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Servicing & Stormwater Management Report

Wateridge Lifestyles
100 Bareille-Snow Street
Wateridge Village at Rockcliffe
Ottawa, ON

Prepared For:

Wateridge Lifestyles Ltd.

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LEGAL NOTIFICATION

This report was prepared by Robinson Land Development for the account of **Wateridge Lifestyles Ltd.**

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **Robinson Land Development** accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project

1.0 INTRODUCTION

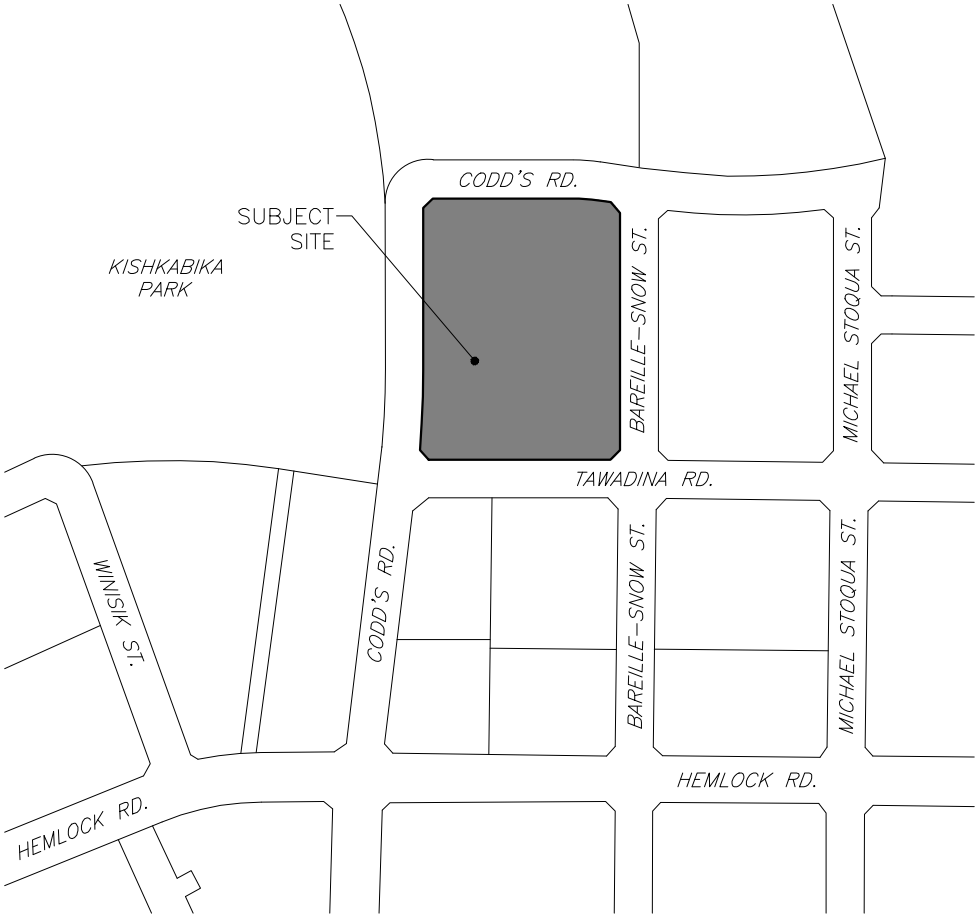
Robinson Land Development have been retained by Wateridge Lifestyles Ltd. to prepare detailed servicing and stormwater management designs in support of the proposed development located at 100 Bareille-Snow Street in the City of Ottawa. The subject site is located within Phase 7 of Wateridge Village at Rockcliffe. The site is bound by Codd's Road to the west and north, Bareille-Snow Street to the east, and Tawadina Road to the south (refer to **Figure 1.0 – Key Plan** following page 1).

This report will detail the proposed means of servicing the site and will provide details on how the stormwater management requirements will be achieved in accordance with overarching reports and current City of Ottawa guidelines.

2.0 GUIDELINES, STUDIES AND REPORTS

The servicing and stormwater management designs for the subject site have been prepared in keeping with the following documents:

- **Sewer Design Guidelines**, City of Ottawa, December 2025 (herein referred to as OSDG).
- **Water Distribution Design Guidelines**, City of Ottawa, May 2026 (herein referred to as OWDG).
- **Design Guidelines for Sewage Works**, Ministry of the Environment, 2008 (herein referred to as MECP Design Guidelines).
- **Design Guidelines for Drinking-Water Systems**, Ministry of the Environment, 2008 (herein referred to as MECP Water Design Guidelines).
- **Stormwater Planning and Design Manual,** Ministry of the Environment, March 2003 (herein referred to as MECP SWM Design Guidelines).
- **Water Supply for Public Fire Protection**, Fire Underwriters Survey, 2020 (herein referred to as FUS Guidelines).
- **Ontario Building Code Compendium**, Ministry of Municipal Affairs and Housing Building Development Branch, June 27, 2025 (herein referred to as OBC).
- **Former CFB Rockcliffe, Master Servicing Study,** IBI Group, August 2015 (herein referred to as the MSS).
- **Stormwater Management Existing Conditions & LID Pilot Project Scoping, Final Report**, Aquafor Beech, August 2015 (herein referred to as the LID Pilot Project Report).
- **Wateridge Village Phases 6 & 7, Developer Checklist**, Aquafor Beech Limited, November 2024 (herein referred to as the Developer Checklist).
- **Design Brief, Wateridge Village at Rockcliffe Phases 6 and 7**, Arcadis, August 2025 (herein referred to as the Arcadis Design Brief).
- **Geotechnical Investigation Report, Block 21,** Cambium, February 2026.



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scale N.T.S.	BLOCK 21, WATERIDGE VILLAGE	project no. 25117
date 09/01/26		
drawn by BLM	KEY PLAN	FIG 1.0

- **Infiltration Assessment,** Cambium, June 2026.
- **Hydrogeological Assessment,** Cambium, June 2026.

A pre-consultation meeting was held with the City of Ottawa on November 12, 2025 to discuss requirements for the proposed development. The pre-consultation meeting feedback has been provided under **Appendix A** for reference.

3.0 EXISTING CONDITIONS

The subject site is contained within a 1.41-hectare block which forms part of Phase 7 of Wateridge Village at Rockcliffe. The subject site (i.e. Block 21) is designated to have a mid-rise mixed-use land use as identified on *Figure 1.7 – Phasing Plan* from the Arcadis Design Brief (provided under **Appendix A**). The lands to west, east, and north of the site are currently undeveloped, however, underground construction for Phases 6 and 7 of the subdivision commenced in early 2026. The municipal right-of-way to the south (i.e. Tawadina Road) has been constructed to wear course asphalt and concrete curb and sidewalk have been installed on the north side, abutting the subject site. Refer to **Figure 2.0** below for an aerial view of the site under its current development state.



Figure 2.0: Existing Conditions

The topography of the property is generally flat and slopes towards the north. Refer to the topographic plan prepared by Monument-Urso Surveying Ltd. under **Appendix A** for more details. Existing municipal infrastructure is available within the adjacent right-of-ways as detailed in the sections below.

4.0 DEVELOPMENT PROPOSAL

The Owner is proposing to develop the subject site to accommodate three new multi-storey buildings which will be constructed in three phases. The key features of each phase have been summarized below:

Phase 1

- Site area of 0.63 hectares
- 6-Storey retirement home building
- Building footprint of 2,912 m^2
- 1 level of underground parking
- Access road connection to Bareille-Snow Street
- Drop-off zone connection to Tawadina Street
- Landscaped amenity area
- 188 dwelling units
    - (98) assisted care units
    - (30) bachelor units
    - (47) 1-bedroom units
    - (13) 2-bedroom units

Phase 2

- Site area of 0.47 hectares
- 9-Storey apartment building
- Building footprint of 2,060 m^2
- 1 level of underground parking (extension of Phase 1 parking garage)
- Enclosed link to the Phase 1 building
- Extension of internal access road
- Landscaped amenity areas
- 170 dwelling units

Phase 3

- Site area of 0.31 hectares
- 9-Storey apartment building
- Building footprint of 1,012 m^2
- 1 level of underground parking (extension of Phase 2 parking garage)
- Landscaped amenity areas
- 100 dwelling units

The full buildout of the subject site will provide a total of 458 residential units. Refer to the Site Plan, prepared by T. Bonhomme Architect, under **Appendix B** for more details. The site will be serviced with new water, sanitary and storm infrastructure via connections to the existing municipal systems as detailed in the sections below.

5.0 WATER SERVICING

5.1 Existing System

Phases 6 and 7 of Wateridge Village at Rockcliffe will be serviced with potable water via connections to the existing 406mm diameter watermain located within the Tawadina Road

right-of-way. The distribution system is located within the Montreal Road Pressure Zone (Zone MONT). The existing and proposed distribution systems are shown on *Figure 2.1* from the Arcadis Design Brief (provided under **Appendix C**). Municipal watermains will be available in proximity to the subject site as follows:

- A 406mm diameter PVC watermain within the Tawadina Road right-of-way (previously constructed as part of Phase 2B).
- A 203mm diameter PVC watermain within the Codd's Road right-of-way (to be constructed as part of Phase 6-7).
- A 203mm diameter PVC watermain within the Bareille-Snow Street right-of-way (to be constructed as part of Phase 6-7).

Service stub locations for Phase 1 have been coordinated with the design for Phases 6 and 7 of Wateridge Village. Refer to the *General Plan of Services,* prepared by Arcadis for Phases 6-7, under **Appendix A** for more details.

5.2 Design Criteria

The design of the watermain distribution system for Phases 6 and 7 of Wateridge Village at Rockcliffe is detailed in the overarching Arcadis Design Brief. The following design criteria were established for the subject site in keeping with the current OWDG:

Residential

• Basic Day (BSDY) Demand	280 L/person/day
• Maximum Day (MXDY) Demand	AVGDY x 2.5
• Peak Hour (PKHR) Demand	MXDY x 2.2
• Apartment (average)	1.8 persons/unit

Commercial Retail

• Basic Day (BSDY) Demand	2,500 L/1000 m^2/day
• Maximum Day (MXDY) Demand	AVGDY x 2.5
• Peak Hour (PKHR) Demand	MXDY x 1.8

• Operating Pressure Range	50 to 80 psi
• Fire Flow Demand	9,000 L/min

Since the Phase 1 building will be classified as a retirement home (i.e. institutional use), water demands for the units which are provided with assisted care have been calculated using the following design criteria:

• Basic Day (BSDY) Demand	450 L/bed/day	(OSDG; Appendix 4-A)
• Maximum Day (MXDY) Demand	AVGDY x 1.5	(OWDG; Table 4.2)
• Peak Hour (PKHR) Demand	MXDY x 1.8	(ISD-2010-2)

5.3 Water Demands

The Arcadis Design Brief provided domestic water demand calculations based on assumed development parameters for the site (i.e. Block 21). The Arcadis Design Brief allocated demands for a total population of 724 people and 2,292 m^2 of commercial retail space. The domestic water demands have been recalculated based on the current development proposal and are summarized in the table below.

Table 5.1: Domestic Water Demands

Development Stage	Basic Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Phase 1	0.95	1.86	3.79
Phase 2	1.06	2.64	5.75
Phase 3	0.58	1.46	3.21
Total Design	**2.59**	**5.96**	**12.75**
Arcadis Design[*1]	*2.42*	*6.03*	*13.20*

Notes:
1. As per Design Brief prepared for Phases 6 and 7 of Wateridge Village at Rockcliffe.

As shown in the table above, the basic day demand has increased by 7.0% while the maximum day and peak hour demands have marginally decreased from the values allocated in the Arcadis Design Brief. The hydraulic model outputs from the Arcadis Design Brief indicate that the pressures within the distribution system range from 69.6 psi to 84.98 psi (480.15 kPa to 585.92 kPa) under the basic day scenario. The 7.0% increase in basic day demand is not anticipated to lower the system pressures below the acceptable range. Refer to the Arcadis water demand calculations and the current water demand calculations provided under **Appendix C** for more details.

5.4 Proposed System

The development of the subject site will be phased with the intention that each phase will undergo a future severance. Since each building will ultimately have independent ownership, each building will be provided with independent water service connections to the municipal distribution system. In accordance with the current OWDG, individual residential facilities with basic day demands greater than 50 m^3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area (VSA). Since the basic day demands will exceed 50 m^3/day, twin water service connections (separated by an isolation valve) will be provided for each building.

The Phase 1 and Phase 3 buildings will receive water supply via individual 152mm diameter water service connections to the existing 203mm diameter watermain on Bareille-Snow Street. The Phase 2 building will receive water supply via individual 152mm diameter water service connections to the existing 203mm diameter watermain on Codd's Road. As noted under **Section 5.1**, service stub locations for Phase 1 have been coordinated with the design for Phases 6 and 7 of Wateridge Village. The proposed watermain network is shown on the Servicing Plan (DWG. 25117-S1) provided under **Appendix B**.

5.5 System Pressures

A boundary condition request was made to the City of Ottawa for the proposed water service connections to the municipal distribution system. However, boundary conditions are not available at the proposed connection locations until such a time that the watermain distribution system within the adjacent right-of-ways is constructed and deemed in service. In lieu of boundary conditions, the hydraulic water model outputs from the Arcadis Design Brief have been used to assess the system pressures at the proposed building locations. The proposed water service connections for the Phase 1 and Phase 3 building will be assessed by the junction node on Bareille-Snow Street (i.e. J16) and the water service connections for the Phase 2 building will be assessed by the junction node on Codd's Road (i.e. J10). Refer to the *Hydraulic Water Model Figure* prepared by Arcadis under **Appendix C**. The Arcadis Design

Brief provided hydraulic model outputs for the minimum and maximum HGL scenarios. The results of those scenarios are summarized in the table below:

Table 5.2: Hydraulic Water Model Outputs

Model Junction	Street	Min. HGL (psi)	Max. HGL (psi)
J10	Codd's Rd.	75.74	76.46
J16	Bareille-Snow St.	75.74	76.44

Notes:
1. Outputs as per Arcadis Design Brief.
2. J10 represents anticipated pressures for the Phase 2 building.
3. J16 represents anticipated pressures for the Phase 1 and Phase 3 buildings.

As shown in the table above, the minimum pressures modelled at the service connections exceed the desired minimum operating pressure of 50 psi and therefore are in accordance with the current OWDG. The maximum pressures modelled at the service connections are below the desired maximum operating pressure of 80 psi and therefore pressure reducing valves (PRVs) will not be required. Refer to the hydraulic model outputs from the Arcadis Design Brief under **Appendix C** for more details.

5.6 Fire Flows

The hydraulic water model developed (by Arcadis) for Phases 6 and 7 of Wateridge Village at Rockcliffe assigned a fire flow demand of 15,000 L/min (250 L/s). The results of the hydraulic simulation verified that all nodes in the system exceed the minimum residual pressure of 20 psi (150 kPa) under the under the max. day plus fire flow scenario.

In accordance with the current OWDG, the total required fire flow shall first be calculated based on OBC *Appendix A-3.2.5.7*. The water supply coefficient (K) is derived from OBC Table 1 based on the type of construction and group classification for the building (as confirmed by the Architect).

The total of spatial coefficient (S_{TOT}) is interpolated from OBC Figure 1 based on exposure distances measured from the proposed building. Where a building has exposures on more than one side, the percentage increase in the fire protection water supply should be totaled to reflect all exposure protection requirements. Note that the total of spatial coefficient need not exceed a value of 2.0.

The required minimum water supply flow rate can then be derived from OBC Table 2 based on the calculated minimum supply of water (Q). The fire flow calculations for each building have been summarized in the table below:

Table 5.3: OBC Fire Flow Calculations

Parameter	Phase 1 Building	Phase 2 Building	Phase 3 Building
Water Supply Coefficient (K)[*1]	10	10	10
Building Volume (V)[*2]	54,673 m^3	42,773 m^3	26,026 m^3
Total of Spatial Coefficient (S_{TOT})[*3]	1.5	2.0	1.5
Type of Construction[*4]	Non-combustible		
Group Classification[*5]	B3	C	C
Minimum Supply of Water (Q)[*6]	820,091 L	855,466 L	390,383 L
Required Water Supply Flow Rate[*7]	9,000 L/min	9,000 L/min	9,000 L/min

Notes:
1. Derived from OBC Table 1.
2. Calculated based on floor areas and heights provided by Architect.
3. Interpolated from OBC Figure 1
4. Constructed type confirmed by Architect.
5. Group classification confirmed by Architect.
6. $Q = K \times V \times S_{TOT}$
7. Derived from OBC Table 2.

In accordance with the current OWDG, where a pressurized hydrant is available and the required minimum water supply flow rate is 9,000 L/min (or greater), the required fire flow shall also be calculated using FUS guidelines. As shown in the table above, the required water supply flow rates for the buildings are not less than 9,000 L/min and therefore additional calculations using FUS guidelines are warranted.

The total required fire flows have been calculated in accordance with the FUS guidelines using the following input parameters:

- Type of Construction — Non-combustible
- Effective Floor Area — Single largest floor area + 25% of two adjoining floors
- Occupancy Class — Limited Combustible
- Sprinkler Protection — Automatic sprinkler protection
Full supervision of sprinkler system
Water supply is standard for system and hose lines
- Exposure Distances — Separations as per Site Plan

Using the parameters above, the total required fire flows have been calculated and summarized in the table below:

Table 5.4: FUS Fire Flow Calculations

Structure	Total Required Fire Flow (L/min)
Phase 1 Building	5,000
Phase 2 Building	4,000
Phase 3 Building	3,000

As shown in the table above, the Phase 1 building will generate the highest required fire flow and therefore will govern the site design. Since the total required fire flow is below the 15,000 L/min fire demand assumed in the Arcadis hydraulic water model, the watermain distribution system will be able to provide adequate fire flow to meet the site demand. Refer to the supporting fire flow calculations provided under **Appendix C** for more details.

5.7 Hydrant Coverage

In accordance with current OWDG, the aggregate fire flow capacity of all contributing fire hydrants within 150 m of a building shall not be less than the required fire flow. The contribution to the required fire flow is dependent on the distance from the hydrant to building being considered. A flow of 5,700 L/min should be assigned to all hydrants with a distance of less than or equal to 75 m from the building being considered and 3,800 L/min to all hydrants with a distance between 75 m and 150 m from the building being considered (as per *Table 1* from *Appendix I* for AA rated hydrants). Coverage for the on-site buildings will be provided by the municipal hydrants located within the adjacent right-of-ways. Since the buildings will be sprinklered, a hydrant must also be located within 45 m of the building's siamese connection in accordance with the Ontario Building Code (OBC). Two hydrants located within 75 m of the subject building will provide a contributing fire flow of 11,400 L/min (5,700 L/min + 5,700 L/min) which well exceeds the total required fire flows calculated above. Refer to **Figure 3.0: Hydrant Coverage Plan** provided under **Appendix C**.

6.0 SANITARY SERVICING

6.1 Existing System

All wastewater flows from Phases 6 and 7 of Wateridge Village at Rockcliffe will be conveyed to the existing sanitary sewer system currently stubbed within Bareille-Snow Street (outlet constructed as part of Phase 2). Wastewater flows will ultimately discharge to the Ottawa Interceptor Sewer which bisects the CLC property south of the subject site. The existing and proposed sanitary sewer network is shown on *Figure 3.1* from the Arcadis Design Brief (provided under **Appendix D**). Municipal sanitary sewers will be available in proximity to the subject site as follows:

- A 250mm diameter PVC sanitary sewer within the Tawadina Road right-of-way (previously constructed as part of Phase 2B).
- A 250mm diameter PVC sanitary sewer within the Codd's Road right-of-way (to be constructed as part of Phase 6-7).
- A 250mm diameter PVC sanitary sewer within the Bareille-Snow Street right-of-way (to be constructed as part of Phase 6-7).

Service stub locations for Phase 1 have been coordinated with the design for Phases 6 and 7 of Wateridge Village. Refer to the *General Plan of Services,* prepared by Arcadis for Phases 6-7, under **Appendix A** for more details.

6.2 Design Criteria

The design of the sanitary sewer system for Phases 6 and 7 of Wateridge Village at Rockcliffe is detailed in the overarching Arcadis Design Brief. The following design criteria were established for the subject site in keeping with the current OSDG:

• Average Residential Flow	280 L/person/day	(ISTB-2018-01)
• Residential Peaking Factor	Modified Harmon Eq.	(ISTB-2018-01)

- Commercial Flow 28,000 L/ha/day (ISTB-2018-01)
- Comm./Instit. Peaking Factor 1.5 (ISTB-2018-01)
- Infiltration Allowance 0.33 L/s/ha (ISTB-2018-01)
- Minimum Full Flow Velocity 0.60 m/s (OSDG S6.1.2.2)
- Maximum Full Flow Velocity 3.0 m/s (OSDG S6.1.2.2)
- Manning's 'n' Value 0.013 (OSDG S6.1.8.2)
- Average Apartment 1.8 persons/unit (OSDG Table 4.2)

Since the Phase 1 building will be classified as a retirement home (i.e. institutional use), sanitary flows for the units which are provided with assisted care have been calculated using the following design criteria:

- Average Institutional Flow 450 L/bed/day (OSDG; Appendix 4-A)
- Peaking Factor 1.5 (Institutional)

Since the unit types for the Phase 1 building are known, populations have been calculated using population densities from the OSDG. Population values for the future buildings (i.e. Phase 2 and 3) are based on the average apartment population density in keeping with the Arcadis Design Brief.

- Bachelor Apartment 1.4 persons/unit (OSDG Table 4.2)
- 1-Bedroom Apartment 1.4 persons/unit (OSDG Table 4.2)
- 2-Bedroom Apartment 2.1 persons/unit (OSDG Table 4.2)

6.3 Existing System Allocation

The design of the sanitary sewer system for Phases 6 and 7 of Wateridge Village at Rockcliffe allocated peak sanitary design flows for the subject site (i.e. Block 21). The design assumed that the subject site would have two sanitary outlets. An outlet to the sanitary sewer system on Codd's Road and a secondary outlet to the sanitary sewer system on Bareille-Snow Street. The allocated peak sanitary design flows are summarized in the table below.

Table 6.1: Allocated Peak Sanitary Design Flows

Outlet	Pop.[*1]	Peak Res. Flow (L/s)	Comm. Area (ha)	Peak Comm. Flow[*2] (L/s)	Infilt. (L/s)	Total Design Flow (L/s)
Codd's[*3]	345.6	3.85	0.15	0.05	0.23	4.13
Bareille-Snow[*4]	378.0	3.72	0.08	0.03	0.23	3.98
Total	**723.6**	**7.57**	**0.23**	**0.07**	**0.47**	**8.12**

Notes:
1. Population based on average apartment density of 1.8 persons/unit.
2. Peak commercial flow calculated using peaking factor of 1.0 as per Arcadis sanitary sewer design sheet.
3. Corresponds to Area MH1A tributary to pipe run MH1A to MH2A.
4. Corresponds to Area MH5A tributary to pipe run MH5A to MH20A.

As shown in the table above, the sanitary sewer system design for Phases 6 and 7 allocated a peak sanitary design flow of 4.13 L/s within the sewer on Codd's Road and 3.98 L/s within the sewer on Bareille-Snow Street for a total design flow of 8.12 L/s from the subject site (i.e. Block 21). Refer to the *sanitary sewer design sheet* and *Sanitary Drainage Area Plan* prepared by Arcadis under **Appendix D** for more details.

6.4 Sanitary Design Flows

Using the design criteria established above, peak sanitary design flows for the subject site have been calculated and summarized in the table below. Since detailed floor plans are not available for Phases 2 and 3 at this time, the commercial area allocated in the Arcadis Design Brief has been assigned to the Phase 2 building which fronts onto Codd's Road. The actual area of commercial retail space provided will need to be reassessed during the detailed design of future phases.

Table 6.2: Peak Sanitary Design Flows

Phase	Peak Res. Flow (L/s)	Peak Comm. Flow (L/s)	Peak Inst. Flow[*2] (L/s)	Infilt. (L/s)	Total Design Flow (L/s)
Phase 1	1.56	0.00	0.77	0.21	2.53
Phase 2	3.43	0.11	0.00	0.16	3.70
Phase 3	2.06	0.00	0.00	0.10	2.16
Total	**7.05**	**0.11**	**0.77**	**0.47**	**8.39**

Notes:
1. Population based on average apartment density of 1.8 persons/unit.
2. Peak commercial flow calculated using peaking factor of 1.0 as per Arcadis sanitary sewer design sheet.
3. Corresponds to Area MH1A tributary to pipe run MH1A to MH2A.
4. Corresponds to Area MH5A tributary to pipe run MH5A to MH20A.

As shown in the table above, the full buildout of the subject site will have a peak sanitary design flow of 8.39 L/s. This value exceeds the peak flow of 8.12 L/s allocated in the Arcadis Design Brief by 0.27 L/s (3.3%). The municipal sanitary sewer system will have adequate capacity to convey peak sanitary design flows from Phase 1, Phase 2, and approximately 88% of Phase 3 based on current design assumptions. At the detailed design stage for Phase 3, the development plans will need to be adjusted to reduce the peak sanitary design flow, or it will need to be demonstrated that the municipal system has adequate capacity to convey additional flows from the subject site.

6.5 Proposed System

The development of the subject site will be phased with the intention that each phase will undergo a future severance. Since each building will ultimately have independent ownership, each building will be provided with independent sanitary service connections to the municipal system. Wastewater flows from the Phase 1 building will be conveyed by a 250mm diameter sanitary service to the 250mm diameter sanitary sewer on Bareille-Snow Street (between MH20A and MH304A). Wastewater flows from the Phase 2 building will be conveyed by a 250mm diameter sanitary service to the 250mm diameter sanitary sewer on Codd's Road (between MH1A and MH2A). Wastewater flows from the Phase 3 building will be conveyed by a 250mm diameter sanitary service to the 250mm diameter sanitary sewer on Bareille-Snow Street (between MH5A and MH20A). As noted under **Section 6.1**, service stub locations for Phase 1 have been coordinated with the design for Phases 6 and 7 of Wateridge Village. The proposed sanitary network is shown on the Servicing Plan (DWG. 25117-S1) provided under **Appendix B**.

Although the peak sanitary design flows could be adequately conveyed with a smaller service size, 250mm diameter pipes have been specified to align with the mechanical design which requires a larger pipe diameter. The proposed sanitary sewers have been designed with

adequate capacity to convey the peak sanitary design flows and to meet self-cleansing velocities under full flow and partial flow conditions. In accordance with the City of Ottawa Sewer-Use By-Law, monitoring maintenance holes will be provided inside the property line for each service connection to the municipal system. Refer to the sanitary sewer design sheet provided under **Appendix D** for more details.

