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.01 CONCRETE PIPE

.01.01 General

This specification covers the material requirements for circular concrete pipe to be used for the conveyance of storm water and sewage. All pipe materials shall meet the requirements of OPSS 1301, OPSS.MUNI 1820, this specification and be selected from the Approved Sewer Products List.

All pipe supplied shall be from a plant listed as Prequalified under the Plant Prequalification Program by the Ontario Concrete Pipe Association.

.01.02 Classes and Uses of Concrete Pipe

The classes of concrete pipe specified for various construction applications are outlined as follows:

- a) Reinforced Concrete Pipe:
ASTM Designation C-76, Class III, or CSA A257.2, 65-D
- b) Reinforced Concrete Pipe:
ASTM Designation C-76, Class IV, or CSA A257.2, 100-D
- c) Reinforced Concrete Pipe:
ASTM Designation C-76, Class V, or CSA A257.2, 140-D

Reinforced concrete pipe shall be used for the construction of storm sewers, manhole channels, and inlet chamber drains which require pipe with an internal diameter of 300mm and larger.

.01.03 Sulphate Resistant Portland Cement

Portland cement used in the manufacture of concrete pipe shall be Type HS High Sulphate Resistant and meet the requirements of OPSS 1301. The type of cementing materials used shall be marked on each pipe in accordance with OPSS 1301.07.02.

.01.04 Inspection and Testing

Pipe manufacturers shall provide the City all reasonable facilities to permit the City representative to verify that the pipe conforms to the City's specification.

The pipe manufacturer shall provide the required test specimens, labour and testing equipment required to satisfy the City that the proposed pipe materials meets the specification.

The costs of all testing shall be at the expense of the pipe supplier and/or manufacturer.

.02 CLAY PIPE

.02.01 General

This specification covers the material requirements for circular clay pipe to be used for the conveyance of storm water, sewage, and industrial waste.

.02.02 Classes and Uses of Clay Pipe

Extra strength clay pipe shall be used for the construction of the following installations:

- a) Storm sewers, sanitary sewers and manhole channels up to and including pipe with an internal diameter of 600mm.
- b) Inlet chamber drains up to and including pipe with an internal diameter of 600mm, and inlet chamber drain risers up to and including pipe with an internal diameter of 250mm.
- c) Private sanitary drains and private sanitary drain risers for pipe with an internal diameter up to and including 250mm.
- d) Catch basin drains, catch basin drain risers, and manhole drop pipes for pipe up to and including an internal diameter of 250mm.

.02.03 Inspection and Testing

Pipe manufacturers shall provide the City all reasonable facilities to permit the City's representative to verify that the pipe conforms to the City's specification. The pipe manufacturer shall provide the required test specimens, labour, and testing equipment and machines to meet the quality assurance conditions of the City.

The costs of all testing shall be at the expense of the pipe supplier and/or manufacturer.

.03 PVC PIPE

.03.01 General

This specification covers the material requirements for circular PVC pipe to be used for the conveyance of storm water and sewage. All pipe materials shall meet the requirements of OPSS 1841, this specification and be selected from the Approved Sewer Products List, latest edition.

.03.02 Classes and Uses of PVC Pipe

The Standard Dimension Ratio (SDR) is the ratio of the average pipe diameter to the minimum wall thickness. The specified SDR values for main sewers and private drain laterals are as follows:

- a) SDR 35 for main sewer installations with a pipe diameter of 200mm up to and including 600mm.
- b) SDR 28 for private drains and laterals.
- c) Profile or Ribbed pipe is not accepted.

.03.03 Inspection and Testing

Pipe manufacturers shall provide the City all reasonable facilities to permit the City's representative to verify that the pipe conforms to the City's specification. The pipe manufacturer shall provide the required test specimens, labour, and testing equipment and machines to meet the quality assurance conditions of the City.

The costs of all testing shall be at the expense of the pipe supplier and/or manufacturer.

.03.03.01 Pipe Stiffness

The pipe stiffness shall be determined at 5 % deflection according to ASTM D2412. The minimum pipe stiffness requirements for SDR values of 35 and 28 shall be 50 and 100 respectively.

.03.03.02 Internal Hydrostatic Pressure

A typical joint assembly shall be subjected to an internal pressure of 74 kPa for 10 minutes without leakage.

