Utilities Kingston

WSP #: 131-18048-00

THE PORTSMOUTH PUMPING STATION FLOW DIRECTION ENVIRONMENTAL ASSESSMENT

KINGSTON, ON

PROJECT FILE REPORT

JULY 30, 2014

WSP

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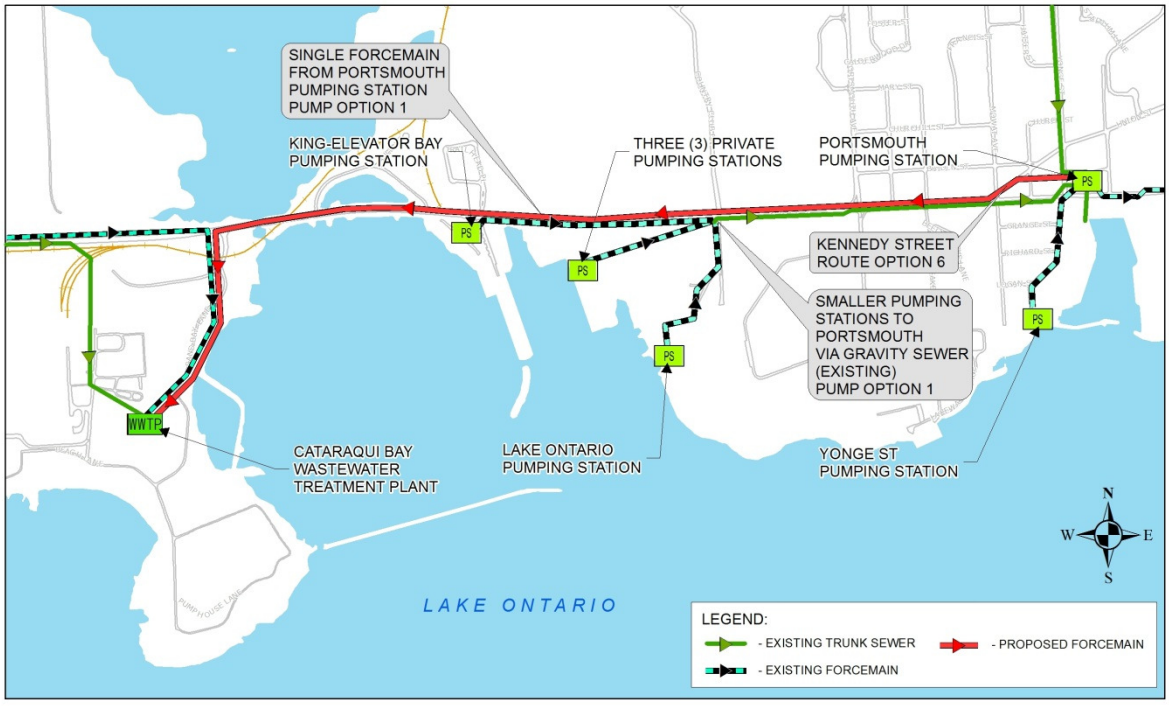
Utilities Kingston has completed a Schedule B Class Environmental Assessment (EA) to evaluate the flow direction of the Portsmouth Pumping station servicing the Portsmouth area. The EA study was initiated to identify how to best support further development (through intensification) in the City of Kingston through sustainable servicing. The City's existing sewer network is currently laid out such that wastewater flows generated in the central and east areas of the City are conveyed to the Ravensview Wastewater Treatment Plant (WWTP) while flows generated in the west area of the City are conveyed to the Cataraqui Bay WWTP. Utilities Kingston undertook the study to evaluate the option of redirecting flow from the Portsmouth service area west towards the Cataraqui Bay WWTP in order to help alleviate any potential system constraints in the central and eastern portions of the City's wastewater network including the opportunity of alleviating Combined Sewer Overflows (CSO). The study concluded that west routing would be the preferred option and further evaluated various route and pumping options to convey the flows to the west where the preferred option includes reusing the existing King St. West Collector and installing a new sewage forcemain along Kennedy St, Union St, King St W & Front Rd.



NOTICE OF COMPLETION
CLASS ENVIRONMENTAL ASSESSMENT (EA) – SCHEDULE 'B'

Portsmouth Pumping Station Flow Direction

Residents, stakeholders and other interested parties may review the EA documents and provide comments to Utilities Kingston within 30 calendar days from the date of this Notice. Documents will be made available online or in person at:

Date: Tuesday, August 12, 2014 – Thursday, September 11, 2014
Time: Monday-Friday: 8:30 am to 4:30 pm

Location(s):

- Utilities Kingston - 85 Lappan's Lane, Kingston, Ontario (Utilities Engineering Department)
- City Clerk's Office – 216 Ontario Street, Kingston, Ontario
- Kingston Frontenac Public Library – Central Branch, 130 Johnson Street, Kingston, Ontario

Comments should be directed in writing to:

Michael Fischer, P.Eng.
Utilities Kingston
85 Lappan's Lane
Kingston, ON K7L 4X7

If concerns arise regarding this project, which cannot be resolved through discussions with Utilities Kingston, a person or party may request that the Ontario Minister of the Environment and Climate Change make a Part II order review to comply with Environmental Assessment Act which addresses individual environmental assessment. Requests must be received by the Minister at the address below within 30 calendar days of this Notice. A copy of the request must also be sent to Utilities Kingston. If no request is received within 30 calendar days of this Notice, Utilities Kingston will be permitted to proceed to design and construction as outlined in the EA Report.

Request to the Ontario Ministry of Environment and Climate Change should be directed to:
Minister of Environment
135 St. Clair Avenue, 10th Floor
Toronto, ON M4V 1P5

For more information, please contact the project team:

Matt Morkem, P.Eng.
Manager, Infrastructure, Kingston
WSP Canada Inc.
1224 Gardiners Street, Suite 201
Kingston ON K7P 0G2
matt.morkem@wspgroup.com
Phone: (613)-634-7373 Ext. 406

Michael Fischer, P.Eng.
Utilities Engineer
Utilities Kingston
85 Lappan's Lane P.O. Box 790
Kingston, ON K7L 4X7
mfischer@utiltieskingston.com
Tel: 613-546-1181 ext. 2356

1 INTRODUCTION

1.1 PURPOSE AND STUDY BACKGROUND

Utilities Kingston (UK) has initiated a Schedule B Class Environmental Assessment (EA) to select the sewage flow direction from the Portsmouth area in the City of Kingston. The City's existing sewer network is currently laid out such that wastewater flows generated in the central and east areas of the City are conveyed to the Ravensview Wastewater Treatment Plant (WWTP) and wastewater flows generated in the west area of the City are conveyed to the Cataraqui Bay WWTP. Due to a planned increase in development through the downtown core (the central area of the City), higher wastewater flows are projected to be conveyed through the central and eastern portions of the City's wastewater network. UK is undertaking the current study to evaluate the option of redirecting flow at the Portsmouth Pumping Station (centrally located) to the west towards the Cataraqui Bay WWTP in order to alleviate any system constraints in the central and eastern portions of the City's wastewater network. Examples of potential system constraints includes a lack of capacity within existing sewers, pumping stations, forcemains and combined sewer overflow (CSO) tanks which may be caused as result of the intensification in the central area of the City.

One of the drivers for the Class EA is to identify how to support further intensification in the City of Kingston's downtown core. The Portsmouth Pumping Station Flow Direction study will additionally focus on identifying a sustainable servicing solution and seeking potential opportunities to reduce combined sewer overflows within the central wastewater network.

1.2 RELATED PROJECTS

SEWAGE INFRASTRUCTURE MASTER PLAN FOR THE CITY OF KINGSTON URBAN AREA (CH2MHILL, XCG, 2010)

The Sewage Infrastructure Master Plan for the City of Kingston Urban Area (2010) was conducted to identify the required wastewater infrastructure in the City of Kingston to 2026. The study included an update to the previous Pollution Control Plan (PCP), with regards to the mitigation of impacts due to CSO's and to identify a plan to achieve the 'virtual elimination' of CSO's in the long term. The main objectives of the Master Plan were to maximize the use and effectiveness of the existing sewer system and provide a plan for implementing future wastewater infrastructure to service planned development, as identified in the City of Kingston's 2006 Official Plan.

The Master Plan's Technical Memorandum #5 documented the evaluation for continuing to convey wastewater flows collected at the Portsmouth Pumping Station eastward towards the Ravensview Wastewater Treatment Plant (WWTP) or re-directing wastewater flows to the west, towards the Cataraqui Bay WWTP. It was determined at the time that re-directing flows to the west was not cost effective in reducing CSO in the long term. The current Class EA is now being undertaken however, as development plans in the central part of the City have changed to include more intensification. The change in the planning projections in the central part of the City may impact the evaluation of the east vs. west flow direction alternatives since there is now a potential for an increased number of capacity constraints in the central and east parts of the wastewater network.

MASTER PLAN FOR WATER SUPPLY FOR THE CITY OF KINGSTON URBAN AREA AND THE CLASS ENVIRONMENTAL ASSESSMENT (SIMCOE, 2007)

The Water Master Plan for the City of Kingston Urban Area (2007) was conducted for the urban area of the City of Kingston's drinking water supply and distribution systems to accommodate the demands for the urban area of the City of Kingston (Central, West and East) and to plan for additional infrastructure requirements to satisfy the considered short-term (2011), mid-term (2016) and long-term (2026) drinking water requirements for the urban area of the City of Kingston.

The City of Kingston is presently serviced by two independent water distribution and water treatment facilities. The Central Water Purifications Plant (WPP) supplies water to Kingston Central and Kingston East services areas. The Kingston West Water Treatment Plant (WTP) supplies water to Kingston West service area. The Kingston Central and Kingston East water distribution systems operate as two separate pressure zones including booster stations, ground reservoirs and elevated storage tanks. The Kingston West water distribution system consists of two main pressure zones including booster stations, ground reservoir and elevated storage tanks. The central and west service areas are interconnected only at one location (a watermain on Bath Rd).

In order to provide additional interconnection between the central and western distributions systems to improve redundancy / looping, water supply and pressure, the Master Plan for water supply recommended that a 1050mm watermain be installed between the discharge points of the west and central WTP/WPP. This recommendation is based on meeting the long term study year 2026 target; however based on the status of the Kingston Central WPP, the central/western system interconnection may be required sooner and would be determined at the discretion of Utilities Kingston. Currently the installation of this watermain has been completed to Sand Bay Lane. The extension of the watermain to Sir John A McDonald Blvd is proceeding; however it is to be coordinated with the Portsmouth re-direction EA and if the outcome is to redirect to the west the installation of the watermain and forcemain are to be completed concurrently.

CITY OF KINGSTON'S OFFICIAL PLAN (JANUARY 27, 2010)

The City's Official Plan (OP) is a planning document which summarizes the land use planning goals and policies the municipality will use to guide development and redevelopment within its municipal borders. Examples of topics covered in the OP include resource and utility policies for development, implementation tools, and standards for developing secondary plans. The City's OP is based on a growth period to 2026 and therefore includes population projections up to that year.

Class EA studies typically refer to OP's with regards to population projections for a given service area in order to size the infrastructure being planned accurately. Albeit the Study will refer to the OP for the population projections within the Portsmouth Pumping Station service area, new population projections for redevelopment projects in the central area of Kingston will also be used to assess the impacts to the existing infrastructure in the central and east areas of the City. These redevelopment projects have been planned subsequent to the OP and have assumed more intensified growth targets in the City's central area than previously assumed in the OP.

CATARAQUI BAY WASTEWATER TREATMENT PLANT UPGRADES ENVIRONMENTAL ASSESSMENT (J.L. RICHARDS, NOVEMBR 2012)

The Sewage Master Plan for the City of Kingston Urban Area (finalized in 2010) recommended works to meet existing and future wastewater collection, conveyance, and treatment requirements resulting from forecasted growth, up to and beyond the year 2026. One of the priority projects identified as part of the preferred solution developed through the Master Plan is an expansion of the Cataraqui Bay Wastewater Treatment Plant (WWTP). In addition to the Master Plan recommendations, Utilities Kingston has determined that some additional modifications to the wastewater system are to be

implemented, including the possible re-direction of wastewater from the Portsmouth Sewage Pumping Station (SPS) to the Cataraqui Bay WWTP.

The expansion to the existing Cataraqui Bay WWTP was carried out in accordance with Schedule C Municipal Class Environmental Assessment (Class EA) and was completed in November 2013. The upgrades for the plant are currently in the design stage.

CITY OF KINGSTON SPECIAL COUNCIL MEETING NO. 2014-14(APRIL 15, 2014)

A special City Council meeting was held (in workshop format) that provided a briefing to Council concerning Clause (1), Report Number 48, regarding the Urban Boundary Update. The briefing indicated *THAT the City of Kingston not amend the Official Plan to move the location of the urban boundary and not initiate a comprehensive analysis of the future growth areas; and THAT the City promote intensification and infill within the urban boundary.*

As the current Class EA is now being undertaken as development plans in the central part of the City have changed to include more intensification this briefing provides documentation of the City's commitment and support to this effort.

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2 ENVIRONMENTAL ASSESSMENT PROCESS

2.1 ENVIRONMENTAL ASSESSMENT PROCESS

This section describes the Environmental Assessment process and the specific requirements associated with this study.

2.1.1 ONTARIO ENVIRONMENTAL ASSESSMENT ACT

The planning of major municipal projects or activities is subject to the Ontario Environmental Assessment (EA) Act, R.S.O. 1990, and requires the proponent (Utilities Kingston) to complete an Environmental Assessment, including an inventory and description of the existing environment in the area affected by the proposed activity. The Act defines the environment broadly as:

1. Air, land or water,
2. Plant and animal life, including human life,
3. The social, economic and cultural conditions that influence the life of humans or a community,
4. Any building, structure, machine or other device or thing made by humans,
5. Any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities,
6. Any part or combination of the foregoing and the interrelationships between any two or more of them.

The purpose of the Act is 'the betterment of the people in the whole or any part of Ontario by providing for the protection, conservation and wise management in Ontario of the environment' (RSO1990, c.E.18, s.2).

PRINCIPLES OF ENVIRONMENTAL PLANNING

The Act sets a framework for a systematic, rational and replicable environmental planning process that is based on five key principles, as follows:

- **Consultation with affected parties -** Consultation with the public and government review agencies is an integral part of the planning process. Consultation allows the proponent to identify and address concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.
- **Consideration of a reasonable range of alternatives -** Alternatives include functionally different solutions to the proposed undertaking and alternative methods of implementing the preferred solution. The "do nothing" alternative must also be considered.
- **Identification and consideration of the effects of each alternative on all aspects of the environment -** This includes the natural, social, cultural, technical, and economic environments.

- **Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects -** The evaluation shall increase in the level of detail as the study moves from the evaluation of alternatives to the proposed undertaking to the evaluation of alternative methods.
- **Provision of clean and complete documentation of the planning process followed –** This will allow traceability of decision-making with respect to the project. The planning process must be documented in such a way that it may be repeated with similar results.

2.1.2 MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Class Environmental Assessments (EA's) were approved by the Minister of the Environment in 1987 for municipal projects having predictable and preventable impacts. The Municipal Class EA document was revised and updated in 1993, 2000, 2007, and again in 2011. The Class EA approach streamlines the planning and approvals process for municipal projects which have the following characteristics:

- Recurring
- Similar in nature
- Usually limited in scale
- Predictable range of environmental impacts
- Environmental impacts are responsive to mitigation

The Municipal Class Environmental Assessment document, prepared by the Municipal Engineers Association (MEA) (October 2000, as amended in 2007 and 2011), outlines the process to be followed to satisfy Class EA requirements for water, wastewater and road projects as required under Part II.1 of the EA Act. The process includes five phases:

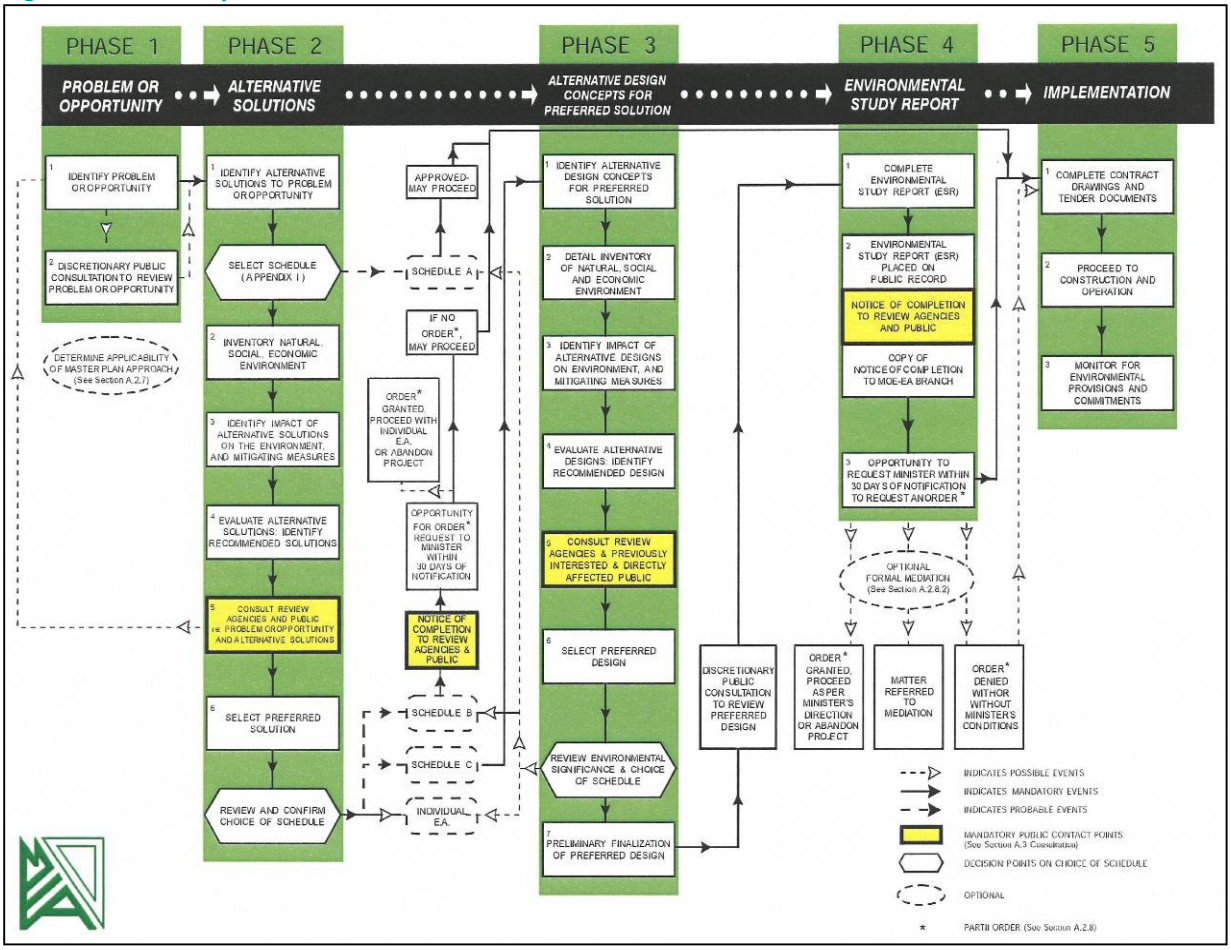
- Phase 1: Problem Definition
- Phase 2: Identification and Evaluation of Alternative Solutions to Determine a Preferred Solution
- Phase 3: Examination of Alternative Methods of Implementation of the Preferred Solution
- Phase 4: Documentation of the Planning, Design and Consultation Process
- Phase 5: Implementation and Monitoring.

Public and agency consultation are integral to the Class EA planning process. Projects subject to the Class EA process are classified into four possible "Schedules" depending on the degree of expected impacts. It is important to note that the Schedule assigned to a particular project is proponent-driven. For example, if a project has been designated as Schedule "A", the proponent can decide to comply with the requirements of a Schedule 'B" or "C" of the MEA process based on the magnitude of anticipated impacts or the special public and agency consultation requirements specific to that particular project.

For Schedule "B" and "C" projects the public has the opportunity to request additional investigation by filing a Part II Order Request to the Ministry of the Environment.

The Class EA process flowchart is provided in Figure 2.1.

Figure 2.1 Municipal Class EA Process



SCHEDULE "A" PROJECTS

Schedule "A" projects are minor, operation and maintenance activities and are pre-approved without the need for further assessment. Projects with this designation are typically limited in scale and have minimal adverse environmental impacts. An example of a Schedule "A" wastewater project is to 'increase pumping station capacity by adding or replacing equipment where new equipment is located within an existing building or structure and where the existing rated capacity is not exceeded'. This type of project is pre-approved and the proponent may proceed to implementation without following the other phases as set out in the Class EA process.

SCHEDULE "A+" PROJECTS

Schedule "A+" projects were introduced by MEA in 2007. Similar to Schedule "A", these projects are also pre-approved. However the difference is that for Schedule "A+" projects, the public must be provided notification prior to project implementation. An example of a Schedule "A+" wastewater project would be the establishment, extension or enlargement of a sewage collection system and all works necessary to connect the system to an existing sewage or natural drainage outlet, provided all

such facilities are in either an existing road allowance or an existing utility corridor, including the use of Trenchless Technology for water crossings.

SCHEDULE “B” PROJECTS

Schedule “B” projects generally include improvements and minor expansions to existing facilities where there is potential for some adverse environmental impacts. These projects require screening of alternatives for their environmental impacts and completion of Phases 1 and 2 of the Class EA planning process. If outstanding issues remain after the public review period, any party may request that the Minister of the Environment consider a Part II Order (also known as bumping-up the project) to elevate the project to a more stringent process (Schedule “C” or an Individual Environmental Assessment). Provided no significant impacts are identified and no requests for a Part II order are received, Schedule “B” projects are approved and may proceed directly to Phase 5: Implementation. An example of a Schedule “B” wastewater project would be the establishment, extension or enlargement of a sewage collection system and all works necessary to connect the system to an existing sewage outlet where such facilities are not in either an existing road allowance or an existing utility corridor.

SCHEDULE “C” PROJECTS

Schedule “C” projects generally include the construction of new facilities and major expansions to existing facilities. These projects are typically more complex and have the potential for significant environmental effects. As a result they proceed under full planning and documentation procedures and satisfy all five phases of the Class EA planning process. Phase 3 involves the assessment of alternative methods of designing the project, as well as public consultation on the preferred conceptual design. Phase 4 is the preparation of an Environmental Study Report which is filed for public review. Provided no significant impacts are identified and no requests for Part II Order or “bump-up” to an Individual Environmental Assessment are received, Schedule “C” projects are then approved and may proceed to Phase 5: Implementation. An example of a Schedule “C” wastewater project would be construction of a new sewage system, including an outfall to a receiving water body and/or a constructed wetland for treatment.

3 PHASE 1: PROBLEM DEFINITION

3.1 DEFINITION OF PROBLEM OR OPPORTUNITY

The Problem Statement for the Portsmouth Pumping Station Flow Direction Class EA is defined as follows:

'To identify how best to support further intensification development in the City of Kingston through sustainable servicing. This will be done by evaluating the option of redirecting the flow at the Portsmouth Pumping Station from the Ravensview Wastewater Treatment Plan (WWTP) to the Cataraqui Bay WWTP.

There is the also the opportunity to potentially reduce combined sewer overflows (CSO) within the system'

3.2 NEED AND PROJECT JUSTIFICATION

The primary justification for this infrastructure is for existing and future growth planned in the Kingston central areas. The Sewage Infrastructure Master Plan for the City of Kingston Urban Area (2010) previously evaluated the alternative of re-directing wastewater flows collected at the Portsmouth Pumping Station to the west (to the Cataraqui WWTP) but determined the preferred servicing solution was to continue pumping wastewater flows to the east (towards the Ravensview WWTP). However, the Master Plan was based on the future planned growth as documented in the Draft 2006 Official Plan. Since the Official Plan was written, development plans in Kingston have started to shift more towards intensification of the central urban area, meaning the area now requires additional infrastructure capacity. Therefore, the basis for evaluating the Portsmouth Pumping Station servicing alternatives have changed since the Sewage Infrastructure Master Plan was written – the capacity requirements to service existing and future populations in the central and east areas of Kingston have increased. The alternative to redirect wastewater flows collected at the Portsmouth Pumping Station to the west is therefore being re-examined based on the new development plans. Figure 3.1 outlines the additional intensification within the central urban area.

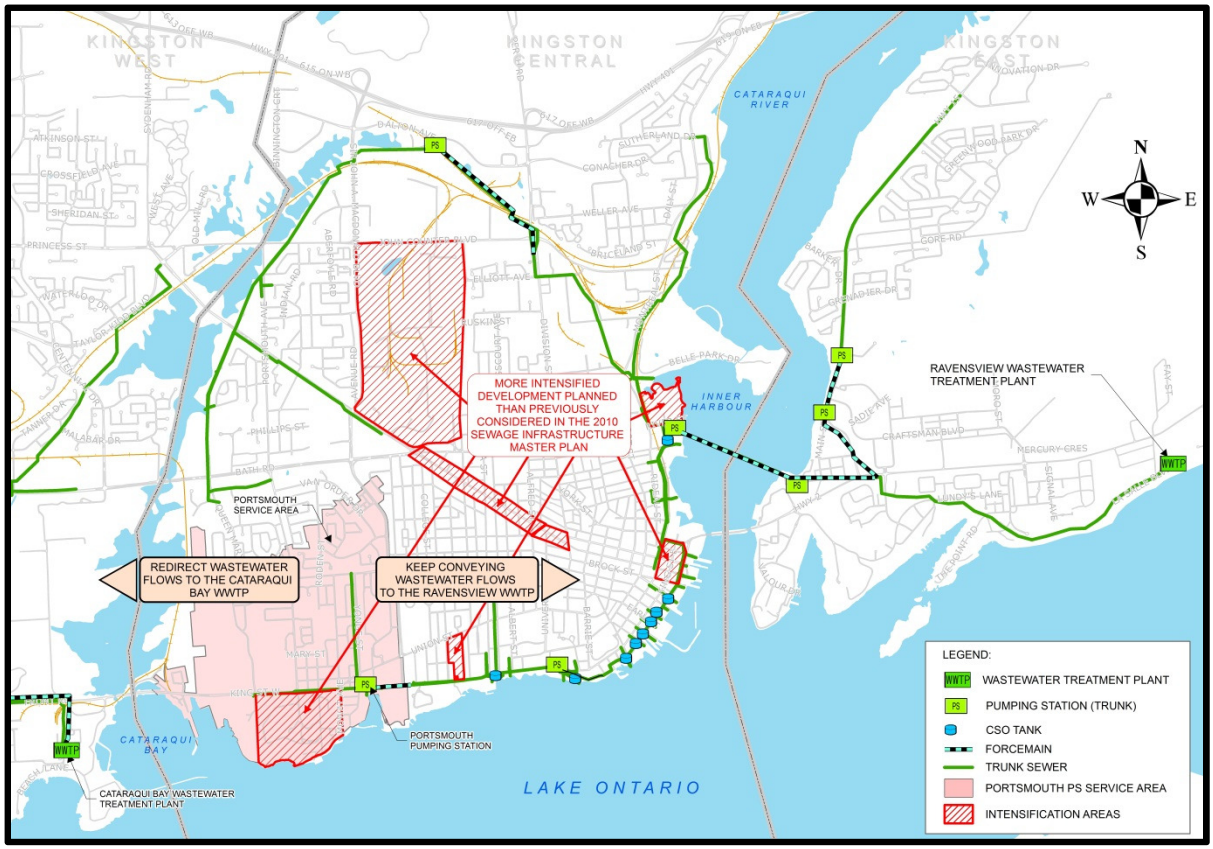


Figure 3.1 Additional Intensification

3.3 PROJECT CLASS EA SCHEDULE

This project was designated as Schedule "B" under the Municipal Class EA process. The project will require extending the sewage collection system and all works necessary to connect the system to an existing sewage outlet where such facilities are not located in an existing road allowance or an existing utility corridor. These two components are identified as Schedule "B" projects in the MEA Class EA document.

