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UPDATE ON THE INFLOW AND INFILTRATION REDUCTION PILOT PROGRAM AND TASK FORCE

The Environmental Services Committee recommends the adoption of the recommendation contained in the following report dated May 19, 2010, from the Commissioner of Environmental Services.

1. RECOMMENDATION

It is recommended that:

1. The Regional Clerk circulate this report to the Clerks of the nine local municipalities.

2. PURPOSE

On February 18, 2010 Council directed staff to report back with additional details on the inflow and infiltration reduction program.

This report provides an update on:

- Activities completed
- Activities underway to reduce inflow and infiltration throughout York Region; and
- Status of local municipal council resolutions sought to achieve active participation in an Inflow and Infiltration Task Force.

3. BACKGROUND

York Region is committed to reduce existing and future inflow and infiltration entering the sanitary sewer collection and treatment systems

Reducing inflow and infiltration has been an integral part of servicing considerations by York Region since the first Water and Wastewater Master Plan developed in 1997. The 2001 York Durham Sewage System (YDSS) Master Plan update specifically identified “water conservation/extraneous flow reduction” as a significant design consideration for all YDSS projects. In conjunction with alternatives considered during the Southeast Collector Individual Environmental Assessment, inflow and infiltration reduction efforts were stepped up in 2007 with Regional Council approving a commitment of \$23 million in the 10-year capital plan with ongoing efforts by both Regional and local municipal staff regarding implementation.

York Region and all of the local municipalities are actively involved in the York Region and Local Municipal Inflow and Infiltration Reduction Program. This ongoing innovative

initiative, the largest of its kind in Canada, will identify industry best practices and cost effective remediation projects to reduce inflow and infiltration. Completion of the detailed studies of the pilot program will provide a full suite of inflow and infiltration reduction measures that are tested and available for all local municipalities and the Region to use in ongoing asset management programs.

In addition to the pilot program, a long term strategy for the reduction of inflow and infiltration throughout York Region is being developed. This strategy will ensure that all of the Minister's conditions of approval related to reduction of inflow and infiltration for the Southeast Collector project are met. It will also provide adequate funding and resources to York Region and the local municipalities for achieving required levels of inflow and infiltration reduction.

Inflow and infiltration reduction is an important part of sustainable asset management

Regional and local area municipalities are required to establish sustainable asset management practices and report on the State of Infrastructure where applicable. With the passing of Bill 175, the *Sustainable Water and Sewage Systems Act* to ensure clean and safe drinking water for Ontario residents and the potential for future regulations, local municipalities will be required to assess the cost of providing water and sewage services and to recover the amount of money needed to operate, maintain, and replace the system.

The Ministry of the Environment, in a commitment to sustainable drinking water systems, has made a regulation (Ontario Regulation 453/07) under the *Safe Drinking Water Act*, 2002 that prescribes requirements for Financial Plans to be prepared as part of the Municipal Drinking Water License Program. In the supporting guidance document, "*Financial Plans Guidance Document for Municipal Drinking-Water Systems and Municipal Wastewater Systems*", 2007, references throughout indicate the potential for the same requirements to be extended to wastewater and stormwater systems. In order to comply with pending future financial regulations and as importantly, provide long-term sustainable management of water and wastewater systems, municipalities will require an assessment of how costs will be recovered to support on-going programs and required infrastructure.

Preferred undertaking of the Southeast Collector Trunk Sewer is defined as construction of the sewer as well as water conservation and efficiency and inflow and infiltration reduction

York Region has ongoing programs in water conservation and inflow-infiltration reduction that are relied upon as mitigation measures supporting development of the new Southeast Collector. Although progress on water conservation, water-use efficiency and inflow-infiltration reduction measures has been substantial, significant additional work is now required to meet the Minister's conditions.

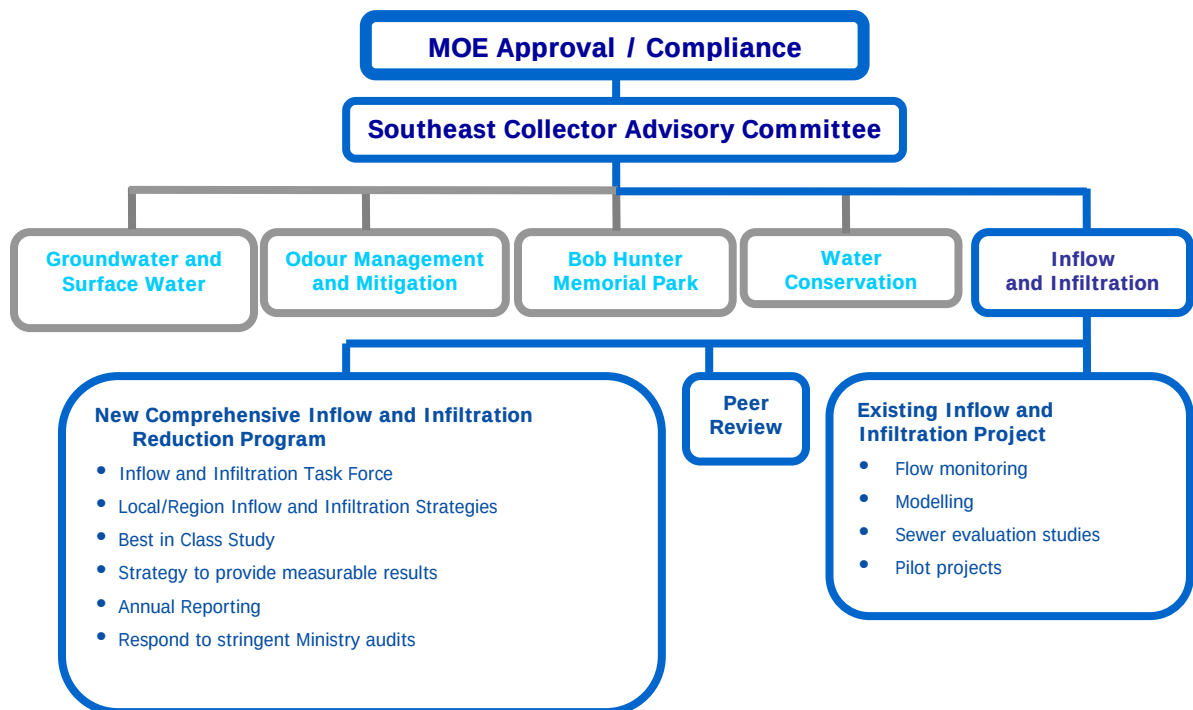
Approval of the Southeast Collector Trunk Sewer is subject to stringent conditions related to inflow and infiltration reduction based upon the following overall directions:

- Best-in-class review of inflow and infiltration reduction measures
- Development of inflow and infiltration reduction strategies to be completed in conjunction with the Region and its Local Municipalities
- Independent peer review of strategy
- Presentation of strategy to an advisory committee
- Submission of strategy and implementation plan to MOE
- Submission of annual monitoring report to MOE

The inflow and infiltration reduction program, beyond the pilot project, is necessary to minimize potential for sewage overflows and to implement intra-municipal inflow and infiltration guidelines for reporting measured inflow and infiltration reductions.

Figure 1 demonstrates differences between the new inflow and infiltration program and the ongoing pilot project.

Figure 1



4. ANALYSIS AND OPTIONS

York Region maintains an active asset inspection program to continually seek out sources of inflow and infiltration on Regional infrastructure

Ongoing inspections of Regional wastewater collection infrastructure are divided into two main categories: sewer inspections and maintenance hole inspections. The following asset inspection programs are being implemented by York Region staff:

- CCTV inspections of 20 kilometers of gravity sewers (approximately 10% of total system) are completed per year. All Regional gravity sewers have been inspected in the past. This is the second round of the Region's ten year inspection program.
- Stream bank inspection program has identified 500 sites where there is potential for erosion and that are within 10 meters of a stream that could be at risk. Approximately 60 high priority sites are inspected per year.
- Assessment of all 1300 maintenance holes will be completed by the end of 2010.
- YDSS inspection walk is a regular visual inspection to observe and assess the structural condition of maintenance holes and sewers in critical locations.