.03.03.03 Internal Vacuum

A typical joint assembly shall be subjected to an internal vacuum of 74 kPa for 10 minutes without leakage.

.05 BEDDING AND BACKFILL OF SEWERS

.05.01 General

Bedding and backfill shall be conducted in accordance with the depths and widths specified on the standard drawings and/or on the Contract Drawings.

OPSS.MUNI 401.07.10 is revised by the following:

.05.02 Bedding

Bedding shall be Granular 'A' material conforming to Form 600, placed in accordance with SEW-300, SEW-301 and SEW-302. Granular 'A' bedding material shall extend to a minimum of 300mm above the top of pipe.

Granular 'A' bedding material shall be compacted in accordance with Form 900. Bedding shall be shaped and compacted adequately to support pipe barrel and bells as required.

.05.03 Backfill

Unless otherwise specified on the Contract Drawings or documents, trenches may be backfilled with select, approved native excavated earth materials from trenches. Where these materials are unavailable or deemed to be unsuitable, granular backfill shall be used.

Where Granular backfill is used, it shall be Granular "A" or "B" Type II, shall conform to Form 600 and shall be compacted in accordance with Form 900.

The use of unshrinkable fill shall be employed where normal means cannot produce the required compaction of the material.

.06 CCTV SEWER INSPECTION

.06.01 CCTV Reports and Submittals

The Contractor shall submit the following once all inspections are complete:

- a) A printed inspection report, including an index for each inspection, and detailed records for every inspection performed
- b) A PDF version of the printed report
- c) Electronic media generated during inspection arranged and identified in a manner that facilitates referencing to each inspection record
- d) A database as specified in Form 500.06.04 Data Format

The Contractor is required to keep a record of all inspection material for the duration of the maintenance period, or a minimum of 3 years from the date of inspection.

.06.02 Inspection Related Instructions

The Contractor will be held responsible for damage to street surfaces, curbs, gutters, existing utilities, etc. that result from their negligence during any inspection.

The Contractor shall repair, at their cost, any damage resulting there from, which shall be subject to approval, by the City.

The Contractor will be required to inspect all sewers without disturbing the existing condition of the sewer. Should the Contractor decide to use a stringing method to inspect the sewer, the stringing lines shall not be left in the sewer for more than five days or without consent of the Project Manager.

All obstructions, cracks, irregularities must be fully inspected and documented. The Contractor must inform the City's representative immediately of any obstruction encountered, locations of hazardous atmosphere, or sewers that are in immediate danger of structural failure while the inspection is still in progress. Where possible, the survey shall be reversed so that the extent of the blockage can be assessed.

The Contractor, under the supervision of the Project Manager, or their representative, may install plugs in the sewers to prevent the flow of sewage during inspection for a period of no longer than 10 minutes. The plugs must then be removed for a minimum of 10 minutes after which time they may be installed again for the period stated above. Plugs shall only be installed when and for the time period directed by the Project Manager where the existing flow hinders a proper inspection.

.06.03 Occupational Health and Safety – Confined Space Entry

The Contractor shall ensure that all aspects of the required work are, at all times, in full and complete compliance with the Occupational Health and Safety Act, as amended.

The Contractor shall provide approved equipment and training to personnel who enter confined spaces as may be required on this project. The procedures the Contractor follows for Confined Space Entry must meet or exceed the requirements outlined by the Occupational Health and Safety Act.

.06.04 Data Format

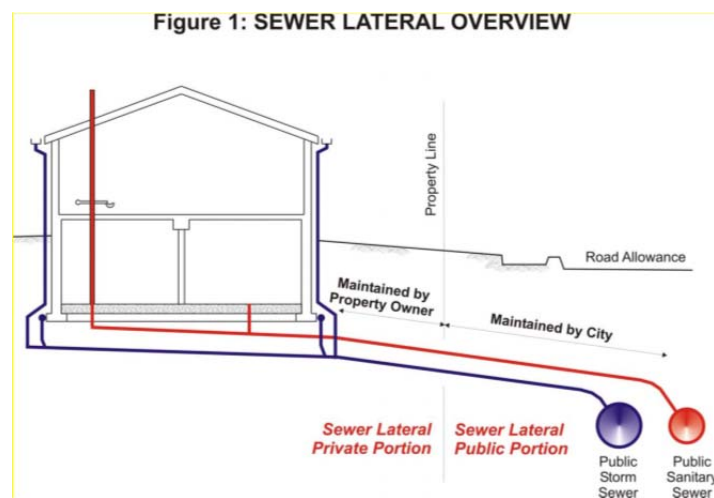
Data structure shall be as specified in the latest NASSCO standard for mainline, manhole, or lateral inspection.