7.0 STORM SERVICING

7.1 Existing System

The minor storm sewer system for Phases 6 and 7 of Wateridge Village at Rockcliffe will discharge to the existing 1650mm diameter storm sewer within Kishkabika Park (outlet constructed as part of Phase 1A). Stormwater will ultimately discharge to the Eastern SWM Facility located northwest of the subject site. The existing and proposed storm sewer network is shown on *Figure 4.1* from the Arcadis Design Brief (provided under **Appendix E**). Municipal storm sewers will be available in proximity to the subject site as follows:

- 750mm diameter concrete storm sewers within the Tawadina Road right-of-way (previously constructed as part of Phase 2B).
- 450mm-1200mm diameter concrete storm sewer within the Codd's Road right-of-way (to be constructed as part of Phase 6-7).
- 525mm-600mm diameter concrete storm sewers within the Bareille-Snow Street right-of-way (to be constructed as part of Phase 6-7).

Service stub locations for Phase 1 have been coordinated with the design for Phases 6 and 7 of Wateridge Village. Refer to the *General Plan of Services,* prepared by Arcadis for Phases 6-7, under **Appendix A** for more details.

7.2 Design Criteria

The design of the minor storm sewer system for Phases 6 and 7 of Wateridge Village at Rockcliffe is detailed in the overarching Arcadis Design Brief. The following design criteria were established for the subject site in keeping with the current OSDG:

• Peak Flow (Q)	2.78CiA	(Rational Method)
• Rainfall Intensity (i)	City of Ottawa IDF Curve Equations	
• Runoff Coefficient (C)	0.80	(Allocated for Blocks)
• Inlet Time	10 minutes	(OSDG S5.1.4)
• Minimum Full Flow Velocity	0.80 m/s	(OSDG S6.1.2.1)
• Maximum Full Flow Velocity	3.0 m/s	(OSDG S6.1.2.1)
• Manning's 'n' Value	0.013	(OSDG S6.1.8.1)
• Design Level of Service	2-Year Event	(PIEDTB-2016-01)

The Arcadis Design Brief assumed a runoff coefficient of 0.80 for all development blocks within Phase 6 and 7. The runoff coefficients for the site design will be calculated based on the actual surface covers proposed on the Site Plan. In accordance with the OSDG, runoff coefficients will be increased by 25% (up to a maximum of 1.0) during the 100-year event. The runoff coefficients for the site design are as follows:

• Pervious Areas	0.20	(100-Year = 0.25)
• Impervious Areas	0.90	(100-Year = 1.00)
• Gravel Areas	0.80	(100-Year = 1.00)

7.3 Existing System Allocation

The design of the minor storm sewer system for Phases 6 and 7 of Wateridge Village at Rockcliffe allocated peak design flows for the subject site (i.e. Block 21). The design assumed that the subject site would have two storm sewer outlets. An outlet to the storm sewer system on Codd's Road and a secondary outlet to the storm sewer system on Bareille-Snow Street. The allocated unrestricted 2-year peak design flows are summarized in the table below.

Table 7.1: Allocated Unrestricted 2-Year Peak Flows

Outlet	Runoff Coefficient[*1]	Area[*1] (ha)	AC	2-Year Peak Flow (L/s)
Codd's Road[*2]	0.80	0.70	0.56	119.57
Bareille-Snow Street[*3]	0.80	0.71	0.57	121.28
Total		**1.41**		**240.85**

Notes:
1. Values as per Arcadis Design Brief.
2. Corresponds to Area S1A tributary to pipe run MH1 to MH2.
3. Corresponds to Area S21 tributary to pipe run MH21 to MH20.

As shown in the table above, the minor storm sewer system design for Phases 6 and 7 allocated a 2-year peak design flow of 119.57 L/s within the sewer on Codd's Road and 121.28 L/s within the sewer on Bareille-Snow Street for a total minor system design flow of 240.85 L/s from the subject site (i.e. Block 21). Refer to the *storm sewer design sheet* and *Storm Drainage Area Plan* prepared by Arcadis under **Appendix E** for more details.

7.4 Minor System Peak Flows

In keeping with the Arcadis Design Brief, the subject site will have two outlets for minor system flows. Approximately 0.55 hectares of the site area will be captured and discharged to the existing storm maintenance hole (MH20) on Bareille-Snow Street and approximately 0.44 hectares will be captured and discharged to the existing storm maintenance hole (MH1) on Codd's Road. The unrestricted 2-year peak flows have been summarized in the table below.

Table 7.2: Unrestricted 2-Year Peak Flows

Outlet	AC[*3]	2-Year Peak Flow (L/s)
Codd's Road[*1]	0.34	71.58
Bareille-Snow Street[*2]	0.48	101.35
Total		**172.94**

Notes:
1. Tributary to pipe run MH1 to MH2.
2. Tributary to pipe run MH20 to MH5.
3. Runoff coefficient calculations provided under **Appendix E**.

As shown in the table above, the unrestricted 2-year peak flows tributary to the municipal storm sewer systems are less than the values allocated for in the Arcadis Design Brief (refer to **Table 7.1**) and therefore the downstream systems should have adequate capacity to convey minor system flows from the subject site.

7.5 Storm Sewer Design

Stormwater runoff from the internal access road and parking lot areas will be captured by surface inlets and conveyed to the proposed storm sewer systems. Runoff captured by the catch basin located within the Phase 1 parking area (denoted as CB 1) will be conveyed by the proposed storm sewer system to the outlet on Bareille-Snow Street. The catch basins located within the future parking lot extension and amenity area (denoted as CB 2, CB 3, and CB 4) will be located atop the proposed Phase 2 parking garage structure. Runoff captured by these inlets will be conveyed by the building's internal plumbing system (to be designed by the Mechanical Engineer) to the storm sewer outlet on Codd's Road.

Stormwater runoff from the proposed underground parking garage ramp will be captured by a trench drain and conveyed by the building's internal plumbing system (to be designed by the Mechanical Engineer) to the storm sewer outlet on Bareille-Snow Street.

The proposed storm sewers have been designed with adequate capacity to convey the unrestricted 2-year peak flow from the subject site. The storm sewers have also been designed to convey the restricted 100-year peak flow without surcharging of the system. The storm sewers have been designed to meet the allowable full flow velocities for self-cleansing in accordance with the current OSDG. Refer to the Storm Drainage Area Plan (DWG. 25117-STM1) and the storm sewer design sheet provided under **Appendix E** for more details.

7.6 Foundation Drainage System

In accordance with the Geotechnical Investigation, perimeter and subfloor foundation drainage systems are recommended for the proposed buildings. The captured groundwater will be conveyed to building sumps. The sumps will incorporate a duplexed pump arrangement for 100% pumping redundancy and will be equipped with emergency power (to be designed by others). The foundation drainage systems will outlet to the proposed building storm services.

7.7 Roof Drainage

The proposed buildings will incorporate flat roof designs. Stormwater runoff will be captured by roof drains and conveyed to the building storm services. Stormwater runoff from the Phase 1 and Phase 3 building roofs will be captured by roof drains and conveyed by the proposed storm sewer system to the outlet on Bareille-Snow Street. Runoff from the Phase 2 building roof will be captured by roof drains and conveyed to the storm sewer outlet on Codd's Road. The sizing of the building storm services has been coordinated with mechanical design requirements. In accordance with City of Ottawa standards, the roof drainage system shall not discharge directly to the foundation drainage system. Refer to **Section 8.4** for additional details on the roof controls.

7.8 Free Flow to Municipal Minor System

Stormwater runoff from the perimeter of the site will be conveyed uncontrolled to the municipal storm sewer systems located within the adjacent right-of-ways. Drainage area FF1 is comprised of the free flow area along the southern perimeter of the site which will be conveyed uncontrolled to the Tawadina Road right-of-way. The runoff will be captured within the existing pipe run MH304 to MH305. Drainage area FF2 is comprised of the free flow area along the western perimeter of the site which will be conveyed uncontrolled to the Codd's Road right-of-way. The runoff will be captured within pipe run MH1 to MH2. Drainage area FF3 is comprised of the free flow area along the northern perimeter of the site which will be conveyed uncontrolled to the Codd's Road right-of-way. The runoff will be captured within pipe run MH4 to MH3. Drainage area FF4 is comprised of the free flow area along the eastern perimeter of

the site which will be conveyed uncontrolled to the Bareille-Snow Street right-of-way. The runoff will be captured within pipe run MH20 to MH5.

The capacities of the municipal storm sewers to accommodate additional flow from the site's free flow areas during the design level of service event (i.e. 2-year) have been assessed and summarized in the table below.

Table 7.3: Downstream Storm Sewer Assessment

Street	Pipe Run	Full Flow Capacity*1 (L/s)	Peak Design Flow*1 (L/s)	Free Flow*2 (L/s)	Revised Percent Full*3 (%)
Tawadina Rd.	MH304 to MH305	604.10	*4	10.3	*4
Codd's Rd.	MH1 to MH2	248.81	161.21	8.4	68.2
Codd's Rd.	MH4 to MH3	1,838.53	1,167.47	4.5	63.7
Bareille-Snow St.	MH20 to MH5	906.40	248.85	11.3	28.7

Notes:
1. As per storm sewer design sheet prepared for Wateridge Village at Rockcliffe.
2. Refer to free flow calculations under **Appendix F**.
3. (Peak Design Flow + Free Flow) / (Full Flow Capacity) *100
4. The peak design flow from the existing phase design is unknown, however, the 2-year free flow accounts for only 1.7% of the total pipe capacity.

As shown in the table above, the municipal storm sewers will have adequate capacity to accommodate free flow from the subject site.

7.9 Interim Storm Servicing

The proposed development will be phased and as such will require an interim storm servicing design to manage stormwater runoff until the future phases are constructed. Under the interim condition (i.e. only Phase 1 constructed), runoff from the parking area and building roof will be conveyed by the proposed storm sewer system to the outlet on Bareille-Snow Street as under the ultimate condition. Stormwater runoff from the future Phase 2 and Phase 3 lands will be conveyed by a drainage swale to a temporary ditch inlet catch basin (denoted as DICB 1). The temporary DICB forms part of the Wateridge Village Phase 6-7 design prepared by Arcadis and discharges to pipe run MH20 to MH5 on Bareille-Snow Street via a 200mm diameter catch basin lead. Refer to the interim Storm Drainage Area Plan (DWG. 25117-STM2) and interim storm sewer design sheet provided under **Appendix E** for more details.

8.0 STORMWATER MANAGEMENT

8.1 Existing System

The stormwater management design for Phases 6 and 7 of Wateridge Village at Rockcliffe has implemented a dual drainage design with minor and major systems. The minor system is conveyed by the storm sewer network to the trunk sewer within Kishkabika Park and ultimately to the Eastern SWM Facility. Inlet control devices (ICDs) are utilized to minimize surcharging in the minor system during infrequent storm events, to maximize available surface storage, and to meet the downstream system allowance. The minor system capture is generally based on the 100-year simulated flow for the individual catchments which is increased above the OSDG 2-year target to minimize major system flow leaving the site. The balance of surface runoff not captured by the minor system is conveyed via the major system. The major overland

/ emergency flow route cascades stormwater to the limit of Codd's Road, east of Michael Stoqua Street. Refer to the *DDSWMM Model Schematic*, prepared by Arcadis, under **Appendix F** for more details.

The hydraulic stormwater model (developed by Arcadis) has assumed that the individual development blocks (i.e. the subject site) will incorporate minor system inflow restrictions with major system flow cascading to the adjacent right-of-ways.

8.2 Design Criteria

In accordance with the overarching Arcadis Design Brief and current OSDG, the following stormwater management design criteria have been implemented for the subject site:

- Control minor system peak flows to the allocated rates provided in *Table 5-3* of the Arcadis Design Brief.
- Control major system flows to the allocated rates provided in *Table 5-7* of the Arcadis Design Brief.
- Provide on-site storage (in excess of the allowable release rates) for all storm events up to and including the 100-year event.
- No surface ponding during the 2-year design event.
- Maximum surface ponding depth of 350mm.
- Minimum 300mm of freeboard between 100-year spill elevation and any building openings.
- No spill from stress test (100-year + 20%) onto permanent structures.
- Minimum 150mm of freeboard between spill elevations and ground elevation at building envelope (in proximity to flow route or ponding area).
- Provide a major overland flow route to the adjacent municipal right-of-ways.
- Low Impact Development (LID) targets
    - Infiltration 4mm
    - Erosion Control 4mm
    - Water Quality 15mm (includes 4mm infiltration/erosion target)
- Quality control via the Eastern SWM Facility

8.3 Allowable Release Rates

The stormwater management design for Phases 6 and 7 of Wateridge Village at Rockcliffe allocated minor and major system flows from the subject site (i.e. Block 21). The subject site is identified as catchments B1A and B21 in the Arcadis Design Brief. The minor system design target was based on the 5-year event, and the major system flow was based on the 100-year 3-hour Chicago storm. As discussed under **Section 7.3**, the Arcadis design assumed that the subject site would have two outlets for stormwater. Catchment B1A is conveyed to an outlet on Codd's Road and catchment B21 is conveyed to an outlet on Bareille-Snow Street. The minor and major system allowable release rates for each outlet are summarized in the table below.

Table 8.1: Allowable Release Rates

Outlet	Arcadis Drainage Area ID	Minor System Capture[*1] (L/s)	Major System Flow[*2] (L/s)
Codd's Road[*3]	B1A	142	121
Bareille-Snow Street[*4]	B21	144	122
Total		**286**	**243**

Notes:
1. As per *Table 5-3* from the Arcadis Design Brief. Provided under **Appendix F**.
2. As per *Table 5-7* from the Arcadis Design Brief. Provided under **Appendix F**.
3. Corresponds to Area B1A tributary to pipe run MH1 to MH2.
4. Corresponds to Area B21 tributary to pipe run MH21 to MH20.

8.4 Quantity Control

In order to restrict stormwater peak flows to the allowable release rates established in the overarching Arcadis Design Brief, quantity controls will be required. Drainage area STM1 is comprised largely of the Phase 1 parking area. Since the proposed storm sewers have capacity to convey the unrestricted 100-year peak flow from area STM1, quantity controls for are not required and the drainage area is assumed to be uncontrolled.

Drainage area STM2, STM3, and STM4 are comprised of the future Phase 2 and Phase 3 parking area and adjacent amenity spaces. The catch basins (denoted as CB 2, CB 3, and CB4) will be located atop the proposed Phase 2 parking garage structure and as such will be conveyed by the building's internal plumbing system (to be designed by the Mechanical Engineer). For stormwater management purposes, these drainage areas are assumed to be uncontrolled to avoid the need for inlet restrictions within the shallow inlet structures located atop the parking garage structure.

Drainage areas R1-R3 are comprised of the building roofs and will be restricted by roof drain controls. At the time of writing this report, the total number of roof drains is unknown. The roof drains have been assumed to have a cumulative maximum release rate of 50 L/s/ha taken over the total roof area. A Watts roof drain specification sheet has been provided under **Appendix F** for reference.

Drainage area FF1 is comprised of the free flow area along the southern perimeter of the site which will be conveyed uncontrolled to the Tawadina Road right-of-way. The runoff will be captured within the existing pipe run MH304 to MH305. Drainage area FF2 is comprised of the free flow area along the western perimeter of the site which will be conveyed uncontrolled to the Codd's Road right-of-way. The runoff will be captured within pipe run MH1 to MH2. Drainage area FF3 is comprised of the free flow area along the northern perimeter of the site which will be conveyed uncontrolled to the Codd's Road right-of-way. The runoff will be captured within pipe run MH4 to MH3. Drainage area FF4 is comprised of the free flow area along the eastern perimeter of the site which will be conveyed uncontrolled to the Bareille-Snow Street right-of-way. The runoff will be captured within pipe run MH20 to MH5. Refer to the free flow calculations provided under **Appendix F**.

Drainage area FF5 is comprised of the underground parking garage ramp and will be captured by a trench drain and conveyed by the building's internal plumbing system (to be designed by the Mechanical Engineer). For stormwater management purposes, the drainage area is assumed to be uncontrolled since there will be no surface storage available at the trench drain location.

Peak flows for the 2-year through 100-year design events have been calculated using the Rational Method. The results have been summarized in the tables below.

Table 8.2: Stormwater Peak Flows (to Codd's Road Outlet)

Drainage Area	2-Year Peak Flow (L/s)	5-Year Peak Flow (L/s)	100-Year Peak Flow (L/s)	Flow Control
STM2[*2] (Minor)	15.2	20.6	39.5	Uncontrolled
STM3[*2] (Minor)	4.8	6.5	12.4	Uncontrolled
STM4[*2] (Minor)	10.5	14.3	28.1	Uncontrolled
R2[*1] (Minor)	10.7	10.7	10.7	Roof Drains
FF2[*2] (Major)	8.4	11.5	23.0	Uncontrolled
FF3[*2] (Major)	4.5	6.1	12.6	Uncontrolled
Total (Minor)	**41.2**	**52.1**	**90.8**	
Total (Major)	**12.9**	**17.5**	**35.5**	
Allowable (Minor)[*3]	**142**	**142**	**142**	
Allowable (Major)[*3]	**121**	**121**	**121**	

Notes:
1. Peak flows for roof areas are based on a maximum roof drain release rate of 50 L/s/ha.
2. Peak flows for uncontrolled areas are calculated at a time of concentration of 10 minutes.
3. Allowable release rates as per Arcadis Design Brief.

Table 8.3: Stormwater Peak Flows (to Bareille-Snow Outlet)

Drainage Area	2-Year Peak Flow (L/s)	5-Year Peak Flow (L/s)	100-Year Peak Flow (L/s)	Flow Control
STM1[*3] (Minor)	21.2	28.7	54.9	Uncontrolled
R1[*1] (Minor)	14.6	14.6	14.6	Roof Drains
R3[*1] (Minor)	5.9	5.9	5.9	Roof Drains
FF4[*2] (Major)	11.3	15.3	30.5	Uncontrolled
FF5[*2] (Minor)	3.5	4.8	9.1	Uncontrolled
Total (Minor)	**45.2**	**54.0**	**84.5**	
Total (Major)	**11.3**	**15.3**	**30.5**	
Allowable (Minor)[*4]	**144**	**144**	**144**	
Allowable (Major)[*4]	**122**	**122**	**122**	

Notes:
1. Peak flows for roof areas are based on a maximum roof drain release rate of 50 L/s/ha.
2. Peak flows for free flow areas are calculated using the Rational Method at a time of concentration of 10 minutes.
3. Peak flow calculated using the Rational Method at a time of concentration of 10 minutes.
4. Allowable release rates as per Arcadis Design Brief.

Table 8.4: Cumulative Stormwater Peak Flows

Outlet	2-Year Peak Flow (L/s)	5-Year Peak Flow (L/s)	100-Year Peak Flow (L/s)
Codd's Rd. (Minor)	41.2	52.1	90.8
Codd's Rd. (Major)	12.9	17.5	35.5
Bareille-Snow St. (Minor)	45.2	54.0	84.5
Bareille-Snow St. (Major)	11.3	15.3	30.5
Tawadina Rd.*1 (Major)	10.3	14.0	27.6
Total (Minor)	**86.4**	**106.1**	**175.3**
Total (Major)	**34.6**	**46.9**	**93.7**
Allowable (Minor)*2	**286**	**286**	**286**
Allowable (Major)*2	**243**	**243**	**243**

Notes:
1. Peak flows for free flow area FF1.
2. Allowable release rates as per Arcadis Design Brief.

As shown in the tables above, the total peak flows from the subject site do not exceed the allowable release rates and therefore the site has been designed in accordance with the overarching Arcadis Design Brief.

8.5 Quantity Storage

In order to restrict stormwater peak flows to the rates provided in **Section 8.4**, on-site storage will be required. On-site storage (in excess of the allowable release rates) will be required for all storm events up to and including the 100-year event. In accordance with the current OSDG, there shall be no surface ponding during the 2-year event, and the maximum ponding depth shall not exceed 350mm. Required storage volumes have been calculated for each drainage area using the Modified Rational Method and the allowable release rates provided in **Section 8.4**.

Since drainage areas STM1-STM4 will be uncontrolled, stormwater runoff for up to and including the 100-year design event will be fully captured by the minor system and no surface storage will be required.

The required storage volumes for drainage areas R1-R3 will be provided as rooftop storage. At the time of writing this report, ponding details for the building roofs are unknown. Available storage volumes for the roofs have been estimated by assuming a conical shaped ponding area with a maximum ponding depth of 150mm.

Storage volumes and ponding depths for the on-site catchment areas during the 100-year design event have been summarized in the table below.

Table 8.5: 100-Year Storage Volumes & Ponding Depths

Drainage Area	100-Year Event		
	Required Storage Volume (m^3)	Available Storage Volume (m^3)	Surface Ponding Depth[*1] (m)
STM1	0.0[*4]	3.6[*2]	0.00
STM2	0.0[*4]	5.1[*2]	0.00
STM3	0.0[*4]	21.1[*2]	0.00
STM4	0.0[*4]	0.7[*2]	0.00
R1	112.1	146.2[*3]	0.15
R2	82.2	107.2[*3]	0.15
R3	45.2	58.9[*3]	0.15

Notes:
1. Ponding depths are measured from the ponding elevation to the top of grate elevation.
2. Available surface storage volumes are calculated using AutoCAD Civil3D by Autodesk.
3. Available roof storage estimated based on conical shaped ponding area at 150mm ponding depth.
4. Capacity of minor system exceeds peak flow therefore no surface storage is required.

As shown in the table above, adequate on-site storage has been provided to detain the 100-year event to the allowable release rates established in the overarching Arcadis Design Brief. Refer to the Ponding Area Plan (DWG. 25117-PA1) and the storage volume tables provided under **Appendix F** for more details.

8.6 Stress Test (100-YR + 20%) and Freeboard

The stress test (100-year + 20%) event must be assessed to ensure that ponding limits do not encroach onto adjacent permanent structures. Flows and required storage volumes for the stress test event are shown on the storage volume tables provided under **Appendix F**. For drainage areas STM1-STM4, no surface ponding will occur during the street test event. For building floodproofing, a minimum freeboard of 0.30m must also be provided between the maximum static ponding elevation and any building openings adjacent to the ponding area. The table below demonstrates the provided freeboard for the subject site:

Table 8.6: Provided Freeboard

Drainage Area	Max. Static Ponding Elev.[*1] (m)	Building Opening Elevation (m)	Freeboard (m)	Stress Test Ponding Elev. (m)	Ground Surface Elev.[*2] (m)	Freeboard (m)
STM1	90.27	90.65	0.38	90.18[*3]	90.48	0.30
STM2	90.31	90.65	0.34	90.21[*3]	90.60	0.39
STM3	90.28	90.65	0.37	90.08[*3]	90.45	0.37
STM4	90.60	90.90	0.30	90.50[*3]	90.85	0.35

Notes:
1. Maximum static ponding elevation before spilling occurs.
2. Ground surface elevation at perimeter of closest permanent structure adjacent to ponding area.
3. Where no surface ponding will occur, ponding elevations are set to the T/G elevation.

As shown in the table above, adequate freeboard has been provided to protect the on-site buildings from flooding for up to and including the stress test event. Refer to the Ponding Area Plan (DWG. 25117-PA1) provided under **Appendix F** for more details.

8.7 Major System

The major system for the subject site has been designed to cascade overland flow from the individual catchment areas to the adjacent municipal right-of-ways. Overland flow from drainage area STM4 and STM1 will cascade east to the Bareille-Snow Street right-of-way. Overland flow from drainage areas STM2 and STM3 will cascade north to the Codd's Road right-of-way. As discussed further under **Section 8.6**, adequate freeboard has been provided in accordance with the current OSDG.

8.8 Low Impact Development (LID)

8.8.1 LID Design Targets

Low impact development (LID) targets for the subject site were established in the overarching Wateridge Village Phases 6 & 7 Developer Checklist prepared by Aquafor Beech Limited. The design targets have been summarized below:

- Infiltration Target — 4mm (applied to full catchment area)
- Erosion Control Target — 4mm (applied to full catchment area)
- Water Quality Target — Minimum: 15mm (applied to impervious catchment area)
  Enhanced: 25mm (applied to impervious catchment area)

Using the above design targets, stormwater volumes have been calculated for the ultimate development. The required volumes associated with the LID design targets have been summarized in the table below:

Table 8.7: LID Design Targets

Total Site Area (m^2)	Impervious Area (m^2)	Infiltration/ Erosion Control Target[*1] (m^3)	Water Quality Target[*2] (m^3)	
			Minimum	Enhanced
13,979	9,811	55.9	107.9	206.0

Notes:
1. Based on target of 4mm. Catchment based target applied over the full catchment area.
2. Based on target of 11mm for minimum requirements and 21mm for enhanced. Target is applied directly to contributing impervious area. The water quality target includes the infiltration/erosion control target (i.e. water quality target = 15mm water quality event – 4mm infiltration/erosion control target).

The above targets will be achieved through the implementation of LID measures as discussed in the sections below. Refer to the LID Drainage Area Plan & Details (DWG. 25117-LID1) under **Appendix G**.

8.8.2 Permeable Surfaces

The LID design targets will be achieved by the implementation of permeable surfaces to promote stormwater retention and infiltration. Permeable pavement is proposed within the limits of the Phase 1 parking area (LID-1) and permeable sidewalks are proposed on the north side of the Phase 1 building (LID-2). Areas of the site which are located directly above the underground parking garage structures are not considered suitable for permeable surfaces.

The drop off access from Tawadina Road and the adjacent sidewalk were considered, however, the Owner intends to install heat tracing materials in this area to prevent slipping hazards for the senior residents and therefore permeable surfaces were not feasible in this location. The permeable surfaces are proposed to be manufactured by PurePave (or approved equivalent). PurePave systems offer the following benefits:

- Superior Infiltration: 35 to 70 times more permeable than traditional materials.
- Extreme Durability: 3 to 6 times stronger than asphalt.
- Winter Performance: Designed for extreme winter conditions, resisting frost heave, ice buildup, and salt damage.
- Low Maintenance: Self-draining surface eliminates ponding, reducing erosion and long-term maintenance costs.

Refer to the PurvePave brochure and specifications under **Appendix G** for more details. The PurePave system includes the following key elements:

- PurePave surface material
- Compacted clear stone layer
- Perforated underdrain (optional – required in high groundwater conditions or with impermeable liner)
- Biaxial geogrid on bottom and sides
- Concrete header (required where there is a transition to different material type)
- Impermeable liner (required within 4 metres of building foundation)

The typical PurePave structure will vary depending on the application (i.e. heavy-duty pavement vs sidewalks). Detailed shop drawings will be provided by PurePave for each application prior to construction. Where a permeable surface is proposed within 4.0 metres of a building foundation, an impermeable liner will be required. On the north side of the Phase 1 building, a 100mm diameter perforated subdrain is proposed within the PurePave system to provide an outlet for stormwater in the area where an impermeable liner is required. The subdrain will outlet to the 300mm storm sewer run between maintenance holes ST201 and OGS1. Stormwater storage will be provided within the underlying clear stone layers to achieve the LID design targets for the site.

