Town of Essex
Improvements to Ward 1 Sanitary Sewer System Phases 1 & 2 (Schedule B) Class Environmental Assessment Report

Prepared for:
Town of Essex

Prepared by:
Stantec Consulting Ltd.

December 7, 2015

Sign-off Sheet

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EXECUTIVE SUMMARY

GENERAL

The Essex Ward 1 Sanitary Sewer System is a separate sanitary sewer system that was designed to carry domestic wastewater flows. The sanitary sewer pipes are sized adequately to carry household sewage or wastewater from homes to the treatment facilities, plus an allowance for inflow and infiltration; however, excessive storm flow entering the sanitary system during severe storm events could overload it, resulting in possible basement flooding.

The goal of this study is to provide possible options for the planning and implementation of measures aimed at mitigating/reducing the sewer backup caused by excess storm water in the Essex Ward 1 Sanitary Sewer System. This study is intended to develop possible solutions to better improve the sanitary sewer system utilizing sound environmental assessment planning principles.

This Environmental Assessment report is the documentation of the Class Environmental Assessment (Class EA) process outlined by the Municipal Engineers Association (MEA) for the Essex Ward 1 Sanitary Sewer System.

This report comprises **Sections 1 to 10** inclusive and **Appendices A to D** inclusive. A brief description of each section follows.

SECTION 1: INTRODUCTION

This section provides background information and a description of the Class EA process.

The Class EA process is comprised of five phases:

Phase 1 – Identification of the problem or opportunity and discretionary public consultation.

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

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

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

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

The study has been carried out in accordance with Phases 1 and 2 of the Class EA process.

SECTION 2: EXISTING ESSEX WARD 1 SANITARY SEWER SYSTEM

This section describes the configuration, physical conditions and hydraulic capacity of the existing Essex Ward 1 Sanitary Sewer System, including wastewater collection and treatment facilities.

SECTION 3: PROBLEM STATEMENT

This section provides an overview of the assessment of the existing Essex Ward 1 Sanitary Sewer System, identifies the problems, and establishes the project objective.

SECTION 4: INVENTORY OF THE EXISTING ENVIRONMENT

This section provides a general description of the existing natural, social and economic environmental conditions in the Essex Ward 1 Area (study area). Alternatives identified through this Class EA process must be evaluated on the basis of the potential impact on the existing environmental conditions of the study area.

SECTION 5: DEVELOPMENT OF OPTIONS FOR IMPROVEMENTS TO SANITARY SEWER SYSTEM

This section involves the identification of various conceptual alternatives with the objective of determining alternative solutions which best address the identified problems and needs based on the potential impact to the natural, social and economic environments.

The following broad planning level alternative solutions have been considered and evaluated for providing improvements to the Essex Ward 1 Sanitary Sewer System:

1. Do Nothing
2. Reduction of Extraneous Flows
3. Increase Hydraulic Capacity of Sanitary Sewer System
4. Re-Commissioning of Southwest Lagoon Cell No.2 for Wet Weather Flow Storage

SECTION 6: EVALUATION CRITERIA AND RESULTS

This section involves the evaluation of the alternative solutions which address the identified problems and study objectives.

SECTION 7: PUBLIC CONSULTATION

On September 8, 2015, a Council Meeting was held to discuss the issues and investigation work that was performed to date. On October 14, 2015, an open house was conducted to present the proposed short-term and long-term solutions.

Public and review agency consultations are ongoing on the evaluation of the preferred solution. This report will be made available to the public and review agencies as a part of the consultation process.

SECTION 8: OPINION OF PROBABLE COST

This section summarizes the proposed short-term solution with respect to capital budget probable costs (in 2015 dollars), anticipated timing and Class EA Schedule.

Table E-1 Summary of Preferred Short-Term Solution Probable Cost

Steps	*Probable Cost*	*Year Required*	*Class EA Schedule*
1. Re-Commissioning Essex Southwest Lagoons	$125,000	2016	B
2. Inlet Pumping Station Upgrades at Essex PCP	$350,000	2016	B
3. Pumping Station No.3 Upgrades	$2,000,000	2016	B or A+
4. Increase Sanitary Sewer Size	$850,000	2016	A+

SECTION 9: SUMMARY

This section summarizes recommendations that are made with respect to this study. It is recommended that the following work be considered as a high priority to address basement flooding issues as follows:

- Re-commission one of the existing Essex Southwest Lagoons
- Upgrade inlet pumping station at the Essex Pollution Control Plant
- Upgrade Pumping Station No.3 and extend new forcemain
- Increase size of existing sanitary sewer along Brien Avenue East

It must be acknowledged that the above recommended "short term" works will not address all the flooding problems in the service areas but will significantly reduce the potential for basement flooding. It is further recommended that the Town continue to implement long-term inflow and infiltration reduction measures as discussed herein.

SECTION 10: REFERENCES

This section presents a list of previous studies and documents that have been referred to for background information and are referenced in this study.

1.0 INTRODUCTION

1.1 BACKGROUND

The Town of Essex, population 19,600, comprises four urban communities - Essex Centre (Essex Ward 1 area), Harrow, Colchester and McGregor. The Town of Essex was created on January 1, 1999 when the former towns of Essex and Harrow and the former townships of Colchester North and Colchester South were amalgamated. With a population of close to 20,000, the Township covers approximately 278 square kilometers and is situated in southwestern Ontario in Essex County as shown in **Figure 1.1** in **Appendix A**.

Figure 1.2 in **Appendix A** shows the existing sanitary sewer system and service areas in the Essex Ward 1 area. Communal sewage collection in the Essex Ward 1 community is provided by sanitary sewers serving two distinct service areas. The northeast service area is serviced by the existing Northeast Lagoon Facility and the southwest service area is serviced by the existing Essex Water Pollution Control Plant (Essex WPCP).

The Inlet Pumping Station at the Essex WPCP receives its sewage flow from the southwest service area and discharges it into the Essex WPCP. Pumping Station No. 3 receives its sewage flow from a portion of the southwest service area and discharges it into an existing trunk sanitary sewer that flows into the Inlet Pumping Station at the Essex WPCP. Pumping Station No. 4 receives its sewage flow from the northeast service area and discharges it into the Northeast Lagoons via a forcemain. The location of sanitary sewers, pumping stations and treatment facilities for the two service areas are shown in **Figure 1.2** in **Appendix A**.

Pumping Station No. 1, located along South Talbot Road west of Victoria Avenue, was previously used to collect sewage flow from the southwest service area and discharge it to the Southwest Lagoons. Both the Southwest Lagoons and Pumping Station No.1 are no longer in service, having been decommissioned approximately 10 years ago.

On September 3, 2015, the Town received a record amount of rainfall that resulted in widespread complaints as a result of basement flooding. Most often, basement flooding in this service area is caused by a sanitary sewer backup associated with excessive inflow and infiltration, which occurs when too much storm water enters the sanitary sewer system during severe storm events. This report represents the beginning of the planning process to review the sewer backup associated with excessive inflow and infiltration, and to evaluate options to reduce the associated risk of basement flooding.

This Environmental Assessment report is intended to satisfy the legislative requirements of the Ontario Environmental Assessment Act. This report follows the planning process set out in a document prepared by the Municipal Engineers Association (MEA) entitled "Municipal Class

Environmental Assessment" dated October 2000, as amended in 2007 and 2011. The Class Environmental Assessment (Class EA) process is further explained in the Section 1.2.

1.2 CLASS ENVIRONMENTAL ASSESSMENT PROCESS

1.2.1 General

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

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

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

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

- **Schedule A** projects are limited in scale, have minimal adverse environmental affects and include a number of normal or emergency municipal maintenance and operational objectives. These projects are pre-approved and can proceed directly to implementation without following the full Class EA planning process.
- **Schedule A+** projects are a new sub-class of activities introduced as part of the 2007 MEA Class EA amendments. Schedule A+ projects are also pre-approved similar to Schedule A, however; the public is to be advised prior to project implementation. Advising the public of the project implementation is a means to inform the public of what is being undertaken in

their local area. The manner in which the public is advised is to be determined by the proponent.

- **Schedule B** projects generally include improvements and minor expansions to existing facilities. In these cases, there is a potential for some adverse environmental impacts and therefore the proponent is required to proceed through a screening process including consultation with those who may be affected.
- **Schedule C** projects generally include the construction of new facilities and major expansions to existing facilities. These projects proceed through the environmental assessment planning process outlined in the Class EA and require preparation of an Environmental Study Report (ESR) to document the planning process.

Schedule B projects generally include improvements and expansions to existing facilities where there is the potential for some adverse environmental impacts, and therefore requires completion of Phases 1 and 2 of the Class EA process, described in Section 1.2.2. Examples of relevant Schedule B projects are given in Appendix 1 of the Municipal Class EA document and include the following activities:

- Establish, extend or enlarge a sewage collection system and all works necessary to connect the system to an existing sewage outlet where such facilities are not in existing road allowance or an existing utility corridor.

The Essex Ward 1 Sanitary Sewer System Improvement project includes activities requiring extension and enlargement of existing sanitary sewers and forcemain and upgrades to the existing sanitary sewage pumping station where such facilities may be located outside of an existing municipal road allowance or utility corridor. Therefore, this project is being completed under the Municipal Class EA as a **Schedule B** activity. Upon completion of Phase 1 and Phase 2 for Schedule B projects, the Owner may proceed directly to Phase 5 and implement the preferred solution.

1.2.2 Phases in Municipal Class EA Process

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

Phase 1 – Identification of the problem

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

Phase 3 – Identification of alternative design concepts (technical alternatives) for the preferred solution, evaluation of the alternative designs and their impacts on the

environment, consultation with review agencies and the public and selection of the preferred design.

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

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

2.0 EXISTING ESSEX WARD 1 SANITARY SEWER SYSTEM

Communal sewage collection is provided by sanitary sewers serving two distinct service areas: the northeast, which contains the commercial area; and the southwest, which is comprised of newer residential developments. **Figure 1.2** in **Appendix A** illustrates the sewers, pumping stations and treatment facilities for the two service areas.

Pumping Station No. 3 collects flow from a portion of the southwest service area and discharges to the Fairview Avenue West sanitary sewer that conveys wastewater northeasterly to the Inlet Pumping Station at the Essex WPCP and from there to the headworks of the Essex WPCP.

Pumping Station No. 4 collects flow from the northeast service area and discharges to the Northeast Wastewater Lagoon.

2.1 ESSEX WARD 1 SANITARY SEWERS

Table 2-1 summarizes the sanitary sewer inventory. The sewer inventory revealed that the existing sewer pipes in Essex Ward 1 are PVC, asbestos cement and reinforced concrete material. The majority of sewer pipe material is PVC.

Table 2-1 Essex Ward 1 Sanitary Sewer Inventory

Pipe Size (mm)	*Length (km)*
Gravity Sewers	
200	9.87
250	5.20
300	0.56
375	0.11
450	0.30
500	0.61
575	1.88
650	0.32
750	0.76
Sub-total	**19.61**
Forcemains	
300	0.55
350	0.01
450	1.70
Sub-total	**2.26**

Pipe Material	*Length (km)*
Gravity Sewers	
PVC	13.74
Asbestos Cement	2.00
Reinforced Concrete	3.86
Sub-total	**19.61**
Forcemains	
PVC	1.53
Sub-total	**1.53**

2.2 SEWAGE PUMPING STATIONS IN ESSEX WARD 1 AREA

2.2.1 Essex WPCP Inlet Pumping Station

The Essex Ward 1 area is serviced by a gravity sewer collection system complete with a series of lift pumping stations.

The southwest sewage collection system conveys sewage to the Inlet Pumping Station located at the Essex WPCP site. This pump station lifts sewage to the inlet works of the treatment plant.

A summary of existing raw sewage pumping capacity is provided in **Table 2-2**.

Table 2-2 Inlet Pumping Station at Essex WPCP

Parameter/Components	*Description*
Pump Well	Wet Well Dimensions: 7.4 x 6.8 meters, 9.45 m deep
Inlet Sewer	One 750 mm diameter inlet sewer
Trash Screen	None
Sewage Pumps	Three (3) Flygt Model NP-3153 MT Submersible Pumps. Each 18 HP Driver, rated for 84 L/s at 12.4 m TDH
Pump Control	Fully automatic control in conjunction with level regulators to operate in triplex and to manually alternate the pumps
Standby Power	Diesel Engine at the Essex WPCP
Forcemain	350 mm diameter, 11 meters long
Flow Measurement	One (1) 350 mm magnetic flow meter

2.2.2 Sewage Pumping Station No. 3

Pumping Station No. 3 discharges sewage to the Fairview Avenue West sanitary sewer, which conveys wastewater southwesterly to the Inlet Pumping Station at the Essex WPCP and from there to the headworks of the Essex WPCP. The details of the pumping station are shown in **Table 2-3**.

Table 2-3 Sewage Pumping Station No. 3

Parameter/Components	*Description*
Pump Well	Wet Well Dimensions: 3.6 m dia. x 9.0 m deep
Inlet Sewer	One 450 mm diameter inlet sewer
Trash Screen	None
Sewage Pumps	Two (2) Flygt Model NP3153.090 MT Submersible, 15 HP Driver, rated for 65 L/s at 13 m TDH
Pump Control	Fully automatic control in conjunction with level regulators to operate in duplex and to manually alternate the pumps
Standby Power	None
Forcemain	300 mm diameter, 550 meters long
Flow Measurement	None

2.2.3 Sewage Pumping Station No. 4

Raw sewage from the Essex northeast collection system is pumped to the Northeast Lagoon by Pumping Station No. 4 located on County Road 8.

This pumping station is currently fitted with two submersible pumps (one duty, one standby) with provisions for a future third pump. The firm capacity rating is 115 L/s and total capacity rating is 230 L/s.

The sewage passes through a manually cleaned inclined trash rack into the pumping station wet well. From there, sewage is pumped to the lagoons through a 450 mm diameter forcemain approximately 1700 metres long. Total flow to the lagoons is calculated based on pump running time and pumping rate which was determined based on draw down tests. Details of the pumping station and forcemain including flow measurement are presented in **Table 2-4**.

Table 2-4 Sewage Pumping Station No. 4

Parameter/Components	*Description*
Pump Well	Wet Well Dimensions: 4.50 x 5.50 meters
Inlet Sewer	One 750 mm diameter inlet sewer
Trash Screen	One (1) manually cleaned inclined trash rack with 50 mm openings (not currently in use)
Sewage Pumps	Two (2) Flygt Model CP 3201 MT Submersible, 35 HP Driver, rated for 115 L/s at 12.8 m TDH
Pump Control	Fully automatic control in conjunction with level regulators to operate in duplex and to manually alternate the pumps
Standby Power	80 KW Stamford Model AC344B Generator, 150 HP Model No. D4800T White Diesel Engine
Forcemain	450 mm diameter, 1,700 meters long
Flow Measurement	Fisher & Porter Magnetic Flowmeter, 7-day circular chart recorder.

2.3 TREATMENT FACILITIES IN ESSEX WARD 1 AREA

2.3.1 Essex Water Pollution Control Plant

The Essex Water Pollution Control Plant (Essex WPCP) treats the sewage from the Southwest Service Area. The Essex WPCP is located at 3980 North Malden Road in the Town of Essex.

The Essex WPCP provides secondary level treatment for municipal wastewater from the Essex Ward 1 Southwest Service Area. The treatment plant was commissioned in 2006 as a Sequencing Batch Reactor (SBR) process.

The treatment plant has an approved average daily capacity rating of 4,590 m^3/d or 53 L/s and a peak flow capacity rating of 14,400 m^3/d or 167 L/s with final effluent discharge to the Essex Outlet Drain.

The Essex WPCP is covered by the current MOE Certificate of Approval No. 6420-6V3NGS, issued on November 20, 2006. A copy of the current Certificate of Approval is included in **Appendix B**.

2.3.2 Southwest Lagoon

The Southwest Lagoon, which is located on Part of F.L. 17 and F.L. 18, Concession 13, Town of Essex, was decommissioned following the Substantial Completion of the Construction of the Essex Water Pollution Control Plant. The facility has not been receiving flows since January 5th, 2006. The Southwest Lagoon, with a rated capacity of 1,561 m^3/d, was designed to service 2,865 persons.

The decommissioned Southwest Lagoon, consisting of three seasonally discharged oxidation cells, was used to treat sewage from the Southwest Service Area. The physical dimensions of the decommissioned lagoon cells are summarized in **Table 2-5**. The lagoon cells were all batch treated with an aluminum salt or clarion for suspended solids (SS) and phosphorus removal approximately one to two weeks prior to spring and fall discharge. Discharge was controlled by valves when the effluent quality met the discharge limits. Currently, one lagoon cell has been converted into a solar farm. The other two decommissioned lagoon cells have not been used for any purpose.

Table 2-5 Physical Dimensions of the Southwest Lagoon Cells

Pond Cell No.	*Depth (m)*	*Surface Area (ha)*	*Volume (m^3)*
1	1.83	4.86	65,558
2	1.83	4.86	71,658
3	1.83	4.86	72,023

2.3.3 Northeast Lagoon

Wastewater from the Northeast Service Area in the Town of Essex is treated in the Northeast Waste Stabilization Ponds, henceforth denoted as the Northeast Lagoon. The Northeast Lagoon, which is located in Part of F.L. 28 and F.L. 29, Concession 5, Town of Lakeshore (formerly the Geographic Township of Maidstone), consists of four municipal wastewater treatment lagoon cells. The first two lagoon cells, with a total surface area of 9.2 hectares, were constructed in 1964. In 1984, the waste stabilization ponds were upgraded and two additional pond cells were added to the Northeast Lagoon. Effluent from these ponds was discharged to the Puce Drain, which flows to the Puce River and subsequently to Lake St. Clair. An overall aerial site plan of the Northeast Lagoon is shown in **Figure 1.1** found in **Appendix A**.

The existing Northeast Lagoon, with a rated capacity of 2,908 m^3/d, was designed to service 5,335 persons. The original design value for average daily domestic flow is 545 L per capita per day. The physical dimensions of the existing lagoon cells are summarized in **Table 2-6**. The total volume of the Northeast lagoon is 395,458 m^3, and the operational volume of the Northeast Lagoon is calculated to be 337,258 m^3, excluding freeboard and bottom of the lagoon cells for sludge storage.

Table 2-6 Physical Dimensions of the Northeast Lagoon Cells

Pond Cell No.	*Depth (m)*	*Surface Area (ha)*	*Volume (m^3)*
1	1.93	4.45	64,631
2	2.08	4.75	73,850
3	2.50	6.10	128,961
4	2.50	6.10	128,016

The Northeast Lagoon is covered by the current MOE Certificate of Approval No. 6420-6V3NGS, issued on November 20, 2006. A copy of the current Certificate of Approval is included in **Appendix B**.

3.0 PROBLEM STATEMENT

3.1 ESSEX WARD 1 WASTEWATER FLOWS

3.1.1 Southwest Service Area

The Essex WPCP, constructed in 2006, is located adjacent to the decommissioned Southwest Lagoon, and includes an inlet pump station, screening and grit removal, chemical feed facilities, sequencing batch reactors with aeration, and UV treatment. The plant is rated for an average daily flow of 4,590 m^3/day and a peak flow rate of 14,400 m^3/day. Future expansion (addition of another SBR cell) will allow the plant design capacities to increase to an average daily flow of 6,130 m^3/day and a peak flow rate of 17,630 m^3/day.

Table 3-1 shows the recorded total daily flow in m^3 from January 2007 to November 22, 2015 inclusive). The existing average flow was calculated to be 2,079 m^3/day. It is evident from these flow records that the hydraulic loading to the Essex WPCP is well below the rated plant capacity of 4,590 m^3/d.

Table 3-1 Flow Records for the Period from 2007 to 2015 at the Essex WPCP

Year	*Average Daily Flow (m^3/d)*
2007	1,895
2008	2,204
2009	2,234
2010	1,865
2011	2,786
2012	1,682
2013	2,047
2014	2,019
2015 (Jan. to Nov. 22 inclusive)	1,980
Average	2,079

The Essex Ward 1's southwest sanitary sewer system frequently experiences periods of high flow for extended durations that are associated with storm events. **Figure 3.1** in **Appendix A** illustrates the average and maximum sewage flows recorded during the period from March 2015 to July 2015. Sewage flow data was provided by the Ontario Clean Water Agency (OCWA).

From this data, maximum flow (approximately 17,500 m^3/d) was recorded during early June and average flow for the period was approximately 2,600 m^3/d. Based on this data, the sanitary sewer system experienced a very high peaking factor of approximately 6.7 when compared to the system's average day dry weather flow. Such a high peaking factor is indicative of very high levels of extraneous flow (inflow & infiltration) entering the Town's sanitary sewer system.

3.1.2 Northwest Service Area

Operating records provided by the OCWA for the period from January 2007 to November 22, 2015 inclusive have been reviewed and compared to the C of A requirements. Operating records prior to 2007 were not used since flows to the Northeast Lagoon were reduced in 2006 when part of the service area was diverted to the Essex WPCP.

Table 3-2 summarizes the flow records for the period from January 2007 to November 22, 2015 inclusive. The flow into the Northeast Lagoon is read by an inline magnetic flowmeter at the inlet pumping station. It is evident from these flow records that the hydraulic loading to the Northeast Lagoons is well below the rated lagoon capacity of 2,910 m^3/d.

Table 3-2 Flow Records for the Period from 2007 to 2015 at the Northeast Lagoon

Year	*Average Daily Flow (m^3/d)*
2007	1,810
2008	1,655
2009	1,493
2010	1,273
2011	1,654
2012	1,128
2013	1,430
2014	1,378
2015 (Jan. to Nov. 22 inclusive)	1,299
Average	1,458

The Essex Ward 1's northeast sanitary sewer system frequently experiences periods of high flow for extended durations that are associated with storm events. **Figure 3.2** in **Appendix A** illustrates the average and maximum sewage flows recorded during the period from March 2015 to July 2015 recorded at Sewage Pumping No. 4, which lifts flow to the Northeast Lagoon. Sewage flow data was provided by the OCWA. From this data, maximum flow (approximately 11,800 m^3/d) was recorded on May 31 and average flow for the period was approximately 1,600 m^3/d. Based

on this data, the sanitary sewer system experienced a very high peaking factor of approximately 7.3, indicating very high levels of extraneous flow (inflow & infiltration) entering the Town's sanitary sewer system.

3.2 PROBLEM IDENTIFICATION

The Essex Ward 1 Sanitary Sewer System is a separate system that was designed to carry domestic wastewater flows. The sanitary sewer pipes are sized adequately to carry household sewage or wastewater from homes to the treatment facilities, plus an allowance for some inflow and infiltration; however, excessive storm flow entering the sanitary system during severe storm events could overload it, resulting in possible basement flooding.

Typically, infiltration and inflow is broken down into two components: groundwater infiltration and rain-dependent infiltration and inflow. Potential sources of extraneous flows included rainfall-dependent inflow and infiltration (i.e. entry of surface water through manhole lids, illicit connection of drains from private properties), and ground infiltration (i.e. groundwater entering through damaged pipe and manhole walls).

