



Sanitary Design Checklist for Submission with Form SS1

Project Name:			Date:
Addressed See Legend	Reference	Design Criteria	Requirement
<input type="checkbox"/>	MECP	General Requirements 1.1.1	<p>Alternation to an existing sewer by modifying, replacing, or extending existing sanitary or forcemains, and/or Appurtenances is not permitted when such works;</p> <ul style="list-style-type: none"> Results in exceedance of hydraulic capacity of the downstream sewer collection system, including pumping stations and uncommitted reserve hydraulic capacity of the receiving sewage treatment plant; Causes an Adverse Effect; Any increase in collection system overflows and or deterioration of the quality of the overflow discharge, that is not offset by measures; or Adversely impacts the approved effluent quality of the sewage treatment facilities. Or its bypasses or overflows.
<input type="checkbox"/>	MECP	General Requirements 1.1.2	<p>The existing Sewage Collection System may be altered by adding, modifying, replacing, or extending existing sanitary sewers or forcemains, appurtenances and other components of these systems that are pre-authorized in the ECA, subject to the following conditions;</p> <ul style="list-style-type: none"> The design for addition, modification, replacement, or extension of sanitary sewers, forcemains and/or Appurtenances; <ul style="list-style-type: none"> Has been prepared by a Licensed Engineering Practitioner; Has been designed to transmit but not treat wastewater; and Satisfies or exceeds the minimum requirements specified in the Design Criteria. <p>Uncommitted Reserve Hydraulic Capacity calculations for the downstream sewage collection system and treatment facilities including allowances for infiltration and inflow has been prepared and submitted by the proponent to the</p>



Meets



Does Not Meet



Not Applicable

TBM – Town of The Blue Mountains Engineering Standards, April 2009

MECP – Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval, July 28, 2022

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			Owner with the supporting documentation as required by the Owner.
<input type="checkbox"/>	MECP	Design Considerations 1.2	<ul style="list-style-type: none"> • All Sanitary Sewers, Storm Sewers, forcemains, maintenance holes, and chambers shall be designed considering all relevant soil and hydrogeological conditions including ground water elevations. • The design of all maintenance holes, chambers, and structures shall conform to all applicable requirements including but not limited to: Occupational Health and Safety Act, Ministry of Labor Confined Space Guidelines and Fire Protection and Prevention Act. • All new maintenance holes and chambers shall be designed with explicit and documented consideration for future inspection, operation, and maintenance requirements. • All precast structures installed in frost susceptible soils shall include necessary hardware to prohibit heave due to frost action unless alternative methods are employed to mitigate frost heaving. • Sewers, maintenance holes, and/or appurtenances shall be avoided where possible in areas subject to flooding or in areas of high groundwater (regular and seasonal). • If Sewers, maintenance holes and/or appurtenances are located in areas subject to flooding/high groundwater, inflow and infiltration and flotation prevention measures shall be included in the design. • The design shall include in the project specifications requirements for; <ul style="list-style-type: none"> ○ Mandatory inspection and testing as per Section 8 of the Design Criteria Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under



