TOWNSHIP OF KING

WASTEWATER

SERVICING IMPLEMENTATION GUIDE (SIG)

KING CITY

This document is a guideline and related specifications to create a comprehensive sustainable development program for the Township of King (Township), in conjunction with the Region of York (Region), that will result in reduced wastewater production, and more efficient infrastructure.

Official Plan

Sustainable Development Policies are included in the Township of King Official Plan as adopted in 2019. The Town's Official Plan includes policies and objectives to "ensure coordination with York Region to eliminate inflow and infiltration into wastewater systems…".

Engineering Standards

The Township's Engineering Design Criteria and Standard Detail Drawings (hereinafter referred as Township's Standards), revised January 2019 and as amended from time to time, have set out guiding principles to follow with respect to the design, construction and materials for wastewater systems. These Standards are often more restrictive than the Ontario Provincial Standard Drawings and Specifications (OPSDS) and also reference York Region's Inflow and Infiltration Reduction Standard for Sewers Servicing New Development[1] (in Appendix 5 of Township's Standards) for all sewer testing.

King City Pumping Station

The King City wastewater collection system consists of local gravity sewers and local sewage pumping stations which all ultimately drains to the Regional King City Pumping Station. In order to accommodate King City Pumping station design conditions, developments within King City are expected to construct new sanitary sewer system in accordance to enhanced requirements set out by the Region to achieve 0.107 L/s/ha or less inflow and infiltration under a 25 year storm to the satisfaction of the Region and the Township. The intent of this document is to provide guidance and requirement to the Owner/Applicant in achieving this target.

[1] The Owner will be required to comply with the latest version of the Inflow and Infiltration Reduction Standard for Sewers Servicing New Development

1.0 Extraneous Flow Reduction

Purpose - to reduce and monitor extraneous flows.

1. Requirements

    a. Achieve the wastewater inflow and infiltration (I and I) control requirements through meeting the Sewer Installation/ Performance Testing Specification in Appendix One.

    b. In case of conflict between the Township's Standards, York Region's Inflow and Infiltration Reduction Standard for Sewers Servicing New Development, and this document, the Owner shall confirm the requirement with the Township.

2. Prior to construction of the proposed sewers, the Owner shall retain a Flow Monitoring Engineering Consultant and submit a Program Conformity Plan to the Peer Reviewer to requirements as outlined in Section 2.0 below. The Plan is to be reviewed and approved by the Township (Peer Reviewer) and Region prior to commencement of sewer construction. Commencement of flow monitoring shall occur in conjunction with the first occupancy.

3. Upon completion of work and the flow monitoring period, a Conformity Report prepared by the Owner's Flow Monitoring Engineering Consultant shall be submitted to the Peer Reviewer demonstrating how the objectives have been met. The Conformity Report shall be prepared to the requirements as outlined in Section 3.0 below.

4. The Peer Reviewer shall be one with demonstrated professional qualification and with no conflict of interest. The Peer Reviewer shall be retained by the Township with cost fully reimbursed by the Owner/Applicant. Selection of the Peer Reviewer shall be satisfactory to Township and the Region.

5. Financial assurance for sanitary servicing work is secured through Subdivision Agreement (or Spine Servicing Agreement) per standard practice. The Township reserves the right to draw on and use the proceeds from the letter of credit to complete any work required to be done by the Owner per the Agreement, which would include work outlined in this document. The Owner should include the cost of the engineering consulting and flow monitoring work as required in this document in the security requirement calculations.

2.0 Program Conformity Plan

The owner/applicant is required to submit the Program Conformity Plan which provides the details/drawings how the project will achieve the required objectives. The following shall be submitted to the Township (Peer Reviewer) and Region:

- Electronic copy of the assembled Program Conformity Plan and number of hard copies as required by the Township (Peer Reviewer) and Region.
- The Program Conformity Plan as outlined in the below.

2.1 Program Conformity Plan

The Program Conformity Plan shall contain:

a. Report Title:

Title of the report shall be “Conformity Plan for [*Insert Community Name, Builder Name and Draft Plan Number*]”.

b. Introduction/ Project Description:

A brief written description of the report supported by drawings/sketches.

c. Wastewater Flow Reduction:

i. Plan showing how the development will meet the sewer installation/ performance testing requirements set out in Sections 1 (above).

ii. A verification plan including the list of consultants and contractors to be performing the tasks, including but not limited to sewer construction/inspection work, CCTV, and flow monitoring.

iii. A contingency remedial plan should performance requirements not be met after construction (may include strategies related to carrying out inflow and infiltration reduction works, etc.).

iv. A flow monitoring plan showing how the flow meters will delineate development flow for monitoring purposes, including the type of meters to be installed.