3.3 PROJECT OBJECTIVE

The project objective is to provide the Town with a plan to mitigate/reduce the sewer backup caused by excess storm water inflow in the Essex Ward 1 Sanitary Sewer System.

This study requires a review of sources of hydraulic stress and confirmation of hydraulic capacity of the existing sanitary sewer system. The plan may recommend solutions such as reduction of wet weather inflows and groundwater infiltration (I&I), increasing hydraulic capacity of sanitary sewers and pumping stations, and storage of excess wet weather flow during severe storm events.

Short term objectives:

- To mitigate hydraulic stress during high wet weather flow events

Long term objectives

- To reduce inflows and infiltration entering sanitary sewer system
- To meet future growth demands

3.4 PROJECT SCHEDULE

A Notice of Study Commencement was published in local newspapers and posted on the Town's website in September and October of 2015 to notify the public of the planning process.

Problem Statement
December 7, 2015

Phases 1 and 2, Schedule B, are expected to be completed by January 2016. The design, construction and commissioning projects are referred to as Phase 5 – Implementation, according to the Class EA process. The Town will proceed to completion of Phase 5 and implement the works by the end of 2016, provided that MOECC review can be prioritized and approval is granted in a timely fashion.

4.0 INVENTORY OF THE EXISTING ENVIRONMENT

Projects identified through this Class EA process must be evaluated on the basis of the potential impact on the existing environmental conditions of the study area. The following sections provide a general description of the existing natural, social and economic environmental conditions in the Town of Essex Ward 1 Area.

4.1 NATURAL ENVIRONMENT

4.1.1 Climate

The climate in Essex County is classified as modified humid continental, which has hot and humid summers with mild winters and adequate precipitation. In comparison with the other areas in the Province, Essex County's southerly latitude and proximity to the lower Great Lakes provides for warmer summer and winter temperatures with a longer growing season. Because the area is also on one of the major continental storm tracks, it experiences wide variations in day to day weather including severe summer thunderstorms. The normal minimum and maximum temperatures are -9°C and +28°C respectively and the mean daily temperature is above 6°C which tends to increase temperatures in surface waters. The extremes in weather, especially the summer storms in conjunction with the shallow nature of Lake Erie, cause wide variations in lake levels. Water levels have been known to rise significantly on the leeward shoreline during some extreme storm conditions.

4.1.2 Geology and Physiography

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

The topography of the area is a comparatively flat and smooth plain with scattered sandy and gravely knolls. The land rises very gently from Lake Erie. The area along Lake Erie is generally quite low lying and has been subject to flooding from high water levels in Lake Erie and its tributaries over the past few decades.

4.1.3 Soils

Soils within the study area were formed from heavy ground moraine which has been altered by glacial lake wave action and lacustrine deposition. The majority of the area is part of smooth clay plain and the predominant soil types are Perth and Brookston clays and their associated

clay loams. Developed from dolomitic limestone intermixed with shale, the imperfectly drained member is the Perth clays and the poorly drained member is the Brookston clays.

Throughout the region, good quality topsoil tends to support an extensive gardening market, cash crops and other agricultural uses throughout the Township.

4.1.4 Water Resources

The Essex Region watershed is comprised of approximately 28 smaller sub-watersheds, flowing either generally northward into Lake St. Clair, westward into the Detroit River, or southward into Lake Erie; (or entirely into Lake Erie in the case of Pelee Island). The Lower Thames Valley Conservation Authority (part of the Thames-Sydenham and Region Source Protection Region) shares the eastern boundary of the Essex Region watershed.

Figure 4.1 in **Appendix A** shows the network of municipal drains in the Town of Essex. The red lines are the municipal drains including the Essex Outlet Drain and Canaan Drain, which convey storm water from the Town of Essex to Lake St Clair and to the Detroit River.

4.1.5 Natural Vegetation

The County of Essex lies completely within the Niagara section of the Deciduous Forest Region of Ontario. Favourable soil and climatic conditions have allowed for the extension of many species of Carolinian and prairie flora which makes the region unique in Canada. The remnant broadleaf forests in Essex County are a resource of national importance. A number of trees with sporadic occurrence on specialized sites reach their northern limits in the area. In addition to rare tree varieties, there are southern herbs and prairie vegetation found in specific areas.

The Town of Essex comprises a large agricultural hinterland with field crop production, horse farms and vineyards. Most of the area was cleared many years ago to allow for agricultural land uses. There are, therefore, comparatively few stands of trees or wood lots.

4.1.6 Terrestrial and Aquatic Animal Life

The agricultural land uses support generally small animals including rabbits, raccoons, skunks, fox, muskrat, etc. As long as the existing land uses are maintained, these animals would be expected to remain as they can effectively adapt to man's activity.

4.2 CULTURAL, SOCIAL AND ECONOMIC ENVIRONMENT

4.2.1 Town of Essex Study Area

The Town of Essex, population 19,600, comprises four urban communities - Essex Centre (Ward 1 area), Harrow, Colchester and McGregor. The Town of Essex was created on January 1, 1999

when the former towns of Essex and Harrow and the former townships of Colchester North and Colchester South were amalgamated. With a population of close to 20,000, the Township covers approximately 278 square kilometers and is situated in southwestern Ontario in Essex County as shown in **Figure 1.1** in **Appendix A**.

The Town extends southward from the shores of Lake Erie generally between County Road 11/County Road 41 on the west and County Road 23 on the east and is bound to the north by County Road No. 8. Geographically, the Town of Essex is located in the southwest corner of Essex County bordered by the Town of Amherstburg to the west, the Town of Lakeshore and Town of Tecumseh to the north, the Town of Kingsville to the east and Lake Erie to the south.

Air quality in the area is good with very few industrial discharges to cause any significant sources of pollution. Noise level is acceptable.

The Essex Ward 1 area is well serviced with an adequate road system and a full range of utilities including electrical, water, natural gas and communications.

4.2.2 Official Plan

The Town of Essex Official Plan was adopted in 2009 to guide development and to set Council priorities and policies on land use for the following 20 years. It follows the guidelines and principals of the County of Essex Official Plan and incorporates the mandates of the Planning Act of Ontario and other legislated requirements.

The adopted Official Plan regulates and controls development and planning policies in the study area and will be updated from time to time as necessary to take into account physical and social changes affecting the community.

Figure 4.2 in **Appendix A** shows the land use plan of the Ward 1 area.

4.2.3 Archaeology

The proposed work will be implemented within existing street and facility footprints which will have a low potential for the discovery of archaeological resources.

During the final design and construction phase, if any new property is required outside of the existing footprints, archaeologists will be consulted to determine whether a Stage 1 archaeological work and further Stage 2 surveys need to be implemented prior to proceeding with construction. Results of these archaeological assessments will be forwarded to the Ministry of Tourism, Culture and Sport prior to construction of the proposed work.

Should buried archaeological remains be found during construction activities, the Ministry of Tourism, Culture and Sport should be notified immediately. These requirements will be included in the contract documents.

4.2.4 Built Heritage and Landscape

The Ministry of Tourism, Culture and Sport (MTCS)'s "Screening for Impacts to Build Heritage and Cultural Heritage Landscapes" checklist was reviewed. The Town of Essex's Planning Department has indicated that there are no Built and/or Cultural Heritage Landscapes within the study area. As the proposed work includes a forcemain extension within existing streets, and upgrades to an existing pumping station which was built in recent years, there appears to be no associated impact to the cultural heritage resources of the area.

Any built heritage resources and/or cultural heritage landscapes in proximity to the locations of proposed sewers will be documented and noted in the contract drawings/specifications. If lands within the proposed work areas have the potential to impact built heritage resources and/or cultural heritage landscapes, a Heritage Impact Assessment (HIA) will be implemented, and a copy of the HIA will be sent to the Ministry of Tourism, Culture and Sport for review by a Heritage Planner. The HIA will be forwarded to the local municipality and its municipal heritage committee for their review and comment and will also be available, upon request, for the local heritage organizations with an interest in the project.

5.0 DEVELOPMENT OF OPTIONS FOR IMPROVEMENTS TO SANITARY SEWER SYSTEM

The following sections present details of work undertaken under Phase 2 of the Class EA process. Phase 2 involves the identification and evaluation of various conceptual alternatives with the objective of determining alternative solutions which best address the identified problems and needs based on the potential impact to the natural, social and economic environments.

5.1 APPROACH

The purpose of this section is to consider reasonable solutions to the defined problem. Some solutions may be touched upon briefly, but not considered as options to be evaluated for one reason or another, as explained below. The criteria used to evaluate the options were based on generally accepted principles and previous experience. The criteria included the following:

- Application of current engineering practices and standards;
- Adherence to applicable laws and regulations;
- Economic considerations;
- Operation and maintenance issues;
- Health and safety;
- Acceptability to concerned stakeholders; and
- Feasibility of implementation.

5.2 OPTIONS FOR EVALUATION

5.2.1 Option 1: Do Nothing

The "Do Nothing" option provides a benchmark for the evaluation and is a required component of the environmental assessment process. This option assumes that nothing is done to address the stated problem. In this particular case, if nothing is done to increase the Ward 1 sanitary sewer system's hydraulic capacity or to reduce the volumes of infiltration and inflow into the sanitary system, the Town cannot connect new users to the sanitary sewage system. Further, if nothing is done to reduce the hydraulic stress at the sanitary sewer system, the risk of basement flooding will not be effectively controlled, particularly during periods of heavy rain events.

5.2.2 Option 2: Reduction of Extraneous Flows

Option 2 is to reduce the volume of extraneous flows entering the sanitary sewer system, thereby mitigating the risks of sewer backup. Extraneous flows to the sanitary sewer system could be reduced by:

- Reducing groundwater infiltration into the sanitary sewers, and/or
- Reducing storm water inflows into the sanitary sewers.

The following sub-section discusses the different components that will contribute to overall sanitary sewer extraneous flow reduction.

5.2.2.1 Reduction of Groundwater Infiltration into Sanitary Sewers

Groundwater enters sanitary systems through holes and cracks in manholes, laterals, and sewer pipes. Groundwater infiltration in the sewers can be reduced by replacing or lining sewers that leak. If groundwater infiltration into the sanitary sewers is significant, high extraneous flows to the sanitary sewer system will be reduced by controlling groundwater infiltration into the sanitary sewers.

The Town has completed an inflow and infiltration study including CCTV inspection, fog tests, sanitary manhole field investigations, flow monitoring and hydraulic modeling for the Essex Ward 1 Sanitary Sewer System. The results of the inflow and infiltration study indicate that the amount of groundwater infiltration in the sanitary system is insignificant compared to storm water inflows.

Reducing groundwater infiltration is therefore considered to have very limited effect on the reduction of extraneous flows entering the sanitary sewer system.

5.2.2.2 Reduction of Storm Water Inflows into Sanitary Sewers

Water from storm events enters the sewage system through direct sources such as yard, roof and downspouts, illegal cross-connections with sanitary sewers, foundation drains, and manhole covers.

The Town has conducted a field investigation and hydraulic modeling to identify the sources of inflow and infiltration. The results of the inflow and infiltration study indicate that the amount of storm water inflows in the sanitary network is very significant, resulting in sewer backup. Storm flows to the sanitary sewer system can be reduced by sealing existing manholes to sanitary sewers and by disconnecting domestic sump pumps and roof drains from the sanitary network and diverting these flows to a storm water drainage system. Reduction of storm water entering the sanitary sewers must be accompanied by storm water management.

The Town has conducted field investigations, manhole cleanups and sewer repairs to control and reduce infiltration. The Town has also installed watertight manhole inserts to prevent rainwater from entering sanitary sewer through manhole covers.

However, the exact source of storm water inflows is difficult to pinpoint. Reducing storm water inflows can be onerous and expensive. Inflow and infiltration reduction and associated storm

water management is a long-term solution. The Town should continue inflow and infiltration reduction program to control and reduce storm water inflows.

5.2.3 Option 3: Increase Hydraulic Capacity of Sanitary Sewer System

The Essex Ward 1 area is served by a separate sanitary sewer system, which is designed for conveying domestic sewage and wastewater with allowable inflow and infiltration as per the design guidelines by the Ontario Ministry of Environment.

The sanitary sewer frequently experiences periods of high wet weather flows during severe storm events. However, the sanitary sewer system, including the gravity sewer, pumping station and forcemain, does not have sufficient hydraulic capacity to handle excess wet weather flows, causing sewer backup. The hydraulic capacity of sanitary sewer system can be increased to handle excess wet weather flows mainly containing storm water.

Figure 5.1 in **Appendix A** shows the overall layout of the preferred short-term solution for increasing the hydraulic capacity of the Essex Ward 1 Sanitary Sewer System. The areas with very limited capacity need to be upgraded to increase hydraulic capacity. **Figure 5.2 and 5.3** in **Appendix A** illustrate the process flow schematic and hydraulic profile of the preferred short-term solution, respectively.

Based on the hydraulic modeling study of the Essex Ward 1 Sanitary Sewer System, the following areas with limited hydraulic capacity shall be improved to handle excess wet weather flows (refer also to **Figure 5.1** in **Appendix A)**:

- Inlet Pumping Station at the Essex WPCP;
- Sewage Pumping Station No. 3 and Forcemain; and
- Sanitary sewer along Brien Avenue East from the Gosfield Town Line to Maidstone Ave East.

5.2.4 Option 4: Re-Commissioning of Southwest Lagoon Cell No.2 for Wet Weather Flow Storage

One of the decommissioned Southwest Lagoon cells can be re-commissioned to buffer the surge of high wet weather flows that occur during high runoff and infiltration periods (e.g. spring snowmelt and heavy rain event) and reduce the risks of sewer backup in the sanitary sewer system. **Figure 5.2** in **Appendix A** illustrates the process flow schematic for re-commissioning Southwest Lagoon Cell No. 2 and proposed improvements to Inlet Pumping Station at the Essex WPCP. It is proposed to reuse Lagoon Cell No. 2 as a wet weather flow storage tank, based on its close proximity to the Essex WPCP and Inlet Pumping Station.

In the event of a large rainfall or even a plant mechanical/biological issue that may occur at the Essex WPCP, it is proposed for incoming sewage flow to be diverted to the Southwest Lagoon Cell No. 2. In doing so, excess storm flow entering the sanitary sewer system will be bypassed into Lagoon Cell No.2, and the North Malden and Puce Drain System will be protected from these potential occurrences. Once conditions return to normal, any excess content can be transferred back to the Essex WPCP for treatment. Details on the transfer of sewage to and from the plant and Southwest Lagoon Cell No. 2 are explained below.

Excess flows resulting from severe storm events are bypassed into a wet weather flow storage tank (i.e. via the re-commissioning of Southwest Lagoon Cell No. 2). If the water quality meets the effluent criteria for the Essex WPCP, then the stored wet weather flow is discharged into the Essex Outlet Drain. If the quality criteria of wet weather flow in the re-commissioned Southwest Lagoon Cell No. 2 is exceeded following the storm event, the lagoon contents are drained back to the Inlet Pumping Station for treatment when capacity becomes available at the plant.

The results of Ward 1 hydraulic modelling analysis indicates that the total volume of all wet weather flow during a 100-year storm event that exceeds 168 L/s is in the range of 20,000 m^3. The volume of Lagoon Cell No.2 is 71,658 m^3, which is larger than required to accept all wet weather flow that exceeds 168 L/s, which would have to be diverted to Lagoon Cell No. 2 and stored until there is treatment capacity available. When the Essex WPCP influent flow is less than 168 L/s, stored wet weather flow in Lagoon Cell No. 2 can be diverted to the plant at a rate that ensures the overall plant influent flow does not exceed the rated treatment capacity of 168 L/s.

Although there is potential for odours to occur if wet weather flows are stored for a number of days after the conclusion of a storm event, it does not seem likely that significant odour problems will be generated by the lagoon cell. The lagoon cell receive excess wet weather flows contained less pollutants that typical sanitary sewage. Also, the minimum water level in the lagoon cell will be maintained at around 193.700 m to minimize the release of any potential odorous gases into the atmosphere.

The MOE Guideline D-2 "*Compatibility between Sewage Treatment and Sensitive Land Use*" states the minimum separation distance from a sewage treatment system noise/odour source to the property line of the sensitive land use shall be 100m. The existing Essex WPCP system is more than 200 m from the closest sensitive land use which is a private residence. The re-commissioned lagoon cell is located in the northwest section of the existing Essex WPCP and the separation distance from the lagoon cell to the closest sensitive land use is greater than150m.

5.2.5 Option 5: New Storm Water Retention Pond

Construction of a new storm water retention pond at another location was considered but excluded from further analysis because it is unknown whether storage of storm water could

significantly reduce storm water entering the sanitary systems to minimize risks of basement flooding.

6.0 EVALUATION CRITERIA AND RESULTS

This section of the report will detail the evaluation criteria and explain the process that was used to review each option in relation to the criteria. Some of the criteria are subjective and, as such, the evaluation process is affected by the opinions of those who participate in the evaluation process. This is generally considered to be a beneficial component of the report since it then compiles many views on the issues presented.

Several conceptual alternative solutions may be proposed to address the identified problems and needs of mitigating the risks of sewer backup. The following broad planning level alternative solutions have been considered for addressing sewer backup:

1. Do Nothing
2. Reduction of Extraneous Flows
3. Increase Hydraulic Capacity of Sanitary Sewer System
4. Re-Commissioning of Southwest Lagoon Cell No.2 for Wet Weather Flow Storage

6.1 SCREENING CRITERIA

The criteria for evaluation are the environments that could be affected by the work. These environments have been grouped into Natural Environment and Social / Economic Environment categories.

The advantages and disadvantages of each alternative together with their effects on the socio-economic and natural environment are discussed in the following sections.

6.2 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.2.1 Socio-Economic Environment

The Do Nothing planning alternative involves retaining the existing sanitary sewer system and carrying out no improvements, expansions or new works to remedy the identified problems and needs. It eliminates the need for large capital expenditures; however, it does not address the problems and needs of the sanitary sewer system.

Due to excess storm water entering sanitary sewer system, the Do Nothing alternative would result in sewer backups in the existing sanitary sewer system as has been demonstrated over the last two years.

Clearly, the Do Nothing alternative will result in no improvements to existing sanitary sewer system and does not provide an acceptable solution to the problems and needs while satisfying the study objectives of mitigating the risks of sewer backup.

The Do Nothing alternative is therefore not considered a viable option and will not be considered further in this study; however, it can serve as a benchmark to evaluate the implications if none of the other planning alternatives are implemented.

As a whole, the remaining alternative planning solutions represent a viable solution to the identified problems from a socio-economic perspective and shall be considered further in this study.

6.2.2 Natural Environment Impacts and Mitigating Measures

Table 6-1 provides a summary of potential environmental impacts and proposed mitigating measures.

As a group, the alternative planning solutions (except the "Do Nothing" alternative) will have a limited effect on the environment and that effect will be mostly due to construction activities.

Table 6-1 Environmental Effects and Mitigation Measures

Operation	*Effect*	*Mitigating Measures*
Cutting, digging, or trimming ground covers, shrubs and trees	Reduced terrestrial wildlife habitat quality (i.e., diversity, area, function) and increased fragmentation of habitat.	➢ This is not a concern as there is no significant existing terrestrial wildlife habitat in the proposed area of construction
	Loss of unique or otherwise valued vegetation features	➢ There are no known unique vegetation features in the area that may be disturbed by construction activities. ➢ Where possible, existing vegetation features will be restored to a preconstruction condition.
Trenching / tunnelling for sewers, excavation and construction for sewage pump station	Soil erosion and sediment transport to adjacent water bodies causing sedimentation and turbidity of adjacent water bodies and drainage ditches	➢ Use of erosion control measures (i.e. sediment traps, silt fences, etc.) ➢ Collect contaminated runoff ➢ Restore vegetation growth quickly ➢ Stage construction activities to minimize potential of adverse impacts
	Reduced water quality and clarity due to increased erosion and sedimentation, and transport of debris.	➢ Apply wet weather restrictions to construction activity. ➢ Comply with any local regulations, policies and guidelines that stipulate a minimum acceptable buffer width (the allowable distance from a water body). Maximum buffer widths are desirable.

Operation	*Effect*	*Mitigating Measures*
		➢ If possible, direct surface drainage away from working areas and areas of exposed soils. To the maximum extent possible, promote overland sheet flow to well vegetated areas. ➢ Install and maintain silt curtains, sedimentation ponds, check dams, cofferdams or drainage swales, and silt fences around soil storage sites and elsewhere, as required.
	Loss of vegetation and topsoil and mixing topsoil and subsoil	➢ Restore site by replacing topsoil and reinstate vegetation to prevent erosion
	Removal and/or disturbance of trees and ground flora	➢ Avoid treed areas where possible ➢ Employ tree protection measures ➢ Replace trees and provide site landscaping
	Temporary disruption of pedestrian and vehicle traffic	➢ Provide and maintain detours ➢ Provide for safe alternate routes ➢ Select alternate routes to minimize inconvenience
	Temporary disruption and inconvenience during construction to adjacent properties, buildings and inhabitants	➢ Notify public agencies and neighbouring owners of construction activities ➢ Prepare program for reporting and resolving problems ➢ Ensure access is provided for emergency vehicles and personnel ➢ Apply noise and vibration control measures ➢ Apply dust control measures ➢ Control emissions from construction equipment and vehicles ➢ Use silencers to reduce noise ➢ Require compliance with municipal noise by-laws
	Possible need to remove petroleum contaminated excavated material.	➢ Sample material. ➢ Handle and dispose of contaminated material in an acceptable manner
	Decreased ambient air quality due to dust and other particulate matter.	➢ Avoid site preparation or construction during windy and prolonged dry periods. ➢ Cover and contain fine particulate materials during transportation to and from the site. ➢ Instruct workers and equipment operators on dust control methods. ➢ Spray water to minimize dust off paved areas or exposed soils. ➢ Stabilize high traffic areas with a clean gravel surface layer or other suitable cover material. ➢ Cover or otherwise stabilize construction materials, debris and excavated soils against wind erosion.
	Disturbance to microscopic organisms in the soil.	➢ Limit the size of stockpiles to avoid anaerobic conditions. ➢ Protect stockpiled soils from exposure to and sterilization by solar radiation (or stockpile in an uncovered shaded

Operation	*Effect*	*Mitigating Measures*
		area).
	Reduced soil capability through compaction and rutting, and mixing of topsoil and layers below.	➢ Avoid working during wet conditions and/or confine operation to paved or gravel surfaces. ➢ Whenever possible, strip and store topsoil separately from the layers below and return to excavation in sequence.
	Removal and/or disturbances of trees and flora.	➢ Avoid treed areas ➢ Employ tree protection measures ➢ Avoid areas with significant vegetation
	Agricultural disruption of field access.	➢ All driveways, roadways and field access will be restored to pre-construction condition ➢ Staging of construction and advance notice to property owners prior to disruption of construction to minimize inconvenience
	Disruption of tile and surface drainage systems.	➢ Provide for temporary drainage systems until final restoration is accomplished. ➢ Avoid disturbing drainage systems during critical periods. ➢ All existing culverts, tiles and drainage systems to be restored to pre-construction conditions following construction.
	Reduced water quality of nearby surface waters having value as wildlife habitat.	➢ Use sediment control techniques for stockpiled materials to minimize degradation of water quality.
	Modifications or removal of aquatic habitat.	➢ Stage construction to minimize potential for adverse impacts.
	Residential impacts.	➢ Construction noise and dust impacts will be controlled through noise by-laws and dust control measures in contract specification. ➢ Inconvenience due to temporary loss of property access will be minimized through proper communication and advance notice of disruption. ➢ Pedestrian safety will be maintained through excavation barricades and construction fencing
	Traffic disruption.	➢ Construction activities will attempt to maintain a minimum of one lane of open traffic at all times with necessary detour signage and flag persons. ➢ If complete closure is required, emergency services will be advised in advance and access will be restored at the end of each working day.
	Visual aesthetics.	➢ Storm water sewers will be buried and have no impact on aesthetics.
	Recreation.	➢ Maintain access to recreational sites during construction.