As a Schedule "B" project, Phases 1 and 2 of the Municipal Class EA process must be completed as shown in Figure 2.1 above, before proceeding to implementation. These phases include:

- Phase 1: Identification of the Problem or Opportunity
- Phase 2: Identification and Evaluation of Alternative Solutions

A Schedule "B" Class EA concludes with the Notice of Completion and placing of the Project File in a location accessible to the public for a mandatory 30-day review period to allow review by the public and agencies which may have an interest in this project.

3.4 SERVICE & STUDY AREAS

3.4.1 SERVICE AREA

The service area for the Portsmouth Pumping Station is illustrated in Figure 3.2.

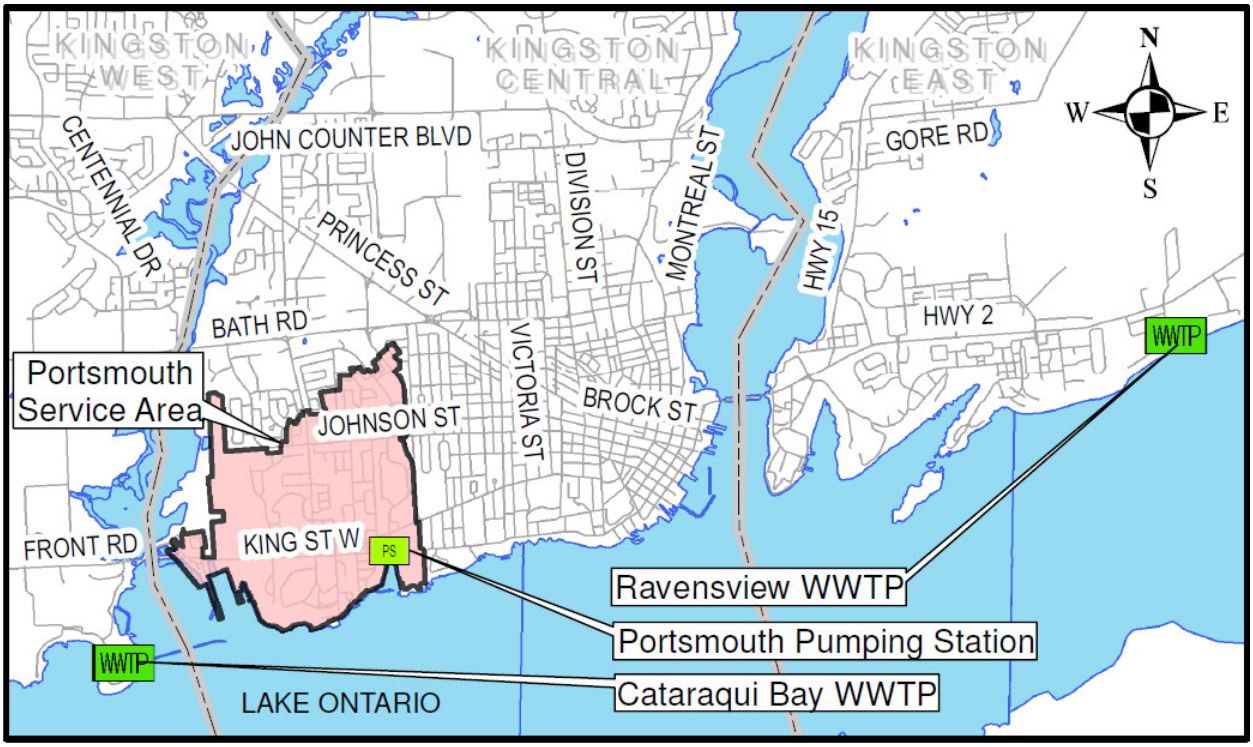


Figure 3.2 Portsmouth Pumping Station Service Area

3.4.2 STUDY AREA

The Overall Study Area delineates the area within which any new infrastructure or upgrades to existing infrastructure can take place. Since the Study will look at either continuing to convey wastewater flows from the Portsmouth Pumping Station to the Ravensview WWTP or redirecting the wastewater flows to the Cataraqui Bay Wastewater Treatment Plant, the Study Area includes two potential re-defined Study Areas, the 'east' and 'west' Study Areas as illustrated in Figure 3.3. The east and west Study Areas have been delineated based on the location of the Portsmouth Pumping Station and the infrastructure required to convey wastewater flows collected at the pumping station to either of the two wastewater treatment plants. To select the study area requires determination of whether the project involves re-directing flows to the west or continuing to pump to the east. Only one of the two Study Areas will be selected based on the screening undertaken in Section 4 to address the issue of which direction flows will be conveyed.

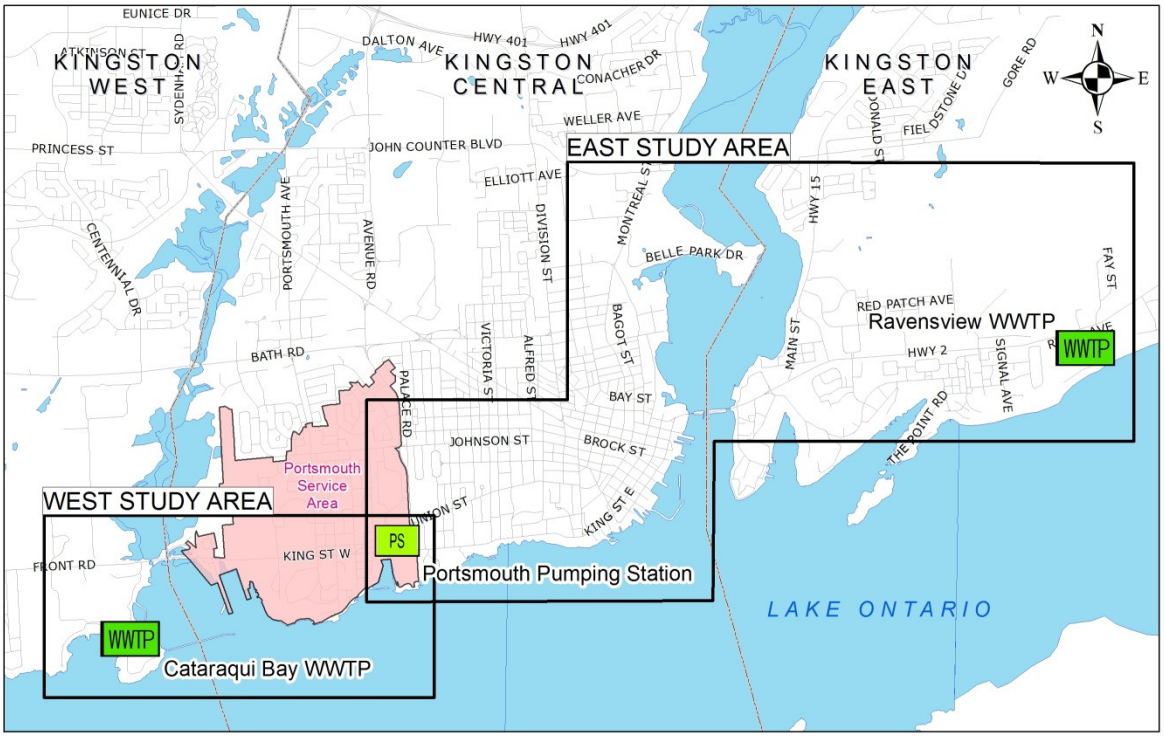


Figure 3.3 Overall Study Area

4 HIGH LEVEL SCREENING PROCESS

4.1 APPROACH TO EVALUATION OF ALTERNATIVES

A primary objective of Phase 2 is the identification of alternative solutions to the problem described in Phase 1. During the initial stages of the project it was determined that there were two major components to the identified problem. The first component was whether wastewater flows collected at the Portsmouth Pumping Station should be conveyed to the east or to the west, that is, to the Ravensview WWTP or the Cataraqui Bay WWTP. The second component was to determine the new infrastructure and/or infrastructure upgrades required to support the identified intensification, as well as the location and alignment of this infrastructure. It was determined that since there were essentially two questions that had to be answered, two levels of evaluation were required. First, a screening of alternatives was required to determine the preferred flow direction, based on the following two alternatives:

ALTERNATIVE 1: CONTINUE CONVEYING WASTEWATER FLOWS TO THE EAST

This alternative includes continuing to convey wastewater flows collected at the Portsmouth Pumping Station to the East, towards the Ravensview WWTP. This alternative includes the requirement for upgrades to the existing infrastructure to maintain the current accepted level of service (i.e. surcharging).

ALTERNATIVE 2: RE-DIRECT WASTEWATER FLOWS TO THE WEST

This alternative includes re-directing wastewater flows collected at the Portsmouth Pumping Station to the West, towards the Cataraqui WWTP. This alternative includes the requirement for a new forcemain (≈3.5Km) along King Street / Front Rd from the Portsmouth Pumping Station that will outlet directly to the WWTP.

The screening process is essentially a *high level* evaluation process. This higher level of evaluation was required since there were common impacts for infrastructure options and routings going either east or west. Therefore, in order to make the evaluation of specific infrastructure options and routings easier by reducing the potential number of options and routings, the overlying question of whether pumping east or west had greater impacts needed to be answered first.

Section 4 will focus solely on the background information and process for undertaking the screening, thereby providing the answer regarding the preferred wastewater flow direction.

4.2 DIFFERENT ALTERNATIVES

During the development of the two alternatives, a variation to the alternative 2 was suggested with a fundamental difference in that flows would be conveyed by aligning the majority of the wastewater conveyance infrastructure underneath Lake Ontario in order to reduce disturbance and overall impact to the City. A technical memorandum was prepared to initially assess this alternative. Upon the completion of the risk assessment and cost analysis it was determined that the option of going underneath the lake, would present significantly more risk and cost as compared to the cost of implementing the infrastructure in-land. This option was therefore screened out. The technical memorandum can be found in Appendix A.

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4.3 DESCRIPTION OF THE AREA

The following three subsections provide a description of the Overall Study Area, as illustrated in Section 3.4.2. The descriptions for the natural, social and cultural environments are predominantly based on the information presented in the schedules for the City's Official Plan.

4.3.1 NATURAL ENVIRONMENT

A description of the natural environment features within the Overall Study is provided in the subsections below. Figure 4.1 provides an illustration of all natural features described.

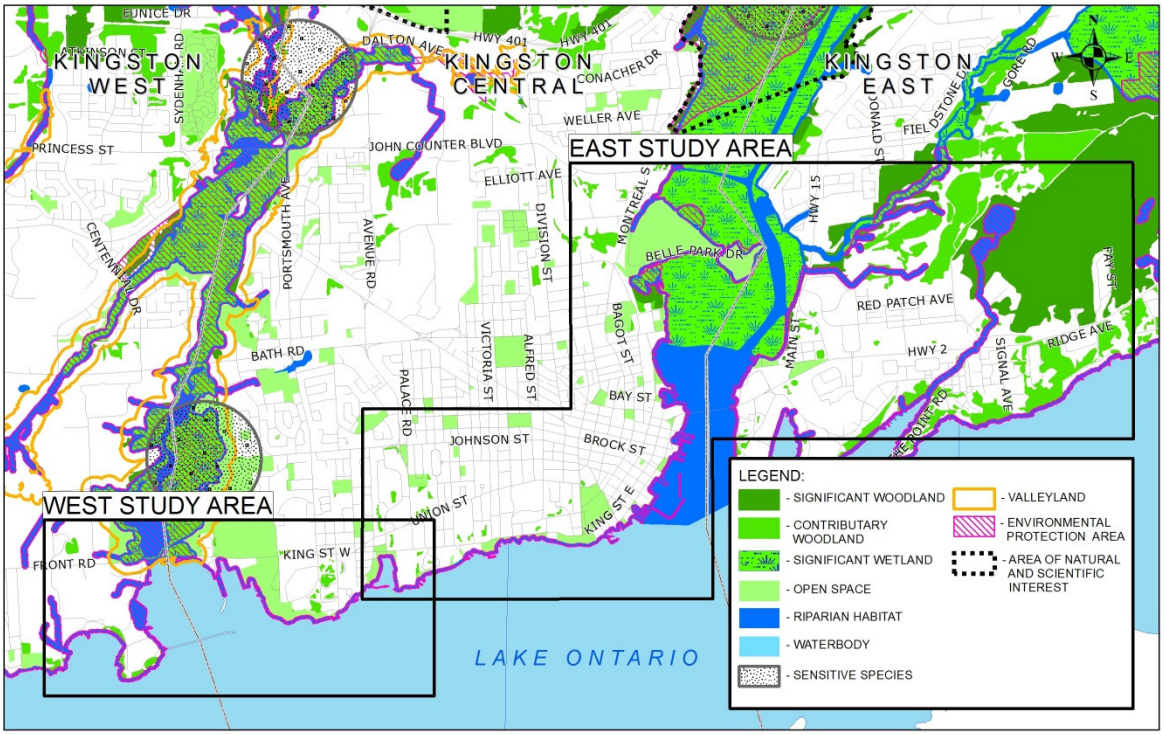

Figure 4.1 Natural Environment Features in Overall Study Area

TERRESTRIAL FEATURES

The Overall Study Area includes several major open spaces and environmental areas, including: the Marshland Conservation Area which fronts onto Cataraqui Bay, a number of parks along the lakefront, and the Cataraqui Golf and Country Club located to the east of the Marshland Conservation Area. All land fronting waterbodies and waterways in the area have been designated as Environmental Protection Areas by the City. These areas essentially delineate the setbacks required for any development within the waterfront. The West Study Area includes a small portion of a valleyland within the city within which a provincially significant wetland has been identified. Several contributory woodlands exist throughout the Overall Study Area, but are minimal in size, since the majority of the area has been built up.

WATER FEATURES

The entire Study Area is located adjacent to Lake Ontario. Additionally, two other major water features are found within the Overall Study Area, including: Cataraqui Bay, located in the West Study Area near the Marshland Conservation Area and the Cataraqui Golf and Country Club, and the Great Cataraqui River, located in the East Study Area, near a number of smaller park spaces and the City's downtown area.

ENVIRONMENTAL FEATURES

None of the lands within the Overall Study Area have been designated as Environmentally Sensitive Areas (ESA); however, the Provincially Significant Wetland in the West Study Area contains an Area of Natural and Scientific Interest (ANSI). While there are no designated ESA, there are environmental protection areas capturing the valleylands designated around Cataraqui Bay and extending north within the West Study Area.

SPECIES / ANIMAL HABITAT

Several sensitive species have been identified within the wetland in the West Study Area. Additionally, riparian habitat has been identified within Cataraqui Bay and the Great Cataraqui River.

4.3.2 SOCIAL AND CULTURAL/HERITAGE ENVIRONMENT

Descriptions of the social and cultural/heritage environment features within the Overall Study are provided in the subsections below. Figure 4.2 illustration all of the social and cultural/heritage features described.

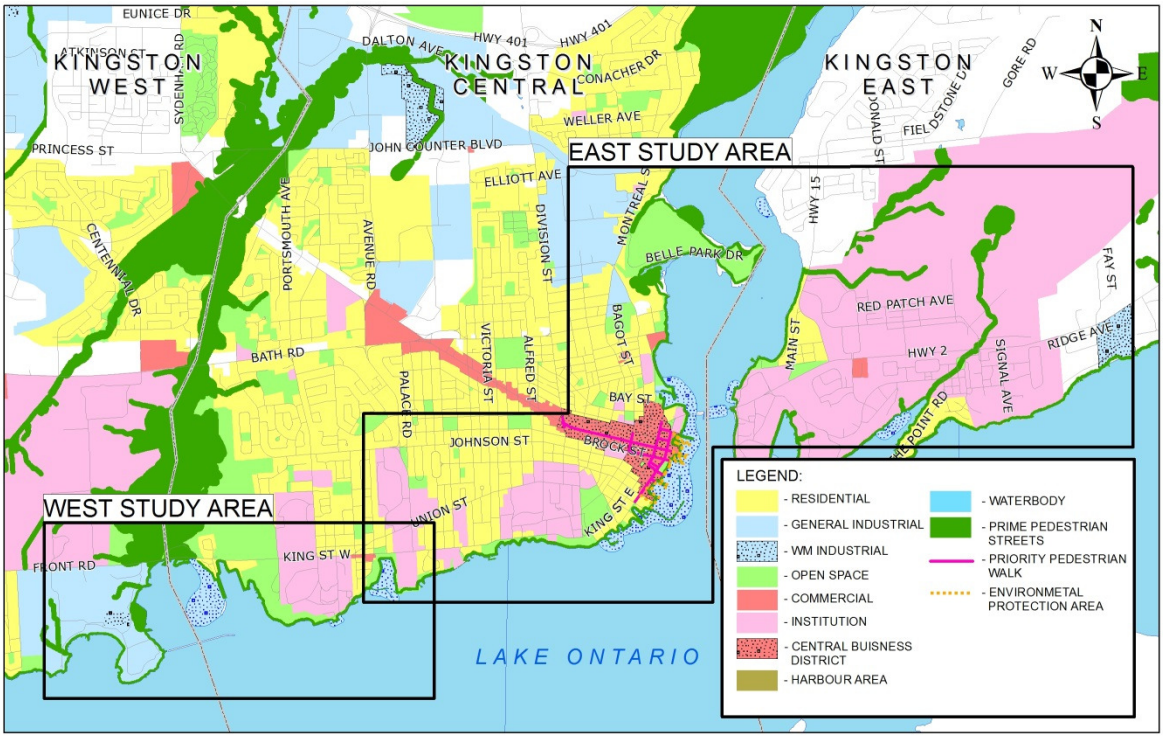

Figure 4.2 Social Environment Features in Overall Study Area

SOCIAL ENVIRONMENT

The Overall Study Area is mostly comprised of residential, institutional areas and open space areas, complemented by business/commercial areas and a general industrial area. Each of these areas and their use are described below.

RESIDENTIAL AREAS

Residential areas in the West Study Area are typically less dense than those in the East Study Area, the latter of which includes the City's downtown area. A portion of the residential area in the downtown is adjacent to a large business/commercial area as well as a large educational institution, Queen's University. The East Study Area therefore includes a significant amount of vehicle and pedestrian traffic, given that these areas are greatly frequented. Some streets in the downtown area have even been designated by the City as prime pedestrian streets.

INSTITUTIONAL AREAS

In addition to the Queens University campus, the East Study Area contains other significant institutional lands outside of the downtown core, including an addition to the Queens University Campus, located just west of Sir John A. MacDonald Boulevard and the Royal Military College of Canada, located east of the Great Cataraqui River. The West Study Area also includes large institutional area uses, including Saint Lawrence College and Providence Care, a mental health and rehabilitative care hospital.

COMMERCIAL/BUSINESS AREAS

The commercial/business area associated with downtown Kingston, within the East Study Area, is far more significant in size and activity than the one located in the West Study Area along King Street.

INDUSTRIAL AREAS

The only significant industrial area within the Overall Study Area is located in the West Study Area. Sited in the area is the Cataraqui Bay WWTP, and industrial businesses such as Invista and Dupont.

CULTURAL / HERITAGE ENVIRONMENT

Given the City's rich history, there are a number of heritage corridors located throughout the Overall Study Area, most of which are located in the East Study Area, within the downtown core and just east of the Great Cataraqui River. While the West Study Area includes the Portsmouth Village, supported by a very active local community, the East Study Area includes the heritage corridor along Lake Ontario, the Old Sydenham Heritage Area, the Lower Princess Street Heritage Area, the Saint Lawrence Ward Heritage Area, the Market Square Heritage District and the Barriefield Heritage District.

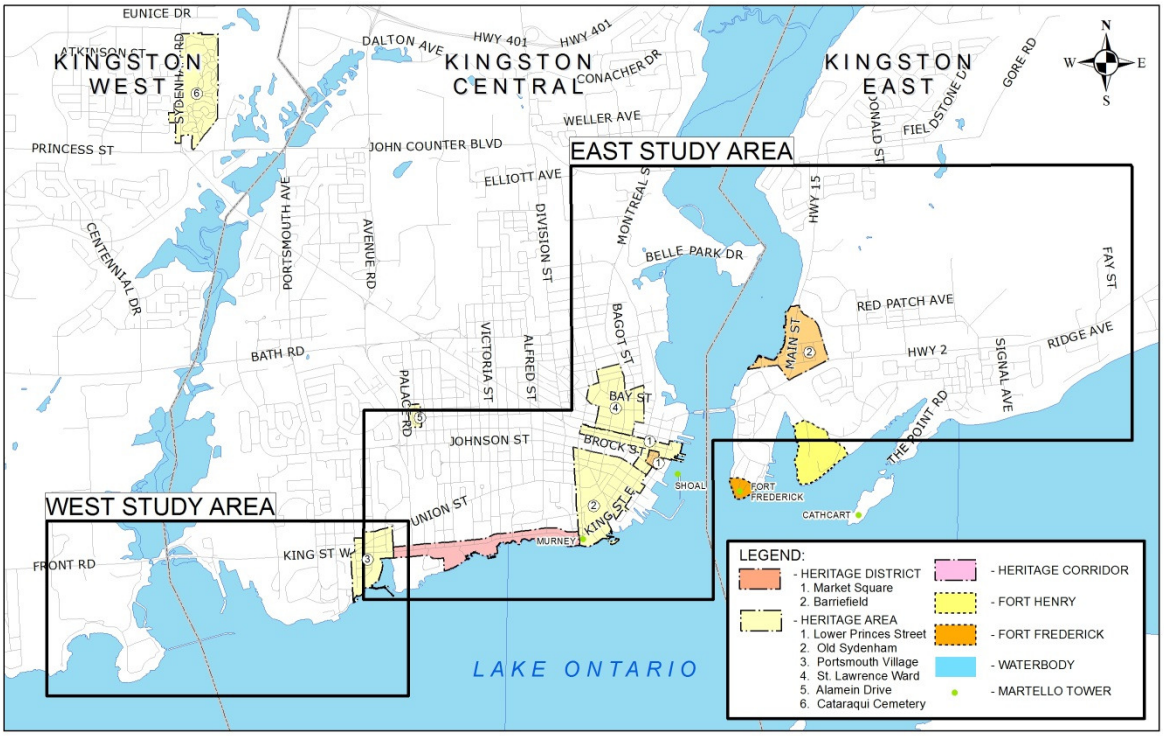

Figure 4.3 Cultural/Heritage Environment Features in Overall Study Area

4.3.3 EXISTING WASTEWATER INFRASTRUCTURE

The City's existing sewer network is currently laid out such that wastewater flows generated in the central and east areas of the City are conveyed to the Ravensview WWTP and wastewater flows generated in the west area of the City are conveyed to the Cataraqui Bay WWTP. The Portsmouth Pumping Station servicing area is approximately 392ha as illustrated in Figure 3.1 and is located in Aberdeen Park directly north of the Portsmouth Olympic Harbour. The pumping station originally built in 1954 and subsequently upgraded in 2001, conveys sewage through a forcemain to the King Street Trunk sewer. Sewage is then conveyed to the Ravensview WWTP through a series of gravity sewers, CSO tank, pumping stations and forcemains. Figure 4.4 illustrate the main trunk sewers, CSO tanks, pumping station and forcemain for the City of Kingston.

In order to properly assess the upgrades to the existing system that would be required to allow further intensification a detailed modelling exercise was completed. The Technical Memorandum details the steps that were taken to prepare this model and the subsequent results.

The model was calibrated and updated to simulate new growth projections in the central part of the city that had changed since the sewer master plan was completed. Additionally the anticipated combined sewers reduction projections, system upgrades using data supplied from Utilities Kingston and the original calibration documents completed by CH2MHILL/XCG Consultants in 2009 for the Kingston Sewer Master Plan were used.

With the updated model completed design scenarios were created to represent the different systems. In order to determine the upgrade to the existing system, a level of service (LOS) or baseline was established. This baseline was developed based on the level of service that the sewer master plan

projected as this has been accepted by the City of Kingston, Utilities Kingston and the public. The baseline included the upgrades to the infrastructure indicated by Utilities Kingston, the planned growth that was detailed in the sewer master plan and the anticipated combined sewer reduction projections; however it did not included the anticipated addition intensification. This baseline was then compared to the other two (2) design scenarios; continue pumping the Portsmouth sewage flows to the east with intensification; and flow redirection of the Portsmouth pumping station service area towards the Cataraqui Bay Wastewater Treatment Plant with the additional intensification.

For each scenario the Peak Instantaneous Flow (PIF) for trunk sewers, pumping stations and wastewater treatment plants infrastructure was evaluated under different design storms as well as two (2) future projection timeline, 2026 and full Build-out that is consistent with the Sewer Master Plan. Also evaluated were the CSO impacts of the flow redirection and combined sewer separation. The level of upgrades that would be required are based on comparisons to provide the same LOS that was originally anticipated from the Sewer Master Plan or at least to the level equal to what the redirection would provide, in the case of alternative 1 as it would not be reasonable to provide a better LOS than redirecting can deliver.