3.0 Conformity Report

The Owner/Applicant is required to submit a Conformity Report confirming how the project has achieved the required objectives. The following shall be submitted to the Township (Peer Reviewer) and Region:

- Electronic copy of the assembled Conformity Report and number of hard copies as required by the Township and Region.
- Conformity Report as outlined in the below.

3.1 Conformity Report

When the owner/applicant has completed the works and monitoring, a Conformity Report is to be submitted and reviewed by the Peer Reviewer to demonstrate how the owner/applicant achieved the required objectives.

This Conformity Report shall contain:

a. Report Title:

   Title of the report shall be “Conformity Report for [*Insert Community Name, Builder Name and Draft Plan Number*]”.

b. Confirmation that the sanitary sewer system has been constructed in accordance with the SIG Sewer Installation/Performance Testing Specification (as outlined in Appendix One).

c. CCTV Reports.

d. I & I and Flow Monitoring Report.

e. Confirmation that the required objectives have been met.

Appendix One

SIG Sewer Installation/Performance Testing Specification

Part 1 - General.

1.1 Objective

Developments tributary to the York Region's King City Sewage Pumping Station shall reduce the impacts of extraneous flows within their wastewater collection systems beyond the current rates within the Township's Standards in order to meet the design conditions of the King City Pumping Station. This is to be achieved through the proactive introduction of improved design and construction standards and hydraulic performance specifications for new wastewater collection infrastructure.

The primary objective of this document is to reduce the ingress of rainfall derived inflow and infiltration (RDII) and to reduce groundwater infiltration (GWI) resulting from newly constructed sanitary sewer systems.

This Specification Document is intended to enhance the existing York Region Inflow and Infiltration Reduction Standard for Sewers Servicing New Development (which also forms part of Township's Standards).

1.2 Background

This sanitary sewer specification follows the York Region Inflow and Infiltration Reduction Standard for Sewers Servicing New Development released in February 2022, that provides direction for the preferred test methods, quality control (testing limits) and specific requirements for the construction of new sanitary sewer systems. These specifications apply for the duration of the construction and maintenance period, including the installation of lateral connections to property line and the subsequent building connections. Furthermore, this document allows for the measurement of the hydraulic performance of newly constructed wastewater infrastructure.

This specification document's standards are also based on current and amended Ontario Provincial Standard Specifications (OPSS), Ontario Ministry of Environment, Conservation and Park Guidelines (MECP), and or American Society of Testing Materials (ASTM).

Part 2 - Construction of New Sanitary Sewer Systems.

2.1 General

All installation, testing and inspection shall be undertaken, at a minimum, as per Township's Standards; York Region Inflow and Infiltration Reduction Standard for Sewers Servicing New Development (except where noted herein); and this Specification document. In case of conflict between the said documents, the requirements and guidelines in this Specification document shall take precedence.

2.2 Sanitary Maintenance Holes

a. Each maintenance hole shall be precast with a pre-benched monolithic base with watertight boot connectors for all pipe connections.

b. Each maintenance hole shall be watertight and free from leakage, with a sealed chimney and pre-manufactured gasketed connections.

c. Maintenance hole frame shall be as per the applicable Township Standard.

d. Maintenance hole covers are to be as per modified OPSD-401.01 with a single pick hole.

e. A 2mm rubber gasket shall be placed between the frame and cover.

f. All maintenance holes constructed in the vicinity of low points or outside the paved roadway or within an overland flow or on down-sloping cul-de-sacs shall have watertight covers, as per Township Standards. Maintenance hole covers shall be locked (bolted) where requested.

g. The entire external surface area of the maintenance hole including all walls, joints, and roof slab shall be wrapped in approved waterproofing membrane complete with protection board. See Appendix Two for a complete list of approved waterproofing membrane material. Each waterproofing membrane layer shall be a minimum width of 1.0 meter and overlap a minimum of 150 mm. Membranes and the associated primer shall be applied in accordance with manufacturer specifications.

h. The use of maintenance hole precast concrete adjustment units is strongly discouraged and where necessary shall be limited to one adjustment unit to facilitate adjusting frame and covers for surface course asphalt placement. Precast concrete adjustment units shall be mortared and parged using prepackaged grout conforming to ASTM C1107. Precast concrete adjustment units must be fully wrapped with an approved waterproofing membrane after grout has sufficiently cured.

