

## **Sanitary Servicing Study Guidelines**

### **1.0 Objectives and Rationale**

The objective of a Sanitary Servicing Study (SSS) is to demonstrate the adequacy of the existing and proposed sanitary sewer systems to satisfy the demands of a proposed development or redevelopment.

### **1.1 System Analysis Requirements**

For residential and ICI redevelopments that will increase the density of a parcel or development area to more than 55 persons per hectare (ppha) and will be discharging a minimum of 1 litre per second, Water Resources may require an SSS using the method outlined below to ensure that there is sufficient system capacity. Water Resources requires both the average dry weather flow and the peak wet weather flow. This report will typically be requested during the Development Permit or Outline Plan process with approval required prior to release of the Development Permit or approval of the Outline Plan.

The study must include both the existing and redevelopment design flow calculations unless the proposed development is within the Centre City Plan Area boundary. To calculate the existing flow the entire catchment area should be assumed to have a density of 55 ppha. A figure illustrating the Centre City Plan Area can be found in Attachment 1.

The analysis of the existing sanitary system must be completed up to the nearest 375mm sanitary sewer pipe. Water Resources will evaluate the infrastructure downstream of this point for any further impacts.

In the West Memorial Sanitary Trunk Catchment impacted area (Attachment 2), when a use is replaced by a new use, and it can be demonstrated to the satisfaction of Water Resources that the new development will not contribute additional net flow to the sanitary system, the application for the replacement use can be approved. In order for Water Resources to evaluate the impact of sanitary flow from a development site, a sanitary study must be submitted. This study needs to identify the average dry weather flow and peak wet weather flow discharge from the proposed development and existing development. This information may be required in this catchment even if the density is not above 55 ppha or the discharge is less than 1 litre/sec. Analysis of the downstream system beyond the connection to the public sanitary main is not required in this catchment.

If a proponent can demonstrate that the proposed development generates sanitary flows that do not adversely impact the West Memorial Sanitary Trunk, that application can be approved. In order for Water Resources to evaluate the impact of sanitary flow from a development site, a sanitary study must be submitted.

In the particular circumstance where one single-detached dwelling is replaced with two single-detached dwellings, a duplex or a semi-detached dwelling (two units), it has been determined that the development does not materially change the risks of basement flooding in the catchment and this type of development may be allowed. A sanitary servicing study is not required for this development.

## **1.2 Design Parameters**

The following parameters shall be used in the design or evaluation of the sanitary sewer system for most developments. The values recommended in this guideline may not be applied to high water consumption land uses such as hospitals, heavy industry, meat packing plants, breweries, etc. Detailed analysis of the design requirements specific to each development proposal is required in such cases.

### **1.2.1 Design Population**

The design population should be based on 55 ppha for residential, industrial, commercial and institutional developments unless actual or planned densities are greater. Established industrial developments may use actual employment data if available.

### **1.2.2 Average Dry Weather Flow**

The average dry weather flow (ADWF) shall be based on the requirements below dependant on the development type.

#### **1.2.2.1 Residential**

For design purposes, the year round average per capita daily dry weather sewage flow for residential developments in the City of Calgary is 380 litres.

#### **1.2.2.2 Commercial / Institutional**

For most commercial or institutional developments the sewage flow shall be estimated using a per capita daily flow rate of 230 litres.

Commercial and institutional developments that generate above normal flows will be required to provide additional details and estimate the discharge rates in accordance to the proposed development.

#### **1.2.2.3 Industrial**

Average daily sewage flows for most established industrial developments shall be based on 230 litres per employee.

Average daily sewage flows for most new industrial developments shall be based on 230 lpcd with a density of 55 ppha.

Industrial developments that generate above normal flows will be required to provide additional details to more accurately predict proposed discharge rates.

### 1.2.3 Peaking Factors

The peaking factor is the ratio of peak dry weather flow to the average dry weather flow. Peak sanitary sewage flow calculations must be provided in addition to average daily flows for residential, industrial, commercial and institutional developments. Peak flows shall be calculated as follows:

$$Q_{pdw} = (G \times P \times P_f) / 86.4$$

Where:  $Q_{pdw}$  = the peak dry weather flow (litre/sec)

G = the per capita average daily design flow (litres/day/person)

P = the design contributing population in thousands

$P_f$  = Harmon's Peaking Factor =  $1 + 14/(4 + P^{0.5})$  but not less than 2.5

### 1.2.4 Infiltration / Inflow

Design flows shall include an allowance of 0.28 litre/sec/ha to account for groundwater infiltration and system inflows (I&I).