Surcharging of varying degrees for different projections and storms were identified in the Princess St. Collector, North End Outfall Sewer, North End Trunk Sewer and Rideau Heights Trunk Sewer where the proposed development intensification will surcharge pipes within 2m of the existing ground; however these trunk sewers are not influenced by the redirection and was therefore not evaluated further

Based on the modelling the following is a summary of the results for each of the alternatives:

Table 4.1 Modelling Results

	Alternative 1 Portsmouth Flows to the East	**Alternative 2 Portsmouth Flows to the West**
Sewage Treatment Plant		
Cataraqui Bay	Treatment Plant would provide the original LOS as no new flow would be direct to this plant.	Treatment Plant would require an upgrade of approximately 200L/s for the 2026 projection and would require an upgrade of approximately 375L/s for the Build-out projection to meet original LOS.
Ravensview	Treatment Plant has sufficient capacity beyond the 2026 projection but would require an upgrade of approximately 600L/s for the Build-out projection to meet original LOS.	Treatment Plant would provide the original LOS as redirection of flow from Portsmouth Pumping Station offsets identified intensification.
Pumping Station		
Portsmouth	Pumping Station would require upgrade of approximately 40L/s to meet original LOS for 2026 and Build-out projections.	Pumping Station would require upgrade to pump to new outlet as well as increase capacity of approximately 40L/s to meet original LOS for 2026 and Build-out projections.
River Street	Pumping Station would require an upgrade of approximately 575L/s to meet the same LOS as redirection for the Build-out projections.	Pumping Station would not require any upgrades to provide original LOS.
King Street	Pumping Station would require upgrade of approximately 100L/s to meet original LOS	Provides better LOS than originally projected.

	Alternative 1 Portsmouth Flows to the East	Alternative 2 Portsmouth Flows to the West
	for 2026 and Build-out projections.	Reduce flow by approximately 300L/s
Trunk Sewers		
King Street	Trunk Sewer requires approximately 14% of the sewers to be upgraded for the 2026 projection to meet the original LOS.	Provides better LOS than originally projected. Eliminates surcharging in the 2026 and Built-out projections that were originally projected.
Ravensview	Trunk Sewer requires approximately 21% of the sewers to be upgraded for the 2026 projection to meet the original LOS.	Provides same LOS originally projected as redirection of flow from Portsmouth Pumping Station offsets identified intensification.
North Harbourfront Interceptor	Trunk Sewer requires approximately 15% of the sewers to be upgraded for the 2026 projection and 42% of the sewer to be upgraded for the build-out projection to meet the original LOS.	Provides better LOS than originally projected. Reduces surcharging in the Built-out projections by approximately 40% (max).
Harbour Front	Trunk Sewer requires approximately 54% of the sewers to be upgraded for the Build-out projection to meet the original LOS.	Provides better LOS than originally projected. Reduces surcharging in the Built-out projections by approximately 10% (max).
Combined Sewer Overflow (CSO)		
Harbourfront Trunk at West St	An additional 4000m^3 of storage is required to meet the original overflow volume for the 2026 projection.	Reduces overflow by approximately 12,000m3 from originally 2026 projection.
Collingwood	An additional 100m^3 of storage is required to meet the original overflow volume for the 2026 projection.	Eliminates overflows at this locations (≈800m3) for the 2026 projection
Belle Park Local 1200	An additional 300m^3 of storage is required to meet the redirected overflow volume for the 2026 projection.	Redirection does not reduce overflow volumes below or equal to originally projection volumes (≈400m3 above original volume)
Barrack Street	An additional 160m3 of storage is required to meet the redirected overflow volume for the 2026 projection.	Reduces overflow by approximately 100m3 from originally 2026 projection.
Queen Street	An additional 150m3 of storage is required to meet the redirected overflow volume for the 2026 projection.	Reduces overflow by approximately 100m3 from originally 2026 projection.
Belle Park Trunk	An additional 70m3 of storage is required to meet the redirected overflow volume for the 2026 projection.	Reduces overflow by approximately 175m3 from originally 2026 projection.
Lower Union	An additional 65m3 of storage is required to meet the redirected overflow volume for the 2026 projection.	Provide same approximate overflow volume as originally projected for 2026.
Earl St	No additional storage is required to meet the redirected overflow volume for the 2026 projection.	Provide same approximate overflow volume as originally projected for 2026.

	Alternative 1 Portsmouth Flows to the East	Alternative 2 Portsmouth Flows to the West
West Street Local Sewer	No additional storage is required to meet the redirected overflow volume for the 2026 projection.	Provide same approximate overflow volume as originally projected for 2026.

The detailed analyses of these results are included in Technical Memorandum “Portsmouth Pumping Station Flow Direction Hydraulic Modelling Memorandum” in Appendix B.

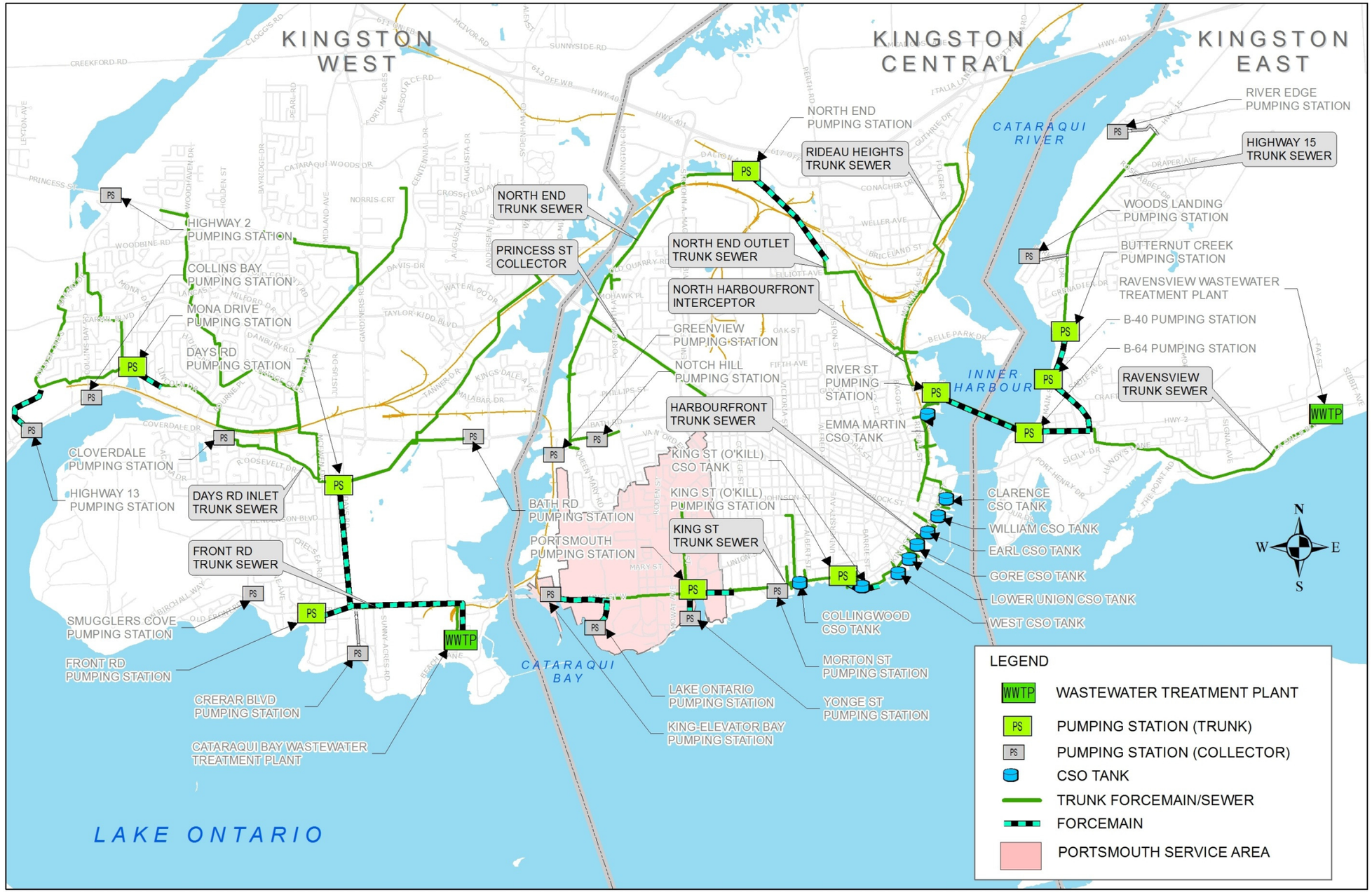

Figure 4.4 Existing Wastewater Infrastructure in Study Area

4.4 SCREENING PROCESS

4.4.1 EVALUATION METHODOLOGY

To qualitatively evaluate the proposed alternatives presented in Section 4.1, each of the criteria presented in section 4.4.2 was assessed in a descriptive manner rather than a quantitative manner. Instead of than having a numerical or weighted ranking system, the evaluation focuses instead on the strengths and weaknesses of each alternative to identify the preferred solution. For each evaluation criterion and for each alternative, the potential effects on the environment were identified and evaluated relative to the other alternatives as being 'most preferred', 'less (moderate) preferred', and' least preferred'. The evaluation is based on the relative advantages and disadvantages of the potential environmental effects for the alternative.

The alternatives were compared on the basis of each evaluation criterion. In addition, the intent of comparing alternatives based on a variety of criteria was to identify and assess the potential impacts. The alternatives were rated for each of the screening criterion. The process is summarized as follows:

- **Step 1: Determine Evaluation Criteria** – Criteria were developed upon which the alternatives would be evaluated against. The evaluation criteria used in the high level screening were developed based on the following overall evaluation criteria: (1) impact on the natural environment, (2) impact on the social and cultural environments, (3) technical suitability and financial considerations. A breakdown of the specific criteria is defined in the section below.

- **Step 2: Create an Evaluation System** – An evaluation system was required to evaluate each of the alternatives. To be impartial, this system was developed prior to determining the potential impacts associated with each alternative. During the evaluation, each of the alternatives was assigned a colour rating: green for "most preferred", yellow for "less preferred" and orange for "least preferred", for each of the evaluation criterion. An overall impact rating for each evaluation category was subsequently determined based on an assessment of the ratings assigned to each specific criterion. The three evaluation criteria categories were assigned equal weighting as they were considered to have equal importance in this evaluation.

- **Step 3: Document Potential Impacts** - The individual impacts associated with each alternative were determined and documented in a matrix. The matrix was created to document the impacts, weigh the alternatives qualitatively, and ultimately determine the preferred solution. The matrix has the alternatives listed along the columns and the evaluation criteria along the rows.

- **Step 4: Evaluate the Alternatives** - Each of the alternatives was assigned a colour rating for each of the three evaluation criteria using the methodology established in Step 2. The evaluation was based on a qualitative assessment of the individual impacts documented in the table created during Step 3. Professional judgement was also factored into the evaluation as part of the qualitative assessment. The colour green rating indicates that the alternative had a low impact (most preferred) with respect to that particular criterion. An orange colour indicates that the alternative had a high impact (least preferred) with respect to that particular criterion. A yellow colour will indicate moderate impact (less preferred).

- **Step 5: Determine the Preferred Alternative** - The servicing alternative with the least overall impact was recommended.

4.4.2 EVALUATION CRITERIA

The following criteria were used to evaluate the two alternatives considered in the high level screening.

Natural and Physical Environment:

- Impacts to Wildlife and Vegetative features along which new infrastructure is to be implemented
- Impacts to water course(s) in or along which new infrastructure is to be implemented.

Social and Cultural Environment:

- Number of people disrupted in the community
- Recent Disruptions to communities by new linear infrastructure works
- Traffic Disruption
- Social Disruption

Technical Suitability & Financial Considerations:

- Capacity at respective wastewater treatment plants
- Capacity of linear infrastructure
- Approximate amount and ease of construction of new required infrastructure
- Relative Cost of Infrastructure (estimated)

4.5 SCREENING EVALUATION

The high level screening of the flow direction alternatives was conducted and is documented in Table 4.2

Legend:

Most Preferred | Less Preferred | Least Preferred

Table 4.2 Evaluation of Portsmouth Pumping Station's Flow Direction Alternatives

	Alternative 1 Portsmouth Flows to the East	**Alternative 2 Portsmouth Flows to the West**
Natural Environmental Considerations		
Impacts to Wildlife & Vegetative Features	▪ Required Upgrades to River Street Pumping Station Adjacent to Provincially Significant Wetland (PSW) ▪ Required Upgrades to North Harbour Front Trunk Sewer adjacent to Provincially Significant Wetland (PSW) ▪ Some Upgrades along Harbourfront Trunk Sewer near or adjacent to riparian habitat. ▪ Required Upgrades to North Harbour Front Trunk Sewer within or adjacent to Significant woodland ▪ Required Upgrades to Ravensview Trunk Sewer within or adjacent to Significant and/or contributory woodland ▪ Majority of required upgrades will remain mostly within Right of Way (R.O.W.) or City owned lands ▪ Some Impact on Vegetation or Green Space mainly for Harbourfront Trunk Sewer and related CSO upgrades.	▪ Required Upgrades (forcemain installation) will be within or adjacent to PSW ▪ Required Upgrades (forcemain installation) will be within or adjacent to riparian habitat ▪ Required Upgrades (forcemain installation) will be within Valleylands ▪ Required Upgrades (forcemain installation) will be within or adjacent to Significant Woodlands ▪ Required Upgrades (forcemain installation) adjacent to unevaluated wetlands ▪ Minor Impact to Animals anticipated; work to remain mainly within Right of Way (R.O.W.) ▪ Minor Disruption to Aberdeen Park
Impacts to Water Course	▪ King Street Trunk Sewer upgrades would be in or immediately adjacent to Lake Ontario ▪ Harbourfront Trunk Sewer upgrades would be in or immediately adjacent to Lake Ontario	▪ Construction of forcemain across a watercourse (Little Cataraqui Creek) ▪ Installation of new forcemain immediately adjacent to Lake Ontario
Natural Environment Overall Rating	Potential for upgrades within environmentally sensitive area	Construction required though environmentally sensitive areas and Little Cataraqui Creek

	Alternative 1 Portsmouth Flows to the East	Alternative 2 Portsmouth Flows to the West
Social and Cultural Environmental Considerations		
Number of People Disrupted in Community	▪ Potential upgrade would affect significant number of people in a number of different downtown communities based on the location of the existing infrastructure	▪ Potential Upgrade would affect small number of people in the Portsmouth Area ▪ Opportunity for completing the watermain extension to the west of Portsmouth with the new forcemain, interruption for local population is minimized through coordinating efforts.
Recent Disruptions to Communities by New Infrastructure	▪ Some recent infrastructure reconstruction/upgrades have occurred and communities have been disrupted by construction	▪ Minor infrastructure reconstruction has recently occurred with few people impacted by construction activities
Traffic Disruption	▪ Construction of potential upgrades would result in disruption to local traffic within the downtown core ▪ Multiple traffic congestion periods (i.e. spread out over several years) due to numerous upgrades required throughout downtown core ▪ Upgrades would have significant disruption to commuter traffic	▪ Forcemain installation would have significant disruption to commuter traffic ▪ Minor disruption to local traffic ▪ Opportunity for completing the watermain extension to the west of Portsmouth with the new forcemain, traffic disruption is minimized through coordinating efforts
Social Disruption	▪ Upgrades would significantly impact tourism within the downtown core area ▪ Upgrades would limit access to commercial buildings ▪ Minor disruption to EMS	▪ Forcemain installation would impact Portsmouth Village Tourism ▪ Tourism is focused in Portsmouth Village so Minimal tourism affect outside of Portsmouth Village ▪ Upgrades would limit commercial access in Portsmouth Village (minor) ▪ Minor disruption to EMS

	Alternative 1 Portsmouth Flows to the East	Alternative 2 Portsmouth Flows to the West
Social/Cultural Environment Overall Rating	Level of development present in downtown makes it difficult for construction and results in impacts to many people and activities in the downtown core	Most of the construction will be outside of built-up areas with only Portsmouth Village impacted
Technical Suitability		
Capacity at respective Wastewater Treatment Plants	▪ Ravensview Wastewater Treatment Plant has sufficient capacity beyond 2026. ▪ Upgrades required at Ravensview for "Build-out" projection.	▪ Cataraqui Bay Wastewater Treatment Plant does not have sufficient capacity ▪ Environmental Assessment has been completed for Cataraqui Bay Wastewater Treatment Plant including provision for sewage from the Portsmouth Pumping Station.
Capacity of Linear Infrastructure	▪ River Street pumping stations requires upgrades to accommodate Build-out projection. ▪ North Harbourfront Interceptor requires upgrades to accommodate 2026 and Build-out projections (~15% & 40%, of pipes, respectively). ▪ King Street Trunk Sewer requires upgrades to accommodate 2026 projections (~15% of pipes). ▪ Harbourfront Trunk Sewer requires upgrade to accommodate Build-out projections (~54% of pipes) ▪ Ravensview Trunk Sewer requires upgrade to accommodate 2026 and Build-out projections (~20% of pipes, both) ▪ Upgrades required at Harbourfront Trunk at West St, Collingwood, Belle Park Local 1200, Barrack Street, Queen Street, Belle Park Trunk CSO and Lower Union.	▪ Portsmouth pumping station will require upgrades in order to pump to WWTP. ▪ New Infrastructure (Portsmouth Pumping Station Forcemain) would be sized to accommodate current and future flows. ▪ Additional opportunity at King Street Pumping station to provide better LOS than originally anticipated (Sewer Master Plan) ▪ Significant additional opportunity at North Harbourfront Interceptor, King Street and Harbour Front Trunk Sewer to provide better LOS than originally anticipated (Sewer Master Plan) ▪ Additional opportunity at Ravensview Trunk Sewer to provide better LOS than originally anticipated (Sewer Master Plan) ▪ Additional opportunity to reduce CSO volumes at Harbourfront Trunk at West Street, Barrack Street, Queen Street and West Street Local Sewer below anticipated projected volumes

	Alternative 1 Portsmouth Flows to the East	Alternative 2 Portsmouth Flows to the West
Approximate Amount and Ease of Construction of New Required Infrastructure	▪ One (1) upgrade required at a pumping station (River Street) ▪ Three (3) upgrades required on trunk sewers (North Harbourfront, King St & Ravensview) to accommodate projections for 2026 and beyond. ▪ One (1) upgrade required on Harbourfront Trunk Sewer to accommodate Build-out projections. ▪ Additional Storage required at 6 CSO tanks (indicated above) including significant increase at Harbourfront Trunk at West St (~4000m^3) ▪ Significant Difficulties anticipated for River Street Pumping Station upgrades due to size and complexity of system. ▪ Difficulties anticipated for majority of reconstruct/ upgrade to existing trunk sewers and CSO tanks due to high level of development present in the area (Downtown) ▪ Significant number of upgrades and required projects/contracts to complete work	▪ Construction of a new 2.8km forcemain will be required; ▪ Minor difficulties anticipated to construct new infrastructure based on overall low level of development present in the area (save & except Portsmouth Village) ▪ Minimize potential impacts and ease of construction by coordinating efforts to complete the forcemain with the watermain extension to the west of Portsmouth. ▪ Upgrades for Cataraqui Bay WWTP already required (regardless of flow direction outcome) and additional flow allowance has been provided for Portsmouth area.
Relative Cost of Infrastructure	▪ Opinion of Probable Cost = $ 20.1 Million but carries a higher constructability risks	▪ Opinion of Probable Cost = $ 9.2 Million but carries lower constructability risks
Technical/Operational Rating	Treatment plant has capacity but existing infrastructure (sewers, pumping station, CSO's etc.) needs upgrades that are difficult to undertake in congested downtown.	Upgrades at treatment plant needed but is currently being completed through other projects; forcemain construction can be combined with watermain extension to minimize impacts.
OVERALL PREFERENCE RATING	**2 – Less Preferred**	**1 - Preferred**

4.6 PREFERRED RECOMMENDED SOLUTION

The preferred recommended solution based on the high level screening was determined to be Alternative 2 – to redirect wastewater flows from the Portsmouth Pumping Station westward to the Cataraqui Bay.

While Alternative 2 does potentially have construction activities though environmentally sensitive areas and Little Cataraqui Creek, there are a number of mitigation measures that can be put in place to mitigate these potential impacts, and the area can be returned to its current condition post construction. In other words, any deleterious effects that the construction may cause can be prevented or reversed through implementation of proper construction activities and reinstatement of existing conditions post construction. Alternative 2 provides a more desirable Social and Cultural impact mainly due to the majority of the construction being outside of built-up areas save and except the Portsmouth Village area in comparison to Alternative 1 that would require construction within the downtown core. Also, Alternative 2 not only provides a more cost effective reduction in sewage flows through the central and east parts of the City, it also provides for the opportunity to reduce CSO's target volumes below 2026 levels. Finally, Alternative 2 not only reduces the distance the sewage from the Portsmouth Area has to travel (3.5km vs 12km), it has synergize with both the Cataraqui Bay WWTP upgrades and the Watermain interconnection projects that have already committed too.

Based on the results of the screening process, the remainder of this report will focus on identifying the configuration of the preferred infrastructure network and its routing for redirecting wastewater flows from the Portsmouth Pumping Station to the Cataraqui Bay Wastewater Treatment Plant. The Study Area for our analysis from this point forward will therefore comprise what was previously known as the West Study Area (as illustrated in Figure 3.3). The Study Area is illustrated in Figure 4.5.

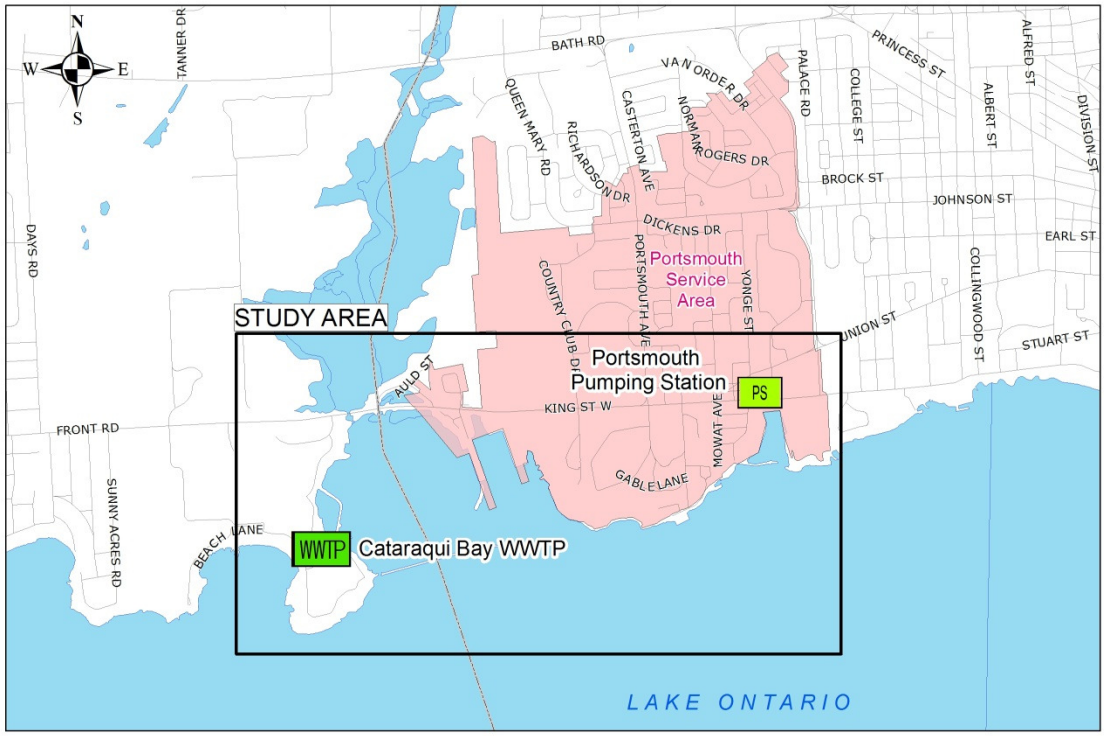

Figure 4.5 Study Area (Previously referred to as the West Study Area in Section 3.4.2)

5 EXISTING CONDITIONS

5.1 EXISTING WASTEWATER INFRASTRUCTURE

The Portsmouth Pumping Station services an area of approximately 392 hectares and consists of a variety of local networks. The pumping station has two (2) main trunk sewers that combine immediately north of the station. There is a trunk sewer that runs north along Yonge Street approximately 1.0km to Johnston Street. The other trunk sewer runs west along King Street approximately 1.0km to County Club Drive. Within the Portsmouth service area there are 4 smaller pumping stations that discharge into the trunk sewers; Yonge St, King-Lake Ontario Park, Hatter St and King-Elevator Bay. Each of these pumping stations services small low lying areas. Additional to the smaller pumping stations, there are 3 large high rise buildings along King Street to the west limits of the servicing area that also have internal pumping stations that discharge to the King Street trunk sewer.

The Portsmouth Pumping Station is located in Aberdeen Park in the historic Portsmouth Village and was originally constructed in 1954 and subsequently upgraded in 2001. The pumping station is equipped with a drum screen grinder and bar screen on the inlet to the wet well. The station is a duplex pump station (2 duty/1 stand-by) with three (3) 90Hp pumps that discharge to one of two (2) forcemains (250mm & 450mm).

5.2 FUTURE INFRASTRUCTURE

WATERMAIN INTERCONNECTION

The City of Kingston is presently serviced by two independent water distribution and water treatment facilities. The Central Water Purifications Plant (WPP) supplies water to Kingston Central and Kingston East services areas. The Kingston West Water Treatment Plant (WTP) supplies water to Kingston West service area. The Kingston Central and Kingston East water distribution systems operate as two separate pressure zones including booster stations, ground reservoirs, elevated storage tanks and stand pipes. The Kingston West water distribution system consists of two main pressure zones including booster stations, ground reservoir and elevated storage tanks. The central and west service areas are interconnected only at one location (a watermain on Bath Rd).

In order to provide additional interconnection between the central and western distributions systems to improve redundancy / looping, water supply and pressure, the Master Plan (Simcoe, 2007) for water supply recommended, among others, that a 1050mm watermain be installed between the discharge points of the west and central WTP/WPP. This recommendation is based on meeting the long term study year 2026 target; however based on the status of the Kingston Central WPP, the central/western system interconnection may be required sooner and would be determined at the discretion of Utilities Kingston. Currently the installation of this watermain has been completed to Sand Bay Lane. The extension of the watermain to Sir John A McDonald Blvd is proceeding; however it is to be coordinated with the Portsmouth re-direction EA. If the outcome was to redirect to the west (which is the preferred alternative from the high level screening process) the installation of the watermain and forcemain are to be completed concurrently.

