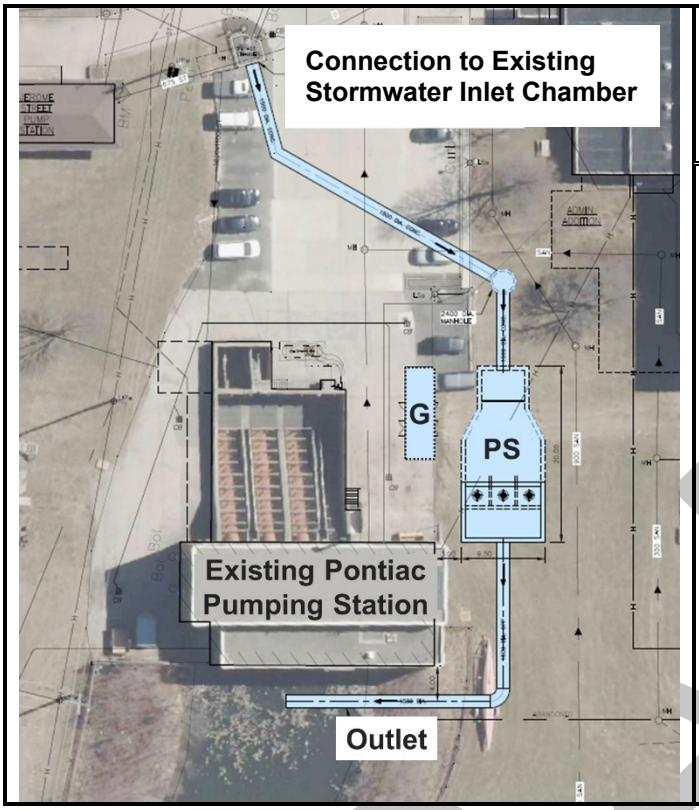
### 5.2.1 Alternative No. 1

Site Layout Alternative No. 1 features the new wet well structure and generator to the south of the existing Pontiac Pumping Station with a designated outlet the Little River embayment. This layout will include the construction of a new storm sewer from the existing bypass chamber, extending southwest to the southern edge of the parking lot, and connecting to a new manhole just north of the administration building expansion. The new storm sewer will then continue west and connect to the wet well structure. The proposed outlet sewer will exit the pumping station heading west and will turn 90-degrees to the north where it will outlet directly into the Little River embayment.

This layout would avoid existing underground sanitary sewer lines and therefore would not require the relocation of any existing utilities resulting in relatively easy construction. However, the construction of the new outlet to the Little River embayment would require in-water construction work and additional considerations under the Fisheries Act and Species at Risk Act. These requirements would result increase the complexity of construction.

Site Layout Alternative No. 1 will include all above grade structures close to the existing Pontiac Pumping Station which will minimize the space utilized at the LRPCP site. This will result in more space for future expansions of the administration building or UV disinfection facilities as well as improved access for vehicles to the northwest side of the site.

See **Figure 5.1A** below and in greater detail in Figure **5.1B** of **Appendix A.**




PS = New Pumping Station

G = Generator

Note: The preliminary layout presented in this figure are for display purpose and may be subject to change during the implementation phase (detailed design). For example, the exact location of the proposed pumping station or generator may be shifted ± 1.0 meters north or south and east or west.

**Figure 5.1A: Site Layout Alternative No. 1**

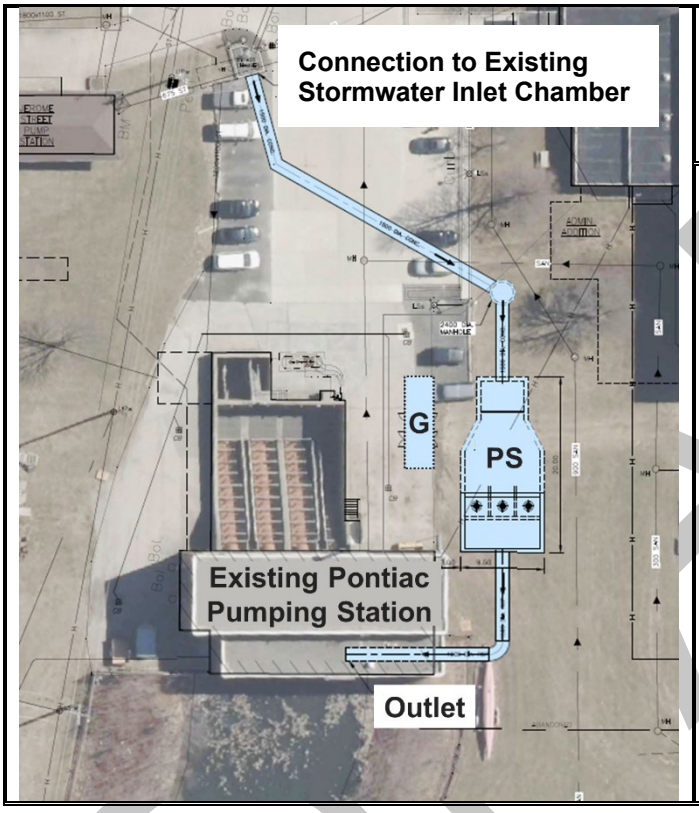
### 5.2.2 Alternative No. 2

Site Layout Alternative No. 2 features the new wet well structure and generator to the south of the existing Pontiac Pumping Station with an outlet the existing Pontiac Pumping Station discharge chamber. This layout will include the construction of a new storm sewer from the existing bypass chamber, extending southwest to the southern edge of the parking lot, and connecting to a new manhole just north of the administration building expansion. The new storm sewer will then continue west and connect to the wet well structure. The proposed outlet sewer will exit the pumping station heading west and will turn 90-degrees to the north where it will outlet directly into the existing Pontiac Pumping Station discharge chamber.

This layout would avoid existing underground sanitary sewer lines and therefore would not require the relocation of any existing utilities resulting in relatively easy construction. The construction of the new outlet to existing Pontiac Pumping Station discharge chamber would require modifications to the existing structures. However, it would negate the requirements for in-water construction work or additional considerations under the Fisheries Act and Species at Risk Act, which would typically increase the complexity of construction.

Site Layout Alternative No. 2 will include all above grade structures close to the existing Pontiac Pumping Station which will minimize the space utilized at the LRPCP site. This will result in more space for future expansions of the administration building or UV disinfection facilities as well as improved access for vehicles to the northwest side of the site.

See **Figure 5.2A** below and in greater detail in Figure **5.2B** of **Appendix A.**




PS = New Pumping Station

G = Generator

Note: The preliminary layout presented in this figure are for display purpose and may be subject to change during the implementation phase (detailed design). For example, the exact location of the proposed pumping station or generator may be shifted ± 1.0 meters north or south and east or west.