Infrastructure identified as needing repair and/or a possible source of inflow or infiltration is scheduled for more detailed inspections to determine appropriate remediation measures. Remediation or replacement projects are then programmed into the Region's 10-Year capital plan through the Infrastructure Improvement Program. The purpose of this program is to produce an annual infrastructure improvement plan and 10 year forecast of infrastructure needs. These needs are based on operational and infrastructure requirements to support the safe and reliable delivery of water and wastewater services. The Region's knowledge of its asset base including condition, remaining life, reliability and risk enhances the ability to prioritize projects. Although the Region's trunk sewer system is quite young relative to other regional municipalities, approximately \$300 Million worth (replacement value) is 25 years or older. This makes rigorous monitoring, inspection, condition assessment and capital planning programs key to ensure the future sustainability of wastewater services.

The current 10-Year capital plan includes approximately \$45 Million in rehabilitation and replacement work on Regional trunk sewer and maintenance hole assets.

Inspections completed on twenty-six catchments throughout York Region

Through the York Region and Local Municipal Inflow and Infiltration Reduction Pilot Project, \$1.5 million of sanitary sewer evaluations studies were completed between August 2009 and March 31, 2010. The sanitary sewer evaluation studies narrowed down the sources and potential remedies for inflow and infiltration in priority areas previously identified throughout York Region.

Attachment 1 shows the priority areas and areas with completed sanitary sewer evaluation studies.

The completed studies include:

- Manhole inspections
- Smoke testing
- Closed circuit TV (inspections on municipal sewers and on private laterals - connections to homes)

These studies were funded by York Region and were completed on local municipal infrastructure. Coordination of the contracts between York Region and local municipal staff was key to the success of completing this work.

- A joint contract for work in East Gwillimbury, Georgina, Markham, Newmarket and Whitchurch-Stouffville completed studies in fourteen catchments.
- Richmond Hill and Vaughan used their own contractors to complete work on another seven catchments.

In addition to work funded by York Region, Aurora received funding from the Build Canada Fund for inflow and infiltration related work. \$500,000 was spent to complete sanitary sewer evaluation studies on five catchments. Build Canada funding was also used to reline 2.5 km of sanitary sewer in 2009 at a cost of \$550,000. In 2010 Aurora has budgeted \$400,000 for additional sanitary sewer evaluation studies and \$2 million for rehabilitation work over 2010 and 2011.

Table 1 summarizes the results of all sanitary sewer evaluation studies. *Attachment 1* shows locations of the evaluation studies.

Inflow and infiltration reduction pilot program has identified sources of inflow and infiltration for remediation in 2010

A range of costs for the repair or replacement of pipes and maintenance chambers identified through the sanitary sewer evaluation work is presented in Table 1. Costs are preliminary and are influenced by:

- Severity of problem
- Location, accessibility, size and depth of infrastructure
- Amount of flow and by-pass requirements

The Region's project consultant is currently reviewing data obtained from the various sanitary sewer evaluation studies. The structural condition of the infrastructure and the potential for inflow and infiltration will be determined and will provide information required to develop specific remediation plans.

Remediation of infrastructure identified through the pilot program will begin in Q4 2010. A workshop with local municipal staff is scheduled for June 2010 to finalize which pilot

projects will be completed. Terms of Reference and detailed cost estimates will then be prepared for each of the pilot projects. York Region will fund approximately \$15 million in inflow and infiltration reduction pilot projects on local municipal wastewater systems.

Results of the sanitary sewer evaluation studies reveal there is not always an obvious problem that can be readily fixed. There are usually numerous small cracks, breaks and misaligned joints that individually contribute a small amount of extraneous flow to the system. However, when these sources are accumulated they create high flows during wet weather events.

Table 1
Results of Sanitary Sewer Evaluation Studies

	Maintenance Holes (MH's)	Smoke Testing	CCTV Mainline	CCTV Lateral
Number Inspected	2000	50 kilometres	90 kilometres	5000
Inspection Findings	Approximately 25% (500) had active infiltration or potential for infiltration	30 direct connections or sources of flow	4,000 individual inflow and infiltration related defects	Analysis complete June 2010
Proposed Actions to Fix	Can include: • Vent plugs • Coatings • Structural rehabilitation • Sealing frame-chimney joint • Manhole pans • Chemical grouting • Replacement	On private property can include: • Disconnections of downspouts or foundation drains	Can include: • Pipe relining • Spot repairs • Chemical grouting • Pipe replacement	Can include: • Pipe relining • Spot repairs • Chemical grouting • Pipe replacement
Estimated Range of Costs	Per maintenance hole \$150 - \$13,000	Per property \$150 - \$13,000	Per meter of pipe \$650 - \$2,500	Per lateral \$650 - \$19,000

Status of local municipal council resolutions to actively participate in the Inflow and Infiltration Task Force

Local municipal staff have advised that they are currently preparing reports to their respective councils seeking authorization to actively participate in the Inflow and Infiltration Task Force. At the request of the local municipalities, the following common recommendation has been drafted for use by local municipalities to put forth at their June/July Council meetings.

In partnership with the Region, *Town* agrees to actively participate at the Inflow and Infiltration Reduction Task Force to:

- Continue to seek out sources of inflow and infiltration
- Adopt standards and guidelines intended to reduce inflow and infiltration in new developments and within existing systems
- Develop funding and cost sharing principles to address future remediation projects

Ongoing participation in Inflow and Infiltration Reduction Task Force will ensure inflow and infiltration reduction targets are met

The commitment to collaboratively deal with inflow and infiltration reduction was recommended in a February 18, 2010 Council recommendation (Report 2, clause 2) through a request for local municipal council resolutions to:

In partnership with the Region, agree to determine what constitutes adequate funding and resources to support reduction of inflow and infiltration into wastewater systems with the objective of generating inflow and infiltration reduction within existing local and Regional systems by:

- Active participation in Inflow and Infiltration Task Force
- Continuing to seek out sources of inflow and infiltration
- Adoption of standards and guidelines intended to reduce inflow and infiltration in new developments and within existing systems
- Developing funding and cost sharing principles to address future remediation projects

On April 15, 2010 Regional and local municipal staff participated in the inaugural Inflow and Infiltration Task Force Workshop. This first meeting identified the following two key initiatives necessary to guide reduction of inflow and infiltration Region wide.

- Confirmation of senior management staff membership from York Region and the nine local municipalities on the Steering Committee.
- Subject specific working groups were identified and tasked to develop a clear Terms of Reference to guide the work plans and to develop short, medium and long term objectives

Attachment 2 provides a list of the Inflow and Infiltration Steering Committee members and their alternates.

Developing and implementing a strategy for inflow and infiltration reduction will satisfy Provincial requirements and position York Region and local municipalities as leaders

A joint strategy and detailed implementation plan between York Region and the local municipalities will be developed in 2010. The program will include reduction priorities, targets, timelines, tactics and initiatives and associated implementation costs. The program will use a full suite of inflow and infiltration reduction measures that are being tested through the pilot program and will be available for all municipalities to use for implementation.

Task Force Working Groups created to identify and achieve short, medium and long term objectives to meet Minister's conditions

Regional and local municipal staff collaborated to develop the terms of reference for each of the following five working groups:

- Strategy Development
- Communications and Advocacy
- Funding
- Standards
- Audit, Measure and Continuous Improvement

The Terms of Reference define the group's purpose, responsibilities and staff and consultant resources required to complete short, medium and long term activities. The Terms of Reference for each of the working groups is appended in *Attachment 3*.

Table 2 summarizes the short term priority tasks to be completed by the working groups by end of Q3 2010. The Strategy Development working group will coordinate tasks with all other working group to ensure all of the Minister's conditions with respect to inflow and infiltration reduction are met.

