

**CITY OF WHITEHORSE SERVICING STANDARDS MANUAL  
SECTION 2 - CONSTRUCTION DESIGN CRITERIA  
SUB-SECTION 2.5 - STORM DRAINS**

---

**Table of Contents**

2.5.1	Design Factors	2.5 - 2
2.5.2	Storm Sewer Main Materials	2.5 - 2
2.5.2.1	Sewer Mains	2.5 - 2
2.5.2.2	Manholes	2.5 - 3
2.5.2.3	Catch Basins	2.5 - 3
2.5.3	Storm Sewer Main Installation and Location	2.5 - 4
2.5.4	Outfall Structures	2.5 - 4
2.5.5	Manhole Installation and Location	2.5 - 4
2.5.6	Trenching and Backfilling	2.5 - 4
2.5.7	Inspection and Testing	2.5 - 4

**CITY OF WHITEHORSE SERVICING STANDARDS MANUAL**  
**SECTION 2 - CONSTRUCTION DESIGN CRITERIA**  
**SUB-SECTION 2.5 - STORM DRAINS**

---

**2.5.1 DESIGN FACTORS**

Storm sewers shall be designed as a separate system and shall be of sufficient capacity to carry storm sewer runoff. The following criteria shall be used in the design of the storm sewer system.

The Rational Method of storm sewer:

$$Q = \frac{CIA}{360}$$

Where Q = the quantity of runoff in cubic metres per second

I = the intensity of rainfall in millimetres per hour

A = the contribution area in hectares

C = the runoff coefficient

The five-year rainfall intensity table for the City shall be used for minor storm sewers and a 100-year rainfall intensity table shall be used for major storm sewers and overall drainage systems. Duration time shall equal inlet time plus flow time.

The following runoff coefficients shall be used with a maximum inlet time of 15 minutes:

- Open space                      0.15
- Residential                      0.35
- Industrial                        0.70
- Commercial                    0.70
- Multiple Family                0.70
- Pavement                        0.90

The minimum velocity shall be 1m/s. Where velocities in excess of 3m/s are attained, special provisions shall be made to protect against displacement by erosion or impact.

Pipe sizing shall be determined by using Manning's Formula. The Rational method is to be used for areas less than 10 hectares. A computer model is to be used in areas greater than 10 Ha. A maximum Manning's "n" of 0.013 for smooth walled storm pipe and "n" of 0.016 for concrete gutters and paved roads is to be used.

**2.5.2 STORM SEWER MAIN MATERIALS**

**2.5.2.1 SEWER MAINS**

Storm sewer mains shall be a minimum of 300 mm in diameter. Storm sewer main pipe shall conform to:

<b>MATERIAL</b>	<b>STANDARD</b>
Non-reinforced concrete pipe	ASTM C14, Class 3
Reinforced concrete pipe	ASTM C76 / D655
CSP Ultraflow 2.0 mm	CSPI No. 501-M
HDPE	CGSB 41-GP-25M
Weholite Pipe	ASTM D1505

**CITY OF WHITEHORSE SERVICING STANDARDS MANUAL**  
**SECTION 2 - CONSTRUCTION DESIGN CRITERIA**  
**SUB-SECTION 2.5 - STORM DRAINS**

---

Pipe classes shall be determined to withstand subsequent superimposed loadings.

Factors affecting the pipe class shall be taken into account, and the pipe class shall be evaluated as per standard engineering practice.

### **2.5.2.2 MANHOLES**

Manholes shall be concrete as specified in Section 2.4.4. Floating manhole frames shall be used in all paved roadways.

Weholite may be used for Storm Manholes.

### **2.5.2.3 CATCH BASINS**

Catch basin barrels with precast base and precast slab top shall be:

- 600 ID pipe barrel conforming to ASTM C478;
- 900 ID pipe barrel conforming to ASTM C478;
- 1,200 ID pipe barrel conforming to ASTM C478.

Catch basin manholes shall be in accordance with the standard drawings in Section 4.

Weholite and Armtex CSP may be used for Catch basins providing they meet all requirements listed in this section.

Catch basin manholes shall be used only at the beginning of the storm main, or place of a catch basin when the lead exceeds 30m.

On commercial sites where roof leaders are tied into the storm drainage system, they shall not be connected to a catch basin or catch basin manhole, but shall be connected directly to a storm manhole or to the storm main through a storm service line.

Catch basin frames and covers shall be:

- Top-inlet, standard round-top catch basins as manufactured by Norwood Foundry or Dobney Foundry as detailed in Section 4
- Standard side inlet for 190 mm straight- face curb and gutter equal to Norwood F36 or Dobney Foundry B36
- Standard side inlet for rolled curb and gutter equal to Norwood F33, or Dobney Foundry B40
- Standard frame, grate and side inlet for use with 900 mm barrel equal to Norwood F33A, or Dobney Foundry B51

The minimum size of catch basin lead shall be 300 mm diameter.

The minimum grade on a catch basin lead shall be 1.0%.

**CITY OF WHITEHORSE SERVICING STANDARDS MANUAL**  
**SECTION 2 - CONSTRUCTION DESIGN CRITERIA**  
**SUB-SECTION 2.5 - STORM DRAINS**

---

The maximum length of a catch basin lead shall be 30 m.

If a lead of over 30 m in length is required, a catch basin manhole shall be installed at the end.

Catch basin leads shall be concrete and shall conform to Section 2.5.2.1.

**2.5.3 STORM SEWER MAIN INSTALLATION AND LOCATION**

Mains shall be installed to provide a minimum depth of cover of 1.2 m below final finished grade at the surface.

Mains shall be located within the road right-of-way in accordance with the standard drawings in Section 4.

Mains shall be located a minimum of 3.0 m from proposed curb or property line unless approved by the Engineer.

Pipe bedding shall be provided for all mains in accordance with the standard drawings in Section 4.

**2.5.4 OUTFALL STRUCTURES**

Concrete pipe shall be used for any outfall structure larger than 600 mm in diameter. For pipe diameters less than 600 mm, CSP will be allowed.

Precast outfall structures shall be protected from erosion by riprap or other suitable means. Riprap shall be sized and placed in accordance with the standard drawings in Section 4.

Where an outfall is placed in an existing watercourse, sluice gates shall be installed.

**2.5.5 MANHOLE INSTALLATION AND LOCATION**

Refer to Section 2.4.4 & 2.4.6.

**2.5.6 TRENCHING AND BACKFILLING**

Refer to Section 2.4.7

**2.5.7 INSPECTION AND TESTING**

Refer to Section 2.4.8