**Figure 5.2A: Site Layout Alternative No. 2**

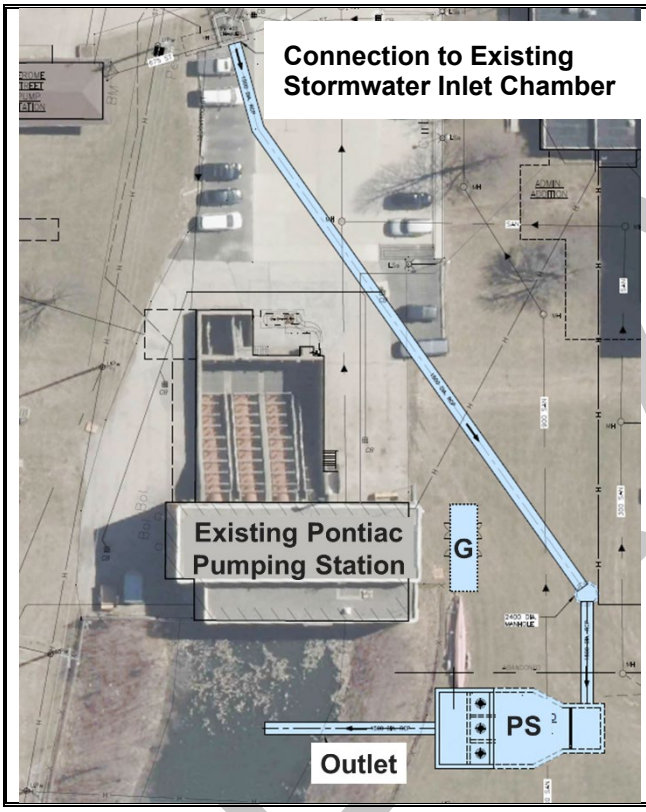
### 5.2.3 Alternative No. 3

Site Layout Alternative No. 3 features the new wet well structure and generator to the south and southwest of the existing Pontiac Pumping Station with a designated outlet the Little River embayment. This layout will include the construction of a new storm sewer from the existing bypass chamber, extending southwest and connecting to a new manhole west of the administration building. The new storm sewer will then continue west and connect to the wet well structure. The proposed outlet sewer will exit the pumping station heading north where it will outlet directly into the Little River embayment.

This layout would avoid intersect with existing underground sanitary sewer lines and therefore would result in more complex construction requirements. In addition, the construction of the new outlet to the Little River embayment would require in-water construction work and additional considerations under the Fisheries Act and Species at Risk Act. These requirements would further increase the complexity of construction.

Site Layout Alternative No. 3 will include above grade structures at a greater distance from the existing Pontiac Pumping Station which will require additional space at the LRPCP site. This will result in less functional space for future expansions of the administration building or UV disinfection facilities as well as limited access for vehicles to the northwest side of the site.

See **Figure 5.3A** below and in greater detail in Figure **5.3B** of **Appendix A.**




PS = New Pumping Station

G = Generator

Note: The preliminary layout presented in this figure are for display purpose and may be subject to change during the implementation phase (detailed design). For example, the exact location of the proposed pumping station or generator may be shifted ± 1.0 meters north or south and east or west.

**Figure 5.3A: Site Layout Alternative No. 3**

### 5.2.4 Evaluation of Alternative Site Layouts

Three site layout alternatives were evaluated based on the following evaluation criteria:

- Ease of Construction
- Space Requirements
- Work In-Water
- Technical Suitability
- General Concerns

Each site layout alternative was reviewed and summarized in **Table 5.4**.

**Table 5.2: Evaluation of Alternative Site Layouts**

| Evaluation Criteria | Alternative No.1 | Alternative No. 2 | Alternative No. 3 |
|---|---|---|---|
| **Ease of Construction** | Moderately complex construction due to:<br>• Requirements and additional considerations for in-water construction work related to constructing the outlet to the Little River Embayment<br>• No relocations of existing sanitary sewers or utilities required | Moderately complex construction due to:<br>• Requirements for modifications to existing Pontiac Pumping Station to accommodate new outlet piping<br>• No relocations of existing sanitary sewers or utilities required<br>• No requirements for in-water work | Most complex construction due to:<br>• Requirements and additional considerations for in-water construction work related to constructing the outlet to the Little River Embayment<br>• Requires relocation of existing sanitary sewer |
| **Space Requirements** | • Low space requirements<br>• Close to existing PS | • Low space requirements<br>• Close to existing PS | • High space requirements<br>• Limits access to west side of site |
| **Work in-Water** | Required | Not required | Required |
| **Technical Suitability** | • Both site layout alternatives will be able to meet flood mitigation objectives and provide an enhanced level of service for the Pontiac drainage area<br>• Comparable O & M requirements with access to generator and pumping chambers | | |

| | |
|---|---|
| **General Concerns** | The social, natural environmental, and economic impacts of the proposed pumping station are anticipated to be similar for each site layout alternative. |

## 5.3 OVERVIEW OF RECOMMENDED DESIGN

The recommended design concepts that form the overall recommended design are summarized in **Table 5.3**. **Section 5.0** identified, evaluated, and reported on the pumping technology and site layout to determine the recommended pumping station design. The recommended design meets the requirements outlined in the SMP to reduce the risk of flooding in the Pontiac drainage area.

In the detailed design phase, replacing the existing Pontiac Pumping Station generator with a new generator to power the existing and new pumping station should be considered. The existing generator requires significant maintenance costs, and it has already exceeded the service life.

**Table 5.3: Summary of Recommended Design**

| Design Concept | Recommendation |
|---|---|
| Pump Technology | Axial Flow Pump<br>Benefits Include:<br>• Low space requirements<br>• High efficiency in high-flow low-head applications<br>• Relatively low to medium capital cost<br>• Relatively low operations and maintenance cost |
| Site Layout | Site Layout Alternative No. 2 as shown in **Figure 5.2A**.<br>Benefits Include:<br>• Moderately complex construction<br>• No utility relocations<br>• No work in-water permitting required<br>• Meets flood mitigation objectives |

# 6.0 ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

## 6.1 OVERVIEW

**Table 6.1** provides a summary of potential environmental impacts and proposed mitigating measures for the preferred design. In general, the preferred design will have a limited effect on the environment and that effect will be mostly due to construction activities. Other than the environmental effects listed in **Table 6.1**, it is anticipated that the preferred work will not have a significant effect on the natural environment such as wildlife, vegetation, or the habitat characteristics of any particular species. The main impact that the alternatives for the proposed work will have on the socio-economic environment is the disruption that residents may experience during the construction. However, this inconvenience and disruption will only be temporary and should not significantly impact the environment.

With respect to other socio-economic impacts, it is anticipated that the preferred servicing alternative will not have any serious impact on existing land uses, cultural activities, heritage resources or any other community program except to the extent that it will permit the ongoing implementation of development and other activities as envisioned in planning documents which have positive impacts on the socio-economic environment.