Operation	*Effect*	*Mitigating Measures*
		➢ Locate water and wastewater infrastructure components to minimize impact.
	Archaeological and heritage resources.	➢ Assess archaeological significance in areas undisturbed by previous activities such as farmland and marine archaeology. Complete Stage 1 & 2 Land and Marine Archaeological Assessment if required and follow mitigative measures outlined in cooperation with the Ministry of Tourism, Culture and Sport.
Use of construction equipment	Contamination of surface waters, drains and public roadways from spills, leaks or equipment refuelling.	➢ Use containment facilities ➢ Inspect equipment regularly for fuel and oil leaks ➢ Clean equipment before it travels off site
	Decreased air quality due to vehicular emissions causing increased concentrations of chemical pollutants.	➢ Minimize operation and idling of vehicles and gas-powered equipment, particularly during local smog advisories. ➢ Use well-maintained equipment and machinery within operating specifications.
	Disruption to wildlife migration and movement patterns, breeding, nesting or hibernation.	➢ There are no known areas containing sensitive vegetation and wildlife. ➢ There are no known areas where migratory birds are breeding.
	Introduction of non-native vegetation, including opportunistic species.	➢ Clean heavy machinery and equipment prior to transporting to new location.
	Loss of unique or otherwise valued vegetation features	➢ Avoid or minimize trampling vegetation with equipment. ➢ Minimize physical damage to vegetation by avoiding push-outs and avoiding the placement of splash onto living vegetation.
	Reduced water quality and clarity due to increased erosion and sedimentation, and transport of debris.	➢ Operate heavy machinery on the shore above the normal water level. ➢ Where possible, conduct activities in the dry, above the actual water level and above any expected rises in water level that may occur during a rainfall or snowmelt event.
	Reduced water quality due to inputs of contaminants from surface runoff during construction and operation.	➢ Refuel equipment off slopes and well away from water bodies. ➢ Securely contain and store all oils, lubricants, fuels and chemicals. If necessary, use impermeable pads or berms.

6.3 SCREENING SUMMARY AND RECOMMENDED ALTERNATIVE SOLUTIONS

A comparative summary of the four standalone conceptual planning level alternative solutions and their ability to meet the needs is presented in **Table 6-2**. The results of the preliminary screening clearly indicate that the preferred alternative solutions which address the identified problems and study objectives are as follows:

A. Reduction of Extraneous Flows

B. Increase Hydraulic Capacity of Sanitary Sewer System

C. Re-Commissioning of Southwest Lagoon Cell No.2 for Wet Weather Flow Storage

It is anticipated that the recommended conceptual planning alternatives are not considered to have any significant effect on the natural environment. In fact, it is anticipated that the provision of a greater degree of pollution control will enhance the quality of local watercourses and improve the natural environment to a great extent.

The main impact on the socio-economic environment is related to the disruption that residents and businesses may experience during the course of construction. However, this potential inconvenience and disruption would be temporary and should not significantly affect the environment.

With respect to other socio-economic impacts, the preferred conceptual planning alternatives are also not considered to have any serious impacts on existing land uses, cultural activities, heritage resources or any other community program except to the extent that it will permit the ongoing implementation of development and other activities as envisioned in planning documents which have positive impacts on the socio-economic environments.

6.4 EVALUATION RESULTS

Based on a review of the identified problems in **Section 3** and development of alternatives for improvements in **Section 5**, the following sections describe the preferred short-term and long-term solutions to the problems related to the Essex Ward 1 Sanitary Sewer System.

6.4.1 Short-Term Solution

Basement flooding is a complex problem, which is further complicated by the changing weather patterns currently being experienced across the country (i.e. - more frequent high intensity storms). Municipalities across Canada are experiencing an increase in basement flooding issues and are being challenged with how best to address the problem in an affordable

Table 6-2 Comparative Summary of Conceptual Planning Alternatives

Conceptual Planning Alternative Solutions	*Advantages*	*Disadvantages*	*R / NR **
Do Nothing	• Eliminates need for large capital expenditures	• Sewer backup associated with excess inflow and infiltration • Potential basement flooding due to sewer backup	NR
Reduction of Extraneous Flows	• Reduces excess inflow and infiltration entering sanitary sewer system and treatment plant • Reduces operation cost of pumping station and treatment facilities • Can potentially defer the timing for very significant capital expenditures • More efficient in diluting and reducing pollutants	• Exact source of extraneous flows difficult to pinpoint • Onerous and expensive long-term solution • Sewer backup problems associated with excess storm water inflow cannot be addressed in short-term	R
Increase Hydraulic Capacity of Sanitary Sewer System	• Significantly reduces basement flooding problems related to excess inflow and infiltration. • Prevents potential bottlenecks from excess storm water inflow and increases hydraulic capacity to minimize basement flooding in the area • Could form part of preferred short-term solutions	• Involves greater community disruption • Involves capital expenditures • Measures alone will not meet long-term servicing needs	R
Re-Commissioning of Southwest Lagoon Cell No.2 for Wet Weather Flow Storage	• Buffers the surge of high wet weather flows that occur during excess inflow and infiltration periods • Significantly reduces basement flooding problems related to excess inflow and infiltration • Could form part of preferred short-term solutions	• Involves capital expenditures due to construction of bypass chamber at Essex WPCP	R

*** R = Recommended NR = Not Recommended**

manner. Long-term solutions generally involve reducing the level of inflow & infiltration coupled with improvements to the storm water system.

Since the long-term solution noted above will take many years to implement, residents cannot simply wait and endure the flooding until I&I is curtailed. Hence, there is a need to implement a short-term solution that will address the flooding in the immediate time frame while the Town continues to implement the long-term solution.

The recommended short-term solution being proposed is to increase the hydraulic capacity of the Town's sanitary sewer system to accommodate the increased sewage flows caused by inflow & infiltration during severe storm events and store it until the storm event passes and the resulting sewage returned to the treatment system.

Various alternatives were reviewed and evaluated to ensure that a cost-effective, viable short-term solution was identified. A summary of the various short-term solutions investigated is presented below:

Southwest Service Area

1. Re-Commissioning the Essex Southwest Lagoon
   - Re-commission one of the existing decommissioned Southwest Lagoons to temporarily store excess wet weather flow.
   - Construct drain line with control valve between the Southwest Lagoons and the wet well of the Inlet Pumping Station at the Essex WPCP.
2. Install fourth pump in the existing Inlet Pumping Station at the Essex WPCP to increase firm pumping capacity from 167 L/s to 250 L/s.
   - Construct new flow distribution chamber adjacent to Inlet Pumping Station at the Essex WPCP. This new flow distribution chamber is to be used to receive and distribute incoming sewage flows to either the Essex WPCP or the Southwest Lagoons for temporary storage (when flows are above the Essex WPCP's peak capacity rating).
   - Construct new interconnection piping between the flow distribution chamber and the Southwest Lagoons.
3. Pumping Station No. 3 Upgrades
   - Increase existing Pumping Station No. 3's firm capacity from 65 L/s to 220 L/s via construction of a new adjacent pumping station and interconnection with the existing pumping station.
   - Extend new sanitary forcemain from the intersection of South Talbot Road and Brien Avenue West to a new flow distribution chamber at the Essex WPCP.
   - Provision of emergency standby power in the event of a power outage during a storm event.

Northeast Service Area

4. Increase Sanitary Sewer Size
    - Replacement of the existing 250 mm diameter sanitary sewer along Brien Avenue East from Gosfield Townline to Maidstone Avenue East with a new 375 mm diameter sanitary sewer.

6.4.2 Long-Term Solution

6.4.2.1 On-Going Inflow and Infiltration Reduction Program

The Town will continue to reduce Inflow& Infiltration through the Sewer Repair & Rehabilitation Program.

Storm water contributes to excessive inflow and infiltration into the Town's sanitary sewers, which in turn contributes to basement flooding. When a significant amount of storm water pools on Town streets and there is significant runoff from existing roof structures; then storm water can enter the Town's sanitary sewer system through:

- holes in the sanitary sewer manhole cover or cracks in the manhole;
- cracks in the sanitary sewer or service connection;
- broken or missing sanitary cleanout caps;
- catch basins directly connected to the sanitary sewer;
- downspouts directly connected with the sanitary sewer; and
- weeping tiles or sump pumps directly connected with the sanitary sewer.

The Town is implementing a Basement Flooding Protection Subsidy Program to assist residents with the following initiatives:

- disconnection of downspouts from the Town's sewers;
- capping storm drains entering the Town's sanitary sewer system;
- installation of a backflow valve on private sanitary sewer lines;
- disconnection of foundation drains from the Town's sewers, and installation of sump pump to drain foundation drains to surface; and
- review of grading and downspout discharge on private property and revise where possible to provide positive drainage.

In September of 2015, the Essex Town Council has approved a subsidy program designed to assist residents in reducing the risk of basement flooding. The program covers backwater valve installation, sump pump/pit installation, investigative pipe camera work, and downspout disconnection work.

6.4.2.2 Public Awareness and Education

The Town shall continue to educate residents on the utilization of private sanitary and storm sewer systems while implementing public awareness and education programs to reduce inflow and infiltration and stem the public abuse of the sanitary sewage system.

Public awareness and education programs are to be aimed particularly at raising and maintaining community awareness on the root causes and consequences of inflow and infiltration including regulatory provisions regarding illegal connections.

Information and education articles on inflow and infiltration reduction can be published thru local media such as Town websites, local newspapers and direct delivery to residents.

6.4.2.3 Storm Water Management (SWM)

Climate changes related to increasing rainfall in the region have a significant impact on municipal sewer systems. Significant amounts of storm water pooling on Town streets and significant runoff from roof structures can drastically increase the volume of storm water entering the Town's sanitary sewer system.

SWM techniques can be used to address capacity issues and improve storm water runoff quality. SWM can effectively mitigate the detrimental effects of urbanization (land development) on the hydrologic cycle including increased runoff during storm events. SWM is considered a shared responsibility between the Town, developers, property owners, conservation authorities and senior levels of government.

It is recommended that the Town's current development policies and standards regarding sanitary sewer and storm water management be reviewed and updated so that SWM including source control is better integrated into the municipal planning process.

Source control is an important element in municipal storm water management. It refers to managing storm water at the lot level (private properties) or nearby in the neighborhood, typically on the road right of way. The purpose of source control is to reduce the flow rate of storm water from private properties into the municipal storm water sewer system.

7.0 PUBLIC CONSULTATION

7.1 PUBLIC AND REVIEW AGENCY CONSULTATION

Public and review agency consultations are ongoing on the evaluation of the preferred solution. This report will be made available to the public and review agencies as a part of the consultation process.

7.2 COUNCIL MEETING

On Tuesday, September 8, 2015, a Council Meeting was held to discuss the issues and investigation work that was performed to date. A strong sense of urgency to resolve the basement flooding issues was felt from the public. A copy of the presentation materials can be found in **Appendix C.**

7.3 PUBLIC INFORMATION CENTRE

Essex Ward 1 Councilors (Mr. Steve Bjorkman and Mr. Randy Voakes) hosted an open house on Wednesday, October 14, 2015, from 7:00 p.m. -9:00 p.m. at the Essex Centre Sports Complex (60 Fairview Avenue West, Essex, Ontario), where information regarding alternative designs for the preferred solution were presented in order to solicit public input. Over 50 members of the public attended the open house. After the presentation of the proposed works by Stantec, the attendees indicated that the recommended short-term and long-term solutions appear to be reasonable. To date, no other comments have been received by the public.

A copy of the open house notice, which was posted on the Town's website, is included in **Appendix C**. The presentation materials, comment sheets and sign-in sheet are also included in **Appendix C.**

7.4 FIRST NATIONS CONSULTATION

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

No comments to the study have been received to date.

8.0 OPINION OF PROBABLE COST

This section discusses the engineer's opinion of probable cost for the preferred short-term improvements to the Essex Ward 1 Sanitary Sewer System.

An opinion of probable cost can be prepared as an attempt to project what someone else will be willing to contract for in the future to do construction work which has not yet been defined and which is subject to changes in scope, design, and market conditions.

8.1 LEVEL OF ACCURACY

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

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

Table 8-1 includes a summary of typical estimate classifications used throughout a project's development including a description of the project stage and range of accuracy. The opinions of probable cost in this study are estimated at the study stage (Class 2) and the corresponding level of accuracy could range from –15% to +30% from the opinion presented in the report.

Table 8-1 Classification of Cost Estimates

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

8.2 FACTORS CONSIDERED IN DEVELOPING AN OPINION OF PROBABLE COST

In addition to the level of accuracy discussed, the opinion of probable cost was prepared taking into consideration the following factors.

- All estimates are third quarter, 2015 dollars based on an Engineering News Record (ENR) Construction Cost Index of 1097 for Toronto (October 2015).
- It is assumed that the Contractor will have unrestricted access to the site and will complete the work during normal working hours from 7:00 am to 7:00 pm Monday to Friday. There is no allowance for premium time included.
- Labour costs are based on union labour rates for the Windsor area.
- An allowance is included for mobilization and demobilization and the Contractor's overhead and profit.
- Equipment costs are based on vendor supplied price quotations and historical pricing of similar equipment.
- Bulk material and equipment rental costs used are typical for the Windsor area.
- The estimate does not include the cost of application or permit fees.
- HST is excluded.
- Allowances for engineering and contingencies (15% and 15% respectively) are included in the estimate.
- No allowance is included for interim financing costs or legal costs.
- No allowance is included for escalation beyond the date of this report.
- It is not known whether contaminated soil conditions would be encountered in the areas proposed for the sewers. The potential impact cannot reasonably be determined at this point and no allowance is included in the estimate for this possible eventuality.

8.3 OPINION OF PROBABLE COST FOR PREFERRED SHORT-TERM IMPROVEMENTS

This section outlines the preferred short-term solution for sanitary sewer system improvements to service the needs of the community and address the issues while minimizing the environmental impacts.

Proposed improvements with respect to capital budget estimates (in 2015 dollars), anticipated timing and Class EA Schedule are summarized in **Tables 8-2**. The budget costs include allowances for contingencies and engineering.

Table 8-2 Opinion of Probable Capital Cost for Preferred Short-Term Solution

Item	Probable Cost	Class EA Schedule
1. Re-Commissioning Essex Southwest Lagoons • Re-commission one of existing decommissioned Southwest Lagoons to temporarily store excess wet weather flow assuming no liner is required • Sludge to be pumped to Essex WPCP for treatment & disposal • Construction of new drain line with flow control between Southwest Lagoons and Inlet Pumping Station at Essex WPCP.	$ 125,000	B
2. Inlet Pumping Station Upgrades at Essex PCP • Installation of new fourth pump in existing Inlet Pumping Station at Essex WPCP to increase firm pumping capacity • Construction of new flow distribution chamber adjacent to Inlet Pumping Station at the Essex WPCP. • Construction of new interconnection piping between flow distribution chamber and Southwest Lagoons.	$ 350,000	B
3. Pumping Station No. 3 Upgrades • Increase Pumping Station No. 3 firm capacity from 65 L/s to 220 L/s via construction of new adjacent pumping station and interconnection with existing pumping station. • Extension of new sanitary forcemain from intersection of South Talbot Road and Brien Avenue West to new flow distribution chamber at Essex WPCP • Provision of emergency standby power in event of a power outage during storm event	$ 2,000,000	B or A+
4. Increase Sanitary Sewer Size • Construction of new replacement sewer for the existing 250 mm diameter sanitary sewer along Brien Avenue East from the Gosfield Townline to Maidstone Avenue East with a new 375 mm diameter sanitary sewer.e	$ 850,000	A+
Sub-Total	**$ 3,325,000**	
Contingency Allowance (15%)	$ 500,000	
Sub-total Construction Cost	**$ 3,825,000**	
Engineering Allowance (15%)	$ 575,000	
TOTAL CAPITAL COST (excluded Taxes)	**$ 4,400,000**	

9.0 SUMMARY

9.1 RECOMMENDATIONS

It is recommended that the work described in **Table 8-2** be considered as a high priority to address basement flooding issues as follows:

- Re-commission one of the existing Southwest Lagoons cells
- Upgrade inlet pumping station at the Essex Water Pollution Control Plant
- Upgrade Pumping Station No. 3 and extend new forcemain
- Increase size of existing sanitary sewer along Brien Avenue East

It must be acknowledged that the above recommended "short-term" works will not address all the flooding problems in the service areas but will significantly reduce the potential for basement flooding. It is further recommended that the Town continue to implement long-term inflow and infiltration reduction measures as discussed herein.

9.2 PERMITS AND APPROVALS

The short-term solutions noted herein are considered to be Schedule "A+" activities for sewer and forcemain initiatives and Schedule "B" activities for pumping station upgrades and recommissioning of the existing Southwest Lagoon Cell No. 2 under the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) Act. This will require the Town to complete both Phases 1 & 2 of the planning process under the Class EA.

A Ministry of Environment and Climate Change (MOECC) Environmental Compliance Approval (ECA) (formerly referred to as certificate of approval) is to be obtained prior to constructing the project. The application shall be prepared upon completion of the design brief followed by completion of the detailed design drawings and specifications.

The MOECC's standard practice is to process and review ECA applications in a chronological order as received. It is anticipated to take 8-10 months for the MOECC to review and approve an ECA application. The MOECC Environmental Approvals Branch accepts priority requests under specific circumstances as outlined below:

- to prevent or mitigate an emergency situation;
- for high priority, government initiatives (e.g. Pan-Am Games);
- to pilot new technologies;
- to address non-compliance issues;
- the project has received a high level of organized public interest/opposition; and
- the project was subject to an individual EA, where a technical review was conducted.

Where proponents believe their application fits into the above criteria, the MOECC requests that detailed written justification including documentation as applicable be provided to the MOECC along with anticipated impacts and record of pre-application consultation with the MOECC district/area office. The Town intends to request prioritization to ensure that the improvements are completed in 2016.

We are not aware of any other regulatory permits and approvals that are necessary with respect to the proposed improvements.

9.3 PROJECT & CONSTRUCTION SCHEDULE

Project & construction schedule is subject to the following activities:

→ Complete Schedule "B" Class Environmental Assessment from October 2015 to January 2016

- 1st Mandatory Public Contact – Notice of Study Commencement in October 2015
- Prepare Schedule "B" Class Environmental Assessment Report during October and November 2015
- 2nd Mandatory Public Contact – Notice of Completion in December 2015
- End of 30-Day Review Period in January 2016

(Note: No time has been included in the above schedule to review Part II Orders. It is not anticipated that Part II Orders will be requested.)

→ Complete design brief and approval drawings and submit MOECC application for environmental compliance approval (ECA) in February 2016

(Note: It is assumed that review of this ECA amendment application will be prioritized and approval will be received within two months)

→ Commence & carry out detailed design and preparation of specifications and contract documents from November 2015 to March 2016

→ Public tender in March 2016 for construction bids with award of contract in April 2016 subject to MOECC approval;

→ Commence construction in May 2016 with final commissioning anticipated in fall 2016 subject to MOECC approval.

10.0 REFERENCES

The following previous studies and documents have been referred to for background reference information:

1. Canadian Historic Places, http://www.historicplaces.ca/en/home-accueil.aspx
2. Environment Canada, Canadian Climate Normals Data, 1971 to 2000
3. Municipal Engineers Association, Municipal Class Environmental Assessment, October 2000 (as amended in 2007 and 2011)
4. Ontario Ministry of the Environment (2008), Design Guidelines for Sewage Works.
5. Ontario Ministry of Tourism, Culture and Sport, Heritage Conservation Districts http://www.mtc.gov.on.ca/en/heritage/heritage_conserving_list.shtml
6. Ontario Ministry of Tourism, Culture and Sport, Archaeological Assessments http://www.mtc.gov.on.ca/en/archaeology/archaeology_assessments.shtml#a1
7. Sewer Maintenance Services, Fog Testing Report, June 2015
8. Sewer Maintenance Services, Sanitary/Storm Sewer Investigation, June 2015
9. Stantec Consulting Ltd., Class Environmental Assessment Study Report for Essex Sewage Works, August 2002
10. Stantec Consulting Ltd., Essex Sanitary Sewer Maintenance Condition Assessment, May 2015
11. Stantec Consulting Ltd., Essex Sanitary Sewer System Hydraulic Model Development, Calibration and Capacity Assessment, August 2015
12. Stantec Consulting Ltd., Essex Ward 1 Inflow and Infiltration Study, September 2014
13. Town of Essex, Official Plan of the Town of Essex, 2009
14. Town of Essex, Interactive Mapping, http://maps.essex.ca/

Appendix A FIGURES

W:\active\165620006_ward_one_flow_opt_&_long_range_planning_san_study\planning\Class EA - Solution to Basement Flooding\Figures\FIGURE 1.1.dwg
2015-11-23 02:02pm BY: jfabbro

essex

Stantec

TOWN OF ESSEX
IMPROVEMENTS TO WARD 1 SANITARY SEWER SYSTEM
CLASS ENVIRONMENTAL ASSESSMENT

KEY PLAN OF ESSEX COUNTY

PROJECT NO. 165620006

DATE: 2015.11.26

0 1 km. 5 km.