8.8.3 Provided Storage Volumes

The implementation of permeable surfaces will provide adequate retention volumes to meet the LID design targets established for the site. The provided storage volumes for each LID feature have been summarized in the table below.

Table 8.8: LID Provided Storage Volumes

LID ID	Feature Type	Surface Area of LID Feature[*1] (m^2)	Depth of Clear Stone Storage Layer[*2] (m)	Provided Storage Volume (m^3)
LID-1	Permeable Pavement	590	0.40	94.4
LID-2	Permeable Sidewalk	137	0.30	16.4
			Total	**110.8**

Notes:
1. Surface area of LID features excludes areas within municipal right-of-way.
2. Void ratio of 0.40 assumed for clear stone layers.

As shown in the table above, the cumulative provided storage volume for all on-site LID measures is 110.8 m^3. When averaged over the total site area (13,979 m^2) the average rainfall depth retained is equal to 7.9mm which well exceeds the 4mm infiltration/ erosion control target. When average over the total site impervious area (9,811 m^2) the average rainfall depth retained is equal to 11.3mm which exceeds the 11mm water quality target.

8.8.4 Ratio of Impervious Area

For each LID measure, the ratio of impervious area to LID feature surface area has been assessed based on recommendations from the LID Manual. The results have been summarized in the table below.

Table 8.9: Ratio of Impervious Area to LID Surface Area

LID ID	Feature Type	Contributing Imp. Drainage Area (m^2)	LID Feature Surface Area[*2] (m^2)	Ratio of Imp. Area to LID Surface Area
LID-1	Permeable Pavement	423[*1]	590	0.7:1
LID-2	Permeable Sidewalk	102	137	0.7:1

Notes:
1. Contributing area to permeable pavement excludes area treated by permeable sidewalk.
2. LID feature surface area excludes area within the municipal right-of-way.

Table 3.4.1 from the LID Manual (provided under **Appendix G** for reference) provides typical impervious area to facility treatment area ratios for various LID practices. For permeable surfaces, the recommended ratio is 1:1 to 1.2:1. As shown in the table above, the ratios for the permeable surfaces do not exceed 1.2:1 and are in accordance with the LID Manual recommendations.

8.8.5 Infiltration Rates

Cambium completed in-situ infiltration testing using a Guelph Permeameter in areas where LID measures were being considered. The nearest test location to the proposed permeable surfaces is identified as GP103-26 on the Test Location Plan (provided under **Appendix G**). The measured infiltration rate must be divided by a safety correction factor (from *Table C2* of the LID Manual) to determine the design infiltration rate. The testing indicated that the in-situ soils have an average infiltration rate of 66 mm/hr. After applying a safety correction factor of 2.5, the design infiltration rate has been calculated to be 26.4 mm/hr which remains favourable for infiltration-based measures. Refer to excerpts under **Appendix G**.

8.8.6 Soil Amendments

In accordance with the Developer Checklist and as discussed in the Arcadis Design Brief, all landscaped areas will require soil amendments to further enhance water quality benefits. The following excerpts are from the Arcadis Design Brief:

Soil amendments are typically composed of the addition of additional organic matter in the form of compost. Compost amendments are tilled or mixed into existing soils thereby enhancing or restoring soil properties by reversing the loss of organic matter and compaction.

In general, soils with appropriate levels of organics, nutrients and good structure are capable of supporting plant and animal life while also providing important stormwater management functions. Healthy soils efficiently infiltrate and store water, adsorb excess nutrients, filter sediments, remove pollutants through biological decomposition, as well as moderate peak

stream flows and temperatures. In addition, healthy soils support vigorous plant and tree growth that also intercepts rainfall and return it to the atmosphere through evaporation and transpiration. Healthy soils also support urban tree canopy cover, a focus of many urban planners and ecologists.

Hydrologically speaking, soil amendments are used to make Hydrologic Group C and D soils suitable for on-site stormwater control and infiltration. Soil amendments benefits include increased infiltration, stormwater storage in the soil matrix, survival rate of new plantings, root growth and stabilization against erosion, improved overall tree and plant health and decreased need for irrigation and fertilization of landscaping. Amended soils are suitable for any pervious area where soils have been or will be compacted by the grading and construction process. [Arcadis Design Brief, Section 6.5]

The options for soil amendments (as detailed in the Developer Checklist) have been provided under **Appendix G** for reference.

8.8.7 Site Constraints

Approximately 62% of the total site area will be comprised of underground parking garage structures which limits the available space to implement infiltration based measures. A minimum horizontal separation of 4.0 m is recommended between building foundations and infiltration based LID measures. Where minimum separations cannot be achieved, impermeable liners shall be implemented. The site is also constrained by 5.0 m wide hydro easements spanning the western and northern property boundaries, further reducing the available space to implement LID measures on-site.

Section 3.1 of the Developer Checklist outlines site conditions which are considered unsuitable or may increase facility failure rate for infiltration based controls. Field investigations were completed by Cambium to verify site conditions and the suitability of LID measures (refer to the Infiltration Assessment prepared by Cambium under a separate cover).

Cambium installed three monitoring wells within the limits of the subject site and recorded groundwater levels in April and May 2026 to verify the seasonally high groundwater levels. Two of the monitoring wells (i.e. MW101-26 and MW102-26) were dry during spring testing, however, MW103-26 had measured groundwater depths of 0.97m and 0.87 during April and May respectively. Refer to groundwater excerpts from the Infiltration Assessment under **Appendix G**.

The recent geotechnical investigations for the site have identified that underlying bedrock was encountered at all borehole locations. The validity of the bedrock was also confirmed by rock coring. Of the four boreholes recently completed, the depth to bedrock ranged from 1.3 m (88.60m) up to 2.8 m (85.80m) below the original ground surface. Additional test pits were excavated across the subject site to further delineate bedrock elevations (locations shown on DWG. 25117-LID1). Refer to excerpts from the geotechnical investigation and Infiltration Assessment under **Appendix G** for more details.

Table 8.10: Summary of LID Constraints

Finished Surface Elev.[*1] (m)	Bottom of LID Elev.[*1] (m)	Bedrock Elev.[*3] (m)	Bedrock Separation[*1] (m)	HGW Elev.[*1] (m)	HGW Separation (m)
90.48	90.02	86.60	3.42	88.93	1.09

Notes:
1. Constraints assessed at location of MW103-26.
2. Groundwater level recorded by Cambium in MW103-26.

3. Bedrock elevation based on on-site investigations.
4. Assessed at highest bedrock location.

As shown in the table above, the bottom of the proposed LID measures will meet the minimum 1.0 metre separation to bedrock based on inferred elevations between test locations. As shown in the table above, the bottom of the proposed LID measures will also meet the minimum 1.0 metre separation to the seasonally high groundwater table based on an assumed depth of 0.87 metres below original ground. All permeable surfaces are proposed in fill areas where the finished surface grade will be located above original ground and therefore it is not anticipated that the proposed LID measures will be impacted by the seasonally high groundwater table. In the event that groundwater levels are elevated during the spring freshet, there remains a benefit for the implementation of infiltration based measures for the remainder of the year when groundwater levels are lower.

Additional LID measures were considered for the site including bioretention areas around the perimeter of Phase 1 and underground infiltration chambers fed from the building roofs. Upon further review of bedrock and groundwater elevations, minimum separations could not be achieved and therefore these measures were deemed to be unfeasible.

8.8.8 Winter Operation

For the permeable surfaces, PurePave is designed for extreme winter conditions and is functional in all seasons. PurePave has been tested and proven to reduce ice accumulation, support snow melt and reduce dependency on de-icing treatments. Winter maintenance operations which could potentially clog the system, such as frequent sanding, should be avoided.

8.9 Quality Control

Stormwater runoff from the subject site will ultimately discharge to the Eastern SWM Facility located northwest of the development. The Eastern SWM Facility was designed to provide enhanced level quality control for the tributary drainage area (which includes the subject site). The Arcadis Design Brief provided updated design calculations to demonstrate that the facility remains adequately sized to provide water quality treatment for the tributary drainage area following the development of Phase 6 and Phase 7. Since quality control will be provided by the existing SWM facility, no additional on-site measures are required. However, the LID measures discussed under **Section 8.8** will provide additional quality control for a portion of the site's stormwater runoff.

To mitigate the risks of trash/debris and/or hydrocarbons entering the storm sewer system, a Tempest HF (high flow) ICD is proposed to be installed within the outlet pipe of the catch basin (i.e. CB 1). The Tempest HF ICD design eliminates the passage of odours and floatables (i.e. trash and hydrocarbons) and allows for debris and sediment to collect in the structure. Since the catchment area is assumed to be uncontrolled, no flow restrictions are required. Refer to the Tempest correspondence provided under **Appendix G** for more details.

Groundwater sampling completed as part of the Hydrogeological Assessment has identified exceedances of TSS, metals, and total phosphorus above the permitted concentrations listed in the City's Sewer Use By-Law for municipal storm sewers. Since any groundwater captured by the building's foundation drainage system will ultimately be discharged to the municipal storm sewer system, mitigation measures to reduce the exceedances have been requested by the City. As noted in the Hydrogeological Assessment, the implementation of a standard oil-grit separator (OGS) is expected to reduce TSS, metals, and phosphorus concentrations to acceptable levels. An OGS unit (denoted as OGS1) is proposed on private property, upstream of the outlet to the municipal storm sewer system on Bareille-Snow Street. In accordance with

the City's Sewer Use By-Law, a monitoring maintenance hole (denoted as ST204) will also be provided on private property, immediately downstream of the OGS unit. The incorporation of a second OGS unit for the proposed storm sewer outlet on Codd's Road will need to be assessed during the detailed design of the Phase 2 building.

The OGS unit is proposed to be a Stormceptor, Model EFO4, designed by Imbrium Systems (or approved equivalent). The Stormceptor EFO removes stormwater pollutants through gravity separation and floatation, and generates positive removal of total suspended solids (TSS) throughout each storm event, including high intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. The Stormceptor EFO technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants and therefore are approved for inline installation. The sizing report (prepared by Rinker Materials) indicates that the unit will provide approximately 83% TSS removal using a fine particle size distribution (PSD). Refer to the OGS correspondence provided under **Appendix G** for more details.

The Stormceptor technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. When prescribed surface loading rates are exceeded, ponding water can overtop the weir height and bypass the lower treatment chamber, exiting directly through the outlet pipe. Hydraulic testing and scour testing demonstrate that the internal bypass effectively prevents scour at all bypass flow rates. Increasing the bypass flow rate does not increase the orifice-controlled flow rate into the lower treatment chamber where sediment is stored. This internal bypass feature allows for in-line installation, avoiding the cost of additional bypass structures. During bypass, treatment continues in the lower chamber at the maximum flow rate. The Stormceptor EFO's lower design surface loading rate is favorable for minimizing re-entrainment and washout of captured light liquids. An ISO 14034 ETV Verification Statement which summarizes the results of third-party testing and verification in accordance with ETV protocol has been provided under **Appendix G**.

Regular inspection and maintenance on the Stormceptor unit (Model EFO4) will be required to ensure maximum operation efficiency and high pollutant removal performance. Inspection of the treatment unit is required as follows:

- Post-construction; prior to putting the unit into service.
- Routine inspections (minimum quarterly); during the first year of operation to accurately assess pollutant accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year, however, should not occur less than once per year.
- Immediately after oil, fuel, or other chemical spills.
- Immediately following major storm events (>25mm rainfall in 24 hour period)

Maintenance cleaning of the treatment unit is required as follows:

- If post-construction inspection indicates presence of construction sediment greater than a few inches, maintenance is recommended at that time.
- The unit should be cleaned out once the sediment depth reaches 203 mm (8 inches).
- Immediately after an oil, fuel, or other chemical spill.

The frequency of inspection and maintenance may need to be adjusted based on site conditions to ensure the unit is operating and performing as intended. Refer to the complete inspection and maintenance manual provided by the manufacturer under **Appendix G**.

8.10 Interim Stormwater Management

The proposed development will be phased and as such will require an interim stormwater management design to manage stormwater runoff until the future phases are constructed. Since the site will remain largely undeveloped, stormwater peak flows will be reduced compared to the ultimate condition. Under the interim condition (i.e. only Phase 1 constructed), runoff from the parking area and building roof will be controlled by the same measures as under the ultimate condition, however, the tributary drainage area to CB 1 (denoted as STM1-1) will be reduced. Stormwater runoff from the future Phase 2 and Phase 3 lands (denoted as STM2-1) will be conveyed by a drainage swale to a temporary ditch inlet catch basin (denoted as DICB 1). The temporary DICB forms part of the Wateridge Village Phase 6-7 design prepared by Arcadis and discharges to pipe run MH20 to MH5 on Bareille-Snow Street via a 200mm diameter catch basin lead. Using the Modified Rational Method and the capacity of the temporary DICB lead as a release rate, it has been determined that no surface ponding will occur for up to and including the 100-year design event. Refer to the supporting flow and storage volume calculations provided under **Appendix F** for more details.

9.0 EROSION AND SEDIMENT CONTROL

Prior to construction and until vegetation has been re-established in disturbed areas, temporary erosion and sediment control measures must be implemented to mitigate the impact of construction on receiving watercourses and existing infrastructure. The following erosion and sediment control (ESC) measures have been proposed for the subject site:

- Limiting the extent of exposed soils at any given time.
- Erosion and sediment control measures shall be maintained until vegetation has been re-established in all disturbed areas. Re-vegetate disturbed areas in accordance with approved Landscape Plan as soon as possible.
- Stockpile soil away (15 metres or greater) from watercourses, drainage features and top of steep slopes.
- Installation of silt sacks between frame and cover on all proposed and existing catch basins and open cover storm manholes until construction is completed.
- Silt fence barriers to be installed and maintained along property boundaries and where indicated on the erosion and sediment control plans.
- Installation of mud mats at all construction entrances.
- For dry weather periods (active and/or inactive construction phases) inspections of ESC measures shall be undertaken on a weekly basis.
- Inspection of ESC measures shall be undertaken immediately after major storm events (>25mm of rain in 24 hour period), significant snowmelt events (melting of snow at a rate which adversely affects the performance and function of the system), and extreme weather events.
- Visual inspections shall also be undertaken in anticipation of large storm events (or a series of rainfall and/or snowmelt days) that could potentially yield significant runoff volumes.
- Identify and rectify any deficiencies and undertake necessary maintenance measures as soon as possible.
- Inspections and maintenance of temporary ESC measures shall continue until they are no longer required.

- The Contractor shall ensure that records of inspection are taken, including at a minimum:
  - the inspector's name;
  - date of inspection;
  - visual observations;
  - any necessary remedial measures taken to maintain the interim ESC measures.
- Care shall be taken to prevent damage to ESC during construction operations.
- In some cases, barriers may be removed temporarily to accommodate construction operations. The affected barriers shall be reinstated immediately after construction operations are completed.
- ESC should be adjusted during construction to adapt to site features as the site becomes developed.
- ESC shall be cleaned of accumulated sedimentation as required and replaced as necessary.
- During the course of construction, if the Engineer believes that additional prevention methods are required to control erosion and sedimentation, the Contractor shall implement additional measures, as required, to the satisfaction of the Engineer.
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) 805.

Refer to the Erosion and Sediment Control Plan (DWG. 25117-ESC1) and Interim Erosion and Sediment Control Plan (DWG. 25117-ESC2) under **Appendix B** for more details.

9.1 ESC for LID Practices

LID practices which rely on infiltration require specific ESC during construction to prevent contamination and/or clogging of the systems during construction. The LID Pilot Project Report prepared by Aquafor Beech provides guidance on ESC for LID practices. Best management practices for a LID ESC plan should include:

- A multi-barrier approach which begins with erosion controls, followed by sediment controls and avoids reliance on a single control point for sediment.
- Retain existing vegetation to the greatest extent possible for as long as possible.
- Minimize disturbed areas.
- Reduce runoff velocities and detain runoff to promote settling.
- Divert runoff from problem areas and away from infiltration based LID practices.
- Minimize slope length and gradient of disturbed areas.
- Maintain overland sheet flow and avoid concentrated flows.
- Store and stockpile soils away from LID practices, watercourses, drainage features and top-of-slopes.
- Acknowledgment that ESC plans are dynamic and require application of the Adaptive Management Approach (AMA) whereby the ESC plan is continually updated as a result of site inspections.

ESC measures to protect the proposed LID practices are shown on the Erosion and Sediment Control Plans under **Appendix B**. The ESC plan will need to be reassessed once construction staging plans are known.

10.0 CONCLUSIONS

It has been demonstrated that the proposed development for Block 21 within Phase 7 of Wateridge Village at Rockcliffe can be adequately serviced and stormwater management requirements can be achieved in keeping with current City of Ottawa guidelines and

overarching reports. Specifically, the development of the site will include the following key servicing and stormwater management design features:

- Each building will receive independent water supply via twin 152mm diameter water service connections to the municipal watermains within Codd's Road and Bareille-Snow Street.
- Water supply for fire protection will be provided by the municipal hydrants located along the adjacent right-of-ways.
- Wastewater flows will be conveyed via 250mm diameter sanitary services to the municipal sanitary sewer systems within Codd's Road and Bareille-Snow Street.
- Stormwater runoff (minor system) will be captured and conveyed by on-site storm sewer systems to the municipal storm sewer systems within Codd's Road and Bareille-Snow Street.
- Stormwater peak flows will be restricted to the allowable release rates established in the overarching Arcadis Design Brief prepared for Phase 6 and Phase 7 of the Wateridge Village at Rockcliffe.
- Adequate on-site storage will be provided for all events up to and including the 100-year design event.
- The major system design will convey overland flow to the adjacent municipal right-of-ways.
- Low impact development (LID) measures have been incorporated into the site design to achieve infiltration (water balance) and erosion control targets (where feasible).
- Enhanced level quality control of stormwater runoff will be provided by the existing Eastern SWM Facility.
- An inline OGS unit will be provided for additional stormwater treatment.
- Erosion and sediment control measures will be implemented prior to construction and maintained until vegetation has been re-established in disturbed areas.

Report Prepared By:



Brandon MacKechnie, P.Eng.
Project Engineer

Appendix A

Pre-Consultation Meeting Feedback

Topographic Plan (prepared by Monument-Urso Surveying Ltd.)

Figure 1.7 – Phasing Plan
(prepared by Arcadis)

General Plan of Services
(prepared by Arcadis)

File No.: PC2025-0281

November 24, 2025

Bridgette Alchawa
Keeper Co.
Via email: bridgette@keeperco.ca

Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Application – 200 Codd's Road

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on November 12, 2025.

Pre-Consultation Preliminary Assessment

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. For your next submission, please submit the required Application Form, together with the necessary studies and/or plans to planningcirculations@ottawa.ca, copy (cc:) to the file lead and planning support.

2. In your subsequent pre-consultation or application submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed is requested with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density it is recommended that a subsequent pre-consultation application be submitted.

4. If the Urban Design Review Panel (UDRP) Report is listed as a required submission material in the Study and Plan Identification List, the applicant must visit the UDRP prior to formally submitting the planning application. The UDRP report is required for the application to be considered complete.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

Official Plan

1. Inner Urban Transect

    a. Minor Corridors provide residents with a full range of services within a walking distance from home, in order to support the growth of 15-minute neighbourhoods.

    b. Privatization of curb space through increasing private approaches is generally discouraged.

    c. Transportation will accommodate motor vehicle access and movement provided doing so does not erode the public realm nor undermine the priority of pedestrians, cyclists and transit users.

    d. Where new development is proposed to include parking as an accessory use, such parking shall be hidden from the public realm by being located behind or within a building, or underground. Parking shall be accessed in ways that minimize impact on the public realm and public/private trees.

    e. All buildings along Minor Corridors shall have active entrances facing the Corridor.

2. Codd's on west side of site – Minor Corridor

    a. Development shall ensure appropriate transitions in height.

    b. Enhance circulation network throughout the site for pedestrians and cyclists.

    c. Provide for a mix of uses.

d. Development shall address the corridor, and access shall generally be provided from the parallel or side street.

3. Evolving Overlay

Secondary Plan

4. Low-Rise to Mid-Rise mixed-use.

    a. Requires a variety of uses including mixed-uses at-grade

5. Building Frontage – west side of block on Codd's

    a. Schedule A – Frontages – the ground floor will be developed to have active retail-type frontages with clear windows and functional entrances across the majority of the building façade (West – Codd's Road)

6. Schedule B - Max height: 30m

7. Schedule C - 143 units per hectare

8. Section 3 2) Surface parking areas are to be located within the interior of development blocks and separated on a minimum of three sides from public rights of way, parks and open spaces with built form

9. Section 6.2 4) Master Plan is required – must show how the development adheres to the SP direction, including density.

Zoning

10. GM31 H(30)

General Comments

11. Staff appreciate the provision of additional density within the Wateridge Subdivision, which surpass the density targets of the Secondary Plan – however, please consult the IPM's comments regarding the infrastructure capacity requirements below.

12. Staff have concerns with the at-grade surface parking lot. The policy framework indicates that parking shall be hidden from the public realm and separated from a minimum of three sides from the public right-of way. Please explore opportunities to better screen and reorient the parking lot to have less of an impact on the public realm.

    a. If all parking were to be located underground, with exception of screened visitor and staff parking, the at-grade conditions would provide for a significant amount of outdoor amenity space for residents as opposed to prioritizing vehicles.

b. The provision of perpendicular parking may represent some safety issues given the lack of crosswalks through the parking lot as well as the curvature of the driveway.

13. In the same vein, we have very significant concerns with the phase 1 parking lot given the SP policies pertaining to the location of parking. An underground parking garage should be provided instead of surface parking at-grade. We have doubts with regards to supportability of the Phase 1 concept plan given it does not adhere to the OP and Secondary Plan Policies relating to location of vehicular parking and impacts to the public realm.

14. Please explore opportunities to make the loading areas and parking garage ramps more efficient. They are all in close proximity to each other and result in a wide expanse of paved area. Look into how they can be consolidated and better oriented to mitigate conflict between vehicles and pedestrians. Some considerations include

    a. Providing one entrance to the underground parking garage. The proposed two entrances are very close to each other.

    b. Internalizing the loading areas to be within the building massing and locating the entrances further from each other.

15. Explore opportunities to improve pedestrian circulation through the parking lot. The current configuration provides for pedestrian crossings at opposite ends of the lot, which may present accessibility and safety concerns for those travelling between buildings.

16. Explore opportunities to locate the horseshoe driveway along the interior of the site at the rear of the retirement home. Staff understand that retirement home facilities have certain requirements for these sorts of accesses, but given the policies of the Secondary Plan, which aim to prioritize pedestrian and cyclist movement and provide for a pedestrian friendly public realm, staff encourage opportunities to better address the integration of the southern frontage along the street to benefit the pedestrian scale public realm.

17. Ensure that the developments meet the Urban Design policies of the Official Plan pertaining to providing an appropriate transition to surrounding developments through articulation of the massing, which should include step-backs to provide for a more pedestrian scale podium massing.

18. Dwelling units located at-grade are encouraged to provide for independent entrances to improve the streetscape through physical and visual activation of the façade.

19. Further, along Codd's Road, the Secondary Plan policies note that the ground floor will be developed to have active retail-type frontages with clear windows and functional entrances across the majority of the building façade. Please incorporate a mix of permitted uses at-grade, such as medical facilities, etc. to provide for a mix of uses that serve the buildings on-site and the surrounding area.

20. Landscaping and street trees within the Wateridge subdivision are a priority. In your formal submission, we will want to see a mix of private and public trees throughout the site.

21. A mix of dwelling unit sizes is highly encouraged and supported by Official Plan policies to provide for a diverse range of residents and needs within the community. Large household dwelling units (being 3 dwelling units or an equivalent size) are requested.

22. A 1:1 ratio of bicycle parking spaces per dwelling unit is highly encouraged for the apartment building.

23. While staff can appreciate the proposed development is meant to be a cohesive and connected development, the two apartment buildings do not meet the definition of a Retirement Home, and therefore need to meet the requirements of the Zoning By-law applying to mid-rise apartment buildings.

    The Zoning By-law includes the following definition: "**Retirement home** means a building or a part of a building containing rooming units or a combination of rooming and dwelling units, providing residence mostly to senior citizens who do not require assistance with daily living, and which may provide ancillary health, personal service, and recreational services to serve the residents of the home, and may have up to 25 per cent of its gross floor area devoted to providing supervised or supportive in-house care for those who need assistance with daily living including on-going medical care, nursing care, counselling and social support services. (maison de retraite) (By-law 2016-131)"

24. The proposed development will need to meet the requirements of the Planned Unit Development provisions (Section 131).

25. The proposed canopy/awning in front of the Retirement Home will be considered a permitted projection. Please ensure the development meets the requirements of Section 65 of the Zoning By-law as it pertains to projections such as canopies and awnings. Staff will be looking to review the massing impacts of this projection at the time of review for the Site Plan Control application.

26. Please refer to Section 109 of the Zoning By-law (Location of Parking) to ensure the proposed parking spaces adhere to the requirements, which prohibit parking in a required front yard, in a required corner side yard, or in the extension of a required corner side yard into a rear yard.

27. If zoning relief is required, then please consult with Staff on the required submission materials for a complete Zoning By-law Amendment application.

Please feel free to contact, Jack Smith, Planner II, for follow-up questions.

Urban Design

Comments:

28. Urban Design Brief is required. Please see attached customized Terms of Reference to guide the preparation.

    a. The Urban Design Brief should be structured by generally following the headings highlighted under Section 3 – Contents of these Terms of Reference.

    b. Please ensure the Design Brief Addresses the following policy/guidelines:

        i. Official Plan

        ii. Water ridge Secondary Plan

        iii. Water Ridge Community Design Plan

29. Additional drawings and studies are required as shown on the SPIL. Please follow the terms of references (Planning application submission information and materials | City of Ottawa) to prepare these drawings and studies. These include:

    a. Site Plan

    b. Landscape Plan

    c. Elevations

    d. Conceptual Floorplans

    e. Shadow Analysis

    f. UDRP Report

Urban Design Review Panel Review and Report

30. The site is located within a Design Priority Area and is subject to review by the Urban Design Review Panel. UDRP review occurs within the preconsultation stage. To proceed with UDRP review, please contact udrp@ottawa.ca.