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			<p>Environmental Compliance Approval, MECP v.1.1 July 28, 2022, or as amended.</p> <p>Adequate control of siltation and erosion during construction.</p>
<input type="checkbox"/>	MECP	<p>Protection of drinking water sources</p> <p>1.3</p>	<p>An assessment of the proposed works shall be completed to determine if the works pose a Significant Drinking Water Threat and if they are, the design shall incorporate features that mitigate the treat to sources of drinking water, such as those included in;</p> <ul style="list-style-type: none"> • Ministry’s Standard Operating Policy for Sewage Works as amended from time to time; and • Source Protection Plan policies pertaining to the works. <p>Refer to Understanding Risks to Sources of Drinking Water, Appendix 1 of the Design Criteria Sanitary Sewers, Storm Sewers, and Forcemains for Alterations Authorized under Environmental Compliance Approval, MECP v.1.1 July 28, 2022, or as amended from time to time.</p>
<input type="checkbox"/>	MECP	<p>Protection of Water Supplies</p> <p>1.4</p>	<p>Sanitary Sewers, Storm Sewers and Forcemains, and all associated appurtenances and structures shall be designed with provisions to provide the required protection for drinking water supply systems in accordance with:</p> <ul style="list-style-type: none"> • The MECP’s F-6-1 Procedures to Govern Separation of Sewers and Watermains; and Section 15 of MECP’s Watermain Design Criteria for Future Alternation Authorized Under a Drinking Water Works Permit.
<input type="checkbox"/>	4.3.1.1 (TBM)	Design	<p>Sanitary sewers shall be designed in accordance with “Design Guidelines for Sewage Works 2008”.</p> <p>Provide a copy of the sanitary collection system design.</p> <p>Provide a copy of the sanitary collection system and/or general servicing drawings.</p>

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<input type="checkbox"/>	4.3.1.1 (TBM)	Design Flows	<p>Average Daily flow is to be 450 litres/capita/day</p> <p>Peak Extraneous flow = 0.28L/s/ha (end of pipe life)</p> <p>Peak Flow = $\frac{MQP}{86.4} + I \times A$ (L/s)</p> <p>Where: M=Peak factor = $1 + \frac{14}{4+P^{0.5}}$ "Harmon Formula"</p> <p>Q=Average daily per capita domestic flow (L/capita/day)</p> <p>P=Design Population/1000</p> <p>I=Unit of peak extraneous flow (L/s/ha)</p> <p>A=Tributary area (ha)</p> <p>Commercial/Institutional:</p> <p>Commercial/Institutional = 100 persons/ha</p> <p>Hospitals = 900-1800L/bed/day</p> <p>Schools = 70-140L/student/day</p> <p>Church = 100 person/ha</p> <p>Motels = 150-200L/bed/day</p> <p>Hotels = 225L/bed/day</p> <p>Note: All Commercial/Institutional flow information is exclusive of extraneous flows.</p> <p>Industrial:</p> <p>Light Industrial = 20000 L/day</p> <p>Heavy Industrial = 55000 L/day</p> <p>Note: All industrial flow information is exclusive of extraneous flows.</p>
<input type="checkbox"/>	4.3.1.2 (TBM)	Population Density	<p>Population density to be determined from maximum unit density permitted under the Official Plan or actual unit count, whichever is the largest, multiplied by the average unit population. The average number of persons per unit regardless of density is 2.3.</p>



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<input type="checkbox"/>	4.3.1.3 (TBM)	Future Sanitary Sewer Requirements	Future land use and population shall be based on the Blue Mountains Official Plan. The system shall be designed to service all areas within the project to their maximum future development in accordance with the Town's Official Plan. Allowance shall be made for inflows from the appropriate adjacent contribution area. Discharges of the system are to be into appropriate sewers and are to be approved by the Town. The exact location for connecting to sewers in adjacent subdivisions or shall be as approved by the Town.								
<input type="checkbox"/>	4.3.2.1 (TBM)	Minimum Pipe Size	Minimum 200mm								
<input type="checkbox"/>	4.3.2.2 (TBM)	Minimum Grade	Regardless of flow velocities achieved, the minimum design grades: <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: left;">Sewer Size</td> <td style="text-align: left;">Minimum Grade</td> </tr> <tr> <td>200 mm – 300 mm</td> <td>0.50%</td> </tr> <tr> <td>375 mm - 675 mm</td> <td>0.40%</td> </tr> <tr> <td>750 mm – 825mm</td> <td>0.30%</td> </tr> </table> <p>First leg of any sewer regardless of size shall be minimum 1.00% grade</p>	Sewer Size	Minimum Grade	200 mm – 300 mm	0.50%	375 mm - 675 mm	0.40%	750 mm – 825mm	0.30%
Sewer Size	Minimum Grade										
200 mm – 300 mm	0.50%										
375 mm - 675 mm	0.40%										
750 mm – 825mm	0.30%										
<input type="checkbox"/>	4.3.2.3 (TBM)	Pipe Capacities	Manning's Formula shall be used in determining the capacity of all sanitary sewers. The capacity of the pipe shall be determined under the condition that the pipe is running full. Roughness coefficient (n) used in the Manning's formula shall be 0.013 for all new smooth-wall pipes.								
<input type="checkbox"/>	4.3.2.4 (TBM)	Flow Velocities	Minimum velocity – 0.75m/s (flowing full) Maximum velocity – 3.0m/s All sewers shall be designed with slopes to provide at least 0.6m/s of flow velocity								
<input type="checkbox"/>	4.3.2.5 (TBM)	Changes in Pipe Size	In no case shall the downstream pipe size be smaller in diameter than that of the upstream pipe, regardless of increase in grade.								
<input type="checkbox"/>	4.3.2.6 (TBM)	Head Losses	Minimum drops across maintenance holes								



