



2021 YORK REGION

INFLOW AND INFILTRATION REDUCTION STRATEGY UPDATE

SEPTEMBER 2021

**York Region**



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1.0 EXECUTIVE SUMMARY

This 2021 Inflow and Infiltration (I&I) Reduction Strategy Update (2021 Update) is the second five-year update to York Region’s [2011 I&I Reduction Strategy](#). It enhances and extends the Region’s commitment to leading I&I reduction programming, meeting regulatory requirements and supporting growth in a socially, financially and environmentally sustainable manner. The 2021 Update will guide implementation of I&I programs at the Region and local municipalities over the next five to ten years.

Development of the 2021 Update included an assessment of the progress made since 2011, evaluation of program opportunities and challenges, and extensive stakeholder engagement and consultation. The [I&I Reduction Strategy Industry Best-in-Class Review](#) was revisited as part of the 2021 Update.

The Region’s 2021 I&I Reduction Strategy Update Objectives

1. Ensure continuous progress is made towards reaching the 2031 target of 40 million litres per day I&I reduction required to meet Southeast Collector Individual Environmental Assessment condition of approval set by the former Ministry of Environment in 2010.
2. Support Regional growth and sustainability goals while balancing overall cost and benefits.
3. Refine Partnership Framework to enhance I&I reduction programming at both the Region and its nine local municipalities.
4. Continue to be an I&I reduction leader, promoting innovation, adaptation, and digital integration in data collection and analysis to drive actions towards the long-term reduction target.

Building on experience and lessons learned over the past decade of strategy implementation, and to align with the 2021 Update objectives, the eight program area structure developed in the 2011 Strategy has been refined into a streamlined structure consisting of five overarching program areas (2021 Program Areas) as shown in **Table A**. The 2021 Program Areas will allow resources to be focused on activities necessary to meet the 2031 I&I reduction target and water demand management goals. Further details of the key activities and timing can be found in Section 4.

Table A: 2021 Programs Areas and key activities

2021 Program Areas	Original Program Areas	Key activities and outcomes
Program Area 1: Enhance Partnerships (Section 4.1)	Reporting Communication, education and advocacy	<ul style="list-style-type: none"> • Increased collaboration, interaction and coordination between York Region, local municipalities, and the development community through workshops and existing partnership meetings.
Program Area 2: Leverage flow monitoring data to set local municipal I&I reduction targets (Section 4.2)	Set goals and targets	<ul style="list-style-type: none"> • Establish short-term and long-term reduction targets for local municipalities and the Region based on flow data and I&I analysis to drive implementation of localized improvement efforts in high priority areas. • Track progress towards meeting targets.
Program Area 3: Advance data collection and analytics (Section 4.3)	Monitor and analyze flows Innovation and adaptation Financial management	<ul style="list-style-type: none"> • Add meters in Regional trunk sewers to complement existing flow monitoring and isolate flows by municipal boundaries. • Advance data analytics through innovative tools and technologies to support planning of I&I work and tracking reductions.

1.0 EXECUTIVE SUMMARY

2021 Program Areas	Original Program Areas	Key activities and outcomes
Program Area 4: Enhance programming for existing sanitary sewer systems (Section 4.4)	Investigate and rehabilitate	<ul style="list-style-type: none"> • Refine sanitary sewer assessments, policies and bylaws, and private-property incentives. • Enhance Public and Private Partnerships (P3) initiatives for I&I considerations.
Program Area 5: Expand programming for new sanitary sewer systems (Section 4.5)	Design and commissioning	<ul style="list-style-type: none"> • Develop and adopt I&I New Development Standard consistent across the Region and introduce monitoring requirements.

The Region’s long-term flow monitoring program is one of the largest and most advanced flow and rainfall monitoring programs in North America. By 2020, the Region installed and maintained more than 70 rain gauges and 290 flow monitors in the Regional and local municipal wastewater systems, covering approximately 90% of the municipal wastewater system within the Region. The monitoring program provides accurate, continuous, near real-time and reliable flow and rainfall monitoring data. The collected data is used for analysis of peak wet weather flows and average dry weather flows to locate areas highly responsive to I&I.

The flow monitoring program and analysis not only support I&I reduction priority mapping but have also expanded to support many other Regional initiatives such as hydraulic modelling calibration, operational support, major storm event analysis, and wastewater system capacity planning. Moving forward, the Region will continue to leverage these data and analysis, in concert with the recently developed cost-benefit analysis model and other decision-making tools, to focus on tracking I&I reductions and driving investigative and rehabilitative work in the high I&I response areas in the existing wastewater system. Targets for each municipality have been established to focus efforts in localized high priority areas.

With greater focus on prevention, the Region’s strategy for new developments is to ensure sanitary sewers are built to watertight standards at the time of construction. Development and implementation of the I&I New Development Standard will ensure consistent design, construction, inspection and testing requirements for new developments across the Region. Effectiveness of the I&I New Development Standard will be assessed through flow monitoring.

The 2021 Update includes a plan to monitor, review, update and report on the I&I Strategy moving forward. The Region will continue to monitor program activities, review lessons learned and achievements against goals and targets and update the I&I Reduction Strategy when necessary to ensure progress towards meeting long-term goals. Reporting will be a key component of the plan as York Region integrates the Long-Term Water Conservation Strategy and I&I Reduction Strategy into one comprehensive demand management program under future updates of [York Region’s Water and Wastewater Master Plan](#).



2.0 BACKGROUND



- 2.1 YORK REGION'S CURRENT WASTEWATER SYSTEMS
- 2.2 HISTORY OF I&I REDUCTION STRATEGY AND ACHIEVEMENTS
- 2.3 REGIONAL STRATEGIC INITIATIVES DRIVING I&I REDUCTION
- 2.4 BENEFITS OF REDUCING I&I



2.0 BACKGROUND

The 2021 Inflow and Infiltration (I&I) Reduction Strategy Update provides the second five-year update to the Region's 2011 I&I Reduction Strategy. It enhances and York Region's commitment to leading I&I reduction programming, meeting regulatory requirements, and supporting growth in a socially, financially, and environmentally sustainable manner. The 2021 I&I Reduction Strategy Update also supports York Region's Water and Wastewater Master Plan under demand management programming.

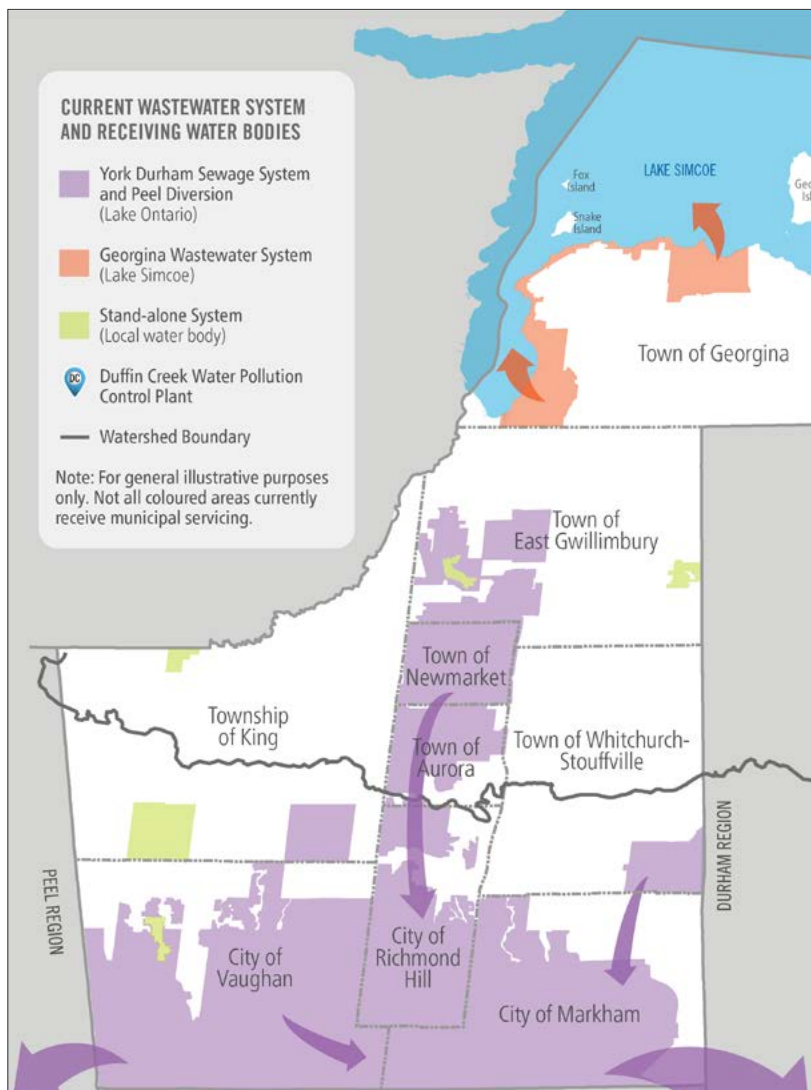
2.1 YORK REGION'S CURRENT WASTEWATER SYSTEMS

Centrally located in the Greater Toronto and Hamilton Area (GTHA), York Region encompasses nine local municipalities including the Cities of Markham, Vaughan and Richmond Hill, the Towns of Aurora, East Gwillimbury, Georgina, Newmarket, and Whitchurch-Stouffville and the Township of King.

Wastewater service in York Region is multi-jurisdictional and based on a two-tier governance structure. The Region is responsible for treatment, major pumping and trunk sewers while the nine local municipalities are responsible for local sewers and local pumping. Private property owners are also an important part of the wastewater system and are responsible for private sanitary sewers on their properties.

The Region's wastewater system comprises York Durham Sewage System and Peel Diversion, Georgina Wastewater System and stand-alone systems as shown in **Figure A**.

Figure A: York Region 2021 wastewater system map



2.0 BACKGROUND

2.2 HISTORY OF I&I REDUCTION STRATEGY AND ACHIEVEMENTS

What is Inflow and Infiltration?