31. The submission of a UDRP report is a requirement for deeming an application complete. Please follow the instructions provided in the Terms of Reference available here: Urban Design Review Panel Report (ottawa.ca)

Comments on Preliminary Design

32. Ottawa is currently in the process of developing Urban Design Guidelines for Mid-Rise buildings - Urban Design Guidelines for Mid-Rise Buildings | Engage Ottawa. Please keep informed on this process.

33. Overall, the site is overly auto oriented. Look at alternate massing and site plan options to internalize some of the auto and loading functions within the buildings to improve amenity and wayfinding within the site:

    a. Parking garage ramps should be internalized within the building. Look at opportunities to consolidate to 1 ramp

    b. Consider locating garbage within the parking garage and winch up to minimize space for loading/garbage at grade.

    c. Ensure that parking spaces are buffered from the building by landscaping.

    d. Underground parking should be provided in Phase 1.

34. Parking and loading areas should be screened from the ROW:

    a. Please look at alternate building configurations to provide additional building frontage on Bareille-Snow Street to screen loading and parking garage entrances.

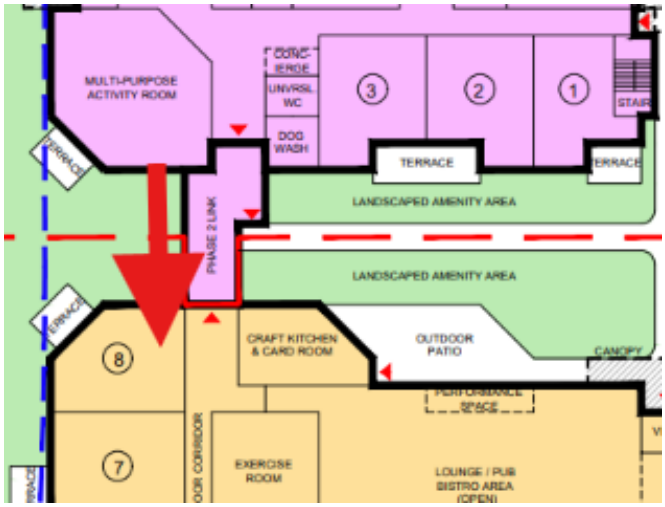
    b. Provide drop off for the retirement home internal to the site to reduce curb cuts.

    c. Surface parking internal to the site should be located behind building faces. Parking spaces adjacent to Codd's road and Bareille-Snow should be removed.

35. Building Massing/Site Design:

    a. Provide a base/middle/top approach to building design. Please rationalize the proposed height of the building base proposed based on datum lines taken from surrounding development. A building stepback should be provided above the building base to provide a human scaled development and to provide transition to surrounding development.

    b. Please rationalize the building separation between Phase 1 and Phase 2, the buildings look quite close – will adequate light be provided to units and ground floor amenity?



36. Public Realm Interface:

    a. Provide active frontages along Codd's road. Including the provision of 'active uses', a high percentage of glazing and pedestrian entrances.

    b. For the apartment buildings, provide ground floor terraces with landscaped edges to provide engagement with the street. Consider providing individual access to the sidewalk.

    c. Ensure that tree plantings and significant landscaped areas are provided along the 4 roadway frontages.

Please feel free to contact, Lisa Stern, Urban Design Planner III, for follow-up questions.

Engineering

Comments:

37. The Stormwater Management Criteria, for the subject site, is to be based on the following:

    a. Please reference the approved **Design Brief, Wateridge Village at Rockcliffe Phase 6 and 7, Prepared by Arcadis Professional Services, dated August 2025,** for the stormwater manament **Quantity control** criteria. In the Phase 6 and 7 subdivision stormwater management system design, the development blocks are subjected to minor system inflow restriction with major flow cascading to a street segment. The restricted rates are provided in Table 5.3 Minor flow capture, taken from the **Design Brief, Wateridge Village at Rockcliffe Phase 6 and 7, Prepared by Arcadis Professional Services, dated August 2025.**

b. Water **Quality Control** of the subdivision is provided by end of pipe treatment via the Eastern SWM facility and is designed to provide an Enhanced Level of Protection.

c. For the LID piolit project targets please refer to the **Wateridge Phase 2B Devloper's Checklist dated May13th, 2018.**

d. Storm water management design must be included for all three phases of the proposed project showing a master design as well as the storm water design proposed for the phase of the project. The report is required to document how the mater design will function, as well as the interim design through the development of each phase.

e. Application of the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

f. For separated sewer systems built up until 2016, the design of the storm sewers were based on a 5-year storm; storm systems after such time are, generally, based on a 2-year level-of-service.

g. In separated areas, the pre-development runoff shall be the lower of the existing coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

h. A calculated time of concentration (cannot be less than 10 minutes).

i. Document how any foundation drainage system will be integrated into the servicing design and show the positive outlet on the plan. Foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.

j. Please note that the minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s in order to reduce the likelihood of plugging.

k. There must be at least 15cm of vertical clearance between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below loading dock openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.

l. **Underground Storage:** Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the

change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.

When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**
If there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.
Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc. UG storage to provide actual 2- and 100-year event storage requirements.
In regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective. Modeling can be provided to ensure capacity for both storm and sanitary sewers for the proposed development by City's Water Distribution Dept. – Modeling Group, through PM and upon request.

m. If rooftop control and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a Roof Drain Plan as part of the submission.

38. Deep Services (Storm, Sanitary and/or Water Supply)

a. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.

b. Connections to trunk sewers and easement sewers are typically not permitted.

c. Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).

d. Review provision of a high-level sewer.

e. Sewer connections to be made above the springline of the sewermain as per:

    i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.

    ii. Std Dwg S11 (For rigid main sewers) – lateral must be less that 50% the diameter of the sewermain,

    iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,

    iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

39. Water

a. Water Supply Redundancy: Residential buildings with a basic day demand greater than 50m3/day (0.57 L/s) or where there are 50 or more residential units are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration. The basic day demand for this site is expected to exceed 50m3/day. Water Data Card (future requirement).

b. Please review Technical Bulletin ISTB-2018-02, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A hydrant coverage figure shall be provided and demonstrate there is adequate fire protection for the proposal. Two or more public hydrants are anticipated to be required to handle fire flow.

c. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

    i. Location of service

    ii. Type of development

iii. The amount of fire flow required (per OBC or FUS).

iv. Average daily demand: ___ l/s.

v. Maximum daily demand: ___l/s.

vi. Maximum hourly daily demand: ___ l/s.

40. Sewer (sanitary and storm)

    a. Sanitary capacity is limited to what was designed in the **Design Brief, Wateridge Village at Rockcliffe Phase 6 and 7,** Prepared by Arcadis Professional Services, dated August 2025.

41. Geotechnical (including, where applicable, detailed sensitive marine clay investigation)

    The geotechnical consultant is required to review and comment on the approved **Geotechnical Investigation Report,** PG6331-1 Revision 10 dated October 31, 2025, and the approved **Groundwater Impact Assessment Report,** PH5006-REP.01 November 29,2024, to assess and confirm that there is no negative impact on the drinking wells at Fairhaven.

    Protection of the interceptor sewer is required to be discussed if any blasting is to occur within 30m of the interceptor sewer.

42. Sewer

    a. A storm sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices.

    b. Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices.

43. Grading- Post-development site grading shall match existing property line grades to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.

44. Phase One Environmental Site Assessment - A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required. The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg.

153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.

45. Background studies and plans:

    a. Former CFB Rockcliffe Master Servicing Study Report 33952-5.2.2 Revised June 2020.

    b. Design Brief, Wateridge Village at Rockcliffe Phase 6 and 7, Prepared by Arcadis Professional Services, dated August 2025

    c. Geotechnical Investigation Report**,** PG6331-1 Revision 10 dated October 31, 2025.

    d. Groundwater Impact Assessment Report, PH5006-REP.01 November 29,2024.

    e. Wateridge Phase 2B Devloper's Checklist dated May13th, 2018.

    f. **Cover Sheet,** prepared by Arcadis, Project No. 139653, dated 2025-07-31.

    g. **General Plan of Services**, Drawing No. 001, prepared by Arcadis, Project No. 139653, revision 8, dated 2025-07-31.

    h. **General Notes, Legend and CB Data Table**, Drawing No. 010, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

    i. **Street Sections, Drawing No. 011,** prepared by Arcadis, Project No. 139653, revision 6, dated 2025-06-27.

    j. **chemin CODD'S Road, STA. 0+620 to STA. 0+920,** Drawing No. 100, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

    k. **chemin CODD's Road STA. 0+920 TO STA. 1+010,** chemin WANAKI Road STA. 0+320 TO STA. 0+400, Drawing No. 101, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

    l. **rue Bareile-SNOW Street STA. 0+117.5 TO STA. 0+260,** Drawing No. 102, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

    m. **rue MICHAEL STOQUA Street STA. 0+117.5 TO STA. 0+260, Drawing** No. 103, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

    n. **rue MOSES TENNISCO Street STA. 0+117.5 TO STA. 0+195,** Drawing No. 104, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

o. **chemin WANAKI Road STA. 0+000 TO STA. 0+320,** Drawing No. 105, prepared by Arcadis, Project No. 139653, revision 8, dated 2025-07-31.

p. **STORM SEWER – KISHKABIKA PARK STA. 0+115 TO STA. 0+380,** Drawing No. 106, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

q. **GRADING PLAN,** Drawing No. 200, prepared by Arcadis, Project No. 139653, revision 8, dated 2025-07-31.

r. **GRADING PLAN,** Drawing No. 201, prepared by Arcadis, Project No. 139653, revision 8, dated 2025-07-31.

s. **SANITARY DRAINAGE AREA PLAN,** Drawing No. 400, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

t. **STORM DRAINAGE AREA PLAN,** Drawing No. 500, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

u. **PONDING PLAN,** Drawing No. 600, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

v. **SEDIMENT AND EROSION CONTROL PLAN,** Drawing No. 900, prepared by Arcadis, Project No. 139653, revision 7, dated 2025-07-31.

w. **PHASE 6 & 7 BIORETENTION BUMP-OUTS GENERAL PLAN / EROSION & SEDIMENT CONTROL PLAN,** Drawing No. GP-1, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

x. **PHASE 6 & 7 BIORETENTION BUMP-OUTS GENERAL PLAN – PHASE 1,** Drawing No. GP-2, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

y. **PHASE 6 & 7 BIORETENTION BUMP-OUTS GENERAL PLAN CROSS SECTION,** Drawing No. XS-1, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

z. **BIORETENTION BUMP-OUT PHASE 1 DETAILS,** Drawing No. CD-1, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

aa. **BIORETENTION BUMP-OUT PHASE 2 DETAILS,** Drawing No. CD-2, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

bb. **BIORETENTION BUMP-OUT PHASE 2 DETAILS,** Drawing No. CD-3, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

cc. **PHASE 6 & 7 BIORETENTION BUMP-OUTS EROSION & SEDIMENT CONTROL PLAN,** Drawing No. ESC-1, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

dd. **PHASE 6 & 7 BIORETENTION BUMP-OUTS PLANTING PLAN,** Drawing No. LP-1, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

ee. **PHASE 6 & 7 SOIL AMENDMENTS,** Drawing No. SA-1, prepared by Aquafor, Project No. 139653, revision 5, dated 06/19/2025.

Feel free to contact Amy Whelan, Project Manager, for follow-up questions.

Noise

Comments:

46. Noise requirements:

    a. As per the approved Enviromental Noise Impact Assessment Wateridge Village Phases 6&7, Prepared by Arcadis IBI Group, August 9, 2024, the following warning clause for aircraft noise is as follows:

       "Purchasers/tenants are advised that due to the proximity of this development to the nearby Rockcliffe Airport, sound levels from the facility may at times be audible."

Feel free to contact Amy Whelan, Project Manager, for follow-up questions.

Transportation

Comments:

47. Right-of-way protection.

    a. See Schedule C16 of the Official Plan.

    b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

48. The Transportation comments were based on the Screening Form, which indicated that the site plan and proposed development of the Seniors Apartments and Retirement Home would generate sufficient traffic to warrant the preparation of a Transportation Impact Assessment (TIA). During our meeting, the consultant clarified that only Phase 1 – the Retirement Home will be constructed at this time, and this phase was already addressed in the original TIA report. Accordingly, the Screening Form must be revised to clearly specify the scope of construction (i.e.,

Phase 1 only), and the Transportation Demand Management (TDM) Measures Checklist must be submitted for review.

49. The Tactile Walking Surface Indicator (TWSI) should be provided at pedestrian crossings. Under the Integrated Accessibility Standards of the Accessibility for Ontarians with Disabilities Act, 2005, and the City of Ottawa Accessibility Design Standards, TWSI's are required for new construction and the redevelopment of elements in public spaces, such as for exterior paths of travel (e.g. sidewalks and at the top of stairs).

50. The City's policy for the provision of pedestrian facilities as set forth by the Official Plan (OP), the Transportation Master Plan (TMP) and the Pedestrian Plan (OPP) specifically direct pedestrian facilities on City roads that lead to areas of work and employment ("retail/commercial/employment").

51. The Owner acknowledges and agrees that all private accesses to Roads shall comply with the City's Private Approach By-Law being By-Law No. 2003-447 as amended https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/private-approach-law-no-2003-447 or as approved through the Site Plan control process.

52. The concrete sidewalks are to meet City standards and be 2.0 metres in width and to be continuous along property frontage and depressed through the proposed accesses.

53. Please note that Section 4.3 of the Official Plan requires that the proposed development include safe, direct, and attractive pedestrian access form the public sidewalks to the major building entrance. The plans must also include pedestrian connections to the optional additional developments should they proceed.

54. Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe, secure places near main entrances and preferably protected from the weather.

55. Standard ROW cross sections are to be used to indicate minimum clearances that are to be incorporated into the design of any new developments involving new and existing streets. Any variations to the standard ROW cross sections are subject to the Infrastructure Services Deviation Process. If proposed cross sections do not comply with new city standards, a deviation process would be required. This would apply only to public streets and not private streets.

56. Ensure that the pedestrian sidewalk has a clear and non-obstructive path of 2.0 metres width minimum and that the bicycle spaces do not interfere with the pedestrian crosswalk.

57. Minimum lane width for fire trucks is 6.0 metres. A fire truck three-point turn as it relates to the proposed lane configurations is to be confirmed by the Fire Chief.

58. The Owner shall be required to enter into maintenance and liability agreement for all pavers, plant and landscaping material placed in the City right-of-way and the Owner shall assume all maintenance and replacement responsibilities in perpetuity.

Feel free to contact Wally Dubyk, Transportation Project Manager, for follow-up questions.

Environment

Comments:

59. This site plan is addressed in the "Wateridge Village: Phases 6 and 7 Environmental Impact Statement and Tree Conservation Report prepared by Arcadis June 2025". Please review for a complete list of mitigation measures however several items to consider at site plan from the EIS include:

    a. Incorporate Low Impact Design (LID) practices, such as bioretention bump-outs and permeable sidewalks designed to achieve the infiltration, erosion, and water quality design targets.

    b. Landscaping planting plans should consider naturalized features with native vegetation seeding and plantings where feasible. For example, a naturalized pollinator gardens should be designed and planted within open park spaces to provide native vegetation within the proposed development, as well as an opportunity for infiltration of stormwater.

60. Bird-Safe Design Guidelines - Please review and incorporate bird safe design elements, where feasible. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions (e.g., elevated walkways), ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf

61. Please consider if there are features that can be added reduce the urban heat island effect (see OP 10.3). For example, this impact can be reduced by adding large canopy trees, green rooves or vegetation walls, or incorporating building with low heat absorbing materials.

Feel free to contact Matthew Hayley, Environmental Planner, for follow-up questions.

Forestry

Comments:

62. A Tree Conservation Report (TCR) and Landscape Plan (LP) are submission requirements of a Site Plan Control application. The TCR can be waived if it's proven there are no trees 10 cm in diameter or greater on or adjacent to the site.

63. Space for trees must be provided throughout the development site, not just along the street frontages (OP Section 4.8.2, policy 3(a)). Ensure the parking garage and LID infrastructure is designed to ensure there is space for trees throughout the site. Maximize soft landscaped areas for amenity space and along outdoor travel corridors. parking garage should be designed to stay at least 3 m from the edge of the property boundary to provide adequate planting space. This is a provision of the New Zoning By-law (Provision 210).

64. Incorporating space and adequate soil volume to plant trees along all street frontages is a direction of the Official Plan (Section 4.1.3, Section 4.8.2).

65. The City of Ottawa is working towards a 40% canopy cover target. This application must demonstrate in the Landscape Plan how the site was designed to reach this target as closely as possible. For a site of this site and the development typology, 25% canopy coverage should be a minimum.

66. The Geotechnical Investigation must address landscaping considerations, including tree planting. The Investigation must speak to how a parking garage would influence tree planting setbacks. The Landscape Plan must note it was prepared in conjunction with the Geotechnical Investigation (date, year).

Feel free to contact Hayley Murray, Forester, for follow-up questions.

Parkland

Comments:

67. Park dedication has been satisfied through the subdivision agreement with CLC. We note that the current phase is over-dedicated.

Parkland Dedication

68. The amount of required parkland conveyance is to be calculated per the City of Ottawa Parkland Dedication By-law No.2022-280 (or as amended):

    a. For cash-in-lieu of conveyance of parkland (residential > 18 units/net ha):

        i. one hectare per 1,000 net residential units but shall not exceed a maximum of 10% of the gross land area where less than or equal to five hectares.

b. For conveyance of parkland, cash-in-lieu of conveyance parkland, or combination thereof:

    i. 5% of the gross land area (residential ≤ 18 units/net ha).

    ii. 5% of the gross land area (other purposes, including residential care facility as defined by the Zoning By-law, excluding residential).

    iii. 2% of the gross land area (commercial & industrial uses).

c. Where land is developed for a mix of uses within a building, the conveyance requirement shall be the cumulative sum for each use, as calculated using the applicable rate prorated proportionally to the gross floor area allocated to each use.

Form of Parkland Dedication

69. PFP will be requesting **land dedication** for parkland dedication in accordance with the Parkland Dedication By-law.

    a. Site Area = 14,162 sq.m (per summary statistics in Site Plan)

    b. Proposed Development:

        i. 1 - 6 storey Residential Care Facility building with 15,818 square meters GFA, and 198 dwelling units.

        ii. 1 – 9 storey Seniors Apartment building with 19,541 square meters GFA and 180 dwelling units

        iii. 1 – 9 storey Apartment building with 10,106 square metres GFA and 100 dwelling units.

    c. Total GFA on Site = 45,465 sq.m. (per summary statistics in Site Plan)

        i. Total Residential GFA = 29,647 sq.m (65.2%)

        ii. Total Residential Care GFA = 15,818 sq.m (34.8%)

    d. Residential Dedication = (14,162 sq.m x 10%) x 65.2% = 923.4 sq.m

    e. Residential Care Facility Dedication = (14,162 sq.m x 5%) x 34.8% = 246.4 sq.m

70. Total dedication required for the proposed development = 1,169.8 sq.m

* Park dedication has been satisfied through the subdivision agreement with CLC*

71. Please note, if the proposed unit count or land use changes, then the parkland dedication requirement will be re-evaluated accordingly.

72. Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the development application.

Feel free to contact Ryan Paliga, Parks Planner, for follow-up questions.

Community issues

Comments:

73. The Wateridge Village Community Association welcomes the overall concept of this development. Wateridge Village contains a wide range of housing types including apartments, townhouses, detached and semi detached houses, and stacked dwellings available for both rental and purchase. We have previously received comments from the community that there is, to date, no specific development directed at seniors, and this proposal would fill that gap.

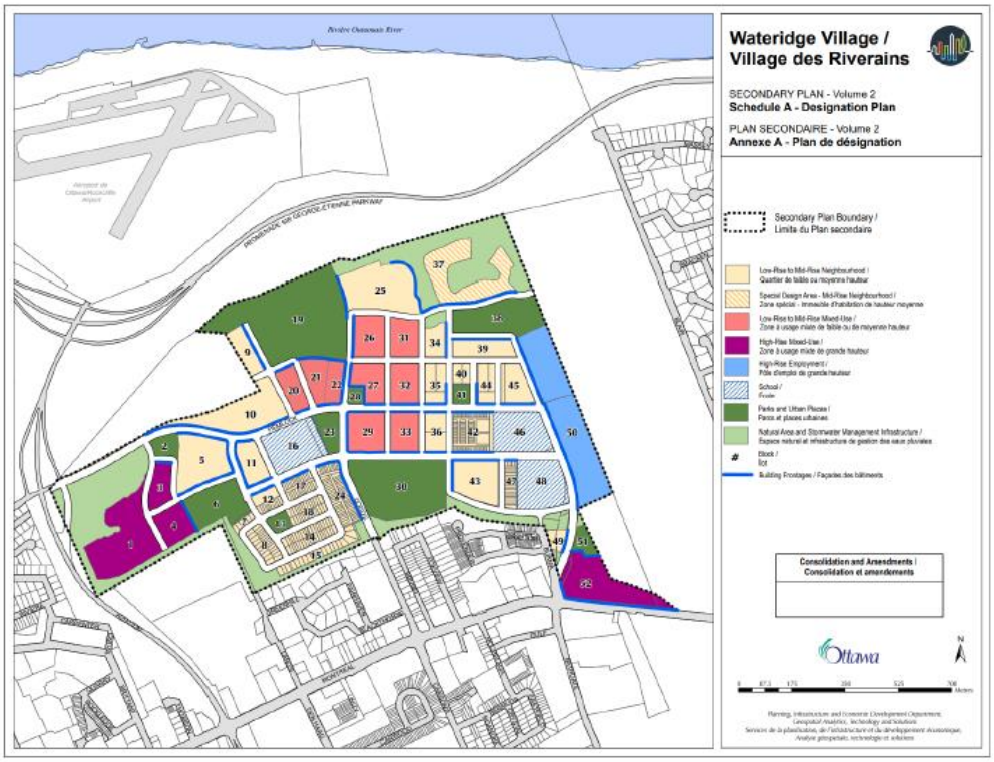
74. The offerings proposed, particularly the multiple levels of care and independent living will provide options for residents to remain in the neighbourhood through more stages of life as well as welcome new residents to enjoy our neighbourhood. The additional employment opportunities that this development would bring to the community are also welcomed.

75. Building Frontages in the Wateridge Core area & Interaction with Kishkabika Park:

    a. This proposed development is the entirety of block 26 in the secondary plan.

    b. Under section 2.2 of the secondary plan:

    c. Where the main / primary building façade(s) is required to face the public realm, as shown on Schedule A – Designation Plan, the ground floor level will be developed to have active retail-type frontages with clear windows and functional entrances across the majority of the building façade.



Schedule A specifies the west side of the block (facing Codd's Road and across from Kishkabika Park-block 19) as an active building frontage.

d. We would suggest that the Codd's Road west side frontage would be better used for some of this development's extensive amenity spaces such as the dining hall, lounge/pub, pool, fitness, library etc.. This combined with large ground-floor windows & tall ceilings (meeting the above requirements) would provide residents with views of Kishkabika park - which will be the largest city-owned park in Rideau-Rockcliffe ward. It is also one of 6 parks or greenspaces along Codd's Road - the same street as this development. The area closest to this development is proposed to contain naturalized areas, natural forested areas, walking paths, and a dog park - uses compatible with a senior population.



This proposed development is in the white area in the lower right corner of the diagram.

e. In the current concept, some of those amenity spaces look out at parking garage ramps and loading zones. The front entrance to the retirement home is also directly across the street from the loading area, garbage area and parking entrance for 375 Codd's Rd. Shifting to the Codd's frontage could present a much more pleasant, natural view when approaching or leaving the development.

f. There is also a concern along Tawadina Road to ensure compatibility with vehicle entrances on the south side of the street to avoid turning conflicts if the drop-off loop is placed on the Tawadina side of the complex.

76. Motor Vehicle Parking

a. The vehicle parking for this development seems appropriate in quantity and is appropriately positioned between the buildings or below grade. We do believe the parking ramps would be better if integrated into the structures, and the east ramp moved away from the street sidewalk. This would provide easier winter operation as well as a more appealing aesthetic.

b. We are concerned that none of the underground garage is proposed in phase 1 construction. The use of surface parking goes against community design and secondary plans. Even though the proposal is temporary,

temporary things can end up lasting much longer than intended due to hard to control factors like economic and market conditions.

c. The applicant expressed the possibility to sever off phase 3 from phases 1 and 2. If this is being considered, care must be given to ensure the garage is designed in a manner that does not result in parking spaces against the wall next to dead ends with no turning space. The applicant expressed concern about the building population requiring parking areas that are easy to maneuver in and out of and the current concept design would result in some very tough spots to enter and exit from if a wall was constructed dividing the phases.

d. The proposed site plan indicates that there won't be an underground parking garage below the Phase 1 building. However, the community has a demonstrated need for more parking, and this presents an opportunity. We don't know if zoning allows for this, or if it would be economically feasible, but perhaps the proponent could explore the idea of incorporating a paid public parking garage under Phase 1, to provide an additional income stream to the building owners, and to help alleviate the shortage of public parking in the community. In addition to neighbourhood residents, over 40 businesses will ultimately be located within 300m of Phase 1 and many of their patrons will also benefit from the availability of additional nearby parking. Until Phases 2 and 3 are completed, this parking facility could be used by the residents and employees of Phase 1, eliminating the need for a temporary surface parking lot.

77. Bicycle Parking

a. We note the development provides fairly extensive bicycle parking, both indoor and outdoor. Like many urban areas, Wateridge has experienced a significant amount of bicycle theft - often during overnight hours. It might be advantageous to future residents and staff to consider moving a portion of the outdoor parking that may be used by residents or staff into some sort of enclosed pavilion accessible using whatever key card, key fob or other access control system will be used by residents and staff. This pavilion could be abutted to the side of one of the other buildings or a separate free-standing structure.

78. General Design

a. If they have not already done so, we would like to remind the proponent of the need to refer to Canada Lands Company's Wateridge Village Urban Design Guidelines and Architectural Controls documentation, which provides specificity surrounding the means by which to achieve the policies contained in the Community Design Plan and the Secondary Plan. The Wateridge Village Secondary Plan is based on the Former CFB Rockcliffe Community Design Plan (CDP) and translates the key aspects

of the CDP into statutory policy. The Urban Design Guidelines and Architectural Controls include detailed guidelines for building design, massing and volume, and façade treatment, that must be referred to in the preparation of development applications.

Other

79. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design and will be applicable to Site Plan Control and Plan of Subdivision applications.

    a. The HPDS was passed by Council on April 13, 2022, but is not in effect at this time, as Council has referred the 2023 HPDS Update Report back to staff with the direction to bring forward an updated report to Committee at a later date. The timing of an updated report to Committee is unknown at this time, and updates will be shared when they are available.

    b. Please refer to the HPDS information at ottawa.ca/HPDS for more information.