Adjustment of maintenance holes for frame and covers that cannot be facilitated by the above requirement shall be fabricated from precast concrete riser sections (minimum height of 300mm) or constructed of a minimum 32 MPa cast-in place concrete and doweled to the precast concrete maintenance hole. Cast-in place and pre-cast concrete adjustment sections must be fully wrapped with an approved waterproofing membrane after cast in place concrete has sufficiently cured.

Alternatively, one of the following systems may be used in lieu of cast-in place adjustment sections:

- Integrated Frame and Cover (IFC) Maintenance Hole;
- Self-level Maintenance Hole; or
- Bibby Autostable Self-Level Maintenance Hole Frame.

2.3 Sanitary Sewers

a. Sanitary sewer pipes shall be constructed in a manner to ensure the absence of extraneous flows, using best available technology.

b. Only pre-manufactured tees and standard fittings shall be permitted.

c. Sanitary sewer pipes shall be comprised of PVC DR 35 (or better) based on the pipe depth and shall be installed with bell and spigot gasketed joints, as per Township Standards.

d. C900 (100 mm to 300 mm) or C905 (340 mm to 600 mm) PVC pipe (or concrete pressure pipe) will be specified in areas of high water table or where sewer is greater than 8.5 meters deep.

e. Connections/joints shall be pre-manufactured gasketed connections.

2.4 Service Connections

a. Only sealed manufactured PVC clean-outs shall be permitted at service connection at property line, with no extension pipe to surface grade.

b. Sanitary service connections shall be comprised of PVC DR 28 (or better) and shall be installed with bell and spigot gasketed joints, as per Township Standards.

2.5 Bulkheads

a. Sewers under construction shall be bulk-headed and sealed from the existing wastewater system, in such a manner as to prevent infiltration or flushing water entering the existing wastewater system during construction and prior to commissioning. Installation of bulkheads and their subsequent removal shall be at the developer's expense.

b. Approval for the removal of bulkheads from the sanitary sewer post commissioning and testing will not occur without the written consent of the Township's authorized representative. Any standing water within the plugged system will first be pumped out and removed to a proper disposal location.

Part 3 - Flow Performance Testing.

a. Sanitary sewer flow monitoring shall take place during a minimum eight-month period commencing in April, in such a manner as to capture any wet weather flows above the dry weather flow, at the following stages of construction:

   i. Immediately following the removal of bulkhead(s) and in conjunction with the first occupancy to the existing system, for a tributary catchment area or phase within the tributary catchment;

   ii. After 85 per cent occupancy is achieved for a tributary catchment area or phase within the tributary catchment;

   An owner/applicant may opt to maintain continuous flow monitoring throughout the development, at the owner/applicant's cost.

b. Flow monitoring shall continue for at least eight months, or until sufficient storm events are captured, and results reviewed, at the discretion of the Township and Region. The flow monitoring period could be extended at the discretion of the Township and Region if the data is, in the opinion of the Township and Region, insufficient or incomplete.

c. Flow monitors and equipment shall be installed, at a minimum, at the point of connection to the existing system, whenever possible, whereby at least 90 per cent of new development flow within a phase is captured. A flow monitoring plan must be submitted to the Township (Peer Reviewer) and Region as part of the Conformity Plan submission, including:

   - Flow monitoring locations
   - Type of flow monitoring equipment
   - Rain gauge locations

d. All flow data shall be collected and provided to the Township and Region on a minimum bi-weekly basis (or immediately if deemed necessary by the Township or Region) at no cost to the Township and Region for record. The Township and Region must have the right to use the data for purposes other than this application.

e. Approval of servicing performance for a phase in accordance with Part 5 of this appendix shall be at the discretion of Township and Region upon completion of the monitoring and inspection program and meeting the performance criteria to the satisfaction of Township and Region.

f. Exceptions and special conditions are applicable for Spine Services and Industrial/Commercial/Institutional and Multi-Residential Development Blocks. Refer to Part 10.

Part 4 - Rainfall Monitoring.

a. Rainfall gauges within two km of the flow monitoring locations shall be utilized to log rainfall data at a minimum of five-minute intervals for the entirety of the flow monitoring period. If there is no existing rainfall gauge within two km of the site, the developer shall install one at his/her expense.

b. Rainfall data produced by the local rain gauge, if installed by the Developer, shall be vetted against precipitation data records from Environment Canada.