**Table 6.1 Environmental Effects and Mitigating Measures**

| *OPERATION* | *EFFECT* | *MITIGATING MEASURES* |
|---|---|---|
| Cutting, digging, or trimming ground covers, shrubs and trees | Reduced terrestrial wildlife habitat quality (i.e., diversity, area, function) and increased fragmentation of habitat. | ➢ This is not a concern as there is no significant existing terrestrial wildlife habitat in the proposed area of construction |
| | Loss of unique or otherwise valued vegetation features | ➢ There are no known unique vegetation features in the area that may be disturbed by construction activities.<br>➢ Where possible, existing vegetation features will be restored to a preconstruction condition. |
| Trenching / tunnelling for sewers, excavation and construction for new wet well structure and | Soil erosion and sediment transport to adjacent water bodies causing sedimentation and turbidity of adjacent water bodies and drainage ditches | ➢ Use of erosion control measures (i.e., sediment traps, silt fences, etc.)<br>➢ Collect contaminated runoff<br>➢ Restore vegetation growth quickly<br>➢ Stage construction activities to minimize potential of adverse impacts |

| *OPERATION* | *EFFECT* | *MITIGATING MEASURES* |
|---|---|---|
| generator foundation. | Reduced water quality and clarity due to increased erosion and sedimentation, and transport of debris. | ➢ Apply wet weather restrictions to construction activity.<br>➢ Comply with any local regulations, policies and guidelines that stipulate a minimum acceptable buffer width (the allowable distance from a water body). Maximum buffer widths are desirable.<br>➢ If possible, direct surface drainage away from working areas and areas of exposed soils. To the maximum extent possible, promote overland sheet flow to well vegetated areas.<br>➢ Install and maintain silt curtains, sedimentation ponds, check dams, cofferdams or drainage swales, and silt fences around soil storage sites and elsewhere, as required. |
| | Loss of vegetation and topsoil and mixing topsoil and subsoil | ➢ Restore site by replacing topsoil and reinstate vegetation to prevent erosion |
| | Removal and/or disturbance of trees and ground flora | ➢ Avoid treed areas where possible<br>➢ Employ tree protection measures<br>➢ Replace trees and provide site landscaping |
| | Temporary disruption of pedestrian and vehicle traffic | ➢ Provide and maintain detours<br>➢ Provide for safe alternate routes<br>➢ Select alternate routes to minimize inconvenience |
| | Temporary disruption and inconvenience during construction to adjacent properties, buildings and inhabitants | ➢ Notify public agencies and neighbouring owners of construction activities<br>➢ Prepare program for reporting and resolving problems<br>➢ Ensure access is provided for emergency vehicles and personnel<br>➢ Apply noise and vibration control measures<br>➢ Apply dust control measures<br>➢ Control emissions from construction equipment and vehicles<br>➢ Use silencers to reduce noise<br>➢ Require compliance with municipal noise by-laws |
| | Possible need to remove petroleum contaminated excavated material. | ➢ Sample material.<br>➢ Handle and dispose of contaminated material in an acceptable manner |
| | Decreased ambient air quality due to dust and other particulate matter. | ➢ Avoid site preparation or construction during windy and prolonged dry periods.<br>➢ Cover and contain fine particulate materials during transportation to and from the site.<br>➢ Instruct workers and equipment operators on dust control methods.<br>➢ Spray water to minimize dust off paved areas or exposed soils.<br>➢ Stabilize high traffic areas with a clean gravel surface layer or other suitable cover material.<br>➢ Cover or otherwise stabilize construction materials, debris and excavated soils against wind erosion. |

| *OPERATION* | *EFFECT* | *MITIGATING MEASURES* |
|---|---|---|
| | Disturbance to microscopic organisms in the soil. | ➢ Limit the size of stockpiles to avoid anaerobic conditions.<br>➢ Protect stockpiled soils from exposure to and sterilization by solar radiation (or stockpile in an uncovered shaded area). |
| | Reduced soil capability through compaction and rutting, and mixing of topsoil and layers below. | ➢ Avoid working during wet conditions and/or confine operation to paved or gravel surfaces.<br>➢ Whenever possible, strip and store topsoil separately from the layers below and return to excavation in sequence. |
| | Industrial disruption of field/facility access. | ➢ All driveways, roadways and field access will be restored to pre-construction condition<br>➢ Staging of construction and advance notice to property owners prior to disruption of construction to minimize inconvenience |
| | Disruption surface drainage systems. | ➢ Provide for temporary drainage systems until final restoration is accomplished.<br>➢ Avoid disturbing drainage systems during critical periods.<br>➢ All existing culverts, tiles and drainage systems to be restored to pre-construction conditions following construction. |
| | Reduced water quality of nearby surface waters having value as wildlife habitat. | ➢ Use sediment control techniques for stockpiled materials to minimize degradation of water quality.<br>➢ An emergency spill kit will be kept on site during construction activities.<br>➢ Service equipment shall be washed, refuelled and/or a minimum of 30 m from watercourses to reduce the risk of deleterious substances entering the watercourse.<br>➢ Construction machinery shall be cleaned prior to entering the site to reduce the potential for establishment of invasive species, such as Phragmites |
| | Modifications or removal of aquatic habitat. | ➢ Stage construction to minimize potential for adverse impacts. |
| | Residential impacts. | ➢ Construction noise and dust impacts will be controlled through noise by-laws and dust control measures in contract specification.<br>➢ Inconvenience due to temporary loss of property access will be minimized through proper communication and advance notice of disruption.<br>➢ Pedestrian safety will be maintained through excavation barricades and construction fencing |

| *OPERATION* | *EFFECT* | *MITIGATING MEASURES* |
|---|---|---|
| | Traffic disruption. | ➢ It is not expected that there will be any significant traffic disruptions during the construction of the proposed work.<br>➢ Emergency services will be advised of work in advance and access to the site will be maintained during construction. |
| | Visual aesthetics. | ➢ The design will adhere to the current visual aesthetics that the surrounding infrastructure currently maintains. |
| | Recreation. | ➢ Maintain access to recreational sites during construction.<br>➢ Locate water and wastewater infrastructure components to minimize impact.<br>➢ Construction and tree protection fencing shall be installed prior to the start of construction, after layout, and shall be reviewed by an engineer. |
| | Archaeological and heritage resources. | ➢ Assess archaeological significance in areas undisturbed by previous activities. Complete Stage 1 & 2 Land Archaeological Assessment if required and follow mitigative measures outlined in cooperation with the MHSTCI.<br>➢ The MHSTCI's "Screening for Impacts to Build Heritage and Cultural Heritage Landscapes" checklist was reviewed. Proposed work is located away from any built heritage and cultural heritage landscapes, and thus is not expected to impact heritage resources in the area. |
| Use of construction equipment | Contamination of surface waters, drains and public roadways from spills, leaks or equipment refuelling. | ➢ Use containment facilities<br>➢ Inspect equipment regularly for fuel and oil leaks<br>➢ Clean equipment before it travels off site |
| | Decreased air quality due to vehicular emissions causing increased concentrations of chemical pollutants. | ➢ Minimize operation and idling of vehicles and gas-powered equipment, particularly during local smog advisories.<br>➢ Use well-maintained equipment and machinery within operating specifications. |
| | Disruption to wildlife migration and movement patterns, breeding, nesting or hibernation. | ➢ There are no known areas containing sensitive vegetation and wildlife.<br>➢ There are no known areas where migratory birds are breeding. |
| | Introduction of non-native vegetation, including opportunistic species. | ➢ Clean heavy machinery and equipment prior to transporting to new location. |

| *OPERATION* | *EFFECT* | *MITIGATING MEASURES* |
|---|---|---|
| | Loss of unique or otherwise valued vegetation features | ➢ Avoid or minimize trampling vegetation with equipment.<br>➢ Minimize physical damage to vegetation by avoiding push-outs and avoiding the placement of splash onto living vegetation. |
| | Reduced water quality and clarity due to increased erosion and sedimentation, and transport of debris. | ➢ Operate heavy machinery on the shore above the normal water level.<br>➢ Where possible, conduct activities in the dry, above the actual water level and above any expected rises in water level that may occur during a rainfall or snowmelt event. |
| | Reduced water quality due to inputs of contaminants from surface runoff during construction and operation. | ➢ Refuel equipment off slopes and well away from water bodies.<br>➢ Securely contain and store all oils, lubricants, fuels and chemicals. If necessary, use impermeable pads or berms. |

# 6.2 NATURAL ENVIRONMENT IMPACTS AND MITIGATING MEASURES

## 6.2.1 Aquatic and Terrestrial Habitat

The proposed work area may contain natural features that may support habitat of endangered species and threatened species. As per Section 2.1.7 of the Provincial Policy Statement (PPS 2014) – "Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements." All issues related to the provincial Endangered Species Act and its regulations shall be addressed prior to the construction of the proposed work.

