

# **REGION OF PEEL**

## **PUBLIC WORKS DESIGN, SPECIFICATIONS & PROCEDURES MANUAL**

### **LINEAR INFRASTRUCTURE**

#### **Functional Servicing and Storm Water Management Report**

PUBLIC WORKS  
FUNCTIONAL SERVICING AND STORM WATER MANAGEMENT REPORT

TABLE OF CONTENTS

<b>1. INTRODUCTION .....</b>	<b>1</b>
<b>2. OBJECTIVES AND RATIONALE .....</b>	<b>1</b>
<b>2.1 FUNCTIONAL SERVICING REPORT .....</b>	<b>1</b>
<b>2.2 STORM WATER MANAGEMENT REPORT .....</b>	<b>1</b>
<b>3. WATER DEMANDS.....</b>	<b>3</b>
<b>4. SANITARY SEWER EFFLUENT.....</b>	<b>4</b>
<b>5. REPORT REQUIREMENTS .....</b>	<b>5</b>
<b>5.1 FUNCTIONAL SERVICING REPORT .....</b>	<b>5</b>
<b>5.1.1 WATER .....</b>	<b>5</b>
<b>5.1.2 WASTEWATER.....</b>	<b>6</b>
<b>5.2 STORM WATER MANAGEMENT REPORT .....</b>	<b>7</b>

## **1.0 Introduction**

The following is meant as a guide for preparing and reviewing Functional Servicing Reports (FSR) and Storm Water Management Reports (SWMR) in the Region of Peel. Details and requirements of any analysis will vary based on the proposed land use, development size and location and what if any studies have previously been completed.

Regional municipal services are to be designed in conformance with the Region's current "Public Works (PW) Design, Specifications & Procedures Manual". All plans and reports are to be reviewed by the Region prior to construction of services. Such clearance shall not relieve the designer from primary responsibility for the design to meet all Federal, Provincial, Regional and Local Municipal requirements and/or codes. Please refer to the Watermain Design Criteria, Sanitary Sewer Design Criteria and Storm Water Design Criteria of the manual for additional information.

## **2.0 Objectives and Rationale**

### **2.1 Functional Servicing Report**

The objective of an FSR is to demonstrate the adequacy of the existing and proposed water and sanitary sewer systems to satisfy the demands of a proposed development. FSRs are required when there is potential for any detrimental impact to the Region's existing infrastructure or current customers.

### **2.2 Storm Water Management Report**

The objective of a SWMR is to evaluate the effects of a proposed development on the storm water drainage pattern, available capacity and how to manage rainwater/snowmelt. The report should be consistent with the Region's and local municipalities' design criteria and with conservation authority, provincial and federal regulations.

- Post-development flows must not exceed pre development flows. These flows should be approved by the Region as well as the process used to determine them.
- The Region of Peel is only responsible for SWM where drainage is intercepted by a Regional Road. Storm sewers and ditches located within Regional roads are generally designed to convey flows generated within the road right-of-way. Therefore, directing runoff from private lands or new developments to the local municipality's system should be pursued prior to proposing draining to the Regional system. Drainage from development to the Regional system shall only be permitted if there is no viable means of

directing drainage to the local municipality's system and it can be clearly demonstrated that the regional system has sufficient excess capacity.

- Methods of quantity and quality control shall be based on established storm water best management practices. Typical storm water storage methods include but are not limited to parking lot storage, rooftop storage, SWM ponds and oversized infrastructure.
- Drainage of storm water to adjacent tributaries shall be avoided.

### 3.0 Water Demands



Water demands are to be calculated using the current Public Works Design, Specifications & Procedures Manual, specifically the Watermain Design Criteria section. The following are some general requirements taken from the aforementioned section to consider when preparing a FSR and should be considered as a minimum.

Table #1

Population Type	Unit	Avg. Consumption Rate	Max Day Factor	Peak Hour Factor
Residential	L/cap • d	280	2.0	3.0
ICI	L/Employee • d	300	1.4	3.0

ICI = Industrial, Commercial or Institutional

Custom demands for larger volume consumers or those with exceptional peak demands require special considerations regarding flow calculations. Each case will be reviewed on an individual basis. The developer/consultant is to use development-specific ICI demands wherever possible.

It has been noted that some new development can generate higher water requirements. Factors for this elevated water use include additional lawn watering for new sod and changes in water use patterns. Table #2 states the potential short term water demand criteria for new development. However, over the long term, the Region expects that water use would ultimately be reduced through water conservation programs and other potential factor including rates. As such, for the purpose of projecting long term water requirements, the water demand criteria in Table #1 should be used.

Table #2 – Potential short term water demand criteria for new development

Population Type	Unit	Avg. Consumption Rate	Max Day Factor	Peak Hour Factor
Residential	L/cap • d	409	2.0	3.0
ICI	L/Employee • d	300	2.0	3.0

#### 4.0 Sanitary Sewer Effluent



Sanitary sewer effluent is to be calculated using the current Public Works Design, Specifications & Procedures Manual, specifically the Sanitary Sewer Design Criteria section. The following are some general requirements to consider when preparing a FSR.