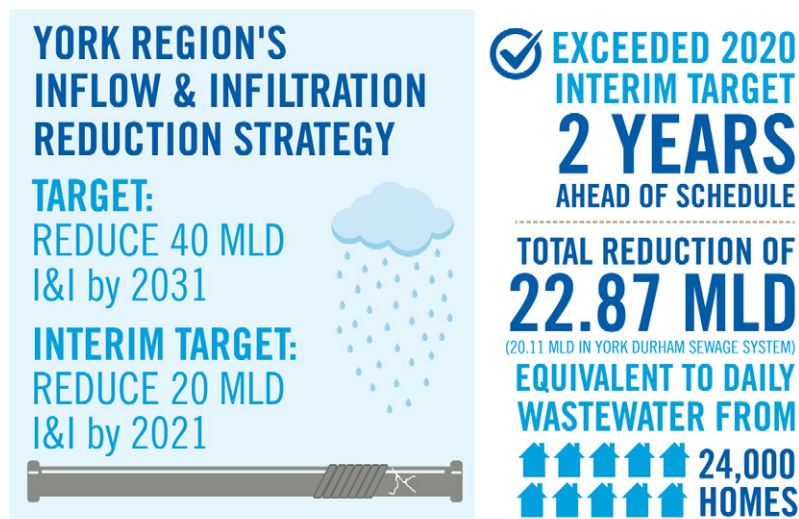
(I&I) happens when water, groundwater, stormwater or snowmelt enters the sewage system through sump pumps, downspouts, foundation drains and/or holes and cracks in the pipes. For more information about what the Region is doing about I&I, check out york.ca/iandi

York Region's inflow and infiltration (I&I) program framework is founded on best-in-class approaches and has evolved to meet the various wastewater system needs from across York Region. Over the last decade, several overarching and award-winning programs were originated here in York Region, including one of the largest and most advanced flow and rainfall monitoring programs in North America. These programs have been effective in managing I&I in both existing sewer systems and new construction. The Region has been an I&I leader and will continue to demonstrate leadership in the industry through regular review and advocacy of industry initiatives, programs and practices and through continuous advancement and innovations in data collection and analysis to drive effective actions to meet the long-term reduction target.

In 2011, the Region developed its first [2011 I&I Reduction Strategy](#) in collaboration with its nine local municipalities to meet a condition of approval of Southeast Collector Individual Environmental Assessment (SEC IEA) set by the Ministry of Environment, Conservation and Parks (MECP). The Region was mandated to achieve 40 million litres per day (MLD) I&I reduction¹ in the YDSS by 2031. The I&I Reduction Strategy is required to be updated every five years, with the first five year update completed in 2016. [The 2016 I&I Reduction Strategy Update](#) reaffirmed the 2031 reduction target of 40 MLD and the overall program direction, as well as established a 2021 interim reduction target of 20 MLD.

Since implementation of the I&I Reduction Strategy in 2011, York Region, local municipalities and development industry partners have reduced I&I by more than 22 MLD. A summary of program achievements to-date is presented in **Figure B**.

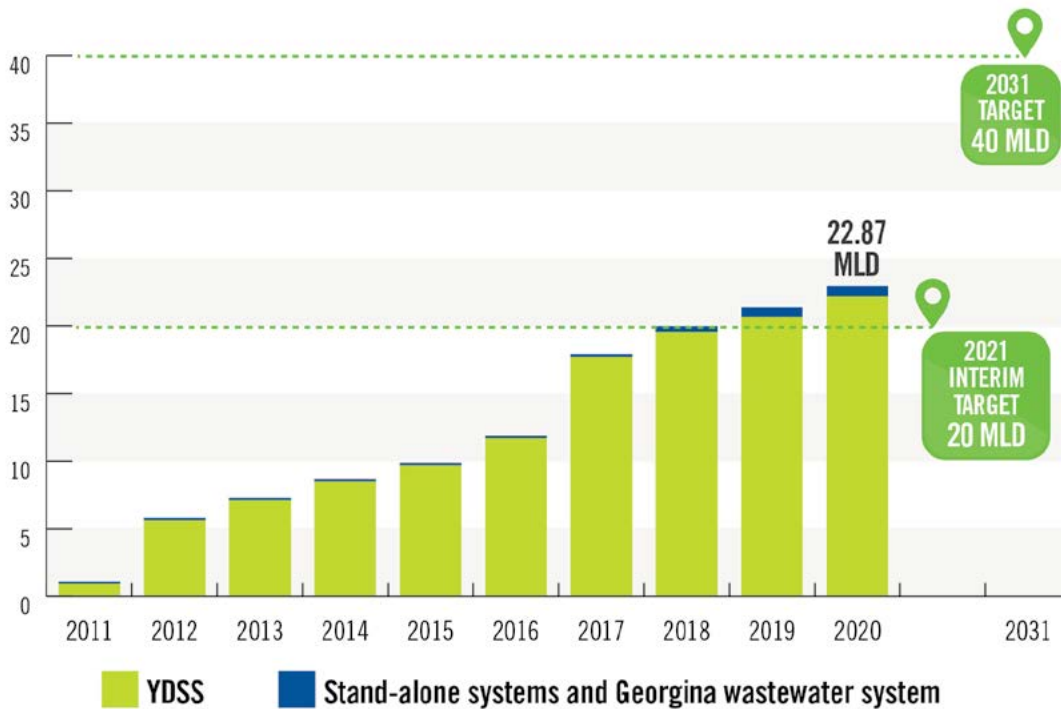
Figure B: Program achievements (2011 to 2020)



¹ Reduce peak wastewater flows entering the YDSS by 10% or 71 MLD by 2031, with 40 MLD achieved through I&I reduction and 31 MLD achieved through water conservation efforts.

Figure C shows the progressive reductions achieved since 2011 within the YDSS as well as reductions in the stand-alone systems and Georgina Wastewater systems servicing satellite communities (Holland Landing, Mount Albert, Schomberg, Nobleton, Kleinburg, Keswick and Sutton). By 2019, York Region achieved the 2021 interim reduction target – two years ahead of schedule.

Figure C: York Region’s progress to meeting I&I reduction targets



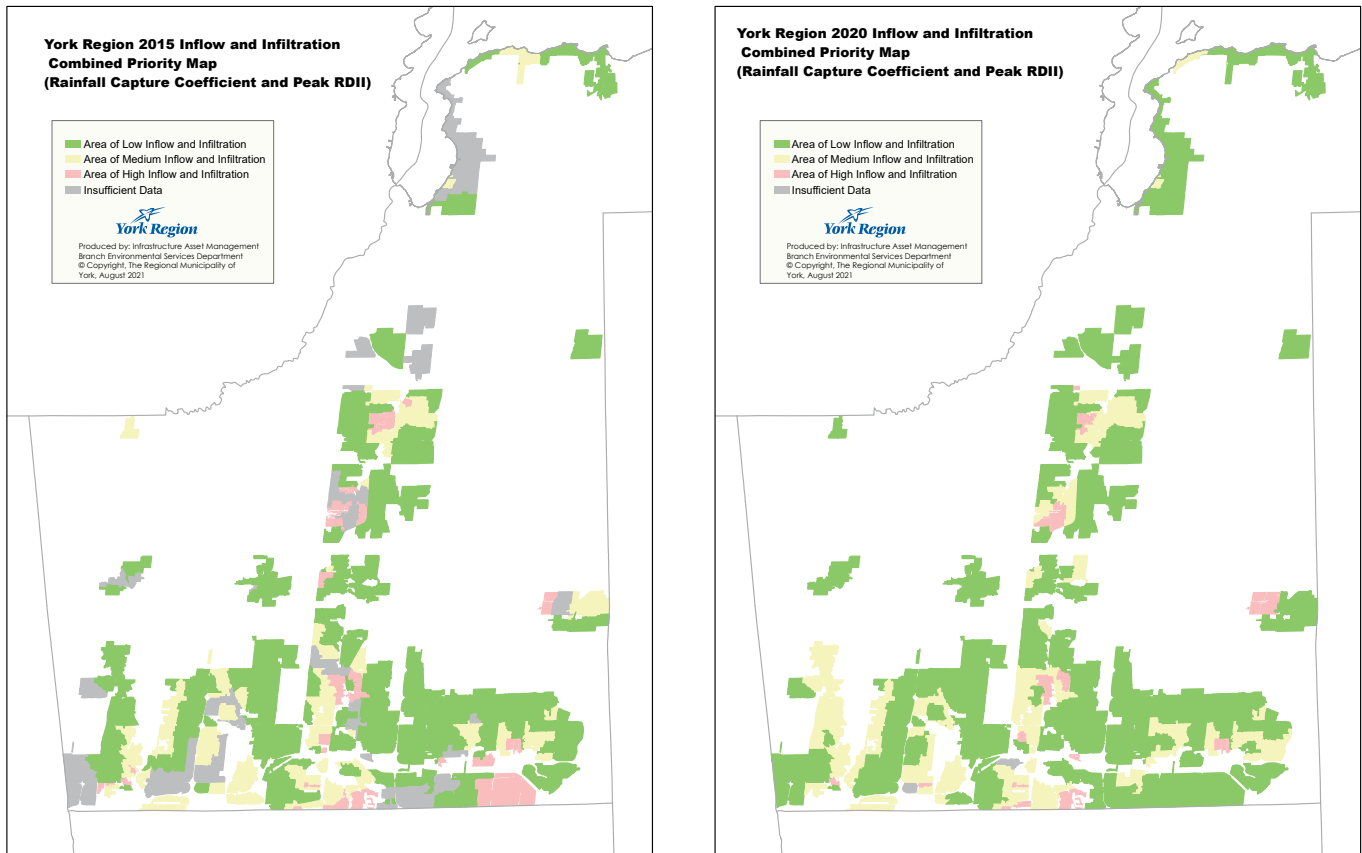
The flow and rainfall monitoring program was first developed in 2012 to support the audit, measurement and monitoring process required to identify I&I target areas and track reductions. By 2020, the Region installed and maintained more than 70 rain gauges and 290 flow monitors in the Regional and local municipal wastewater systems, covering approximately 90%² of the municipal wastewater system within the Region.

The flow monitoring program provides accurate, continuous, near real-time and reliable flow and rainfall monitoring data. The collected data are used for analysis of peak wet weather flows and average dry weather flows to locate areas highly responsive to I&I. Priority maps pinpointing areas with high or medium I&I responses for each local municipality were introduced in 2015. These maps have been shared with local municipalities annually to help support planning I&I work in these high and medium priority areas.

Figure D compares the 2015 and 2020 Region wide priority map where data collection has been improved and a positive trend of reduced high priority areas can be observed.

² The coverage percentage is estimated based on total contributing sanitary catchment area monitored out of the total sanitary catchment area potentially monitorable (excluding septic or other sanitary systems not owned and operated by York Region or its local municipalities)

**Figure D: York Region inflow and infiltration priority map 2015 versus 2020
(combined KPIs of rainfall capture coefficient and peak RDII)**



The flow monitoring program and analysis not only support I&I reduction priority mapping but have also been expanded to support many other Regional initiatives such as hydraulic modelling calibration, operational support, major storm event analysis and wastewater system capacity planning. I&I reduction has been an integral part to [York Region's One Water Approach](#) and supports its goal of innovation, integration, and infra-stretching³. I&I reduction enhances system resilience to climate change and supports infra-stretching the current wastewater system by reducing extraneous flows, freeing up capacity and deferring the need for new infrastructure to service growth. Moving forward, the Region will continue to leverage these data and analysis, in concert with the recently developed cost-benefit analysis model and other decision-making tools, to focus on tracking I&I reductions and driving investigative and rehabilitative work in the high I&I response areas in the existing wastewater system.

³ Maximize the useful life and capacity of built infrastructure to defer capital investment

2.0 BACKGROUND

2.3 REGIONAL STRATEGIC INITIATIVES DRIVING I&I REDUCTION

An important part of the I&I Reduction Strategy and its five-year updates has been establishing and growing links to several important Regional plans, programs and initiatives.