DRAWING NO. FIGURE 1.1

W:\active\165620006_ward_one_flow_opt_&_long_range_planning_san_study\planning\Class EA - Solution to Basement Flooding\Figures\FIGURE 1.2.dwg
2015-11-24 09:50am BY: jfabbro

essex

Stantec

TOWN OF ESSEX
IMPROVEMENTS TO WARD 1 SANITARY SEWER SYSTEM
CLASS ENVIRONMENTAL ASSESSMENT

EXISTING SANITARY SEWER SYSTEM AND SERVICE AREAS IN ESSEX WARD 1 AREA

PROJECT NO. 165620006
DATE: 2015.11.25
1:12500
0 125 375 600m
DRAWING NO. FIGURE 1.2

PHASE 1

PROBLEM OR OPPORTUNITY

1. IDENTIFY PROBLEM OR OPPORTUNITY
2. DISCRETIONARY PUBLIC CONSULTATION TO REVIEW PROBLEM OR OPPORTUNITY

DETERMINE APPLICABILITY OF MASTER PLAN APPROACH (SEE SECTION A.2.7)

PHASE 2

ALTERNATIVE SOLUTIONS

1. IDENTIFY ALTERNATIVE SOLUTIONS TO PROBLEM OR OPPORTUNITY

SELECT SCHEDULE (APPENDIX 1)

2. INVENTORY NATURAL, SOCIAL, ECONOMIC ENVIRONMENT
3. IDENTIFY IMPACT OF ALTERNATIVE SOLUTIONS ON THE ENVIRONMENT, AND MITIGATING MEASURES
4. EVALUATE ALTERNATIVE SOLUTIONS; IDENTIFY RECOMMENDED SOLUTIONS
5. CONSULT REVIEW AGENCIES AND PUBLIC re: PROBLEM OR OPPORTUNITY AND ALTERNATIVE SOLUTIONS
6. SELECT PREFERRED SOLUTION

REVIEW & CONFIRM CHOICE OF SCHEDULE

SCHEDULE A

APPROVED – MAY PROCEED

IF NO ORDER*, MAY PROCEED

ORDER* GRANTED, PROCEED WITH INDIVIDUAL E.A. OR ABANDON PROJECT

OPPORTUNITY FOR ORDER* REQUEST TO MINISTER WITHIN 30 DAYS OF NOTIFICATION

NOTICE OF COMPLETION TO REVIEW AGENCIES AND PUBLIC

SCHEDULE B

SCHEDULE C

INDIVIDUAL E.A.

PHASE 3

ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION

1. IDENTIFY ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION
2. DETAIL INVENTORY OF NATURAL, SOCIAL AND ECONOMIC ENVIRONMENT
3. IDENTIFY IMPACT OF ALTERNATIVE DESIGNS ON THE ENVIRONMENT, AND MITIGATING MEASURES
4. EVALUATE ALTERNATIVE DESIGNS; IDENTIFY RECOMMENDED DESIGN
5. CONSULT REVIEW AGENCIES & PREVIOUSLY INTERESTED & DIRECTLY AFFECTED PUBLIC
6. SELECT PREFERRED DESIGN

REVIEW ENVIRONMENTAL SIGNIFICANCE & CHOICE OF SCHEDULE

7. PRELIMINARY FINALIZATION OF PREFERRED DESIGN

DISCRETIONARY PUBLIC CONSULTATION TO REVIEW PREFERRED DESIGN

PHASE 4

ENVIRONMENTAL STUDY REPORT

1. COMPLETE ENVIRONMENTAL STUDY REPORT (ESR)
2. ENVIRONMENTAL STUDY REPORT (ESR) PLACED ON PUBLIC RECORD

NOTICE OF COMPLETION TO REVIEW AGENCIES AND PUBLIC

COPY OF NOTICE OF COMPLETION TO MOE–EA BRANCH

3. OPPORTUNITY TO REQUEST MINISTER WITHIN 30 DAYS OF NOTIFICATION TO REQUEST AN ORDER*

OPTIONAL FORMAL MEDIATION (SEE SECTION A.2.8.2)

ORDER* GRANTED, PROCEED AS PER MINISTER'S DIRECTION OR ABANDON PROJECT

MATTER REFERRED TO MEDIATION

ORDER* DENIED WITH OR WITHOUT MINISTER'S CONDITIONS

PHASE 5

IMPLEMENTATION

1. COMPLETE CONTRACT DRAWINGS AND TENDER DOCUMENTS
2. PROCEED TO CONSTRUCTION AND OPERATION
3. MONITOR FOR ENVIRONMENTAL PROVISIONS AND COMMITMENTS

NOTE:

THIS FLOW CHART IS TO BE READ IN CONJUNCTION WITH PART A OF THE MUNICIPAL CLASS EA

INDICATES MANDATORY EVENTS

INDICATES POSSIBLE EVENTS

INDICATES PROBABLE EVENTS

MANDATORY PUBLIC CONTACT POINTS (SEE SECTION A.3 CONSULTATION)

DECISION POINTS ON CHOICE OF SCHEDULE

OPTIONAL

* PART II ORDER (SEE SECTION A.2.8)

essex

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TOWN OF ESSEX
IMPROVEMENTS TO WARD 1 SANITARY SEWER SYSTEM
CLASS ENVIRONMENTAL ASSESSMENT

MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

PROJECT NO. 165620006
DATE: 2015.11.26

DRAWING NO. FIGURE 1.3

W:\active\165620006_ward_one_flow_opt_&_long_range_planning_san_study\planning\Class EA – Solution to Basement Flooding\Figures\FIGURE 1.3.dwg
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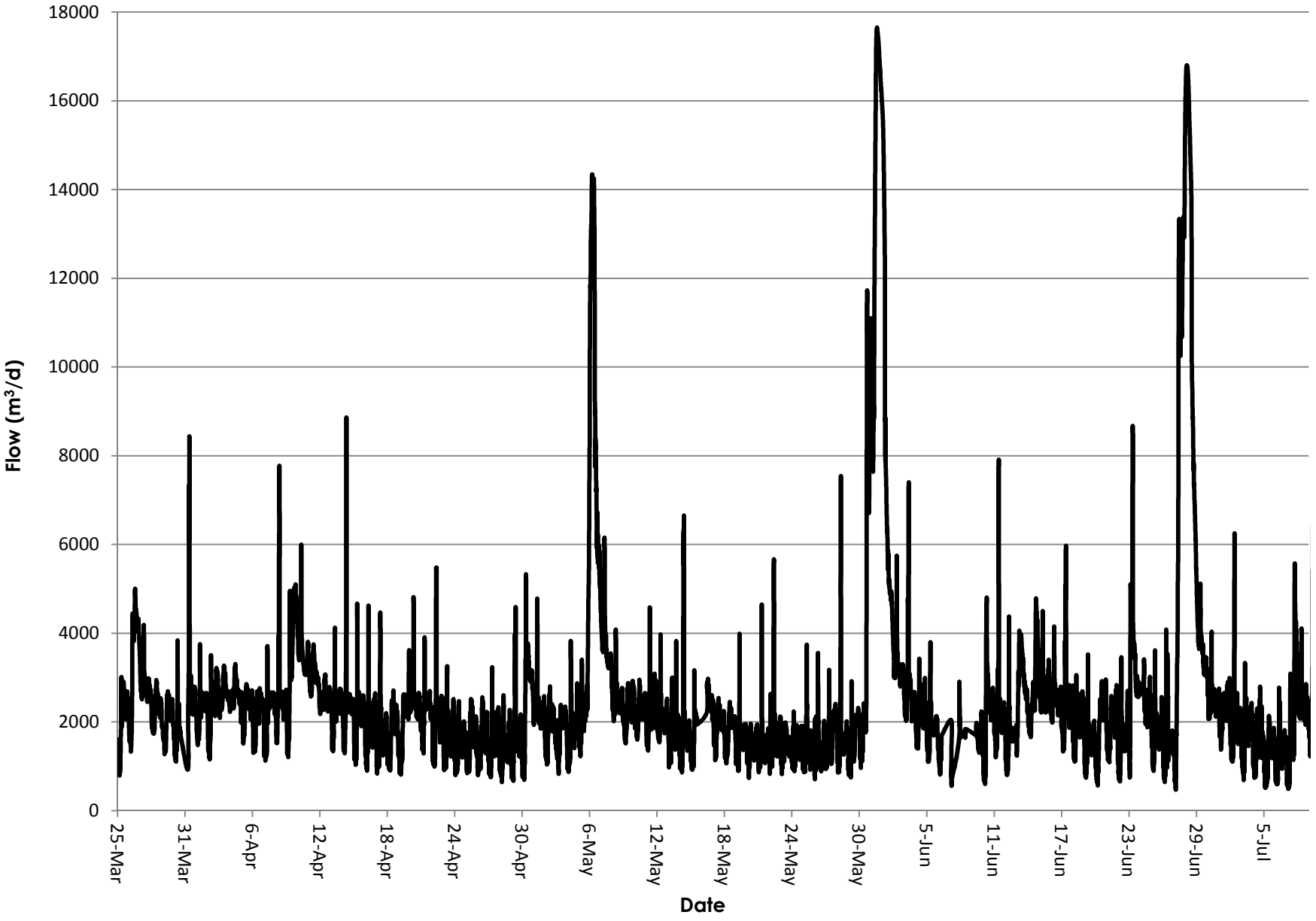


Figure 3.1 Wastewater Flows Recorded at the Essex WPCP (March-July, 2015)

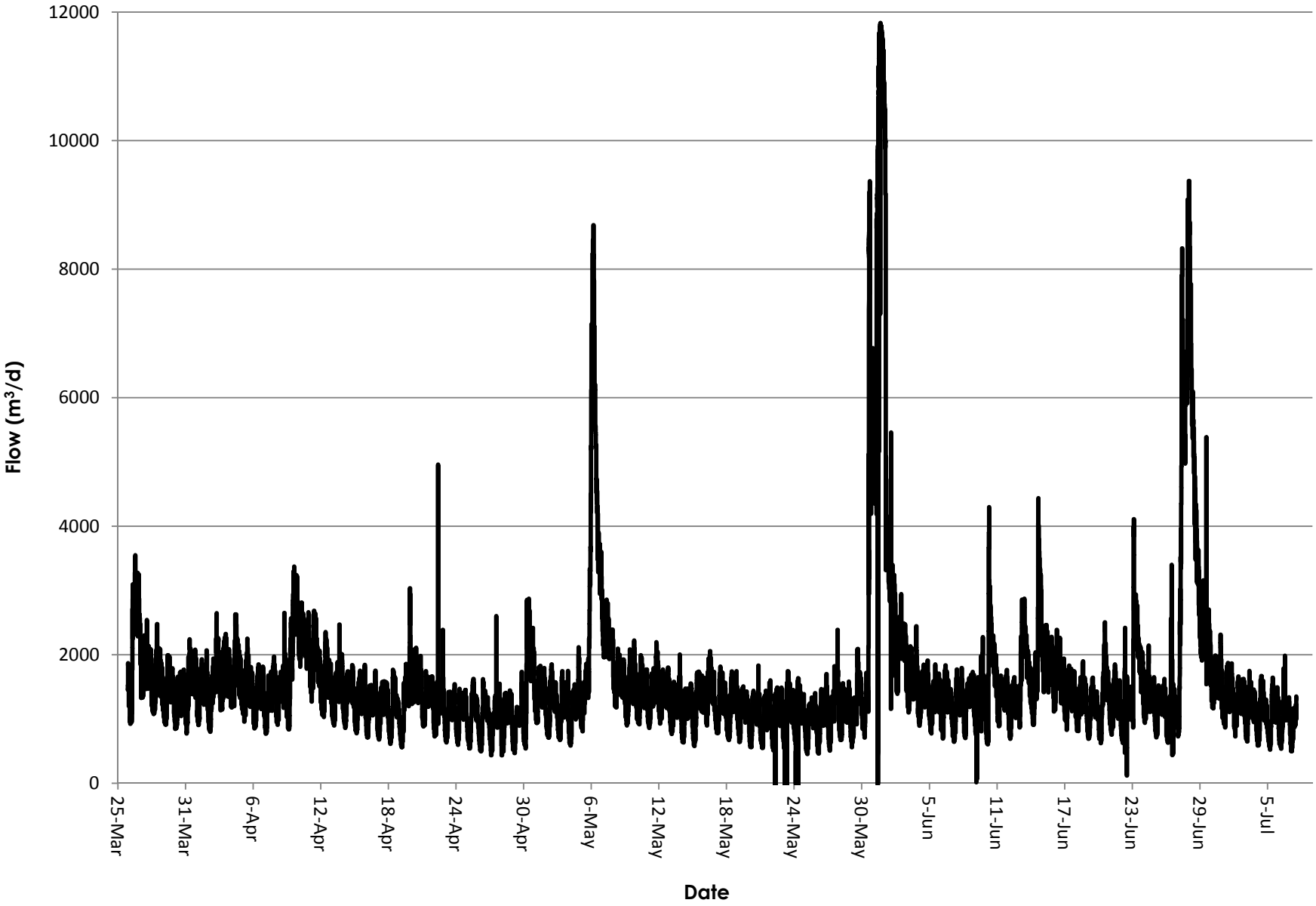


Figure 3.2 Wastewater Flow Recorded at Pumping Station No.4 to the Northeast Lagoon (March-July, 2015)

Hopgood Drain
Hopgood Drain
Hyland Drain
6th. Conc. Drain South of Middle Road
14th. Conc. E. Drain Branch
14th. Conc. E. Drain Branch
Rush Drain
No Name Drain
14th. Conc. E. Drain Branch
McInteer Drain
Burstyn Drain
Dodley Drain
Essex Outlet Drain
Canaan Drain
N.T.R. CONCESSION
MAIDSTONE AVE. WEST
MAIDSTONE AVE. EAST
MAIDSTONE COLCHESTER TOWNLINE
CANADA SOUTHERN RAILWAY CO.
TOWNSVIEW CT.
FRANCES CT.
BREN AVE.
STANTON COURT
DOWDELL ST.
GREELEY TOWNLINE
COUNTY ROAD 34
TALBOT ROAD
COLLEGE ST.
FORESTER'S DRIVE
FORGET AVE.
ALLEN AVE.
BEL ST.
BROCK AVE.
HARVEY AVE.
ANDERSON ST.
STORM ST. W.
CAMERON AVE.
HEDORA AVE.
FOX ST.
ELLIOTT ST.
ALICE ST. N.
THOMAS ST.
KITCHEN ST.
GORDON AVE.
ALISON AVE.
ARTHUR AVE.
CROMPTON CT.
MAPLE ROW
PARK AVE.
RUSSELL ST.
VICTORIA STREET
TURNBERRY CRES.
VICTORIA ST.
SCOTT ST.
ISLER AVENUE
MORRISON CRES.
MORRISON DRIVE
LAIRD AVE.
QUEENSWAY
KINGSBRIDGE PARKWAY
VICTORIA ST.
CRAWFORD ST.
MEIKLE ST.
LAIRD AVE.
IRENE AVE.
QUEEN CT.
KING'S TOWNLINE NO. 3 RR#2&3
COUNTY ROAD 34
IRENE AVE. WEST
WEST MAIN CRES.
WEST MAIN CT.
PAUL ST.
VINCI CT.
WESTCROFT DRIVE
IRWIN AVE.
MICHAEL DR.
BEAMAN DR.
BRETT DRIVE
WOODVIEW DRIVE
OAK DRIVE
MAPLE LANE
PARK LANE
WILLOW CT.
OAK DRIVE
281
280

W:\active\165620006_ward_one_flow_opt_&_long_range_planning_san_study\planning\Class EA - Solution to Basement Flooding\EA Report\AFIGURE 4.1.dwg
2015-12-07 09:55am BY: jholmes

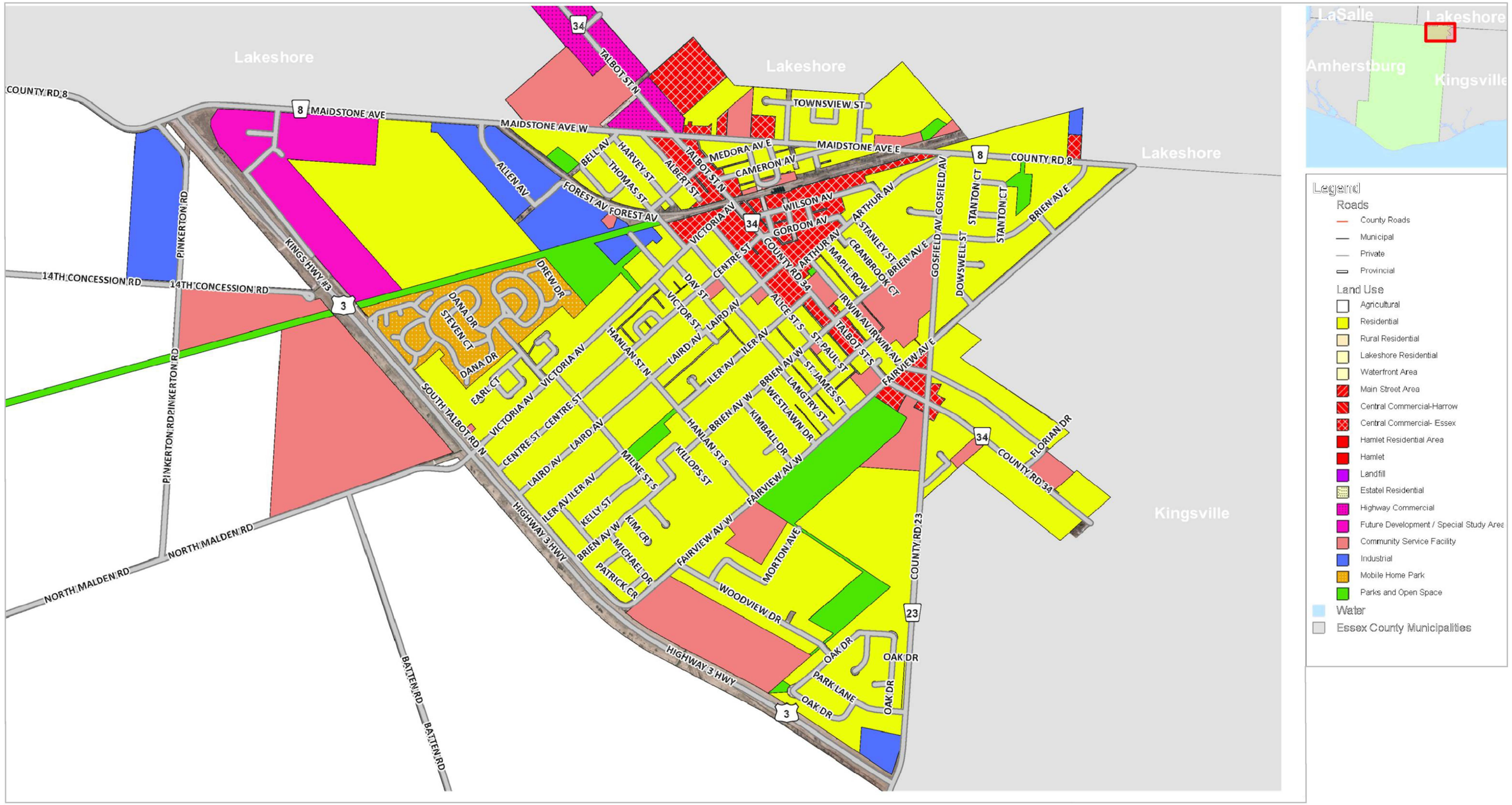
essex

Stantec

TOWN OF ESSEX
IMPROVEMENTS TO WARD 1 SANITARY SEWER SYSTEM
CLASS ENVIRONMENTAL ASSESSMENT

NETWORK OF MUNICIPAL DRAINS IN THE ESSEX WARD 1 AREA

PROJECT NO. 165620006
DATE: 2015.11.26
0 125 375 600m
1:12500
DRAWING NO. FIGURE 4.1



W:\active\165620006_ward_one_flow_opt_&_long_range_planning_san_study\planning\Class EA – Solution to Basement Flooding\Figures\FIGURE 4.2.dwg
2015-11-24 09:43am BY: jfabbro

TOWN OF ESSEX
IMPROVEMENTS TO WARD 1 SANITARY SEWER SYSTEM
CLASS ENVIRONMENTAL ASSESSMENT

LAND USE PLAN OF ESSEX WARD 1 AREA

PROJECT NO. 165620006
DATE: 2015.11.26
DRAWING NO. FIGURE 4.2

NORTHEAST LAGOON SERVICE AREA

ESSEX PCP SERVICE AREA

EXISTING FORCEMAIN

EXISTING NORTHEAST LAGOONS

PUMPING STATION NO. 4

REPLACE EXISTING 200mm SANITARY SEWER WITH A 375mm SANITARY SEWER

DECOMMISSIONED SOUTHWEST LAGOONS

RE-COMMISSION ONE ESSEX SOUTHWEST LAGOON

CONSTRUCT NEW FLOW DISTRIBUTION CHAMBER TO DIVERT EXCESS WET WEATHER FLOW TO THE LAGOON

EXISTING POLLUTION CONTROL PLANT

IINSTALL FORTH PUMP IN INLET PUMPING STATION

EXTEND SANITARY SEWER FORCEMAIN TO NEW FLOW DISTRIBUTION CHAMBER

EXISTING FORCEMAIN

PUMPING STATION NO. 3
INCREASE THE PUMP CAPACITY, PROVIDE EMERGENCY GENERATOR BACKUP POWER

NORTHEAST LAGOON SERVICE AREA

ESSEX PCP SERVICE AREA

N

TOWN OF ESSEX
IMPROVEMENTS TO WARD 1 SANITARY SEWER SYSTEM
CLASS ENVIRONMENTAL ASSESSMENT

PREFERRED SHORT-TERM SOLUTION – OVERALL LAYOUT

PROJECT NO. 165620006

0 125 375 600m

1:12500

DRAWING NO. FIGURE 5.1

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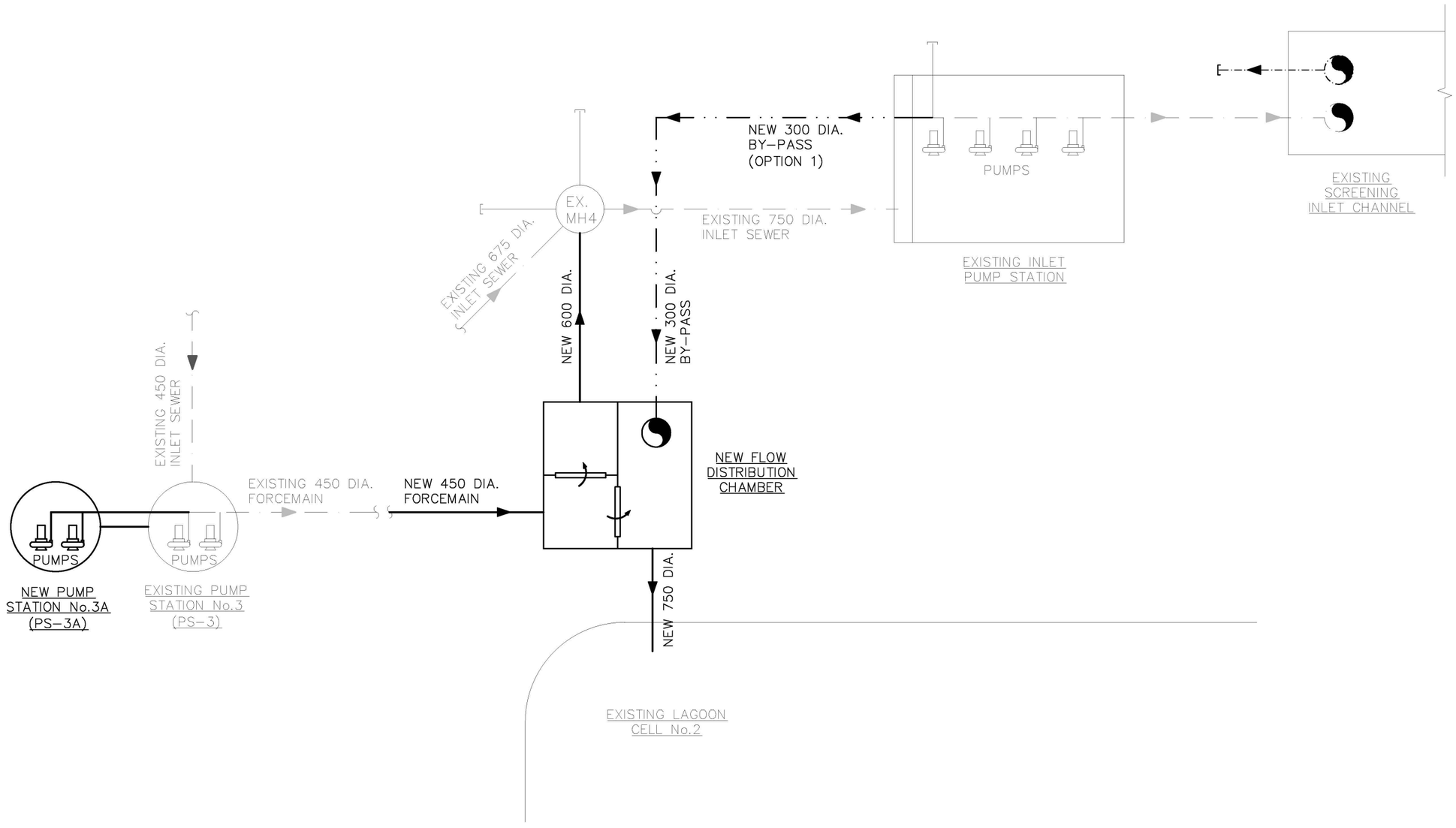
2015-12-04 11:57am BY: jholmes