Stantec completed a site investigation on April 13th, 2022, to document existing natural heritage conditions in the Study Area. Surveys included Ecological Land Classification (ELC) of vegetation communities, a species at risk (SAR) habitat assessment of terrestrial features, and a fish habitat assessment of the shoreline. The natural heritage features that were identified through the background review were confirmed during the field surveying. Potential impacts associated with the construction of the proposed building and connecting infrastructure include soil compaction, siltation of adjacent natural communities, vegetation disturbance, spills of deleterious substances into the Little River, noise disturbance and encounters with wildlife. The impacts are considered short term, localized to the construction area during construction activities, and will be mitigated through the application of appropriate construction techniques and mitigation measures. The natural heritage impact assessment report is included in **Appendix C**.

Eight (8) SAR have the potential to be present in the general study area and include the Barn Swallow, Chimney Swift, bat SAR (4 different species), Butler's Gartersnake, and Eastern Foxsnake. Of these, Butler's Gartersnake and Eastern Foxsnake are the only SAR that have potential to be

present within the work zone. Mitigation measures for these SAR snakes are discussed in **Section 6.2.2**. Climbing prairie rose is a species of conservation concern that may be present within the impacted thicket community. A site visit to look for this species is recommended prior to vegetation removal. If the species is present, relocation may be needed. Impacts from construction of the proposed building and connecting infrastructure will primarily be limited to anthropogenic habitats that do not support wildlife. No permanent impacts to breeding birds, reptiles or other wildlife species, is expected as a result of the construction of the proposed building and connecting infrastructure provided mitigation measures recommended are implemented.

### 6.2.2 Butler's Gartersnake and Eastern Foxsnake Mitigation

The sensitive periods of the year for Butler's Gartersnake and Eastern Foxsnake include hibernation and breeding. The breeding and birthing period for this species is between late May and September while the hibernation period for the species is approximately November 1 – March 31, but individuals may emerge earlier during warm spring weather.

If work is to be completed between April 1 and October 31 (i.e., during the active period for the species) the following mitigation is recommended:

- All persons entering the site should be provided training about Butler's Gartersnake and Eastern Foxsnake and proper steps to take upon encountering these species.

- If Crayfish burrows, ant hills, small mammal burrows or other potential hibernacula features are observed, they should not be impacted during a time of year when they may be in use by hibernating snakes (i.e., October 1 to April 30).

- Vegetation brushing or removal that is required to facilitate the Activity must be limited to the smallest extent possible, ideally under guidance of a qualified biologist, and while air temperatures are above 10 °C, when snakes are more active and able to flee.

- To reduce interaction with Butler's Gartersnake and Eastern Foxsnake, sediment fencing is recommended along the border of the Work Zone to reduce interactions of snakes on site. Installation of sediment fencing will occur before April 1 or after October 31 (i.e., outside of snake active season) to define Work Zones and restrict the movement of snakes into the working area. If the installation of fencing occurs during the active season, it is recommended that the area be searched by a Qualified Biologist for the presence of snakes prior to installation of fencing. Fencing materials with plastic mesh will not be used due to risk of entanglement of snakes or other wildlife. Further specifications for reptile exclusion fencing should follow Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing and Best Management Practices for Mitigating the Effects of Road Mortality on Amphibian and Reptile Species at Risk in Ontario. As per the recommendations fencing should be buried to a depth of 10-20 cm and a height of 200 cm. The exclusion fencing is to be maintained around the work area for the duration of

the active season and checked daily to identify any repairs that may be needed. Fencing should be repaired immediately if it is found to be deficient.

- A thorough visual search of the Work Zone by construction contractors is recommended before work commences each day. Visual searches should include inspection of machinery and equipment, prior to starting equipment, particularly during the peak reptile activity period from April 1 to October 31.

- In the unlikely event that a Butler's Gartersnake or Eastern Foxsnake enters the work area and is in immediate danger, a 30 m buffer should be placed on the work area and construction activities should cease until the snake has vacated the work area on its own accord before recommencing construction activity. If the reptile does not vacate the area within a reasonable time, a qualified individual may be used to relocate the reptile to a safe location away from the Work Zone.

### 6.2.3 Protection of Migratory Birds

The Migratory Birds Convention Act, 1995 (MBCA) provides legal protection of migratory birds and their active nests in Canada. The loss of migratory bird nests, eggs and/or nestlings due to tree cutting or other vegetation clearing can be avoided by limiting clearing of vegetation to outside of the general nesting period for migratory birds in this region (C2) as identified by Environment and Climate Change Canada (ECCC) (i.e., between April 1 and August 31). If work must be performed within this window, a survey for active nests or breeding activity should be conducted by a qualified biologist before work commences and additional mitigation measures (e.g., implementation of avoidance distances during construction) implemented, if required.

### 6.2.4 Protection of Fish and Fish Habitat

In addition to the measures identified in **Sections 6.1.1**, the following specific measures are recommended to protect fish and fish habitat:

• Avoid in-water work during the restricted activity period for spring spawning fish species in the MNRF's Southern Region (i.e., no in-water work March 15 to July 15).

• The contractor should monitor the five-day weather forecast daily to anticipate weather conditions and should be prepared to leave the site in a stable and secure condition should water levels rise.

• Prior to instream construction activity, fish should be rescued from the isolated work areas by implementing a fish removal and relocation plan.

• During dewatering of the in-water work areas the dewatering pump inlet should be covered with filter fabric or clear stone. The outlet should discharge to a sediment bag or trap. Discharge

from the bag should be released to a relatively flat vegetated location or if vegetated location is not available, a flow dissipating structure should be provided.

• Water from dewatering and unwatering operations should be directed to a sediment control measure and/or a vegetated discharge are 30 m away from the waterbodies or as far as practical form the top of bank of any waterbody, prior to discharge to the natural environment. No dewatering shall be sent directly to a sewer. These control measures shall be monitored for effectiveness and maintained or revised to meet the objective of reducing the risk of the entry of sediment into the watercourse.

• All water intakes used to dewater area(s) that may contain fish should be screened to reduce the risk of the impingement and entrainment of fish as per DFO's Interim Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater.