Table 2
Short Term Priorities

Working Group	Short Term Priorities (completion Q3 2010)
Strategy Development	• Establish goals and objectives • Develop strategy for ongoing reduction • Establish steps to achieve targets • Oversee implementation of standards, auditing and continuous improvement

Working Group	Short Term Priorities (completion Q3 2010)
Communication and Advocacy	• Identify stakeholders, spokesperson, champion • Identify the audience • Identify benefits of strategy • Identify what and why to do inflow and infiltration reduction and the link to community • Align with academia, climate change, corporate activities, and sustainability objectives • Assess risk management • Develop plan to communicate and educate
Funding	• Establish principles • Identify sources to explore funding options • Identify mechanisms for funding • Funding strategies, feasibility and accountability
Standards	• Assess and develop standards (existing and new) • Develop implementation plan • Develop and undertake monitoring and evaluation
Audit, Measure and Continuous Improvement	• Define 10% inflow and infiltration reduction based on industry best practices and similar municipal studies • Determine baseline for current inflow and infiltration • Identify and develop practices, benchmarking and feedback

Quantifying the success of inflow and infiltration reduction is a challenging process

The Audit, Measure and Continuous Improvement Working Group is tasked with defining 10% reduction of inflow and infiltration for York Region and the local municipalities. The audit and measurement process will be unique to York Region but will be based on industry best practices and similar municipal studies. Developing this measure is a complex process with many factors to consider such as:

- Where to measure – at the catchment, municipality or Regional level
- Changing weather conditions – inflow and infiltration is directly related to wet weather like rain and snow. These conditions change from year to year and from storm event to storm event.
- Changing conditions as systems age – the occurrence of inflow and infiltration will continue to change as systems age and as new pipes are added.

Relationship to Vision 2026

Inflow and infiltration reduction meets a variety of goals and objectives of Vision 2026. Specifically inflow and infiltration reduction directly addresses the objectives of protecting the quality and quantity of ground and surface waters.

Through the partnership approach taken between York Region and the local municipalities the Region is taking a coordinated leadership role in environmental strategies and conservation. In addition, inflow and infiltration reduction helps to ensure that land, infrastructure and services are used efficiently in urban areas to ensure stable cost effective wastewater treatment.

5. FINANCIAL IMPLICATIONS

Funding for the Regional and Local Municipal Inflow and Infiltration Reduction Program

Funding for inflow and infiltration reduction pilot project is available in 2010 through 2013. A total of \$23 million has been allocated for the Inflow and Infiltration Reduction program since 2009 in the 10-year capital plan. The program will be funded 93% from development charges and 7% from wastewater rates. It is far more cost effective to reduce inflow and infiltration to gain sewer capacity than to construct new infrastructure. The Region committed to fully funding this pilot program in 2007 through the study and pilot project stage to final full scale recommendations.

The Region's \$15 million of pilot program remediation funding will begin to address the inflow and infiltration problem in York Region. Work not covered by the Region's pilot program will need to be funded through regional and local municipal budgets and other sources. Cost sharing strategy will be developed for additional remediation works through the Inflow and Infiltration Reduction Task Force

Of the total \$23 million program budget, approximately \$1.5 million was allocated for the sanitary sewer evaluation studies and approximately \$15 million has been allocated for the pilot remediation projects. Pilot remediation projects are currently being determined with construction work beginning in late 2010 through to 2012. Other tasks included in the program budget include flow monitoring, data review and analysis and ongoing program support.

Table 3 summarizes the work plan activities identified for completion of the pilot remediation projects.

Table 3
Work Plan for Pilot Projects

Pilot Project Activity	Timeline
Scoping of Pilot Projects • Workshop with local municipal staff • Prepare scope sheets • Identify first phase of remediation – small scale local projects	Q3 2010
Completion of first phase remediation projects	Q4 2010
Second phase remediation projects- large scale including work on private property • Finalize selection • Complete detailed design	Q1 2011
Begin to monitor results of phase 1 projects Begin construction of phase 2 pilot projects	Q2 2011
Develop private property inflow infiltration reduction strategy and design one project	Q3 2011
Begin to monitor results of phase 2 projects Begin construction of one private property project	Q1 2012

The York Region and Local Municipal Inflow and Infiltration Reduction Pilot Project will help reduce the operational costs at our wastewater pumping stations and treatment facilities and extend the life of the facilities by reducing the amount of wastewater flow during rainfall events and spring snowmelt.

Cost Benefit Analysis will assist in evaluating effectiveness of pilot remediation

A key component in the review of pilot project results is an analysis of the costs and benefits associated with inflow and infiltration reduction. A tool will be developed to analyze inflow and infiltration data, pilot project construction costs and potential operational savings to the local municipalities and the Region. This analysis will be used to identify which pilot projects are the most cost effective.

6. LOCAL MUNICIPAL IMPACT

The combined Regional and local municipal wastewater network of sewers is comprised of well over 3300 kilometers of pipe, with at least 90% of the system under the jurisdiction of the local municipalities and on private property. Consequently, most of the inflow and infiltration related issues originate in local municipal and private systems. To effectively reduce the amount of inflow and infiltration entering the systems, the inflow

and infiltration reduction program must be a priority for both the Region and the nine local municipalities.

Regional funding is provided for the study and pilot remediation of selected inflow and infiltration sources. Beyond the pilot projects, local municipal resources will also be required over the long term to ensure success. Inflow and infiltration reduction must be a priority across the Region in all nine local municipalities and will require local municipal resources to participate in the study and to remediate local municipal wastewater systems.

Additional sources of funding may be available for remediation of areas experiencing high inflow and/or infiltration. The Town of Aurora has been successful in acquiring funding through the Build Canada Fund. The Inflow and Infiltration Reduction Task Force will investigate sources of funding to continue reducing inflow and infiltration in the wastewater systems throughout York Region. The region will fund \$15 million in remediation of inflow and infiltration on local municipal systems.

Throughout completion of the pilot remediation projects municipal contribution is necessary through involvement of staff resources. Municipal staff will be required during the construction period and may be required to manage contractors for some of the smaller remediation projects.

York Region staff will continue to work with the local municipalities to support sustainable asset management practices through programs such as the Inflow and Infiltration Reduction Program. With continued coordination and development of business processes, best practices, technology and business resources, York Region and the local municipalities will continue to ensure sustainable environmental services.

7. CONCLUSION

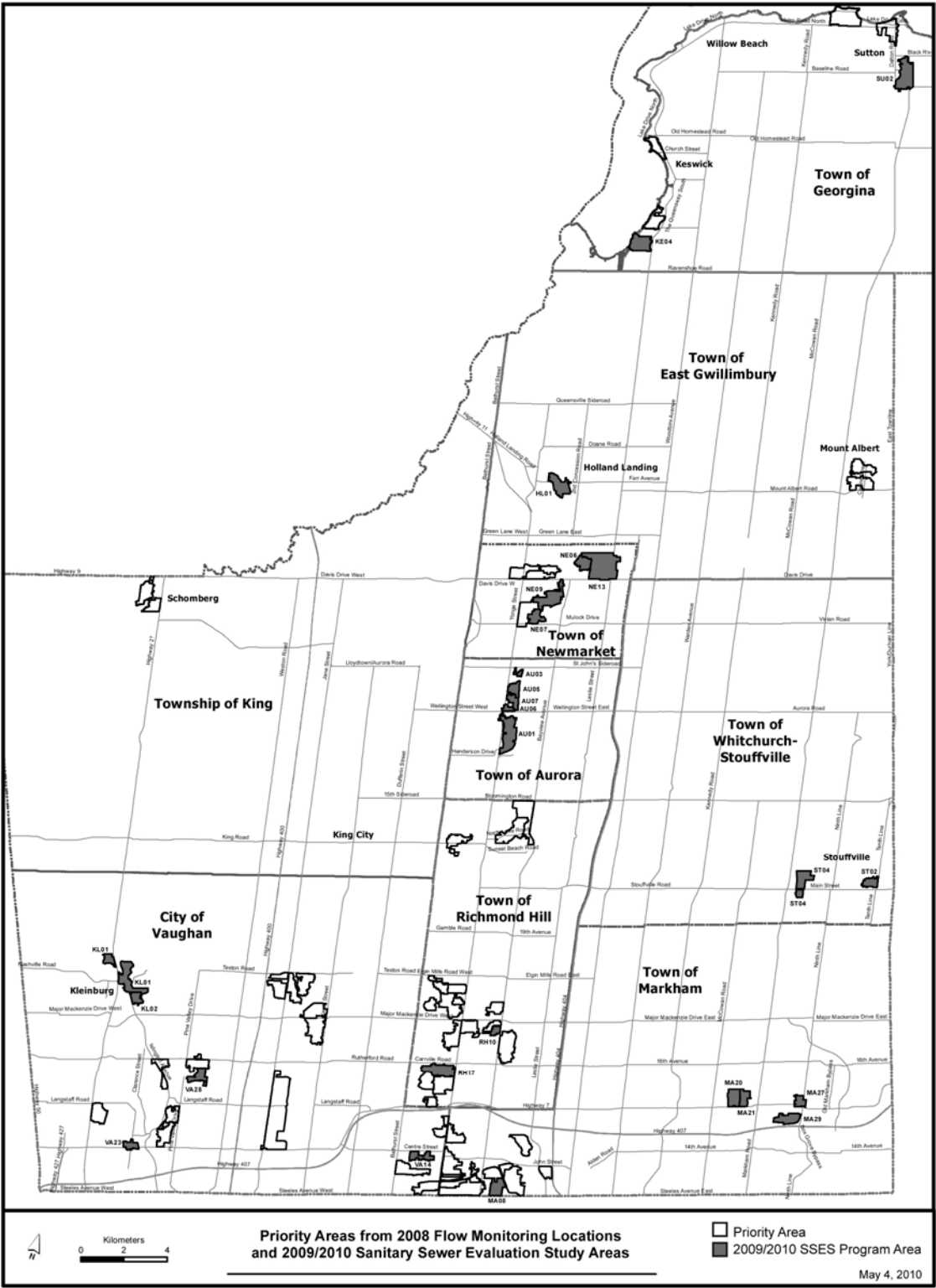
York Region together with our local municipalities are committed to reducing the amount of existing and future inflow and infiltration entering the collection and treatment systems. York Region's Inflow and Infiltration Reduction Pilot Program builds on this commitment through the coordinated efforts between York Region and the local municipalities and a Regional committed expenditure of \$15 million. The program will result in the availability of more secure, cost effective sanitary conveyance and treatment to meet the needs of existing residents, businesses and to service future growth.