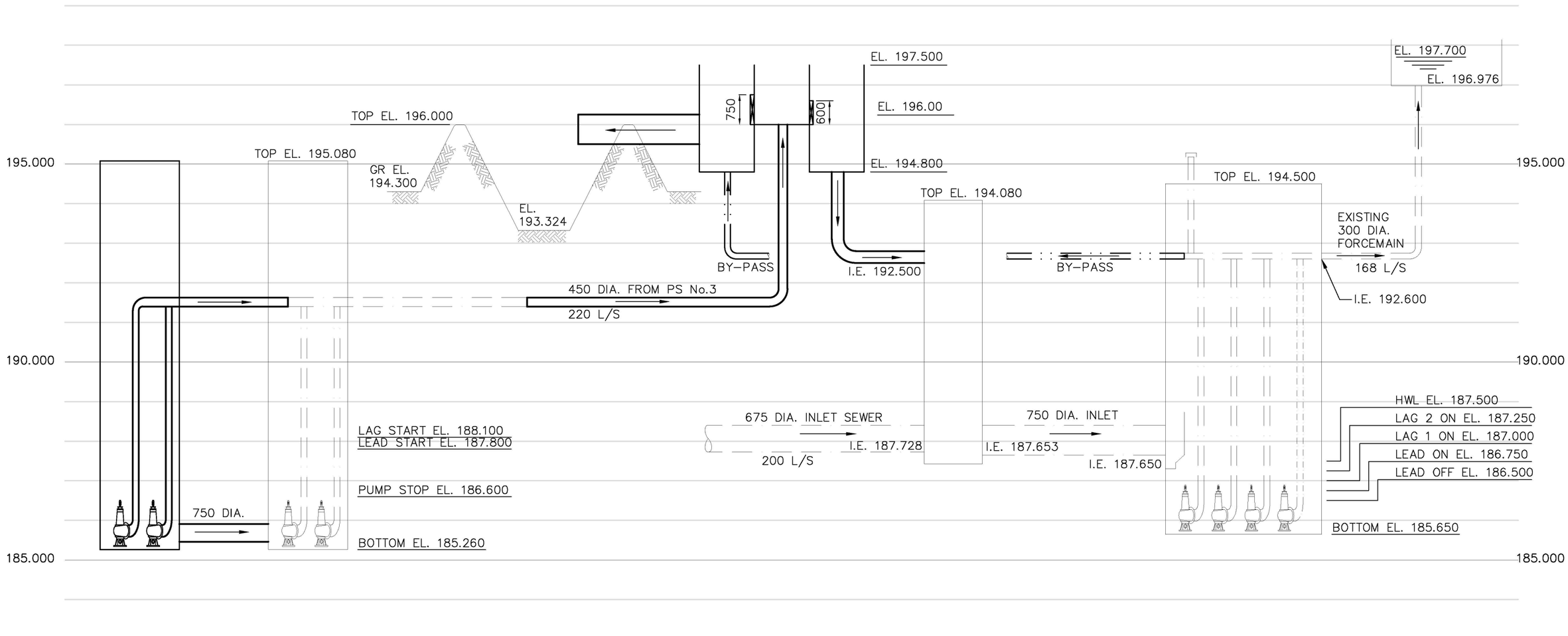
W:\active\165620006_ward_one_flow_opt_&_long_range_planning_san_study\planning\Class EA - Solution to Basement Flooding\Figures\FIGURE 5.2.dwg
2015-11-25 11:26am BY: qkha

TOWN OF ESSEX
IMPROVEMENTS TO WARD 1 SANITARY SEWER SYSTEM
CLASS ENVIRONMENTAL ASSESSMENT

PREFERRED SHORT-TERM SOLUTION – PROCESS FLOW SCHEMATIC

PROJECT NO. 165620006

DRAWING NO. FIGURE 5.2



TOWN OF ESSEX
IMPROVEMENTS TO WARD 1 SANITARY SEWER SYSTEM
CLASS ENVIRONMENTAL ASSESSMENT

PREFERRED SHORT-TERM SOLUTION – HYDRAULIC PROFILE

PROJECT NO. 165620006

DRAWING NO. FIGURE 5.3

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2015-11-25 11:29am BY: qkha

Appendix B MOECC CERTIFICATES OF APPROVAL

670-02
APPROVALS - SEWAGE

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDED CERTIFICATE OF APPROVAL
MUNICIPAL AND PRIVATE SEWAGE WORKS
NUMBER 6420-6V3NGS
Issue Date: November 20, 2006

The Corporation of the Town of Essex
33 Talbot St S
Essex, Ontario
N8M 1A8

Site Location: Essex Pollution Control Plant
3980 North Malden Road
Town of Essex, County of Essex

and

North East Waste Stabilization Ponds
401 County Road 8 (Victoria Street)
Town of Essex, County of Essex

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

alterations to the Essex Pollution Control Plant and/or the existing North East Waste Stabilization Ponds for the collection, transmission, treatment and disposal of domestic sewage from the Town of Essex, located at the above site locations, rated at the capacities mentioned below and consisting of the following *Works*;

Rated Capacities	
Essex Pollution Control Plant	
Rated Capacity	4,590 m^3/d
Peak Flow Rate	14,400 m^3/d
North East Waste Stabilization Ponds	
Rated Capacity	2,910 m^3/d

PROPOSED WORKS

The *Proposed Works* consist of construction of a dewatering building housing the following:

- one (1) dewatering centrifuge capable of handling 0.34 dry tons of sludge per hour;
- one (1) centrifuge feed pump rated at 21 L/s against 9.8 m total dynamic head (TDH);
- a polymer feed system designed to feed polymer up to 12.1 kg/hr;
- one (1) odour control system designed at an air flowrate of 133 m^3/min (4,700 cubic foot per minute) equipped with a scrubber assembly, two (2) 50 L/hr chemical metering pumps and two

(2) 8 L/hr chemical metering pumps; and

- all controls and sensors, electrical and mechanical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned *Proposed Works*.

all in accordance with the Application for Approval of Municipal and Private Sewage Works submitted by The Corporation of the Town of Essex dated August 10, 2006 (received September 18, 2006) under a cover letter from Stantec Consulting Limited along with process and design calculations, a set of tender drawings and a copy of tender specifications, all prepared by Stantec Consulting Limited, Windsor, Ontario.

EXISTING WORKS

ESSEX POLLUTION CONTROL PLANT

Inlet Sewer

An inlet sewer consisting of approximately 25 m of 250 mm diameter PVC DR35 sanitary sewer from the existing Pumping Station No. 1 to manhole MH S-1, 260 m of 675 mm diameter reinforced concrete sanitary sewer from MH S-1 to MH S-4, and 5.0 m of 750 mm diameter reinforced concrete sanitary sewer from MH S-4 to the new Inlet Pumping Station at the Essex Pollution Control Plant, including all manholes and appurtenances.

Inlet Pumping Station and Forcemain

an inlet pumping station and forcemain comprising of the following:

- one (1) wet well measuring 4.8 m x 5.4 m x 8.85 m (SWD);
- three (3) submersible sewage pumps (two duty, one standby) providing a total firm pumping capa of 167 L/s at 12.2 m TDH; and
- approximately 11 m of 350 mm diameter PVC DR25 forcemain from the Inlet Pumping Station to the Screening and Grit Removal Building, including a 300 mm magnetic flow meter.

Screening

Screening facilities include the following:

- one (1) mechanically cleaned bar screen with 12 mm clear spacing to handle a flowrate of 17,630 m^3/d; and
- one (1) manually cleaned coarse bar screen in the bypass channel with 25 mm clear spacing to handle an ultimate flow of 17,630 m^3/d.

Grit Removal

One (1) vortex type grit tank with grit pump, cyclone and classifier to handle a flowrate of 17,630 m^3/d.

Sequencing Batch Reactor

The sequencing batch reactor (SBR) system consists of the following:

- one (1) SBR comprising of three tanks, each measuring 10 m x 33 m x 5.25 m (SWD) and each equipped with fine bubble diffused aeration system; and
- one (1) waste activate sludge (WAS) pump in each SBR tank and each rated at 17.0 L/s at 5.1 m TDH.

Chemical Feed System

One (1) chemical storage tank having a capacity of 36,300 L and two (2) chemical feed pumps (one duty, one standby), each rated at 181 L/hr.

Effluent Disinfection

One (1) ultraviolet (UV) disinfection unit capable of handling a flowrate of 22,630 m^3/d.

Outfall Sewer

Approximately 100 m of 600 mm diameter sewer outfall discharging to Essex Outlet Drain.

Sludge Management

One (1) aerated sludge holding tank having an approximate capacity of 1,730 m^3 and one (1) sludge transfer pump having a capacity of 22.0 L/s at 9.0 m TDH.

NORTH EAST WASTE STABILIZATION PONDS

Forcemains

Approximately 1,505 m of 450 mm diameter forcemain along Townline Road and Lagoon Access Road from Pumping Station No. 4 to the inlet structure of the North East Waste Stabilization Ponds.

Waste Stabilization Ponds

North East Waste Stabilization Ponds consist of the following:

- a waste stabilization pond system along with distribution chambers, located on the South side of the Conrail Concession Road, comprising of four (4) cells having the following features:

Cell Number	Operating Depth (m)	Surface Area (m^2)	Operational Volume (m^3)
Column 1	Column 2	Column 3	Column 4
1	1.93	44,500	64,631
2	2.08	47,500	73,850
3	2.5	61,000	128,961
4	2.5	61,000	128,016

- batch alum dosing facilities during the discharge periods for phosphorus removal; and

- an effluent outfall structure and approximately 330 m of 525 mm diameter sewer outfall discharging to Puce Drain; and

All controls and sensors, electrical and mechanical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned *Existing Works*.

all in accordance with the following supporting documentation:

1. Application for Approval of Municipal and Private Sewage Works submitted by The Corporation of the Town of Essex dated May 21, 2004 under a cover letter from Stantec Consulting Limited along with "Essex Sewage Works Design data Sheet" dated September 17, 2003 prepared by ECO Equipment and Process International Inc. and "Essex Sewage Works Addendum to Environmental Study Report" dated June 2003 prepared by Stantec Consulting Limited, Windsor, Ontario; and

2. all previous documents, plans and specifications submitted with the previous application(s) for sewage works approval.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"*Act*" means the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended;

"*Average Daily Flow*" means the cumulative total sewage flow to the sewage works during a calendar year divided by the number of days during which sewage was flowing to the sewage works that year;

"BOD_5" (also known as $TBOD_5$) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;

"*By-pass*" means any discharge from the *Works* that does not undergo any treatment or only undergoes partial treatment before it is discharged to the environment;

"*$CBOD_5$*" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

"*Certificate*" means this entire certificate of approval document, issued in accordance with Section 53 of the *Act*, and includes any schedules;

"*Daily Concentration*" means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required;

"*Director*" means any *Ministry* employee appointed by the Minister pursuant to section 5 of the *Act*;

"*District Manager*" means the District Manager of the Windsor District Office of the Ministry;

"*E. Coli*" refers to the thermally tolerant forms of Escherichia that can survive at 44.5 degrees Celsius;

"*Existing Works*" means those portions of the sewage works previously constructed and existing on-site at the time of issuance of this *Certificate*;

"*Geometric Mean Density*" is the n^{th} root of the product of multiplication of the results of n number of samples over the period specified;

"*Ministry*" means the Ontario Ministry of the Environment;

"*Monthly Average Concentration*" means the arithmetic mean of all *Daily Concentrations* of a contaminant in the effluent sampled or measured, or both, during a calendar month;

"*Owner*" means The Corporation of the Town of Essex and includes its successors and assignees;

"*Peak Flow Rate*" means the maximum rate of sewage flow for which the plant or process unit was designed;

"*Proposed Works*" means the sewage works described in the *Owner*'s application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate*;

"*Rated Capacity*" means the *Average Daily Flow* for which the *Works* are approved to handle;

"*Seasonal Average Concentration*" means the arithmetic mean of all *Daily Concentrations* of a contaminant measured during a seasonal discharge window. For two discharge windows, *Seasonal Average concentration* shall be calculated separately for each discharge window;

"*Seasonal Average Loading*" means the value obtained by multiplying the *Seasonal Average Concentration* of a contaminant by the *Average Daily Flow* over the same seasonal discharge window.

For two discharge windows, *Seasonal Average Loading* shall be calculated separately for each discharge window;

"Substantial Completion" has the same meaning as *"substantial performance"* in the Construction Lien Act; and

"*Works*" means the sewage works described in the *Owner*'s application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* and includes both *Existing Works* and *Proposed Works*.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

(3) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. CHANGE OF OWNER

(1) The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of *Owner*;

(b) change of address of the *Owner*;

(c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*;

(d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Informations Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager*;

(2) In the event of any change in ownership of the *Works*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Certificate*, and a copy of such notice shall be forwarded to the *District Manager* and the *Director*.

4. UPON THE SUBSTANTIAL COMPLETION OF THE WORKS

(1) Upon the *Substantial Completion* of the *Proposed Works*, the *Owner* shall prepare a statement, certified by a Professional Engineer, that the works are constructed in accordance with this *Certificate*, and upon request, shall make the written statement available for inspection by *Ministry* personnel.

(2) Within one year of the *Substantial Completion* of the *Proposed Works*, a set of as-built drawings showing the *Works* "as constructed" shall be prepared. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be retained at the *Works* for the operational life of the *Works*.

5. BY-PASSES

(1) Any *By-pass* of sewage from any portion of the *Works* is prohibited, except where:

(a) it is necessary to avoid loss of life, personal injury, danger to public health or severe property damage; or

(b) the *District Manager* agrees that it is necessary for the purpose of carrying out essential maintenance and the *District Manager* has given prior written

acknowledgment of the *by-pass*.

(2) The *Owner* shall collect at least one (1) grab sample of the *By-pass* and have it analyzed for the parameters outlined in Condition 7 using the protocols in Condition 9 .

(3) The *Owner* shall maintain a logbook of all *By-pass* events which shall include, at a minimum, the time, location, duration, quantity of *By-pass*, the authority and/or reason for *By-pass* pursuant to subsection (1), and the reasons for the occurrence.

(4) The *Owner* shall, in the event of a *By-pass* event from the Essex Pollution Control Plant pursuant to subsection (1), disinfect the by-passed effluent prior to it reaching the receiver such that the receiver is not negatively impacted.

6. EFFLUENT OBJECTIVES

(1) The *Owner* shall use best efforts to design, construct and operate the *Works* with the objective that the concentrations of the materials named below as effluent parameters, except dissolved oxygen, are not exceeded in the effluent from the *Works*.

Table 1 - Effluent Objectives

Effluent Parameter	Concentration Objective (milligrams per litre unless otherwise indicated)	
	Essex Pollution Control Plant	North East Waste Stabilization Ponds
$CBOD_5$	5.0	25.0
Total Suspended Solids	5.0	25.0
Total Phosphorus	0.3	1.0
Total Ammonia Nitrogen -freezing (see Note 1) -non-freezing (see Note 2)	 2.0 1.0	 - -
Total Chlorine Residual	0	-
Dissolved Oxygen	>5.0	-
E. Coli (see Note 3)	150 organisms/100 mL (Monthly *Geometric Mean Density*)	-

Note 1: November 1 to April 30.
Note 2: May 01 to October 31.
Note 3: During the disinfection period, which is May 01 to October 31, inclusive.

(2) The *Owner* shall use best efforts to:

(a) maintain the pH of the effluent from the *Works* within the range of 6.5 to 8.5 inclusive, at all times;

(b) operate the *Works* within the *Rated Capacity* of the *Works*;

(c) operate the *Works* according to the capacity of the plants and the component

process units; and

(d) ensure that the effluent from the *Works* is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.

(3) The *Owner* shall include in all reports submitted in accordance with Condition 10, a summary of the efforts made and results achieved under this Condition.

7. EFFLUENT LIMITS

(1) The *Owner* shall operate and maintain the *Works* such that the concentrations and waste loadings of the materials named below as effluent parameters are not exceeded in the effluent from the *Works*.

Table 2 - Effluent Limits

	Essex Pollution Control Plant (Note 1)	North East Waste Stabilization Ponds (Note 2)		
Effluent Parameter	**Monthly Average Concentration** (milligrams per litre unless otherwise indicated)	**Seasonal Average Concentration** (milligrams per litre)	**Seasonal Average Loading** (kilograms per day)	
Column 1	Column 2	Column 3	Column 4	
			April 01 to April 30	***Sept. 15 to Dec. 14***
$CBOD_5$	10.0	30.0	401	221
Total Suspended Solids	10.0	30.0	401	221
Total Phosphorus	0.5	1.0	13.4	7.4
Total Ammonia Nitrogen -freezing (Note 3) -non-freezing (Note 4)	 3.0 1.5	- -	- -	- -
Total Chlorine Residual	0.05	-	-	-
E. Coli (Note 5)	200 organisms/100 mL (Monthly *Geometric Mean Density*)	-	-	-

Note 1: Based on continuos discharge throughout the year.

Note 2: Based on two seasonal discharge windows, one between April 01 to April 30 and the second between September 15 to December 14, inclusive.

Note 3: Between November 01 to April 30, inclusive.

Note 4: Between May 01 to October 31, inclusive.

Note 5: During the disinfection period, which is May 01 to October 31, inclusive.

(2) For the purposes of determining compliance with and enforcing subsection (1):

Essex Pollution Control Plant

(a) The *Monthly Average Concentration* of $CBOD_5$, Total Suspended Solids, Total Phosphorus, Total Ammonia Nitrogen and Total Chlorine Residual as named in Column 1 of Table 2 of subsection (1) shall not exceed the corresponding maximum allowable average concentration set out in Column 2 of Table 2 in subsection (1).

(b) The monthly *Geometric Mean Density* of *E. Coli* as named in Column 1 of Table 2 of subsection (1) shall not exceed the corresponding maximum allowable monthly *Geometric Mean Density* set out in Column 2 of Table 2 in subsection (1).

North East Waste Stabilization Ponds

(c) The *Seasonal Average Concentration* of $CBOD_5$, Total Suspended Solids and Total Phosphorus as named in Column 1 of Table 2 of subsection (1) shall not exceed the corresponding maximum allowable average concentration set out in Column 3 of Table 2 in subsection (1).

(d) The *Seasonal Average Loading* of $CBOD_5$, Total Suspended Solids and Total Phosphorus as named in Column 1 of Table 2 of subsection (1) shall not exceed the corresponding maximum allowable average loading set out in Column 4 of Table 2 in subsection (1).

(3) The pH of the effluent from Essex Pollution Control Plant and the North East Waste Stabilization Ponds shall be maintained within 6.5 to 9.0, at all times.

(4) Paragraphs (a) to (d) of subsection (2) shall apply upon the issuance of this *Certificate*.

(5) Only those monitoring results collected during the corresponding time period shall be used in calculating the *Monthly Average Concentration, Geometric Mean Density, Seasonal Average Concentration* and *Seasonal Average Loadings* for this *Certificate*.

8. OPERATION AND MAINTENANCE

(1) The *Owner* shall exercise due diligence in ensuring that, at all times, the *Works* and the related equipment and appurtenances used to achieve compliance with this *Certificate* are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training, including training in all procedures and other requirements of this *Certificate* and the *Act* and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the *Works*.

(2) No effluent shall be discharged from the North East Waste Stabilization Ponds between

May 01 to September 14 and between December 15 to March 31 of every year, without prior permission of the *District Manager* in writing.

(3) The *Owner* shall prepare or update an operations manual within six (6) months of the date of issuance of this *Certificate* that includes, but not necessarily limited to, the following information:

(a) operating procedures for routine operation of the *Works*;

(b) inspection programs, including frequency of inspection, for the *Works* and the methods or tests employed to detect when maintenance is necessary;

(c) repair and maintenance programs, including the frequency of repair and maintenance for the *Works*;

(d) procedures for the inspection and calibration of monitoring equipment;

(e) a spill prevention control and countermeasures plan, consisting of contingency plans and procedures for dealing with equipment breakdowns, potential spills and any other abnormal situations, including notification of the *District Manager*; and

(f) procedures for receiving, responding and recording public complaints, including recording any follow-up actions taken.

(4) The *Owner* shall maintain the operations manual current and retain a copy at the location of the *Works* for the operational life of the *Works*. Upon request, the *Owner* shall make the manual available to *Ministry* staff.

(5) The *Owner* shall provide for the overall operation of the *Works* with an operator who holds a licence that is applicable to that type of facility and that is of the same class as or higher than the class of the facility in accordance with Ontario Regulation 129/04.

9. MONITORING AND RECORDING

The *Owner* shall, upon commencement of operation of the *Works*, carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this *Certificate* are to be taken at a time and a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) For the purposes of this condition, monthly means once per month, weekly means once every week and twice per week means two times every week, at a minimum.