“Living Sustainably” is one of eight goal areas in York Region’s [Vision 2051](#) to create strong, caring and safe communities. The path to meet this goal has been set out through the [Corporate Strategic Plan](#) and [Regional Official Plan](#). The I&I Reduction Strategy aligns with sustainability goals in Vision 2051 and translates these commitments into actionable and innovative demand management programming as part of its Water and Wastewater Master Plan. Starting in 2021, the Water and Wastewater Master Plan Update will be the central strategy York Region uses to communicate updates to the I&I Reduction Strategy.

Over the last decade, beneficial outcomes of the I&I Reduction Strategy have forged new links with other Regional programs, plans and initiatives supporting [York Region’s One Water Approach](#). The One Water approach is an integrated planning and implementation approach that considers the urban water cycle as a single integrated system and is a key strategic component in water and wastewater service planning.

A significant linkage is provided by wastewater flow and rainfall data collected by the I&I flow monitoring program. These data and information have been used to support various Regional initiatives including master planning, capacity assessment, hydraulic modelling and operations. Another important tangible benefit is capacity gain realized through I&I reduction efforts which supports planning and capacity allocation. **Appendix A** provides further details on these links as well as the significance and benefits of I&I reduction to York Region.

Implementation of the I&I Reduction Strategy is an integral part of One Water approach and supports its principles by:

- **Innovation** through applying the advancements in technology, programming and intelligent information systems to respond to Regional and municipal wastewater system needs;
- **Integration** with day-to-day operational needs and decision making throughout the Region and local municipalities; and
- **Infra-stretching** the current wastewater system by reducing extraneous flows, freeing up capacity, and deferring the need for new infrastructure to service growth.

2.0 BACKGROUND

2.4 BENEFITS OF REDUCING I&I

I&I reduction brings a wide range of benefits beyond simply reducing the cost of treating clean water from rain and groundwater in sewage. It improves the resiliency and ability of our system to cope with extreme weather, while supporting growth through deferred infrastructure needs. **Table B** outlines benefits of I&I reduction.

Table B: Benefits of I&I reduction

Social benefits	Environmental benefits
<ul style="list-style-type: none"> • Reduces risk of basement flooding which can have a major impact on communities • Maximizes use of existing wastewater system and defers or minimizes capital investment in infrastructure to accommodate growth • Promotes environmental stewardship and protection • Ensures sustainable and cost-effective long-term water and wastewater servicing 	<ul style="list-style-type: none"> • Reduces risk of wastewater bypasses and spills to environment at treatment facilities • Reduces or avoids environmental impacts due to construction of new infrastructure • Reduces chemical use in wastewater treatment • Reduces treating wastewater discharged to the environment • Reduces energy use and greenhouse gas emissions due to reductions in wastewater treatment and pumping • Enhances resilience to climate change
Financial benefits	Policy and legislative linkages
<ul style="list-style-type: none"> • Defers capital investment in new wastewater infrastructure • Frees-up capacity for future growth • Reduces operations and maintenance costs. • Reduces energy costs for wastewater treatment and pumping • Improves chances of obtaining federal and provincial funding and grants through adoption of best practices 	<ul style="list-style-type: none"> • Supports goals of the Regional Official Plan and Vision 2051 • Meets Conditions of Approval for SEC IEA required by MECP • Supports other Regional strategies, policies and plans including the Water and Wastewater Master Plan and the Long-Term Water Conservation Strategy, which are guided by the principals of integration, infra-stretching and innovation to achieve greater system sustainability and better decision making



3.0 2021 I&I REDUCTION STRATEGY UPDATE



- 3.1 2021 UPDATE OBJECTIVES
- 3.2 2026 INTERIM REDUCTION TARGET
- 3.3 REFINING PROGRAM AREAS



3.0 2021 I&I REDUCTION STRATEGY UPDATE

To meet approval condition 8.10 of the SEC IEA, the second five-year update to the I&I Reduction Strategy (2021 Update) has been completed for submission to MECP by September 30, 2021. Development of the 2021 Update included an assessment of the progress made since 2011, evaluation of program opportunities and challenges, and extensive stakeholder engagement and consultation. The [I&I Reduction Strategy Industry Best-in-Class Review](#) was revisited as part of the 2021 Update with a focus on the successes and lessons learned from other agencies with a similar two-tier governance structure.

Consultation with stakeholders, including York Region staff and local municipal staff, were conducted to explore alternatives in addressing challenges and opportunities. Stakeholder engagement and consultation with First Nations was conducted as part of York Region's 2021 Water and Wastewater Master Plan Update process, which presents I&I reduction as a demand management program.

All these assessments have been culminated in this 2021 Update of the I&I Reduction Strategy.

3.1 2021 UPDATE OBJECTIVES

Program objectives were developed in 2011 to help realize reduction goals throughout the Region and these objectives were reaffirmed in the 2016 I&I Reduction Strategy Update. Since 2011, I&I reduction programming has evolved to respond to the needs of our partners while exploring new initiatives following new technologies and demands. Over the past decade, I&I reduction has become integrated into day-to-day operational activities and decision making throughout the Region and local municipalities.

The objectives were updated in 2021 to capture refined program needs from new and emerging links between the I&I Reduction Strategy and other Regional strategic initiatives and plans, and moved towards integrating I&I reduction within standard asset management practices and specifications.

York Region's 2021 I&I Reduction Strategy Update objectives (2021 Update Objectives) are:

1. Ensure continuous progress is made towards reaching the 2031 target of 40 MLD I&I reduction
2. Support Regional growth and sustainability goals while balancing overall cost and benefits
3. Refine Partnership Framework to enhance programming at both the Region and local municipalities
4. Continue to be an I&I reduction leader, promoting innovation, adaptation, and digital integration in data collection and analysis to drive actions towards meeting the long term reduction target

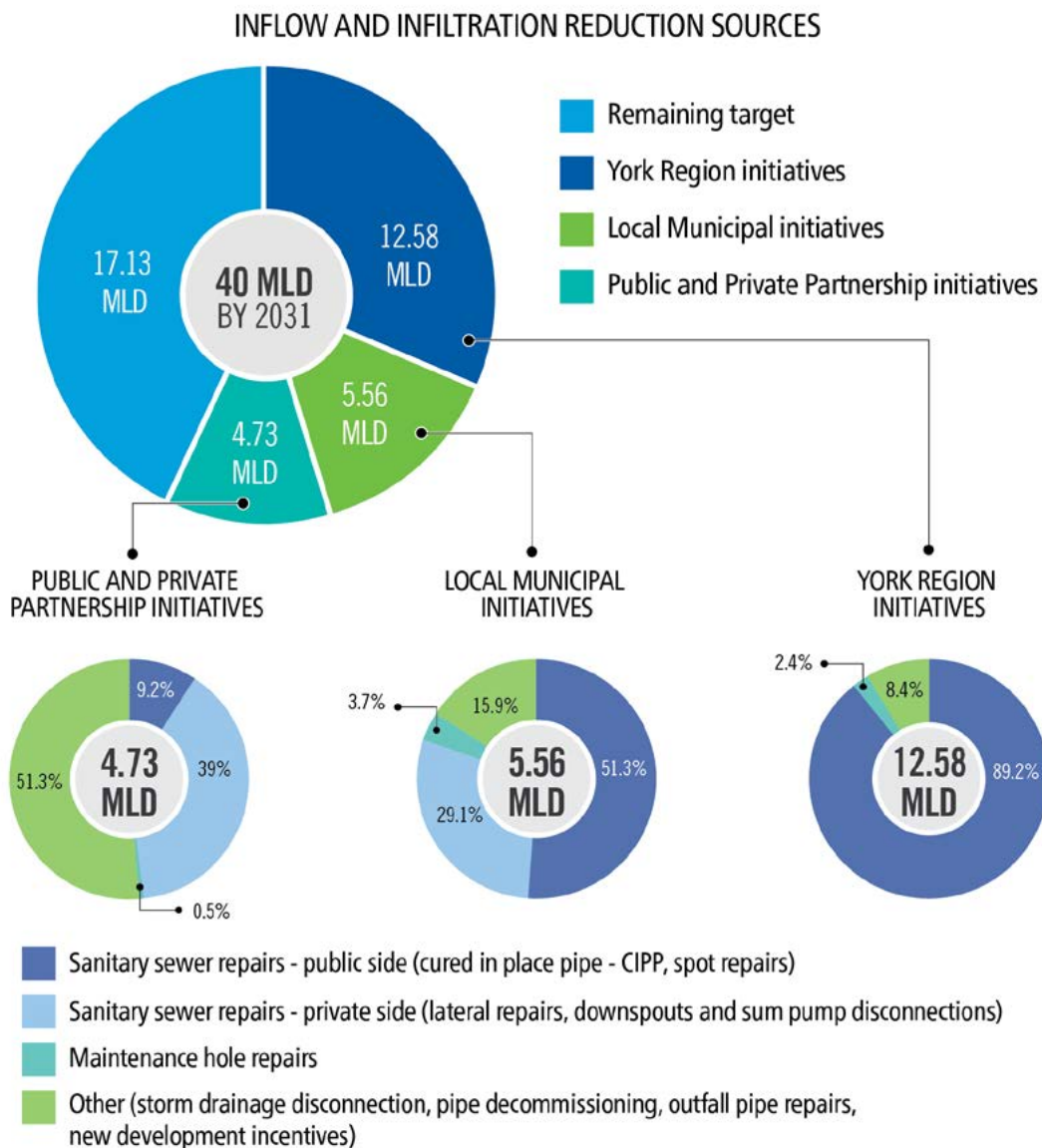
3.0 2021 I&I REDUCTION STRATEGY UPDATE

3.2 2026 INTERIM REDUCTION TARGET

York Region and its partners have achieved significant progress towards meeting the 2031 I&I reduction target of 40 MLD. At the end of 2020, 22.11 MLD of I&I were reduced in the YDSS and a further 0.76 MLD were reduced in the Georgina Wastewater System and stand-alone Systems. This brings the total reduction to 22.87 MLD throughout the Region, which exceeded the 2021 interim target (of 20 MLD). Most of the reductions have been achieved through rehabilitation and remediation work in Regional and local municipal systems and have included sewer repairs, replacement, elimination of storm-cross-connections and private property works such as downspout disconnections and sewer lateral repairs.

Figure E shows the reductions achieved to date and the detailed breakdown of I&I work completed by each partner.

Figure E: Breakdown of I&I reductions by partners (in MLD)



3.0 2021 I&I REDUCTION STRATEGY UPDATE

The Region will continue to identify and rehabilitate I&I sources within Regional Infrastructure and maintain a good state of repair, and will focus on leveraging flow monitoring data and analysis to support local municipalities and development industry partners in identifying and rehabilitating I&I sources in high priority areas. Opportunities to incentivize development industry partners to identify and complete more difficult and more costly I&I repair work will be explored.