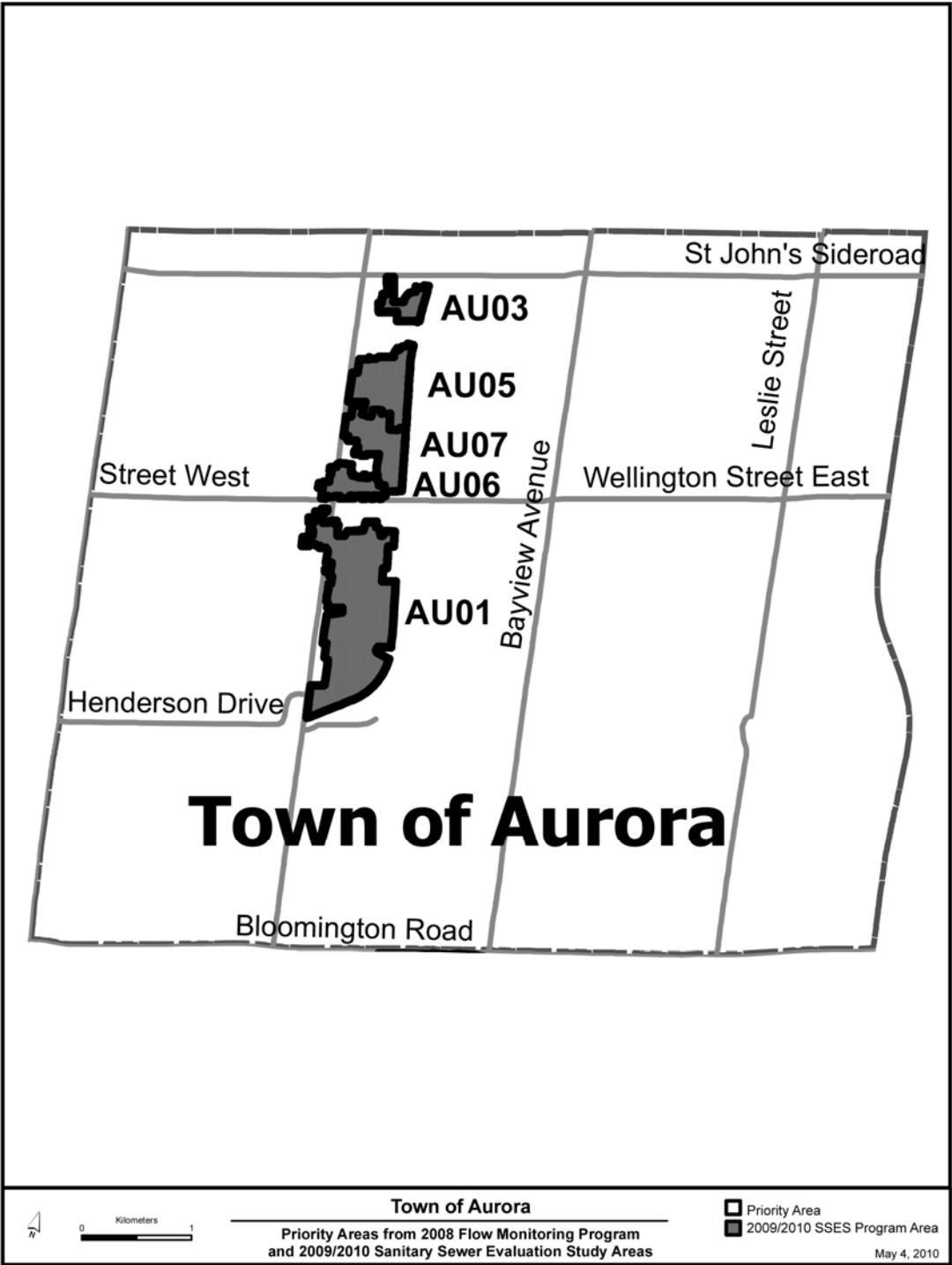
York Region, together with our local municipal partners, is charged with planning and providing capacity for additional growth, while working within sustainable servicing options. Inflow and infiltration reduction continues to be an important component of wastewater servicing strategy and is a vital part of sustainable asset management in York Region.

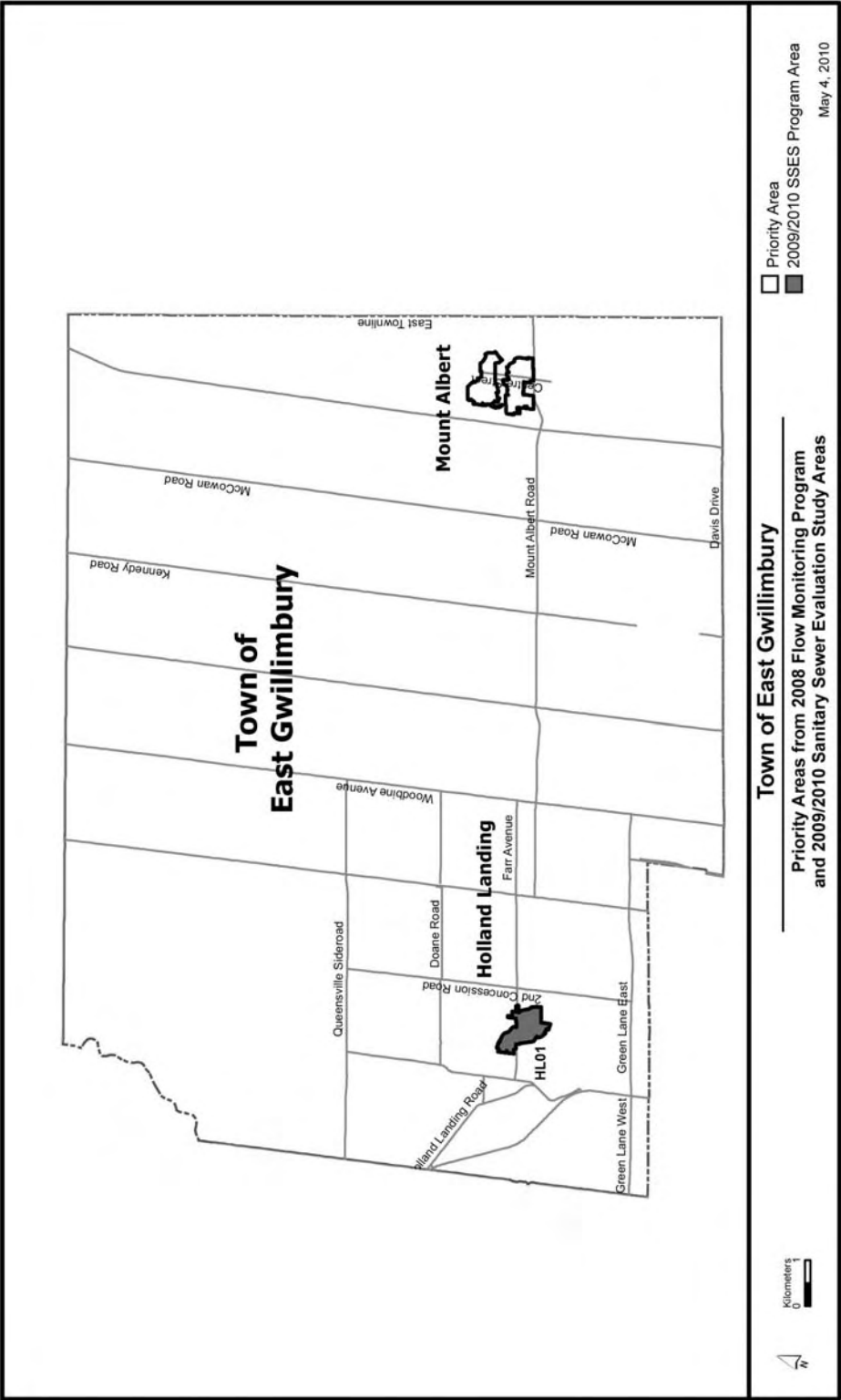
For more information on this report, please contact Laura McDowell, Director Environmental Promotion and Protection at (905) 830-4444 Ext. 5077.