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			<p>Change in horizontal direction Minimum Drop</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 80%;">0° – no change</td> <td style="text-align: right;">30mm</td> </tr> <tr> <td>1° to 45°</td> <td style="text-align: right;">50mm</td> </tr> <tr> <td>46° to 90°</td> <td style="text-align: right;">80mm</td> </tr> </table> <p>Change in direction of the inlets and outlet pipes shall always be 90° or less. In the case of sewers 900mm or greater, the change in direction of flow in any maintenance hole shall be not more than 45°</p>	0° – no change	30mm	1° to 45°	50mm	46° to 90°	80mm
0° – no change	30mm								
1° to 45°	50mm								
46° to 90°	80mm								
<input type="checkbox"/>	4.3.2.7 (TBM)	Location	Sanitary sewers shall be shown on the Engineering Standard Design Road Cross section drawings. Generally, the location is in the centerline of the roadway.						
<input type="checkbox"/>	4.3.2.8 (TBM)	Minimum Cover	Sanitary sewers shall be buried a minimum of 1.0 m below basement floor elevations where possible to allow for the installation of sewer laterals. In areas of no sanitary sewer connection the sewers shall have a minimum frost cover of 1.6 m.						
<input type="checkbox"/>	4.3.2.9 (TBM)	Pipe Crossings	300mm minimum clearance between outside barrels at all points of crossing. Sanitary sewers are required to go under storm sewers. 500mm separation required between sanitary and watermains, with sanitary below watermains.						
<input type="checkbox"/>	4.3.2.10 (TBM)	Limits	Maintenance holes required at limits of project. Maintenance holes shall be designed for future extension of the sewer.						
<input type="checkbox"/>	4.3.3 (TBM)	Materials	Shall be constructed of PVC. Concrete or HDPE may be considered in some applications. All sanitary pipes shall conform to requirements of CSA and OPSS. For sewer applications requiring pressure pipe, pipe design should reference MECP guidelines. Type and class, as well as bedding classification shall be shown on plan and profile drawings. PVC pipe shall be used in accordance with OPSD 806.040, excluding the use of DR41.						
<input type="checkbox"/>	4.3.4 (TBM)	Pipe Bedding	As per OPSD						