Part 5 - Flow Monitoring Performance

Analysis and Results.

a. Flow monitoring data at a minimum of five-minute intervals shall be plotted against rainfall data such that the volume of extraneous flows is computed for each separate storm event, based on the contributing gross drainage area of the catchment. The effective area tributary to the flow monitoring locations to be as indicated in the Conformity Plan.

b. Maximum instantaneous RDII flow allowance shall be **0.107 L/s/ha, under a 25-year event** in the newly constructed sanitary sewer system. This shall be considered the Performance Limit. An extraneous flow less than the Performance Limit shall be deemed acceptable by the Township and Region.

c. A variation of this Performance Limit, in 5(b), can be considered acceptable at the mutual discretion of Township and Region. Should it not be deemed acceptable, the developer/builder shall repair the problem within a three-month period from the confirmation of performance results. The performance of the system will then be reassessed via flow monitoring prior to approval of the works by the Township and Region.

Part 6 - Inspection.

a. Township shall inspect all main sanitary sewer sections and maintenance hole installations and related work during all phases of the construction.

b. CCTV inspection of Sanitary Laterals – 100 per cent of private sanitary laterals shall be CCTV inspected from the main line to building face. Inspection equipment can be launched from either mainline or from building face, and after backfilling.

d. CCTV inspection of all sanitary mains and manholes will be performed in accordance with the Township requirements per OPSS.MUNI.409.

e. CCTV inspection work shall be carried out by certified and qualified Pipeline Assessment and Certification Program (PACP) / Manhole Assessment and Certification Program (MACP) trained operator(s) using established rating systems developed by the Water Resources Council (WRc).

f. Visual Inspection of Sanitary Maintenance Holes – All maintenance holes shall be visually inspected for leakage after assembly and backfilling. Any visible leaks shall be repaired, irrespective of any test results prior to the acceptance of the new works.

Part 7 - Testing Requirements.

7.1 General

If the test results are deemed not to be satisfactory, the test section shall be repaired at the developer's expense and retested until satisfactory results are obtained, and should generally follow the repair and testing process outlined in Attachment A of the Region's Inflow and Infiltration Reduction Standard for Sewers Servicing New Development (except where noted herein).

7.2 Maintenance Hole Testing

Installed chimney seals in sanitary maintenance holes shall be chimney seal tested, per Section 4.5 of the Region's Inflow and Infiltration Reduction Standard for Sewers Servicing New Development.

7.3 Sanitary Sewers and Service Laterals Testing

Gravity sanitary sewer pipes shall be cleaned and flushed with high pressure water blasting after construction and just prior to inspection and/or testing.

i. Mandrel deflection testing shall be performed on all Thermo-Plastic pipe sewer, per Section 2.7 of the Region's Inflow and Infiltration Reduction Standard for Sewers Servicing New Development.

ii. Low Pressure Air test shall be performed on all sewers and service laterals, per Section 2.3 of the Region's Infiltration Reduction Standard for Sewers Servicing New Development. **(overrule 2.3 - No exceptions)**

Part 8 - Submittals.

a. Test Reports – Test reports showing the sanitary works meets the performance requirements shall be submitted to the Township, including:

- Visual inspection of sanitary maintenance holes
- CCTV Inspection Report
- Chimney seal test results of maintenance holes, if applicable
- Mandrel deflection test results
- Low Pressure Air test results

b. Conformity Report(s) verified by a Peer Reviewer:

- I and I and Flow Monitoring Report
- CCTV Inspection Report

Part 9 - Approval of Servicing.

a. Acceptable performance of the servicing will be determined at the sole discretion of the Township through flow monitoring and achievement of performance criteria.

b. Flow monitoring and subsequent analysis of extraneous flows will be based on methodology approved and adopted by the Township.

Part 10 – Special Conditions.

10.1 Spine Servicing

Spine Servicing is defined as the installation of a trunk or arterial collection (Spine) sewer with no or relatively minimal laterals in advance of the local sewer system in a larger development. Upon initial completion, the Spine sewer would expect to experience no sanitary flow and solely extraneous flow since no occupancy would have occurred. In this scenario, the following exception would apply:

a. In lieu of the requirement stated in Part 3(a) and 3(b) above, monitoring shall occur for a minimum of twelve months commencing any time (instead of minimum eight months commencing April). The flow monitoring period could be extended at the discretion of the Township and Region if the data is, in the opinion of the Township and Region, insufficient or incomplete. Remainder of requirements stipulated in Part 3 would continue to apply.

10.2 Connection to a Downstream System Not Yet Accepted

a. If a downstream sanitary system, including the Spine sewer, requires, but has not received the Township and Region's acceptance to the Conformity Report, the Owner may choose to construct the upstream sewers at their own discretion. The Owner should acknowledge that connection to the downstream system will not be permitted. Watertight plugs/bulkheads must be installed to isolate flow. If the Owner chooses to proceed on this basis, a detailed work and contingency plan must be provided in the initial Program Conformity Plan. The work plan should include how infiltration flow and incidental flow resulting from construction activities and occupancies accumulated at the bulkheads will be pumped and removed from the system. It should be noted that based on Region's experience, flow accumulated at the end of the system may impact the flow monitoring results.