An interim cumulative reduction target of 31.44 MLD has been set for 2026 on the basis that 50% of the remaining targets will be achieved in the next five years. This translates to interim reduction target of 8.57 MLD between 2021 and 2026 to be achieved by the Region and the nine local municipalities. To set this 2026 interim target, it has been assumed that York Region and its partners will continue to make progress consistent with what has been achieved since 2011. Progress towards meeting the 2026 interim target will be monitored and reviewed over time and program refinements may be necessary to ensure this interim target is met. Minor program refinements will be considered on an annual basis and, if necessary, more significant refinements can be contemplated in 2026 as part of a Strategy Update. A Plan for monitoring, reviewing, and updating the 2021 I&I Reduction Strategy has been developed and is described in **Section 5**.

3.3 REFINING PROGRAM AREAS

Building upon experience and lessons learned over the past decade of strategy implementation and to align with the 2021 Update Objectives, the eight program-areas developed in the 2011 Strategy have been refined into a streamlined structure consisting of five overarching program areas (2021 Program Areas). **Table C** presents the 2021 Program Area structure and its connection and alignment to the 2021 Update Objectives and the original eight program areas. The 2021 Program Areas will allow resources to be focused on activities necessary to meet the 2031 I&I reduction target and water demand management goals. Detailed program components are described in **Section 4**.

3.0 2021 I&I REDUCTION STRATEGY UPDATE

Table C: Refined Program Area structure - 2021 Program Areas

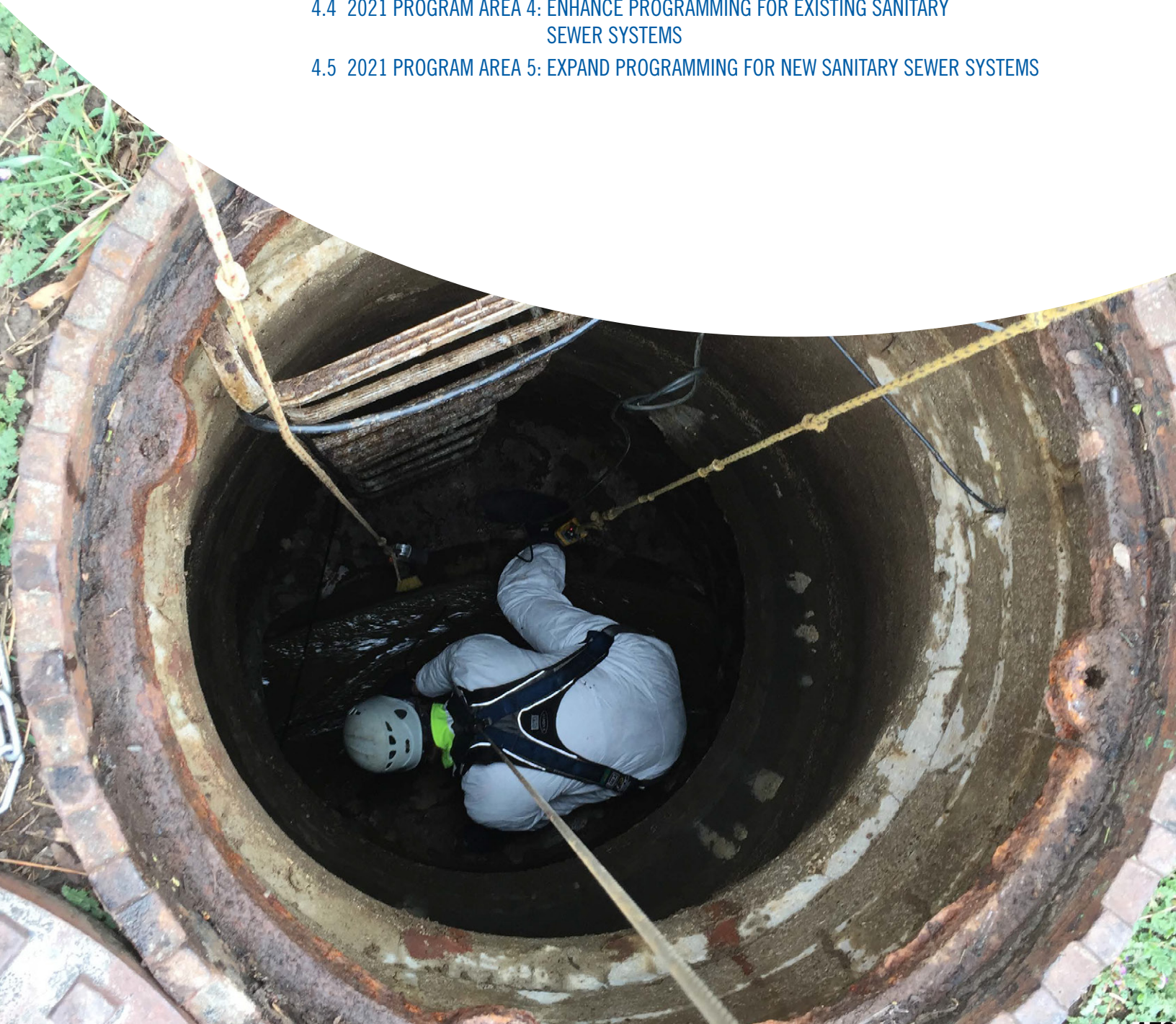
2021 Program Areas	Original Program Areas	Timing	Rationale
Program Area 1: Enhance Partnership (Section 4.1)	Reporting Communication, Education and Advocacy	2021-2031	<ul style="list-style-type: none"> Supports 2021 Update Objective #1, #3 and #4. Increased collaboration, interaction and coordination between York Region, local municipalities, and the development community through workshops and existing partnership meetings.
Program Area 2: Leverage flow monitoring data to set local municipal I&I reduction targets (Section 4.2)	Set Goals and Targets	2021-2026 (2026 interim target) 2026-2031 (2031 target) Post 2031 (long-term target that meet the system needs)	<ul style="list-style-type: none"> Supports 2021 Update Objective #1 and #3. Establish short-term and long-term reduction targets for local municipalities and the Region based on flow data and track progress towards meeting targets to drive implementation of localized improvement efforts in high priority areas.
Program Area 3: Advance data collection and analytics (Section 4.3)	Monitor and Analyze flows Innovation and Adaptation Financial Management	2021-2031	<ul style="list-style-type: none"> Supports 2021 Update Objective #3 and #4. Add meters in Regional trunks to complement existing flow monitoring and isolate flows by municipal boundaries; advance data analytics through innovative tools and technologies.
Program Area 4: Enhance programming for existing sanitary sewer systems (Section 4.4)	Investigate and Rehabilitate	2021-2031	<ul style="list-style-type: none"> Supports 2021 Update Objective #2 and #4. Refine sanitary sewer assessments, policies and bylaws, and private-property incentives and enhance Public and Private Partnerships (P3) initiatives for I&I considerations.
Program Area 5: Expand programming for new sanitary sewer systems (Section 4.5)	Design and Commissioning	2021-2031	<ul style="list-style-type: none"> Supports 2021 I&I Reduction Strategy Update Objective #2 and #4. Develop and adopt new standards for new systems- consistent across the Region and introduce monitoring requirements.



4.0 2021 I&I REDUCTION PROGRAM AREAS



- 4.1 2021 PROGRAM AREA 1: ENHANCE PARTNERSHIPS
- 4.2 2021 PROGRAM AREA 2: LEVERAGE FLOW MONITORING DATA TO SET LOCAL MUNICIPAL I&I REDUCTION TARGETS
- 4.3 2021 PROGRAM AREA 3: ADVANCE DATA COLLECTION AND ANALYTICS
- 4.4 2021 PROGRAM AREA 4: ENHANCE PROGRAMMING FOR EXISTING SANITARY SEWER SYSTEMS
- 4.5 2021 PROGRAM AREA 5: EXPAND PROGRAMMING FOR NEW SANITARY SEWER SYSTEMS



4.0 2021 I&I REDUCTION PROGRAM AREAS

This section expands on the five overarching program areas introduced in Section 3.3 and will guide implementation and monitoring of the I&I Reduction Strategy in the next five to ten years to ensure goals, objectives and targets are met. Continued collaboration between York Region and its partners as well as integration with the Water and Wastewater Master Plan will ensure successful implementation to 2031 and beyond. Key updates of this 2021 I&I Reduction Strategy Update have been presented and reviewed with local municipal staff through a number of virtual engagement sessions.

4.1 2021 PROGRAM AREA 1: ENHANCE PARTNERSHIPS

Refine partnerships to enhance collaboration amongst the Region, local municipalities, and development industry.

The 2021 Program Area 1 focuses on refining partnerships to enhance collaboration amongst the Region, local municipalities, and development industry. **Table D** summarizes key activities, timing and anticipated outcomes identified for 2021 Program Area 1.

Table D: 2021 Program area 1 – activity and outcomes

Activity	Timing	Outcomes
Implement a refined partnership framework, organize themed I&I workshops and provide a platform to discuss new and emerging issues, technology advancement, collaboration and support with stakeholders	2021-2026	Workshops as required for improved information sharing between partners and customize Region’s support to local municipalities.
Share outputs from the workshops through existing partnership meetings and working groups	2021-2026	Leverage existing venues to provide technical recommendations and drive informed decision making.

Partnerships are critical to the success of I&I reduction efforts in York Region. Through the development and implementation of a Regionally adopted Strategy in 2011, the Region and its nine local municipalities have been able to demonstrate leadership in I&I reduction. The commitment of the Region and its local municipalities to I&I reduction continues to serve as a major building block of the I&I Reduction Strategy.

Since 2011, collaboration amongst the Region, the local municipalities, the development industry and residents has been instrumental to achieving successes. **Appendix B** presents a high-level overview of the updated roles and responsibilities of the different partners as identified through this update.

Recognizing the need to continue leveraging and enhancing these partnerships, a refined partnership framework has also been developed as part of this update. **Figure F** demonstrates the refined partnership framework and how values are created and exchanged between the Region and its local municipal partners.

4.0 2021 I&I REDUCTION PROGRAM AREAS

Figure F: Refined partnership framework



Refining the Partnership Framework and focusing on aligning partner values will:

- Enable more effective information sharing
- Customize Regional support for operationalizing I&I reduction work at a local municipal level
- Drive better decision making

Values shared, offered, desired and created through the partnership between York Region, its nine local municipalities, the development industry and residents were further refined based on successes already achieved and lessons learned.

To ensure these values continue to be met and evolve to meet the 2021 Update Objectives, workshops have been proposed and will focus on continuous improvement. **Appendix B** includes possible topics of the workshop. Workshops will be organized by the Region's I&I team on a quarterly, annually or as-needed basis depending on the topic of discussion and will leverage available resources. These workshops will provide a venue and an opportunity for collaboration, interaction, and coordination between York Region, the nine local municipalities, and industry partners who will provide technical recommendations to drive decision making.

4.0 2021 I&I REDUCTION PROGRAM AREAS

Key outputs from these workshops will be shared through a number of existing venues including the Public Works Liaison Committee, the Local Municipal/ York Region Quarterly Partnership meetings and other existing working groups and taskforces to drive decision making.

