

Report

**City of Port Colborne
EXTRANEOUS FLOW REDUCTION
PROGRAM**

Report to Council

DECEMBER 2009

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1 Introduction

The City of Port Colborne initiated its Extraneous Flow Reduction Program, initially in the sanitary catchment area tributary to the Arena Pump Station, in response to the recommendations arising through its Pollution Control Plan [2007](#) and the Regional Municipality of Niagara's Master Servicing Plan [2003](#). The program is designed as a targeted and aggressive approach to identifying, quantifying and eliminating sources of extraneous flow in the study area, and eventually across the entire city.

To date the program has resulted in:

- The development and [passing adoption](#) of the City of Port Colborne Sewer Use By-Law No. 5228/134/08, mandating disconnection of sources of extraneous flow to the sanitary collection system,
- Detailed inspection of 370 of the 470 private sanitary service connections within the current study area,
- Identification of and preliminary work to disconnect 11 direct sump pump connections to the sanitary collection system,
- Development of a new CCTV sewer inspection protocol to provide meaningful inspection data that will compliment the City's existing GIS and Asset Management practices [and will allow for the rapid identification of remedial works required.](#)
- Identification of and work to repair at least 16 critical sewer defects.

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2 Background

The City of Port Colborne in conjunction with the Regional Municipality of Niagara completed the City of Port Colborne Pollution Control and Infrastructure Study in February of 2007. This study was an in depth and detailed follow up to the Region of Niagara Master Servicing Plan which was released in final form in 2007. Both of the stated studies presented various options for the management of inflow and infiltration in the City of Port Colborne's sewer system, including both end of pipe and source control alternatives. These studies and their findings, and a description of the project area are reviewed in the following sections.

In the interest of clarity the two referenced studies were conducted at two distinct levels of detail in relation to their scope and the granularity of the results.

2.1 Region of Niagara Master Servicing Plan, Macviro Consultants (2003)

The purpose of the 2003 Master Servicing Plan Update was to develop a Region wide capital works program including a financial impact assessment and strategy for water and wastewater servicing to 2012 and beyond. Within the broad scope of the Update, a particular objective relevant to the

Port Colborne Extraneous Flow Reduction Program was to identify effluent quality and wastewater treatment issues, including combined sewer overflows (CSO's).

Specific recommendations related to reduction of CSO's in the Arena Pump Station and Omer Avenue Pump Station drainage areas included the following:

1. Replacement of the two existing 57 L/s pumps at Arena PS with two new 140 L/s pumps.
2. Replacement of the three existing 82 L/s pumps at Union Street PS with three new 103 L/s pumps. (This recommendation was implemented by the Region)
3. Construction of a 2,400 m³ storage tank upstream of Arena PS.
4. Construction of a 2,800 m³ storage tank upstream of Union PS.*
5. Construction of a 4,600 m³ storage tank upstream of Omer Avenue PS.

*Note that the Arena PS is tributary to the Union Street PS, making these recommendations immediately relevant to the Arena Area I&I reduction program.

In addition to the above, recommendations related to operational practices and growth for the next 10 years in the Omer Pump Station drainage area included the following:

1. Decommissioning of the Oxford Boulevard PS and the Steele Street PS, both of which are tributary to the Omer Avenue PS.
2. Construction of a new 725 m long, 750 mm diameter sanitary sewer on Elm Street between Barrack Road and Bartok Crescent to provide additional capacity and replace the existing 375mm – 450mm diameter sewer.
3. Construction of a new 500 m long, 800 mm diameter sanitary sewer on Elm Street and Omer Avenue between Bartok Crescent and the Omer Avenue PS to provide additional capacity and replace the existing 450mm diameter sewer.
4. Construction of a new 630 m long, 450 mm diameter sanitary sewer on Steel Street, Shamrock Avenue, Fielden Avenue and Bartok Crescent between the Steel Street PS and Elm Street to provide additional capacity and replace the existing 300 mm diameter sewer.