### 6.2.5 Floodplain Hazard Management

The proposed work site is under the jurisdiction of the Essex Region Conservation Authority. The preferred route and location of this project was reviewed in accordance with ERCA's floodplain mapping of this area, and it has been determined that the western limits fall within the Limit of Regulated Area. The proposed excavations, construction of structures, drain crossings, and placement and grading of fill, within the regulated area will require permits from the ERCA under Ontario Regulation 158/06, (Development, Interference with Wetlands and Alteration to Shorelines and Watercourse Regulations - Section 28 of the Conservation Authorities Act).

In the final design phase, an application of flood proofing measures must be submitted to the ERCA for review and approval. The permit application shall meet the following requirements:

- Specific "Best Management Practices" regarding erosion control measures, sedimentation, and the removal of vegetation, which is provided in the MECP Stormwater Management Planning and Design Manual (2003).
- The Windsor-Essex Region Stormwater Management Standards Manual (2018), https://essexregionconservation.ca/wp-content/uploads/2018/12/WE-Region-SWM-Standards-Manual.pdf.
- Water quality measures shall be considered to ensure no adverse impact on the downstream watercourse. The new preferred outfall sewer will run parallel to the existing LRWRP outfall sewer that is located along Prospect Ave, and outletting to the Detroit River. Surface water monitoring program is to be implemented to verify no adverse impact on the downstream watercourse.
- Items listed in **Table 6.1** "Environmental Effect and Mitigation Measures" described in this ESR Report.

### 6.2.6 Erosion and Sediment Control

Appropriate erosion and sediment controls should be employed during all phases of construction to reduce erosion and sediment transport into the Little River to the extent possible. Mitigation measures to reduce the risk of negative effects on fish, fish habitat and water quality in the Little River are listed below:

- Silt fence will be installed around the perimeter of the work area
- Materials requiring stockpiling (fill, topsoil, etc.) will be stabilized and kept outside of the floodplain
- All disturbed areas are to be restored with erosion protection/vegetative cover following disturbance
- Erosion and sediment control materials (silt fence, strawbales, clear stone) are to be kept on site for emergencies and repairs
- Erosion and sediment controls should be monitored and maintained, as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected until cover is re-established
- Conditions of the anticipated ERCA permit under Ontario Regulation (O. Reg.) 171/06 should be followed during these activities.

### 6.2.7 Source Water Protection

#### 6.2.7.1 Source Water Protect

For the protection of local municipal drinking water sources, the Essex Region Source Protection Plan (SPP), which has been established under the Clean Water Act, 2006 (Ontario Regulation 287/07), came into effect on October 1, 2015.

The Clean Water Act (2006) refers to four types of Vulnerable Areas, which include:

- Intake Protection Zones
- Wellhead Protection Areas
- Highly Vulnerable Aquifers
- Significant Groundwater Recharge Areas

The types of Vulnerable Areas are addressed further below in relation to this project location.

### 6.2.7.2 Intake Protection Zones (IPZs)

There are two municipal Water Treatment Plants (WTPs) in the region, the A. H. Weeks (Windsor) and Amherstburg WTPs, having their intakes in the Detroit River (refer to Map 3 of the Essex Region Source Protection Plan). Intake Protection Zones are areas of land and water, where run-off from streams or drainage systems, in conjunction with currents in lakes and rivers, could directly impact the source water at the municipal drinking water intakes.

An Intake Protection Zone can be described as a defined area surrounding a surface water body intake. The size and shape of each zone in an IPZ represents either a set distance around the intake pipe, or the length of time it would take water and contaminants to reach the intake:

- IPZ-1 is the area closest to the intake pipe and is a set distance which extends one kilometre upstream and 120 metres onto the shore.
- IPZ-2 includes the on and offshore areas where flowing water and any pollution would reach the intake pipe within two hours.
- IPZ-3 is an area where contaminants could reach the intake pipe during and after a large storm.

According to Approved Source Protection Plan for Essex region source protection area, the Detroit River in the study area is characterized to be an Intake Protection Zone 3 (IPZ-3). Refer to Map 10 of the Essex Region Source Protection Plan)

The purpose of this EA study is to investigate and report on alternative means of controlling storm and coastal flooding in the riverfront area near St. Rose Avenue. The proposed pumping station for the collection of wet weather flow will have a negligible impact on the source of drinking water quality.

### 6.2.7.3 Wellhead Protection Areas

Wellhead Protection Areas are not applicable in the Essex Region, as no municipal drinking water systems are supplied by groundwater.

### 6.2.7.4 Highly Vulnerable Aquifers (HVAs)

Highly Vulnerable Aquifers (HVAs) are defined as aquifers on which external sources have or are likely to have a significant adverse impact, and include the land above the aquifer.

In the ERSPA these HVAs are generally located in the sandy soil areas in the southern part of the region, including most of Pelee Island (refer to Map 4 of the Essex Region Source Protection Plan). There are no HVAs located in or close to the proposed work area.

### 6.2.7.5 Significant Groundwater Recharge Areas

Significant Groundwater Recharge Areas (SGRAs) are defined as per Regulation 287/07 as areas within which it is desirable to regulate or monitor drinking water threats that may affect the recharge of an aquifer. Groundwater recharge occurs where rain or snowmelt percolates into the ground and flows to an aquifer. The greatest recharge usually occurs in areas which have loose or permeable soil such as sand or gravel that allows the water to seep easily into the aquifer.

Most of the SGRAs in the ERSPA are located in the sandy soil areas of the southern part of the Essex Region, in the Harrow area, parts of Leamington and Kingsville, and limited parts of the Turkey Creek and Pelee Island subwatersheds (refer to Map 5 of the Essex Region Source Protection Plan). There are no HVAs located in the northern part of the Essex Region including City of Windsor area.

### 6.2.7.6 Overall Vulnerability Assessment Summary

Project activities in vulnerable areas need to be assessed to determine the risk they pose. The Clean Water Act requires that significant threats be managed to reduce the threat to a point where it is no longer significant. Action may be taken to address low and moderate threats at the discretion of the Source Protection Committee. Table 6.2 provides a summary of threats to vulnerable areas and the subsequent actions to be taken, relating to this project.

**Table 6.2 Summary of Threats to Vulnerable Areas**

| Vulnerable Area | Threat Potential | Action Taken |
|---|---|---|
| Intake Protection Zone | Low | None |
| Wellhead Protection Areas | Not applicable | None |
| Highly Vulnerable Aquifer | Not applicable | None |
| Significant Ground Water Recharge Areas | Not applicable | None |

## 6.2.8 Permits to Take Water

At the site location, the Little River water surface is approximately 2 meters below the site grade while the ground water table is about 12.5 m to 14.1 m below, indicating that the native silty clay soil has low permeability and ground water control will not be a big issue during construction. It is anticipated that any groundwater inflows from excavating within this stratum during construction can be managed by pumping from properly filtered sumps located within the excavation.

The use of these dewatering systems will require the acquisition of a Permit to Take Water from the MECP.

### 6.2.9 Climate Change

Climate encompasses all aspects of weather, including: temperature, precipitation, air pressure, humidity, wind speeds, and cloudiness. Weather and climate are not static processes and variability is often normal. Weather, for example, changes on a daily and sometimes hourly basis. Weather can also change on a monthly basis, through the changing of seasons. When climate changes on a global scale, it is referred to as Climate Change.