4.2 2021 PROGRAM AREA 2: LEVERAGE FLOW MONITORING DATA TO SET LOCAL MUNICIPAL I&I REDUCTION TARGETS

Leverage monitoring and measuring of incoming wastewater flows from local municipalities to establish short-term and long-term local municipal I&I reduction targets.

The 2021 Program Area 2 focuses on leveraging monitoring and measuring of incoming wastewater flows from local municipalities to establish short-term and long-term local municipal I&I reduction targets. Key activities, timing and anticipated outcomes are summarized in **Table E**.

Table E: 2021 Program Area 2 – activity and outcomes

Activity	Timing	Outcomes
Set 2026 I&I reduction targets based on 2019 priority area results and a Region-wide reduction target of 8.57 MLD to be achieved between 2021 and 2026.	2021-2026	A recommended 2026 reduction target for each local municipality and the Region. These targets are minimum reduction requirements to be achieved in a 5-year timeframe. Progress will be tracked annually and reported to existing partnership meetings.
Expand data acquisition for 2031 target development through importing data currently available in SCADA and installing new flow monitors in the Regional trunk sewers to monitor I&I by municipal boundary.	2021-2031	A new dataset to complement existing audit basin flow monitoring and isolate flows and I&I by municipality.
Set long-term I&I reduction targets and track progress towards meeting long-term targets using analysis of the boundary flow data.	2026-2031 and beyond	Leverage information gained from existing and expanded data collection to update long-term targets and track progress of local municipalities and York Region in meeting those targets. Progress will be tracked annually and reported to existing partnership meetings.

The original 2011 I&I Reduction Strategy was endorsed by York Region and all local municipal Councils in 2011. The I&I programs have been applied to all sanitary sewer systems throughout York Region beyond just the YDSS. Moving forward, the Region will track progress in reducing I&I in all local municipalities, including those with stand-alone systems and the Georgina Wastewater System and incorporate reductions achieved in these systems into the total reduction achieved. This change recognizes the importance of I&I reduction and the benefits it provides to all wastewater systems within the Region.

4.0 2021 I&I REDUCTION PROGRAM AREAS

As shown in **Figure E**, York Region and its local municipalities have succeeded in achieving a reduction of 22.87 MLD of the 40 MLD I&I reduction target, leaving a reduction of another 17.13 MLD to be achieved over the next 10 years.

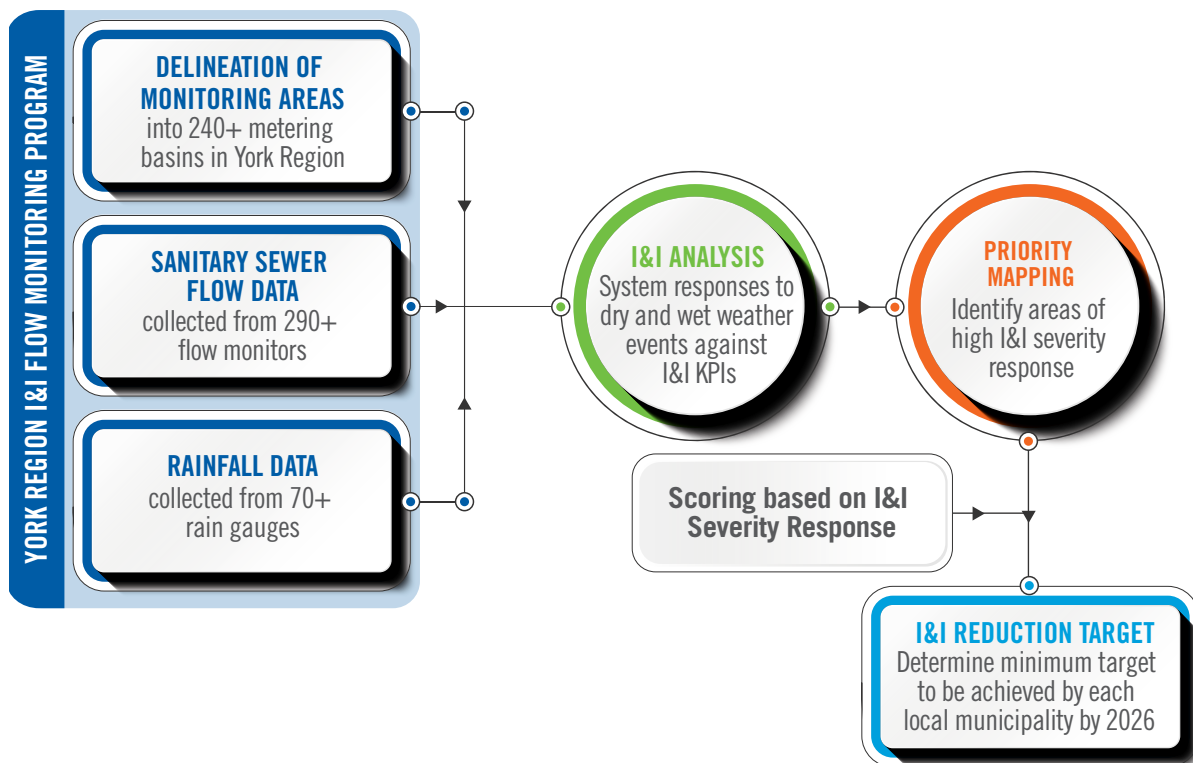
It is anticipated that achieving the remaining 17.13 MLD reduction will become more challenging as sources become more difficult and costly to locate and remediation also becomes more difficult and costly to complete. With more than 40% of the wastewater linear system owned and operated by the local municipalities, a collaborative effort with enhanced partnership is imperative to build on I&I reductions achieved to date and to continue to drive future reductions in our collective system.

In assessing the benefits and challenges, York Region identified an opportunity to introduce I&I reduction targets for each local municipality to encourage I&I reduction programs and focus work in areas with the highest levels of I&I. A virtual engagement session was held in February 2021 with staff from all local municipalities to present this new target framework. Feedback collected was used to develop the framework.

4.2.1 2026 I&I REDUCTION TARGETS

Leveraging sanitary sewer flow and rainfall monitoring data collected from monitoring locations in the local wastewater systems across the Region, a methodology and framework for recommended I&I targets to 2026 was developed. Targets have been developed based on a rationale that used I&I analysis and priority mapping (**Figure G**) in response to the feedback received from local municipal stakeholders.

Figure G: Process chart to setting recommended I&I reduction targets



4.0 2021 I&I REDUCTION PROGRAM AREAS

The 2026 I&I reduction targets presented in **Table F** are minimum recommended targets to ensure the interim reduction target of 8.57 MLD between 2021 and 2026 is met and can be increased to meet other local municipal needs such as flood protection or deferral of new or existing infrastructure upgrades needed to service growth. These targets have been shared, discussed and reviewed with local municipalities through several stakeholder engagement sessions.

Table F: 2026 Recommended I&I reduction targets

Municipalities	Recommended five-year I&I reduction target (To be achieved by 2026) (MLD)
Town of Aurora	0.64
Town of East Gwillimbury	0.14
Town of Georgina	0.27
Township of King	0.12
City of Markham	1.61
Town of Newmarket	0.52
City of Richmond Hill	1.55
City of Vaughan	1.36
Town of Whitchurch-Stouffville	0.21
York Region	2.15
Total	8.57

Having individual targets will help all nine local municipalities and York Region better define future I&I reduction program needs, provide a stronger rationale for new projects and initiatives, and give all nine local municipalities flexibility to develop and implement successful programs to best meet the needs of their systems.

Recommended targets will be supported with I&I priority area mapping and continuous analysis of flow data collected in the local municipal system, together with the Region's support on:

- Progress tracking and analysis of reductions made in the local municipal sanitary sewer systems through annual I&I discussions with individual local municipalities and on an as-needed basis
- Knowledge sharing of different studies and pilot projects completed by the Region or any of the local municipalities
- Development of recommended work plans in priority areas supported by sanitary sewer flow monitoring and I&I analysis
- Workshops aimed at continuous improvement of technology, new and emerging issues, to drive informed decision making

4.0 2021 I&I REDUCTION PROGRAM AREAS

4.3 2021 PROGRAM AREA 3 - ADVANCE DATA COLLECTION AND ANALYTICS

Advance I&I monitoring and analysis frameworks and methodologies to ensure continuous improvement and innovation and more alignment with Regional plans.

The 2021 Program Area 3 focuses on advancing I&I monitoring and analysis frameworks and methodologies to ensure continuous improvement and innovation and more alignment with Regional plans. Key activities, timing and anticipated outcomes identified for 2021 Program Area 3 are summarized in **Table G**.

Table G: 2021 Program Area 3 – activity and outcomes

Activity	Timing	Outcomes
<p>Continue with cost-benefit model development and estimate return on investment specific to I&I reduction projects</p> <p>Refine and share cost-benefit model with local municipalities through partnership framework identified in Section 4.1 and scale up to meet program needs/updates identified in Section 4.4</p>	<p>2021-2022</p> <p>2022-2026</p>	<p>A tool to identify where the greatest I&I reduction benefits can be achieved while maximizing return on investment and informing decision making.</p> <p>Leverage tool to inform local and municipal I&I remediation works and capital investments and set/update KPIs to track progress e.g. \$/MLD/year.</p>
<p>Maintain long-term and short-term monitoring and update existing I&I Key Performance Indicators (KPIs) to incorporate capacity and/or operational constraints and growth demands into I&I prioritization/mapping.</p>	<p>2023-2031</p>	<p>Updated KPIs for enhanced tracking of program performance and standardized comparisons to support efforts for Infra-stretching.</p> <p>Updated matrices and I&I analysis and priority mapping incorporating the new KPIs.</p>
<p>Implement visualization tools supporting self-serve analytics and dashboards to streamline data analysis and automate production of I&I priority mapping.</p> <p>Continue exploring the use of Artificial Intelligence based methods /machine learning models for predicative analysis. Provide data for advanced hydraulic model calibration and support Digital Twin development efforts.</p>	<p>2021-2023</p> <p>2023-2031</p> <p>2021-2026</p>	<p>Pilot a tool for streamlined/automated analysis and optimized resource allocation. And scale up to include the whole Region and opportunities for AI following pilot success (2023-2031). Tool to align with York Region digital transformation efforts and strategies</p>
<p>Increase monitoring in Regional trunks and integration of data collected at Regional facilities through Supervisory control and data acquisition (SCADA) into a one cloud-base data management system</p> <p>Use data collected to support efforts at developing long-term municipal targets identified in Section 4.2.1.</p>	<p>2021-2023</p> <p>2023-2026</p>	<p>A new dataset for Quality Assurance/ Quality Control and flow mass balance calculations.</p> <p>Integration with existing SCADA data will provide easy access to real-time data to monitor system response to rainfall at the local collection system and Regional facilities within a particular sewer shed of Regional facility and by municipal boundary.</p>

4.0 2021 I&I REDUCTION PROGRAM AREAS

The flow monitoring program was first defined in the early stages of the 2011 I&I Reduction Strategy implementation. The program is designed to support the audit, measurement and monitoring process required for identifying I&I targets and tracking reductions realized in the YDSS and stand alone Wastewater systems.