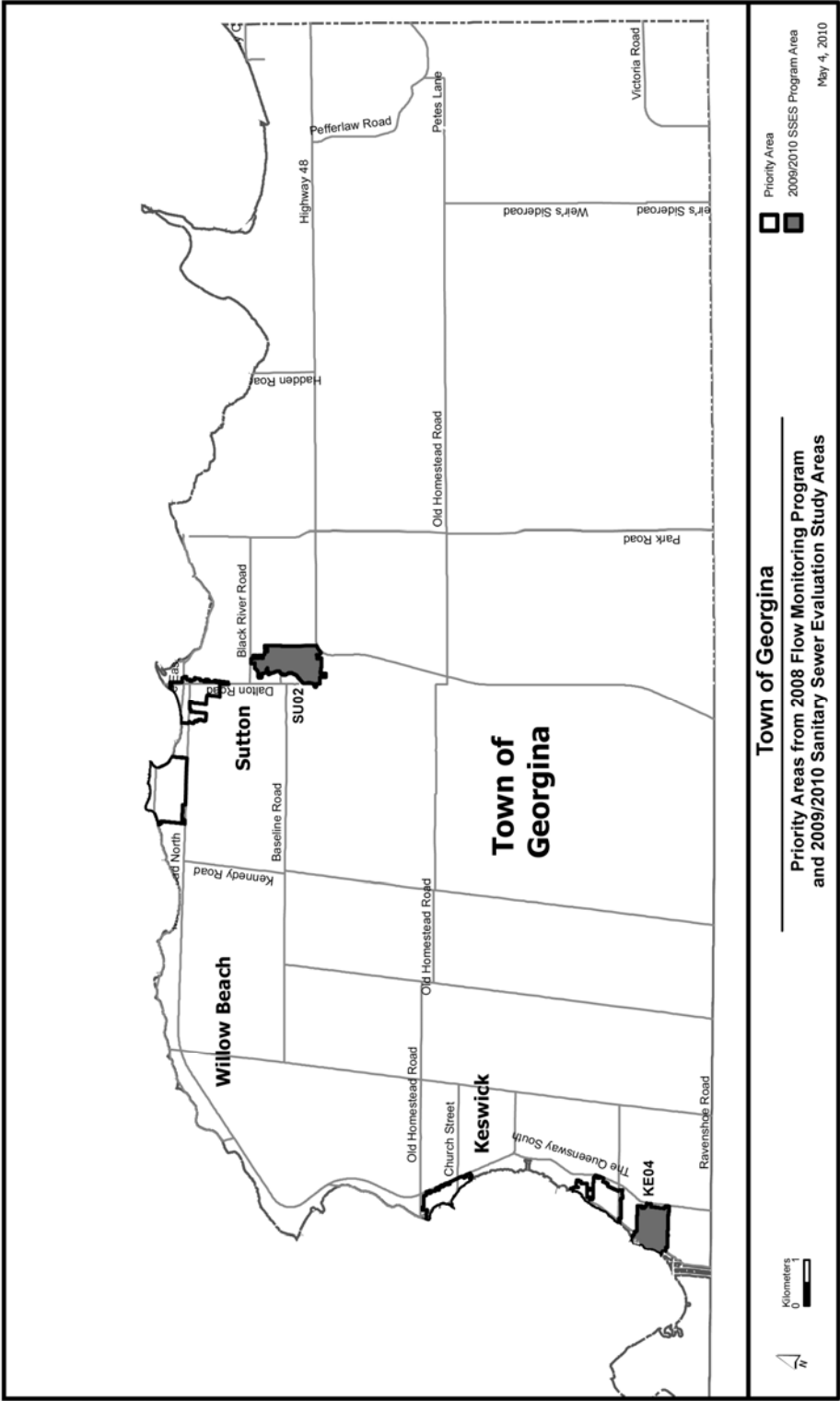
The Senior Management Group has reviewed this report.

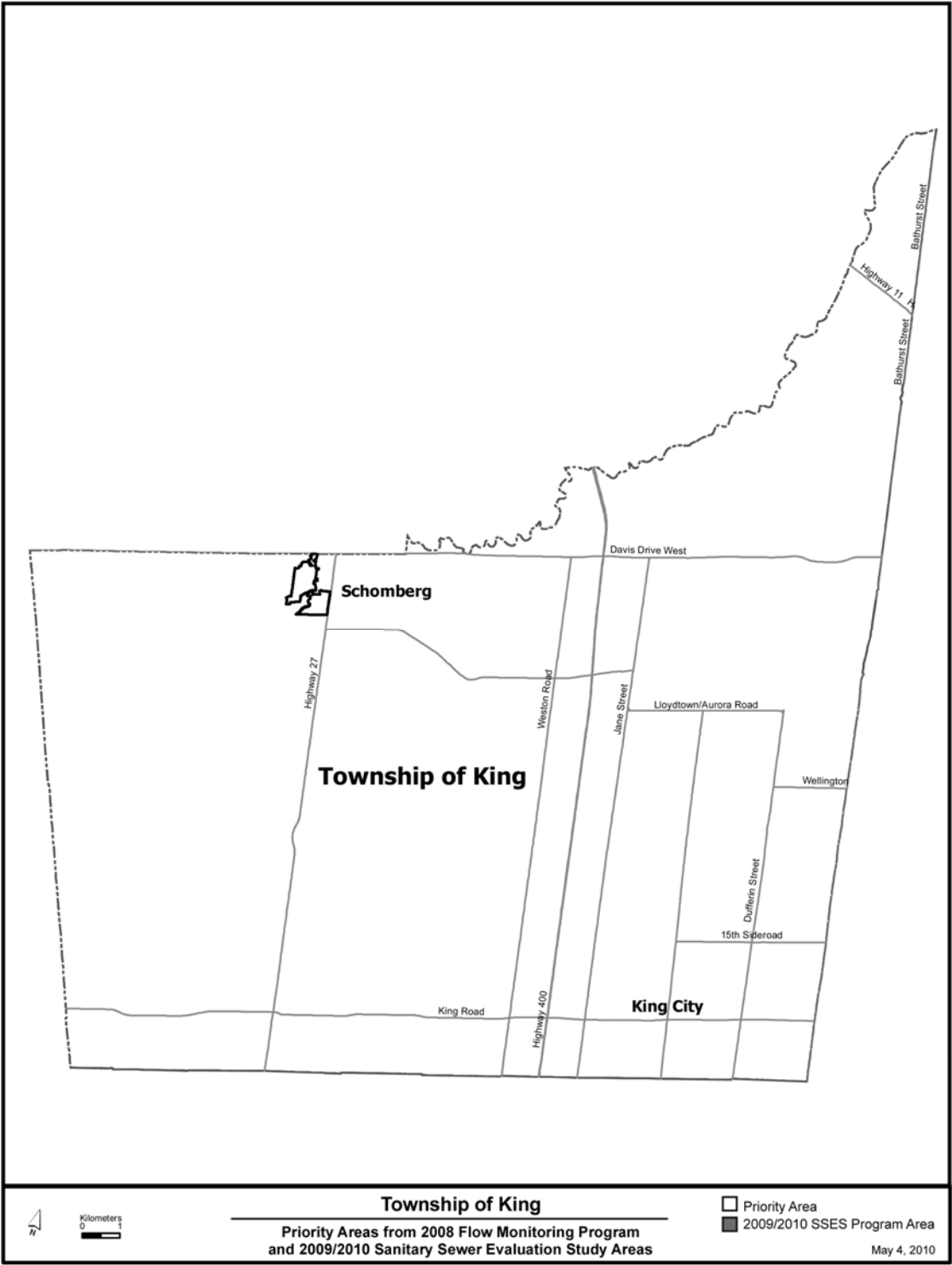
(The three attachments referred to in this clause are attached to this report.)