Database file shall be in Microsoft Access format.

Key fields issued by the City to identify inspection records and assets shall be used during inspection and be included in the database inspection records.

.06.05 Lateral Inspection and Asset Inventory

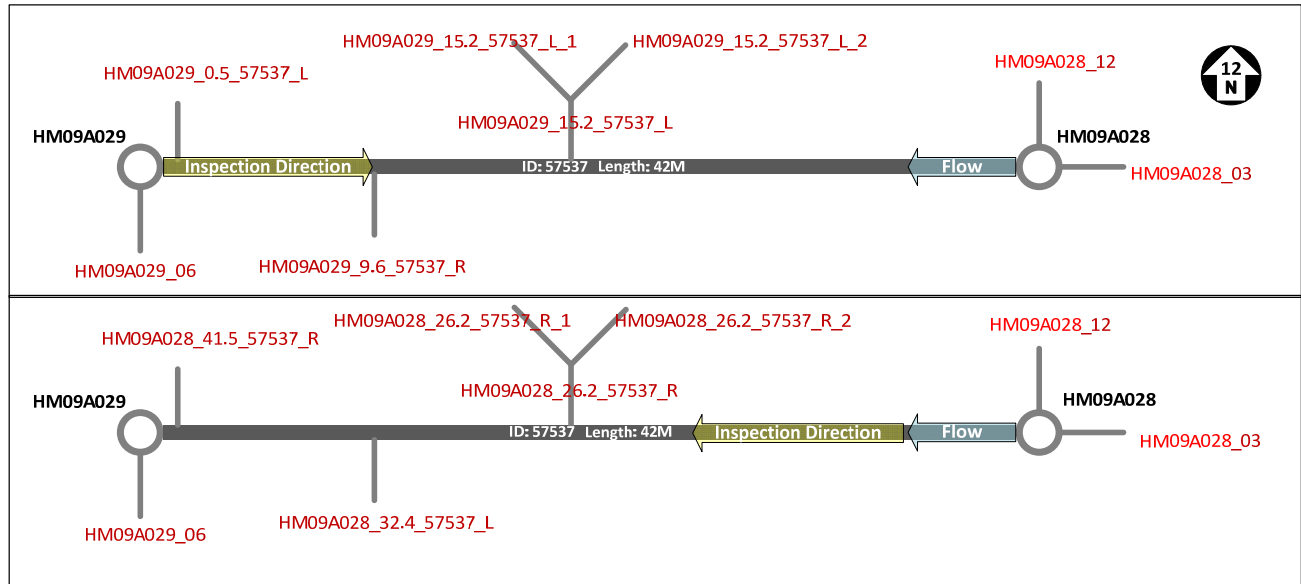
A Sewer Lateral-Private Portion refers to the drain pipe extending from a building on private property to the Sewer Lateral-Public Portion. The Sewer Lateral-Private Portion may be used to convey either storm water, sanitary sewage, or a combination of the two. Figure 1 outlines the location of the Sewer Lateral-Private Portion.



Unless otherwise specified, Contractors shall inspect laterals from the mainline sewer only and up to property line (public portion).

Where sewer lateral inventory is not available, Contractors will be required to generate lateral inventory based on conditions observed during inspection in relation to the existing mainline sewer inventory. Figure 2 outlines the methodology for lateral ID creation.

Figure 2: Sewer Lateral Inspection – Lateral ID Creation



ID Components - Mainline Laterals (PACP Lateral_Segment_Reference field)

Starting Manhole ID_Chainage_Mainline ID_Direction of Lateral

Start Manhole ID: The Hansen Manhole ID (MH_ID*)
Chainage: Length in m to one decimal point from start manhole to lateral connection
Mainline ID: The Hansen Mainline ID (COMPKEY*)
Direction of Lateral: L – Left, R – Right

*City of Hamilton GIS layer field name reference

ID Components - Manhole Laterals

Manhole ID_Clock Position

Manhole ID: The Hansen Manhole ID
Clock Position: North is 12o'clock