80. Under the Affordable Housing Community Improvement Plan, a Tax Increment Equivalent Grant (TIEG) program was created to incentivize the development of affordable rental units. It provides a yearly fixed grant for 20 years. The grant helps offset the revenue loss housing providers experience when incorporating affordable units in their developments.

    a. To be eligible for the TIEG program you must meet the following criteria:

        i. the greater of five units OR 15 per cent of the total number of units within the development must be made affordable

        ii. provide a minimum of 15 per cent of each unit type in the development as affordable

        iii. enter into an agreement with the city to ensure the units maintain affordable for a minimum period of 20 years at or below the city-wide average market rent for the entire housing stock based on building form and unit type, as defined by the Canada Mortgage and Housing Corporation

        iv. must apply after a formal Site Plan Control submission, or Building Permit submission for projects not requiring Site Plan Control, and prior to Occupancy Permit issuance

    b. Please refer to the TIEG information *at Affordable housing community improvement plan / Plan d'améliorations communautaires pour le logement abordable for more details or contact the TIEG coordinator via email at affordablehousingcip@ottawa.ca.*

Submission Requirements and Fees

1. For submission requirements and fees please see the Site Plan Control | City of Ottawa
    a. Additional information regarding fees related to planning applications can be found here.
2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Jack Smith, Planner II

Encl. Studies and Plans Identification List
Urban Design Brief Terms of Reference
Supplementary Development Information
List of Technical Agencies
HPDS Overview for Applicants
HPDS Example Checklist
ADS Site Plan Checklist

c.c. Jean-Charles Renaud, Planner III
Spencer Mulvaney, Planner I
Lisa Stern, Urban Design Planner III
Wally Dubyk, Transportation Project Manager
Amy Whelan, Infrastructure Project Manager
Ryan Paliga, Parks Planner II
Hayley Murray, Planner Forester
Matthew Hayley, Environmental Planner III
Amy MacPherson, Planner II, SI

Darren Kipp, Wateridge Village Community Association - darrenkipp@gmail.com
John Grant, Wateridge Village Community Association - jhg@granty.ca

TOPOGRAPHIC PLAN OF

PART OF WATER RIDGE DEVELOPMENT BEING SHOWN AS BLOCK 21 ON DRAFT M-PLAN LOCATED NORTH OF TAWADINA ROAD AND EAST OF CODD'S ROAD

GEOGRAPHIC TOWNSHIP OF GLOUCESTER

CITY OF OTTAWA

MONUMENT-URSO SURVEYING LTD.

SCALE 1 : 250

10 7.5 5 2.5 0 5 10

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOV. 26, 2025
DATE

J.E. ANDERSON
ONTARIO LAND SURVEYOR

LEGEND

EOA	DENOTES	EDGE OF ASPHALT
EOG	-	EDGE OF GRAVEL
BC	-	BACK OF CURB
FH	-	FIRE HYDRANT
CB	-	CATCH BASIN
	-	WELL
MH-W	-	MAINTENANCE HOLE - WATER
MH-H	-	MAINTENANCE HOLE - HYDRO
MH-S	-	MAINTENANCE HOLE - SANITARY
MH-ST	-	MAINTENANCE HOLE - STORMWATER
MH	-	MAINTENANCE HOLE - UNIDENTIFIED
MW	-	MONITORING WELL
WV	-	WATER VALVE
AN	-	ANCHOR
UP	-	UTILITY POLE
∅	-	DIAMETER
— OH —	-	OVERHEAD WIRES
88.00	-	EXISTING ELEVATIONS
+88.00	-	TOP OF WALL/CURB ELEVATIONS
	-	DECIDUOUS TREE

BLOCK 23

BLOCK 22

CHEMIN CODD'S ROAD

SUBDIVISION

PLAN 04273

DRAFT PLAN

BLOCK 24

CHEMIN CODD'S ROAD

BLOCK 21

BLOCK 20

BARRILLE-SNOW STREET

BLOCK 15 (0.30 RESERVE)
PART 1 PLAN 4R-29378
SUBJECT TO EASEMENT INST. OC1771382
PIN 04273 - 0844

BLOCK 14
(0.30 RESERVE)

CHEMIN TAWADINA ROAD
PIN 04273 - 0851

BLOCK 2
REGISTERED PLAN 4M-1718

CHEMIN CODD'S ROAD
PIN 04273 - 0847

BLOCK 13
(0.30 RESERVE)

BLOCK 12

REGISTERED PLAN 4M-1651

SITE BENCHMARK
FIRE HYDRANT
Top Of Spindle
Elev.=91.69

UTILITY NOTE

THIS DRAWING DOES NOT SERVE AS A COMPREHENSIVE CONFIRMATION OF ALL UTILITIES PRESENT. IT IS THE USERS RESPONSIBILITY TO CONTACT THE RELEVANT UTILITY AUTHORITIES FOR VERIFICATION.

ONLY UTILITIES VISIBLE ON THE SURFACE HAVE BEEN IDENTIFIED PRIOR TO ANY ACTIVITIES SUCH AS DIGGING, IT IS MANDATORY TO OBTAIN A FIELD LOCATION OF UNDERGROUND UTILITIES FROM THE APPROPRIATE AUTHORITY.

ELEVATION NOTE

ELEVATIONS ARE GEODETIC AND REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD2013:78) BY DIRECT MEASUREMENT TO A REAL TIME NETWORK.

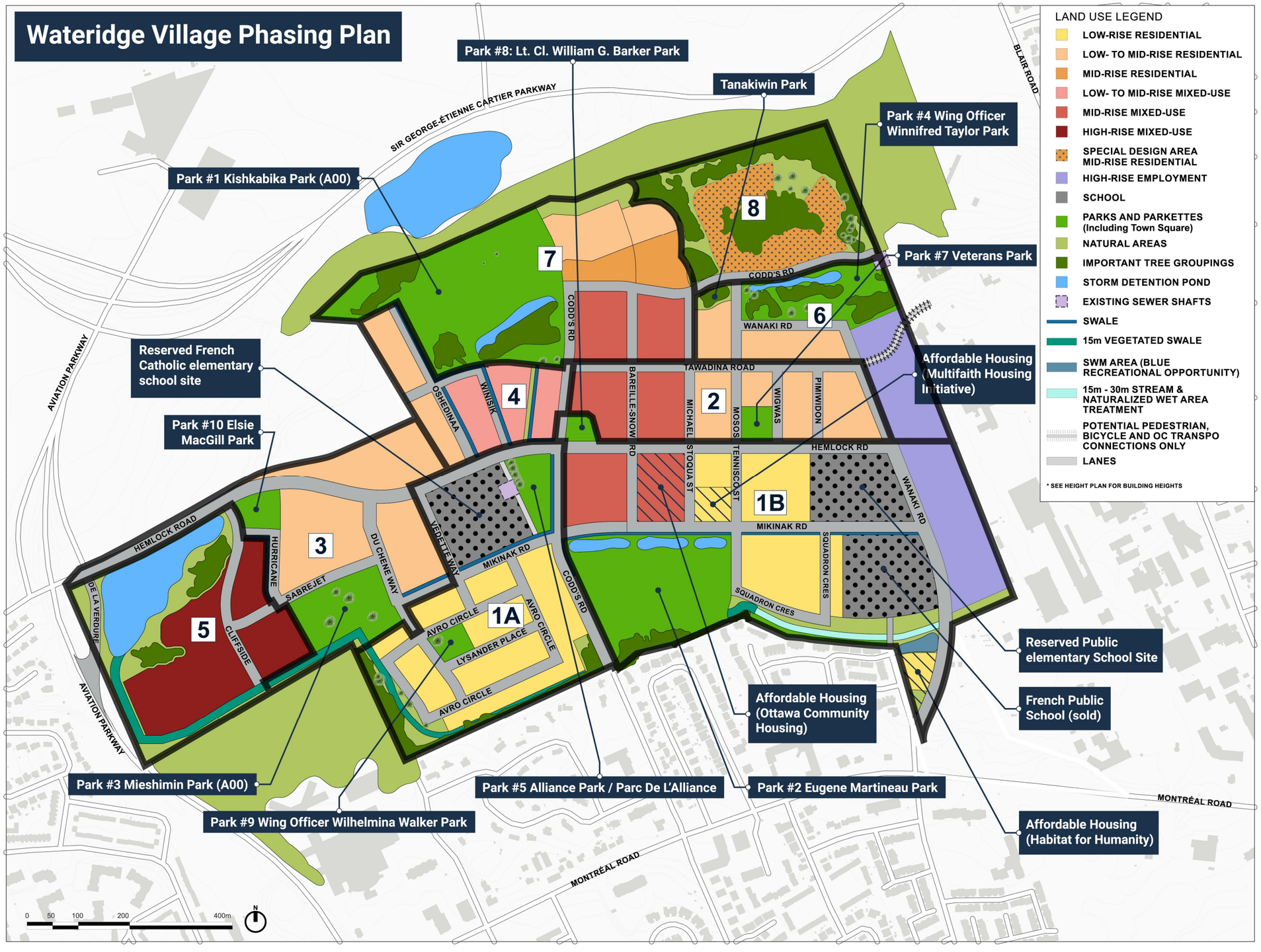
THE USER OF THIS INFORMATION BEARS THE RESPONSIBILITY TO CONFIRM THAT THE JOB BENCHMARK REMAINS UNALTERED AND UNDISTURBED, AND THAT ITS RELATIVE HEIGHT AND DESCRIPTION ALIGN WITH THE DETAILS PRESENTED IN THIS PLAN.

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Monument-Urso Surveying Ltd.
Ontario Land Surveyors | Canada Land Surveyors
1755 WOODWARD DRIVE, SUITE 200
OTTAWA, ON K2C 0P9
TEL: (613) 800-1583
536 'C' FOURTH LINE EAST
SAULT STE. MARIE ON, P6A 6J8
TEL: (705) 254-7851
FAX: (705) 254-5571

DRAWN: ED	FIELD: JH	FILE No: 25-0473_Waterridge Village BLK 21 (Chaitat_TPOS_23
PROCESSED: JA	CHECKED: JA	

Wateridge Village Phasing Plan



LAND USE LEGEND

- LOW-RISE RESIDENTIAL
- LOW- TO MID-RISE RESIDENTIAL
- MID-RISE RESIDENTIAL
- LOW- TO MID-RISE MIXED-USE
- MID-RISE MIXED-USE
- HIGH-RISE MIXED-USE
- SPECIAL DESIGN AREA MID-RISE RESIDENTIAL
- HIGH-RISE EMPLOYMENT
- SCHOOL
- PARKS AND PARKETTES (Including Town Square)
- NATURAL AREAS
- IMPORTANT TREE GROUPINGS
- STORM DETENTION POND
- EXISTING SEWER SHAFTS
- SWALE
- 15m VEGETATED SWALE
- SWM AREA (BLUE RECREATIONAL OPPORTUNITY)
- 15m - 30m STREAM & NATURALIZED WET AREA TREATMENT
- POTENTIAL PEDESTRIAN, BICYCLE AND OC TRANSPO CONNECTIONS ONLY
- LANES

* SEE HEIGHT PLAN FOR BUILDING HEIGHTS

J:\139653_600399-49__W\7.0_Production\7.03_Design\04_Civil\Sheets\Design Brief\Figure 1.7 PHASING PLAN.dwg Last Saved By: milnem4626 Last Saved At: Jun. 23, 25

ARCADIS

Project Title
DESIGN BRIEF
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASES 6 & 7

Drawing Title
PHASING PLAN

Sheet No.
FIGURE 1.7
2025-06-27

Project North

BLOCK 23

BLOCK 22

BLOCK 24

BLOCK 25

KISHKABIKA PARK

BLOCK 21

BLOCK 20

chemin CODD'S Road

rue BARFELLE-SNOW Street

rue MICHAEL STOQUA Street

chemin WANAKI Road

chemin TAWADINA Road

rue MOSES TENNISCO Street

100

101

102

103

104

105

106

BLOCK 1

BLOCK 2

BLOCK 3

BLOCK 4

BLOCK 5

BLOCK 6

BLOCK 7

BLOCK 8

BLOCK 9

BLOCK 10

BLOCK 11

BLOCK 12

BLOCK 13

BLOCK 14

BLOCK 15

BLOCK 16

BLOCK 17

BLOCK 18

BLOCK 19

BLOCK 27

BLOCK 28

BLOCK 29

BLOCK 7

BLOCK 3

BLOCK 2

BLOCK 1

BLOCK 12

BLOCK 11

BLOCK 10

BLOCK I

CLIENT

CANADA LANDS COMPANY

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA

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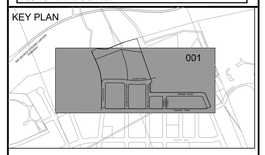
Arcadis Professional Services (Canada) Inc.
formerly IBI Group Professional Services (Canada) Inc

ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2023-10-05
2	REVISED WANAKI ROAD AND MOSES TENNISCO STREET PROFILES	2023-12-01
3	ISSUED FOR CLIENT REVIEW	2024-06-12
4	SUBMISSION NO.2 FOR CITY REVIEW	2024-06-21
5	ISSUED FOR GEOTECHNICAL REVIEW	2024-11-26
6	SUBMISSION NO.3 FOR CITY REVIEW	2024-12-20
7	SUBMISSION NO.4 FOR CITY REVIEW	2025-06-27
8	SUBMISSION NO.5 FOR CITY REVIEW	2025-07-31
9	ISSUED FOR CONSTRUCTION	2025-12-05
10	REVISED PER CITY/HYDRO	2026-02-03
11	ADDED SERVICES TO BLOCK 21	2026-02-19

SEE 010, 011 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN



1:1250 0 12.5 37.5 62.5m

SEAL

LICENSED PROFESSIONAL ENGINEER
S. E. LABADIE
100214983
2026/02/19
PROVINCE OF ONTARIO

ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASES 6 AND 7

PROJECT NO: 139653	
DRAWN BY: **M.M.**	CHECKED BY: **J.I.M.**
PROJECT MGR: **S.L.**	APPROVED BY: **S.L.**

SHEET TITLE

GENERAL PLAN OF SERVICES

SHEET NUMBER	ISSUE
001	11

SCALE CHECK

CITY PLAN No.19055 CITY FILE No. D07-16-15-0003

File Location: J:\139653_600399-49__W1\0_Production\7.03_Design\04_Civil\Sheets\000 GENERAL PLAN.dwg Last Saved: January 29, 2026, by mlivens4926 Plotted: February 19, 2026 10:31:46 AM by Milne, Marian

Appendix B

Site Plan
(prepared by T Bonhomme Architect)

Servicing Plan (DWG. 25117-S1)

Interim Servicing Plan
(DWG. 25117-S2)

Grading Plan (DWG. 25117-GR1)

Interim Grading Plan
(DWG. 25117-GR2)

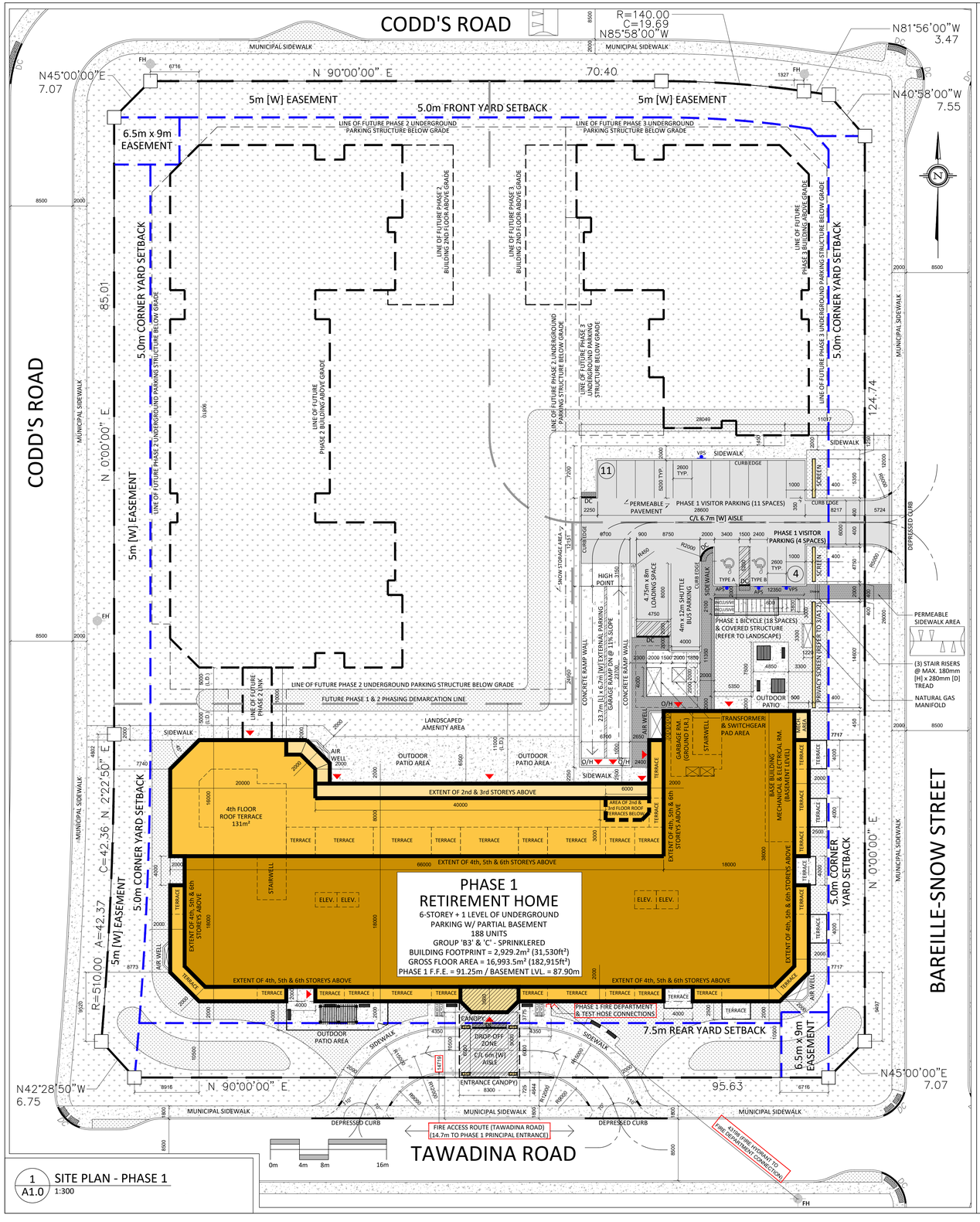
Underground Parking Garage Plan &
Profile (DWG. 25117-P1)

Erosion and Sediment Control Plan
(DWG. 25117-ESC1)

Interim Erosion and Sediment Control
Plan (DWG. 25117-ESC1)

Notes & Details (DWG. 25117-N1)

Existing Conditions and Removals Plan
(DWG. 25117-R1)



1 / A1.0 SITE PLAN - PHASE 1
1:300

Site Information

Legal Description:	Part of Lot 23, Concession 1 (Ottawa Front), Geographic Township of Gloucester and Part of Reserve Block 15 on 4M-1651
Block 21 - Lot Area:	14,162m² (1.4162 hectares or 3.5 acres)
Disclaimer:	The concept site plan has been compiled using information contained in the Plan of Subdivision - Registered Plan 4M-1651 provided by Annis, O'Sullivan, Vollebekk Ltd., Ontario Land Surveyors.

Zoning Information - GM31 H(30) [By-Law 2008-250] / CM1A H(30) [By-Law 2026-50]

GM31 H(30)	Zoning Requirement	Provided
Minimum Front Yard with Residential Land Use at Grade:	5.0m	85.6m (Codd's Road - North)
Minimum Corner Side Yard with Residential Land Use at Grade:	5.0m	7.7m (Bareille-Snow Street & Codd's Rd.- West)
Minimum Interior Side Yard with Residential Land Use at Grade:	3.0m	N/A
Minimum Rear Yard with Residential Land Use at Grade:	7.5m	9.0m (Tawadina Road)
Additional Front & Corner Side Yard Setback Required for 4th Floor:	2.0m	2.0m
Minimum Separation between Portions of a Building above 4 Storeys:	23.0m	28.0m (Phase 1 & Future Phase 2) 39.0m (Phase 1 & Future Phase 3)
Maximum Building Area of Floor Plates at 7th Floor and Above:	750m²	N/A (6-Storey Building)
Maximum Building Height:	30.0m	23.625m (Phase 1 Building / 6-Storeys)

Phase 1 Retirement Home Building Information

Floor Level	Area	Group 'B3' & 'C' Details	Rentable Area of Suites / GFA
Basement Floor Area:	2,995.5m² (32,243ft²)	(0) Rooming Units	0m² (0ft²) = 0% of GFA
Ground Floor Area:	2,929.2m² (31,530ft²)	(6) Rooming Units	464.4m² (4,999ft²) = 16% of GFA
2nd Floor Area:	2,768.7m² (29,802ft²)	(49) Rooming Units	1,810.1m² (19,484ft²) = 65% of GFA
3rd Floor Area:	2,768.7m² (29,802ft²)	(49) Rooming Units	1,810.1m² (19,484ft²) = 65% of GFA
4th Floor Area:	1,843.8m² (19,846ft²)	(28) Rooming Units	1,499.5m² (16,140ft²) = 81% of GFA
5th Floor Area:	1,843.8m² (19,846ft²)	(28) Rooming Units	1,513.9m² (16,295ft²) = 82% of GFA
6th Floor Area:	1,843.8m² (19,846ft²)	(28) Rooming Units	1,501.3m² (16,160ft²) = 82% of GFA
Gross Floor Area (GFA):	16,993.5m² (182,915ft²)	(188) Rooming Units	8,599.3m² (92,562ft²) = 51% of GFA

Proposed Building Height: 23.625m measured from grade to top of parapet (23.186m from grade to top of flat roof surface)
Number of Storeys: (6) storeys above grade

Phase 1 Vehicular Parking Information

Phase 1 Retirement Home Building Parking		Zoning Requirement	Provided
Resident:	0.25 spaces per unit = 188 units x 0.25 = 47 spaces	Table 101 - R20 - Column II [Bylaw No. 2008-250]	47 spaces (provided in below grade indoor parking garage)
Staff:	1 space per 100m² GFA used for medical, health or personal services = 900m² GFA x 1 = 9 spaces	Table 101 - R20 - Column II [Bylaw No. 2008-250]	13 spaces * (provided in below grade indoor parking garage)
Visitor:	No requirement for Retirement Home		15 spaces ** (surface parking)
Total Phase 1 Building - Vehicular Parking Required:		= 56 spaces	
Total Phase 1 Building - Vehicular Parking Provided:		= 75 spaces consisting of (15) exterior surface & (60) indoor parking	

General Phase 1 Parking Space Note:

* When the Phase 2 Senior's Apartment Building and underground parking structure is completed, (2) standard indoor parking spaces for Phase 1 staff will be removed to accommodate for the 6.7m [W] drive aisle connection between the Phase 1 & Phase 2 indoor parking garages.

** When the Phase 3 Senior's Apartment Building and underground parking structure is completed, (11) standard exterior surface spaces for Phase 1 visitors will be transferred to the Phase 3 parking requirements and consisting of (10) standard exterior surface spaces for Phase 3 visitors and (1) Phase 3 loading space.

Exterior Surface Parking (15 spaces): **

13 standard spaces @ 2.6m x 5.2m
1 accessible Type 'A' space @ 3.4m x 5.2m with 1.5m shared access aisle
1 accessible Type 'B' space @ 2.4m x 5.2m with 1.5m shared access aisle

Underground Indoor Parking (60 spaces): *

38 standard spaces @ 2.6m x 5.2m
16 compact car spaces @ 2.4m x 5.2m
3 parallel spaces @ 2.6m x 6.7m
1 accessible Type 'A' space @ 3.5m x 5.2m with 1.5m shared access aisle
1 accessible Type 'B' space @ 2.4m x 5.2m with 1.5m shared access aisle
1 accessible Type 'B' space @ 2.4m x 5.2m with 1.5m access aisle

Phase 1 Bicycle Parking Information

Phase 1 Retirement Home Bicycle Parking		Zoning Requirement
Short Term Spaces:	Min. 4 spaces + 0.1 spaces per unit above 20 units = 4 + 168 units x 0.1 = 21 spaces	Table 613B (a) (viii) [Bylaw No. 2026-50] - Retirement Home
Long Term Spaces:	0.25 spaces per unit = 188 units x 0.25 = 47 spaces	Table 613B (b) (viii) [Bylaw No. 2026-50] - Retirement Home
Total Phase 1 Short Term Bicycle Parking Provided: = 22 spaces consisting of:		20 horizontal outdoor @ 0.6m x 1.8m / space & 2 horizontal outdoor inclusive @1.0m x 2.75m / space
Total Phase 1 Long Term Bicycle Parking Provided: = 47 spaces consisting of:		44 horizontal indoor @ 0.6m x 1.8m / space & 3 horizontal inclusive indoor @1.0m x 2.75m / space

Site Plan & Master Plan Symbol Legend

- Denotes proposed Phase 1 retirement home building
- Denotes proposed Phase 2 senior's apartment building
- Denotes proposed Phase 3 senior's apartment building
- Denotes concrete surface
- Denotes permeable sidewalk
- Denotes seed/ sod ground landscape cover
- Denotes shrub / perennial bed
- Denotes building feature above
- Denotes property line
- Denotes site setback
- Denotes proposed phasing line
- Denotes c/l drive aisle
- Denotes building entrance
- Denotes fire department connection
- Denotes accessible parking
- Denotes depressed curb
- Denotes high colour contrast pavement marking
- Denotes tactile walking surface indicator (TWSI)
- Denotes aluminum sign
- Denotes bench seating
- Denotes fire hydrant

ISSUE RECORD

REV.	DESCRIPTION	DATE
01	FOR SITE PLAN APPROVAL	01/20/2026
02	FOR SITE PLAN APPROVAL	02/27/2026
03	FOR COORDINATION	04/16/2026
04	FOR SUPERSTRUCTURE PERMIT	05/05/2026
05	FOR ZONING BY-LAW AMENDMENT	06/04/2026
06	FOR SITE PLAN APPROVAL	06/10/2026
07	FOR COORDINATION	07/03/2026
08	FOR SITE PLAN APPROVAL	07/14/2026

GENERAL NOTES

1. DO NOT SCALE DRAWINGS. ALL MEASUREMENTS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES TO THE ARCHITECT.
3. ALL WORK DESCRIBED UNDER THIS CONTRACT TO COMPLY WITH ONTARIO BUILDING CODE, 2024 AND/OR NATIONAL BUILDING CODE, 2020 AND OTHER CODES AND BY-LAWS IN EFFECT.
4. THIS DRAWING IS AN INSTRUMENT OF SERVICE AND IS PROTECTED BY COPYRIGHT. COPYRIGHT FOR THE ARCHITECT'S INSTRUMENT OF SERVICE BELONGS TO THE ARCHITECT. COPIES, INCLUDING ELECTRONIC COPIES, MAY ONLY BE USED OF THE PURPOSE INTENDED AND FOR A ONE-TIME USE, ON THE SAME SITE, AND FOR THE SAME PROJECT AND MAY NOT BE OFFERED FOR SALE OR TRANSFER WITHOUT THE EXPRESS WRITTEN CONSENT OF THE ARCHITECT.