(3) Samples shall be collected per Tables 3 and 4 at the sampling points, at the frequency

specified, by means of the specified sample type and analyzed for each parameter listed and all results recorded:

Table 3 - Raw Sewage Monitoring
(Samples to be collected at the head of the inlet works, both at the Essex Pollution Control Plant and the North East Waste Stabilization Ponds)

Parameters	Sample Type (Note 1)	Minimum Frequency
BOD_5	Grab or 24-hr composite	monthly
Total Suspended Solids	Grab or 24-hr composite	monthly
Total Kjeldahl Nitrogen	Grab or 24-hr composite	monthly
Total Phosphorus	Grab or 24-hr composite	monthly

Note 1: Grab samples to be taken in case of North East Waste Stabilization Ponds and 24-hr composite samples in case of Essex Pollution Control Plant.

Table 4 - Effluent Monitoring
(Samples to be collected at the outlet of the disinfection unit at the Essex Pollution Control Plant and at the outlet of the North East Waste Stabilization Ponds)

	Essex Pollution Control Plant		North East Waste Stabilization Ponds		
Parameters	**Sample Type**	**Minimum Frequency**	**Sample Type**	**Minimum Frequency**	
				April 01 to April 30	*Sept. 15 to Dec. 14*
$CBOD_5$	24-hr composite	Weekly	Grab	Twice per week	Weekly
Total Suspended Solids	24-hr composite	Weekly	Grab	Twice per week	Weekly
Total Phosphorus	24-hr composite	Weekly	Grab	Twice per week	Weekly
Total Ammonia Nitrogen	24-hr composite	Weekly	Grab	Twice per week	Weekly
Dissolved Oxygen	24-hr composite	Weekly	Grab	Twice per week	Weekly
Hydrogen Sulphide	-	-	Grab	Twice per week	Weekly
E. Coli (Note 1)	Grab	Weekly	-	-	-
pH	Grab/Probe	Weekly	Grab/Probe	Twice per week	Weekly
Temperature	Grab/Probe	Weekly	Grab/Probe	Twice per week	Weekly

Note 1: During the disinfection period, which is May 01 to October 31, inclusive.
(Note: Definitions for grab and composite samples are included in one or more documents below. 24-hour composite sample means a time-composite sample and constitutes of an integrated sample made up of blending 24 hourly aliquots taken by refrigerated autosampler, which are obtained at an hourly frequency having same sample volume).

(4) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended from time to time by more recently published editions;

(b) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions; and

(c) the publication "Standard Methods for the Examination of Water and Wastewater" (20th edition), as amended from time to time by more recently published editions.

(5) The temperature and pH of the effluent from the *Works* shall be determined in the field at the time of sampling for Total Ammonia Nitrogen. The concentration of unionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended, for ammonia (unionized). For the purposes of determining concentration of unionized ammonia in the effluent from the Essex Pollution Control Plant, single representative values of temperature and pH obtained through a probe shall be considered complementary to the 24-hour composite total ammonia nitrogen sample.

(6) The *Owner* shall undertake monitoring of total ammonia nitrogen and unionized ammonia in the Puce Drain, through grab sampling, within one hundred (100) metres downstream of the point of effluent discharge of the North East Waste Stabilization Ponds at the following frequency:

(i) within one week before the April discharge begins;
(ii) one week after the April discharge begins;
(iii) within one week before the September to December discharge begins;
(iv) two weeks after the September to December discharge begins; and
(v) six weeks after the September to December discharge begins.

The impacts of ammonia on the receiver shall be assessed and submitted to the *District Manager* in the "Puce Drain Ammonia Impact Assessment Report" per Condition 10 (7).

(7) A sufficient number of flow measuring devices, calibrated at regular intervals not exceeding one year to ensure their accuracy to within plus or minus ten per cent (+/-10 %) of actual rate of flow within the range of 10% to 100% of the full scale reading of the measuring devices, shall be installed, maintained and operated at the Essex Pollution Control Plant and the North East Waste Stabilization Ponds in order to measure and record:

(i) the quantity of sewage being conveyed to and through the sewage treatment plant; and

(ii) the quantity of sewage being bypassed without treatment.

(8) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this *Certificate*.

10. REPORTING

(1) Ten (10) days prior to the date of a planned *By-pass* being conducted pursuant to Condition 5 and as soon as possible for an unplanned *By-pass*, the *Owner* shall notify the *District Manager* (in writing) of the pending start date, in addition to an assessment of the potential adverse effects on the environment and the duration of the *By-pass*.

(2) Ten (10) days prior to the start up of the operation of the *Proposed Works*, the *Owner* shall notify the *District Manager* in writing of the pending start up date.

(3) The *Owner* shall report to the *District Manager* or designate, any exceedance of any parameter specified in Condition 7 orally, as soon as reasonably possible, and in writing within seven (7) days after receiving analytic results of the exceedance.

(4) In addition to the obligations under Part X of the Environmental Protection Act, the *Owner* shall, within 10 working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the *District Manager* describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(5) The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.

(6) The *Owner* shall prepare, and submit to the *District Manager*, a performance report, on an annual basis, within ninety (90) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7, including an overview of the success and adequacy of the *Works*;

(b) a description of any operating problems encountered and corrective actions taken;

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works*;

(d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

(e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment;

(f) a description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6;

(g) a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

(h) a summary of any complaints received during the reporting period and any steps taken to address the complaints;

(i) a summary of all *By-pass*, spill or abnormal discharge events; and

(j) any other information the *District Manager* requires from time to time.

(7) The *Owner* shall prepare and submit to the *District Manager*, a "Puce Drain Ammonia Impact Assessment Report" on an annual basis within 60 days after the two discharge periods have been utilized for wastewater disposal during that year. This report shall include, but not limited to the following:

(a) a summary of total ammonia nitrogen and unionized ammonia concentrations in the Puce Drain before and after the discharge periods; and

(b) a comparison of total ammonia nitrogen and unionized ammonia concentrations in the Puce Drain before and after the discharge periods including its comparison with respect to ammonia concentrations toxic for aquatic life and an evaluation of their potential impacts on the Puce Drain based on this comparison.

11. REVOCATION OF EXISTING APPROVALS

(1) The descriptions of the approved works and conditions of approval in this *Certificate* apply in place of all the existing descriptions and conditions in the Certificates of Approval under the Ontario Water Resources Act for sewage works which are part of the *Works* approved by this *Certificate*.

(2) Notwithstanding Condition 11(1) above, the original applications for approval, including design calculations, engineering drawings, and reports prepared in support of the existing Certificate(s) of Approval whose descriptions of the approved works and conditions are now replaced pursuant to Condition 11(1) above, shall form part of this *Certificate*.

(3) Where an existing Certificate of Approval referred to in Condition 11(1) above applies to *Works* in addition to the *Works* approved by this *Certificate*, it shall continue to apply to those additional *Works*.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitte for review. The condition also advises the *Owners* their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the *Works* are made aware of the *Certificate* and continue to operate the *Works* in compliance with it.

4. Condition 4 is included to ensure that record drawings of the *Works* "as constructed" are maintained for future references.

5. Condition 5 is included to indicate that by-passes of untreated sewage to the Essex Outlet Drain (and Puce Drain) are prohibited, save in certain limited circumstances where the failure to *By-pass* could result in greater injury to the public interest than the *By-pass* itself where a *By-pass* will not violate the approved effluent requirements, or where the *By-pass* can be limited or otherwise mitigated by handling it in accordance with an approved contingency plan. The notification and documentation requirements allow the *Ministry* to take action in an informed manner and will ensure the *Owner* is aware of the extent and frequency of *By-pass* events.

6. Condition 6 is imposed to establish non-enforceable effluent quality objectives which the *Owner* is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits of Condition 7 are exceeded.

7. Condition 7 is imposed to ensure that the effluent discharged from the *Works* to the Essex Outlet

Drain and the Puce Drain meet the *Ministry*'s effluent quality requirements thus minimizing environmental impact on the receiver and to protect water quality, fish and other aquatic life in the receiving drains.

8. Condition 8 is included to require that the *Works* be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the owner and made available to the *Ministry*. Such a manual is an integral part of the operation of the *Works*. Its compilation and use should assist the *Owner* in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for *Ministry* staff when reviewing the *Owner*'s operation of the *Works*.

9. Condition 9 is included to enable the *Owner* to evaluate and demonstrate the performance of the *Works*, on a continual basis, so that the *Works* are properly operated and maintained at a level which is consistent with the design objectives and effluent limits specified in the *Certificate* and that the *Works* does not cause any impairment to the receiving drains.

10. Condition 10 is included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Certificate,* so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

11. Condition 11 is included to stipulate that this *Certificate* replaces all previous approvals for the *Works* being the subject of this *Certificate*, and that the existing approvals remain in force for the purpose of any *Works* which are not subject to this *Certificate*.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 3630-6EFJTV issued on July 26, 2005.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;

6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 20th day of November, 2006

THIS CERTIFICATE WAS MAILED
ON NOV. 23, 2006
9C
(Signed)

Mohamed Dhalla, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

ZB/
c: District Manager, MOE Windsor
Chris Nepszy, P.Eng., Stantec Consulting Ltd. ✓
Water Standards Section, Standards Development Branch, MOE Toronto

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDED CERTIFICATE OF APPROVAL
AIR
NUMBER 6859-6Z9NFK
Issue Date: April 19, 2007

The Corporation of the Town of Essex
33 Talbot St S
Essex, Ontario
N8M 1A8

Site Location: Essex Pollution Control Plant
3980 North Malden Rd
Essex Town, County of Essex

You have applied in accordance with Section 9 of the Environmental Protection Act for approval of:

- one (1) packed bed, counter current wet scrubber, to control emissions from sludge dewatering operations, equipped with 3.05 metres of 2-K Tellerettes packing and spray nozzles, using sodium hypochlorite solution, venting into the atmosphere at a maximum volumetric flow rate of 2.21 actual cubic metres per second through a stack, having an exit diameter of 0.5 metre, extending 12.6 metres above grade;

- one (1) standby diesel generator set, having a rating of 350 kilowatts, to provide power for sewage treatment equipment during emergency situations;

all in accordance with the application for a Certificate of Approval (Air) dated November 3, 2006 and signed by Wayne Miller, Chief Administrative Officer, the letters from Stantec Consulting Ltd., dated February 8, 2007 and April 5, 2007, and signed by Chris Nepszy, P.Eng., and all information associated with the application.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

(1) "Act" means the *Environmental Protection Act* ;

(2) "Certificate" means this Certificate of Approval (Air), issued in accordance with Section 9 of the Act;

(3) "Company" means The Corporation of the Town of Essex;

(4) "Director" means any Ministry employee appointed by the Minister pursuant to Section 5 of the Act;

(5) "District Manager" means the District Manager, Windsor District Office, South-Western Region of the Ministry;

(6) "Equipment" means the wet scrubber, described in the Company's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate;

(7) "Facility" means the entire operation located on the property where the Company is located;

(8) "Manual" means a document or a set of documents that provide written instructions to staff of the Company;

(9) "Ministry" means the Ontario Ministry of Environment.

(10) "Manager" means the Manager, Technical Services Section, Standards Development Branch, or any other person who represents and carries out the duties of the Manager, as those duties relate to the conditions of this Certificate;

(11) "Point of Impingement" means any point outside the facility in the natural environment and as defined by s. 2 of O. Reg. 419/05. The point of impingement for the purposes of verifying compliance with the Act shall be chosen as the point located outside the company's property boundaries at which the highest concentration is expected to occur, when that concentration is calculated in accordance with the Ontario Regulation 419/05, or any other method accepted by the Director;

(12) "Pre-test Information" means the information outlined in Section 1 of the Source Testing Code;

(13) "Source Testing Code" means the Source Testing Code, Version 2, Report No. ARB-66-80, dated November 1980, prepared by the Ministry, as amended;

(14) "Source Testing" means sampling and testing to measure emissions resulting from the operation of the Facility . identified in this Certificate and when the associated production lines and equipment are operating at a maximum production level;

(15) "Test Contaminants" means Hydrogen Sulphide CAS # 7783-06-4.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

OPERATION AND MAINTENANCE

1. The Company shall ensure that the Equipment is properly operated and maintained at all times. The Company shall:

(1) Prepare, before commencement of operation of the Equipment, and update, as necessary, a manual outlining the operating procedures and a maintenance program for the Equipment, including:

(a) routine operating and maintenance procedures, in accordance with good engineering practices and as recommended by the Equipment suppliers;

(b) emergency procedures;

(c) procedures for any record keeping activities relating to operation and maintenance of the Equipment; and

(d) all appropriate measures to minimize noise and odorous emissions from all potential sources,

(2) Implement the recommendations of the Manual.

RECORD RETENTION

2. The Company shall retain, for a minimum of two (2) years from the date of their creation, all records related to recording activities required by this Certificate, and make these records available for review by staff of the Ministry upon request. The Company shall retain all records of process upsets causing increased emissions to the atmosphere, failure of air pollution control equipment and any environmental complaints, including:

(1) a description, time and date of the incident causing the complaint;

(2) wind direction and wind speed at the time of the incident;

(3) a description of the measures taken to address the cause of incident and to prevent a similar occurrence in the future.

NOTIFICATION OF COMPLAINTS

3. The Company shall notify the District Manager, in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:

(1) a description of the nature of the complaint; and

(2) the time and date of the incident to which the complaint relates.

SOURCE TESTING

4. The Company shall perform Source Testing to determine the rates of emission of the Test Contaminants from scrubber .

5. The Company shall submit, not later than three (3) months after commencement of operation of the Equipment, to the Manager a test protocol, including the Pre-Test Information for the Source Testing required by the Source Testing Code.

6. The Company shall finalize the test protocol in consultation with the Manager.

7. The Company shall not commence the Source Testing until the Manager has accepted the test protocol.

8. The Company shall complete the Source Testing not later than three (3) months after the Manager has accepted the test protocol.

Notification of Upcoming Source Testing

9. The Company shall notify the District Manager and the Manager, in writing, of the location, date and time of any impending Source Testing required by this Certificate, at least ten (10) business days prior to the Source Testing.

Report on Source Testing

10. The Company shall submit a report on the Source Testing to the District Manager and the Manager not later than two (2) months after completing the Source Testing. The report shall be in the format described in the Source Testing Code, and shall also include:

    (1) an executive summary;

    (2) records of all operating conditions;

    (3) results of the Source Testing; and

    (4) the results of dispersion calculations in accordance with the dispersion model accepted by the Director, indicating the maximum concentration of the Test Contaminant at the Point of Impingement.

Refusal of Source Testing

11. The Director may not accept the results of the Source Testing if:

    (1) the Source Testing Code or the requirements of the Manager were not followed; or

    (2) the Company did not notify the District Manager and the Manager of the Source Testing; or

    (3) the Company failed to provide a complete report on the Source Testing.

12. If the Director does not accept the results of the Source Testing, the Director may require re-testing.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No.1 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, the regulations and this Certificate.

2. Conditions No. 2 and No. 3 are included to require the Company to keep records and provide information to staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

3. Conditions Nos. 4 to No. 12, inclusive, are included to require the Company to gather accurate information so that compliance with the Act, the regulations and this Certificate can be verified.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 3756-63PQT6 issued on August 11, 2004

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to eachportion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 9, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted works are approved under Section 9 of the Environmental Protection Act.

DATED AT TORONTO this 19th day of April, 2007

THIS CERTIFICATE WAS MAILED
ON May 1, 2007
dc
(Signed)

Victor Low, P.Eng.
Director
Section 9, *Environmental Protection Act*

JK/
c: District Manager, MOE Windsor
Mazen AbuOmar, Stantec Consulting Ltd.✓

Appendix C PUBLIC CONSULTATION DOCUMENTATION

1. Notice of Study Commencement
2. Presentation at Council Meeting on September 8, 2015
3. Open House Attendees List and Comments on October 22, 2015

Notice of Study Commencement: Ward 1 Sanitary Sewer System Class Environmental Assessment

Posted on Tuesday October 13, 2015

Essex Ward 1 Community Sanitary Sewer System
Class Environmental Assessment

Notice of Study Commencement

The Study
The Town of Essex, through their consultant Stantec Consulting Ltd., has initiated a Municipal Class Environmental Assessment (Class EA) to provide short-term solutions to basement flooding caused by sanitary sewer backups in Essex Ward 1 area.

The Process
The study is being undertaken in accordance with the planning and design process for 'Schedule B' projects outlined in the Municipal Class Environmental Assessment (June 2000, as amended in 2007 and 2011) under the Ontario Environmental Assessment Act. The Class EA process includes public and review agency consultation, an evaluation of alternatives, an assessment of the potential environmental effects of the proposed works, and identification of reasonable measures to mitigate any adverse impacts that may result.

Comments
Public participation will form an integral part of this Class EA study to ensure that the concerns of the public and affected groups within the study area are identified, documented and assessed. A Public Consultation Centre will be scheduled during the study to present the findings to date and to collect community feedback and input before finalizing the preferred solution.

Any parties that wish to provide suggestions or comments about this study at this time should do so, preferably in writing, by contacting the individual identified below.

Mr. Chris Nepszy, P. Eng., PE
Director of Infrastructure and Development
(519)776-7336 x1114
cnepszy@essex.ca

Under the Municipal Freedom of Information and Protection of Privacy Act and the Ontario Environmental Assessment Act, unless otherwise stated in the submission, with the exception of personal information, all comments will become part of the public record and will be released, if requested, to any person. Subjective to comments received and the receipt of necessary

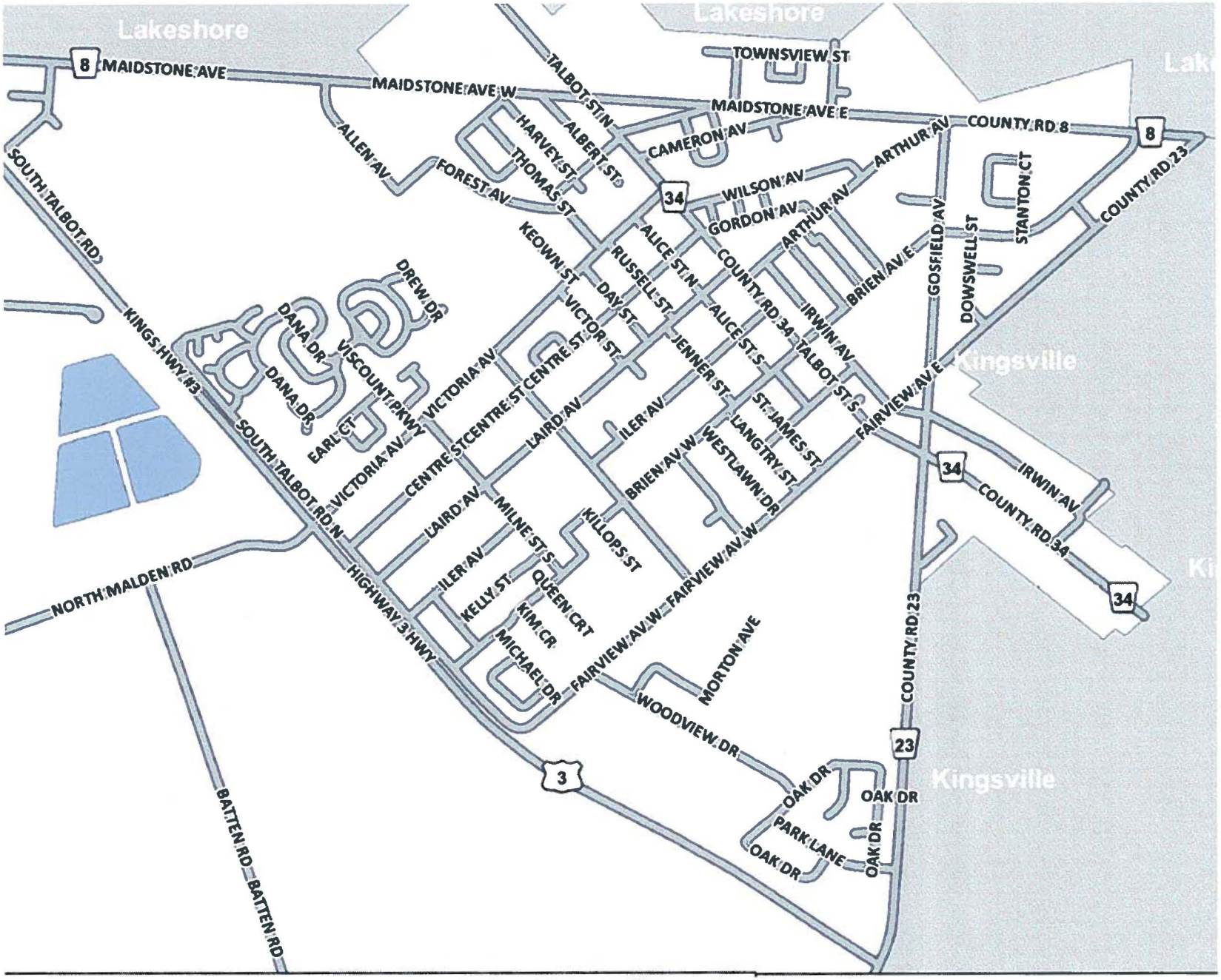
approvals, the Town of Essex intends to proceed with the planning, design and construction of this project, to be completed by late 2016.

(This Notice first issued 25th September, 2015)

Attachments

Map of Ward 1 Class Environmental Assessment Study Area

Back to Search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HARVEY ST
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ALBERT ST
CAMERON AV
COUNTY RD 8
ARTHUR AV
WILSON AV
GORDON AV
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STANTON CT
COUNTY RD 23
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JENNER ST
ALICE ST S
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BRIEN AV E
GOSFIELD AV
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DREW DR
DANA DR
VISCOUNT PKWY
EARL CT
KINGS HWY #3
VICTORIA AV
CENTRE ST
LAIRD AV
ILER AV
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FAIRVIEW AV E
ST JAMES ST
LANGTRY ST
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QUEEN CRT
KIM CR
MICHAEL DR
HIGHWAY 3 HWY
MORTON AVE
WOODVIEW DR
COUNTY RD 23
3
OAK DR
PARK LANE
BATTEN RD

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SALES REP:	GRAPHIC DESIGNER:	NOTE:
In House	Lana	

16 Centre Street, Essex ON N8M 1N9 | Ph: 519-776-4268 | Fax: 519-776-4014 | Email: essexfreepress@on.aibn.com

Please review your proof carefully & return with signature of approval, and/or indication of changes required, by Friday prior to publication.