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<input type="checkbox"/>	4.3.5 (TBM)	Sanitary Maintenance Holes	Shall be provided at each change in alignment, grade or pipe material, at all pipe junctions and at regular intervals along the pipe.								
<input type="checkbox"/>	4.3.5.1 (TBM)	Sanitary Maintenance Hole Maximum Spacing	<p>Spacing between maintenance holes shall be as follows:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Pipe Size</th> <th style="text-align: left;">Maximum Spacing</th> </tr> </thead> <tbody> <tr> <td>200mm to 750mm</td> <td>100m</td> </tr> <tr> <td>750mm to 1200mm</td> <td>125m</td> </tr> <tr> <td>1200mm and greater</td> <td>150m</td> </tr> </tbody> </table>	Pipe Size	Maximum Spacing	200mm to 750mm	100m	750mm to 1200mm	125m	1200mm and greater	150m
Pipe Size	Maximum Spacing										
200mm to 750mm	100m										
750mm to 1200mm	125m										
1200mm and greater	150m										
<input type="checkbox"/>	4.3.5.2 (TBM)	Maintenance Hole Types	<p>Shall be constructed of precast or poured concrete.</p> <p>OPS 700 series Drawings shall be used for maintenance hole design.</p> <p>Consideration related to soil conditions, ground water, loading and other pertinent aspects to determine structure suitability.</p> <p>In cases where the OPSDs are not adequate, the maintenance hole(s) shall be designed, detailed and stamped by the engineer.</p> <p>Plan and Profile drawings will include type and size of all maintenance holes.</p>								
<input type="checkbox"/>	4.3.5.3 (TBM)	Maintenance Hole Design	<p>All chamber openings shall be located such that the ladder rungs are over the raised portions of the benched bottoms.</p> <p>Safety grates shall be provided in all maintenance holes exceeding a depth of 5 m.</p> <p>Maximum spacing between safety grates shall not exceed 4.5m.</p> <p>The obvert of the outlet pipe shall not be higher than the obvert of the inlet pipes.</p> <p>Where the difference in elevation between the inlet invert and outlet invert exceeds 900mm, a drop structure shall be placed on the inlet side of the maintenance hole.</p>								

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			<p>Minimum width of benching shall be 230mm.</p> <p>Minimum size of stack shall be 685mm x 685mm.</p> <p>Maximum height of maintenance hole entry rings (i.e. Mod-u-loc) is 450mm before an additional precast concrete maintenance hole riser section is necessary.</p> <p>Total maximum offset in maintenance hole entry rings is 50mm.</p>						
<input type="checkbox"/>	4.3.5.4 (TBM)	Maintenance Hole Frames and Covers	<p>Maintenance holes within the travelled portion of the roadway shall have the rim elevation set flush with the surface of the course of asphalt. Setting of the frame and cover shall be constructed in accordance with OPSD 704.010.</p> <p>In cases where sanitary maintenance holes are located in areas where storm water surface ponding is designed to take place, a watertight maintenance hole cover shall be used as per OPSD 401.050.</p> <p>Maintenance hole frames and covers are to be raised using concrete rings prior to the placement of the top course of asphalt.</p>						
<input type="checkbox"/>	4.3.6 (TBM)	Sanitary Service Connections	<p>Minimum slope of 2.0% at all sections</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Sanitary Connection</th> <th style="text-align: left; border-bottom: 1px solid black;">Size</th> </tr> </thead> <tbody> <tr> <td>Single Family Residential</td> <td>125mm PVC SDR 28</td> </tr> <tr> <td>Multiple family residential Block, institutional, Commercial, and Industrial Blocks</td> <td>Designed to carry peak flows. Minimum 200mm diameter</td> </tr> </tbody> </table> <p>Shall be in accordance with: OPSD 10006.010 Sewer Service Connection for Rigid Pipe.</p>	Sanitary Connection	Size	Single Family Residential	125mm PVC SDR 28	Multiple family residential Block, institutional, Commercial, and Industrial Blocks	Designed to carry peak flows. Minimum 200mm diameter
Sanitary Connection	Size								
Single Family Residential	125mm PVC SDR 28								
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			OPSD 1006.020 Sewer Service Connection for Flexible Pipe.
	4.3.7 (TBM)	Testing and Acceptance	Maintenance holes tested in accordance with OPSS. Pipes tested in accordance with OPSS Deformation Gauge (pig) Test. All pipe works shall have CCTV inspection as per OPSS 409 as part of the preliminary and final acceptance.

Name (Print) _____

Date _____

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N/A

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