As the monitoring program has evolved over the years, so have the datasets and analyses used to inform delivery of work. Continual advances in data collection, analysis methods and analysis tools have improved efficiencies, streamlined efforts and increased confidence in decision making. These advances align with York Region's digital transformation efforts by putting an emphasis on defining processes, optimization, digitization, automation, mapping technologies and data analytics.

Continual advances will help to:

- Identify and monitor areas with I&I and evaluate rainfall response in both existing local and York Region systems and in new developments
- Provide accurate, continuous, near real-time and reliable flow and rainfall monitoring data for analysis of peak wet weather flows and average dry weather flows
- Support to identify deficiencies in the wastewater system and the state of infrastructure information, as well as review capacity constraints
- Quantify I&I in the system, identify priority areas and identify costs for conveying and treating I&I
- Explore opportunities to track I&I reductions, at a audit basin level or for specific projects, through flow monitoring and analysis
- Identify system capacity constraints to inform capital programming and support efforts to maximize the useful life and capacity of built infrastructure and potentially defer capital investments through infra-stretching

York Region will continue to advance data collection, management and analytics over the next five years while also supporting efforts to optimize resource use in all aspects of its programming.

4.3.1 FINANCIAL MANAGEMENT

The 2011 I&I Strategy envisioned a collaborative long-term funding model based on a cost shared approach between the two tiers of local government. The 2011 I&I Strategy estimated that a funding target of \$100 million over a 20 year period would be needed to meet the 2031 I&I reduction target. This equates to annual investment of \$5 million per year across the Region. The proportionate share based on average cost of \$0.04 per m³ of water sales (\$0.02 of the local municipal rate and \$0.02 of the Regional rate). Since 2011, the Region has invested more than \$2.5 million per year for the Regional program and initiatives.

The 2021 Update recognizes the importance of financial management at the Regional and local municipal level and has identified the need to incorporate consideration of return on investment (ROI) and cost effectiveness into decision making. To that end, York Region recently developed a cost benefit model and will be sharing this model with the local municipalities. This model takes a holistic approach and allows a fulsome consideration of both the costs and benefits of I&I reduction efforts to inform decision making and prioritization. From 2021 and onward, York Region plans to utilize this model to assess the target investment needed to meet 2031 targets and to establish the overall ROI of the I&I program. These assessments and future funding sources and investments will continue to be evaluated with York Region's partners through the enhanced partnership framework to ensure sustainable program funding to 2031 and beyond.

4.0 2021 I&I REDUCTION PROGRAM AREAS

4.4 2021 PROGRAM AREA 4: ENHANCE PROGRAMMING FOR EXISTING SANITARY SEWER SYSTEMS

Expand on programming in existing sanitary systems through refined sanitary sewer assessments, policies and bylaws, private-property incentives in focused high priority areas and increased Public and Private Partnership (P3) initiatives like developer funded I&I programs.

The 2021 Program Area 4 focuses on expanding programming in existing sanitary sewer systems. **Table H** summarizes key activities, timing and anticipated outcomes identified for 2021 Program Area 4.

Table H: 2021 Program area 4 – activity and outcomes

Activity	Timing	Outcomes
Scale-up the use of the Cost Benefit Analysis model and RDII source modelling and expand uses to better inform decision making.	2021 to 2031	A tool for improved decision making on the selection of areas for rehabilitation, rehabilitation techniques and potential reductions that can be achieved from private property programs.
Review Bylaws and develop sample clauses for consideration by local municipalities to address mitigation of private and non-residential property sources and limit dewatering activities.	2021 to 2026	Sample Bylaw clauses for use by local municipalities to address private property sources and facilitate their removal and ensure limits are set for flows from dewatering activities in capacity constrained or high I&I response areas.
Develop a toolkit containing standardized messaging to ensure consistency across York Region, data analysis support to target specific sources and administrative processes.	2021 to 2026	Key tools for use by the local municipalities to identify sources of I&I to be targeted and to develop and implement successful private property programs. Tool to be leveraged for information sharing and developing engagement and communication strategies and messaging that align with sources identified as well as demographic, cultural and political perspectives on I&I reduction and basement flooding prevention.
Enhance developer-funded projects for I&I considerations.	2021 to 2031	Updated Guiding Principles for developer-funded programs targeted to high priority-areas for mutual benefit.

4.0 2021 I&I REDUCTION PROGRAM AREAS

York Region and its local municipalities have been completing sanitary sewer evaluation studies and associated remedial work on assets deemed critical for rehabilitation and replacement in areas identified as high priority per York Region's hydraulic modeling and analyses. The sewer evaluation work includes annual CCTV inspections of the municipal system, as well as field surveys and tracer studies on private properties. Most remedial works completed to date have included relining and spot-repair of sanitary sewers and lateral sewers, maintenance hole repairs on public infrastructure, and downspout and/or sump pump disconnections on private properties.

Completing private property investigations, an innovative hydraulic and hydrologic model has been piloted in 2018 and further refined in 2020 for a study area in Newmarket to quantify I&I from various private sources and to estimate I&I reductions that could be achieved through remediation activities.

York Region has also engaged in developer-funded I&I reduction agreements with several local municipalities and the development industry for the mutual benefit of reducing I&I in existing sanitary sewer systems since 2010. Developer-funded agreements permit completion of I&I reduction work in exchange for capacity allocation at a two-to-one ratio of achieved reductions to allocation credits. The program allows a level of planned growth to continue without additional infrastructure investment. The portion of recovered capacity retained by York Region helps mitigate future capacity risks by buffering against the effects of ageing infrastructure and climate change.

I&I remedial works completed have included disconnection of residential and commercial downspouts from the sanitary sewer system, sanitary sewer spot repairs, maintenance hole repairs, modifications to drains on reverse-sloped residential driveways, disconnection of sewer cross-connections and disconnection of residential sump pumps from the sanitary sewer system. Details of the rehabilitation activities, location and I&I reduction quantification estimates have been reported annually to MECP. These [annual reports](#) are also posted on the Region's I&I webpage.

Building on these programs and initiatives, the following sections provide details on expanded programming in existing sanitary sewer systems included in this 2021 I&I Reduction Strategy Update. The Region has been preparing financial budget and tracking expenditures of I&I programs and capital works on an annual basis.

4.4.1 SCALE-UP PILOTS AND EXPAND USES TO BETTER INFORM DECISION MAKING

An I&I source model was piloted in 2018 to identify and quantify sources of I&I on private properties. This pilot study combines hydraulic modelling with Geographic Information System (GIS) mapping and real data to estimate the volume and identify the sources of I&I present based on flow patterns. Data from the model was verified with field data and show that flow patterns can be used to gain a deeper understanding of what kinds of I&I sources are present in an area.

The pilot study completed extensive field program and site investigations in 2019/2020 and generated results that can help reduce the requirements for costly Sanitary Sewer Evaluation Surveys (SSES) work. Expanding application of the I&I source model in upcoming years will allow municipalities to better direct SSES work to locate I&I sources. Information gained from the pilot I&I source modelling will be made available to the local municipalities.

4.0 2021 I&I REDUCTION PROGRAM AREAS

York Region initiated development of a Cost-Benefit Analysis (CBA) model tool in 2020, calibrated using wastewater flow data collected to:

- Estimate the return on investment of I&I reduction projects
- Inform decision making to select areas for rehabilitation and/or rehabilitation techniques that will result in the highest benefit for the lowest cost
- Quantify project specific I&I reductions achieved and associated cost savings, which can be used to obtain York Region and/or local municipality council support

The CBA tool considers both direct and indirect costs and benefits of various remediation works. It will be made available to local municipalities to enhance decision making in 2022. The model has the flexibility to be updated over time and to integrate future information.

Expansion of these tools will allow for more focused SSES work and result in resource savings both in time and cost, leading to more successful I&I reduction projects.

4.4.2 REVIEW EXISTING SEWER USE BYLAWS AND DEVELOP SAMPLE CLAUSES FOR LOCAL MUNICIPAL BYLAW UPDATES

York Region's [Sewer Use Bylaw](#) requires a permit for temporary dewatering prior to discharging. The Region is developing a Standard Operating Procedure (SOP) for reviewing and monitoring temporary dewatering applications. The SOP will include permit criteria that will incorporate I&I considerations and limit discharge of flows from dewatering activities in capacity constrained or high I&I response areas. The Region will work collectively with local municipal staff to develop an integrated process aimed at improving the efficiency of the temporary dewatering application process for the discharge of flows to local sanitary sewers first and eventually into the Regional system.

In collaboration with the local municipalities, York Region will also investigate opportunities to develop sample Bylaw clauses for consideration of inclusion by the local municipalities, consistently across the Region. Sample Bylaw clauses will focus on mitigating private property sources (such as connected foundation drains), sources from non-residential land uses (ICI) and potential enforcement activities for illegal cross connections on private properties.

4.0 2021 I&I REDUCTION PROGRAM AREAS

4.4.3 DEVELOP PRIVATE-SIDE I&I REDUCTION TOOLKIT WITH INCENTIVIZED PROGRAM MODELS FOR LOCAL MUNICIPAL IMPLEMENTATION OF PRIVATE-SIDE I&I REDUCTION PROGRAMS

Sanitary sewers located on private properties make up more than 50% of York Region wastewater conveyance system in length. Experience in other municipalities has indicated that I&I sources on the private side can contribute 60% to 80% of I&I in a wastewater system. Working with residents to address these issues is imperative to the successful implementation of the I&I Reduction Strategy.

In 2018, York Region launched a private-side I&I reduction pilot project in partnership with the local municipalities in two study areas. Out of the 1,398 total residents in the pilot study areas, 63% engaged with the Region and its representatives, resulting in 42% of residents signing up to participate in property inspections. Remediating private-side I&I sources is generally beyond York Region's jurisdiction and relies on local municipal efforts, programs, and enforcement. This pilot project generated important lessons on how to achieve a high resident participation rate including a flexible program model, a rigorous residents' communication platform, and focused programs to allow targeted communications. Additional input, such as education and enforcement, would be required to increase residents' participation in uptake of incentives and rehabilitation work.

Built on the knowledge gained by the Region through its private-side I&I reduction pilot project and analyzing reductions from local municipal-lead programs such as City of Markham's Downspout Disconnection Program and Flood Protection Program, the Region is committed to support local municipalities in the development and implementation of new private-side programs, or enhancement of their existing private-side programs, through a toolkit consisting of:

- Standardized materials and messaging across the Region as education and outreach is critical to drive resident participation
- Program models that can be customized for program planning and initiation
- Analysis of results through Region's flow monitoring program
- Administrative processes and applications

Private-side programs will be directed to high-priority and ageing residential neighborhoods. The toolkit will be continually updated with lessons learned through municipal use to develop best management practices and to promote a culture of information sharing. I&I workshops will be used to further develop toolkit requirements and expansion options in this area.