Since the beginning of the industrial revolution in the 18th century, excessive emission of greenhouse gases, like carbon dioxide and methane, have been released through human activities, causing an increased percentage of solar radiation to be trapped in our atmosphere. In recent decades the effect of this on climate has become clearer. As more energy is retained within the atmosphere, a general increasing trend in global temperatures has occurred.

Regardless of the cause, the average temperature in Windsor has increased by almost 1°C since 1940. As air temperatures increases, so does the capacity of the air to hold more water leading to more intense rainfall events. The Environment Canada weather station located at Windsor Airport has been monitoring and recording weather data since 1941. Since this time, an increasing trend in annual precipitation has been documented.

The effects of climate change are expected to include an increase in the number and severity of storms, leading to increased precipitation. Since 1970, there has been increasing evidence of heavier short duration (24 hours or less) rain events in southern Ontario.

Climate changes related to increasing rainfall in the region have a significant impact on municipal sewer systems. The City of Windsor recently experienced a significant rainfall event that inundated and overwhelmed the area's sanitary and storm sewer system/facilities. In the last decade alone, this region has experienced six (6) significant storm events that have surpassed current 1:100 year regulatory standards, and have resulted in urban flooding issues and sewer backups that have impacted hundreds of homes and businesses in the region. As such, historical data regarding the likelihood of major flooding events must be reconsidered. It is important that the proposed work for storm and coastal flooding control continues to operate effectively in the future. A solution needs to be identified to provide resiliency to the impacts of climate change.

The City's own Climate Change Adaptation Policy notes that focus needs to be directed towards climate change impacts such as: operating/maintenance demands to deal with climate extremes, flooding to basements, roads and infrastructure, and operation demands during severe storms. **Table 6.3**, which is obtained from City of Windsor Climate Change Adaption Plan (September 2012), summarizes the average trends in the amount of annual maximum rain events.

**Table 6.3 Summary of the Observed and Projected Increases in Rainfall Over Time in Windsor**

| | Observed trends 1970 – 2000 | Projected trends to 2050 (High Emissions) |
|---|---|---|
| **30 Minute Extremes** | • 5% increase per decade<br>• 4.5% increase per decade to 1996 | • 5% increase per decade |
| **Daily Extremes** | • 7% per decade (May, June, July)<br>• 5% increase per decade (over the year) to 1996 | • 3% per decade over the year (20 year return period)<br>• 2.5 to 6% increase per decade (rainfall with probability <5 %) |
| **Annual Rainfall** | • 1% to 3% increase per decade | • 1% increase per decade |

In conjunction with the regional municipalities including City of Windsor, the ERCA has developed a set of regional stormwater management guidelines that take into account adjustments for the impacts of Climate Change. The recommendations from this guidance document have also been considered and endorsed in the Storm and Coastal Flooding Master Plan.

The proposed work for storm and coastal flooding control, which was coordinated with the above studies, was recommended based on current standards with a conservative design method that provides a safety margin for extreme rainfall events above and beyond the average year design storms. The proposed facility is designed to handle an additional flow of 2.5 $m^3/s$, which is the estimated additional flow predicted during the 100-year storm event.

As there is an increase in the number and intensity of storm events affecting the region, climate change needs to be considered in the evaluation of alternative solutions, and the opportunity for flooding protection is considered where feasible.

# 6.3 SOCIO-ECONOMIC IMPACTS AND MITIGATING MEASURES

## 6.3.1 Built Heritage Resources and Cultural Heritage Landscapes

**Figure 2.2** of **Appendix A** is an aerial plan showing the heritage resources around the proposed work areas. As shown in the aerial plan, there are no built heritage resources and/or cultural heritage landscapes in proximity to the locations of proposed work areas.

The vibration limits set for the project will ensure that all buildings, including those with heritage features, are protected. Monitoring during construction will ensure that vibration is kept below the established limit.

### 6.3.2 Archaeological Resources

The Stage 1 Archaeological Assessment for the proposed upgrades of the Pontiac Pumping Station site, which is situated within the Little River Treatment Plant was completed in 2020. The Stage 1 Archaeological Assessment was completed by Fisher Archaeological Consulting and determined that the area retained potential for the identification of archaeological resources. The Stage 1 Archaeological Assessment consisted of a review of geographic, land use, and historical information for the property and the relevant surrounding area, a property visit to inspect its current condition and contacting MHSTCI to find out whether there are any known archaeological sites on or near the property. Its purpose is to identify areas of archaeological potential and further archaeological assessment (e.g. Stage 2-4) as necessary.

The Stage 1 Archaeological Assessment indicated that there was one registered archaeological site within a one-kilometer radius of the study area and there were no previous archaeological reports for work within fifty meters of the study area. The Pontiac Pumping Station study area is located between Little River and the 'Old' Little River. The historic NTS map from 1912 shows some channelization of the 'Old' Little River. The archaeological potential for Indigenous and Euro-Canadian sites is high based on the study area's proximity to this watercourse. Although the archaeological potential is high, there have been obvious disturbances to parts of the study area during the construction of the existing pumping station. Due to the potential for discovery of Aboriginal or Euro-Canadian resources, it was recommended that the small portion of the study area indicated as having high archaeological potential undergo a Stage 2 Archaeological Assessment by a test pit survey at five metre intervals.

The Stage 2 Archaeological Assessment to determine if any archaeological resources are on the property using test pit survey was carried out by Stantec on May 19th, 2022. No archaeological resources were identified during the Stage 2 Archaeological Assessment at the site. Therefore, no further land-based archaeological assessment of the study area is required. The archaeological assessment carried out as a part of this study is included in **Appendix C**.

### 6.3.3 Community

#### 6.3.3.1 Disruption of Traffic

It is not expected that there will be any significant traffic disruptions during the construction of the proposed work. If there are any traffic disruptions during the construction of the proposed facility and outfall, all emergency services will be notified of detours prior to commencement of construction. Mitigating measures are to provide and maintain detours, provide safe alternate routes, and select alternate routes to minimize inconvenience, if applicable.

#### 6.3.3.2 Proximity to Arterial Roadway

The EC Row Expressway and Highway 401 are major arterial roadways that provide direct access to the Windsor Communities and neighboring areas. It is not expected that there will be any significant traffic disruptions during the construction of the proposed work.

## 6.4 PERMITTING CONSIDERATIONS

### 6.4.1 Essex Region Conservation Authority

Conservation Authorities Act - The Study Area is located in the Essex Region Conservation Authority regulated area related to the Detroit River and its associated floodplain. As such, development in the ERCA regulated area is subject to the policies of O. Reg. 171/06 under the Conservation Authorities Act.

### 6.4.2 Ministry of the Environment, Conservation and Parks

Endangered Species Act, 2007 - Eight SAR have the potential to be present in the Study Area: Barn Swallow, Chimney Swift, bat SAR (4 species), Butler's Gartersnake and Eastern Foxsnake; however, there is a low likelihood of occurrence within the Work Zone as the area is heavily disturbed. Avoidance of the migratory bird nesting season (April 1 - August 31) and active reptile season (April 1 and October 31) is recommended. If this is not possible, then bird nesting surveys must be completed in advance of construction as well as the erection of proper exclusionary fencing for reptiles form the Work Zone. With the implementation of this mitigation, no authorizations are anticipated under the ESA.