CATARAQUI BAY WASTERWATER TREATMENT PLANT UPGRADES

In September 2010, the Sewage Infrastructure Master Plan (CH2MHill/XCG, 2010) for the City of Kingston Urban Area was completed. The Master Plan identified works to meet existing and future wastewater collection, conveyance, and treatment requirements resulting from forecasted growth, up to and beyond the year 2026. One of the identified projects is an expansion of the Cataraqui Bay Wastewater Treatment Plant (WWTP).

A Schedule C Municipal Class Environmental Assessment (EA) was completed for the upgrade to the Cataraqui Bay WWTP (JLR/XCG, 2012). The EA for Cataraqui Bay WWTP identified that upgraded from its rated capacity of 38 800 m^3/d to 68 000 m^3/d are required. This included an allowance of 10,000m^3/d re-directed wastewater from the Portsmouth Sewage Pumping Station.

5.3 NATURAL ENVIRONMENT

The following sections provide a more detailed description of the natural environment in the West Study Area. Information documented in Sections 5.3.2 to 5.3.5 is based on the Natural Environment Assessment report, included in Appendix C.

5.3.1 PHYSIOGRAPHY & GEOTECHNICAL CONDITIONS

A geotechnical investigation was completed by WSP (formerly GENIVAR) that included the advancement of forty-seven (47) boreholes, designated as BH13-1 to BH13-47, from existing ground level to refusal depths (presumed bedrock) and is appended in Appendix D.

Geological mapping shows the study area to be within limestone and clay plains. Regional native soil deposits surrounding the investigation area include Pleistocene age fine-textured glaciolacustrine deposits composed of silt and clay with minor amounts of sand and gravel. This is consistent with the geotechnical characteristic determined in the field.

Bedrock in this region underlies a shallow layer of surficial soil. The region hosts the Middle Ordovician Gull River and Bobcaygeon Formations. The Gull River Formation is characteristically comprised of very fine grained, grey to brown limestone and dolostone, whereas the Bobcaygeon Formation is characteristically comprised of brown to grey-brown fossiliferous limestone. Boreholes completed for this investigation reached refusal at depths of 0.7 to 8.4 mBGL (meters below ground level) with an average 3.3 mBGL. Based on typical pipe installation methods, some rock removal will be required for the installation of the piping. For the Crossing of Little Cataraqui Creek a tunnel at least 2 m below the bedrock surface or the channel bottom should be used to install the pipe.

Soil samples indicate that some of the soils show elevated levels of boron, cadmium, mercury, molybdenum, and zinc metals. Additionally, laboratory analyses of the soil show elevated levels of poly-chlorinated biphenyls (PCB's), petroleum hydrocarbons (>C10 – C16), and benzo(a)pyrene. Chemical test results in exceedences of the MOE guidelines are summarized in Table 5.1.

Table 5.1 Summary of Chemical Exceedences for Soils (Maximum concentration and location)

	MOE SCS'S TABLE 3 (O.REG 153)	MAXIMUM MEASURED CONCENTRATION	BOREHOLE LOCATIONS REPORTING EXCEEDENCES
Parameter	(µg/g)	(µg/g)	
Boron	120	625.0	BH13-1, BH13-12
Cadmium	1.9	31.3	BH13-1, BH13-3, BH13-8, BH13-12, BH13-13, BH13-14, BH13-22
Mercury	3.9	34.3	BH13-1, BH13-3, BH13-8, BH13-12, BH13-13, BH13-14, BH13-22
Molybdenum	40.0	290.0	BH13-3, BH13-8, BH13-12, BH13-13
Zinc	340.0	1000.0	BH13-10
Poly-Chlorinated Biphenyls (PCB's)	1.1	38.9	BH13-1, BH13-3, BH13-8, BH13-12, BH13-13, BH13-14, BH13-22
PHC F2 (>C10-C16)	230.0	3530.0	BH13-6, BH13-9, BH13-25
Benzo(a)pyrene	0.3	0.5	BH13-13

Based the test results above there are locations along the alignment that have chemical levels above the MOE guidelines and will need special consideration if excavated, to dispose of the non-hazardous solid waste material.

Chemical test exceedences results for groundwater samples are summarized in Table 5.2. Provincial Water Quality Objectives (PWQO's), City of Kingston Sewer Use By-Law (SUB), and Table 5.1 (O.Reg 153) criteria are provided for comparison, to assess dewatering discharge requirements.

Table 5.2 Summary of Chemical Exceedences for Soils (Maximum concentration and location)

	PWQO'S	SUB	MAXIMUM MEASURED CONCENTRATION
Parameter	(µg/L)	(ug/LL	(µg/g)
Boron	0.2		95
Copper	0.005	2	0.9
Lead	0.005	1	0.54

Exceedences from the groundwater testing will require special treatment of any dewatering activities related to the installation of the infrastructure.

Groundwater, wet soil and/or seepage was observed in the following sections of the project:

- Low-lying section of Kings Street West, at borehole locations BH13-6 through BH13-8, proximal to the Portsmouth Pumping Station, between Gardiner Street and Young Street.
- Low-lying section of Kings Street West, at borehole locations Bh13-28 and BH13-33.

- Low-lying section of Front Road, at borehole locations BH13-35 through BH13-37, proximal to the interface of the Little Cataraque River and Lake Ontario.
- A single borehole at borehole location BH13-43, west of Sandy Bay Lane, proximal to the Invista/Dupont Plant.

Estimated hydraulic conductivity of the expected materials in the excavations range from 10-4 to 10-6 m/s for the silty sands and less than 10-6 m/s for the clayey silts and finer soils. Hydraulic conductivity of the shallow bedrock is controlled by fracturing and jointing, but based on experience should be less than 10-5 m/s. Based on hydraulic properties, a 15 meter long by 3 meter wide trench in silty sand is expected to require a dewatering rate of less than 20,000 L/day. However, along Front Rd near Lake Ontario additional dewatering will be required based on the level of Lake Ontario and the depth of the pipe installation. For the tunneling of the Crossing of Little Cataraqui Creek, anti-seepage collars should be considered at the ends to protect the creek from potential loss of base flow into the pipe trench.

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5.3.2 VEGETATION COMMUNITIES

Overall, the Study Area is urbanized, consisting of commercial, institutional, health services, and residential areas. Vegetation within the Study Area is primarily planted, with natural occurring vegetation limited to the wetland areas, a thin woodland northeast of Front Road bridge and the Marshlands Conservation Area. Per the City's land use designations, the Study Area is comprised of environmental protection, institutional and residential areas.

Due to the urbanized nature of the Study Area and influence of anthropogenic activities, Ecological Land Classification (ELC) communities are limited to the following:

- Cattail Mineral Shallow Marsh Type (MASM1-1);
- Fresh – Moist Deciduous Woodland Ecosite (WODM5)
- Aquatic System (AQ); and
- Constructed (CV)

These areas are illustrated in Figure 5.1. The details regarding the location and prominence of these communities are further described in the sub-sections below.

Figure 5.1 Existing Natural Environment

CATTAIL MINERAL SHALLOW MARSH TYPE (MASM1-1)

A Cattail Mineral Shallow Marsh Type (MASM1-1) occurs north and south of the Front Road bridge and within the Marshlands Conservation Area, as illustrated in Figure 5.1. The perimeter of Cataraqui Creek dominated by Cattail (i.e. *Typha latifolia* and *Typha angustifolia*) and is associated with the Provincially Significant Wetland. The MASM1-1 abuts the north and south side of Front Road bridge and causeway. Cattail occurs within the Marshlands Conservation Area, abutting the north side of Front Road.

FRESH – MOIST DECIDUOUS WOODLAND ECOSITE (WODM5)

A thin strip of Fresh – Moist Deciduous Woodland Ecosite (WODM5) occurs northeast of the Front Road bridge, as illustrated in Figure 5.1. Overhead hydro-lines extend along the roadside, within this community. The canopy and sub-canopy included Trembling Aspen (*Populus tremuloides*), Paper Birch (*Betula papyrifera*) and White Willow (*Salix alba*). This community is part of the significant woodland identified within the City's Official Plan (OP).

AQUATIC SYSTEM (AQ)

An Aquatic System consisting of Open Water (OA) and Shallow Water (SA) was documented within and adjacent to the Study Area. The Open Water (OA) community generally consisted of water with a depth greater than 2 m and no visible vegetation. The OA community occurs centrally within the channel of Little Cataraqui Creek and is also along the Lake Ontario shoreline. Depths less than 2 m and possessing visible aquatic vegetation constitute a Significant Wetland (SW) community. Pockets of Floating-leaved Shallow Aquatic vegetation consisting of more than 25% of the water's surface was observed within inlets of the MASM1-1 community, north and south of the Front Street bridge.

CONSTRUCTED (CV)

The Study Area is comprised mostly of Constructed type, including Golf course, roadway, residential commercial/industrial, education and health. Vegetation of this area consisted of native species occurring within the road Right of Way (ROW) such as Pineapple-weed Chamomile (*Matricaria discoidea*), Vetch (American Purple Vetch (*Vicia* spp.) and Birds-foot Trefoil (*Lotus corniculatus*). Landscaping of the parkland, educational and commercial/industrial areas possessed native species, including Sugar Maple (*Acer saccharum*), Spruce (*Picea* spp.), and Red Oak (*Quercus rubra*) and also introduced species such as Norway Maple (*Acer platanoides*). Within the residential areas, native trees were present; however, shrub and groundcover were dominated by ornamentals, such as Spirea (Spiraea spp.), Hostas (*Hosta* spp.) and Lilies (*Lilium* spp.).

Based on the vegetation communities found along the King St/Front Rd corridor and Little Cataraqui Creek special consideration and mitigation measures should be reviewed for each area based on the proposed installation of infrastructure to occur.

5.3.3 SURFACE WATER FEATURES & FISH HABITAT

SURFACE WATER FEATURES

Two permanent features and one intermittent water feature were identified within or adjacent to the Study Area, including Little Cataraqui Creek, Lake Ontario shoreline and an intermittent tributary to Lake Ontario. Each water feature is described below:

LAKE ONTARIO SHORELINE

The shoreline south of the Front Road causeway is uniform; gradually sloping into the water. Substrate consists primarily of gravel (70%), scattered boulders (25%) and fine sediments (5%). Large limestone boulders and small gravel occur along the shoreline and extend partly in the water and appear to have been placed as part of shoreline stabilization practices. Riparian vegetation consisted primarily of Cattail with few trees, including, Willow (*Salix* spp.), and Manitoba Maple (*Acer negundo*).

A shoreline walking path begins east of the Front Road causeway. Large limestone boulders occurred between the path and shoreline. The boulders accumulated free-floating aquatic vegetation, forming mats on the surface of the water. Several large cyprinids (likely Common Carp, *Cyprinus carpio*) approximately 60 cm in length were observed swimming near the vegetation mats.

The shoreline of the inlet, south of Marshlands Conservation Area has been stabilized with large limestone boulders. The inlet was approximately 1m deep at 7m from shore and substrate comprised almost entirely of sand (95%) with a few scattered boulders (5%). Aquaticvegetation was scarce and riparian vegetation was minimal and limited to only a few trees (i.e. Salix spp.) along the northeast corner of the inlet. The shoreline of the Portsmouth Olympic Harbour has been stabilized with sheet piling, large boulders or a combination of both. The depths of the harbour likely exceed 2m to allow boat navigation. Limited visibility did not allow for confirmation of substrate composition. Limited submergent vegetation was visible from the docks and pier at the south end of the harbour. Limited riparian cover exists along the shoreline due to its constructed nature (e.g. docks, shoreline stabilization, etc.).

INTERMITTENT TRIBUTARY

An intermittent tributary occurs within Marshlands Conservation Area and crosses southward under Front Road through a corrugated steel pipe culvert. The watercourse occurs within a Cattail Mineral Shallow Marsh immediately north of Front Road. A pool occurs at the north edge of the culvert, approximately 2m in area and a depth of 50cm. The pool diminishes into a poorly defined channel

with intermittent small pockets of water (i.e. depth of 2 -6cm) and saturated soils north of the pool. The watercourse possesses a bankful width of approximately 50cm and a substrate consisting of muck (70%), sand (25%) and detritus (5%). Cattail shade almost 100% of the watercourse.

LITTLE CATARAQUI CREEK

Little Cataraqui Creek is a permanent feature flowing southward into Lake Ontario. The Creek is moderately sinuous, moderately flowing and possessed average wetted width of 350m within the Study Area. The Cattail Mineral Shallow Marsh community occurs along both banks of the creek. Although constituting a separate community type, as per ELC designation (i.e. MASM1-1), there is no barrier between the creek and the Cattail community. Substrate of the Cattail community consisted of muck, while the main channel immediately south of Front Road bridge consisted primarily of gravel (80%) and large boulders (20%). In-stream vegetation was scarce (i.e. less than 5%). Riparian cover consisted of Cattail of the MASM1-1 community (97%), with limited cover provided by graminoid and roadside vegetation (3%) adjacent to the bridge. Riparian vegetation shades less than 5% of the creek. The watercourse is channelized to an approximate width of 15m at the Front Road. The depth of the creek at the bridge is approximately 2.75m.

FISH HABITAT

Fish habitat as defined by the *Fisheries Act*, c. F-14 includes the spawning grounds and nursery, rearing food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes. Based on a database review, the following fish documented in

Table 5.3 are documented to have occurred within Little Cataraqui Creek.

Table 5.3 Fish Historically Occurring within Cataraqui Creek

COMMON NAME	SCIENTIFIC NAME	S-RANK[1]	SARO[2]	SARA[3]	CATARAQUI CREEK (OMNR[4])
Alewife	*Alosa pseudoharengus*	SNA			
Banded Killifish	*Fundulus diaphanus*	S5	NAR	NAR	✓
Blackchin Shiner	*Notropis heterodon*	S4	NAR	NAR	
Black Crappie	*Pomoxis nigromaculatus*	S4			✓
Blacknose Shiner	*Notropis heterolepis*	S5			
Bluegill	*Lepomis macrochirus*	S5			✓
Bluntnose Minnow	*Pimephales notatus*	S5	NAR	NAR	
Bowfin	*Amia calva*	S4			
Brook Silverside	*Labidesthes sicculus*	S4	NAR	NAR	
Brook Stickleback	*Culaea inconstans*	S5			✓
Brown Bullhead	*Ameiurus nebulosus*	S5			✓
Central Mudminnow	*Umbra limi*	S5			✓
Creek Chub	*Semotilus atromaculatus*	S5			✓
Common Carp	*Cyprinus carpio*	SNA			
Eastern Silvery Minnow	*Hybognathus regius*	S2	NAR	NAR	
Fathead Minnow	*Pimephales promelas*	S5			✓
Finescale Dace	*Phoxinus neogaeus*	S5			✓
Gizzard Shad	*Dorosoma cepedianum*	S4			
Golden Shiner	*Notemigonus crysoleucas*	S5			✓
Johnny Darter	*Etheostoma nigrum*	S5			✓
Largemouth Bass	*Micropterus salmoides*	S5			✓

COMMON NAME	SCIENTIFIC NAME	S-RANK[1]	SARO[2]	SARA[3]	CATARAQUI CREEK (OMNR[4])
Longnose Gar	*Lepisosteus osseus*	S4			
Northern Pike	*Esox lucius*	S5			✓
Northern Redbelly Dace	*Phoxinus eos*	S5			✓
Pumpkinseed	*Lepomis gibbosus*	S5			✓
Rock Bass	*Ambloplites rupestris*	S5			✓
Round Goby	*Neogobius melanostomus*	SNA			
Smallmouth Bass	*Micropterus dolomieu*	S5			✓
Sunfish spp.					
White Sucker	*Catostomus commersoni*	S5			
Yellow Bullhead	*Ameiurus natalis*	S4			
Yellow Perch	*Perca flavescens*	S5			✓

[1] Protection priority Provincial Rank (NHIC 2012); 1 - Critically Imperiled, 2 - Imperiled, 3 - Vulnerable, 4 - Apparently Secure, 5 – Secure; SX-Presume Extirpated, SH – Possibly Extirpated, SNR – Unranked, SU-Unrankable, SNA – Not Applicable, S#S# -Rank Range, S#B – Breeding migrants and S#N – Non-breeding migrants;
[2] Species protected under the provincial Endangered Species Act; END – Endangered, THR – Threatened, SC – Special concern;
[3] Species protected under the federal Species at Risk Act (2007); and
Species not at Risk – NAR.
[4] Spang Elizabeth, MNR Planner, pers. comm. July 26, 2013

Fish habitat assessments were completed as part of the Study to determine the sensitivity of fish and fish habitat within the Study Area. Two fish species were captured including Round Goby (*Neogobius melanostomus*) and unidentified Darter (*Etheostoma* spp.). No other fish were captured. Four large cyprinids (likely Common Carp) were observed, near the accumulated vegetation mat.

Based on the findings, Little Cataraqui Creek, Lake Ontario and an intermittent tributary within Marshlands Conservation Area supports permanent and/or seasonal fish population and may be used as a migration corridor. Special consideration and mitigation measures should be reviewed for these areas where the installation of infrastructure is to occur including but not limited to avoidance of construction activities during critical life stages of local fauna.

5.3.4 SIGNIFICANT ENVIRONMENTAL FEATURES

SIGNIFICANT WETLANDS

Wetlands are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. There are four major wetland types; swamps, marshes, bogs, and fens. A significant wetland is defined as an area identified as provincially significant by the Ministry of Natural Resources using evaluation procedures established by the province, as amended from time to time. Little Cataraqui Creek Complex Provincially Significant Wetland occurs immediately north of the Front Road bridge. An unevaluated wetland occurs north and south of the bridge.

SIGNIFICANT WOODLANDS

Significant Woodlands are defined as treed areas that provide environmental and economic benefits such as erosion prevention, water retention, and provision of habitat, recreation and the sustainable harvest of woodland products. No development or site alteration is permitted to occur within “significant woodlands south and east of the Canadian Shield unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions”.

The OP depicts a significant woodland north of the Front Road causeway. This area is described as a WODM5.

SIGNIFICANT VALLEYLANDS

Significant Valleylands are “a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year”. The local planning authority is responsible for identifying and evaluating Significant Valleylands.

The OP depicts a Significant Valleyland encompassing Little Cataraqui Creek, through to the area south of Front Road bridge.

SIGNIFICANT WILDFLIFE HABITAT

Wildlife habitat is defined as areas where plants, animals, and other organisms live and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual life cycle; and areas which are important to migratory and non-migratory species. Wildlife habitat is referred to as significant if it is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System. Habitats of species of conservation concern do not include any habitats of endangered or threatened species.

Special Concern species identified during the agency and database consultation were reviewed for potential to occur within the Study Area based on known habitat preferences. Table 5.4 ranks the species occurrence potential as None, Low, Moderate or High, based on habitat observed during on site investigations. Species were deemed to have a Low occurrence potential when key habitat traits were not observed or documented for the Study Area or adjacent areas. A Moderate habitat potential indicates the presence of key habitat traits within the Study Area, while High potential indicates the presence of key habitat traits and confirmation of the species on or within the vicinity of the Study Area.

Table 5.4 Potential for Special Concern Species Occurrences within Study Area

SPECIES	S-RANK[1]	SARO[2]	SARA[3]	HABITAT DESCRIPTION	HABITAT POTENTIAL[4]
BIRDS					
Black Tern *Chlidonias niger*	S3B	SC	NAR	The species requires large, shallow, quiet marshes where their floating nests are not subject to disturbance from humans or boat traffic.	Moderate
Peregrine Falcon *Falco peregrinus*	S3B	SC	SC	This species generally nests in remote areas, on cliffs overlooking water bodies, or they nest in urban environments, on tall buildings overlooking waterbodies.	Low
HERPETOFAUNA					
Northern Map Turtle *Graptemys geographica*	S3	SC	SC	This species typically occurs in large bodies of water such as: Southern Great Lakes, Lake St. Clair, Thames River, Grand River and Ottawa River.	Moderate
Snapping Turtle *Chelydra serpentina*	S3	SC	SC	This species prefers large bodies to small ponds containing dense vegetation.	High
Eastern Milksnake *Lampropeltis triangulum*	S3	SC	SC	This species is typically found in rural areas, and most commonly found within or outside agricultural buildings, within close proximity to water.	Low
Western Chorus Frog *Pseudacris triseriata pop. 2*	S3	NAR	THR	This species can be found in moist cultivated, meadows or forests. Tadpoles develop within vernal pools or low-flow, shallow water, absent of fish.	Moderate
INSECTS					
Monarch Butterfly *Danaus plexippus*	S2N,S4B	SC	SC	This species is typically located in meadows possessing Milkweed or areas with wildflowers.	Moderate

[1] Protection priority Provincial Rank (NHIC 2012); 1 - Critically Imperiled, 2 - Imperiled, 3 - Vulnerable, 4 - Apparently Secure, 5 – Secure; SX-Presume Extirpated, SH – Possibly Extirpated, SNR – Unranked, SU-Unrankable, SNA – Not Applicable, S#S# - Rank Range, S#B – Breeding migrants and S#N – Non-breeding migrants;
[2] Species protected under the provincial Endangered Species Act; END – Endangered, THR – Threatened, SC – Special concern;
[3] Species protected under the federal Species at Risk Act (2007); and Species not at Risk – NAR.
[4] Habitat Potential – None, Low, Moderate or High

SIGNIFICANT AREAS OF NATURAL AND SCIENTIFIC INTEREST

Significant Areas of Natural and Scientific Interest (ANSI) are defined as areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education. A review of the Natural Heritage Information Centre (NHIC) database and the Land Information Ontario (LIO) did not reveal any ANSI's within the Study Area. The Kingston OP identifies an ANSI approximately 650 m north of the Front Road bridge; however as there are no ANSI within 120m of the study area, there are no areas of concern.

5.3.5 SPECIES AT RISK & ENDANGERED OR THREATENED SPECIES HABITAT

SPECIES AT RISK

A database consultation was undertaken to obtain Species at Risk and rare species occurrences. The search identified seventeen (17) Species at Risk and species of concern; twelve (12) avian and five (5) herpetofauna; that may occur within or adjacent to the Study Area. The Species at Risk are the following:

AVIAN SPECIES

- Barn Swallow (*Hirundo rustica*)
- Black Tern (*Chlidonias niger*)
- Bobolink (*Dolichonyx oryzivorus*)
- Northern Bobwhite (*Colinus virginianus*)
- Chimney Swift (*Chaetura pelagic*)
- Common Nighthawk (*Chordeiles minor*)
- Eastern Meadowlark (*Sturnella magna*)
- Henslow's Sparrow (*Ammodramus henslowii*)
- Least Bittern (*Ixobrychus exilis*)
- Loggerhead Shrike (*Lanius ludovicianus)*
- Red-headed Woodpecker (*Melanerpes erythrocephalus*)
- King Rail (*Rallus elegans*)

HERPETOFAUNA SPECIES

- Snapping Turtle (Chelydra serpentina)
- Blanding's Turtle (Emydoidea blandingii)
- Western Chorus Frog (Pseudacris triseriata pop. 2)
- Eastern Milksnake (Lampropeltis triangulum)
- Eastern Hog-nosed Snake (Heterodon platirhinos)

Breeding bird, mammal and amphibian surveys were conducted to document the presence of any Species at Risk within or adjacent to the Study Area. Based on the surveys two Species at Risk were observed. Barn Swallow was observed south of Front Road and a crushed carapace of a Snapping Turtle was also observed on Front Road, immediately east of the Front Road bridge (likely the result of a vehicle collision).

SIGNIFICANT HABITAT OF ENDANGERED OR THREATENED SPECIES HABITAT

Significant habitat can be defined as habitat necessary for the maintenance, survival, and/or recovery of naturally occurring or reintroduced populations of endangered and threatened species; and those areas that are occupied or habitually occupied by the species during all or any part of its life cycle. The MNR is directly responsible for identifying, listing and conducting ongoing assessments for Species at Risk and their related habitats.

Species at Risk identified during agency and database consultation, were reviewed for their potential to occur within the Study Area. Table 5.5 ranks each species' habitat occurrence potential as None, Low, Moderate, or High, based on habitat observed during on site investigations. Species were deemed to have a Low occurrence potential when key habitat traits were not observed or documented for the Study Area or adjacent areas. A Moderate habitat potential indicates the presence of key habitat traits within the Study Area, while High potential indicates the presence of key habitat traits and confirmation of the species on or within the vicinity of the Study Area.

Table 5.5 Potential for Species at Risk Occurrence within Study Area

SPECIES	S-RANK[1]	SARO[2]	SARA[3]	HABITAT DESCRIPTION	HABITAT POTENTIAL[4]
BIRDS					
Barn Swallow *Hirundo rustica*	S4B	THR	No Status	This species can be found in many habitats types such as agricultural, urban and coastal. They will nest in agricultural building or construct their nest on bridges.	High
Bobolink *Dolichonyx oryzivorus*	S4B	THR	No Status	This species build nests on the ground, in dense grasses such as unmaintained hayfields.	Low
Chimney Swift *Chaetura pelagica*	S4B,S4N	THR	THR	This species feeds in flocks around water bodies. Nesting occurs in large, hollow trees or in the chimneys of houses in urban and rural areas.	Moderate
Common Nighthawk *Chordeiles minor*	S4B	SC	THR	This species nests in areas with little to no ground vegetation, such as logged or burned-over areas, forest clearing, rock barrens, etc.	Low
Eastern Meadowlark *Sturnella magna*	S4B	THR	No Status	This species prefers pastures, open fields and overgrown vegetation along roadsides.	Low
Least Bittern *Ixobrychus exilis*	S4B	THR	THR	This species breeds in stable marshes with emergent vegetation, such as cattails, and areas with open water. They are typically found in large, quiet marshes.	Moderate
Loggerhead Shrike *Lanius ludovicianus migrans*	S3B	END	END	This species prefers meadows with scattered shrubs.	Low
Red-headed Woodpecker *Melanerpes erythrocephalus*	S4B	SC	THR	The species lives in open woodlands and woodland edges, most commonly in oak savannah and riparian forest, where dead trees are used for nesting and perching.	Low
Henslow's Sparrow *Ammodramus henslowii*	SHB	END	END	This species prefers open fields possessing tall grasses and herbaceous plants.	Low
Northern Bobwhite *Colinus virginianus*	S1	END	END	This species is often associated with agricultural fields, thickets, young forests or hedges.	Low
King Rail *Rallus elegans*	S2B	END	END	This species is found in large, heavily vegetated, shrub marshes.	Low
HERPETOFAUNA					
Blanding's Turtle *Emydoidea blandingii*	S3	THR	THR	This species inhabits lakes, slow-ms and wetlands, preferring shallow s with abundant aquatic vegetation.	High

SPECIES	S-RANK[1]	SARO[2]	SARA[3]	HABITAT DESCRIPTION	HABITAT POTENTIAL[4]
Eastern Hog-nosed *Heterodon platirhinos*	S3	THR	THR	This species prefers well-drained habitats such as a beach, in close proximity to wetland areas.	Low
Gray Ratsnake *Pantherophis* *1*	S3	THR	THR	This species prefers habitat with a combination of woodland pastures/fields and marches.	Low
FISH					
Lake Sturgeon *Acipenser fulvescens*	S2	THR	THR	This species prefers large rivers or lakes between 5 and 10 m deep, over clay with mud, sand and/or gravel.	Low

[1] Protection priority Provincial Rank (NHIC 2012); 1 - Critically Imperiled, 2 - Imperiled, 3 - Vulnerable, 4 - cure, 5 – Secure; SX-Presume Extirpated, SH – Possibly Extirpated, SNR – Unranked, SU-Unrankable, SNA – Not S# -Rank Range, S#B – Breeding migrants and S#N – Non-breeding migrants;
[2] Species protected under the provincial Endangered Species Act; END – Endangered, THR – Threatened, SC – Special concern;
[3] Species protected under the federal Species at Risk Act (2007); and Species not at Risk – NAR.
[4] Habitat Potential – None, Low, Moderate or High

Accordingly Barn Swallow's and Blanding Turtles are of significance within the study area and were identified within 120m. Special consideration and mitigation measures should be reviewed for habitat of these species where the installation of infrastructure is to occur.