Your ad will publish in 10,000 copies of The Essex Free Press.

essex

Essex Ward 1 Community Sanitary Sewer System Class Environmental Assessment

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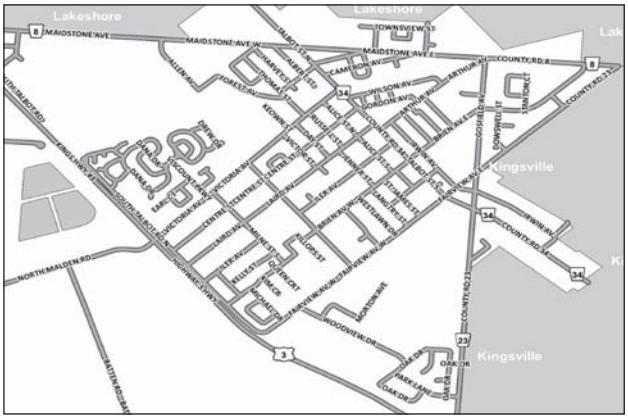

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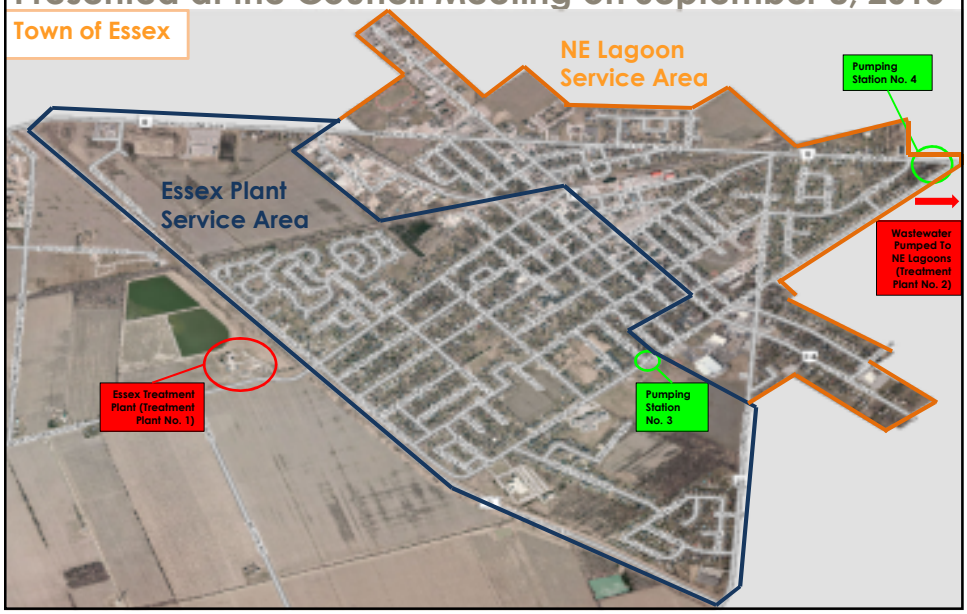
Name

Signature

Town of Essex
Ward 1 Area Basement Flooding Study
Presented at the Council Meeting on September 8, 2015

Stantec



Outlines of Presentation

1 Introduction

2 Flow Monitoring Program

3 Manhole inspections

4 CCTV and Smoke Testing

5 Modeling

6 Findings and Proposed Improvements

7 Recommendations

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1. Introduction

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Locations of reported basement flooding on August 2014 storm event

Causes of Basement Flooding

- Surface water/floodplain
- Site grading/backfill/downspouts
- Groundwater
- Sewer backup
- Combinations of the above

Study is primarily focused on basement flooding caused by SANITARY SEWER backups.

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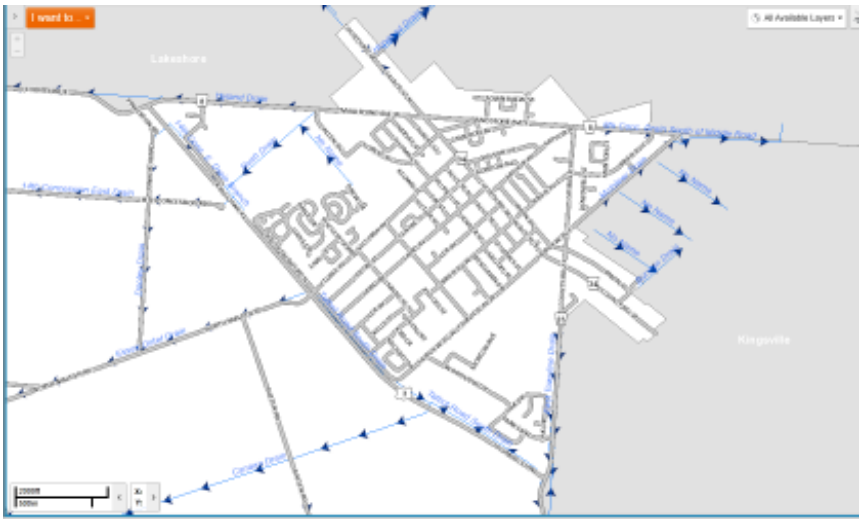
Surface water/floodplain



Main drains include Essex Outlet Drain and Canaan Drain

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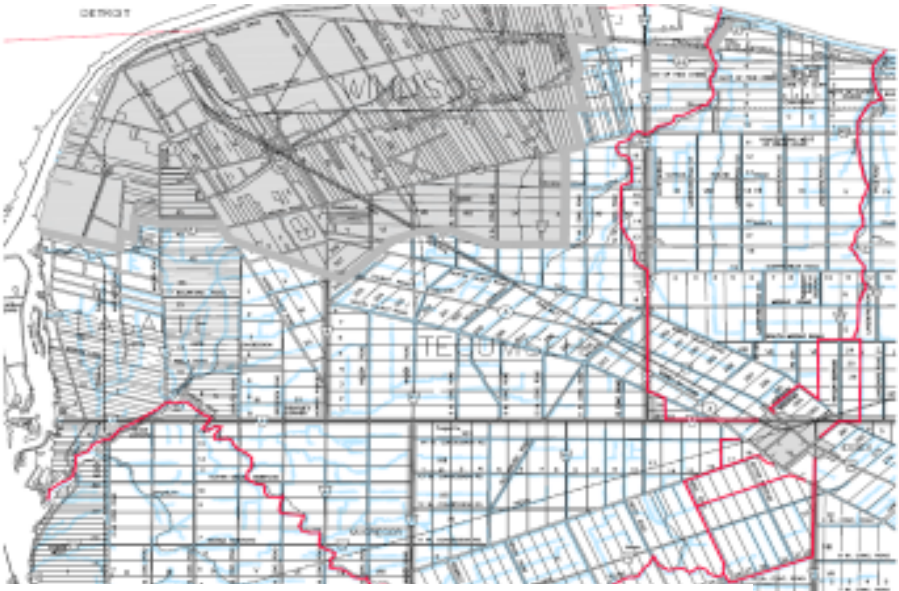
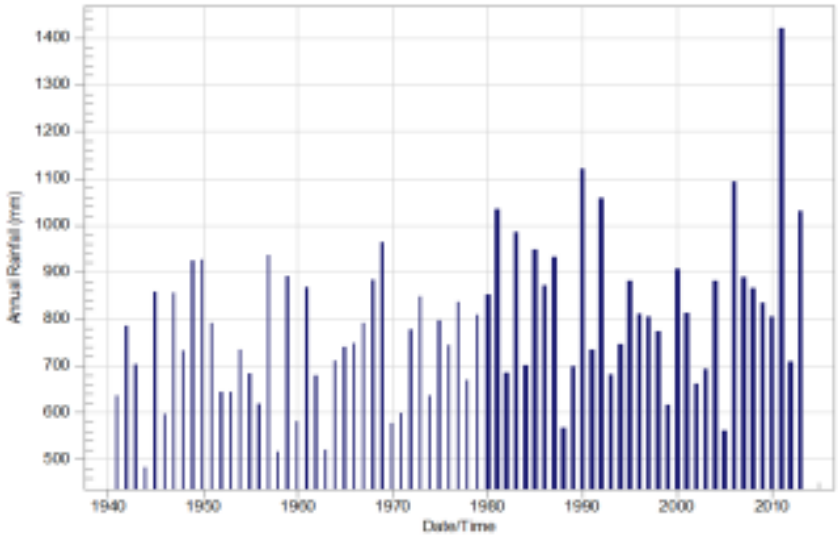
Surface water/floodplain



Main drains include Essex Outlet Drain and Canaan Drain

Causes of Basement Flooding: Weather

Figure 1: Annual rainfall at Windsor airport from 1940 – 2014



Surface water/floodplain

Figure 2: Essex Outlet Drain PRIOR to a small storm event (June 2015).

Figure 3: Essex Outlet Drain flowing full after a small storm event. Photo taken AFTER ½" of rainfall (June 2015).

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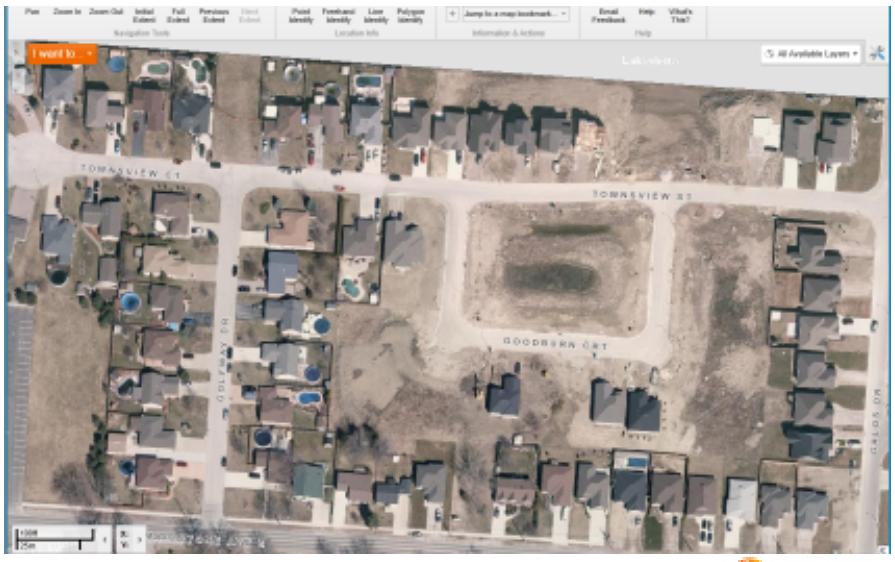
Site Grading – Golfway and Galos Developments



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Site Grading – Golfway and Galos Developments

Basement flooding in Golfway and Galos Development is considered to be mainly caused by site grading

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Basement Flooding

Basement flooding problems in other Municipalities largely due to climate changes and significant I/I entering system

- Essex
- Amherstburg
- LaSalle
- Windsor
- Bigger Cities – Toronto, etc.


THE WINDSOR STAR

NEWS

LaSalle homeowners irate after repeated basement flooding


THE WINDSOR STAR

Windsor grapples with flood damage after record-level rain hits region (With video)


CBC news | Windsor

Amherstburg cleans up after flooding

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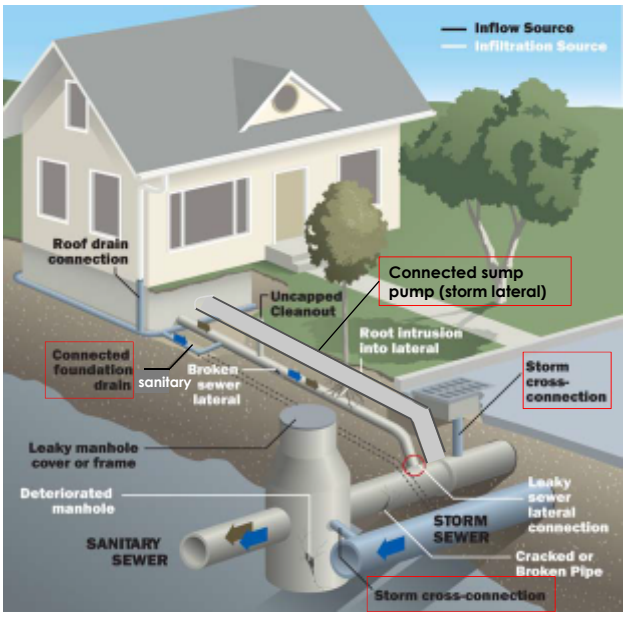
What is Inflow and Infiltration?

Inflow
Water from rainfall or snow melt that enters the sewage system through **direct sources** such as yard, roof and downspouts, illegal cross-connections with sanitary sewers, foundation drains, and manhole covers.

Infiltration
Groundwater that enters through holes and cracks in manholes, laterals, and sewer pipes

Sources of Inflow and Infiltrations



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Chronology of Events and Activities

Date	Events/Activities
Jan, 2015	The Town retained Stantec to study basement flooding and formed a flooding advisory committee.
Feb, 2015	Basement flooding questionnaire prepared and distributed to Town Flooding Committee. Received approx. 12% responses (240 out of 2000 residents).
Mar-present, 2015	Flow monitoring to identify potential inflow and infiltrations (I&I) and collect data for sewer modeling
Apr-May, 2015	Inspected all manholes (approx. `500), and submitted inspection report documented findings
June, 2015	Fog testing of 5,480 m sewer to find potential I&I
June-July, 2015	CCTV of 6,300 m to inspect sewer an find potential I&I
May-Aug, 2015	Sewer modeling study, prepared a report documented areas of limited sewer capacity and proposed alternatives for improvements

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2. Flow Monitoring Program

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Flow Monitoring Program

Purpose

- *Locate and prioritize areas with excessive inflow and infiltration*
- *Utilize the flow monitoring data to calibrate the sanitary sewer system model.*

Year 2014

- Four (4) sites in the Northeast Lagoon service area between March 2014 and June 2014.

Year 2015

- Five (5) sites in the Essex Plant service area between March 2015 to June 2015
- Three (3) more sites in the Essex Plant service area from June 2015 and expected to end in October 2015.

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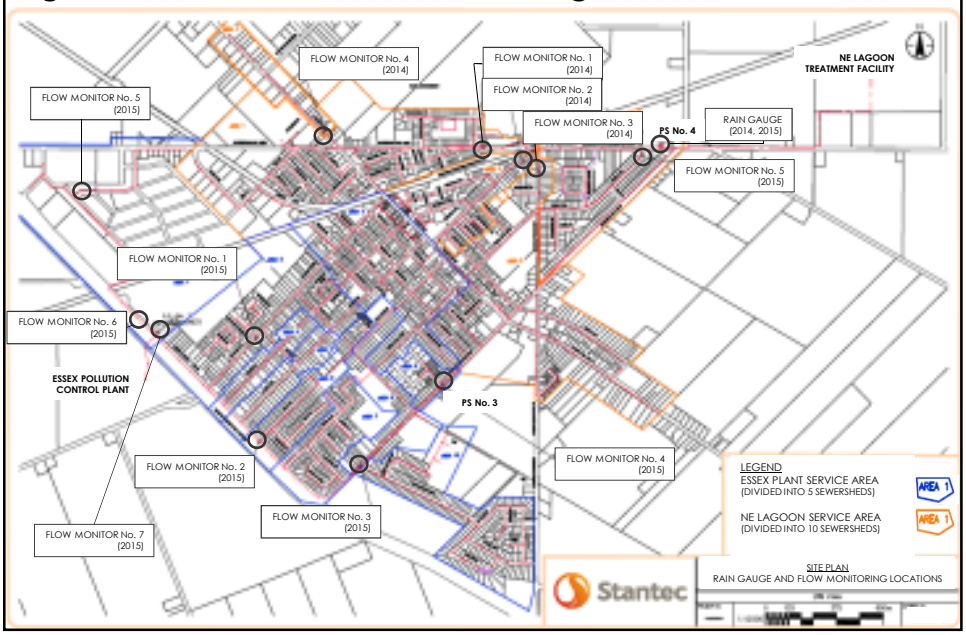
Figure 4: Rainfall and Flow Monitoring Locations



Flow Monitoring Program

SUMMARY OF SYSTEM-WIDE I/I RESULTS

- Typically sanitary sewers in Ontario are designed to accommodate an infiltration allowance between 0.20 L/s/ha to 0.28 L/s/ha

Table 1: Summary of NE Lagoon Service Area Inflow and Infiltration

Event No.	Rainfall Event	Rainfall Depth (mm)	Duration (hr)	Peak I/I Rate (L/s/ha)
1.	Apr-3, 2014	25	25	0.15
2.	Apr-28, 2014	20	12	0.15
3.	May-12, 2014	48	22	0.34
4.	May-27, 2014	32	9	0.28
5.	Jun-18, 2014	64	17	0.19

Exceedances

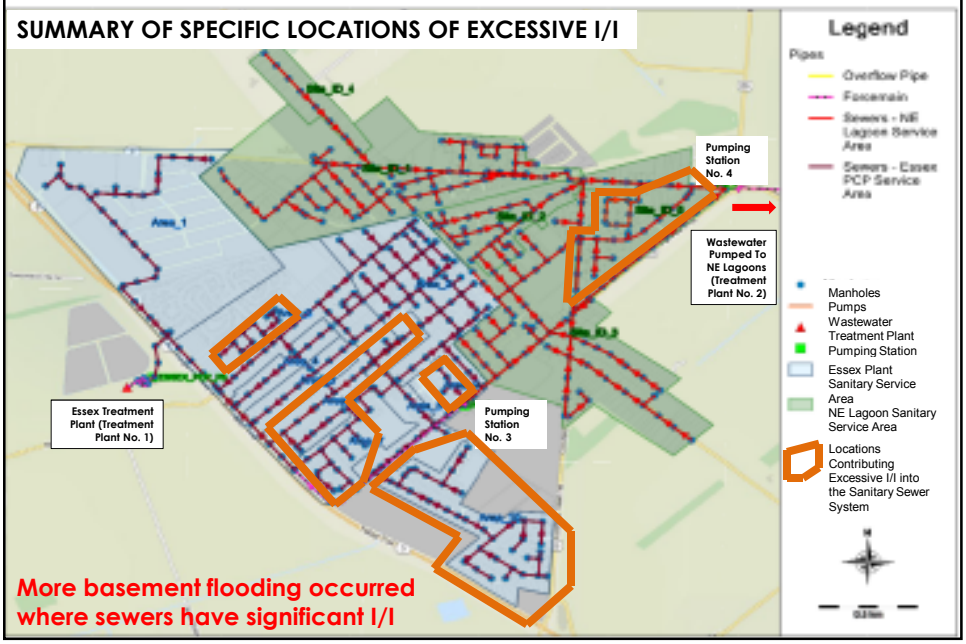
Table 2: Summary of Essex Plant Service Area Inflow and Infiltration

Event No.	Rainfall Event Start Date	Rainfall Depth (mm)	Duration (hr)	Peak I/I Rate (L/s/ha)
1.	Apr-3, 2015	17	17	0.20
2.	Apr-7, 2015	48	19	0.61
3.	Apr-28, 2015	100	25	0.75
4.	May-12, 2015	62	26	0.72

Exceedances

Flow Monitoring Program

SUMMARY OF SPECIFIC LOCATIONS OF EXCESSIVE I/I



3. Manhole Inspections

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Manhole Inspections

Purpose:

- Manholes are considered to be one of the significant sources of I/I.

Work Completed:

- Visual inspection was conducted in March 2015 to investigate the condition of the Town's approximately 500 sanitary manholes.

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Manhole Inspections (cont'd)

Figure 5: Inflow and infiltration entering sewer system (A, B, C, D)

Manhole Inspections

Results: Engineer

- Majority of manhole were in acceptable condition
- Some manholes were found to require repair/rehabilitation

Results: Town

- Pans installed in low-lying areas to mitigate infiltration. Approx. 120 pans installed.
- Started sewer repair/rehabilitation based on manhole inspections, and smoke and CCTV testing

Figure 6: Inflow insert (pan) being installed in a manhole to mitigate surface water entering the sanitary sewer system

4. CCTV and Smoke Testing

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CCTV Inspection and Smoke Testing

Purpose

- To investigate sewer system defects & cross-connections between storm and sanitary systems

Important to Note:

- CCTV and smoke testing will **NOT** find any private cross-connections inside households

Work Completed

- Smoke testing of approximately 5,480 m of sanitary sewers
- CCTV inspection of approximately 6,300 m of various diameter sewers

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Smoke Testing

Results:

- Some storm water directly discharge into sanitary sewer, and some defects observed (mostly related to cleanout caps)

Figure 7: Heavy fog from cleanouts (A, B) and driveway drain (C)

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CCTV Inspection

Work Completed:

- CCTV inspection of approximately 6,300 m of various diameter sewers
- Focused on areas have significant I/I, including:
  - South Talbot Road
  - Victoria Ave
  - Kimball Dr
  - Iler Ave
  - Woodview Drive, Joan Flood Drive and Oak St
  - Townsview CT, Golfway Drive and Goodburn CT
  - Brien Ave and Stanton Court

- **Results:**
- Report given to Town detailing sewers requiring repair/rehabilitation

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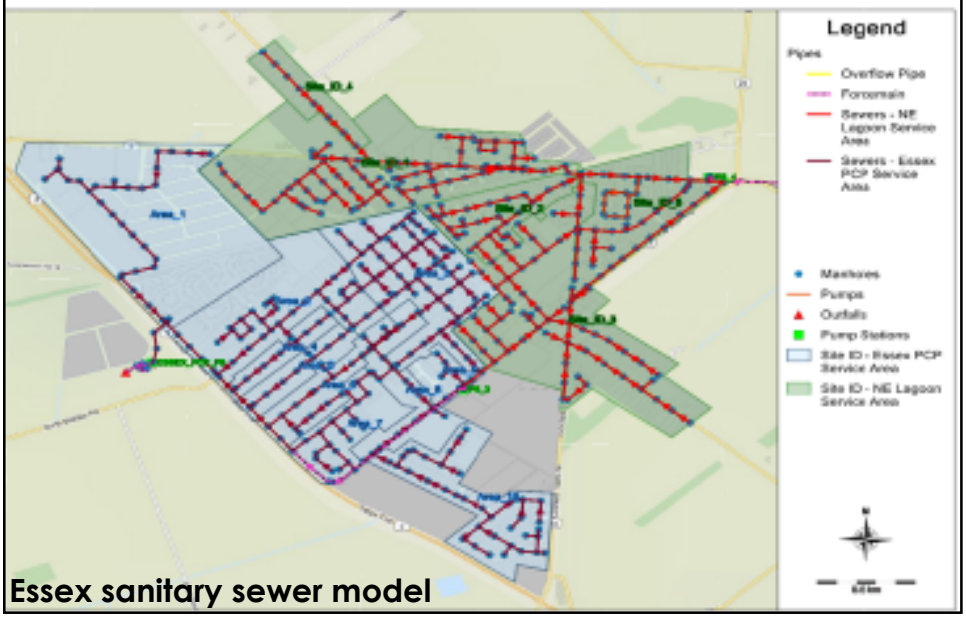
5. Modeling



Essex sanitary sewer model

Modeling

Purpose:

- Evaluate ***what*** area(s) of the network are causing sewer back-ups (operating over designed-capacity)?
- Evaluate ***why*** are these area(s) in the network operating over designed-capacity?
- Evaluate alternatives for improvements to increase capacity

Approach:

- Evaluate dry weather flow capacity
- Evaluate the wet weather capacity of the system under a variety of rainfall events

Infrastructure limiting capacity in the Essex Sanitary System:

- Gravity sewer pipes
- Pumping station pump capacity

Stantec

Capacity Assessment: Dry Weather Flow

Gravity Sewers

- Sewers operated adequately under current dry weather loadings.
- Peak liquid level did not exceed 35% of pipe diameter in any pipe in the network at peak dry weather flow.

Pump Stations

- Capacity of all three (3) pump stations was adequate under current dry weather loadings.
- Capacity of pumps utilized was 15-25% of pumping capacity at peak dry weather flow.

