THE REGIONAL MUNICIPALITY OF YORK

Feasibility of the Construction of Flow Control Structures in the York Durham Sewage System (YDSS)

Executive Summary

This report discusses the feasibility of constructing gates within large trunk sections of the York Durham Sewer System (YDSS) to attenuate wastewater flows and protect sections of the Southeast Collector (SEC) from excessive surcharge. By attenuating flows, wastewater is effectively detained in trunk sewer sections that have excess capacity to reduce peak flow rates in the SEC that has little or no remaining capacity. Four (4) gate structures are considered at the following locations:

- Gate 1 is located within Manhole T-06-29-AS-5 on Leslie Street approximately 530 m south of 19th Avenue
- Gate 2 is located within Manhole YR-T99102-05 on Leslie Street approximately 140 m north of Elgin Mills Road
- Gate 3 is located within Manhole YR-T9948-19 on 16th Avenue approximately 50 m east of Woodbine Avenue
- Gate 4 is located within Manhole YR-9801-9-01A on 9th Line approximately 70 m north of Rouge Bank

This project is being considered because the in-service date of the twinned sections of the SEC is now expected to be 2012. Previous master planning exercises have identified that the SEC will reach capacity in 2010 under design flow conditions. The identified gate structures would provide a 25-yr storm protection level and mitigate risk of capacity shortfalls in the SEC until 2012 as well as provide ongoing operational flexibility through Real Time Control (RTC) after the SEC is completed.

The ability to provide ongoing operational flexibility is particularly timely given the realities of climate change to mitigate the impact of extreme weather and flow events. The anticipated operational benefit would include not only greater flexibility and reduction of risk of surcharging and overflows in the collection and conveyance system, but also improvement to the treatment works as well through greater consistency of influent flow rates and the ability to optimize flow control to the process trains.

The use of gates is commonly used in large sewer systems including the YDSS to control flows and reduce peak levels. Currently, the YDSS uses a gate structure on the Bathurst Collector to attenuate flows. In addition, the lower sections of the SEC (downstream of Valley Farm Road) have been designed to operate under surcharge conditions to permit flow attenuation at Duffin Creek. Moreover, regulatory authorities including USEPA embrace the use of Real Time Control (RTC) to provide operational flexibility and protect the environment. Several documents discussing Flow Attenuation through RTC are appended to the report and are available from the following locations:

EarthTech
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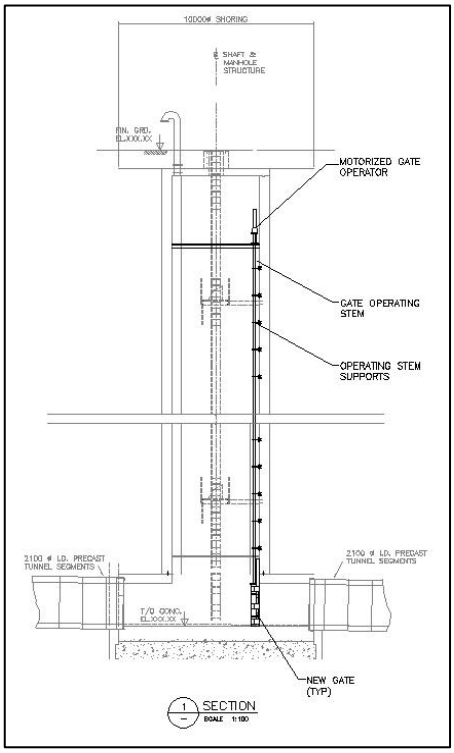
- Real Time Control of Combined Sewer Networks, EPA Science Forum, 2004 (http://www.epa.gov/ORD/NRMRL/scienceforum/stinson_m.pdf)
- Milwaukee Metropolitan Sewerage District Overflow Reduction Plan (http://www.mmsd.com/wastewatertreatment/overflow_reduction_plan.cfm)
- Real Time Control of Urban Drainage Networks, USEPA, September 2006 (http://www.epa.gov/nrmrl/pubs/600r06120/600r06120.pdf)
- Real Time Control for a Trunk Sanitary Sewer and Tunnel Relief System in the City of Ottawa, IDS-Water White Paper, (http://www.idswater.com/Common/Paper/Paper_209/Real-Time.htm)

The proposed gates will generally consist of the following and as shown in Figure ES-1:

- a stainless steel gate c/w overflow/bypass capability and water level and gate position sensors located within the existing manhole
- a large diameter riser section of the manhole to permit movement and maintenance of the gate (suitably sealed as noted below)
- a small, buried chamber containing motorized gate actuators c/w manual control, electrical and communications equipment



The gate would normally allow dry weather flow (DWF) to pass freely. During large, rainfall-induced flow events when there is risk of surcharge in the SEC, the gate would be lowered to a pre-determined level (not closed) and restrict the flow of wastewater to the downstream sections. As a result, the wastewater would begin to be detained (back up) upstream of the gate and fill the air space in the large-diameter sewers. Pipes upstream of the gate would become surcharged, however, the level of surcharge would remain well below the surrounding aquifer level at Sites 1-3 and no risk of leakage (exfiltration) would exist. At Site 4, where surcharge levels within the pipe may exceed the surrounding aquifer level for brief periods, the pipe's design engineer, MacViro (now Genivar) has certified that the pipe can withstand these forces without leakage. Genviar recommends that concrete joints in the riser section be sealed from the inside to protect against possible exfiltration from the riser section itself. Additional details will be established during future detailed design.

The design and construction cost for the four (4) gates is estimated to be $ 3.07M and a budgeting allowance of $3.50M is recommended to address Class EA and CofA requirements. While full budgeting of the works will follow the ongoing refinement of the SEC cost estimates, it is anticipated that potential savings associated with capital cost deferment of the SEC to 2012 will yield a net savings to the Region.

The environmental approval process will follow the June 2000 MEA Class EA process. The Schedule that the EA process will follow will impact the cost and construction schedule of the works. It is noted that these costs assume that the works. A Schedule A activity is anticipated

since the proposed works involve only operational aspects of the sewer system that do not change the objective or size of the conveyance system and would be constructed within existing road allowances.