5.4 EXISTING UTILITIES

KING STREET/FRONT ROAD

There are extensive utilities within the King Street Right Of Way (R.O.W.) including watermains, storm sewers, gas mains, Kingston Hydro (both underground and overhead) and other service provided(telecom etc). The portion of King Street between Portsmouth pumping station and Portsmouth Avenue has a smaller R.O.W. and has significant utilities within it that make this corridor extremely congested. Additionally, Utilities between Yonge St and Union Ave were replaced around 1994. Refer to Appendix E for drawing showing the existing utilities.

KENNEDY STREET / UNION AVENUE

Within the section of the R.O.W. there is also watermains, storm sewers, gas mains and Kingston Hydro both underground and overhead) and other service provided (telecom etc); however Kennedy is a residential street and mainly has local collector infrastructure. The section of Union within the study area also has limited infrastructure and does not have storm sewers along this section. Refer to Appendix E for drawing showing the existing utilities.

BAIDEN STREET

Kennedy Street and Union Avenue utilities are indicated above; 2 blocks of Baiden Street were recently reconstructed (2012) and as such is much less congested than the other streets within the study area. Similar to Kennedy Street, Baiden Street is a local residential road and consists mainly of local collector infrastructure. Refer to Appendix E for drawing showing the existing utilities.

5.5 TRAFFIC, ROAD USE AND TRANSPORTATION

Front Road is a 50 / 60 km/h arterial that extends from Kingston Airport to Cataraqui Bay and widens to a 4-lane undivided roadway east of Days Road. It becomes King Street east of Cataraqui Bay and narrows to a 2-lane roadway at McDonald Avenue (upstream of Union Street). Speed is reduced to 40 km/h between Portsmouth Avenue and Gardiner Street.

The analysis of traffic operations was performed implementing the Highway Capacity Manual (HCM) 2000 methodology.

The traffic performance results should be interpreted as follows:

- **Volume-to-Capacity (V/C) Ratio**: represents the level of utilization of a turning movement. Typically, a V/C value below 0.85 indicates efficient operations whereas a value above 1 indicates congestion problems.
- **Average Delay per Vehicle** and **Level of Service (LOS)**: represents the drivers' level of satisfaction. The LOS is directly based on the average delay. A level of service 'E' or 'F' may require corrective measures depending on the context.

Traffic signal timings are assumed to be optimized for analysis purpose. Table 5.6 indicates the results for the balanced traffic volumes.

Table 5.6 Intersection Performance, Existing Conditions

INTERSECTION	MORNING PEAK HOUR				AFTERNOON PEAK HOUR			
	Volume-to-Capacity Ratio		Delay (s) and Level of Service		Volume-to-Capacity Ratio		Delay (s) and Level of Service	
	Critical Ratio	Critical Movement	Overall LOS[1]	Critical Movement[2]	Critical Ratio	Critical Movement	Overall LOS[1]	Critical Movement[2]
Front Road / Sand Bay Lane	0.50	EBT/R	5 A	NBL	0.55	WBL/T	5 A	NBL
King Street / Portsmouth Avenue	0.78	SBL/T	19 B	SBL/T	0.75	SBL/T	15 B	SBL/T
King Street / Union Street / Mowat Avenue	0.73	NBL/T/R	11 B	NBL/T/R	0.95	SBR	22 C	SBR
King Street / Yonge Street	0.54	EBL/T/R	5 A	SBL	0.63	WBL/T/R	9 A	NBL
King Street / Sir John A. Macdonald Boulevard	0.79	SBL	17 B	SBL	0.77	WBT	17 B	SBL

1. Level of Service or LOS is based on average control delay (in seconds) - For signalized intersections, "LOS" represents the overall intersection LOS.
2. Represents the movement with the worst LOS.

Near Capacity (V/C ≥ 0.85)

The results indicate that none of the intersections under study experience any traffic capacity problem. The intersection at Union Street / Mowat Avenue appears close to capacity in the afternoon, but this is caused by the stop sign located on the southbound right turn channelization. The Traffic analysis report is included in Appendix F.

Additionally, a meeting was conducted with the City of Kingston Director of Engineering and the Manager of Traffic to discuss the project. The City indicated that they currently have some traffic delays due to west bound vehicles preforming left turns into a commercial development just west of the Union Ave / King St W intersection. They indicated that if the project construction activities were to in this area, collaboration to correct this problem could be completed

5.6 ARCHAEOLOGICAL AND HERITAGE FEATURES

5.6.1 ARCHAEOLOGICAL FEATURES

A combined Stage 1 and 2 Archaeological Assessment was conducted in 2013 by WSP Canada Inc (previously GENIVAR). The property inspection and test pit survey that is part of the Stage 2 Archaeological Assessment was conducted on July 24, 2013. The results of the assessment indicate that although the area holds archaeological potential for the discovery of pre-contact archaeological sites and high potential for the discovery of historic Euro-Canadian sites, the previous implementation of municipal infrastructure (road, sewer, etc.) has damaged the integrity of any archaeological resources and therefore there is no longer any archaeological potential. The Stage 1 and 2 Archaeological Assessment report is included in Appendix G.

At the westerly most limit of the study area, the Stage 1 assessments of the Cataraqui Bay Wastewater Treatment Plant (Adams, 2010), Proposed Cataraqui Bay Wastewater Treatment Plant Upgrade (Earl 2012) and the Front Road Bridge (Berry, 2013) provide an overview of the history (precontact and postcontact) of the additional area along the alignment to the Cataraqui Bay WWTP, including resources and a determination of archaeological potential. These properties were cleared from any archaeological potential from their subsequent studies.

5.6.2 HERITAGE FEATURES

A Heritage Impact Statement (HIS) was prepared by WSP to identify the heritage features that will be impacted by the work being planned in the area and to prescribe the mitigation strategies to be employed to reduce the impact to these features. The HIS report is included in Appendix H. The Study included a review of documents pertaining to the Study Area including consultation with the City of Kingston Heritage Planning staff. The HIS revealed a number of designated heritage properties, listed heritage properties and provincially significant heritage properties in the area, as illustrated in Figure 5.2.

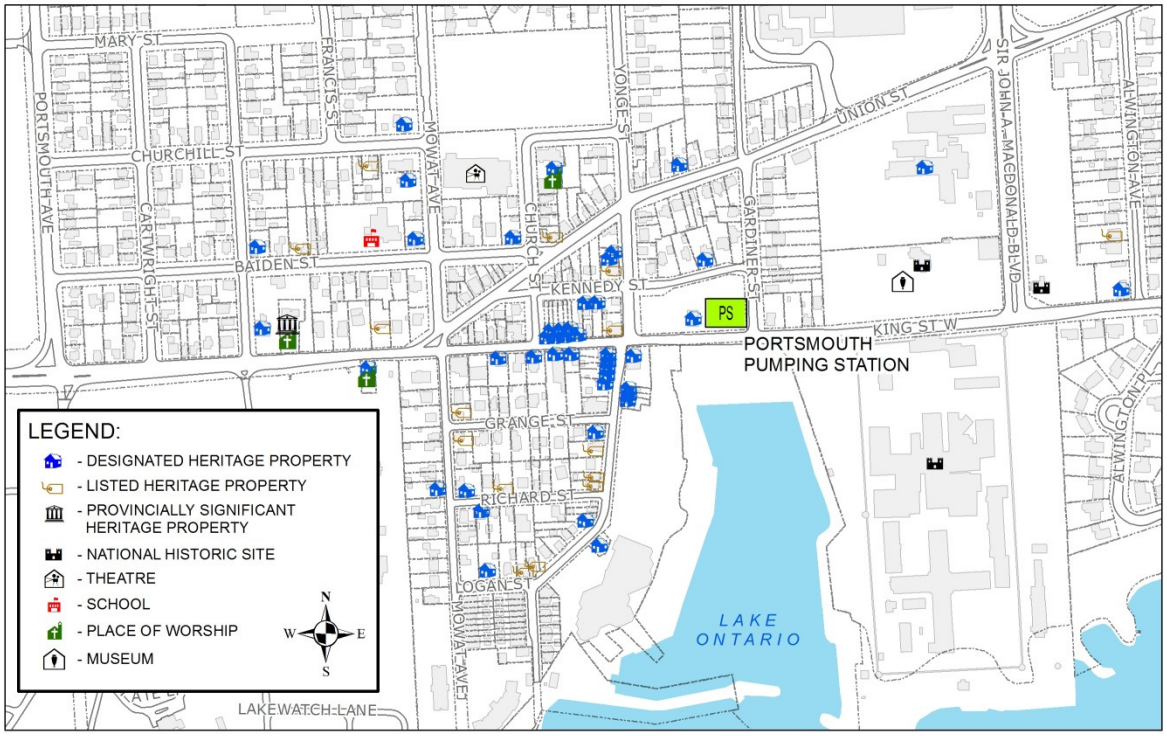

Figure 5.2 Existing Built Heritage Features

The area to be physically impacted by the proposed activities is limited to the road right-of-way (ROW), Aberdeen Park, and an area east of the Cataraqui Bridge which has already been previously disturbed by construction. However, due to the proximity of the work to adjacent heritage resources including the identified Portsmouth Village and King Street Heritage Corridor there is the potential that development impacts from destruction, removal/relocation, alteration and soil disturbance may impact these resources.

5.7 LAND USE

The Overall Study Area is mostly comprised of residential, institutional areas and open space areas, complimented by a small business/commercial areas and a general industrial area. Each of these areas and their use are described below.

RESIDENTIAL AREAS

Residential areas in East Study Area are typically of medium density (single family homes) with some student housing for St Lawrence College and Queens West campus. A portion of the residential area in the Portsmouth area is adjacent to some small business/commercial area as well as large educational institutions, St Lawrence College and Queen's University.

INSTITUTIONAL AREAS

In addition to the St Lawrence College and Queens University West campuses, the Study Area contains another significant institutional land, the Providence Care, a mental health and rehabilitative care hospital located just south of King St W.

COMMERCIAL/BUSINESS AREAS

The commercial/business area within the Study Area is a small localized area in Portsmouth Village.

INDUSTRIAL AREAS

The only significant industrial area within the Study Area is the Cataraqui Bay WWTP, and industrial businesses such as Invista and Dupont.

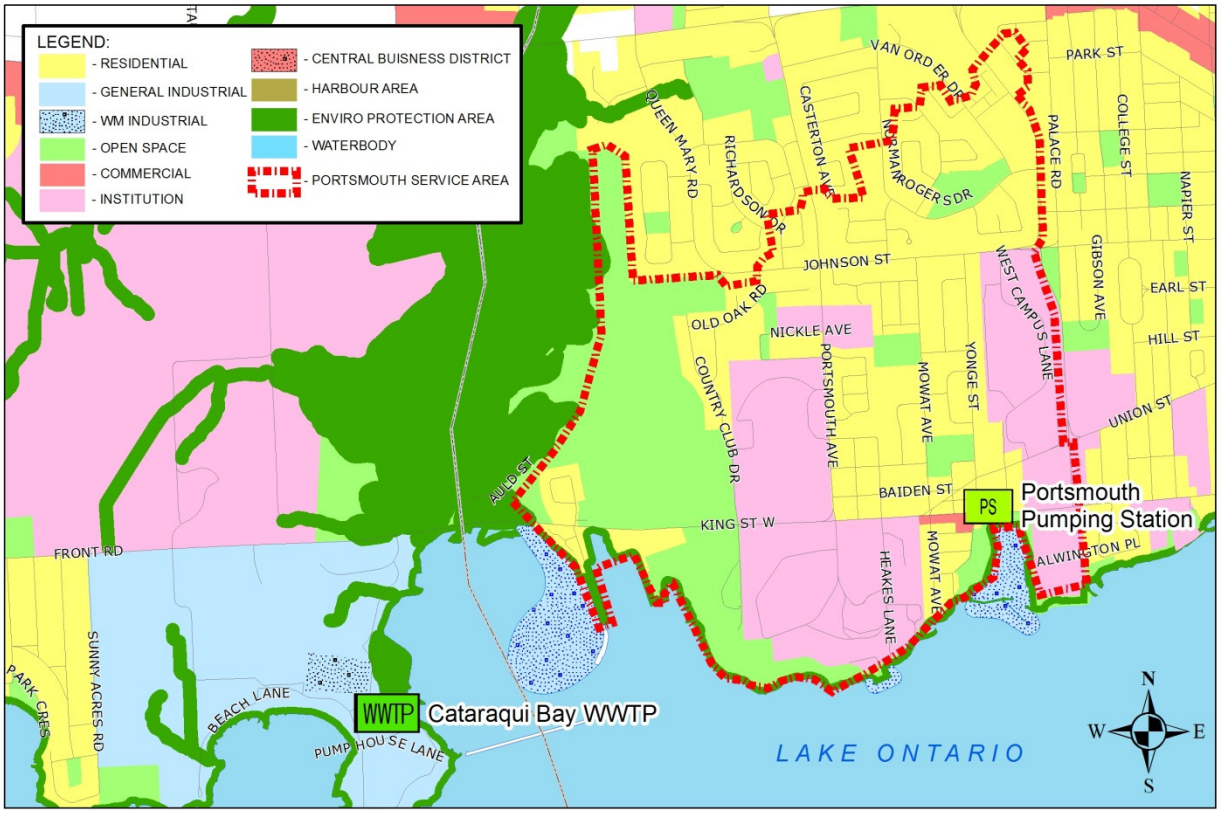

Figure 5.3 Land Use Features in Study Area

6 PHASE 2A: IDENTIFICATION OF ALTERNATIVE SOLUTIONS

6.1 PUMPING OPTIONS

OPTION 1: PUMP ENTIRE DISTANCE WEST/SMALLER PS'S TO PORTSMOUTH VIA GRAVITY SEWER

This option includes the Portsmouth pumping station transferring the flow via a new forcemain the entire distance to Cataraqui Bay Treatment Plant. The smaller pump stations along the route would continue to pump back to Portsmouth PS via the existing gravity sewer.

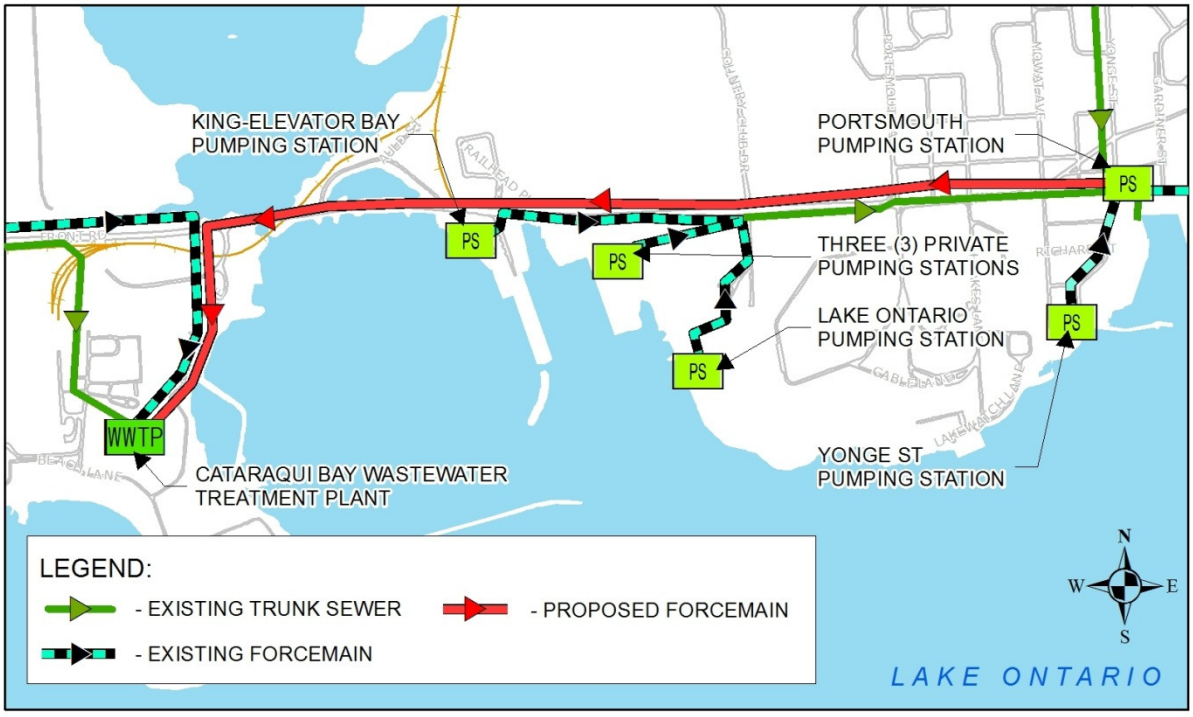

Figure 6.1 Option 1 - Pump Entire Distance West/Smaller PS's to Portsmouth via Gravity

OPTION 2: PUMP ENTIRE DISTANCE WEST/TIE-IN SMALLER PS'S TO FORCEMAIN

This option includes the Portsmouth pumping station transferring the flow via a new forceman the entire distance to Cataraqui Bay Treatment Plant using a single forcemain. Smaller pumping stations along the route are pumped into the single forcemain.

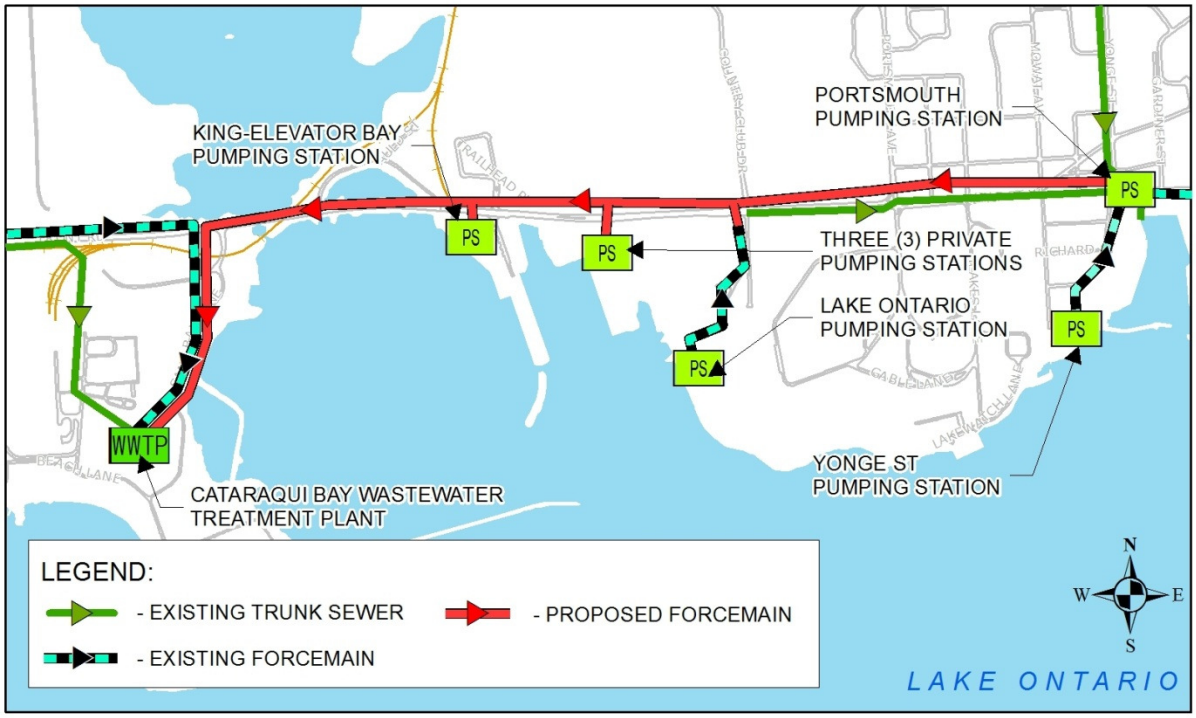

Figure 6.2 Option 2 – Pump Entire Distance West/ Tie-in Smaller PS's to Forcemain

OPTION 3: PUMP ENTIRE DISTANCE WEST/SECOND FORCEMAIN FOR SMALLER PS'S

This option includes the Portsmouth pumping station transferring the flow via a new forcemain the entire distance to Cataraqui Bay Treatment Plant using one forcemain. A second (twinned) forcemain would be installed along the route from the Portsmouth Pumping Station to the WWTP for the smaller pumping stations to pump into (under normal conditions).

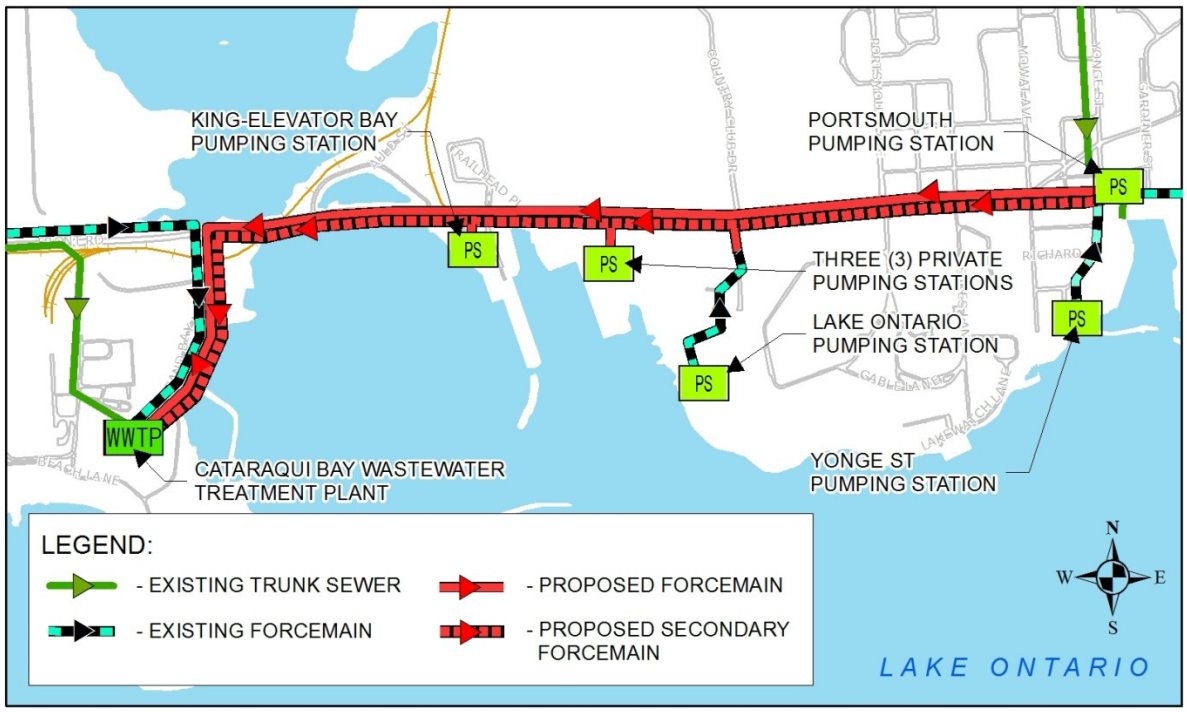

Figure 6.3 Option 3 – Pump Entire Distance West/ Second Forcemain for Smaller PS's

OPTION 4: PUMP TO HIGH POINT, GRAVITY TO NEW PS THAT DISCHARGES TO WWTP

This option includes the Portsmouth pumping station transferring flow via a new forcemain to the top of the hill (near St. Lawrence College) then draining by gravity to a new pumping station that would replace the existing King-Elevator Bay pumping station. The other small pumping station along the route would pump into a new gravity sewer. All flow would then be pumped from the new pumping station to Cataraqui Bay Treatment Plant via a new forcemain

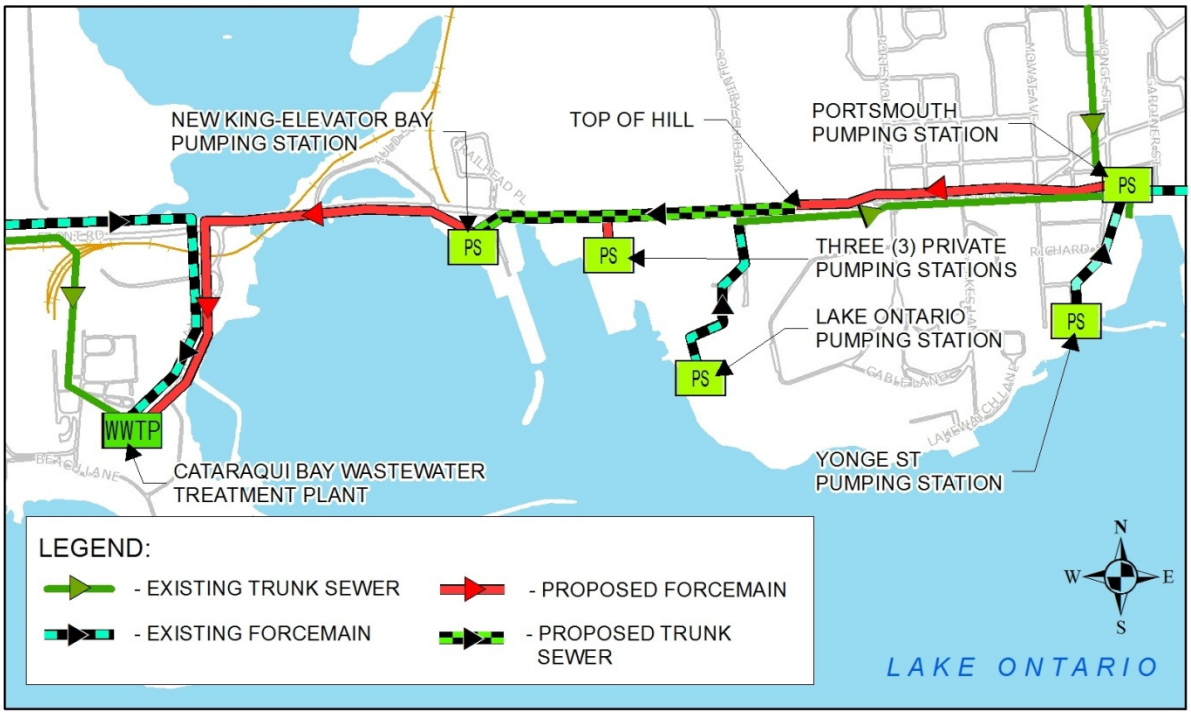

Figure 6.4 Option 4 – Pump to High Point, Gravity to New PS that Discharges to WWTP

6.2 ROUTING OPTIONS

During the evaluation of the potential options for routing it was determined that there are minimal variations to the route for the infrastructure west of Portsmouth Ave. Therefore it was concluded that the infrastructure west of Portsmouth Ave would follow King St W/Front Rd until approximately Sand Bay Lane at which point it would turn south and connect to Cataraqui Bay WWTP. For the purposes of evaluating the routing options, the Study Area was limited to east of Portsmouth Ave. Below is a description of the routing options.