PROJECT TEAM

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E: Colin@dm-structural.ca

MECHANICAL & ELECTRICAL ENGINEER
GOODKEY, WEEDMARK & ASSOCIATES LTD.
1688 Woodward Drive, Ottawa, ON K2C 3R8
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E: rqv@gwal.com

KEY PLAN



ONTARIO ASSOCIATION OF ARCHITECTS
TOMMY R. BONHOMME
LICENCE 11096

T Bonhomme Architect

PROJECT TITLE

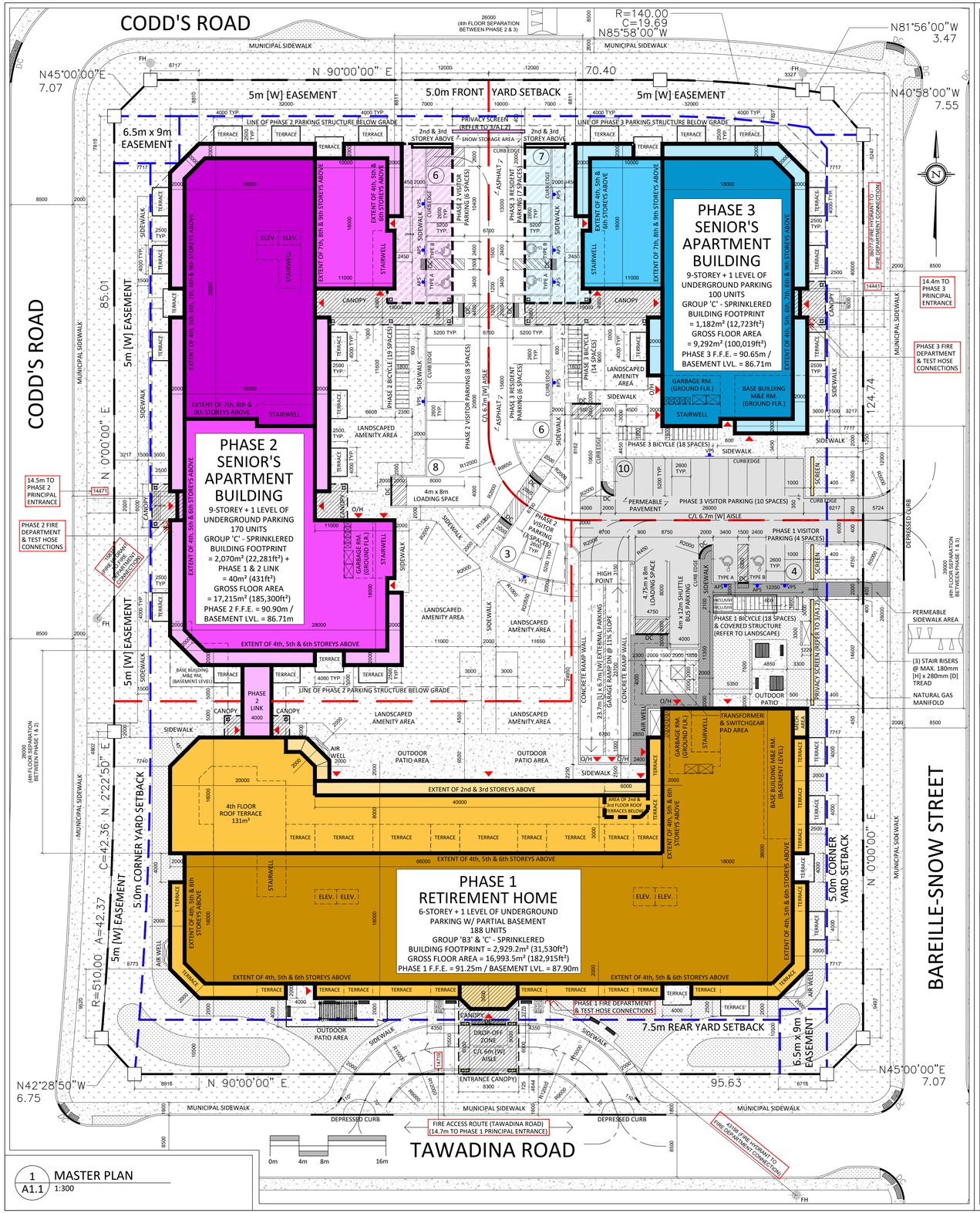
WATERIDGE LIFESTYLES - PHASE 1 RETIREMENT HOME
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET, OTTAWA ON

DRAWING LIST

SITE PLAN - PHASE 1

JOB No.	TBA-2026-01
DATE	01/20/2026
SCALE	AS NOTED
DRAWN & REVIEWED BY T.B.	DRAWING No. A1.0

FILE No. D07-12-26-0020 / PLAN No. xx



1 A1.1 MASTER PLAN 1:300

Site Information

Legal Description: Part of Lot 23, Concession 1 (Ottawa Front), Geographic Township of Gloucester and Part of Reserve Block 15 on 4M-1651

Block 21 - Lot Area: 14,162m² (1.4162 hectares or 3.5 acres)

Disclaimer: The concept site plan has been compiled using information contained in the Plan of Subdivision - Registered Plan 4M-1651 provided by Annis, O'Sullivan, Vollebekk Ltd., Ontario Land Surveyors.

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Minimum Interior Side Yard with Residential Land Use at Grade:	3.0m	N/A
Minimum Rear Yard with Residential Land Use at Grade:	7.5m	9.0m (Tawadina Road)
Additional Front & Corner Side Yard Setback Required for 4th Floor:	2.0m	2.0m
Minimum Separation between Portions of a Building above 4 Storeys:	23.0m	28.0m (Phases 1 & 2), 39.0m (Phases 1 & 3) 26.0m (Phases 2 & 3)
Maximum Building Area of Floor Plates at 7th Floor and Above:	750m²	Phase 1 - N/A, Phase 2 - 652m², Phase 3 - 652m²
Maximum Building Height:	30.0m	23.625m (Phase 1 Building / 6-Storeys) 30.0m (Phase 2 & 3 Buildings / 9-Storeys)

Phase 1 Retirement Home Building Information

Floor Level	Area	Group 'B3' & 'C' Details	Rentable Area of Suites / GFA
Basement Floor Area:	2,995.5m² (32,243ft²)	(0) Rooming Units	0m² (0ft²) = 0% of GFA
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5th Floor Area:	1,843.8m² (19,846ft²)	(28) Rooming Units	1,513.9m² (16,295ft²) = 82% of GFA
6th Floor Area:	1,843.8m² (19,846ft²)	(28) Rooming Units	1,501.3m² (16,160ft²) = 82% of GFA
Gross Floor Area (GFA):	16,993.5m² (182,915ft²)	(188) Rooming Units	8,599.3m² (92,562ft²) = 51% of GFA
Proposed Building Height:	23.625m measured from grade to top of parapet (23.186m from grade to top of flat roof surface)		
Number of Storeys:	(6) storeys above grade		

Phase 2 Senior's Apartment Building Information

Floor Level	Area	Group 'C' Details
Underground Parking Garage Area:	4,411m² (47,480ft²)	(0) Dwelling Units
Link between Phase 1 & 2 Buildings:	40m² (431ft²)	(0) Dwelling Units
Ground Floor Area:	1,900m² (20,451ft²)	(18) Dwelling Units
2nd Floor Area:	2,066m² (22,238ft²)	(25) Dwelling Units
3rd Floor Area:	2,066m² (22,238ft²)	(25) Dwelling Units
4th Floor Area:	1,592m² (17,136ft²)	(25) Dwelling Units
5th Floor Area:	1,592m² (17,136ft²)	(25) Dwelling Units
6th Floor Area:	1,592m² (17,136ft²)	(25) Dwelling Units
7th Floor Area:	652m² (7,018ft²)	(9) Dwelling Units
8th Floor Area:	652m² (7,018ft²)	(9) Dwelling Units
9th Floor Area:	652m² (7,018ft²)	(9) Dwelling Units
Gross Floor Area (GFA):	17,215m² (185,300ft²)	(170) Dwelling Units
Proposed Building Height:	30.0m measured from grade to top of parapet	
Number of Storeys:	(9) storeys above grade	

Phase 3 Senior's Apartment Building Information

Floor Level	Area	Group 'C' Details
Underground Parking Garage Area:	1,448m² (15,586ft²)	(0) Dwelling Units
Ground Floor Area:	1,012m² (10,893ft²)	(8) Dwelling Units
2nd Floor Area:	1,178m² (12,680ft²)	(13) Dwelling Units
3rd Floor Area:	1,178m² (12,680ft²)	(13) Dwelling Units
4th Floor Area:	840m² (9,042ft²)	(13) Dwelling Units
5th Floor Area:	840m² (9,042ft²)	(13) Dwelling Units
6th Floor Area:	840m² (9,042ft²)	(13) Dwelling Units
7th Floor Area:	652m² (7,018ft²)	(9) Dwelling Units
8th Floor Area:	652m² (7,018ft²)	(9) Dwelling Units
9th Floor Area:	652m² (7,018ft²)	(9) Dwelling Units
Gross Floor Area (GFA):	9,292m² (100,019ft²)	(100) Dwelling Units
Proposed Building Height:	30.0m measured from grade to top of parapet	
Number of Storeys:	(9) storeys above grade	

Phase 1, 2 & 3 Vehicular Parking Information

Phase 1 Retirement Home Building Parking		Zoning Requirement	Provided
Resident:	0.25 spaces per unit = 188 units x 0.25 = 47 spaces	Table 101 - R20 - Column II [Bylaw No. 2008-250]	47 spaces (provided in below grade indoor parking garage)
Staff:	1 space per 100m² GFA used for medical, health or personal services = 900m² GFA x 1 = 9 spaces	Table 101 - R20 - Column II [Bylaw No. 2008-250]	11 spaces (provided in below grade indoor parking garage)
Visitor:	No requirement for Retirement Home		4 spaces (surface parking)
Phase 2 Senior's Apartment Building (Mid-High Rise) Parking		**Zoning Requirement**	**Provided**
Resident:	0.5 spaces per unit = 170 units x 0.5 = 85 spaces * * (designed for 0.75 spaces per unit = 128 spaces)	Table 101 - R12 - Column II [Bylaw No. 2008-250]	129 spaces (provided in below grade indoor parking garage)
Visitor:	0.1 spaces per unit = 170 units x 0.1 = 17 spaces	Table 102 - Mid-High Rise - Column II [Bylaw No. 2008-250]	17 spaces (surface parking)
Phase 3 Senior's Apartment Building (Mid-High Rise) Parking		**Zoning Requirement**	**Provided**
Resident:	0.5 spaces per unit = 100 units x 0.5 = 50 spaces	Table 101 - R12 - Column II [Bylaw No. 2008-250]	37 spaces (provided in below grade indoor parking garage) 13 spaces (surface parking)
Visitor:	0.1 spaces per unit = 100 units x 0.1 = 10 spaces	Table 102 - Mid-High Rise - Column II [Bylaw No. 2008-250]	10 spaces (surface parking)

Bicycle Parking Information

Phase 1 Retirement Home Bicycle Parking

Short Term Spaces:

Table 613B (a) (viii) [Bylaw No. 2026-50] - Retirement Home

Min. 4 spaces + 0.1 spaces per unit above 20 units = 4 + 168 units x 0.1 = 21 spaces

Long Term Spaces:

Table 613B (b) (viii) [Bylaw No. 2026-50] - Retirement Home

0.25 spaces per unit = 188 units x 0.25 = 47 spaces

Total Phase 1 Short Term Bicycle Parking Provided:

= 22 spaces consisting of:

20 horizontal outdoor @ 0.6m x 1.8m / space & 2 horizontal outdoor inclusive @1.0m x 2.75m / space

Total Phase 1 Long Term Bicycle Parking Provided:

= 47 spaces consisting of:

44 horizontal indoor @ 0.6m x 1.8m / space & 3 horizontal inclusive indoor @1.0m x 2.75m / space

ISSUE RECORD

REV.	DESCRIPTION	DATE
01	FOR SITE PLAN APPROVAL	01/20/2026
02	FOR SITE PLAN APPROVAL	02/27/2026
03	FOR COORDINATION	04/16/2026
04	FOR SUPERSTRUCTURE PERMIT	05/05/2026
05	FOR ZONING BY-LAW AMENDMENT	06/04/2026
06	FOR SITE PLAN APPROVAL	06/10/2026
07	FOR COORDINATION	07/03/2026
08	FOR SITE PLAN APPROVAL	07/14/2026

GENERAL NOTES

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3. ALL WORK DESCRIBED UNDER THIS CONTRACT TO COMPLY WITH ONTARIO BUILDING CODE, 2024 AND/OR NATIONAL BUILDING CODE, 2020 AND OTHER CODES AND BY-LAWS IN EFFECT.
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KEY PLAN



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T Bonhomme Architect

PROJECT TITLE

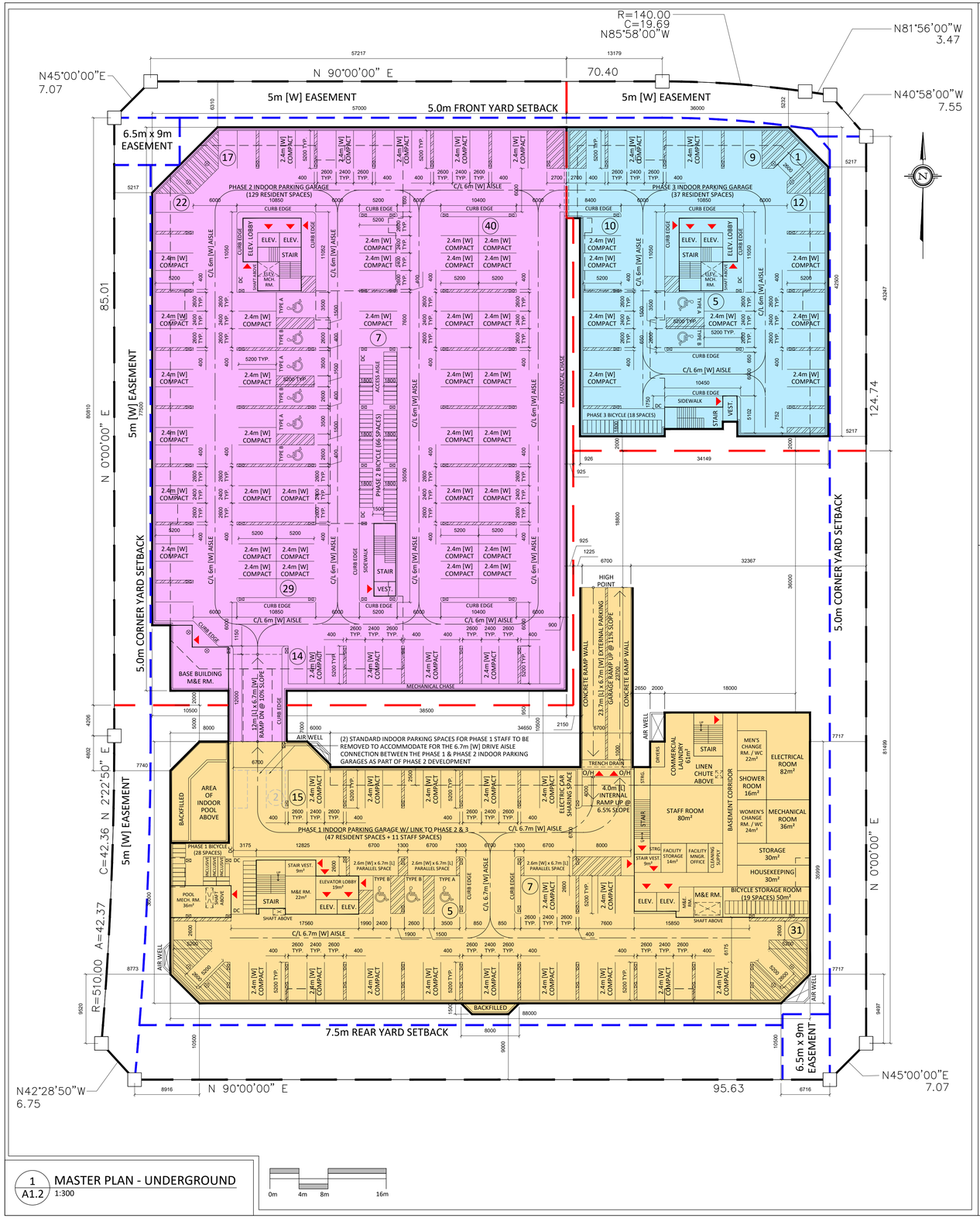
WATERIDGE LIFESTYLES - PHASE 1 RETIREMENT HOME
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET, OTTAWA ON

DRAWING LIST

MASTER PLAN

JOB No.	TBA-2026-01	DRAWING No.
DATE	01/20/2026	A1.1
SCALE	AS NOTED	
DRAWN & REVIEWED BY T.B.		

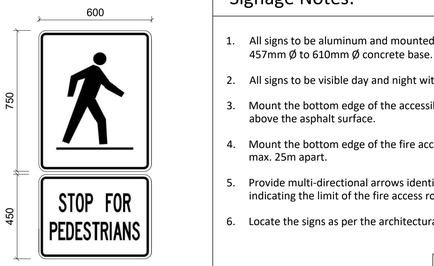
FILE No. D07-12-26-0020 / PLAN No. xx



1 A1.2 MASTER PLAN - UNDERGROUND
1:300



PEDESTRIAN CROSSING SIGN - RIGHT (Ra-5R)



PEDESTRIAN CROSSING SIGN - LEFT (Ra-5L)

ADVANCE PEDESTRIAN CROSSING SIGN - RIGHT (Wc-27R)



ACCESSIBLE PARKING SIGN (APS)



DIRECTIONAL FIRE ACCESS ROUTE SIGN (FARS)



DIRECTIONAL RESIDENT PARKING SIGN (RPS)

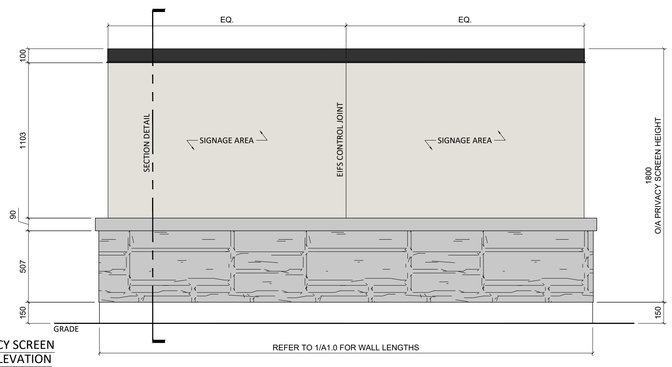


DIRECTIONAL VISITOR PARKING SIGN (VPS)

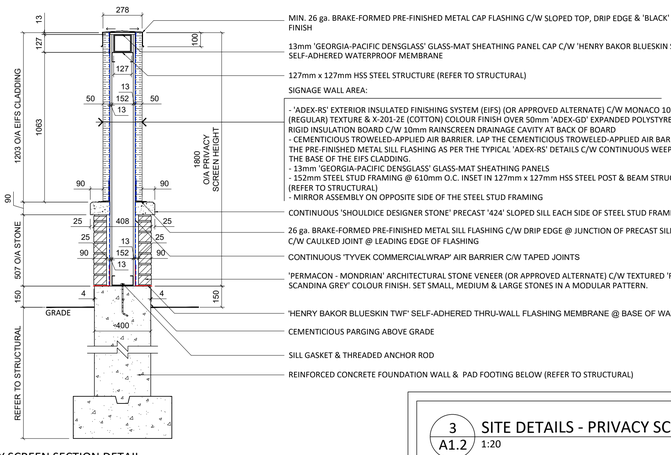
Signage Notes:

1. All signs to be aluminum and mounted on a permanent 60mm Ø galvanized steel post set in a 457mm Ø to 610mm Ø concrete base.
2. All signs to be visible day and night with scotch light reflective vinyl background & lettering.
3. Mount the bottom edge of the accessible parking, resident parking & visitor parking signs at 1200mm above the asphalt surface.
4. Mount the bottom edge of the fire access route sign at 2000mm above the asphalt surface & spaced max. 25m apart.
5. Provide multi-directional arrows identifying the fire access route or a single directional arrow indicating the limit of the fire access route.
6. Locate the signs as per the architectural site plan where noted by the symbol:

2 A1.2 SITE DETAILS - SIGNAGE
N.T.S.



PRIVACY SCREEN TYP. ELEVATION



- MIN. 26 ga. BRAKE-FORMED PRE-FINISHED METAL CAP FLASHING C/W SLOPED TOP, DRIP EDGE & 'BLACK' COLOUR FINISH
- 13mm 'GEORGIA-PACIFIC DENSGLASS' GLASS-MAT SHEATHING PANEL CAP C/W 'HENRY BAKOR BLUESKIN SA' SELF-ADHERED WATERPROOF MEMBRANE
- 127mm x 127mm HSS STEEL STRUCTURE (REFER TO STRUCTURAL)
- SIGNAGE WALL AREA:
  - 'ADEX-RS' EXTERIOR INSULATED FINISHING SYSTEM (EIFS) (OR APPROVED ALTERNATE) C/W MONACO 105 (REGULAR) TEXTURE & X-201-2E (COTTON) COLOUR FINISH OVER 50mm 'ADEX-GD' EXPANDED POLYSTYRENE (EPS) RIGID INSULATION BOARD C/W 10mm RAINSCREEN DRAINAGE CAVITY AT BACK OF BOARD
  - CEMENTICIOUS TROWELED-APPLIED AIR BARRIER. LAP THE CEMENTICIOUS TROWELED-APPLIED AIR BARRIER OVER THE PRE-FINISHED METAL SILL FLASHING AS PER THE TYPICAL 'ADEX-RS' DETAILS C/W CONTINUOUS WEEP JOINT AT THE BASE OF THE EIFS CLADDING.
  - 13mm 'GEORGIA-PACIFIC DENSGLASS' GLASS-MAT SHEATHING PANELS
  - 152mm STEEL STUD FRAMING @ 610mm O.C. INSET IN 127mm x 127mm HSS STEEL POST & BEAM STRUCTURE (REFER TO STRUCTURAL)
  - MIRROR ASSEMBLY ON OPPOSITE SIDE OF THE STEEL STUD FRAMING
- CONTINUOUS 'SHOULDICE DESIGNER STONE' PRECAST '424' SLOPED SILL EACH SIDE OF STEEL STUD FRAMING
- 26 ga. BRAKE-FORMED PRE-FINISHED METAL SILL FLASHING C/W DRIP EDGE @ JUNCTION OF PRECAST SILL & EIFS C/W CAULKED JOINT @ LEADING EDGE OF FLASHING
- CONTINUOUS 'TYVEK COMMERCIALWRAP' AIR BARRIER C/W TAPED JOINTS
- 'PERMACON - MONDRIAN' ARCHITECTURAL STONE VENEER (OR APPROVED ALTERNATE) C/W TEXTURED 'RANGE SCANDINA GREY' COLOUR FINISH. SET SMALL, MEDIUM & LARGE STONES IN A MODULAR PATTERN.
- 'HENRY BAKOR BLUESKIN TWF' SELF-ADHERED THRU-WALL FLASHING MEMBRANE @ BASE OF WALL
- CEMENTICIOUS PARGING ABOVE GRADE
- SILL GASKET & THREADED ANCHOR ROD
- REINFORCED CONCRETE FOUNDATION WALL & PAD FOOTING BELOW (REFER TO STRUCTURAL)

PRIVACY SCREEN SECTION DETAIL

3 A1.2 SITE DETAILS - PRIVACY SCREEN
1:20

ISSUE RECORD

REV.	DESCRIPTION	DATE
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KEY PLAN



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T Bonhomme Architect

PROJECT TITLE

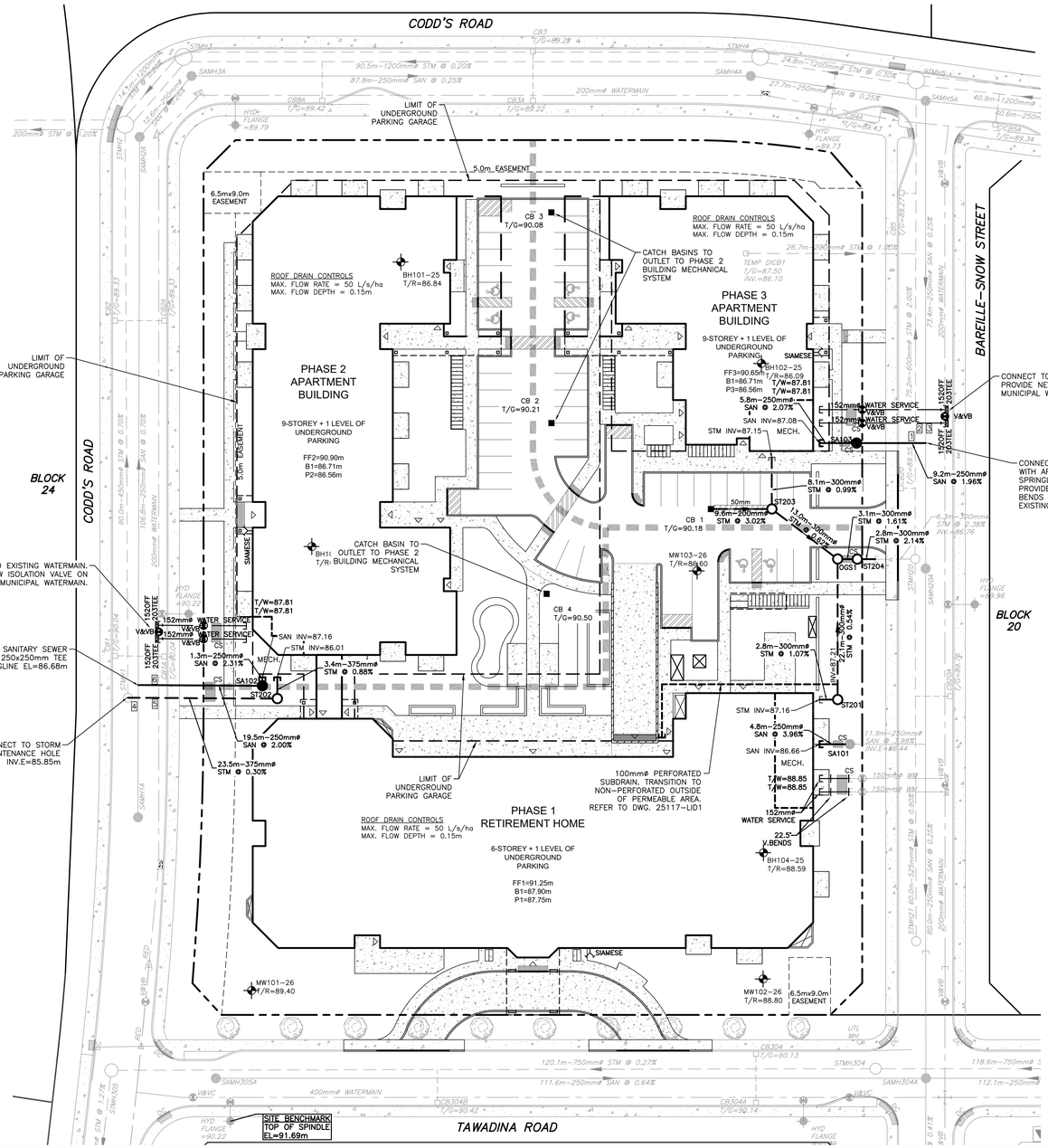
WATERIDGE LIFESTYLES - PHASE 1 RETIREMENT HOME
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET, OTTAWA ON

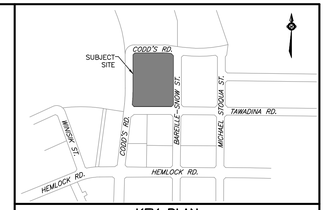
DRAWING LIST

MASTER PLAN - UNDERGROUND & SITE DETAILS

JOB No.	TBA-2026-01	DRAWING No.
DATE	01/20/2026	A1.2
SCALE	AS NOTED	
DRAWN & REVIEWED BY T.B.		