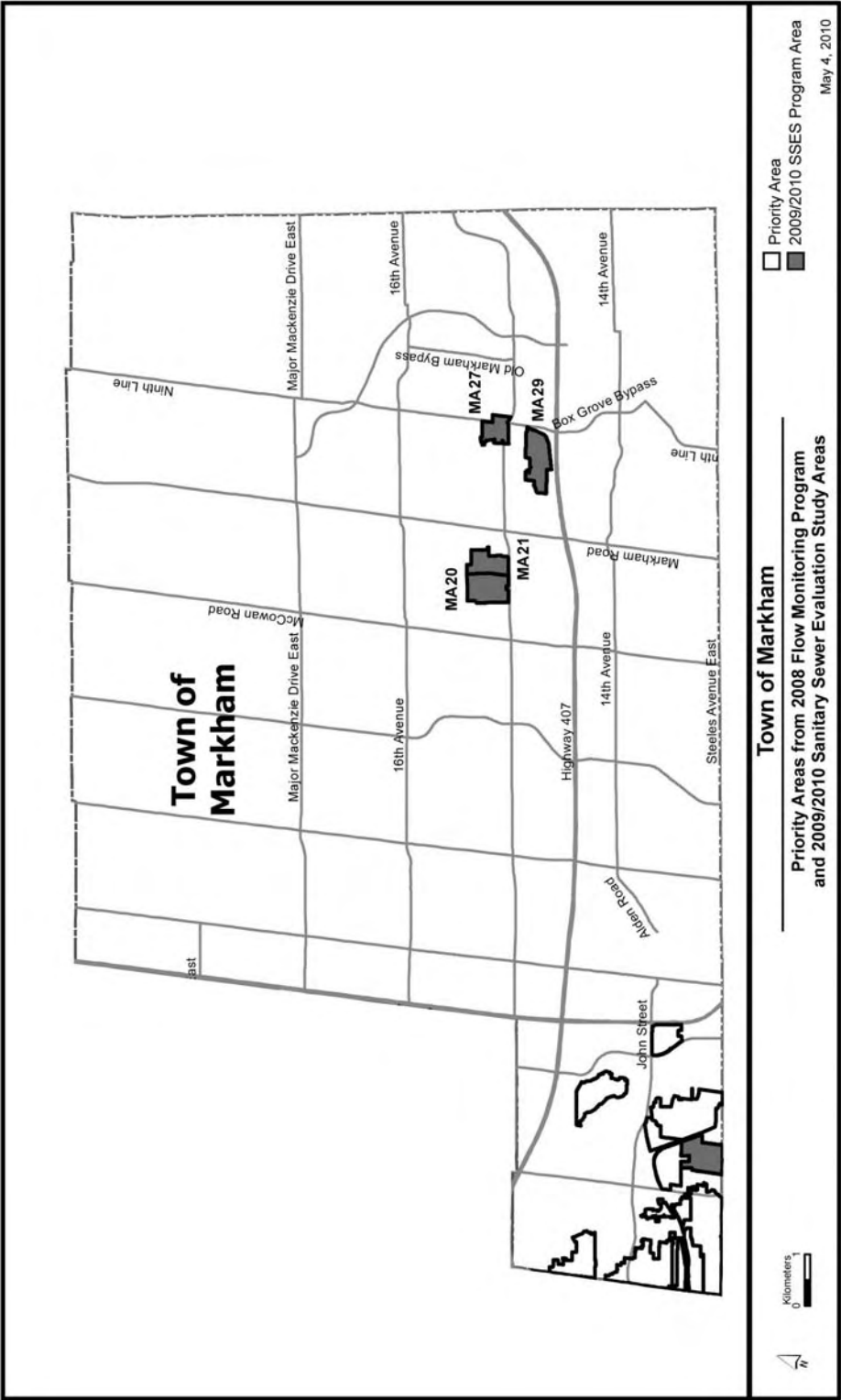


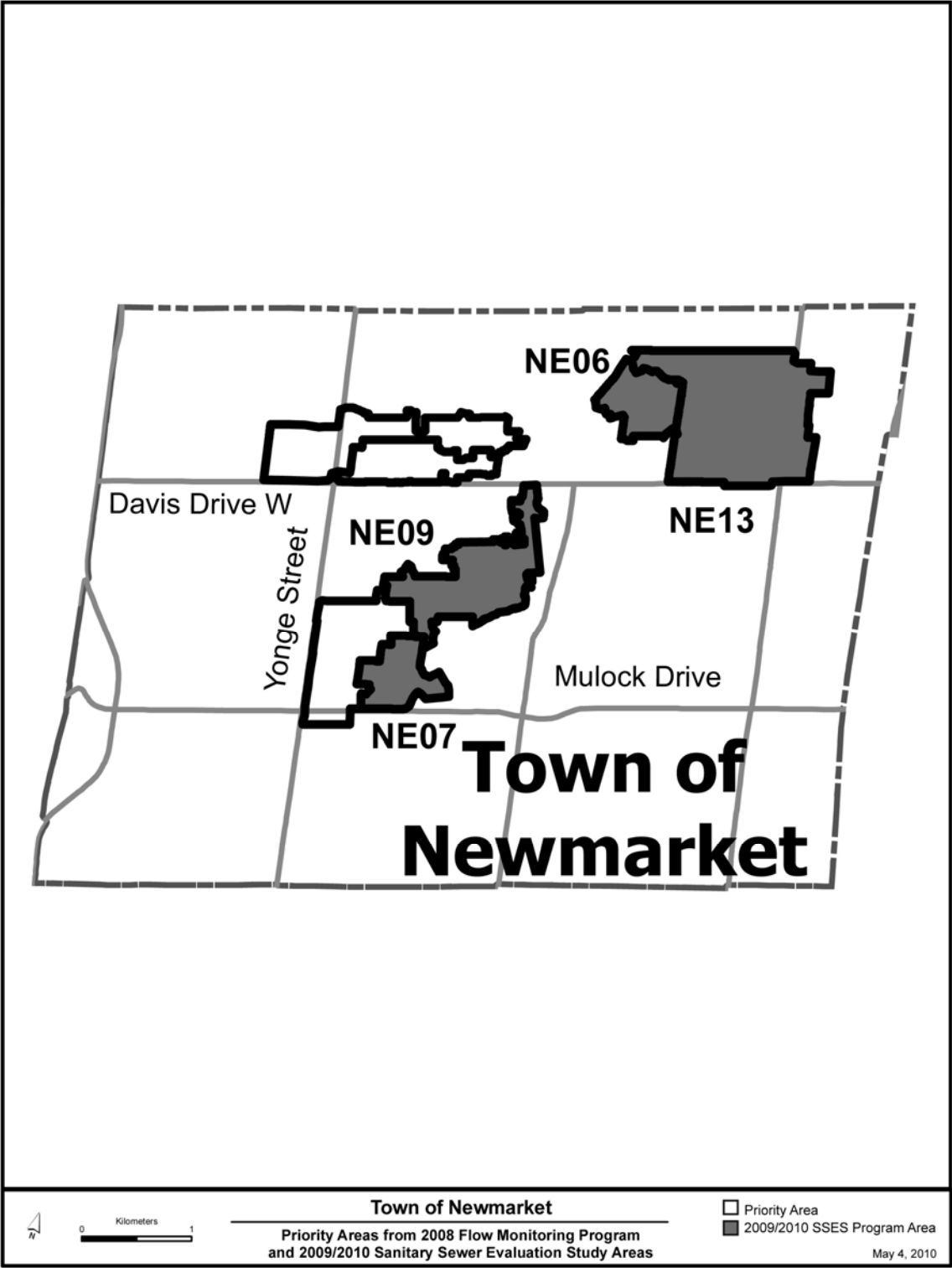


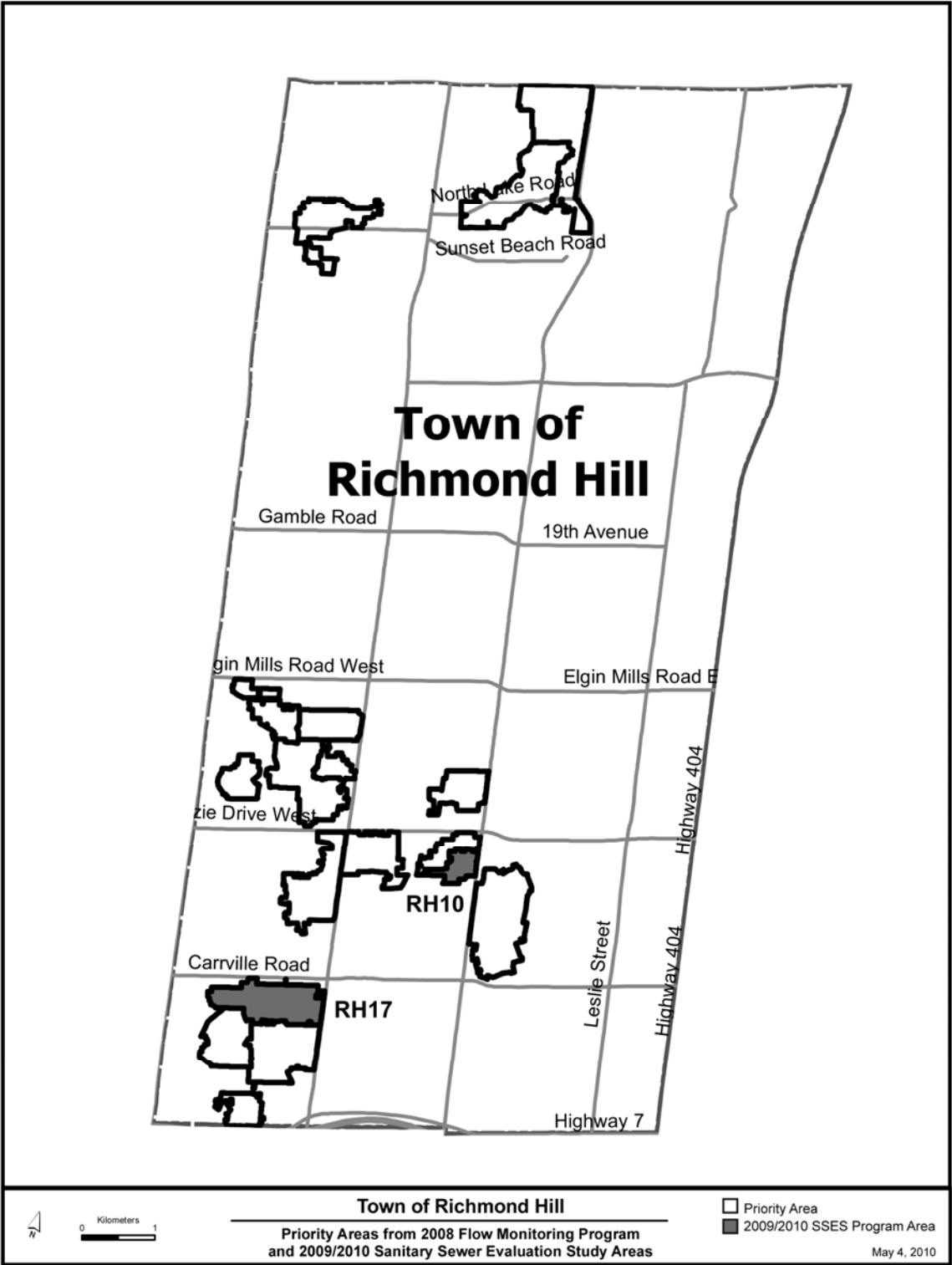


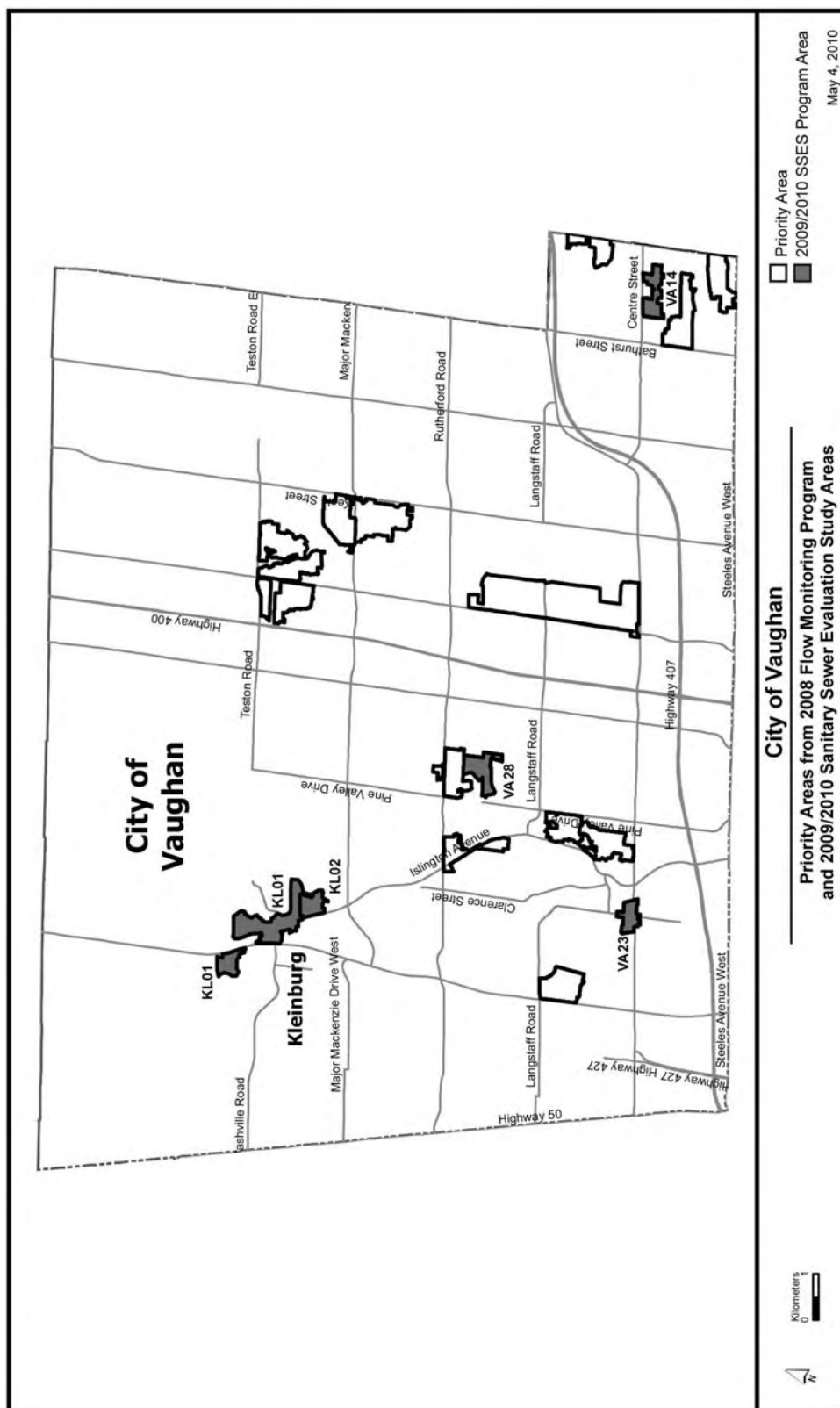


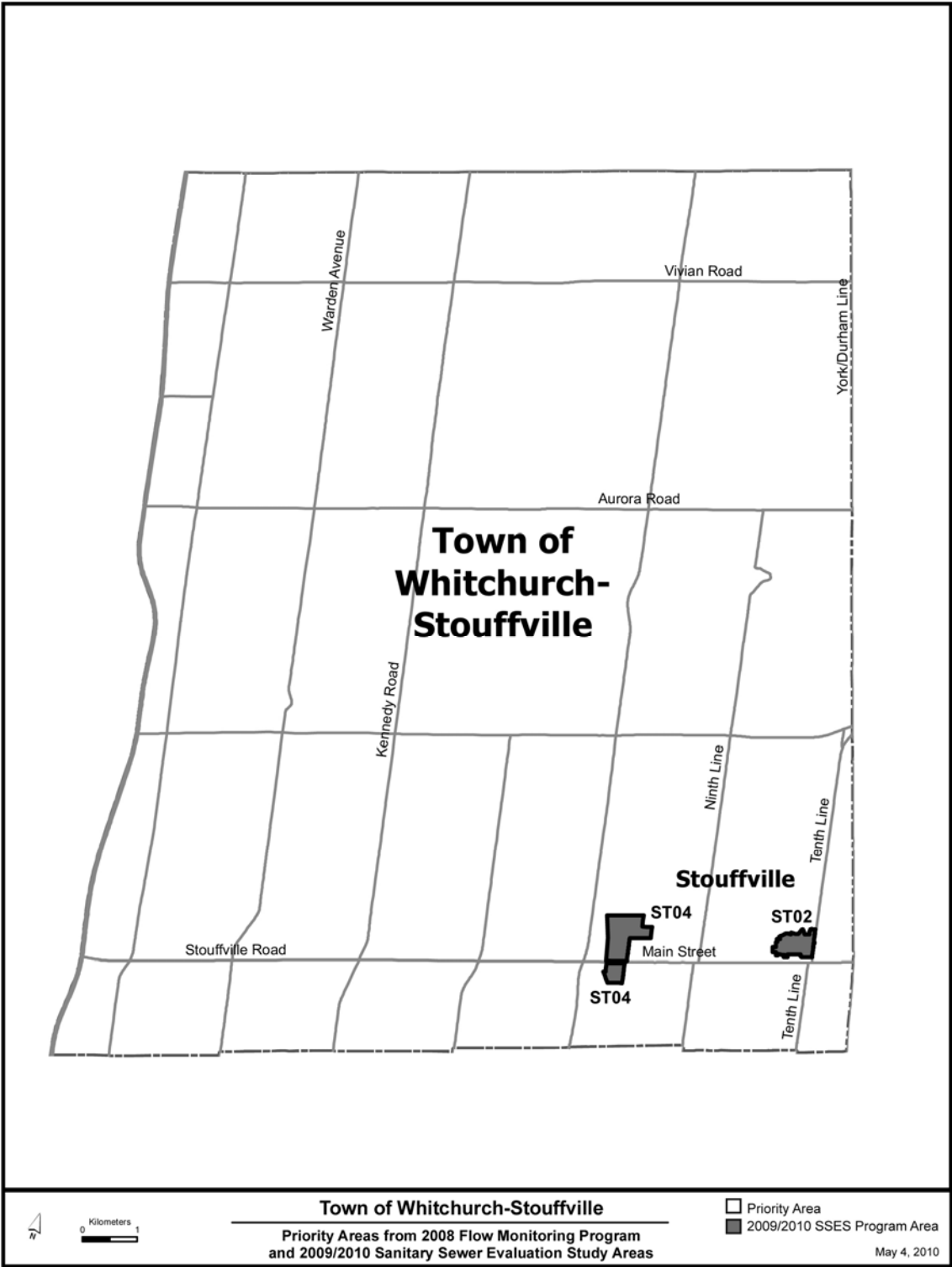












Members of the Inflow-Infiltration Reduction Steering Committee

Municipality	Committee Member	Alternate Member
York Region	Director, Strategy and Business Planning	Director, Operations, Maintenance and Monitoring
	Director, Environmental Promotion and Protection	Director, Capital Planning and Delivery
Aurora	Director, Public Works	Acting Manager, Operations Services
East Gwillimbury	Director, Engineering and Environmental Services	Manager, Development Services
Georgina	Director, Engineering and Public Works	Manager, Operations
King	Director, Engineering and Public Works	Development Technologist
Markham	Director, Operations	Director, Engineering
Newmarket	Director, Engineering Services	Director, Public Works Services
Richmond Hill	Director, Transportation, Environmental and Development Services	Director, Maintenance and Operations
Vaughan	Director of Development and Transportation Engineering	Director, Public Works
Whitchurch-Stouffville	Director, Engineering and Capital Projects Department	Director, Public Works

Inflow And Infiltration Working Groups –Terms Of Reference Summary

	STRATEGY DEVELOPMENT	COMMUNICATION AND ADVOCACY	FUNDING	STANDARDS, MONITORING AND IMPLEMENTATION	AUDIT, MEASURE, CONTINUOUS IMPROVEMENT
PURPOSE	- To establish common goals and objectives - To develop “global” strategy: - Set priorities/benchmarks - Identify opportunities - Roles and responsibilities - Link to other working group strategies - To establish steps to achieve target and set timelines	To provide: - Internal communication tools for