- Domestic sewage flows are based upon a unit sewage flow of 302.8 L/cap•d
- Domestic sewage flow for less than 1,000 persons shall be 0.013 m<sup>3</sup>/sec.
- Population equivalent densities are to be calculated based upon the following criteria:

<b>Density</b>	<b>Pop./Hectare</b>
Single family (greater than 10 m lots)	50 persons/hectare
Single family (less than 10 m lots)	70 persons/hectare
Semi-detached	70 persons/hectare
Row dwellings/Townhouses	175 persons/hectare
Apartments/Highrise	475 persons/hectare

- For apartments, if the proposed population equivalent is greater than 475 persons/hectare, based on a rate of 2.7 people per unit (ppu), then the calculated population equivalent shall be used for design.

$$\frac{2.7 \text{ ppu} \times (\# \text{ units})}{\text{area}} = \text{persons/hectare}$$

- For light industrial areas, use an equivalent population of 70 persons/hectare. Individual studies are to be made for special industries and major industrial areas.
- For commercial areas, use an equivalent population of 50 persons/hectare. Individual studies are to be made for infill commercial development, redevelopment, land use intensification and areas where the equivalent population will be greater than 50 persons/hectare.
- For Peak Dry Weather Flows use Harmon's Peaking Factor formula

$$M=1+14/(4+P^{0.5})$$

Where P = Population equivalent in '000s). However, the maximum and minimum value of Harmon's Peaking Factor to be used for sanitary flows calculation should range between 4 and 2.

## **5.0 Report Requirements**

### **5.1 Functional Servicing Report**

The Functional Servicing Report shall include, but may not be limited to, the following:

- Location map and description of the subject property;
- Description of proposed development;
- (Removed “Define”) External/future development requirements for municipal water and wastewater services;
- Illustration showing the proposed development, existing and proposed infrastructure and proposed servicing connection points and diameter for water, sanitary sewer (including identification of the connection manhole and storm sewer (if adjacent to a Regional road)
- Rationale behind the proposed servicing plan and additional significant issues relevant to the development (i.e., high population densities, expected occupancy schedule)
- Originally allocated population densities for developed areas
- Completed Region of Peel sanitary sewer design sheet (refer to Standard Drawing 2-5-1)
- External Sanitary Sewer Drainage Plan;
- Calculations for sanitary sewer effluent;
- Calculations for domestic water demand;
- Calculations for fire flow requirements;
- Hydrant flow test(s);
- Signature and stamp of a Professional Engineer.

Every FSR should include a section titled “Design Basis” summarizing the assumptions used in the analysis.

#### **5.1.1 Water**

The details included in a FSR will depend on the type and scale of development.

The extent of an FSR should include, but may not be limited to, an examination of the development impacts on water treatment, pumping, storage, transmission and distribution watermains. The FSR shall include, but may not be limited to, the following:

- Average day, maximum day and peak hour demand for the ultimate site or development requirements.
- Analysis of “maximum day plus fire flow” and “peak hour demand” conditions for the current and 2031 scenarios.

- Identification of capital improvements, if required, for the current and year 2031 scenarios to meet the Region's design criteria and the MOE design guidelines for water distribution systems.
- Analysis of recorded nominal pressure ranges experienced in the distribution supply mains and comparative anticipated maximum and minimum pressures to be experienced within the proposed service area during periods of maximum and minimum flows.
- Analysis of pumping capacity and storage requirements for the appropriate pumping station(s) to meet the development's demands for the current and year 2031 scenarios (where required, as instructed by Project Manager or designate).

The following questions should also be addressed:

- What is the total equivalent population to be serviced within the development and total lands to be serviced?
- What pressure zones will service the development and what parts are serviced by each zone? The servicing scheme should incorporate full looping of the water systems within each zone and any permanent pressure reducing valves at the pressure zone boundaries.
- Designation of lands external to the development which are to be serviced through the internal development infrastructure.
- How does proposed servicing of the development blend with Peel's long-term and permanent infrastructure (needs and benefits, capital costs, operation and maintenance costs, financial responsibilities)?
- Is there the potential for higher short term water demand for the new development?

### **5.1.2 Wastewater**

The details included in a FSR will depend on the type and scale of development. The extent of the FSR should include, but may not be limited to, details of the following:

- Any assumption used to reach a conclusion must be clearly outlined;
- Any deviation from the Public Works Design, Specification & Procedures Manual should be clearly referred to the authority accommodating such deviation;
- The FSR should illustrate how it conforms to current and future Regional infrastructure planning initiatives;
- Where the servicing strategy deviates from Regional infrastructure planning, the FSR should identify the benefits to the Regional system in terms of costs and servicing;



- The FSR should take into account the drainage scheme for the external lands.
- The need for any ancillary wastewater pumping stations shall be examined and, if required, shall comply with associated Region of Peel standards.

## **5.2 Storm Water Management Report**

For a SWMR to be considered complete, it shall include, but may not be limited to, the following:

- Site Plan of the subject property which includes property area, pavement areas and building areas
- Property description;
- Pre and Post development drainage plans including flood lines and overland flow routes;
- Schematic layout of proposed and existing site services;
- Schematic layout of the sub-watershed showing the main watercourse, tributaries and outfall locations;
- Run-off coefficients
- Summary table illustrating Pre- and Post-development flows for 2-year to 100-year storms including supporting calculations;
- A clause stating that "Post-development flows must be equal to or less than Pre-development flows";
- Signature and stamp of a Professional Engineer.
- Description of storm water management technique being used to maintain pre-development flows