10.3 Industrial/Commercial/Institutional and Multi-Residential Development Blocks

For industrial, commercial, institutional, and multi-residential development blocks where the length of sanitary sewers and/or service laterals to be installed within the site is insignificant for extraneous flows as determined by the Township and the Region, flow performance requirements described herein do not apply. In lieu of flow monitoring and I&I performance limit verification requirements for such applications, the Owner will be required on all new sewer and/or service lateral works to conduct and pass without exception an "Exfiltration Test - Low Pressure Air" in accordance with Section 2.3 of the Region's Infiltration Reduction Standard for Sewers Servicing New Development (February 2022). Other relevant inspection and testing requirements described in

Section 2 of the Guideline, including CCTV inspection and Mandrel Deflection Testing will still apply.

Part 11 - Glossary.

Chimney – The cylindrical variable height portion of the maintenance hole structure used to support and adjust the finished grade of the maintenance hole frame. The chimney extends from the top of the corbel or cone to the base of the maintenance hole frame. The chimney includes the ring, concrete extensions, and moduloc/adjustment rings used to raise the maintenance hole. Maintenance hole covers are often disturbed during paving or as a result of traffic. The crack between the ring and cover can often be leaky. The intent of the chimney seal is to prevent inflow from the area beneath the rim of the maintenance hole.

Cone – The portion of the maintenance hole structure which slopes downward and outward from the bottom of the maintenance hole frame to the required barrel or diameter of the maintenance hole.

Cleanout – A fitting access in a drainage system or venting system that is installed to provide access for cleaning and inspection and that is provided with a readily replaceable airtight cover.

Extraneous Flow – Flow resulting from rainfall entering sanitary sewer systems via downspouts and/or illicit storm drain connections.

Part 12 - Referenced Design Standards, Guidelines and Manuals.

a. Ontario Ministry of the Environment. Design Guidelines for Sewage Works. 2008
b. Ontario Provincial Standard Specification. OPSS.MUNI.409 - Construction Specification for Closed-Circuit Television Inspection of Pipelines. November 2017
c. Ontario Provincial Standard Specification. OPSS.MUNI.410 - Construction Specification for Pipe Sewer Installation in Open Cut. November 2018
d. Water Research Centre (WRC). Manual of Sewer Condition Classification (3rd Edition). 1993.
e. York Region. Inflow and Infiltration Reduction Strategy. January 2011
f. York Region. Infiltration Reduction Standard for Sewers Servicing New Development (Formerly Sanitary Sewer System Inspection, Testing and Acceptance Guideline). February 2022
g. Township of King Design Criteria and Standard Detail Drawings (January 2019)

Appendix Two

Approved Waterpoofing Membrane Material

Manufacturer	**Warm Weather Membrane**	**Compatible Warm Weather Primer and Minimum Temperature Application**	**Cold Weather Membrane Product**	**Compatible Cold Weather Primer/Adhesive and Minimum Temperature Application**
GCP Applied Technologies	Bituthene 3000 (apply only in dry weather and air and surface temperatures above 5^{o} C)	Bituthene primer WP-3000 (in dry weather above 4^{o} C)	Bituthene low temperature membrane (apply only in dry weather and air and surface temperatures above -4^{o} C to 16^{o} C)	Bituthene adhesive primer B2 LVC (in dry weather above -4^{o} C)
Henry Company	Blueskin WP200	Bakor Aquatic Emulsion Primer(in dry weather and temperatures above -4^{o} C)	Blueskin WP200	Bakor Hi-Tac Construction Adhesive and Primer or Blueskin Adhesive (in dry weather and temperatures above -12^{o} C)
Soprema	Colphene 3000 Summer Grade (apply in dry weather and air and surface temperatures 10^{o} C to 50^{o} C)	Elastocol Stick H_2O (minimum temperature application -4^{o} C)	Colphene 3000 Winter Grade (apply in dry weather and air and surface temperatures -10^{o} C to 10^{o} C)	Elastocol Stick Zero (temperatures above -10^{o} C), SopraSeal Stick Primer (temperatures above -30^{o} C)
WR Meadows	MEL-ROL (in dry weather and temperatures above 4^{o} C)	MEL-PRIME WB (in dry weather and temperatures above 4^{o} C)	MEL-ROL LOW TEMP (Canada) (apply in dry weather and air and surface temperatures -7^{o} C to 16^{o} C)	MEL-PRIME (in dry weather and temperatures above -17.8^{o} C)