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Capacity Assessment Wet Weather Flow: 2-year storms

(2-year storm = 1 ¾" rainfall over 12-hours)

Gravity Sewers

Essex Plant Service Area

- Pipe capacity limited along several portions of the network shown in next slide.

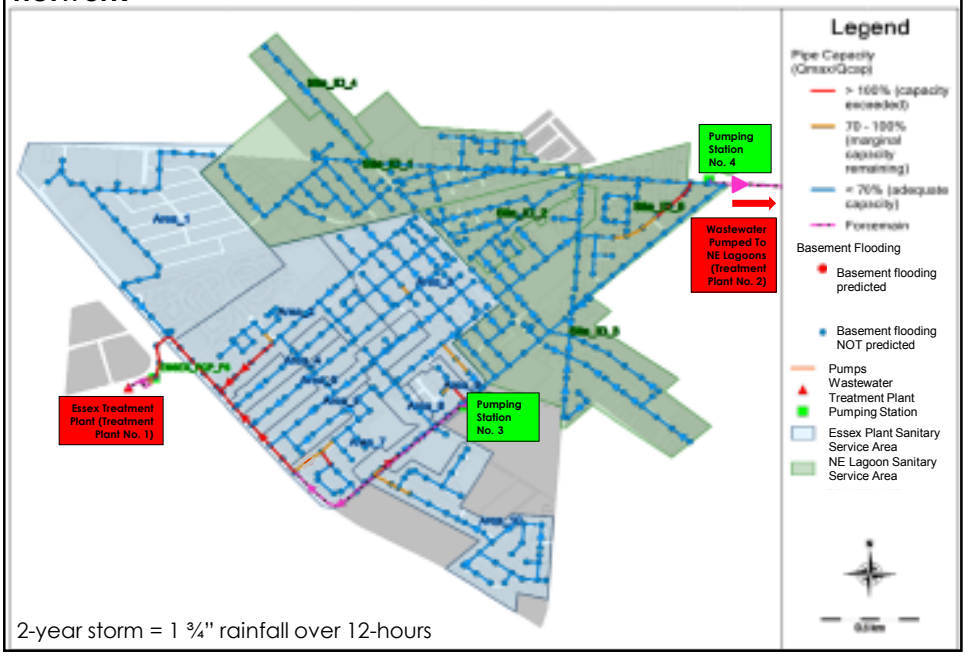
NE Lagoon Service Area

- Pipe capacity limited in the northeast portion of the sewershed.

- No basement flooding was predicted from 2-year storms.

Stantec

Predicted effect of 2-year storm on sanitary sewer network



2-year storm = 1 ¾" rainfall over 12-hours

Capacity Assessment
Wet Weather Flow: 10-year storms

(10-year storm = 2 ½" rainfall over 12-hours)

Gravity Sewers

Essex Plant Service Area

- Storms equal to or exceeding 10-year return periods caused the majority of the Essex Plant service area to be surcharged.
- Basement flooding occurred in several portions of the network shown in next slide.

NE Lagoon Service Area

- Pipe capacity further limited in the northeast portion of the sewershed.
- Basement flooding was also prevalent in this subdivision.

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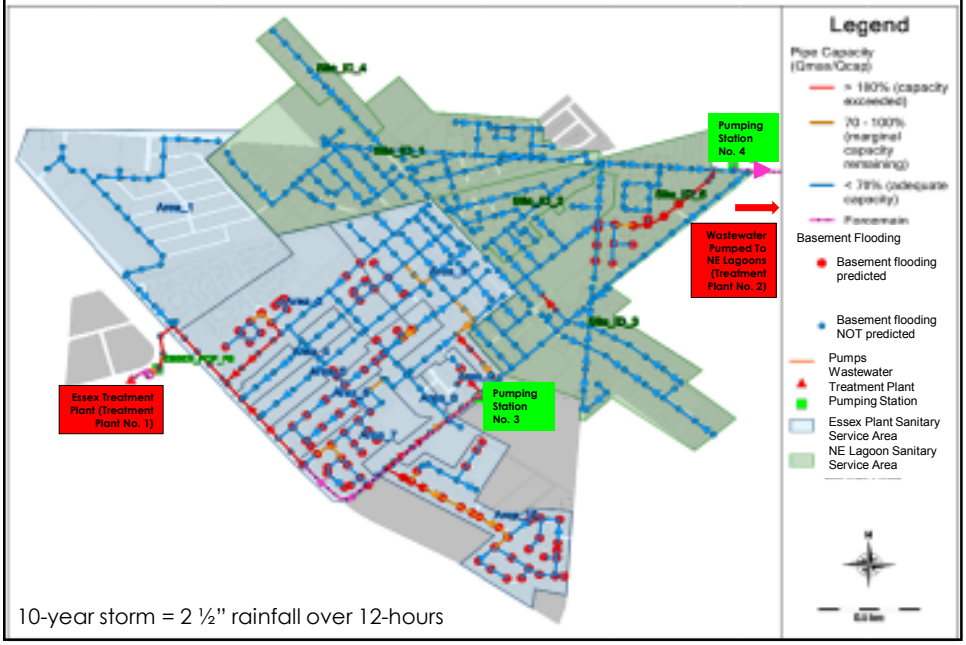
Predicted effect of 10-year storm on sanitary sewer network



10-year storm = 2 ½" rainfall over 12-hours

Capacity Assessment: Wet Weather Flow

Pumping Stations

Table 3: Pump station wet weather capacity assessment

Parameter	Storm Event	Rainfall over 12-hours	NE Lagoon Service Area	Essex Plant Service Area	
Pumping Station			Pumping Station No. 4	Pumping Station No. 3	Essex Plant Pumping Station
Capacity of Station at Peak Flow (%)	2-yr	1 ¾"	36%	**105%**	91%
Capacity of Station at Peak Flow (%)	5-yr	2 ¼"	45%	**110%**	99%
Capacity of Station at Peak Flow (%)	10-yr	2 ½"	75%	**120%**	**107%**
Capacity of Station at Peak Flow (%)	25-yr	3 ¼"	66%	**119%**	**106%**
Capacity of Station at Peak Flow (%)	100-yr	3 7/8"	**113%**	**120%**	**112%**

Historical Rainfall Events

Table 4: Historical rainfall events in the Town of Essex where basement flooding has been reported

Event No.	Rainfall Event Start Date	Estimated Return Period (yrs)	Total Rainfall Depth (in)	Duration (hr)
1	August 11, 2014	> 10yr (<25yr)	2 7/8"	10-hour
2	May-30, 2015	> 25yr (<50yr)	3 ¾"	25-hour
3	Sept-3, 2015	> 25yr (<50yr)	3 3/8"	12-hour

Table 5: Rainfall event in the Town of Essex where basement flooding is predicted

Event No.	Estimated Return Period (yrs)	Total Rainfall Depth (in)	Duration (hr)
Predicted Basement Flooding Event	10yr	2 ½"	12-hour

6. Findings and Improvements

Improvements to increase system capacity and minimize basement flooding.

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Findings - Why Basement Flooding?

- I/I significantly higher than MOE value for typical sewer design
- CCTV and smoke test showing some storm water directly discharge into sanitary sewer

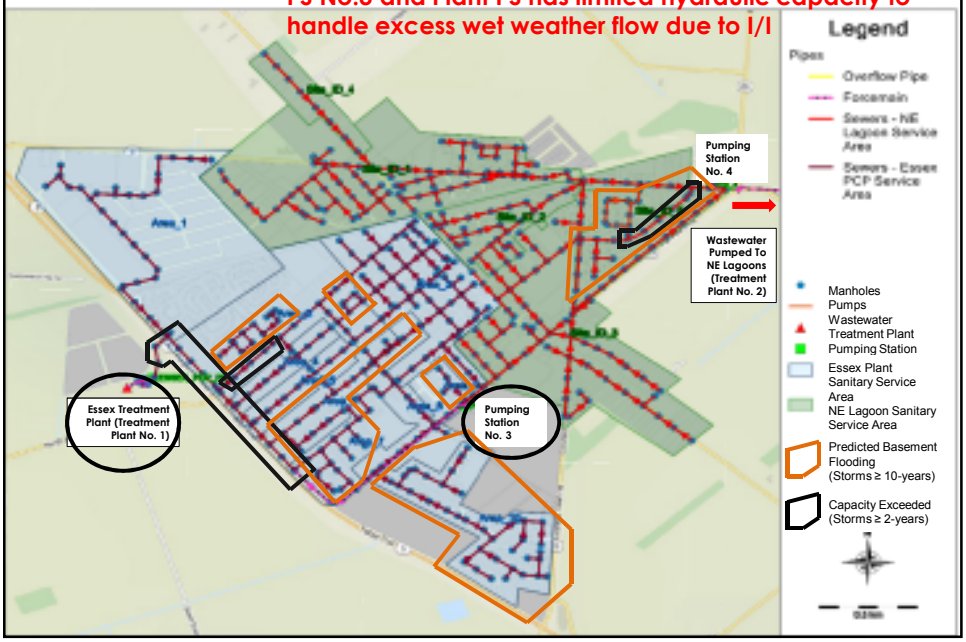
- Pumping Station No. 3 and Essex Plant pumping station can not handle wet weather flow due to significant amount of I/I

- At 2-year storm (1 ¾" over 12-hours) some sewers are operating over-capacity and sewer back-ups are beginning
- At 10-year storms (2 ½" over 12-hours) the sewer backups are causing the liquid level in the network to reach typical household basement elevation

Stantec

Findings

- **More basement flooding occurred where sewers have significant I/I**
- **PS No.3 and Plant PS has limited hydraulic capacity to handle excess wet weather flow due to I/I**



Improvements: Minimize Basement Flooding

- Three (3) alternatives will be discussed

Important to Note:

- These alternatives will not prevent rainwater from getting into the sanitary system
- Too many private storm cross-connections exist in the network to reduce the rainwater entering the system significantly enough to mitigate basement flooding
- Once repairs/rehabilitation of manholes, CCTV and smoke testing are completed it is still **NOT** likely this will reduce the rainwater entering the system significantly enough to mitigate basement flooding

Improvements Approach:

- Remove excessive I/I from the sanitary system and store or bypass at the treatment plant

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Improvements – Minimize Basement Flooding

- Possible alternatives

1. Existing Pumping Station upgrades
2. Adding an additional Remote Pumping Station
3. Sewer pipe improvements in locations that are over-capacity during storm events due to excessive I/I

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Improvements – Minimize Basement Flooding

Alternative 1.
Pumping Station Improvements: Existing Pumping Stations

- Increase pumping capacity at Pumping Station No. 3
- Extend existing forcemain at Pumping Station No. 3 directly to the Essex Plant

- Introduce process modifications (including pumping capacity) to bypass flow at the Essex Plant to offline storage basins or to the outfall

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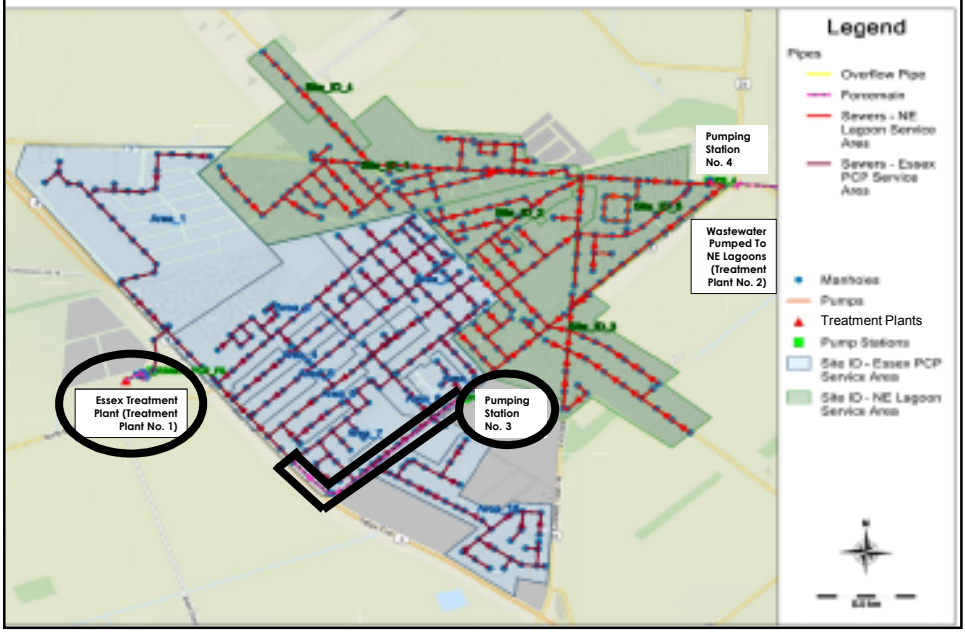
Alternative 1: Locations of existing pumping station improvements



Improvements – Minimize Basement Flooding

Alternative 2.
Pumping Station Improvements – Adding an Additional Remote Pumping Station

- Construct an additional remote pumping station and pump excess flow directly to offline storage basins.

- Potential location could be the decommissioned Pumping Station No. 1.
- The existing building could be renovated and the existing forcemain could potentially be utilized to pump from the remote pumping station directly to offline storage basins.
- Decommissioned lagoons located on the north side of the Essex Plant would be retrofitted into offline storage basins.

- Increase pumping capacity at Pumping Station No. 3

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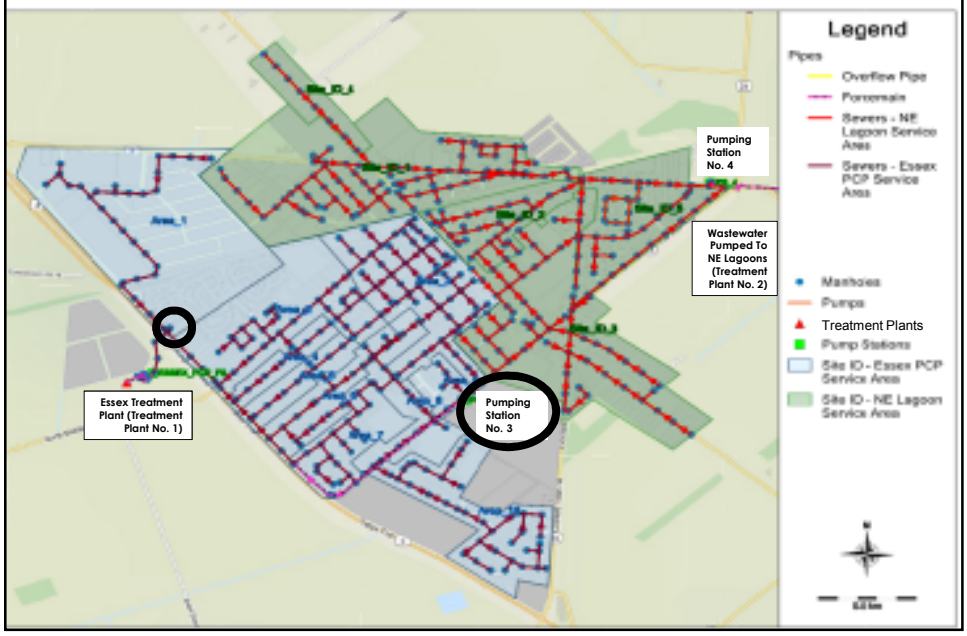
Alternative 2: Location of additional remote pumping station



Improvements – Minimize Basement Flooding

3. Sewer pipe improvements in locations that are over-capacity due to excessive I/I

- South Talbot Rd interceptor sewer
- Victoria Ave trunk sewer between Viscount Pkwy and South Talbot Rd
- Brien Ave E trunk sewer between Stanton Ct and Maidstone Ave E
- Sewer pipe capacity could be increased through complete pipeline replacement or twinning next to the existing sewer pipe

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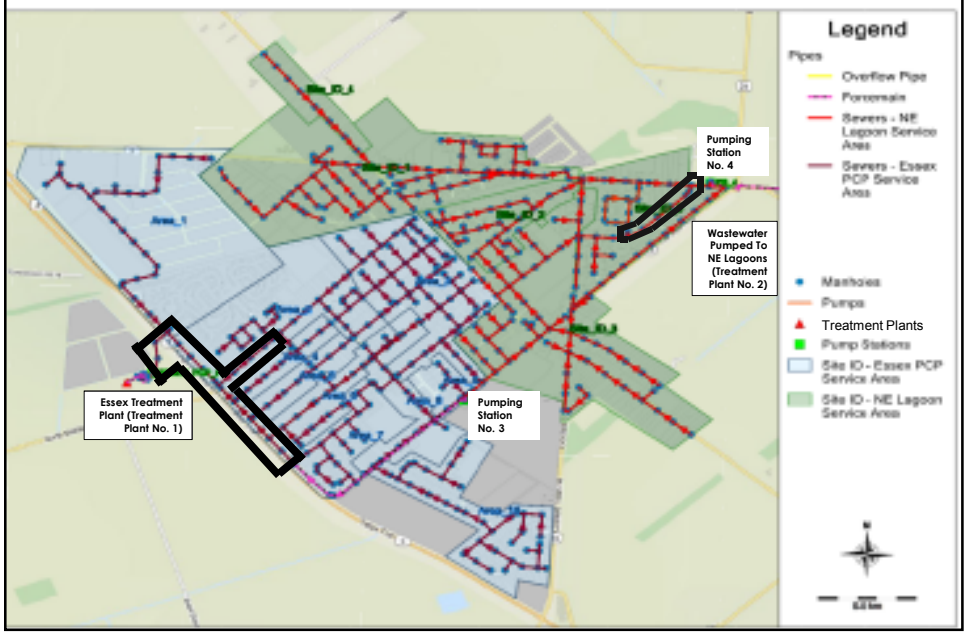
Alternative 3: Locations of sewer pipe improvements



7. Recommendations

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Recommendations

High priority for short term implementation in an effort to address the basement flooding

- **Alternative No. 1:**
- Upgrade Pumping Station No. 3
- Extend the existing forcemain at Pumping Station No. 3 directly to the Essex Plant
- Introduce process modifications (including pumping capacity) to bypass flow at the Essex Plant to offline storage basins or to the outfall
- Portions of other alternatives still being evaluated

On-going implementation of inflow and infiltration reduction program

- Town to continue to reduce I/I through repair/rehab programs
- Continue educating residents on utilization of private sanitary and storm sewer systems
- On-going partnership with ERCA and MOECC to develop accurate IDF curves for design of storm sewer system
- Flooding committee in final stages of preparing Basement Flooding Protection Subsidy Program to assist residents

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TOWN OF ESSEX
CLASS ENVIRONMENTAL ASSESSMENT
ESSEX WARD 1 COMMUNITY SANITARY SEWER SYSTEM
OPEN HOUSE
Shaheen community room at the arena
October 14, 2015 – 7:00 p.m. to 9:00 p.m.
SIGN-IN SHEET

No.	Name (Please Print)	Address	Telephone Number
1	Patti Oshar	132 Kimball Drive	519 984-6440
2	JACL BRERETON	107 Kimball	519 776 5518
3	Elaine Gandelton	193 Oak DR.	519-776-7186
4	JEAN MOCERI	31 STANLEY ST	979-3830
5	JACK DARROCH	130 KIMBALL	961-9222
6	Brian RivesT	34 Townsview crt	776-7633
7	BEVERLEY KENNY	42 QUEENSWAY	776-5678
8	TED GROOT	45 QUEENSWAY	-8625
9	myra & Bernard Harpsa	129, Kimball. DRIVE	966 9032
10	Julie Campbell	136 Oak drive	519-776-6421
11	Hilda + Ron Ware	271 Iler Ave Essex	519-776-6297
12			

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SIGN-IN SHEET

No.	Name (Please Print)	Address	Telephone Number
13	ROBERT + IRENE MARION	105 KIMBALL	519-776-8753
14	BILL + ANGIE KONRAD	220 OAK	519-776-8338
15	T C ROSS	157 Laird	519 776-6819
16	Chris Tapping	177 OAK DR	5197764551
17	VIC + LINDA BARAS	12 MASASCO DR.	519 726 44 67
18	JANICE & ANDREW JOHNSON	91 OAK DR	519 776 8501
19	RICK & KARIN FEDAK	67 MILNE ST. S	519-776-6901
20	Tom & Kelly McManus	10 Earl Crt	519-776-6025
21	Jason Durrand	104 Oak Drive	519.776.5008
22	Ken Miller	153 WOODVIEW	519-776-8496
23	Ashley Allen Jason McGrath	21 Milne St. S	519.964.0245
24			

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No.	Name (Please Print)	Address	Telephone Number
25	GERALD + LIZ VANHOORNE	37 HANLAN ST S. ESSEX	519-776-7207
26	JODY WIPP	248 Fairview Ave W	5199040880
27	GLEN + LAURA MILLS	81 TOWNSVIEW CRT	519-776-8075
28	JOE + CAROL GALOS	1 FALL COURT	519-980-8408
29	Patty Reaume	284 Ike Ave	519-776-9391
30	Rudy Wey	276 Ike	
31	DENIS BASTARACHE	SMASACCO - McGREGOR	519 726 4424
32	Deborah Rousseau	185 Victoria Ave	519-776-9155
33	KENNETH RUPERT	26 KINGSWAY	[redacted] 965-952
34	Kyle Wasylinuk	173 Victoria Ave	519-776-8225
35			
36			

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SIGN-IN SHEET

No.	Name (Please Print)	Address	Telephone Number
37	KARL GRTMONPREZ	311 ILER AVE	519.992-6946.
38	VICKI + BILL REEB	165 LAIRD AVE	519-776-6874
39	DICK RUIMERS	356 ILER AVE	519-776-7753
40	Christine Dinniey	264 Iler Ave	519 890-8451
41	G CASHMBACK	14 EARL	519-776-6823
42	Lena West	152 Oak Drive	519-776-1430
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SIGN-IN SHEET

No.	Name (Please Print)	Address	Telephone Number
49	Joe & Carla Mahenfent	296 Fisher ave	776-5191
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COMMENT FORM

You are invited to give comment or express your comments related to the Essex Ward 1 Community Sanitary Sewer System. As part of the Municipal Class Environmental Assessment, the Town has undertaken this study to identify problem and evaluate alternatives for the Essex Ward 1 Community Sanitary Sewer System leading to selection of a preferred solution to basement flooding issue caused by sanitary sewer backups.

Please complete and leave this form today (or later by mail or fax) so that your opinions and concerns on this project can be considered. All comments are to be directed to:

Chris Nepszy, P.Eng., PE
Director of Infrastructure and Development
Town of Essex
33 Talbot Street South
Essex, Ontario N8M 1A8
Telephone: 519.776.7336 x1114
Fax: 519.776.8811
Email: cnepszy@essex.ca

COMMENTS OR CONCERNS:

request posted copies

jwipp826@gmail.com

(Use reverse side or additional sheets for additional comments if needed)

Name: _____

Address: _____

Telephone / Fax: _____ / _____

E-mail: _____

Affiliation or Group (If Any): _____

Date: _____

Signature: _____