The rationale for all of the above improvements was to accommodate future development flows and to meet or exceed MOE F-5-5 requirements respectively. The recommended timeframe for the improvements was stated as 0 to 10 years.

2.2 Port Colborne Pollution Control and Infrastructure Study (XCG Consultants, 2007)

In February of 2007, the City of Port Colborne, in conjunction with the Regional Municipality of Niagara, completed the City of Port Colborne Pollution Control and Infrastructure Study.

With the objective of meeting the requirements of MOE procedure F-5-5 in the short term, and F-5-1 in the long term, the study presented various options for the management of inflow and infiltration in the City of Port Colborne sewer system. The project study report took the form of a Pollution Control Plan (PCP), which was adopted by the City of Port Colborne Mayor and Council.

Development of the PCP included a review of the recommendations and policies implemented as a result of the City's Infrastructure Needs Study, completed in 1992. The PCP also makes reference to the Region of Niagara's Master Servicing Plan of 2003, discussed above. The PCP indicates that since the completion of the 1992 Infrastructure Needs Study, the City has taken several steps related to I/I and CSO reduction including:

- . Lateral and On-Lot Surveys
- . Smoke Testing
- . Sump Pump Disconnection
- . Roof Leader Disconnection
- . Lateral Repairs
- . Sewer and Manhole Inspection
- . Sewer and Manhole Repairs
- . Creation and Maintenance of Asset Database

While all of the above are positive steps to reducing I/I and CSO, most are undertaken only on an as needed, or opportunistic approach, the exception being the City's current practices to inspect all sewer's and manholes on a five year cycle. Review of the PCP indicates that no comprehensive strategic plan exists to identify and remediate I/I sources in a systematic fashion. An I/I reduction program is clearly identified in the PCP as the preferred option and approach for mitigation of extraneous flows versus storage and or pump station upgrade options.

3 Extraneous Flow Reduction Program

The City of Port Colborne's I/I program was designed as a targeted and aggressive approach to identify, quantify and eliminate sources of I/I in a manner consistent with the recommendations of the Pollution Control Plan.

3.1 Flow Monitoring Program

The flow monitoring component will gauge the ultimate success of the extraneous flow reduction program by quantifying the reduction in extraneous flows achieved through the private property and municipal sewer retrofit and rehabilitation programs.

The first phase of flow monitoring has been completed in both the Arena PS and Omer PS study areas. Flows were monitored for a period of four months, and the resulting data assessed to determine the average dry and wet weather flows in each area under current conditions. This

exercise also confirmed the excessive wet weather flow in the Arena PS area that was reported in the PCP.

Observations made during the course of the Arena area flow monitoring program included on several occasions, during dry weather, the surcharging of local sanitary sewers adjacent to the Arena PS. The surcharge events coincide with the pump cycles at the Arena PS. The pump on cycles appear to be approximately 5 minutes in length with approximately 20 minutes between cycles where the contributing sanitary sewers are surcharged above the obvert until the next pump cycle.

This pump station induced surcharge appears to be contributing to debris accumulation in the sewers adjacent to the Arena PS and makes the use of any type of area velocity equipment in close proximity to the station unfeasible. It is likely that the surcharge is also a factor causing the observed excessive and sustained wet weather flows in the portion of the catchment immediately upstream of the Arena PS.

AE has initiated contact with Regional Staff to discuss the operating characteristics of the Arena PS, and will continue to monitor its impact on the collection system.

3.2 Private Property Inspection and Retrofit Program

To date, approximately 370 of the 470 properties in the Arena PS Pilot Study Area have been inspected to identify the presence of improper downspout, weeping tile or sump pump connections. Observations made during the private property inspections have not revealed any downspout or weeping tile connections, however 11 sump pump connections were found. Of the remaining 100 properties yet to be inspected, AE suspects at least 3 additional sump pump connections based on previous lot inspections conducted by City Staff in 1991.