### 6.4.3 Fisheries and Oceans Canada

Fisheries Act and Species at Risk Act (SARA) - Under the fish and fish habitat protection provisions of the Fisheries Act, works, undertaking or activity of a project must incorporate measures to avoid causing the death of fish and the harmful alteration, disruption, or destruction (HADD) of fish habitat. To assist proponents with determining if their project will comply with the fish and fish habitat provisions, DFO provides measures to protect fish and fish habitat (DFO 2021b) as well as several standards and codes of practice (DFO 2021c). If it is determined that a project cannot implement the measures to protect fish and fish habitat and if there are no applicable standards and codes of practice, then it is recommended that the proponent request a review of the project by DFO. If DFO determines that a project will result in the death of fish and/or HADD if fish habitat an Authorization under the Fisheries Act may be required.

Based on the presence of fish habitat in the Study Area, the proposed activities, and DFO's current guidelines, Stantec recommends that a DFO Request for Review form be completed and submitted to DFO for review of the project under the Fisheries Act. DFO also reviews projects under

the federal SARA. A SARA permit may be required by DFO for potential handling of Aquatic SAR during in water construction activities.

# 7.0 PUBLIC CONSULTATION

The Municipal Class Environmental Assessment process provides a minimum of three points of contact for a Schedule C undertaking where members of the public and review agencies have the opportunity to review the project findings and submit comments for consideration in development of the project. The following sections summarize the approach that has been taken with respect to public participation during this project.

## 7.1 PUBLIC PARTICIPATION

A notice of commencement was originally published in the March 5th, 2022, edition of the Windsor Star and on the City of Windsor's Webpage advising of the initiation of this Class EA undertaking and inviting public input. A copy of the notice is contained in **Appendix B**.

In addition to this discretionary point of contact, there are two points for mandatory public contact during the Class EA process, namely:

- Phase 3: Public Consultation and Information Centre
- Phase 4: Notice of Completion

A public Open House was held on July 13th, 2022, to provide information regarding this undertaking and to invite input and comment from interested persons. A copy of the open house notice as published in the Windsor Star on July 2nd, 2022 is included in **Appendix B** together with a list of persons who attended the open house and a copy of the material that was given to all attendees.

## 7.2 REVIEW AGENCIES

The Class EA provides for the involvement in the project by the MECP's various branches as well as other provincial and federal ministries and outside agencies. The list of Review Agencies varies depending upon the scope of the project, its location and the potential environmental impacts.

Emails were sent out to review agencies the week of March 7th 2022, advising of the initiation of this project. Copies of the letter, notice of project commencement and the list of review agencies are contained in **Appendix B**.

The Notice of Public Information Centre was distributed to review agencies and mandatory contacts July 4th, 2022. A copy of the email, the notice and the distribution list is included in **Appendix B**.

# 7.3 RESPONSE FROM PUBLIC AND REVIEW AGENCIES

## 7.3.1 Notice of Project Initiation

The notice of initiation of the project did not generate any public response. The following responses (copies included in **Appendix B**) were received from review agencies and mandatory contacts.

- Ministry of the Environment, Conservation and Parks (MECP) – provided acknowledgement of Notice of Project Initiation on March 30, 2022.

- Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDNRF)– advised in an email dated March 18, 2022, that the Class EA should identify and address potential impacts to natural heritage including species at risk or other resource values.

- Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI) – advised in an email dated April 20, 2022, that Little River is in an area of High Archaeological Potential and works proposed would have to be subject to City of Windsor adopted Archaeological Management Plan (WAMP). MHSTCI then advised in an email dated May 11, 2022, that they recommend the Environmental Study Report clearly articulates the existing conditions and that there are no impacts to the existing storm water pumping station which is over 40 years old.

- Ministry of Transportation – advised in an email dated April 8, 2022, that the site (Little River Pollution Control Plant) does not fall within the MTO Permit Control Area (PCA), and as such, MTO permits are not required. MTO would have concerns with any work that could potentially impact the highway or falls within the PCA.

- Windsor Police - advised in an email dated March 15, 2022, that any alternative design concepts/solutions developed for the proposed Pontiac Pumping Station Capacity Upgrades capture appropriate target hardening (physical access control and related security) measures to ensure an outcome that functions with less risk. They want to continue to be informed with project updates as they develop.

- Enwin Utilities – advised in an email dated March 11, 2022, that they would like to stay informed on the progress of the project.

- TELUS – advised in an email dated March 14, 2022, that they have no underground infrastructure in the area of the proposed work.

### 7.3.2 Public Open House

A total of one (1) person attended the Open House held on July 13th, 2022. No one expressed any objection to the proposed undertaking. Email comments (copies included in **Appendix B**) were received from the following review agencies and mandatory contacts.

- ERCA - advised in a letter dated August 3rd, 2022, that
    - The study area is regulated, by the Conservation Authority, under Section 28 of the Conservation Authorities Act. In addition, there is very little by way of natural heritage that, should be affected by the works proposed for the new pumping station in the study area
    - For the new pumping station, early consultation with the ERCA, at the detailed design stage, is encouraged to obtain feedback on the recommended / preferred design. This is to ensure environmental impacts are avoided and to discuss the specific permitting requirements for this project,
- Hydro One - advised in an email dated July 6th, 2022, that
    - "In our preliminary assessment, we confirm there are no existing Hydro One Transmission assets in the subject area. Please be advised that this is only a preliminary assessment based on current information. If plans for the undertaking change or the study area expands beyond that shown, please contact Hydro One to assess impacts of existing or future planned electricity infrastructure. Any future communications are sent to Secondarylanduse@hydroone.com. Be advised that any changes to lot grading and/or drainage within proximity to Hydro One transmission corridor lands must be controlled and directed away from the transmission corridor."
- Windsor Police Service – advised in an email dated July 5th, 2022, that
    - This project is not anticipated to carry any significant impact to public safety in a way that is overtly discernible.
    - The primary issue, while low in overall risk probability, is to ensure the property is established and maintained in a way that optimizes physical security. This is because of the high importance associated with this asset, when required. In this regard, failure of its functioning should unlawful access be gained, would be detrimental. Criminal access that leads to possible acts of sabotage needs to be prevented. In saying this, extra care should be given to solidifying good access control measures into the site, plus implementing important target hardening features.
    - It is also important that uninhibited access by all emergency responders (Police, Fire, and EMS) be achieved as an outcome from the final design, when it is constructed and made operational.

No feedback forms were received in response to the information provided at the Public Open House.

## 7.4 FIRST NATIONS CONSULTATION

Consultation with First Nations is ongoing in accordance with the Municipal Class EA First Nations Consultation requirements. As part of this Environmental Assessment, communications with First Nations agencies and communities is being undertaken in parallel with the other stakeholder communications and consultations. This report will be sent to the First Nations groups and organizations to solicit their interest or non-interest in the study.

The communities contacted as a part of this EA study include:

- Aamjiwnaang First Nation
- Caldwell First Nation
- Walpole Island First Nation (Bkejwanong Territory)
- Chippewas of the Thames First Nation
- Chippewas of Kettle & Stony Point First Nation
- Oneida Nation of the Thames (ONYOTA'A:KA)
- Métis Nation of Ontario
- Moravian of the Thames (Delaware Nation)

First nations consultation is to be completed in accordance with the Municipal Class EA First Nations Consultation requirements. As part of this Class EA, communications with First Nations agencies and communities are being undertaken in parallel with the other stakeholder communications and consultations. Letters were sent to the following First Nations groups and organizations at study commencement and public open house to solicit their interest or non-interest in the study.