4.0 2021 I&I REDUCTION PROGRAM AREAS

4.4.4 ENHANCE EXISTING PARTNERSHIP INITIATIVES TO PROVIDE FURTHER GAINS

Enhancement of Private and Public Partnerships (P3) will be an important tool, available to local municipalities, to drive I&I reduction in existing sanitary sewer systems. The current York Region Council-approved Guiding Principles for developer-funded I&I reduction projects allows for some flexibility, and individual agreements can be customized to suit the unique situations of local municipalities. Potential refinements could include:

- Definition of areas for inclusion in tri-party agreements based on I&I priority mapping
- Customized agreements to achieve additional benefits to the local municipalities
- Consideration of changes to the benefit structure of these agreements to incentivize development industry partners to identify and complete more difficult and more costly I&I repair work
- Reassignment of repairs identified but not completed by individual developers

4.5 2021 PROGRAM AREA 5: EXPAND PROGRAMMING FOR NEW SANITARY SEWER SYSTEMS

Expand on programming in new sanitary sewer systems to minimize I&I in new construction through updated standards and advanced technologies.

2021 Program Area 5 focuses on expanding programming in new sanitary sewer systems. **Table I** summarizes outcomes identified for 2021 Program Area 5.

Table I: 2021 Program area 5 – activity and outcomes

Activity	Timing	Outcomes
<p>Finalize I&I New Development Standard</p> <p>Develop flow monitoring requirements to measure effectiveness of the I&I New Development Standard</p> <p>Bring report to Regional Council for endorsement</p> <p>Full implementation by all local municipalities</p>	<p>2021 to 2022</p> <p>2021 to 2022</p> <p>Q1 2022</p> <p>2022 to 2024</p>	<p>Release I&I New Development Standard for implementation consistently across the Region to replace the 2011 Sanitary Sewer System Inspection, Testing and Acceptance Guideline.</p> <p>Seek Regional Council endorsement in 2022 and full implementation by all local municipalities by end of 2024. By 2026, new infrastructure will be constructed in accordance with new standards and specifications.</p>
<p>Pilot flow monitoring in new development</p> <p>Update the I&I New Development Standard for lessons learned from implementation and flow monitoring results</p>	<p>2023 to 2026</p> <p>2026 to 2031</p>	<p>Initiate implementation of monitoring requirements following standardized monitoring procedures and I&I allowance thresholds.</p> <p>Continually update and maintain New Development Standard that reflects innovations and improvements and following monitoring results.</p>

4.0 2021 I&I REDUCTION PROGRAM AREAS

Activity	Timing	Outcomes
Retire I&I reduction component from current incentive programs, given the roll out of the I&I New Development Standard	2022 to 2024	Ensure I&I SIP/SDIP performance requirements for enrolled developments are achieved. Allow for a transition period for applications already in-place before retiring I&I component from incentives.
Conduct research and in-field pilot of new materials and technologies to reduce I&I in new development	2021 to 2031	Utilize refined partnership framework, in-field pilots and workshops aiming at continuous improvement in new development.
Advocacy aimed at improving National and Provincial Codes and Standards to prevent I&I in New Systems	2021 to 2031	Utilize refined partnership framework and workshops to advocate for Code change requests that focus on continuous improvement of minimum standards promoting I&I reduction provincially and nationally and that will drive improved design and construction methods.

I&I = Inflow and Infiltration; SDIP = Sustainable Development Incentive Program; SIP = Servicing Incentive Program.

To support York Region’s commitment to delivering and promoting sustainable services, adoption of best practices for the management of I&I in new developments became a proactive and cost-effective means to avoid future expenditures and promote sustainable growth and development.

The plan for new construction is to ensure sanitary sewers are watertight at the time of construction using sound engineering requirements in design, and vigilant inspection and monitoring during construction and commissioning and before assumption.

The I&I New Development Standard is being finalized for adoption by the nine local municipalities by 2024 with a focus on four main categories including design and construction, inspection, testing, and flow monitoring procedures and performance conformity for site plans and new subdivision service permits. Components of the I&I New Development Standard have been tested and tried in over 5,000 built units through the Region’s incentive programs promoting sustainable new residential developments such as York Region’s Servicing Incentive Program (SIP) and the Town of East Gwillimbury’s Sustainable Development Incentive Program (SDIP).

To continue York Region’s demonstrated leadership and commitment in this area, the 2021 I&I Reduction Strategy Update identified the need to expand on programming in new sanitary sewer systems. Continuous improvement through updated standards, and monitoring procedures along with Region-wide application of new technologies, will help achieve continued reductions in I&I in new construction.



4.0 2021 I&I REDUCTION PROGRAM AREAS

4.5.1 A REGION-WIDE IMPLEMENTATION OF I&I NEW DEVELOPMENT STANDARD FOR PUBLIC AND PRIVATE INFRASTRUCTURE

The I&I New Development Standard has been developed to address gaps and inconsistencies identified in current practices and to specify minimum standardized requirements in design, construction, testing and inspection in both the public and private right-of-way. The I&I New Development Standard will be implemented in a phase-in approach and will be applicable to all new development sites throughout all local municipalities within York Region starting in 2022/23.

The I&I New Development Standard has been developed in close collaboration and with extensive consultation with the local municipalities and the development industry. Representatives from the nine local municipalities, building officials, plumbing inspectors and industry partners including the Building Industry and Land Development Association (BILD), Greater Toronto Sewer and Watermain Contractors Association (GTSWCA), Ontario Concrete and Drain Contractors Association (OCDCA) and Ontario Concrete Pipe Association (OCPA) have all been engaged in developing this I&I New Development Standard through multiple committees formed in the past two years.

Once fully implemented by all local municipalities, flow monitoring will be conducted to evaluate success, following standardized new development monitoring procedures and thresholds. Lessons learned from the rollout, implementation and results of monitoring in new development will be reviewed with municipal and development industry partners and the I&I New Development Standard will be updated as needed. New technologies becoming available or proven will also be assessed.

To date, the Region in collaboration with the local municipalities and the development industry have used incentives through P3 initiatives such as SIP and SDIP to implement more stringent and watertight practices and technologies. Incentives include offering sanitary sewer allocation credits in exchange for proven low I&I rates (less than 0.12 litres per second per hectare (L/s/ha), under a 25-year design storm). With the New Development Standard roll-out, York Region will be looking into retiring the incentive from I&I reduction component of these initiatives with some transition period for applications already in-place.

4.5.2 UPDATE GUIDELINES, POLICIES AND STANDARDS

With the knowledge gained through the development of the I&I New Development Standard, York Region will continue its advocacy to enhance National and Provincial codes and standards to reduce I&I in new sanitary systems.



5.0

PLAN FOR MONITORING, REVIEWING AND UPDATING THE 2021 I&I REDUCTION STRATEGY



5.0 PLAN FOR MONITORING, REVIEWING AND UPDATING
THE 2021 I&I REDUCTION STRATEGY



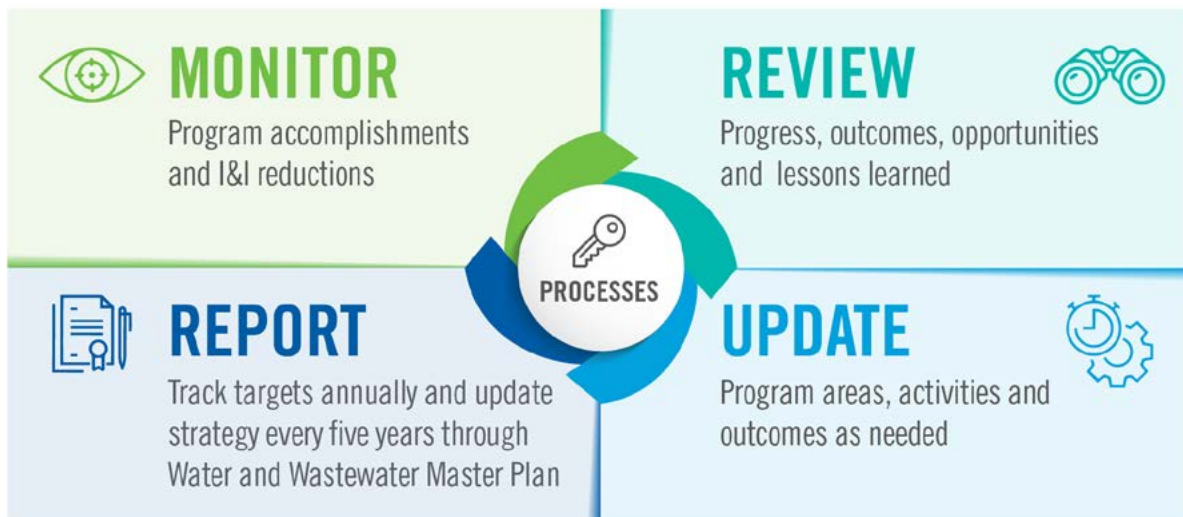
5.0 PLAN FOR MONITORING, REVIEWING AND UPDATING THE 2021 I&I REDUCTION STRATEGY

York Region will continue to monitor program activities, review them against goals and targets and update the I&I Reduction Strategy when necessary to ensure progress towards meeting the 2031 I&I reduction target of 40 MLD. Reporting will also be a key component of the plan as York Region will continue to integrate the Long-Term Water Conservation Strategy and the I&I Reduction Strategy into one comprehensive demand management program under the Water and Wastewater Master Plan updates to 2031 and beyond.

Annual reports will continue to be prepared and shared with York Region’s partners and stakeholders. The [2020 Annual I&I Report](#) summarizing I&I reduction activities and accomplishments in 2020 is posted on Region’s website. York Region will continue with this reporting style in the future.

Figure H presents a summary of the key elements of the process that will be followed to monitor, review, update, and report on the I&I Reduction Strategy. **Table J** builds on the information provided in **Figure H** and provides further details planned for each activity.

Figure H: Plan for future I&I strategy updates



5.0 PLAN FOR MONITORING, REVIEWING AND UPDATING THE 2021 I&I REDUCTION STRATEGY

Table J: Strategy monitoring, review, updating and reporting

Activity	Description	Frequency	Outcomes
Monitor	Monitoring and tracking of program accomplishments, I&I reductions achieved and implementation and schedule of program refinements.	Progress reports to be prepared annually and used as a tool to track progress towards meeting the 2026 interim targets.	Annual reports to be shared with Public Works Liaison Committee and presented at the Local Municipal/York Region Quarterly Partnership Meetings.
Review	Review program issues and successes, identify opportunities for advancement and enhancement, and consolidate lessons learned.	Yearly reductions to be included in the annual report. Lessons learned are consolidated on a five-year basis.	Reductions will be reviewed at the Local Municipal/York Region Quarterly Partnership meetings. Annual reductions achieved and five-year consolidation of lessons learned will be presented to Public Works Liaison Committee.
Update	Update I&I programming based on consolidated lessons learned and progress made towards meeting the reduction targets.	Updates will be captured every five years through the Water and Wastewater Master Plan Update.	Updated implementation plans will include program refinements and will be completed, as recommended through Strategy review.
Report	Reporting of a Strategy Update and financial spending information.	Updated programming will be presented in York Region's Water and Wastewater Master Plan under demand management programming every five years.	Reports will be shared with Public Works Liaison Committee and other stakeholders and will be posted online. Report will follow a new format following the 2020 Annual I&I Report card now posted on york.ca/iandi .