Assuming a capacity of 1.5 L/s to 3.0 L/s (25 to 50 USGPM) per pump, the 11 identified connections could result in approximately 17 L/s to 35 L/s being discharged directly to the sanitary sewer system during storm events, potentially causing surcharges and placing a heavy burden on the 52.7 L/s capacity of the Arena Pump Station.

Through a newspaper advertisement and direct mail, several local plumbers were invited, with the intention of developing a roster of available contractors to undertake the required private property retrofit work. AE is currently coordinating 2 local plumbing contractors to complete the necessary retrofit work on private property to disconnect the identified private sumps from the collection system. Work is expected to begin within the next two weeks.

At the outset of the program, each private property survey included a CCTV inspection of the sewer service lateral to characterize the overall condition of laterals in the Study Area. Approximately 195 CCTV inspections were conducted. Review of the inspection records indicated that the sewer laterals are generally in good condition, and confirmed the lack of weeping tile connections in the

Study Area. Based on the observations of those 195 lateral inspections, the AE and the City agreed that CCTV component of the inspection program would provide no further benefit in the Arena Area, and was discontinued.

3.3 Public Participation and Regulatory Program

While public participation has been generally good, the overall success of the program relies on 100% participation of the Study Area, both for the inspection phase as well as for the retrofit phase. With that in mind, the City's Sewer Use By-Law No. 5228/134/08 was developed, and passed by City Council on December 15, 2008, to mandate private sewer lateral inspections, and disconnection of any sources of I/I such as sump pumps, downspouts or weeping tiles.

As of October 28, 2009, AE has made at least 4 attempts to contact property owners in the Arena PS study area to schedule private property inspections. The most recent public notice, delivered directly to the remaining 100 properties not yet inspected, indicated that in accordance with the new Sewer Use By-Law property owners may be subject to fines should they fail to schedule an inspection.

It is the intent of this program to conduct a detailed inspection of each and every private property and eliminate every source of I/I within the current study area, and eventually the entire City. Continued support from City Council will be essential as the program migrates across the City.

The need for Council support also extends to the private property retrofit program. As state above, the program has, to date, identified 11 sump pumps to be disconnected. Many of the identified retrofits are somewhat complicated, requiring work in and around finished basements, extensive landscaping, concrete driveways etc.

3.4 Municipal Sewer Inspection and Rehabilitation Program

The City of Port Colborne conducts annual CCTV inspection of the wastewater collection system based on a return rate of one in five years. In theory and subject to available funding this program should evaluate every main sewer section every five years on a rotating basis. AE's review of the historical CCTV data record revealed that it was incomplete for the Arena PS study area and a portion of the record was in excess of five years old.

In order to garner a comprehensive assessment of sewer condition for the Pilot Study, AE requested that the City employ the 2008 CCTV budget allotment to the Arena PS study area. As part of its advisory services related to the Pilot Program, AE developed a new Terms of Reference for the CCTV inspection program. Included in the terms of reference were specific requirements for digital data deliverables that would allow for the review and analysis of the data in a more efficient manner than previous City contracts, and support the needs of the Extraneous Flow Reduction Program and an overall City Wide CCTV based sewer replacement and rehabilitation program.

All of the data collected by the CCTV contractor, including records of 51 observed defects was provided to AE. Through a detailed review of the data, the 51 observed defects were found to include a total of 16 critical defects identified as one or more of the following, and recommended for immediate repair:

- . Points of active infiltration and inflow
- . Points of past infiltration and inflow, encrustations
- . Defective previous repairs
- . Structural defects which had the potential for contributing to inflow and infiltration
- . Operational defects with the potential to impact hydraulic capacity

Work to repair the 16 critical defects is currently underway and is expected to be complete within two weeks. Given that the CCTV inspection was completed one year ago, it is not surprising that four additional defects were found, and are being repaired under the current contract.

The 2009 CCTV inspection contract is currently underway and includes the entire Omer Avenue PS collection system to be evaluated in the same manner under the second phase of the Inflow and Infiltration program.

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