Steering Committee and staff - External communication plan for council, the public, other agencies By: - Communicating benefits of the strategy - Developing consistent and appropriate messaging (for council, staff, public, other agencies) - Developing communication plans - Promoting through large audience i.e. conferences and seminars	To establish principles for long-term and adequate sustainable funding sources	To recommend best practices for I-I reduction and management for the full life cycle of the waste water collection system.	- Determine and define 10% reduction - Measure success of I-I Reduction Program and recommend future improvements - To satisfy the MOE conditions for SEC
SHORT TERM WORK PLAN ACTIVITIES	Activities: - Confirm objectives, targets, mission/vision - Draft strategy framework by June 14, 2010 - Circulate framework to Steering Committee - Finalize Strategy by June 28, 2010	Activities: - Identify stakeholders, spokesperson, political champion - Identify benefits of strategy incl links to municipal sustainability programs - Develop framework for Task Force communication for Year 1 - Communication protocol including process and data sharing for internal and external - Presentation template and content material for council & stakeholders - Develop process to follow up on inter-municipal action items - Develop TOR for academic peer review (with SEC team) - Develop risk management strategy	Activities: - Identify funding sources, rates (local/regional), DC’s (local/regional), Federal/Provincial, etc. - Investigate DC funding options and feasibility (local/regional) - Identify current state of I-I funding (local/regional)	Activities: - Collect work that has been done by AECOM as per new development/commissioning standards and SSES