OPTION 5: KING STREET

This option includes installing the forcemain from the Portsmouth pumping station along the King Street R.O.W. to Portsmouth Ave at which point it follow the alignment indicated above.

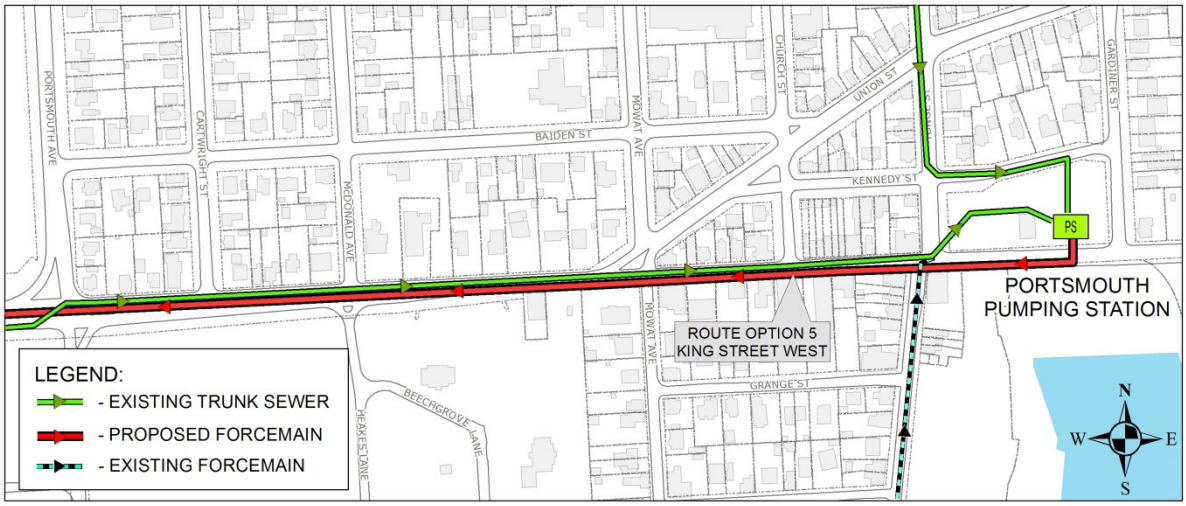

Figure 6.5 Option 5 – King St

OPTION 6: KENNEDY, UNION, KING STREET

This option includes installing the forcemain from the Portsmouth pumping station along the Kennedy Street R.O.W. to Union Street W; continuing southwest in Union Street W R.O.W. to King Street W. then along King Street W. R.O.W. to Portsmouth Ave at which point it follows the alignment indicated above.

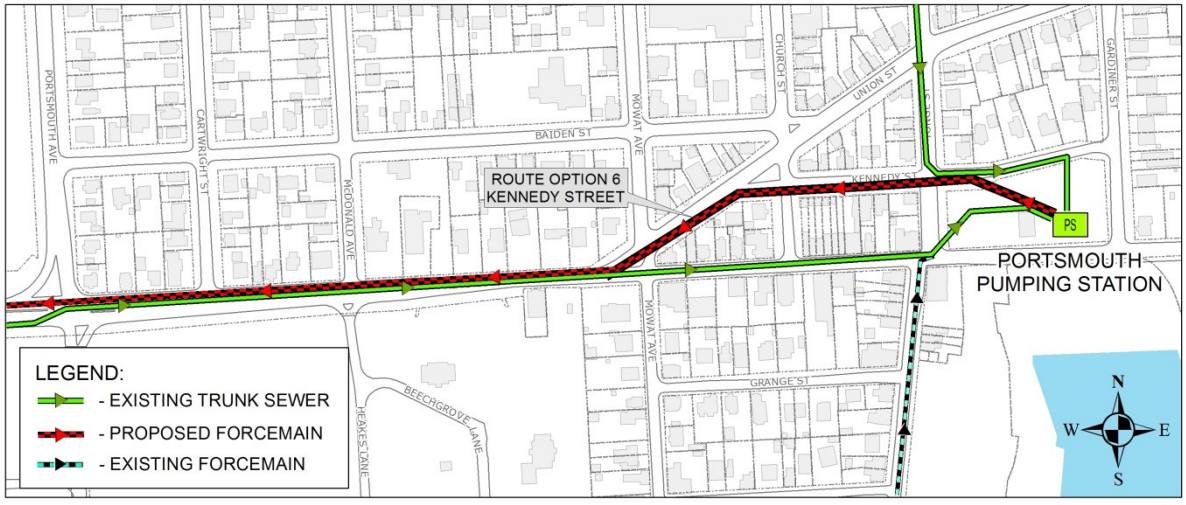

Figure 6.6 Option 6 – Kennedy St, Union Ave, King St

OPTION 7: KENNEDY, BAIDEN, KING STREET

This option includes installing the forcemain from the Portsmouth pumping station along the Kennedy Street R.O.W. to Church Street; continuing for a short distance on the Church St R.O.W. to Baiden St. then along Baiden Street R.O.W. to Portsmouth Ave; continuing south on the Portsmouth Ave R.O.W. for a short distance to King Street W at which point it follow the alignment indicated above.

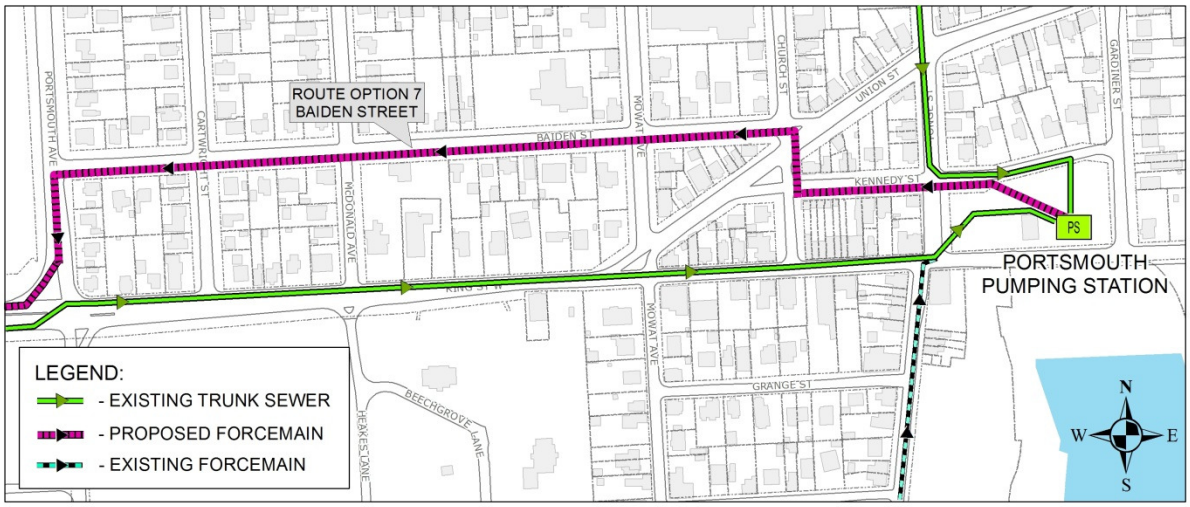

Figure 6.7 Option 7 – Kennedy St, Baiden St, King St

6.2.1 ALTERNATE ROUTING OPTIONS

During the development of the routing options, a routing alternative was considered regarding the installation of the forcemain across the Little Cataraqui Creek. Consideration was given to installing the piping on the bridge that cross the creek (rather than under) as it was being reconstructed and the re-designed could have incorporated the new infrastructure. After consideration of the option, it was ruled out based on the following criteria:

- Forcemain and watermain project are intended to be constructed together and watermain is a large diameter pipe (1050mm) that would be very difficult to suspend from the bridge along with the forcemain (≈500mm),
- There is limited ability to address leaks in the future as the pipes would be concealed in the concrete bridge,
- Greater chance of failure in suspended watermain/forcemains,
- Increased risk to the natural environment if there is a forcemain leak as sewage would be discharged directly to the surface (Lake, Little Cataraqui Creek etc.),
- Significant cost in heat trace and insulation,
- Minimum deck thickness is less than watermain size (i.e. pipe would extend below underside of bridge),
- Limited clearance between underside of bridge and water level (≈1.2m),
- CN rail line requires trenchless method to cross that is immediately east of bridge.

7 PHASE 2B: EVALUATION OF ALTERNATIVES

7.1 APPROACH TO EVALUATION OF ALTERNATIVES

7.1.1 EVALUATION METHODOLOGY

The evaluation methodology used in the screening process in Section 4 was also used in the detailed evaluation of infrastructure options and routings to redirect wastewater flows from the Portsmouth Pumping Station west, towards the Cataraqui Bay Wastewater Treatment Plant.

As summary of the process is summarized as follows:

- **Step 1: Determine Evaluation Criteria** – Criteria were developed upon which the alternatives would be evaluated against. The criteria used in the detailed evaluation were developed based on the following overall evaluation categories: (1) impact on the natural environment, (2) impact on the social and cultural environments, (3) technical suitability, and (4) financial impacts. A breakdown of the specific criteria is defined in the section below.

- **Step 2: Create an Evaluation System** – An evaluation system was required to evaluate each of the alternatives. To be impartial, this system was developed prior to determining the potential impacts associated with each alternative. During the evaluation, each of the alternatives was assigned a colour rating: green for “most preferred”, yellow for “less preferred” and orange for “least preferred”, for each of the evaluation criterion. An overall impact rating for each evaluation category was subsequently determined based on an assessment of the ratings assigned to each specific criterion. The four evaluation criteria categories were assigned equal weighting as they were considered to have equal importance in this evaluation.

- **Step 3: Document Potential Impacts** - The individual impacts associated with each alternative were determined and documented in a matrix. The matrix was created to document the impacts, weigh the alternatives qualitatively, and ultimately determine the preferred solution. The matrix has the alternatives listed along the columns and the evaluation criteria along the rows.

- **Step 4: Evaluate the Alternatives** - Each of the alternatives was assigned a colour rating for each of the four evaluation criteria categories using the methodology established in Step 2. The evaluation was based on a qualitative assessment of the individual impacts documented in the table created during Step 3. Professional judgement was also factored into the evaluation as part of the qualitative assessment. The colour green rating indicates that the alternative had a low impact (most preferred) with respect to that particular criterion. An orange colour indicates that the alternative had a high impact (least preferred) with respect to that particular criterion. A yellow colour will indicate moderate impact (less preferred).

- **Step 5: Determine the Preferred Alternative** - The servicing alternative with the least overall impact was recommended.

7.1.2 EVALUATION CRITERIA

The following criteria were used in the detailed evaluation of infrastructure options and routings to redirect wastewater flows collected at the Portsmouth Pumping Station westward to the Cataraqui Bay Wastewater Treatment Plant. It should also be noted that as the watermain interconnection is to proceed concurrently with the redirection (based on going west) and follow the same preferred alignment, consideration was given to this with regards to the evaluation (i.e. available space, traffic disruption, technical suitability etc.)

Natural and Physical Environment:
- Watercourse Crossings
- Vulnerable / Threatened / Endangered (VTE) Species
- Environmentally Sensitive Areas (ESA)
- Areas of Natural Scientific Interest (ANSI)
- Proximity to Valleylands and Floodplains
- Impacts to Groundwater (from potential dewatering)

Social and Cultural Environment:
- Social Disruption
- Cultural Environment
- Traffic Disruption
- Impacts to Local Businesses/Heritage

Technical Suitability Considerations:
- Existing Infrastructure
- Ease of Construction
- Hydraulic Considerations
- Future Planning Initiatives

Financial Impact:
- Operational Cost
- Land Acquisition Requirements
- Capital Costs (including constructability risks)

7.2 COMPARATIVE EVALUATION OF ALTERNATIVES

Legend:

Most Preferred | Less Preferred | Least Preferred

Table 7.1 Detailed Evaluation of Alternatives

	Pumping Options				Route Options (East of Portsmouth Ave and King St Intersection)		
	Pump Entire Distance West			Option 4 Pump to High Point, Gravity to New PS that Discharges to WWTP	Option 5 King St	Option 6 Kennedy, Union, King St	Option 7 Kennedy, Baiden, King St
	Option 1 Smaller PS's to Portsmouth via Gravity Sewer (Existing)	Option 2 Tie-in Smaller PS's to Forcemain	Option 3 Second Forcemain for Smaller PS				
Natural Environmental Considerations							
Watercourse Crossings	▪ Minimize with Installation at watercourse crossing completed by trenchless techniques. ▪ Minor risk of "frac-out" entering watercourse during trenchless operations	▪ Minimize with Installation at watercourse crossing completed by trenchless techniques. ▪ Minor risk of "frac-out" entering watercourse during trenchless operations	▪ Minimize with Installation at watercourse crossing completed by trenchless techniques. ▪ Minor risk of "frac-out" entering watercourse during trenchless operations	▪ Minimize with Installation at watercourse crossing completed by trenchless techniques. ▪ Minor risk of "frac-out" entering watercourse during trenchless operations	▪ minimal anticipated impact	▪ minimal anticipated impact	▪ minimal anticipated impact
Vulnerable / Threatened / Endangered (VTE) Species	▪ Low to Moderate Potential of VTE species within Study Area	▪ Low to Moderate Potential of VTE species within Study Area	▪ Low to Moderate Potential of VTE species within Study Area	▪ Low to Moderate Potential of VTE species within Study Area	▪ No anticipated impact	▪ No anticipated impact	▪ No anticipated impact
Environmentally Sensitive Areas (ESA)	▪ Installation of forcemain will extend through or adjacent to Provincially Significant Wetland (PSW) and Significant Forest ▪ Potential harmful alteration, disruption or destruction of fish habitat (HADD)	▪ Installation of forcemain will extend through or adjacent to Provincially Significant Wetland (PSW) and Significant Forest ▪ Potential harmful alteration, disruption or destruction of fish habitat (HADD)	▪ Installation of forcemain will extend through or adjacent to Provincially Significant Wetland (PSW) and Significant Forest ▪ Potential harmful alteration, disruption or destruction of fish habitat (HADD)	▪ Installation of forcemain will extend through or adjacent to Provincially Significant Wetland (PSW) and Significant Forest ▪ Potential harmful alteration, disruption or destruction of fish habitat (HADD)	▪ No anticipated impact	▪ No anticipated impact	▪ No anticipated impact
Areas of Natural Scientific Interest (ANSI)	▪ No ANSI identified within the Study Area	▪ No ANSI identified within the Study Area	▪ No ANSI identified within the Study Area	▪ No ANSI identified within the Study Area	▪ No anticipated impact	▪ No anticipated impact	▪ No anticipated impact
Proximity to Valleylands and Floodplains	▪ Installation of forcemain will extend through or adjacent to Significant Valleylands ▪ Installation of forcemain will occur within floodplain	▪ Installation of forcemain will extend through or adjacent to Significant Valleylands ▪ Installation of forcemain will occur within floodplain	▪ Installation of forcemain will extend through or adjacent to Significant Valleylands ▪ Installation of forcemain will occur within floodplain	▪ Installation of forcemain will extend through or adjacent to Significant Valleylands ▪ Installation of forcemain will occur within floodplain	▪ No anticipated impact	▪ No anticipated impact	▪ No anticipated impact

	Pumping Options				Route Options (East of Portsmouth Ave and King St Intersection)		
	Pump Entire Distance West			Option 4 Pump to High Point, Gravity to New PS that Discharges to WWTP	Option 5 King St	Option 6 Kennedy, Union, King St	Option 7 Kennedy, Baiden, King St
	Option 1 Smaller PS's to Portsmouth via Gravity Sewer (Existing)	Option 2 Tie-in Smaller PS's to Forcemain	Option 3 Second Forcemain for Smaller PS				
Impacts to Groundwater (from potential dewatering)	▪ Minor impacts to groundwater during installation of forcemain	▪ Minor impacts to groundwater during installation of forcemain	▪ Minor impacts to groundwater during installation of forcemain	▪ Moderate impacts to groundwater during forcemain and new pumping station installation	▪ No anticipated impact	▪ No anticipated impact	▪ No anticipated impact
Natural Environment Overall Rating	No Difference Between Options for Evaluation Purposes			Same as Option 1-3 except moderate impacts to groundwater	No Difference Between Options for Evaluation Purposes ▪ No natural impacts anticipated due to forcemain construction in road right-of-ways within the urban area of Portsmouth.		
Social and Cultural Environmental							
Cultural Environment	▪ No significant areas within Study Area identified	▪ No significant areas within Study Area identified	▪ No significant areas within Study Area identified	▪ No significant areas within Study Area identified	▪ Installation of forcemain immediately adjacent to Portsmouth Village Buildings ▪ Significant risk of damage to building during construction due to narrow Right of Way (ROW)	▪ Installation of forcemain adjacent to Portsmouth Village Buildings ▪ Minimal risk of damage to building during construction due to the wider Right of Way (ROW)	▪ Installation of forcemain adjacent to Portsmouth Village Buildings ▪ Minimal risk of damage to building during construction due to the wider Right of Way (ROW) ▪ Baiden St recently reconstructed (i.e. ≤5yrs)
Traffic Disruption	▪ Minor Traffic impacts during construction phase only	▪ Minor Traffic impacts during construction phase only	▪ Minor Traffic impacts during construction phase only	▪ Minor Traffic impacts during construction phase only	▪ Major traffic impacts during construction since King St is a main artery for commuter and local traffic	▪ Moderate impacts during construction since Kennedy St and Union St have mix of local and commuter traffic	▪ Minor impact during construction since Baiden St is less used (more local traffic use)
Impacts to Local Businesses	▪ Limited number of local businesses in study area; minor impacts.	▪ Limited number of local businesses in study area; minor impacts.	▪ Limited number of local businesses in study area; minor impacts.	▪ Limited number of local businesses in study area; minor impacts.	▪ Significant impact to local businesses due to road closure	▪ Minor impacts to local businesses during construction; limited anticipated road closures	▪ Minimal impacts to local businesses during construction; limited anticipated road closures
Social and Cultural Overall Rating	No Difference Between Options for Evaluation Purposes				▪ Numerous businesses present and major impacts are anticipated during construction since King St is a main artery for commuter	▪ Some businesses are present and the wider road present minimizes road closures resulting in moderate impacts during construction since the roads have a	▪ Fewer businesses present and the wider road present minimizes road closures resulting in minor impact during construction since the roads have mostly

	Pumping Options				Route Options (East of Portsmouth Ave and King St Intersection)		
	Pump Entire Distance West			Option 4 Pump to High Point, Gravity to New PS that Discharges to WWTP	Option 5 King St	Option 6 Kennedy, Union, King St	Option 7 Kennedy, Baiden, King St
	Option 1 Smaller PS's to Portsmouth via Gravity Sewer (Existing)	Option 2 Tie-in Smaller PS's to Forcemain	Option 3 Second Forcemain for Smaller PS				
					and local traffic.	mix of local and commuter traffic.	local traffic use.
Technical Suitability Considerations							
Existing Infrastructure	▪ No anticipated alteration to the existing smaller pumping station would be required ▪ The existing Portsmouth pumping station can be re-utilized	▪ Potential alteration required at smaller pumping stations ▪ Potential sewage back-up at smaller pumping station including the private one, that would pump into forcemain ▪ The existing Portsmouth pumping station can be re-utilized	▪ Potential alteration required at smaller pumping stations ▪ Less Potential for sewage back-up at smaller pumping station including the private ones, that would pump into second forcemain ▪ The existing Portsmouth pumping station can be re-utilized	▪ No anticipated alteration to the existing pumping station would be required ▪ The existing Portsmouth pumping station can be re-utilized ▪ Large apartments could drain by gravity to sewer ▪ King-Elevator Bay pumping station would be completely replaced by a new larger station	▪ Less complicated tie-in to existing linear infrastructure at Portsmouth Pumping Station ▪ Pre-mature replacement of existing sewers and watermains (installed mid 90's) within Portsmouth Village	▪ More complicated tie-in to existing linear infrastructure at Portsmouth Pumping Station	▪ More complicated tie-in to existing linear infrastructure at Portsmouth Pumping Station ▪ Requires Replacement of newly installed (2012) infrastructure along Baiden St (i.e. asphalt, curbs etc.).
Ease of Construction	▪ No constructability staging challenges to maintain smaller pumping station functions during construction ▪ Minor constructability staging challenges to maintain Portsmouth pumping station functions during construction	▪ Constructability staging challenges to maintain smaller pumping station functions during construction ▪ Minor constructability staging challenges to maintain Portsmouth pumping station functions during construction	▪ Constructability staging challenges to maintain smaller pumping station functions during construction ▪ Minor constructability staging challenges to maintain Portsmouth pumping station functions during construction ▪ Installation of second forcemain increases constructability difficulty	▪ Constructability staging challenges to maintain smaller pumping station functions during construction ▪ Minor constructability staging challenges to maintain Portsmouth pumping station functions during construction ▪ A new pumping station is required to be constructed ▪ Some constructability issues due to limited property in area for new larger King-Elevator Bay pumping station ▪ Some constructability issues due to installation of a pumping station in a low lying area near Lake Ontario	▪ Significant existing underground utilities that may be impacted during construction ▪ Narrow R.O.W; limited space for new infrastructure	▪ Minor existing underground utilities that may be impacted during construction	▪ Minimal existing underground utilities that may be impacted during construction ▪ Recent and accurate as-built of Baiden St; recently reconstructed.
Hydraulic Considerations	▪ Simpler forcemain hydraulics ▪ Reduced capacity of local	▪ More complex forcemain hydraulics ▪ Increased capacity of local	▪ More complex forcemain hydraulics; interconnection of second forcemain	▪ Potentially reduced required upgrades to Portsmouth pumping	▪ Better hydraulic characteristic; shortest distance with	▪ Moderate hydraulic characteristic; slightly longer with additional	▪ Least favorable hydraulic characteristic; longest

	Pumping Options				Route Options (East of Portsmouth Ave and King St Intersection)		
	Pump Entire Distance West			Option 4 Pump to High Point, Gravity to New PS that Discharges to WWTP	Option 5 King St	Option 6 Kennedy, Union, King St	Option 7 Kennedy, Baiden, King St
	Option 1 Smaller PS's to Portsmouth via Gravity Sewer (Existing)	Option 2 Tie-in Smaller PS's to Forcemain	Option 3 Second Forcemain for Smaller PS				
	gravity sewer ▪ Increased required pumping at Portsmouth	gravity sewer ▪ Potential alteration required at smaller pumping stations (i.e. pumps)	▪ Increased capacity of local gravity sewer ▪ Potential alteration required at smaller pumping stations (i.e. pumps) ▪ Increased reliability and redundancy	station ▪ Second pumping station required to transfer flows to treatment plant ▪ Some steep slopes within gravity section; more complex sewer design (i.e. potential supercritical flows) ▪ No anticipated alteration required at existing smaller pumping stations (i.e. no pump upgrades required)	fewer bends	bends	distance with the most bends
Future Planning Initiatives	▪ More limited available capacity in local sewers to accommodate future planning initiatives	▪ Increased available capacity in local sewers to accommodate future planning initiatives	▪ Increased available capacity in local sewers to accommodate future planning initiatives	▪ Potential to redirect additional central drainage area from the east to the west	▪ Less complicated coordination with installation of watermain ▪ Better coordination with City of Kingston Transportation Initiatives	▪ More complicated coordination with installation of watermain ▪ Moderate coordination with City of Kingston Transportation Initiatives	▪ More complicated coordination with installation of watermain ▪ Least coordination with City of Kingston Transportation Initiatives
Technical Suitability Overall Rating	• Easier to construct and connect to existing infrastructure and reduce sewage back-up risk at other pumping stations.	• Able to handle future planning due to increased available capacity in local sewers but more complex to construct and requires staging to maintain pumping stations functions	• Able to handle future planning due to increased available capacity in local sewers but greater potential for sewage back-ups and requires staging to maintain pumping stations functions.	• Able to handle future planning due to increased available capacity in local sewers but requires new King-Elevator Bayr pumping station. Constructability issues anticipated for new pumping station due to limited property and proximity to Lake Ontario	▪ Extremely difficult to construct in narrow, congested R.O.W but able to address future planning initiatives. Issues with connecting to existing infrastructure and hydraulic characteristics	▪ Moderate issues with connecting to existing infrastructure, hydraulic characteristics and dealing with future planning initiatives	▪ Difficult to connect to existing infrastructure and deal with future planning initiatives and hydraulic characteristics
Financial Considerations							
Operational Costs	▪ Sewage flows from smaller pumping station are pumped twice (i.e. increased energy costs) ▪ Minor additional costs to operate Portsmouth pumping station due to increased flows	▪ Sewage flows from smaller pumping station are pumped once (i.e. less energy) ▪ Minimal reduction in additional costs to operate Portsmouth pumping station due to reduced flows	▪ Sewage flows from smaller pumping station are pumped once (i.e. less energy) ▪ Minimal reduction in additional costs to operate Portsmouth pumping station due to reduced flows	▪ Sewage flows from smaller pumping station are pumped once (i.e. less energy) ▪ Reduced operational costs based on less pressurized system maintenance (i.e. Air Release/ Vacuum Breaking valve chambers etc.)	▪ Least operational cost due to shortest length and fewest bends	▪ Moderate operational cost due to slightly longer length with additional bends	▪ Most operational cost due to longest length with the most bends