6.0 CONCLUSION





6.0 CONCLUSION

The 2021 I&I Reduction Strategy Update is the second five-year update to the Region's 2011 I&I Reduction Strategy and satisfies SEC IEA approval condition 8.10. It enhances and extends the Region's commitment to leading I&I reduction programming, meeting regulatory requirements, and supporting growth in a socially, financially, and environmentally sustainable manner. The 2021 I&I Reduction Strategy Update also supports York Region's Water and Wastewater Master Plan under demand management programming.

Since 2011, York Region in collaboration with the local municipalities and development industry has reduced a significant 22.87 MLD I&I in the sanitary sewer systems across York Region. This is equivalent to wastewater flow generated from approximately 24,000 homes, in addition to providing a range of social, environmental and financial benefits to the residents and partners. Moving forward, York Region is committed to achieving the 2031 reduction target of 40 MLD through program refinement and enhancement presented in this 2021 Update.

I&I reduction Program Areas have been streamlined from the original eight-program area structure to a new five-program area structure (2021 Program Areas) to align with the 2021 Update objectives and enable focused efforts and optimum resource allocation. Key activities, timelines and outcomes have been identified for each of the 2021 Program Areas and will be used to guide implementation of the I&I Reduction Strategy in the next five to ten years.

Finally, this 2021 Update also includes a plan for monitoring, reviewing, updating, and reporting of Strategy updates. Monitoring and reviewing will occur and reported within York Region on an annual basis. Strategy and programming updates will be consolidated into York Region's Water and Wastewater Master Plan under demand management programming every five years.



7.0 APPENDICES



APPENDIX A: DRIVERS FOR I&I REDUCTION

APPENDIX B: UPDATED ROLES AND RESPONSIBILITIES AND WORKSHOP TOPICS



APPENDIX A: DRIVERS FOR I&I REDUCTION

Table K: Drivers for I&I reduction

Drivers for I&I reduction		Related Regional plans, programs, and activities	Significance/benefits
Reduction drivers	<p>*NEW*</p> <p>Free up capacity to meet growth demands</p>	<ul style="list-style-type: none"> Water and Wastewater Master Plan Capacity Assessment One Water Action Plan Service incentive programs Hydraulic modelling 	<ul style="list-style-type: none"> Reduce I&I in existing systems and prevent I&I in future systems to maintain wastewater system capacity through infra-stretching Develop wastewater system capacity for future growth and allow system relief while capital projects are underway Flow monitoring data reflect efforts made towards I&I reduction and capacity gains which are tangible benefits and feed into hydraulic model calibration and planning activities
	<p>*NEW*</p> <p>Meet wastewater system regulatory requirements in satellite systems</p>	<ul style="list-style-type: none"> Wastewater operations Long-Term Water Conservation Strategy 	<ul style="list-style-type: none"> Ensure satellite wastewater treatment systems and facilities meet compliance requirements for bypasses and effluent quality Support environmental stewardship activities related to York Region wastewater treatment facilities
	<p>*NEW*</p> <p>Provide wastewater system-related operational support</p>	<ul style="list-style-type: none"> Wastewater operations Sewer-Use Bylaw Water resources 	<ul style="list-style-type: none"> Track system responses and surcharges during wet weather events Provide analysis and support on significant rainfall events and I&I analysis Provide monitoring and analysis support to Sewer Use Bylaw group and other groups such as Water Resources
	<p>*NEW*</p> <p>Adapt to climate change</p>	<ul style="list-style-type: none"> Climate Change Adaptation Plan 	<ul style="list-style-type: none"> Flow monitoring and rainfall data characterize area-specific wet weather events and system's responses to these events Support York Region's climate change adaptation approaches through the identification of system vulnerabilities and enhanced system resiliency
	<p>*NEW*</p> <p>Deliver and promote environmentally sustainable services</p>	<ul style="list-style-type: none"> Vision 2051 York Region Corporate Strategy 2019-2023 York Region Strategic Plan York Region Official Plan Energy Conservation Plan 	<ul style="list-style-type: none"> Continue to implement I&I reduction programs to work toward achieving reduction targets Continue to provide a range of social, environmental, and financial benefits resulting from reduced flooding risks, energy costs associated with pumping and treating extraneous flows, and delayed need for new infrastructure
	<p>*ORIGINAL*</p> <p>Meet wastewater system regulatory requirements in the YDSS</p>	<ul style="list-style-type: none"> Wastewater operations Capital planning and delivery Long-Term Water Conservation Strategy 	<ul style="list-style-type: none"> Meet the IEA SEC conditions of approval (2031 I&I reduction target) This is core requirement of I&I Reduction Strategy
	<p>*ORIGINAL*</p> <p>Reduce basement and wastewater system flooding</p>	<ul style="list-style-type: none"> Wastewater operations Local municipal wastewater operations 	<ul style="list-style-type: none"> Reduce flows during large rainfall events and reduce the risk of flooding Support nine local municipalities by reducing the risk of local basement flooding

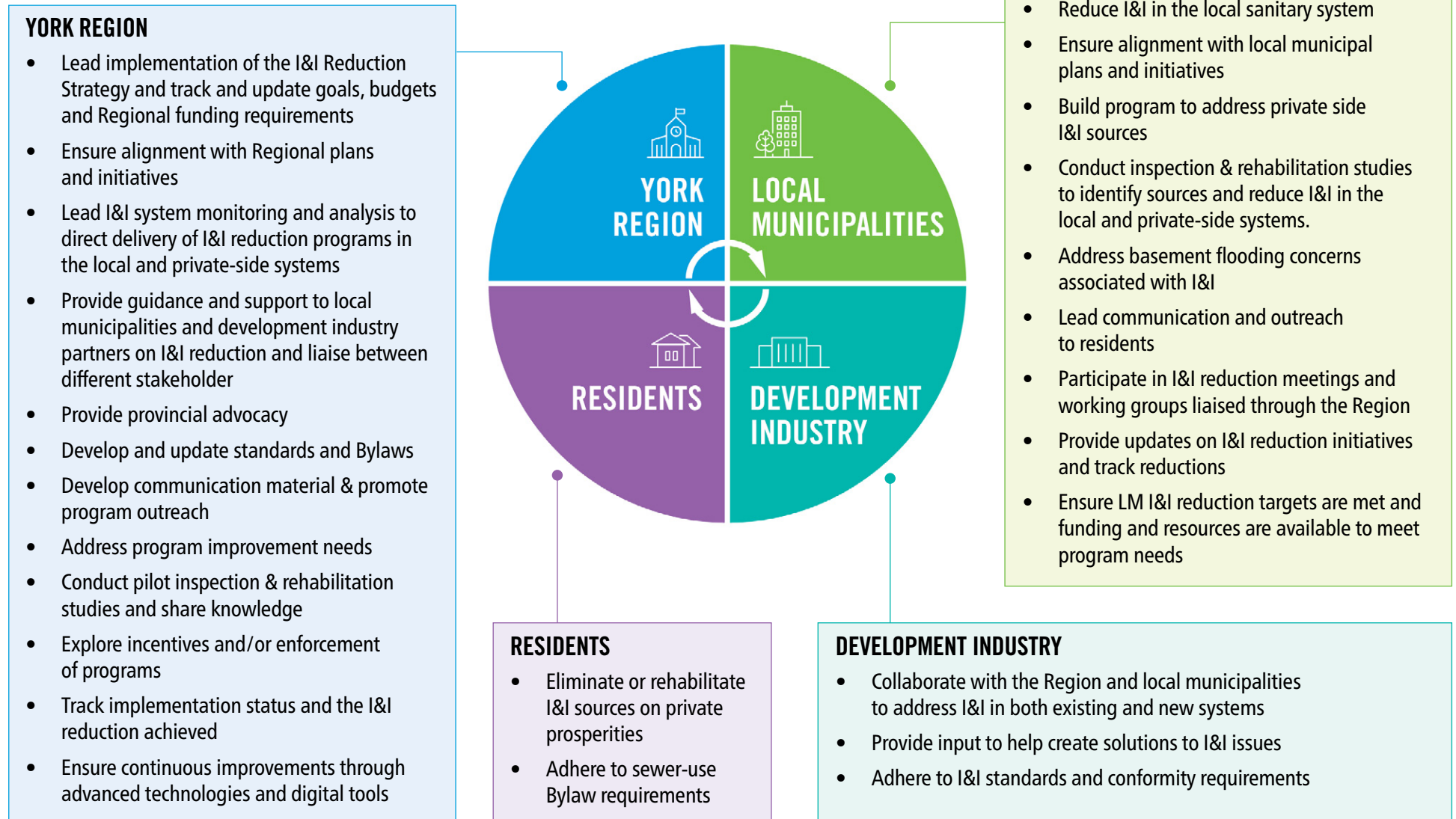
APPENDIX A: DRIVERS FOR I&I REDUCTION

Table K: Drivers for I&I reduction

Drivers for I&I reduction		Related Regional plans, programs, and activities	Significance/benefits
Program drivers	<p>*NEW*</p> <p>Develop local municipal target framework</p>	<ul style="list-style-type: none"> • Business planning and financial support 	<ul style="list-style-type: none"> • Develop target framework that assigns specific targets to York Region and the nine local area municipalities • Support partnership while eliminating duplication at York Region and nine local municipalities and enhance overall cost effectiveness • Additional flow monitoring data from boundary metering will provide basis for future water rate studies as I&I has been identified as a risk in the recent water rates study
	<p>*NEW*</p> <p>Implement and enforce new guidelines and bylaws</p>	<ul style="list-style-type: none"> • Capital planning and delivery 	<ul style="list-style-type: none"> • Enforce design, inspection and acceptance standards and guidelines for wastewater systems • Maintain uniform standards for plumbing and private-property system inspections • Prevent I&I from new systems and private-property systems
	<p>*ORIGINAL*</p> <p>Maintain Council support and endorsement</p>	<ul style="list-style-type: none"> • Water and Wastewater Master Plan 	<ul style="list-style-type: none"> • Maintain support and the endorsement of York Region Council and the nine local municipal councils • Integrate future Strategy Update with the Master Planning process
	<p>*ORIGINAL*</p> <p>Refine partner roles and responsibilities</p>	<ul style="list-style-type: none"> • Strategy and innovation 	<ul style="list-style-type: none"> • Reaffirm York Region leadership and redefine roles and responsibilities of partners • Ensure clarity and commitment of York Region and the nine local municipalities • Provide platforms for continuous improvement through workshops

APPENDIX B: UPDATED ROLES AND RESPONSIBILITIES AND WORKSHOP TOPICS

Figure I: Updated Partners' roles and responsibilities



7.0 APPENDICES

APPENDIX B: UPDATED ROLES AND RESPONSIBILITIES AND WORKSHOP TOPICS

Figure J: I&I Reduction proposed workshop topics for continuous improvement