### 1.2.5 Peak Wet Weather Flow

$$\text{Peak Wet Weather Flow (PWWF)} = \text{ADWF} \times P_f + \text{I\&I}$$

### 1.2.6 Sanitary Sewer Design Flow

Sanitary sewers shall be designed such that the PWWF does not exceed 86% of the sewer capacity.

Additional details on recent changes to City of Calgary sanitary sewer designs including minimum flushing velocities can be found at:

[http://www.calgary.ca/PDA/DBA/Documents/urban\\_development/publications/DGSS-Addendum-2011-03-31.pdf](http://www.calgary.ca/PDA/DBA/Documents/urban_development/publications/DGSS-Addendum-2011-03-31.pdf)

## **2.0 Report Requirements**

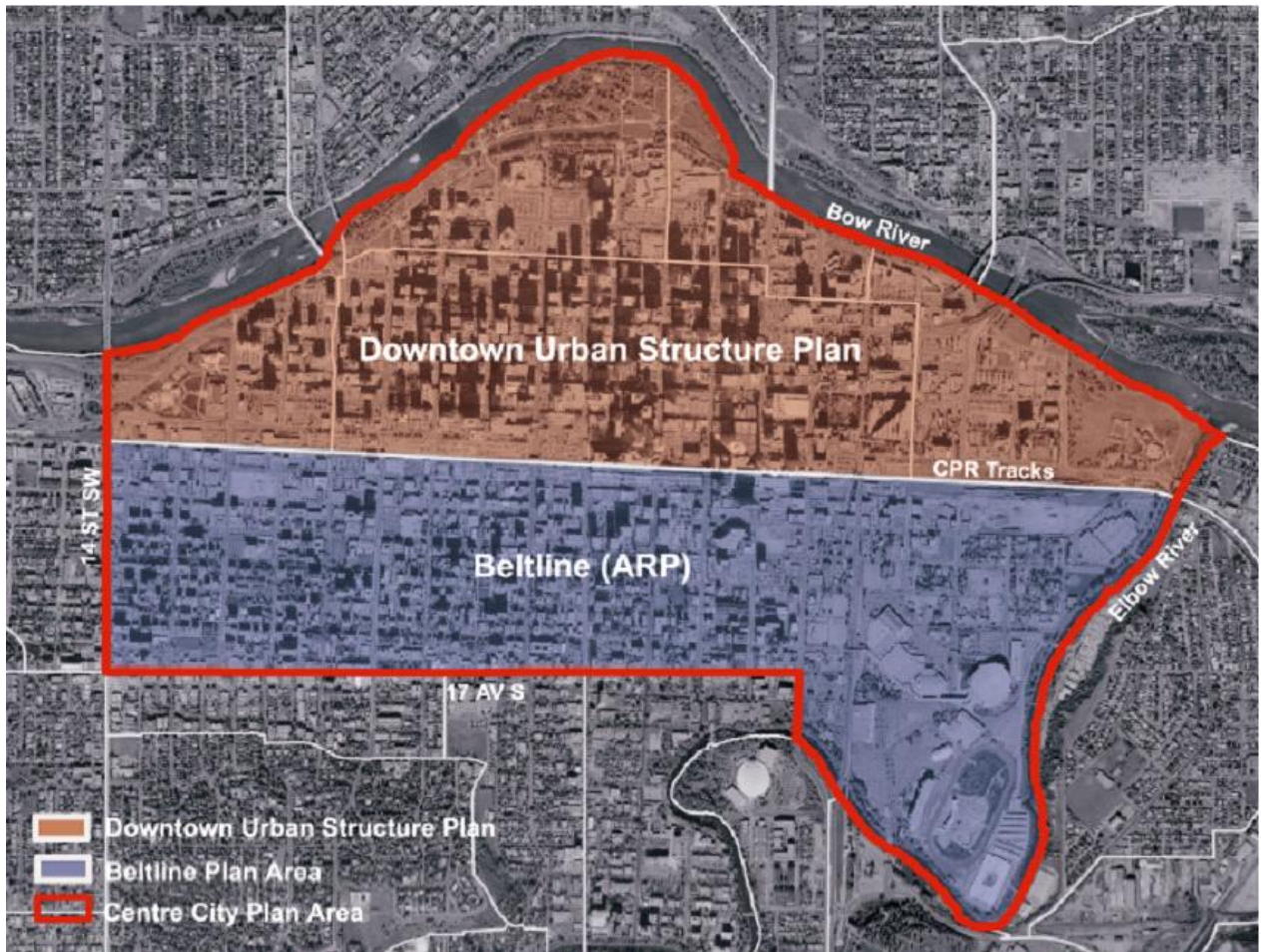
The Sanitary Servicing Study shall include, but may not be limited to, the following:

- Location map and description of the subject property;
- Description of the proposed development and development land use;
- Plan showing the proposed development, existing and proposed infrastructure, upstream catchment area and proposed service connection point and diameter;
- Calculations of design flow parameters detailed in section 1.2 and a comparison with existing flows
- Rationale behind the proposed servicing plan and additional significant issues relevant to the development (ie., high population densities, expected schedule and phasing of development)
- Provincial Permit to Practice Number
- Signature and stamp of a Professional Engineer

## **2.1 Submission Requirements**

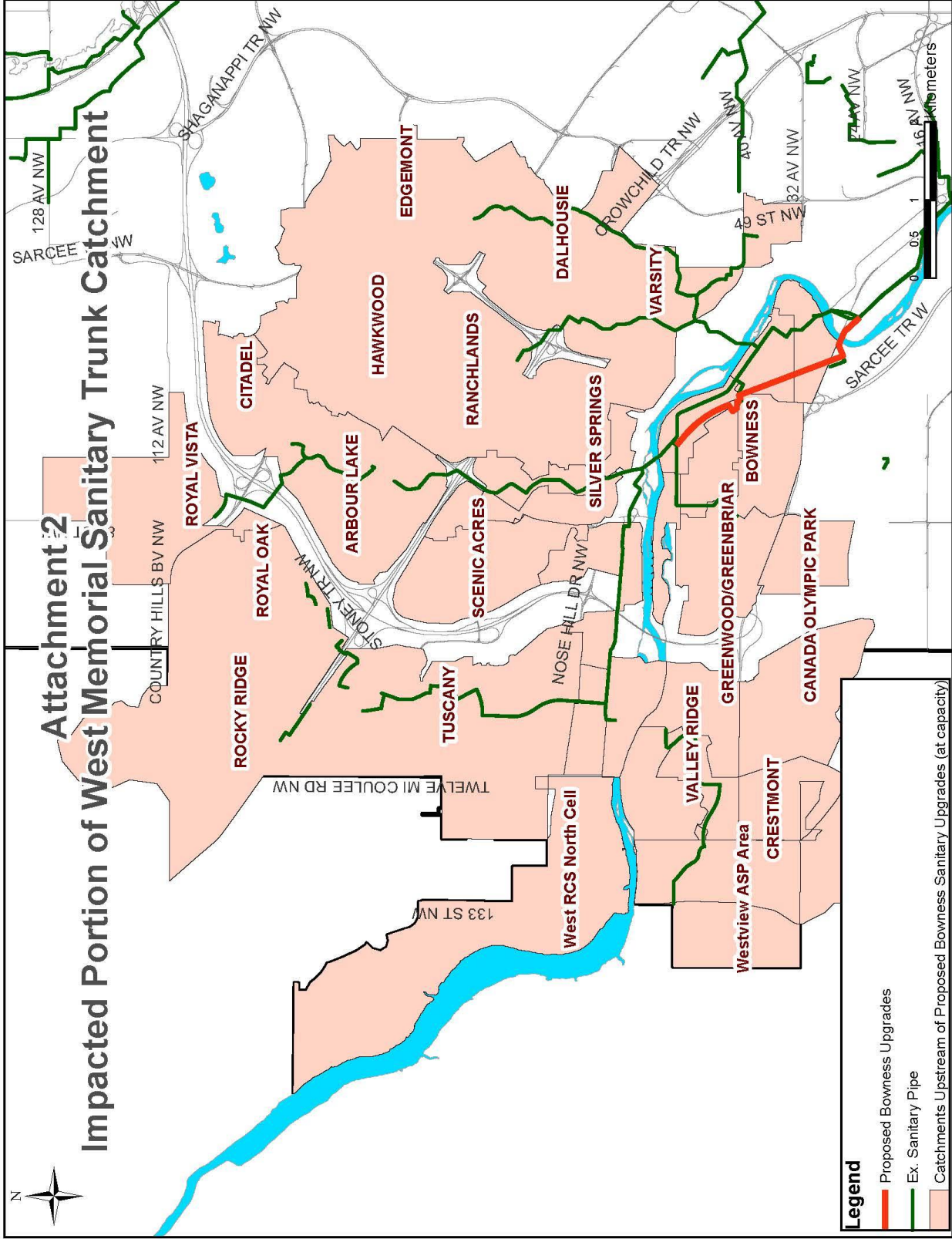
- Two copies of the Sanitary Servicing Study are required

# Attachment 1



## Attachment 2

# Attachment 2 Impacted Portion of West Memorial Sanitary Trunk Catchment



**Legend**

- Proposed Bowness Upgrades
- Ex. Sanitary Pipe
- Catchments Upstream of Proposed Bowness Sanitary Upgrades (at capacity)