	Pumping Options				Route Options (East of Portsmouth Ave and King St Intersection)		
	Pump Entire Distance West			Option 4 Pump to High Point, Gravity to New PS that Discharges to WWTP	Option 5 King St	Option 6 Kennedy, Union, King St	Option 7 Kennedy, Baiden, King St
	Option 1 Smaller PS's to Portsmouth via Gravity Sewer (Existing)	Option 2 Tie-in Smaller PS's to Forcemain	Option 3 Second Forcemain for Smaller PS				
			▪ Additional asset management costs due to second forcemain	▪ Significant additional operational cost for new pumping station			
Land Acquisition Requirements	▪ No land acquisition requirements	▪ No land acquisition requirements	▪ No land acquisition requirements	▪ Land acquisition may be required for new larger pumping station.	▪ No land acquisition requirements	▪ No land acquisition requirements	▪ No land acquisition requirements
Capital Costs (including constructability risks)	▪ Opinion of Probable Cost = $ 9.3 Million but carries lower constructability risks	▪ Opinion of Probable Cost = $ 9.5 Million but carries moderate constructability risks	▪ Opinion of Probable Cost = $ 12.3 Million but carries moderate constructability risks	▪ Opinion of Probable Cost = $ 12.1 Million but carries higher constructability risks	▪ Highest capital cost with higher constructability risk	▪ Moderate capital cost with moderate constructability risk	▪ Lowest capital cost with lower constructability risk
Financial Overall Rating	▪ Easier to operate with no land required and lowest capital costs	▪ No land required but moderate operational and capital costs	▪ Highest capital costs but no land required and moderate operational costs	▪ Land required and highest operational and capital costs	▪ Highest capital costs but no land required and lowest operational costs	▪ Moderate operational and capital costs but no land required	▪ Highest operational costs but no land required and lowest capital costs
OVERALL PREFERENCE RATING	**1 - Preferred**	**2 – Less Preferred**	**2 – Less Preferred**	**3 – Least Preferred**	**3 – Least Preferred**	**1 - Preferred**	**2 – Less Preferred**

7.3 IMPACTS ON NATURAL ENVIRONMENT

As indicated in table 7.1 the overall rating for the natural environment is summarized in the table below:

Table 7.2 Natural Environment Overall Rating

Pumping Options			Route Options	
Natural Environment Overall Rating				
Pump Entire Distance West	**Option 1 Smaller PS's to Portsmouth via Gravity Sewer (Existing)**	**Less Preferred**	**Preferred**	**Option 5 King St**
	Option 2 Tie-in Smaller PS's to Forcemain	**Less Preferred**	**Preferred**	**Option 6 Kennedy, Union, King St**
	Option 3 Second Forcemain for Smaller PS	**Less Preferred**	**Preferred**	**Option 7 Kennedy, Baiden, King St**
	Option 4 Pump to High Point, Gravity to New PS that Discharges to WWTP	**Least Preferred**		

7.3.1 PUMPING OPTIONS

There will be the potential for impacts to watercourses in the area and due to the sensitivity of the Little Cataraqui Creek; construction will require the use of trenchless technology to avoid in-water works in this area. In-water works could have the potential for harmful alternation, disruption or destruction of the fish habitat present in Little Cataraqui Creek. The use of trenchless technology has the potential for "frac-out" to occur which may impact the watercourse by allowing material to enter. Due to the presence of rock and the technology proposed, this has a low to moderate potential to occur. There is a low to moderate potential for species at risk to be present (e.g., Blanding's Turtles) in the Little Cataraqui Creek area.

Overall the impacts for the pumping options (Options 1, 2 and 3) all have the same potential impacts on the natural environment. There were no differences between these options for evaluation purposes and it is anticipated that there will be significant impacts to the Provincially Significant Wetland, Significant Forest and Significant Valleylands during construction of the forcemain. As there were no differences between Options 1, 2 and 3 for evaluation purposes and it is anticipated that there will be some impacts to the natural environment, these options were thus rated with "less preferred". Option 4 will require dewatering during construction and will thus have moderate impacts to groundwater during construction of the forcemain and new pumping station. Option 4 was thus rated with "least preferred" due to this difference from the other three (3) options.

7.3.2 ROUTING OPTIONS

The only difference in routing Options 5, 6, and 7 is within Portsmouth Village, the remainder of the routing is common to all alternatives west of Portsmouth Village. This route extends primarily within the terrestrial environment, along Front Road, within or adjacent to a valleyland, woodland, wetlands and Lake Ontario shoreline. There are two (2) locations where in-water crossing will be necessary, including crossing of Little Cataraqui Creek at the Front Road bridge and across the intermittent watercourse located within the Marshlands Conservation Area. Potential impacts related to the construction activities will be temporary and can be mitigated. Impacts related to critical life stages of local fauna (i.e. nesting birds, nesting & hibernating reptiles and spawning fish) can be mitigated through avoidance of these periods. There are no impacts to the Natural Environment east of Portsmouth Village as there are no noteworthy natural features.

The routes that were evaluated are Options 5, 6 and 7 where there are different routes that can be used within the Portsmouth Village area. Overall the impacts for the routing options (Options 5, 6 and 7) all have the same potential impacts on the natural environment since there are no natural features present as the area is within an urban environment. There were no differences between the options for evaluation purposes and it is anticipated that there will be minimal impact and thus they were rated with “most preferred”.

7.4 IMPACTS TO SOCIAL AND CULTURAL ENVIRONMENT

The key criteria in assessing impacts on the social and cultural environments are the impacts on traffic, disruption to residences/businesses in the area based on previous construction projects that have occurred in the area, impacts to local businesses and impacts on the heritage area of Portsmouth Village.

As indicated in table 7.1 the overall rating for the social and cultural environment is summarized in the table below:

Table 7.3 Social and Cultural Environment Overall Rating

Pumping Options			Route Options	
Social and Cultural Environment Overall Rating				
Pump Entire Distance West	**Option 1 Smaller PS’s to Portsmouth via Gravity Sewer (Existing)**	**Less Preferred**	**Least Preferred**	**Option 5 King St**
	Option 2 Tie-in Smaller PS’s to Forcemain	**Less Preferred**	**Less Preferred**	**Option 6 Kennedy, Union, King St**
	Option 3 Second Forcemain for Smaller PS	**Less Preferred**	**Preferred**	**Option 7 Kennedy, Baiden, King St**
	Option 4 Pump to High Point, Gravity to New PS that Discharges to WWTP	**Less Preferred**		

7.4.1 PUMPING OPTIONS

Overall the impacts for the pumping options (Options 1, 2, 3 and 4) all have the same potential impacts on the social and cultural environment. There were no differences between the options for evaluation purposes and it is anticipated that there will be no cultural areas impacted, minor traffic impacts during construction and a limited number of local businesses in the area will have minor impacts during construction. There were no differences between the options for evaluation purposes and it is anticipated that there will be some traffic disruption and impacts to local businesses and thus they were rated with “less preferred”.

7.4.2 ROUTING OPTIONS

Options 5, 6 and 7 did have significant differences on the potential impacts to the social and cultural environment. Option 5 has significant potential impacts due to the route being adjacent to Portsmouth Village buildings in a narrow road right of way. This potentially impacts the buildings and also business due to the need for road closures and construction occurring along King Street which is a main artery for commuter and local traffic. Options 6 has construction adjacent to Portsmouth Village but within a wider road right of way. However, Option 6 has minor to moderate impacts on traffic and businesses due to construction on Kennedy and Union Streets which are a mix of local and commuter traffic. The wider road right of way will result in limited road closures being anticipated. Option 7 is similar to Option 6 for the impact on Portsmouth Village since Baiden Street has a wider road right of way, however this is less preferred than Option 6 since Baiden Street was reconstructed within the last 5 years and this would result in impacts to the community again.

Option 5 is the overall least preferred due to the potential impacts on Portsmouth Village and the traffic disruption due to the narrow road right of way and heavy commuter use of King Street. Option 6 is less preferred since the wider road right of way and less heavily traveled roads (Union and Kennedy Streets) reduces the impacts to minor and moderate. Option 7 is most preferred even though Baiden Street was recently reconstructed it has a wide right of way and Baiden Street is less used and more for local traffic.

7.5 TECHNICAL SUITABILITY CONSIDERATIONS

As indicated in table 7.1 the overall rating for the technical suitability consideration is summarized in the table below:

Table 7.4 Social and Cultural Environment Overall Rating

Pumping Options			Route Options	
Technical Suitability Overall Rating				
Pump Entire Distance West	**Option 1** **Smaller PS's to Portsmouth via Gravity Sewer (Existing)**	**Preferred**	**Least Preferred**	**Option 5** **King St**
	Option 2 **Tie-in Smaller PS's to Forcemain**	**Less Preferred**	**Less Preferred**	**Option 6** **Kennedy, Union, King St**
	Option 3 **Second Forcemain for Smaller PS**	**Less Preferred**	**Least Preferred**	**Option 7** **Kennedy, Baiden, King St**
	Option 4 **Pump to High Point, Gravity to New PS that Discharges to WWTP**	**Least Preferred**		

7.5.1 PUMPING OPTIONS

The table above indicates that Option 1 is the preferred option from a technical perspective. While Option 1 does not reduce the overall sewage flows in the trunk sewer along King Street it does provide the least complicated overall construction as upgrades / alterations (i.e. forcemain connections, pumping station alterations etc.) to the smaller pumping station (King-Lake Ontario, King-Elevator Bay & Yonge), including the private ones, would be eliminated and upgrades to existing infrastructure would be limited to the Portsmouth Pumping Station. While connecting the existing smaller pumping station into the new forcemain is operationally more effective (i.e. sewage not being pumped more than once), the smaller pumping station within the Portsmouth servicing area contribute less than 15% of the overall flow and the amount of work required to connect these pumping station did not seem practical compared to the contributing amount of flow. Additionally Option 1 has the least amount of risk of collateral damage, in comparison to Options 2 and 3. In the event there was a failure of the forcemain or check valve(s) within the smaller pumping stations, that would not only impede the ability to transfer sewage to its discharge point but because the systems are connected to a pressurize forcemain that contains sewage from other areas, it could back flow into these pumping station, including the large apartment building private pumping station. Option 1 also has the least risk during construction, in comparison to Option 2 and 3, as alteration to an existing pumping station could potentially require staging and/or by-pass that poses a risk of sewage back-up.

Option 4 does eliminate the need for any upgrades/alterations to the existing smaller pumping station and provides a similar amount of risk of collateral damage as Option 1 either during or after construction; however, the construction of a new pumping station and/or repurposing of the King-Elevator Bay pumping station has significant technical issues and complexities including property constraints, construction of a large pumping station near Lake Ontario (both dewatering and soil

conditions) and the staging of maintaining flows from the King-Elevator Bay drainage area cause this option to be more difficult to construct (i.e. ease of construction).

7.5.2 ROUTING OPTIONS

From a technical perspective, none of the routing options have low impacts or a preferred rating as all of the options have temporary moderate to high impacts. Option 5 - King Street route provides a less complicated tie-in at Portsmouth as the tie could be made to the existing forcemain on King Street and better hydraulic characteristics due to the shorter distance and less bends. Option 5 also has the most preferred coordination with the planned watermain extension, as the watermain could simply continue along King Street from the Portsmouth pumping station to Sir John A McDonald Blvd tie – in and without having to go through or around the park and coordinates well with the City of Kingston Transportation Initiative. However, due to the narrow right of way, the proximity of the existing buildings and congestion of utilities in the Portsmouth Village area makes it near impossible to install both a new forcemain and watermain in addition to the existing infrastructure. Utilities Kingston also indicated that the local sewers and watermains along King St are in reasonable condition and do not need replacement. Option 7 – Kennedy St /Baiden St/ King St route avoids this congested and narrow section of King St, however provides a less desirable hydraulic characteristic due to the longer length and additional bends, requires the reconstruction of a portion of Baiden St that was very recently reconstructed and would require the watermain to go through or around the park in order to connect at Sir John A McDonald Blvd. Additionally, Option 7 does not coordinate well with the City of Kingston's Transportation initiatives along King St. Option 6 has the least amount of impact in comparison to Options 5 and 7, and has a moderate impact rating as it coordinate well with the City of Kingston Transportation initiatives, avoids the narrow and congested Portsmouth Village area while still providing moderate hydraulic characteristics.

7.6 FINANCIAL CONSIDERATIONS

As indicated in table 7.1 the overall rating for the financial consideration is summarized in the table below:

Table 7.5 Financial Consideration Overall Rating

Pumping Options			Route Options	
Technical Suitability Overall Rating				
Pump Entire Distance West	**Option 1** **Smaller PS's to Portsmouth via Gravity Sewer (Existing)**	**Preferred**	**Least Preferred**	**Option 5** **King St**
	Option 2 **Tie-in Smaller PS's to Forcemain**	**Less Preferred**	**Preferred**	**Option 6** **Kennedy, Union, King St**
	Option 3 **Second Forcemain for Smaller PS**	**Less Preferred**	**Less Preferred**	**Option 7** **Kennedy, Baiden, King St**
	Option 4 **Pump to High Point, Gravity to New PS that Discharges to WWTP**	**Least Preferred**		

7.6.1 PUMPING OPTIONS

Option 1 is the preferred option in regards to financial consideration both from an operational and capital cost perspective. While connecting the existing smaller pumping station into the new forcemain is operationally more cost effective, as sewage would only be pumped once and therefore less energy costs, the anticipated increased maintenance required to reduce the risk of catastrophic failure (i.e. sewage back flow) would increase. Based on the small amount of contributing flow from the smaller pumping station it is expected that the increased energy cost would be less than the increase maintenance cost. In addition, option 4 presents a greater capital and operational cost to construct and maintain two (2) slightly smaller pumping stations verses one (1) larger pumping station (Option 1).

7.6.2 ROUTING OPTIONS

While Option 5 – King St provides the shortest overall length (marginally), the complexity and potential utilities relocations and/or by-pass would significantly increase the capital cost for the installation and would have the highest overall cost in comparison to Options 6 and 7. Option 7 would have the lowest capital cost with a slightly higher operational cost, however would require the removal of infrastructure (roadway, sidewalks, curbing etc.) that recently had capital invested. Option 6 – Kennedy St/ Union Ave / King St is the preferred route financially, as it provide both moderate capital and operational costs (i.e. middle ground) while allowing investment in less recent infrastructure upgrades.

7.7 PREFERRED OPTIONS

As indicated in table 7.1 the overall rating is summarized in the table below:

Table 7.6 Financial Consideration Overall Rating

Pumping Options			Route Options	
Overall Rating				
Pump Entire Distance West	**Option 1 Smaller PS's to Portsmouth via Gravity Sewer (Existing)**	**1-Preferred**	**3-Least Preferred**	**Option 5 King St**
	Option 2 Tie-in Smaller PS's to Forcemain	**2-Less Preferred**	**1-Preferred**	**Option 6 Kennedy, Union, King St**
	Option 3 Second Forcemain for Smaller PS	**2-Less Preferred**	**2-Less Preferred**	**Option 7 Kennedy, Baiden, King St**
	Option 4 Pump to High Point, Gravity to New PS that Discharges to WWTP	**3-Least Preferred**		

The preferred alternatives and options are summarized in the above evaluations for the Schedule B Class EA for the Portsmouth Pumping Station Flow Direction.

The preferred pumping option is Option 1, which pumps sewage from Portsmouth Pumping Station the entire distance to Cataraqui Bay WWTP while the smaller pumping stations within the Portsmouth drainage area continue to pump to gravity sewers that outlet to the Portsmouth Pumping Station. The preferred route option is Option 6 that would install the forcemain north through the park, west along Kennedy Street to Union, along Union to King St and then extending to the Cataraqui Bay WWTP via King St / Front Rd. The following figure illustrates the preferred options:

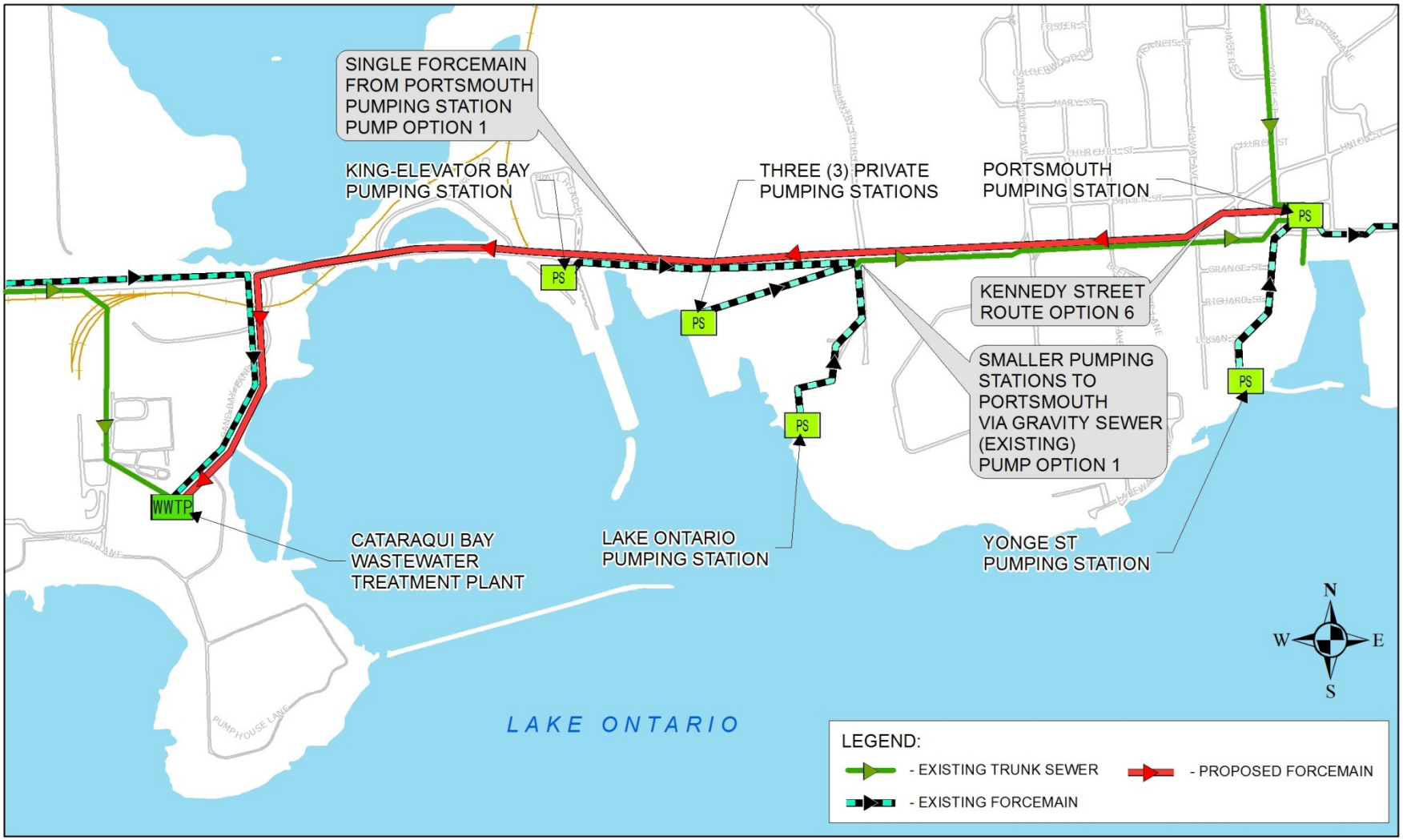

Figure 7.1 Preferred Options

8 POTENTIAL EFFECTS AND MITIGATING MEASURES

8.1 NATURAL ENVIRONMENT IMPACTS

There are anticipated impacts to the natural environment during construction. These have been minimized where possible through the use of mitigation measures or avoidance alternatives. The potential impacts relate to vegetation, wildlife & wildlife habitats and aquatic habitats & communities. Table 8.1 outlines the construction activities and the potential impacts that may result from these activities. In addition there are mitigation measures to minimize these potential impacts with a description of the residual effect that may remain. As identified in the table there are no negative result impacts anticipated from the construction activities.

Due to the sensitive environmental areas in and around the Little Cataraqui Creek, there is the potential for negative residual impacts to result to the aquatic environment present. Therefore trenchless methods for installation of the pipe through this section will need to be employed to avoid in-water works in the area. This avoidance alternative should result in no permanent negative residual impacts.

Table 8.1 Natural Environment Impacts, Mitigation Measures and Residual Effects

Potential Activity	Potential Effect/Impact	Mitigation Measure or Avoidance Alternative	Residual Effect
Vegetation Clearing/Grubbing Removal of ground cover vegetation and trees may be necessary.	▪ Reduced bank stability ▪ Increased erosion/runoff entering watercourse, waterbody and wetland. ▪ Alteration to existing aquatic and terrestrial habitats ▪ See Construction Timing	▪ Secure work area with erosion control fencing prior to vegetation removal. Fencing should be inspected regularly. ▪ Re-vegetate disturbed area with native planting, during appropriate periods. Erosion control fencing should remain in-place until plantings are established. ▪ A minimum 1:1 native tree planting compensation plan to be employed. ▪ Trees not proposed for removal, occurring within 30 m of the proposed development areas should be protected with tree protection fencing. ▪ Stabilize banks to pre-disturbance condition.	▪ Areas cleared of vegetation can be restored to pre-disturbance condition. ▪ No negative residual impact is anticipated.
Excavation Terrestrial excavation	▪ Increased erosion potential	▪ See Vegetation Clearing/Grubbing ▪ Stockpiling of material on site should occur a minimum of 30 m away for a	▪ Area will be restored to pre-disturbance

Potential Activity	Potential Effect/Impact	Mitigation Measure or Avoidance Alternative	Residual Effect
necessary for placement of infrastructure, resulting in exposed soils.	▪ Loss of vegetation	watercourse, waterbody, wetland or other sensitive area.	condition. ▪ No negative residual impact is anticipated.
Placement of Material Placement of foreign materials in aquatic and/or terrestrial environments may be necessary to support design criteria.	▪ Change in channel morphology ▪ Barrier to fish passage ▪ Disturbance to sensitive habitats ▪ Increased erosion potential & sedimentation ▪ Alteration of flow conditions ▪ Change in habitat structure ▪ Introduction of invasive species ▪ Introduction of contaminants	▪ See Vegetation Clearing/Grubbing ▪ See Excavation ▪ See Construction Timing ▪ Only material free of invasive species shall be brought on site. ▪ Only clean material shall be brought on site.	▪ Material brought on site will not negatively alter the form or function of the aquatic or terrestrial environments. ▪ No negative residual impact is anticipated.
Use of Industrial Equipment **Industrial equipment may be necessary to carry out excavation, vegetation clearing or construction activities.**	▪ Increased erosion potential & sedimentation ▪ Disturb or kill local fauna ▪ Potential for oil, grease or fuel leaks	▪ See Vegetation Clearing/Grubbing ▪ See Excavation ▪ See Construction Timing ▪ Prepare a spill management plan for on-site activities. ▪ Ensure equipment is regularly maintained (i.e. free of leaks, clean). ▪ Refuel equipment a minimum of 30 m from all watercourses, waterbodies, wetlands or other sensitive areas.	▪ Application of mitigation measures will result in no change to the form and function of the aquatic and terrestrial environments. ▪ No negative residual impact is anticipated.
Flow Management Dewatering may alter flow conditions.	▪ Change in migration/access to habitats	▪ Contain and dewater in-water work areas as per a work-specific isolation/containment plan.	▪ Application of mitigation measures will

Potential Activity	Potential Effect/Impact	Mitigation Measure or Avoidance Alternative	Residual Effect
	▪ Change in habitat structure and cover ▪ Increased erosion potential and sedimentation ▪ Change in water temperature, contaminant and nutrient concentrations	▪ Pumps should be outfitted with fish screens ▪ Transfer fish captured from isolated areas, downstream ▪ See Construction Timing.	result in no change to the form and function of the aquatic and terrestrial environments. ▪ No negative residual impact is anticipated.
Water Extraction Water extraction (e.g. dewatering, placement of material) may be necessary to undertake construction works.	▪ Change in flow conditions ▪ Disturbing or killing fish ▪	▪ See Placement of Material	▪ Alteration to natural flow will be temporary. ▪ No negative residual impact is anticipated.
In-water Infrastructure Placement of infrastructure in water may be necessary.	▪ Alteration to flow ▪ Changes in water temperature ▪ Changes to water chemistry ▪ Barrier to fish passage ▪ Change in migration/access to habitats ▪ Mortality of contained fish	▪ No in-water infrastructure or construction is anticipated with the use of trenchless technology proposed.	▪ No residual impact should occur, when the trenchless technology is used for tunnelling below the bed of the waterbody/watercourse.
Construction Timing Construction work may occur during one or more consecutive	▪ Impact to nesting birds ▪ Impact to migration stopover site	▪ See Species at Risk ▪ In-water work should adhere to the warmwater timing window, whereby work is not permitted between April 1st and June 30th of any given year.	▪ Adherence to the construction timing windows will limit potential impact to species during

Potential Activity	Potential Effect/Impact	Mitigation Measure or Avoidance Alternative	Residual Effect
seasons.	▪ Impact to Species at Risk (e.g. Barn Swallow) ▪ Impact to spawning fish ▪ Impact to nesting or overwintering turtles ▪ Impacts to affect use of migration corridors or linkage areas	▪ No vegetation removal (e.g. ground cover, shrubs or trees) between May 1st and July 31st of any given year. Where vegetation removal is necessary within this period, a qualified biologist must first confirm vegetation is free of nesting birds and eggs. ▪ Pre-construction inspection for turtles and snakes should be carried out. Construction activities should not occur during the turtle nesting season (i.e. May 15 to June 30). No in-water works should occur between October 15th and April 15th of any given year. ▪ Exclusionary fencing should be erected in areas where turtles may be impacted. The fencing should extend 10-50 m beyond the endpoint and be angled to deter turtles from crossing the road.	critical life stages. ▪ No negative residual impact is anticipated.
Species at Risk Species at Risk may be encountered during construction activities.	▪ Disturb or kill Species at Risk	▪ See Construction Timing ▪ Where a Species at Risk is encountered on site, activities should stop immediately. The individual(s) must not be handled. The Ministry of Natural Resources should be contacted for further direction. ▪ Pre-construction inspection for nesting fauna and eggs should be carried out prior to construction. ▪ Where a Barn Swallow nest is observed, all construction activities should be restricted to April 15 to August 15 of any given year. Where construction in or surrounding a nest is necessary, structures (e.g. bridges) should be blocked with screen or tarps prior to April 15. ▪ Exclusionary fencing should be placed along both sides of the Front	▪ Application of mitigation measures will result in no change to the form and function of the aquatic and terrestrial environments. ▪ No negative residual impact is anticipated.