Following the project Notice of Commencement, a consultation response was received from Chippewas of the Thames First Nation (COTFN), stating that the proposed project is located within the McKee Treaty Area (1790) to which Chippewas of the Thames First Nation (COTTFN) isa signatory. It is also located within the Big Bear Creek Additions to Reserve (ATR) land selection area, as well as COTTFN's Traditional Territory. COTFN requested to have a First Nation Field Liaison present for the Stage 2 Archaeological Assessment. COTFN was notified of the assessment and a COTFN Field Liaison was on site May 19th, 2022, when the assessment was completed.

Documentation of consultation with First Nations communities during the Environmental Assessment Process is in **Appendix B**.

# 8.0 OPINION OF PROBABLE COST

This section discusses an opinion of probable cost for the preferred solution. The opinion of probable cost is an estimate of the future contract price for the engineering and construction work, which is not yet fully defined and may be subject to changes in scope, design, and market conditions.

## 8.1 LEVEL OF ACCURACY

Opinions of probable cost are typically provided throughout various stages of a project's life cycle. There are a number of classifications for estimates that identify typical minimum and maximum probable costs or levels of accuracy. These classifications vary widely by industry but all are based on the fact that the level of accuracy is directly proportional to the level of detail available at each stage of the project.

The level of accuracy increases as the project moves through the various stages from planning to preliminary design to final design. A wide range of accuracy would be expected at the planning stage of a project development because a number of details would be unknown. As the project moves closer to completion of final design, the estimate would become more accurate due to the increased level of detail available and the reduced number of unknowns.

**Table 9-1** includes a summary of typical estimate classifications used throughout a project's development including a description of the project stage and range of accuracy. The opinions of probable cost in this study are estimated at the study stage (Class 2) and the corresponding level of accuracy could range from –15% to +30% from the opinion presented in the report.

**Table 8.1: Classification of Cost Estimates**

| Class | Description | Level of Accuracy | Stage of Project Lifecycle |
|---|---|---|---|
| 1 | Conceptual Estimate | +50% to -30% | Screening of alternatives. |
| 2 | Study Estimate | +30% to -15% | Treatment system master plans. |
| 3 | Preliminary Estimate | +25% to -10% | Pre-design report. |
| 4 | Detailed Estimate | +15% to -5% | Completed plans and specifications. |
| 5 | Tender Estimate | +10% to -3% | This is the actual tender price and it can vary depending on the amount of contingency allowance consumed. |

## 8.2 OPINION OF PROBABLE COST FOR PREFERRED SOLUTION

A capital budget estimate (in 2022 dollars) is summarized in **Table 9-2**. In addition to the level of accuracy discussed, the opinion of probable cost was prepared taking into consideration the following factors.

- All estimates are in 2022 dollars based on an Engineering News Record (ENR) Construction Cost Index of 1200 (Average in March 2022).
- It is assumed that the Contractor will have unrestricted access to the site and will complete the work during normal working hours from 7:00 am to 6:00 pm Monday to Friday. There is no allowance for premium time included.
- Labour costs are based on union labour rates for the Windsor area.
- An allowance is included for mobilization and demobilization and the Contractor's overhead and profit.
- Equipment costs are based on vendor supplied price quotations and historical pricing of similar equipment.
- Bulk material and equipment rental costs used are typical for the Windsor area.
- The estimate does not include the cost of application or permit fees.
- Allowances for engineering and contingency allowances (approximately 15% and 30%, respectively) are included in the estimate.
- No allowance is included for interim financing costs or legal costs.
- No allowance is included for escalation beyond the date of this report.
- A factor that could impact the estimate is the possible presence of archaeological resources in the construction area. However, the potential for these resources has been identified to be low and therefore no allowance is included in the estimate.

**Table 8.2: Opinion of Probable Capital Cost for Preferred Solution**

| Item | Description | Probable Cost |
|---|---|---|
| 1 | Pumping Station and Outlet Structure | [redacted] |
| **Sub-total Construction Cost** | | [redacted] |
| | Contingency Allowance (30%) | [redacted] |
| | Engineering Allowance (15%) | [redacted] |
| **TOTAL CAPITAL COST (excluding taxes)** | | [redacted] |

Note: Details regarding the Opinion of Probable Cost for the proposed Pontiac Pumping Station are not available at this stage and will be presented in the Final ESR. It is anticipated that the Opinion of Probable Cost has increased approximately 50 – 60 % from the estimate provided in the SMP Study.

# 9.0 SUMMARY

This ESR presents a thorough review and evaluation of alternative design concepts for the proposed Pontiac Pumping Station. This ESR identified, evaluated, and reported on alternative design concepts including the site layout and pumping technology in order to determine the recommended pumping station design. **Section 5.0** summarizes the decision-making process and outcomes of the analysis for each design concept.

Through the comprehensive SMP study, the Pontiac drainage area was identified as a problem zone due to high risk of basement and surface level flooding. The Pontiac drainage area is at high risk for these types of flooding because the existing pumping station does not have the hydraulic capacity to meet the required level of service. The existing Pontiac Pumping Station is not able to effectively discharge wet weather flows during sever storm events. In the SMP, the City identified constructing a new wet well structure to expand the existing pumping station as the recommended design solution to increase the level of service in the Pontiac drainage area and provide increased flood protection in the case of a 1:100-year storm event.

Through detailed analysis carried out as a part of this Municipal Class EA, alternative site layouts and pumping technologies were evaluated to form the overall recommended design. Axial – flow pumps are recommended for this primarily stormwater pumping station design based on their high efficiency, low space requirements, and low operation and maintenance costs. Site Layout Alternative No. 2, with the wet well structure and generator to the south of the existing pumping station was identified as the recommended site layout alternative. Benefits of this site layout include low space requirements and relatively simple construction since there will be no utility relocations or in-water work required.

The recommended design meets the requirements outlined in the SMP to reduce the risk of flooding in the Pontiac drainage area in the case of severe storm events. When capital budget funding becomes available, it is recommended that the work described in this ESR proceed to Phase 5 with final design and construction. Construction of the proposed infrastructure will positively impact the community and work to decrease the risk of damage to municipal infrastructure, local transportation networks, and residential properties due to flooding.

# APPENDICES

# Appendix A FIGURES

# Appendix B PUBLIC CONSULTATION

1. Notice of Study Commencement
2. Public Information Centre
3. Email Packages to Review Agencies
4. Response from Review Agencies – Notice of Project Commencement
5. Response from Public – Public Notice of Project Commencement
6. Response from Review Agencies – Public Open House
7. Response from Public – Public Open House
8. First Nations Consultation

# Appendix C FIELD INVESTIGATIONS

1. Geotechnical Assessment and Preliminary Geotechnical Exploration Report
2. Preliminary Soil Characterization Report
3. Stage 2 Archaeological Assessment Report
4. Natural Heritage Impact Assessment Report
5. Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes – Checklist