standards - Determine if AECOM is still retained by YR for new development/commissioning standards - Compile design standards from 9 municipalities and YR - Compile design standards from other municipalities that are industry leaders	Activities: - Define the 10% reduction (consider environmental, financial, sustainability, social, economic) - Determine baseline for current I-I - Review components/factors of I-I - Collect information from I-I Reduction Pilot Program, Municipal programs, review findings - Define balance between flow reduction and growth (may not have measurable reduction to flow)
	Deliverables: - Draft strategy report by June 14th - Reduction targets and link to each municipality - Strategy framework to guide other working groups	Deliverables: - Stakeholder list - Spokes person, political champion - Focus group or survey - Framework for communication plan - Summary of relevant municipal sustainable programs - Communication with BILD & industry stakeholders - Data delivery site and schedule - Communication protocol - Templates - Process for inter-municipal council action items	Deliverables: - Guiding principles - Report on the current I-I investment (operating and capital) in programs and budgets - Define parameters for objective of “invest for capacity” vs. “invest for environment” - Differentiate investment to I-I to gain extra allocation and investment due to environmental benefit. - Ensure drivers are there for continued investment in I-I	Deliverables: - Collected work that has been done by AECOM as per new development commissioning standards and SSES standards - Design standards from 9 municipalities and YR - Compiled design standards from other municipalities that are industry leaders	Deliverables: Definition of 10% reduction