Potential Activity	Potential Effect/Impact	Mitigation Measure or Avoidance Alternative	Residual Effect
		Road causeway no later than the September prior to construction. The fencing should prevent turtles from accessing the area for overwintering or nesting.	

8.2 SOCIAL, CULTURAL AND ECONOMIC IMPACTS

8.2.1 TRAFFIC

The impacts to traffic will be minimized as much as possible during construction. The main impact to traffic will be lane closures and the increase in construction traffic for delivery of material and equipment and haulage of spoils. Construction signage will be posted outside the construction zone to make motorists aware of the construction and allow them to take alternate routes. Traffic management plans will be developed with the City of Kingston Traffic Department. These plans may involve one (two-way) lane staying open at all times and being controlled by temporary traffic signals and/or flagmen control over the length of the work area.

8.2.2 LAND USE

Temporary disruption of the business within the Portsmouth Village area are excepted, however it is anticipated to be minor as the preferred route does not directly interfere with their business. Signage will be posted to inform detouring motorist that businesses are still open and accessible. Institutional properties (St. Lawrence, Providence Care mental health and rehabilitative care hospital) within the affected areas are considered destinations and have major alternate routes available to minimize affect.

8.2.3 ARCHAEOLOGY AND HERITAGE FEATURES

As detailed in the Archaeological Investigation Report (Stages 1 and 2) there are no archaeological areas of impact along the preferred alignment. In the event of a potential archaeological find during construction, all works will be suspended and the authorities contacted to investigate the site.

The area to be physically impacted by the proposed activities has already been disturbed by road construction, sewer and infrastructure development. However, due to the proximity of the work to designated heritage structures and landscapes in and around the Portsmouth heritage district, a statement of potential impacts and mitigation measures is required to satisfy the Ontario Heritage Act requirements.

- Design and locate new infrastructure required along routes with the largest setback from heritage buildings (center of ROW within roadway) and along the least compact streetscapes wherever possible;
- Prior to construction, the contractor must become familiar with the locations of all known built heritage resources and cultural heritage landscapes adjacent to the area of the undertaking and, as outlined herein, take steps to prevent any impact to those heritage resources;
- Prior to construction, a vibration susceptibility analysis must be conducted to establish baseline data on identified built heritage resources. Should the analysis indicate that a

resource will be unduly impacted, a building monitoring program must be implemented during construction;

- If during the process of development previously undetected built heritage resources or cultural heritage landscapes are identified, work in the area should cease and the developer or their agents should immediately notify the City of Kingston' heritage Planner (613-546-4291, ext 1386)
- During construction ad after the completion of construction activities, the City of Kingston heritage planning staff will inspect the property to confirm that there are no unanticipated adverse impacts on the built heritage or cultural heritage landscapes. Should any damage be done to an existing structure, the City of Kingston's Policy on Masonry Restoration in Heritage Buildings is to be followed.

There is an amount of noise, dust and vibration associated with construction projects that is unavoidable. The potential sources of noise, dust, and vibration are truck traffic and regular construction activities. These impacts can generally be mitigated by doing the following:

- Following the "Approach for Addressing Vibration Impact on Heritage Buildings" from Appendix D of the *Portsmouth Pumping Station Flow Direction and Front Road Trunk Watermain Interconnection – Heritage Impact Statement (Appendix H)*
- Excavated materials will be used on-site as much as possible in order to minimize truck haulage to off-site disposal areas;
- The majority of construction activities, including truck traffic and excavation equipment operation will be restricted pursuant to local municipal noise bylaws. The bylaw states that there will be no construction activity between 7pm and 7am (9am on Sundays) – Monday to Saturday and all day Sundays and Statutory Holidays;
- Dust control agents will be applied as necessary;
- Dry exposed soil will be sprayed with water to make it less susceptible to wind erosion, and covered if left for extended periods of time.
- A building monitoring program will be implemented for buildings in close proximity to construction activities to assess effects from exposure.
- Heavy equipment will be restricted to remain with the existing roadways R.O.W.

8.2.4 PUBLIC NOTIFICATION

Public notification will be facilitated through newspaper ads, construction signage and flyers to local residents and businesses. All emergency services (Police, Fire, EMS) will be contacted and notified of the project and specifically where construction is to impact access to public roads.

8.3 UTILITY IMPACTS

There are existing utilities within the road allowance that may be impacted during construction. This includes existing watermains, sewers, gas mains, buried cable and telephone lines, and hydro lines and poles. During the design phase, preliminary drawings will be circulated to the utility companies to confirm the location of existing utilities and determine if any relocation will be required.

8.4 GENERAL MITIGATING MEASURES

Table 8.2 General Mitigation Measures

Effect	Mitigating Measures	Application Where/When
Terrestrial Vegetation and Wildlife		
Changes in vegetative composition as a result of loss of topsoil and subsoil mixing	▪ restore site by replacing soils in preconstruction horizons	▪ Trenching or excavating
Removal or disturbance of significant trees and/or ground flora	▪ review status of species ▪ avoid these areas ▪ employ tree protection measures in accordance with City of Kingston by-laws	▪ During site grading and construction phase of any project
Vegetation removal impacts and effects during construction on birds, nests and breeding	▪ minimize vegetation removal and stabilize disturbed areas ▪ vegetation removal should occur outside of core breeding period for birds in eastern Ontario	▪ During detailed design and construction phases ▪ Heavy construction activities should be done outside of May to end of July
Heritage Resources		
Unwanted increase in public access and potential vandalism	▪ fence off area of concern ▪ prevent public access	▪ Where appropriate with respect to significance of the heritage resource
Threatened viability of, or opportunity for, retention of sites having heritage value	▪ avoid these areas ▪ record or salvage information on features to be lost ▪ relocate cultural resources when possible	▪ Where appropriate with respect to significance of the heritage resource
Unavoidable alteration to, or destruction of, heritage structures or archaeological sites	▪ record or salvage information on features to be lost ▪ relocate cultural resources when possible	▪ Where appropriate with respect to significance of the heritage resource
Disruption of quiet enjoyment	▪ staging of construction to cause least disruption ▪ employ noise and dust control measures	▪ As general practice
Land Uses		
Disruption of pedestrian movements between adjacent uses	▪ maintain continuity of pedestrian walkway system as much as possible ▪ provide walkway strips to adjacent residential areas	▪ As general practice ▪ Where possible

Effect	Mitigating Measures	Application Where/When
Facilities inconsistent with or which disrupt character of areas	▪ preserve existing amenities as much as possible ▪ design and site structures to blend with adjacent building forms and materials ▪ site grading; utilize berms or other screening devices	▪ As general practice ▪ Where suitable
Temporary disruption during construction and/or inconvenience to users of adjacent properties and building	▪ notify public agencies and adjacent owners of construction scheduling ▪ prepare emergency program to ensure quick resolution of servicing problems ▪ consult with public, agency and/or adjacent landowners regarding temporary access routes ▪ schedule construction so as to minimize period of disruption in proximity of adjacent uses and structures ▪ ensure access for emergency response vehicles/personnel ▪ apply noise and vibration control measures	▪ Where substantial inconvenience or disruption to adjacent uses would be experienced and where measures would substantially reduce effects ▪ As general practice
Traffic, noise and dust control	▪ restrict working hours ▪ apply dust control agent ▪ scheduling of construction	▪ Where appropriate ▪ Where traffic impacts are substantial ▪ To protect heritage resources
Pre-construction earthmoving impacts on buildings	▪ Require that the earthworks contractor use the least destructive method available to complete the work. ▪ complete an existing conditions survey prior to the project commencing	▪ Where appropriate ▪ Required for work adjacent to known and potential heritage resources
Outdoor Recreation		
Temporary disruption of open space activities during construction	▪ employ noise and dust control measures ▪ staging of construction to cause least disruption	▪ In areas within or adjacent to public open space

Public Health		
Exhaust emissions from construction equipment and vehicles	▪ minimize operation on site, control location on site	▪ Where adjacent uses or natural vegetation could be adversely affected
Ground contamination	▪ construction refueling precautions ▪ precautions in operation and storage facilities	▪ On site generally

9 PRELIMINARY DESIGN CONSIDERATIONS

9.1 CONSTRUCTION TECHNIQUES

9.1.1 OPEN-CUT CONSTRUCTION

Pipe installation by open-cut construction is a common construction technique that involves the excavation of a trench from the surface utilizing excavators. As the depth of the trench increases, the excavation is either sloped back (i.e. 1H:1V) to ensure slope stability or is temporarily supported using a trench boxes or sheeting to prevent collapse of the trench walls.

With open-cut construction, the trench is excavated to the required depth, the pipe is installed at the design grade and the trench then backfilled and compacted. The use of open-cut trench construction is generally limited to excavations less than 10m deep due to equipment restrictions, safety concerns, and economical feasibility.

In addition, when construction is within urbanized areas, consideration must be given to the protection and support of existing underground utilities that may be impacted by the excavation.

The majority of the installation of the pipe will be installed through open cut save and except the crossing for the Canadian National (CN) railways spur line and Little Cataraqui Creek.

9.1.2 TRENCHLESS CONSTRUCTION

Due to the sensitive environmental areas in and around the Little Cataraqui Creek and requirements from CN, trenchless methods for installation of the pipe through these sections will need to be employed. Based on the proximity of the spur line to Little Cataraqui Creek it is anticipated to complete the installation in this section as one continuous process. Based on the geotechnical findings the rock is approximately 1m below the creek bottom and therefore the pipe would be installed in rock. Based on the above the forcemain could be installed by rock Horizontal Directional Drilling (HDD) or Rock Bore.

HDD is an extremely versatile trenchless technology that is used for the installation of everything from service connections to residences and buildings, to pipes and cables under roadways and rivers. HDD is best suited for installing pressure pipes and conduits where precise grades are not required.

The main components of HDD are:

1. a directional drill rig sized for the job at hand;
2. drill rods linked together to form a drill string for advancing the drill bit and for pulling back reamers and products;
3. a transmitter/receiver for tracking and recording the location of the drill and product;
4. a tank for mixing and holding drilling fluid; and
5. a pump for circulating the drilling fluid. Other components of an HDD operation include bits, reamers, swivels and pulling heads.

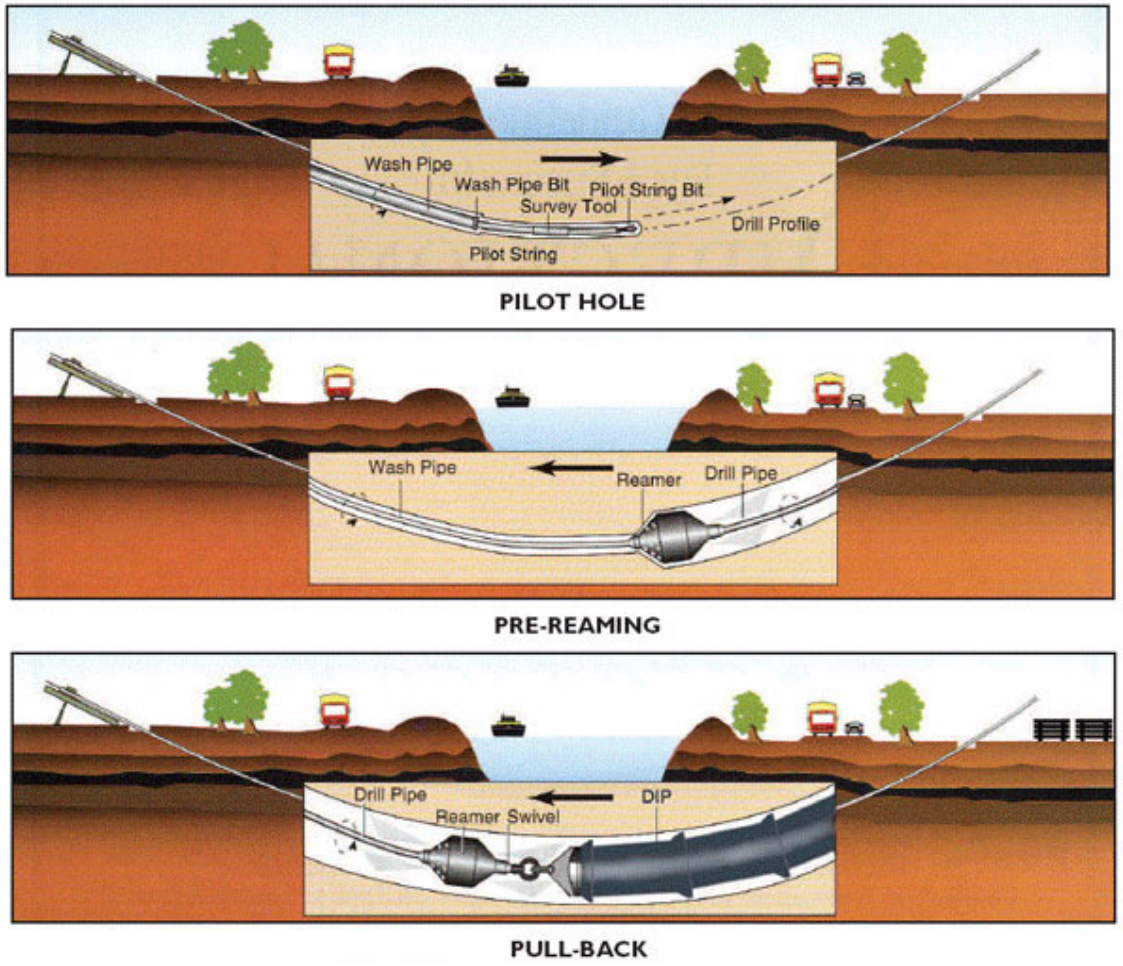

Figure 9.1 HDD Process

A job of this type where tracking the drill head using a walkover system is not possible due to the depth or surface conditions instead use wire lines to track progress.

A typical HDD project has a launch site where the rig is set-up and positioned to drill a pilot bore along a planned path to an exit pit where either the product pipe, reamer or product pipe reamer is attached and pulled back through the bore hole.

The rig is secured by means of on-board power-rotating augers and positioned at a distance behind the entry point to allow the drill to enter the ground at the planned location. The entry angle of the drill string is typically 8 to 16 degrees. A pit for capturing drilling fluids (returns) is dug at the point of entry and at the planned exit point. The drill string, comprised of a series of drill rods, is advanced by a combination of rotation and thrust supplied by the rig. The string is initially advanced using both rotational torque and thrust until the drill string has enough down-hole stability to allow the operator to change the direction that the string will advance along a planned bore path. There are many types of bits designed to navigate through different types of ground material including rock. On-board controls allow the operator to monitor the orientation of the bit and the change in general direction of the bore.

Once the pilot bore reaches the exit area, the reaming and installation of the product pipe phase begins. The hole is reamed in one or more passes to the required diameter. When the bore is large enough to accept the product it is attached to the drill string with a pulling head and swivel, and pulled back to the rig.

9.2 DESIGN & CONSTRUCTION CONSIDERATIONS

RAIL & LITTLE CATARAQUI CREEK CROSSING

As the installation of the forcemain and watermain are being installed concurrently there may be some economics in combining the installation into a single, larger casing. The Ministry of the Environments (MOE) allows the installation of watermains and forcemains in the same tunnel as indicated in their Design Guidelines for Drinking Water Systems section 10.11.5. A detailed analysis of this option should be completed during the preliminary design stage.

UTILITIES CROSSINGS

Along the selected route for the forcemain there are still a significant amount of existing utilities. Consultation with each of the utility provider should be completed to determine the particulars of their plant, any relocation requirements and / or bracing that would be required.

CONNECTION TO CATARAQUI BAY WWTP

During the preliminary design a review of the connection to the WWTP should be completed in consultation with the consultant completing the upgrades. Currently the WWTP has a forcemain from Days Road pumping station that tie-ins into the elevated headwork's and an influent lift station that lifts the sewage from a gravity sewer into the headworks. Capacity of this infrastructure (gravity sewer and forcemain) should be reviewed to determine if flows from the Portsmouth Pumping Station should be connected to one of the existing discharge systems or a third discharge to the plant installed.

PIPE TRANSIENT

The selected pumping option is to pump the entire distance to the Cataraqui Bay WWTP. Due to the topography of the route the sewage will be pumped to a high point (near St. Lawrence College) and then flow by gravity to approximately Little Cataraqui Creek at which point the topography is fairly flat. Gravity flow within a pressurized system can cause issues if not adequately designed for transient and negative pressures. A detail transient analysis should be completed to ensure the forcemain operates safety and efficiently.

PORTSMOUTH PUMPING STATION WET WELL

With the upgrades to the Portsmouth Pumping Station a detail review of the operating level should be completed. Based on a preliminary review of the operating range at the pumping station, it appears to be limited and additional capacity may be needed to provide adequate pump cycles (i.e. ramp up/down time).

ENVIRONMENTAL

As detailed in the geotechnical analysis some contamination was encountered along the route (mainly between Sir John A McDonald and Portsmouth Ave). This should be reviewed to determine the requirements for excavation, material backfilling and dewatering to confirm conformance with environmental legislation.

9.3 APPROVAL REQUIREMENTS

CITY OF KINGSTON

Construction of the project is completely within the City of Kingston and construction will occur along municipal roads. Approvals and reviews will be required by the City of Kingston to ensure that the design complies with their infrastructure requirements. Traffic Management Plans should be developed during the design stage, including an outline of all lane closures, and will be subject to the review and approval of the City of Kingston Traffic Division.

MINISTRY OF THE ENVIRONMENT (MOE)

Environmental Compliance Approval (ECA) from the MOE will be required for the construction of the forcemain and pumping station upgrades.

A Permit to Take Water (PTTW) is required under Section 34 of the Ontario Water Resources Act for temporary water taking from groundwater, which exceeds 50,000 L per day. The dewatering on this project will be temporary and may exceed the limit, therefore, application and approval should be considered during the detailed design phase of the project. Further geotechnical work will be carried out to determine the category need for this project.

MINISTRY OF NATURAL RESOURCES (MNR)

As construction of the forcemain is to occur near shore lands and environmentally sensitive areas and a work permit from MNR will be required. A work permit is a document issued by the MNR under authority of Section 14 of the Public Lands Act, to authorize specific activities and works on public lands and shore lands.

CATARAQUI REGION CONSERVATION AUTHORITY (CRCA)

The CRCA has in effect Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulations (Ontario Regulation 148/06) made under the Conservation Authorities Act. This regulation prevents or restricts development and site alterations near water and wetlands to protect the public from flooding, erosion and other hazards. This permit is required for this project.

DEPARTMENT OF FISHERIES AND OCEANS (DFO)

As of November 25, 2013, the DFO has revised the approval process to a self-assessment process. Proponent are required to review the guidelines regarding waterbodies and project activities & criteria where DFO review is not required and if the project is one of the waterbody types, and / or activities, DFO review is not required; however, this project does not meet the criteria. Therefore a Request for Review application must be submitted to DFO for review.

CANADIAN NATIONAL (CN) RAILWAY

In order to complete the installation of the pipe under the railway tracks a Letter of Authorization (LOA) must be obtained from CN. This involves submitting an application to CN detailing the construction methodology, design parameters and a complete settlement monitoring program that will be completed during construction. CN personnel “flagging” may be required during construction under the CN spur line.

10 PUBLIC, AGENCY AND FIRST NATIONS CONSULTATION

10.1 PUBLIC & AGENCY CONSULTATION

10.1.1 CONSULTATION APPROACH

Consultation with the public (which includes stakeholders and interested parties) and government review agencies is a necessary and important component of the Municipal Class Environmental Assessment (EA) process. To meet the Class EA consultation requirements for this Schedule B project, Utilities Kingston ensured that members of the public and government agencies were informed of the Study. They were given the opportunity to provide input (both written and verbal) on the screening process to determine the preferred flow direction for the Portsmouth Pumping Station and on the detailed design to determine the preferred infrastructure option and routing to convey wastewater flow collected at the Portsmouth Pumping Station to the Cataraqui Bay Wastewater Treatment Plant.

The key aspects of our consultation approach included the following:

- **Creating/Maintaining a Stakeholder Contact List:** At Study Commencement, a preliminary stakeholder contact list was developed. The list included any government agencies and Aboriginal communities that would be impacted by the project. The list was maintained throughout the course of the Study. Additional parties were added to the list upon their request. All persons on the list would receive any communications or notices regarding the project by mail. The list has been included in Appendix K
- **Holding Public Information Centres:** In order to engage the public, agencies and Aboriginal communities, the project team held Public Information Centres (PIC). These PICs consisted of a display of boards with key information regarding the project on which members in attendance were able to discuss with the project team. Two PICs were held for this project and are described in more detail in the next section.
- **Using Web Based Tools:** An information page regarding the Study was created and maintained within Utilities Kingston's website to provide information about the project and its timelines and progress. Project Notices and display materials presented at the PICs were made available to download off the site. Contact information for the key lead at Utilities Kingston and WSP were also included on the site. The page can be found at the following website: (http://www.utilitieskingston.com/Wastewater/Projects/PortsmouthPumpingStation.aspx)

10.1.2 KEY POINTS OF CONTACT

The following sub sections provide a summary of the key points of contact that were undertaken throughout the course of the Study as well as a summary of comments received.

NOTICE OF STUDY COMMENCEMENT

The Notice of Study Commencement and PIC No. 1 was developed to target the ministries, organizations, agencies and other stakeholders that may be affected by the Portsmouth Pumping Station Flow Direction project.

The Notice of Study Commencement and PIC No. 1 was published in the local newspaper, the Kingston Whig Standard February 18th and 25th, 2014 with the objective of informing the public and other stakeholders of the Study. The notice briefly outlined the purpose and justification for the Study and included information regarding Public Information Centre No. 1 to be held February 27, 2014..

WSP also sent letters and contact response forms along with a copy of the Notice of Study to all stakeholders and affected government agencies and First Nation communities. Each recipient was asked to respond to the project team, indicating their interest in being included in the mailing list for the Study. Stakeholders remained on the mailing list for the duration of the public consultation process unless they requested to be removed.

The stakeholder list and Notice of Study Commencement and PIC No. 1, as well as the letter and response form can be found in Appendix I.

PUBLIC INFORMATION CENTRES

Public Information Centre No.1

The Portsmouth Pumping Station Flow Direction Class EA PIC No. 1 was held on February 27, 2014 at the Portsmouth Olympic Harbour, to present an overview of the Study, including the proposed two stage evaluation approach, and the evaluation criteria and methodology that were going to be used in the Study. The purpose of this PIC was to communicate the process used to carry out the Study and provide an opportunity to receive comments on the evaluation approach used by Utilities Kingston. A total of 2 attendees recorded their names on the sign in sheet and did not request to be added to the stakeholder contact sheet. A copy of the material presented at PIC is included in Appendix J, along with the sign in sheet for the PIC and the Response Form provided to all attendees.

Public Information Centre No.2

The Portsmouth Pumping Station Flow Direction Class EA PIC No. 2 was held on May 13, 2014 at the Portsmouth Olympic Harbour, to present an overview of the Study, including the proposed two stage evaluation approach, the evaluation criteria and methodology that were used in the Study and provide an opportunity to receive comments on the evaluation and the recommended alternative solution. A total of 5 attendees recorded their names on the sign in sheet and did not request to be added to the stakeholder contact sheet. A copy of the material presented at PIC is included in Appendix J, along with the sign in sheet for the PIC and the Response Form provided to all attendees

NOTICE OF STUDY COMPLETION

The Notice of Study Completion is relevant for two reasons: it provides the public and relevant agencies with a final period of thirty (30) days to review the final conclusions of the Study, and it informs the general public of the outcome of the Study and the nature of the resulting project.

10.1.3 PUBLIC AND AGENCY COMMENTS AND RESPONSES

A summary of the comments and questions received from agencies and the public during the Class EA process are included below. Copies of the actual written correspondence received from agencies are provided in Appendix K.

PUBLIC AND AGENCY COMMENTS AND RESPONSES FROM PIC NO. 1

No Comments received from PIC#1

PUBLIC AND AGENCY COMMENTS AND RESPONSES FROM PIC NO. 2

No specific comments were received from PIC#2; however a comment sheet was completed by one attendee with general comments and is include in Appendix K.

10.2 ABORIGINAL COMMUNITIES CONSULTATION

CONSULTATION APPROACH

The First Nation and Metis Communities consultation process followed the same process that was used with the public and agencies. Affected First Nation and Metis communities were identified based on previous projects undertaken by Utilities Kingston and based on recommendations received from the MOE regarding affected/interested communities that should be consulted with for a project within the City of Kingston. These Aboriginal communities were added to the stakeholder contact list and were thereby invited to attend both Public Information Centres. No separate meetings with First Nations and Metis Groups were requested by and/or held with them as part of the Study.

ABORIGINAL COMMUNITIES COMMENTS AND RESPONSES

A summary of the comments and questions received from First Nations and Metis communities during the Class EA process are included below. Copies of the actual written correspondence received from agencies are provided in Appendix K.

Comment: *As per the Alderville First Nation Consultation Protocol, your proposed project is deemed a level 3, having minimal potential to impact our First Nations' rights, therefore, please keep Alderville apprised of any archaeological findings, burial sites or any environmental impacts, should any occur.*

Appendix A-K

Digital copy may be found on appended CD.

For hard copy, please contact the project team:

Matt Morkem, P.Eng.
Manager, Infrastructure, Kingston
WSP Canada Inc.
1224 Gardiners Street, Suite 201
Kingston ON K7P 0G2
matt.morkem@wspgroup.com
Phone: (613)-634-7373 Ext. 406

Michael Fischer, P.Eng.
Utilities Engineer
Utilities Kingston
85 Lappan's Lane P.O. Box 790
Kingston, ON K7L 4X7
mfischer@utiltieskingston.com
Tel: 613-546-1181 ext. 2356