FILE No. D07-12-26-0020 / PLAN No. xx





STORM STRUCTURE TABLE				
STRUCTURE ID	DIMENSIONS (mm)	FRAME	T/G ELEV	INVERT
CB 1	600x600	S19	90.18	E=88.38
CB 2	CUSTOM	S19	90.21	MECH.
CB 3	CUSTOM	S19	90.08	MECH.
CB 4	CUSTOM	S19	90.50	MECH.
OGS1	EF04	STORMCEPTOR	90.15	NW=86.93 S=86.95 E=86.90
ST201	1200	S24.1	90.62	N=87.07 W=87.13
ST202	1200	S24.1	90.96	N=85.98 W=85.92
ST203	1200	S24.1	90.27	N=87.07 W=88.09 SE=87.01
ST204	1200	S24.1	90.00	W=86.85 E=86.82

NOTES:
1. CB2, CB3, AND CB4 TO OUTLET TO PHASE 2 BUILDING MECHANICAL SYSTEM.

SANITARY STRUCTURE TABLE				
STRUCTURE ID	DIMENSIONS (mm)	FRAME	T/G ELEV	INVERT
SA103	1200	S24	89.91	W=86.96 E=86.93
SA101	1200	S24	90.37	W=86.47 E=86.44
SA102	1200	S24	90.80	N=87.13 W=87.07

INLET CONTROL DEVICE (ICD) TABLE	
STRUCTURE	ORIFICE TYPE
CB 1	TEMPEST HF WITH NO FLOW RESTRICTION

152mmø WATERMAIN GRADE TABLE – PHASE 1 BUILDING TWIN SERVICES				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
1+000	90.10	87.70	2.40	V&VB (BY OTHERS)
1+002	90.26	87.70	2.56	22.5° VERTICAL BEND
1+004.8	91.15	88.75	2.40	22.5° VERTICAL BEND
1+006.7	91.25	88.85	2.40	CAP
152mmø WATERMAIN GRADE TABLE – PHASE 2 BUILDING TWIN SERVICES				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
2+000	90.03	87.63	2.40	152 OFF 203 TEE
2+007	90.26	87.86	2.40	VALVE & VALVE BOX
2+013.8	90.80	87.81	2.99	CAP
152mmø WATERMAIN GRADE TABLE – PHASE 3 BUILDING TWIN SERVICES				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
3+000	89.52	87.12	2.40	152 OFF 203 TEE
3+004.6	89.57	87.34	2.23	STORM CROSSING
3+013	89.74	87.34	2.40	VALVE & VALVE BOX
3+019.7	90.43	87.81	2.62	CAP

NOTES:
1. CONNECTIONS TO LIVE WATERMAINS TO BE COMPLETED BY CITY FORCES. CONTRACTOR TO PROVIDE EXCAVATION, MATERIAL, BACKFILL AND ASSISTANCE AS REQUIRED.

CROSSING TABLE			
CROSSING No.	SERVICE	INVERT/OBVERT	SEPARATION (m)
1	SANITARY	86.75	0.39
	STORM	86.36	
2	WATER	87.19	0.50
	STORM	86.69	
3	WATER	87.07	1.46
	SANITARY	85.61	
4	SANITARY	86.57	0.34
	STORM	86.23	
5	WATER	87.58	1.19
	STORM	86.39	
6	WATER	87.55	0.56
	SANITARY	86.99	

LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING WATERMAIN
- V&VB EXISTING VALVE & VALVE BOX
- V&VC EXISTING VALVE & VALVE CHAMBER
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- EXISTING TREE
- WATERMAIN
- V&VB VALVE & VALVE BOX
- SIAMESE CONNECTION
- CATCH BASIN
- SANITARY SEWER & MANHOLE (WATERTIGHT COVER)
- STORM SEWER & MANHOLE
- CS CLAY SEAL (CITY STD. S8)
- BUILDING ENTRANCE
- 1 CROSSING NUMBER
- 50mm INSULATION & THICKNESS (CITY STD. W22/S35)
- BOREHOLE/MONITORING WELL (REFER TO GEOTECHNICAL)

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHIC PLAN OF PART OF WATER RIDGE DEVELOPMENT BEING SHOWN AS BLOCK 21 ON DRAFT M-PLAN LOCATED NORTH OF TAWADINA ROAD AND EAST OF CODD'S ROAD, GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA, MONUMENT-URSO SURVEYING LTD. ELEVATIONS ARE GEODETIC AND REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (GCVD28:78).

NO.	REVISION DESCRIPTION	DATE	BY
6	REVISED PER COMMENTS	21/07/26	BLM
5	REVISED PER COMMENTS	10/06/26	BLM
4	ISSUED FOR BUILDING PERMIT	05/05/26	BLM
3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B.L. MACKECHNIE
100199554
21 JULY 26
PROVINCE OF ONTARIO

Robinson Land Development
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DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

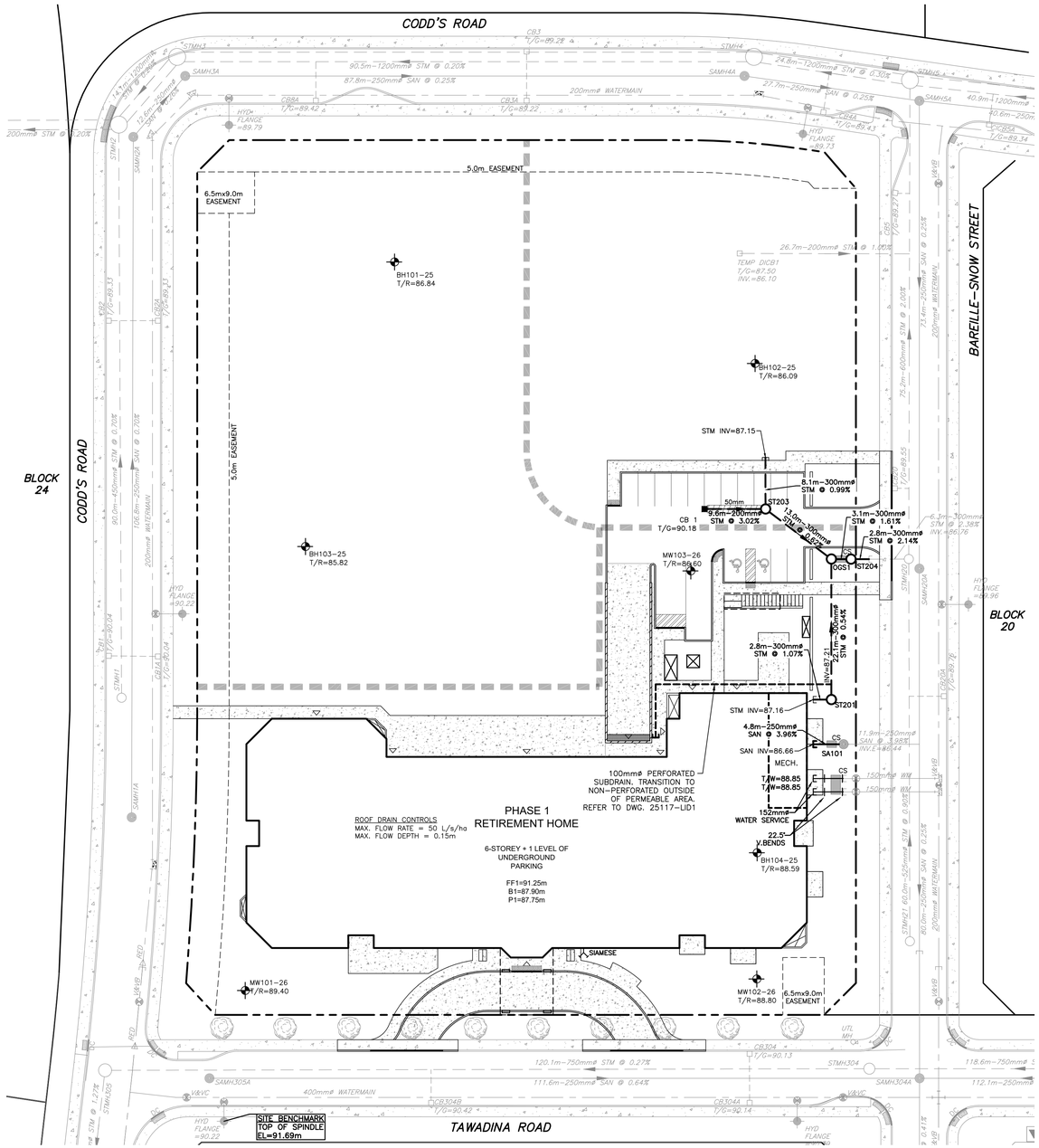
WATERIDGE LIFESTYLES LTD.

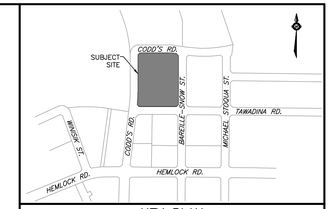
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

SERVICING PLAN

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-S1

FILE No. D07-12-26-0020





STORM STRUCTURE TABLE				
STRUCTURE ID	DIMENSIONS (mm)	FRAME	T/G ELEV	INVERT
CB 1	600x600	S19	90.18	E=88.38
CB 2	CUSTOM	S19	90.21	MECH.
CB 3	CUSTOM	S19	90.08	MECH.
CB 4	CUSTOM	S19	90.50	MECH.
OGS1	EF04	STORMCEPTOR	90.15	NW=86.93 S=86.95 E=86.90
ST201	1200	S24.1	90.62	N=87.07 W=87.13
ST202	1200	S24.1	90.96	N=85.98 W=85.92
ST203	1200	S24.1	90.27	N=87.07 W=88.09 SE=87.01
ST204	1200	S24.1	90.00	W=86.85 E=86.82

NOTES:
1. CB2, CB3, AND CB4 TO OUTLET TO PHASE 2 BUILDING MECHANICAL SYSTEM.

SANITARY STRUCTURE TABLE				
STRUCTURE ID	DIMENSIONS (mm)	FRAME	T/G ELEV	INVERT
SA103	1200	S24	89.91	W=86.96 E=86.93
SA101	1200	S24	90.37	W=86.47 E=86.44
SA102	1200	S24	90.80	N=87.13 W=87.07

INLET CONTROL DEVICE (ICD) TABLE	
STRUCTURE	ORIFICE TYPE
CB 1	TEMPEST HF WITH NO FLOW RESTRICTION

152mmø WATERMAIN GRADE TABLE – PHASE 1 BUILDING TWIN SERVICES				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
1+000	90.10	87.70	2.40	V&VB (BY OTHERS)
1+002	90.26	87.70	2.56	22.5° VERTICAL BEND
1+004.8	91.15	88.75	2.40	22.5° VERTICAL BEND
1+006.7	91.25	88.85	2.40	CAP

LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING WATERMAIN
- V&VB — EXISTING VALVE & VALVE BOX
- V&VC — EXISTING VALVE & VALVE CHAMBER
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- EXISTING TREE
- WATERMAIN
- V&VB — VALVE & VALVE BOX
- SIAMESE CONNECTION
- CATCH BASIN
- SANITARY SEWER & MANHOLE (WATERTIGHT COVER)
- STORM SEWER & MANHOLE
- CS — CLAY SEAL (CITY STD. S8)
- BUILDING ENTRANCE
- 1 — CROSSING NUMBER
- 50mm — INSULATION & THICKNESS (CITY STD. W22/S35)
- BOREHOLE/MONITORING WELL (REFER TO GEOTECHNICAL)

NOTES

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3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B.L. MACKECHNIE
100199554
21 July '26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

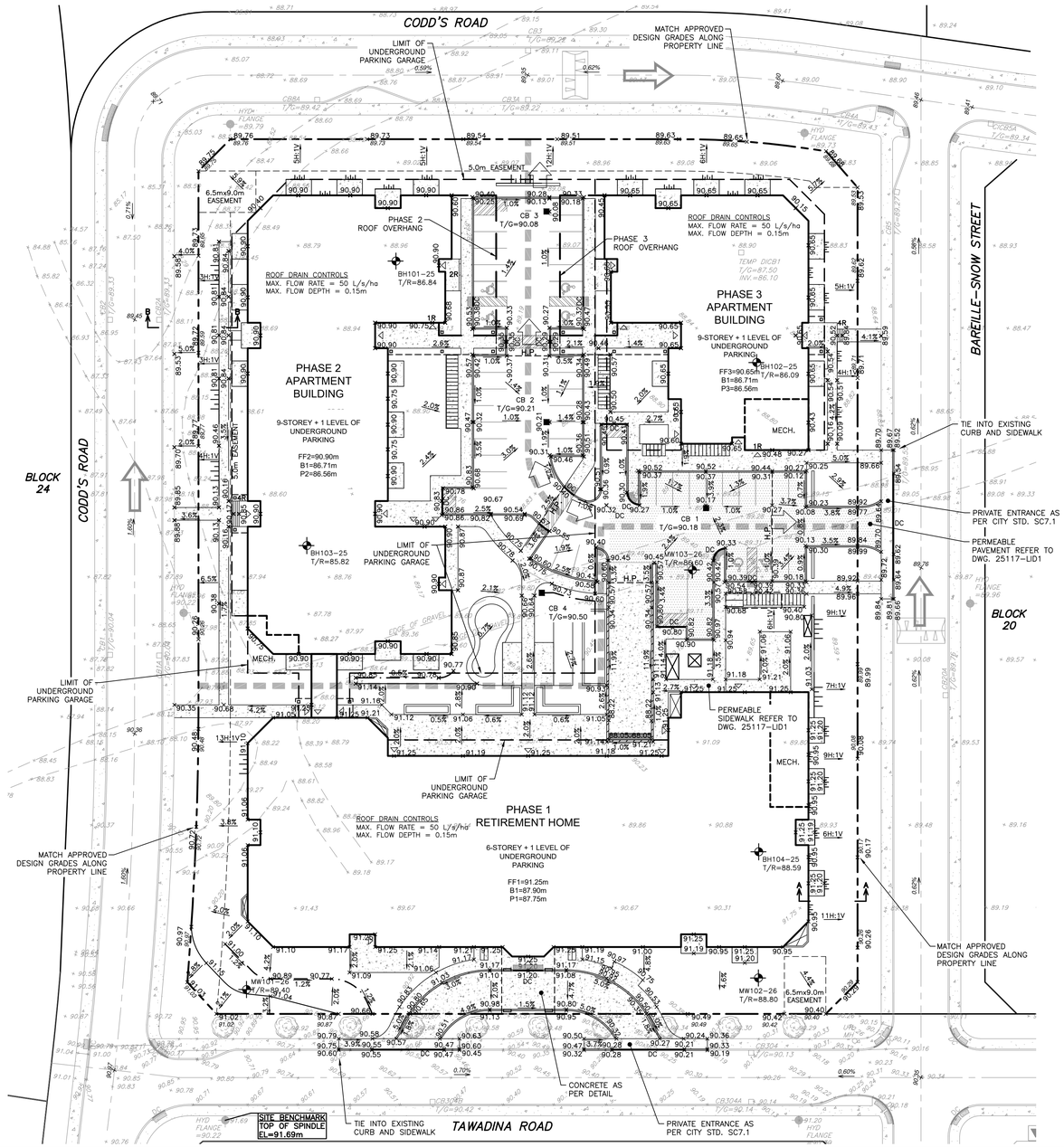
WATERIDGE LIFESTYLES LTD.

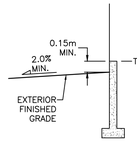
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

INTERIM
SERVICING PLAN

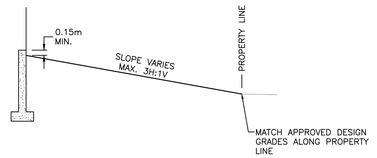
PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-S2

FILE No. D07-12-26-0020

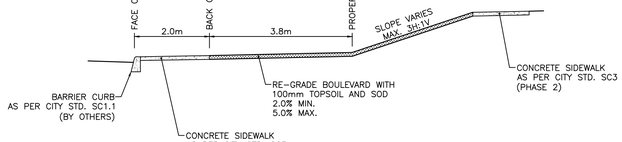




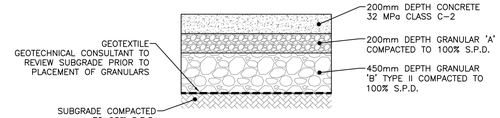
TYPICAL FOUNDATION DETAIL
N.T.S.



SECTION A–A (TYP.)
N.T.S.

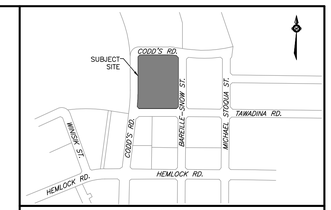


SECTION B–B (TYP.)
N.T.S.



NOTE: HEAT TRACING DETAILS TO BE SPECIFIED BY OTHERS.

TAWADINA ROAD ACCESS / PARKING GARAGE RAMP STRUCTURE DETAIL
N.T.S.



KEY PLAN



LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- × 88.00 EXISTING ELEVATION
- × 90.00 PROPOSED GRADE
- × 90.00 APPROVED DESIGN GRADE
- 2.0% PROPOSED DRAINAGE SLOPE & DIRECTION
- 3R PROPOSED NUMBER OF RISERS
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING TREE
- CATCH BASIN
- BUILDING ENTRANCE
- BOREHOLE/MONITORING WELL (REFER TO GEOTECHNICAL)
- TERRACING (3H:1V MAX.)
- SWALE
- 100-YR PONDING LIMIT
- RETAINING WALL
- H.P. HIGH POINT
- DC DEPRESSED CURB WITH TWSI
- MAJOR OVERLAND FLOW ROUTE
- EXTERNAL MAJOR OVERLAND FLOW ROUTE
- PERMEABLE PAVEMENT STRUCTURE

FF1 FINISHED FLOOR ELEVATION
B1 BASEMENT LEVEL ELEVATION
P1 PARKING GARAGE LEVEL ELEVATION

NOTE:
NO SURFACE PONDING OCCURS DURING THE 2-YEAR THROUGH 100-YEAR DESIGN EVENTS.
REFER TO PONDING AREA PLAN (DWG. 25117-PA1) FOR MORE DETAILS.

NOTES

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3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B.L. MACKECHNIE
100199554
21 JULY 26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

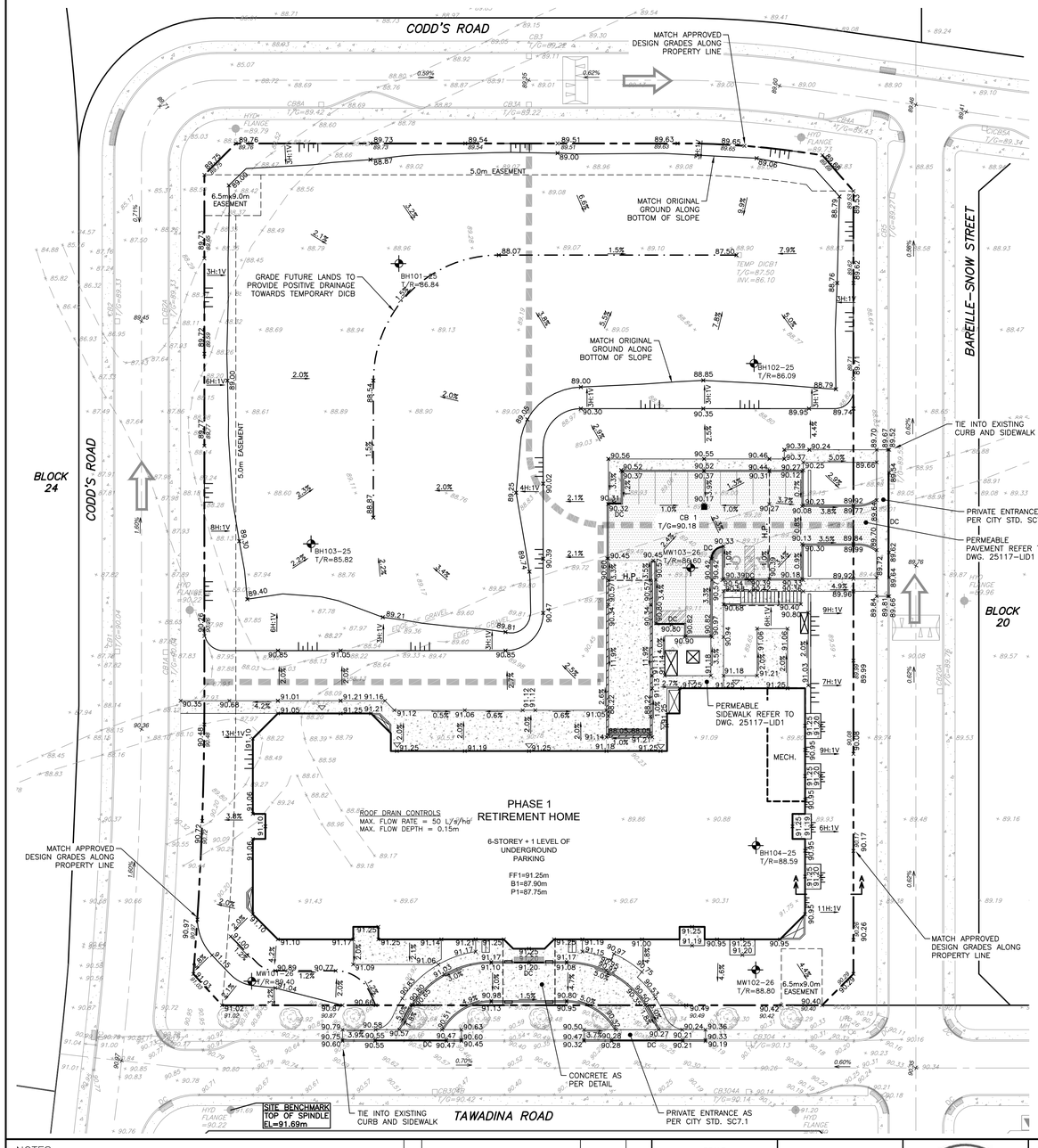
WATERIDGE LIFESTYLES LTD.

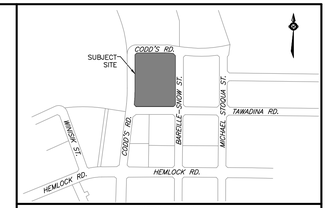
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

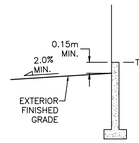
GRADING AND DRAINAGE PLAN

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-GR1

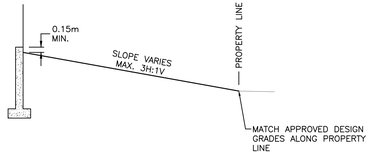
FILE No. D07-12-26-0020



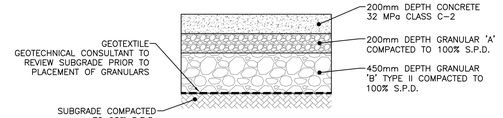




TYPICAL FOUNDATION DETAIL
N.T.S.



SECTION A–A (TYP.)
N.T.S.



NOTE: HEAT TRACING DETAILS TO BE SPECIFIED BY OTHERS.

TAWADINA ROAD ACCESS / PARKING GARAGE RAMP STRUCTURE DETAIL
N.T.S.

LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- × 88.00 — EXISTING ELEVATION
- × 90.00 — PROPOSED GRADE
- × 90.00 — APPROVED DESIGN GRADE
- 2.0% — PROPOSED DRAINAGE SLOPE & DIRECTION
- 3R — PROPOSED NUMBER OF RISERS
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING TREE
- CATCH BASIN
- BUILDING ENTRANCE
- BOREHOLE/MONITORING WELL (REFER TO GEOTECHNICAL)
- TERRACING (3H:1V MAX.)
- SWALE
- 100–YR PONDING LIMIT
- RETAINING WALL
- H.P. — HIGH POINT
- DC — DEPRESSED CURB WITH TWSI
- MAJOR OVERLAND FLOW ROUTE
- EXTERNAL MAJOR OVERLAND FLOW ROUTE
- PERMEABLE PAVEMENT STRUCTURE

FF1 FINISHED FLOOR ELEVATION
B1 BASEMENT LEVEL ELEVATION
P1 PARKING GARAGE LEVEL ELEVATION

NOTE:
NO SURFACE PONDING OCCURS DURING THE 2–YEAR THROUGH 100–YEAR DESIGN EVENTS.
REFER TO PONDING AREA PLAN (DWG. 25117–PA1) FOR MORE DETAILS.

NOTES

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2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B.L. MACKECHNIE
100199554
21 JUL '26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

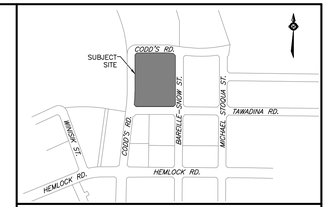
WATERIDGE LIFESTYLES LTD.

WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

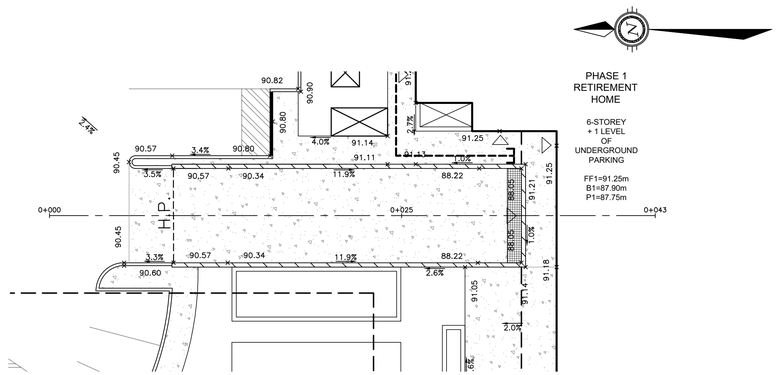
INTERIM GRADING AND DRAINAGE PLAN

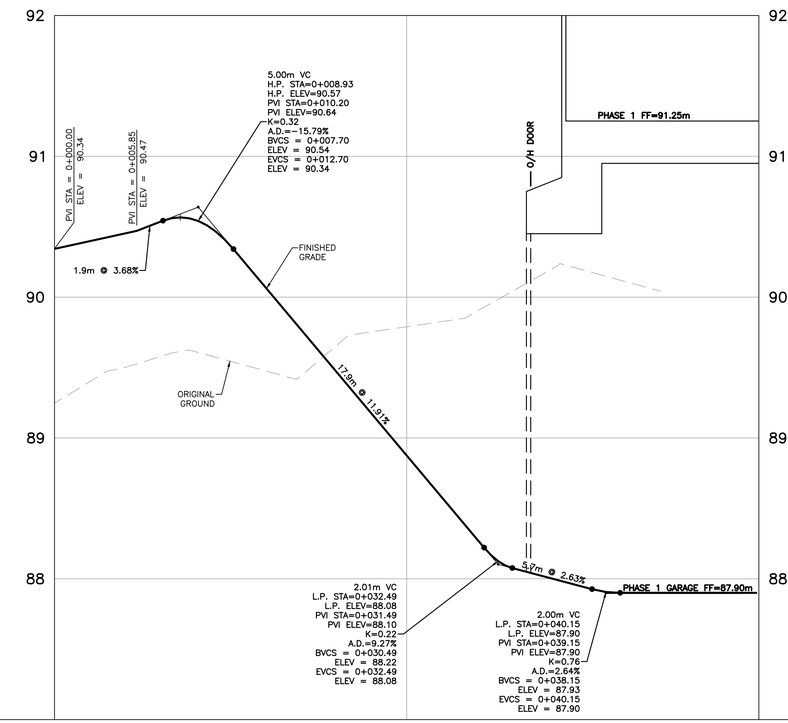
PROJECT No.	25117
SURVEY	MONUMENT–URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-GR2

FILE No. D07-12-26-0020



KEY PLAN





PROPOSED RAMP ELEVATION		90.34 90.47 90.57 90.54	88.88 88.13 87.91 87.90	PROPOSED RAMP ELEVATION
ORIGINAL GROUND		*89.25*	*89.79*	ORIGINAL GROUND
CHAINAGE		**0+000**	**0+025** **0+050**	CHAINAGE

NOTES

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1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE

VERTICAL 1:20 (0, 0.2m, 0.4m, 0.8m)

HORIZONTAL 1:200 (0, 2m, 4m, 8m)

LICENSED PROFESSIONAL ENGINEER — B.L. MACKECHNIE 100199554 — PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
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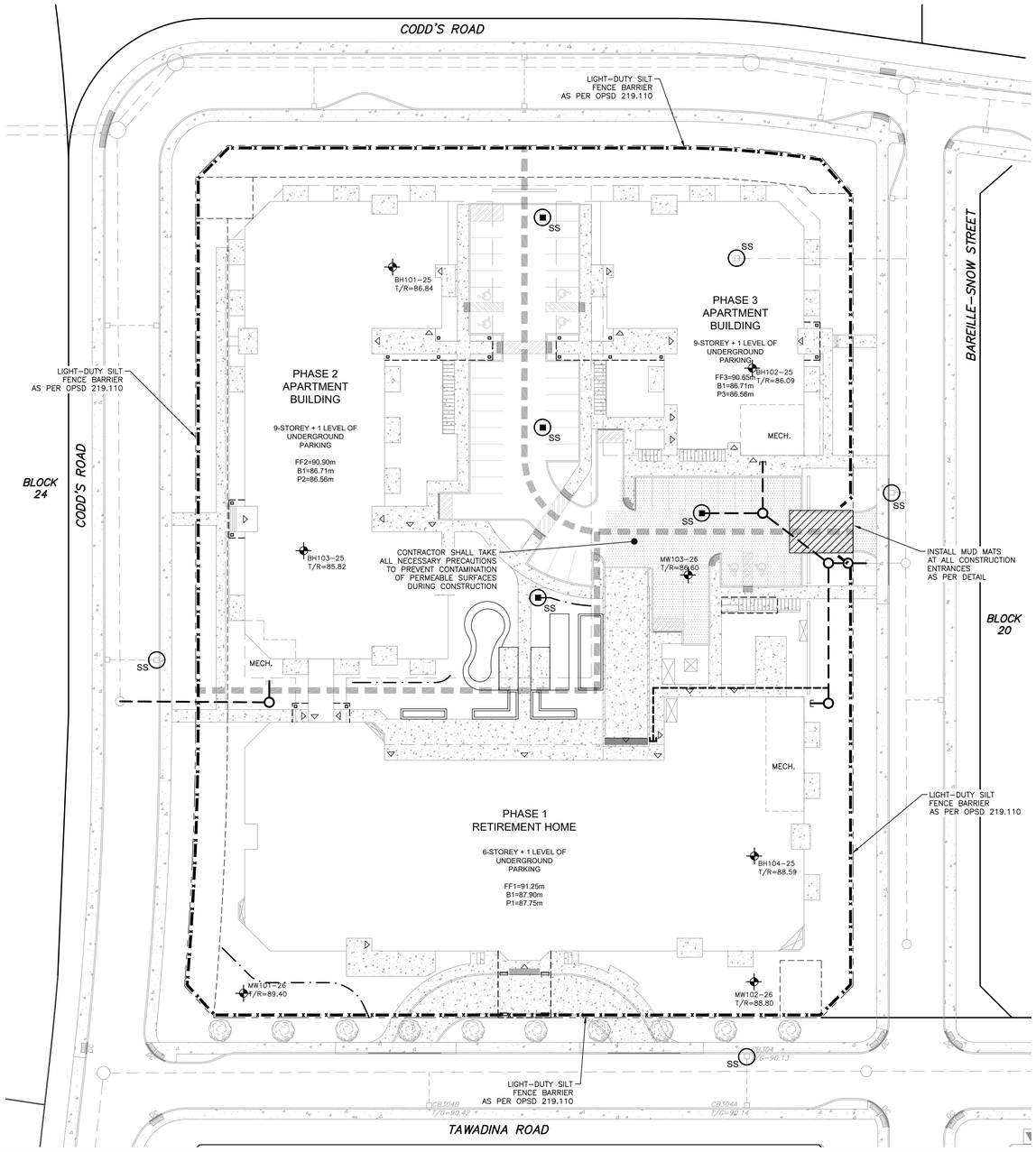
WATERIDGE LIFESTYLES LTD.

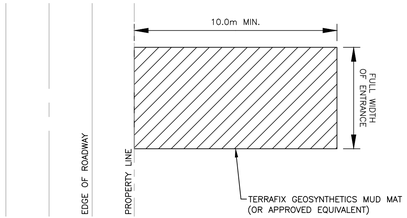
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

UNDERGROUND PARKING GARAGE RAMP PLAN & PROFILE

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-P1

FILE No. D07-12-26-0020

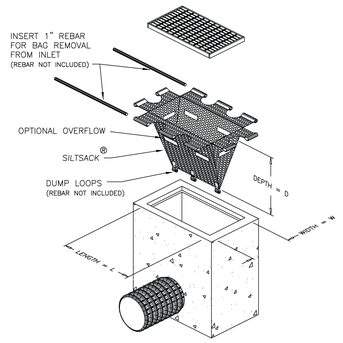


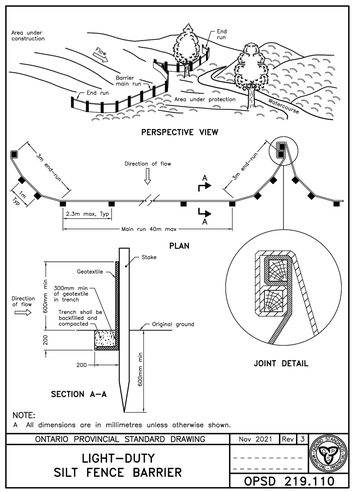


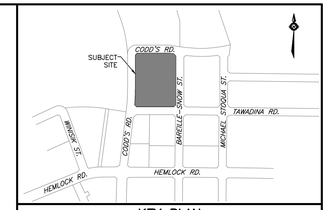
NOTES:
1. SEDIMENT SHALL BE CLEANED FROM ROADWAYS AS REQUIRED.
2. INSTALL AND MAINTAIN MUD MATS AT ALL CONSTRUCTION ENTRANCES.

MUD MAT DETAIL
N.T.S.

Typical Siltsack® Construction - Type B







KEY PLAN



LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- CATCH BASIN
- STORM SEWER & MANHOLE
- BUILDING ENTRANCE
- BOREHOLE/MONITORING WELL (REFER TO GEOTECHNICAL)
- TERRACING (3H:1V MAX.)
- SWALE
- LIGHT-DUTY SILT FENCE BARRIER
- SILT SACK (OR APPROVED EQUIVALENT)

NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE ULTIMATE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. LIMIT THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
3. RETAIN EXISTING VEGETATION TO THE GREATEST EXTENT POSSIBLE FOR AS LONG AS POSSIBLE.
4. MINIMIZE SLOPE LENGTH AND GRADIENT OF DISTURBED AREAS.
5. MAINTAIN OVERLAND SHEET FLOW AND AVOID CONCENTRATED FLOWS.
6. REDUCE RUNOFF VELOCITIES AND DETAIN RUNOFF TO PROMOTE SETTLING.
7. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL VEGETATION HAS BEEN RE-ESTABLISHED IN ALL DISTURBED AREAS. RE-VEGETATE DISTURBED AREAS AS SOON AS POSSIBLE.
8. DIVERT RUNOFF FROM PROBLEM AREAS AND AWAY FROM INFILTRATION BASED LID PRACTICES.
9. AVOID HEAVY VEHICLE TRAFFIC WHERE INFILTRATION BASED LID MEASURES ARE PROPOSED.
10. CONTRACTOR SHALL MINIMIZE THE AMOUNT OF STOCKPILED MATERIAL. ALL STOCKPILE SOIL SHALL BE AWAY (15 METRES OR GREATER) FROM WATERCOURSES, LID PRACTICES, DRAINAGE FEATURES AND TOP OF STEEP SLOPES. THE DOWNSTREAM SIDE OF ALL STOCKPILES SHALL BE PROTECTED WITH SILT FENCE. FIBRE ROLLS OR EQUIVALENT MEASURES PRIOR TO A RAINFALL EVENT.
11. SILT SACKS ARE TO BE PLACED UNDERNEATH THE FRAME AND COVER OF ALL PROPOSED AND EXISTING CATCH BASIN AND OPEN COVER STORM MANHOLES UNTIL CONSTRUCTION IS COMPLETED.
12. LIGHT-DUTY SILT FENCE BARRIERS SHALL BE INSTALLED AS PER OPSD 219.110 WHERE INDICATED AND MAINTAINED AS REQUIRED.
13. DURING ACTIVE CONSTRUCTION PERIODS, VISUAL INSPECTIONS SHALL BE UNDERTAKEN ON A WEEKLY BASIS AND AFTER MAJOR STORM EVENTS (>25mm RAIN IN 24 HOUR PERIOD) ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY.
14. EROSION AND SEDIMENT CONTROL BARRIERS SHALL ALSO BE ASSESSED (AND REPAIRED AS REQUIRED) FOLLOWING SIGNIFICANT SNOWMELT EVENTS.
15. VISUAL INSPECTIONS SHALL ALSO BE UNDERTAKEN IN ANTICIPATION OF LARGE STORM EVENTS (OR A SERIES OF RAINFALL AND/OR SNOWMELT DAYS) THAT COULD POTENTIALLY YIELD SIGNIFICANT RUNOFF VOLUMES.
16. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION OPERATIONS.
17. IN SOME CASES, BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS SHALL BE REINSTATED IMMEDIATELY AFTER CONSTRUCTION OPERATIONS ARE COMPLETED.
18. SEDIMENT CONTROL DEVICES SHALL BE CLEANED OF ACCUMULATED SEDIMENTATION AS REQUIRED AND REPLACED AS NECESSARY.
19. DURING THE COURSE OF CONSTRUCTION, IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES, AS REQUIRED, TO THE SATISFACTION OF THE ENGINEER.
20. CONSTRUCTION AND MAINTENANCE REQUIREMENTS FOR EROSION AND SEDIMENT CONTROLS ARE TO COMPLY WITH OPSS 805.
21. MUD MATS SHALL BE INSTALLED AT ALL CONSTRUCTION ENTRANCES.
22. INSPECTION AND MAINTENANCE OF TEMPORARY ESC MEASURES SHALL CONTINUE UNTIL THEY ARE NO LONGER REQUIRED.
23. THE CONTRACTOR SHALL ENSURE THAT RECORDS OF INSPECTION ARE TAKEN, INCLUDING INSPECTOR'S NAME, DATE OF INSPECTION, VISUAL OBSERVATIONS, AND ANY NECESSARY REMEDIAL MEASURES TAKEN TO MAINTAIN INTERIM ESC MEASURES.

NOTES

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1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

PROFESSIONAL ENGINEER B.L. MACKECHNIE 100199554 PROVINCE OF ONTARIO 21 JULY '26

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
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DRAWN	BLM
CHECKED	SM
APPROVED	BLM

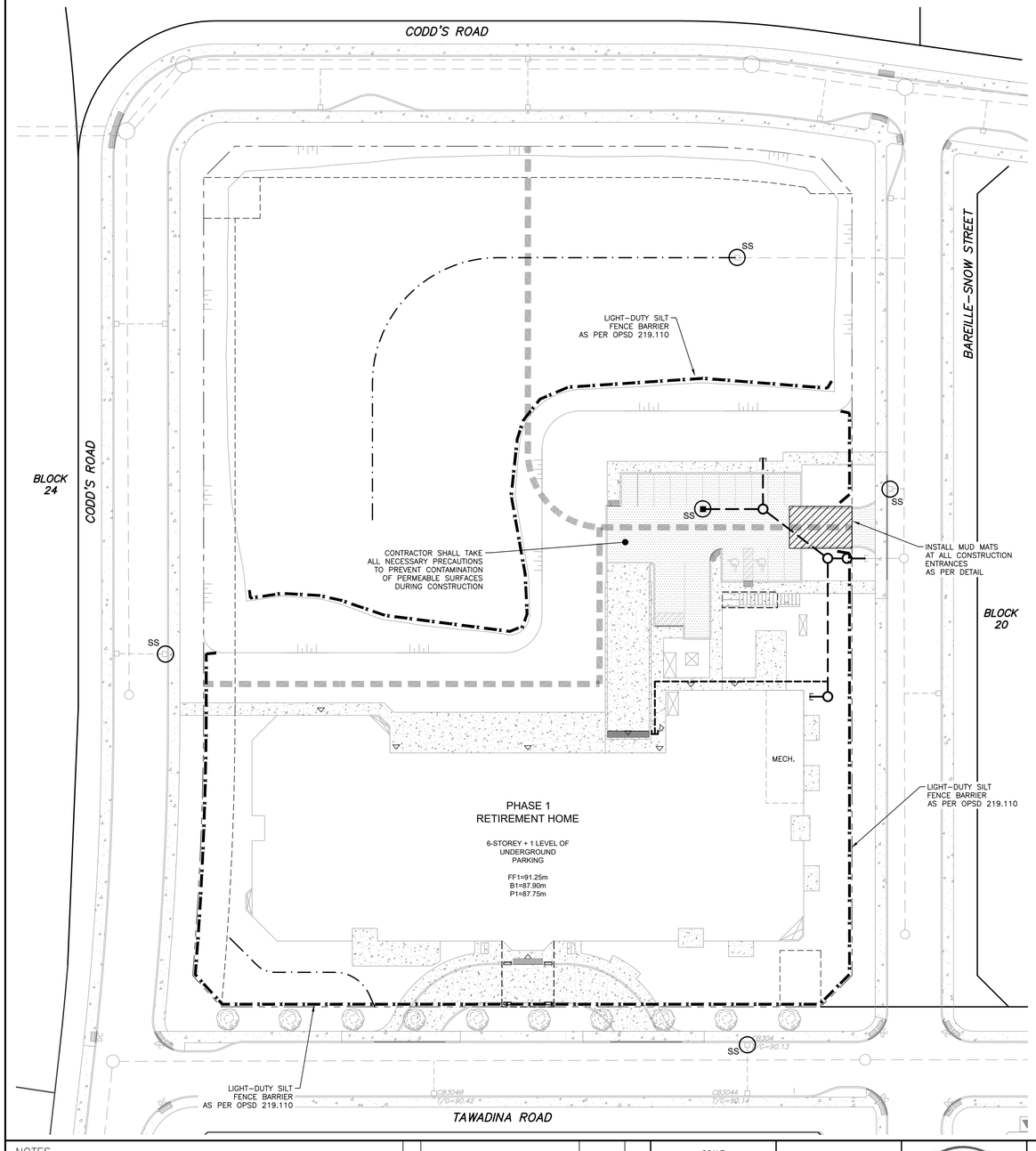
WATERIDGE LIFESTYLES LTD.

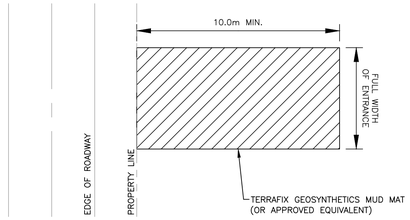
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

EROSION AND SEDIMENT CONTROL PLAN

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-ESC1

FILE No. D07-12-26-0020

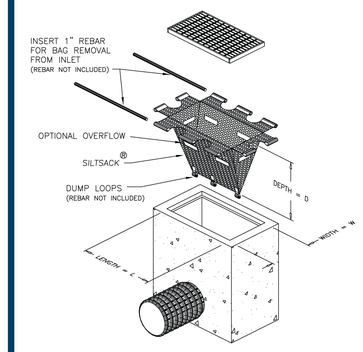


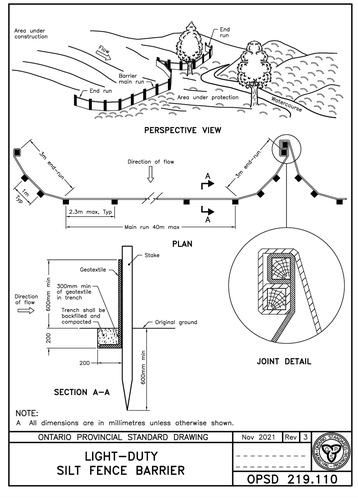


NOTES:
1. SEDIMENT SHALL BE CLEANED FROM ROADWAYS AS REQUIRED.
2. INSTALL AND MAINTAIN MUD MATS AT ALL CONSTRUCTION ENTRANCES.

MUD MAT DETAIL
N.T.S.

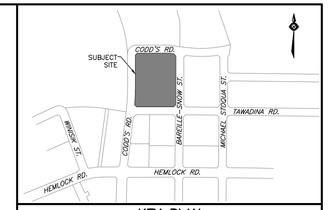
Typical Siltsack® Construction - Type B





NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev 3
LIGHT–DUTY SILT FENCE BARRIER		OPSD 219.110



KEY PLAN



LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- CATCH BASIN
- STORM SEWER & MANHOLE
- BUILDING ENTRANCE
- BOREHOLE/MONITORING WELL (REFER TO GEOTECHNICAL)
- TERRACING (3H:1V MAX.)
- SWALE
- LIGHT–DUTY SILT FENCE BARRIER
- SS — SILT SACK (OR APPROVED EQUIVALENT)

NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE ULTIMATE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. LIMIT THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
3. RETAIN EXISTING VEGETATION TO THE GREATEST EXTENT POSSIBLE FOR AS LONG AS POSSIBLE.
4. MINIMIZE SLOPE LENGTH AND GRADIENT OF DISTURBED AREAS.
5. MAINTAIN OVERLAND SHEET FLOW AND AVOID CONCENTRATED FLOWS.
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HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B.L. MACKECHNIE
100199554
21 July 26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
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CHECKED	SM
APPROVED	BLM

WATERIDGE LIFESTYLES LTD.

WATERIDGE VILLAGE
100 BAREILLE–SNOW STREET
CITY OF OTTAWA, ON

INTERIM EROSION AND SEDIMENT CONTROL PLAN

PROJECT No.	25117
SURVEY	MONUMENT–URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117–ESC2

FILE No. D07–12–26–0020

GENERAL NOTES:

1. ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), AS AMENDED BY THE CITY OF OTTAWA.
2. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS AND ELEVATIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
4. DESIGN ELEVATIONS GIVEN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY ROBINSON LAND DEVELOPMENT.
5. ANY AREAS BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE.
6. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
7. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST AMENDMENT).
8. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
9. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH, AS SPECIFIED BY OPSD, IS EXCEEDED.
10. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH THE CITY OF OTTAWA PRIOR TO ANY TREE CUTTING.
11. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY CAMBIUM DATED FEBRUARY 26, 2026.
12. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE FOR DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS AND TRENCHING AS WELL AS RELEASE OF ANY PUMPED GROUNDWATER IN A CONTROLLED AND APPROVED MANNER.
13. DO NOT CONSTRUCT USING DRAWINGS THAT ARE NOT MARKED "ISSUED FOR CONSTRUCTION".
14. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
15. CLAY SEALS SHALL BE INSTALLED WITHIN SEWER TRENCHES IN ACCORDANCE WITH CITY STANDARD S8.
16. MOVEMENT OF MATERIAL ON AND/OR OFF SITE SHALL BE IN ACCORDANCE WITH ONTARIO EXCESS SOIL REGULATION O.REG. 406/19.
17. THE CONTRACTOR SHALL COMPLETE A CCTV INSPECTION OF ALL NEW SANITARY AND STORM SEWERS. A COPY OF THE VIDEO INSPECTION SHALL BE PROVIDED TO THE ENGINEER FOR REVIEW.

STORM SEWERS:

1. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2 (LATEST AMENDMENT). ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1 (LATEST AMENDMENT). PIPE SHALL BE JOINTED WITH STD. RUBBER GASKETS AS PER CSA A257.3 (LATEST AMENDMENT).
2. ALL STORM SEWER TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
3. ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
4. STORM MANHOLE FRAME AND COVERS SHALL BE AS PER CITY OF OTTAWA STD. S24.1.
5. CATCH BASIN MANHOLE FRAME AND COVERS SHALL BE AS PER CITY OF OTTAWA STD. S28.1.
6. STORM SEWER MANHOLES SERVING SEWERS LESS THAN 900mm SHALL BE CONSTRUCTED WITH A 300mm SUMP. FOR STORM SEWERS 900mm AND OVER USE BENCHING IN ACCORDANCE WITH OPSD 701.021.
7. THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED ABOVE. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ADDITIONAL BEDDING, A DIFFERENT TYPE OF BEDDING OR A HIGHER PIPE STRENGTH AT HIS OWN EXPENSE AND SHALL ALSO BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.
8. ALL STORM MANHOLES SHALL BE 1200mm DIAMETER AS PER OPSD 701.010 UNLESS OTHERWISE NOTED.
9. ALL CATCH BASINS SHALL BE 600mm X 600mm AS PER OPSD 705.010 UNLESS OTHERWISE NOTED.

SANITARY SEWERS:

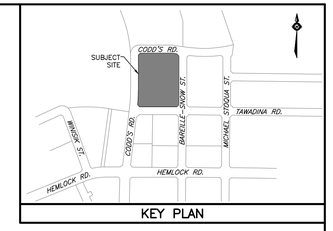
1. ALL SANITARY SEWERS 200mm IN DIAMETER (OR GREATER) SHALL BE PVC SDR 35, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
2. ALL SANITARY SERVICES 135mm IN DIAMETER SHALL BE PVC SDR 28, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
3. ALL SANITARY SEWERS/SERVICES WITH LESS THAN 2.5m HORIZONTAL SEPARATION TO WATERMAINS SHALL BE CONSTRUCTED USING SEWER PIPE IN ACCORDANCE WITH OPSS 1841, WITH JOINTS CAPABLE OF 345 kPa MINIMUM, CONFORMING TO PSM PVC, CSA B182.2/CSA 182.7 OR CSA B137.3 OR AWWA 302.
4. SANITARY SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF OTTAWA STD. S6 AND S7, CLASS 'B' BEDDING UNLESS OTHERWISE NOTED.
5. ALL SANITARY SERVICES ARE TO BE EQUIPPED WITH APPROVED BACKWATER VALVES.
6. SANITARY MANHOLE FRAME AND COVERS SHALL BE WATERTIGHT AS PER CITY OF OTTAWA STD. S24.
7. SANITARY SEWER MANHOLES SHALL BE BENCHED AS PER OPSD 701.021.
8. FOR SANITARY MANHOLES, DEPENDING ON THE ELEVATION OF THE GROUNDWATER TABLE, AND BASED ON THE RECOMMENDATION OF THE PROJECT GEOTECHNICAL CONSULTANT, CRETEX SEALS, OR A SIMILAR PRODUCT, SHALL BE INSTALLED IN THE PRE-CAST MANHOLE SECTION TO JUST BELOW THE MANHOLE FRAME TO PREVENT INFILTRATION.
9. CONTRACTOR SHALL PERFORM EXFILTRATION TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR ALL SANITARY SEWERS IN ACCORDANCE WITH OPSS 410.

WATER SUPPLY:

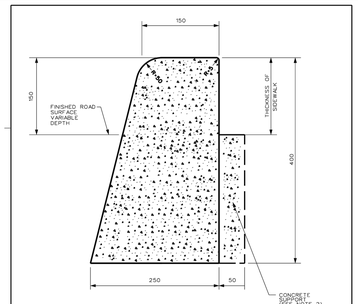
1. ALL PVC WATERMAINS SHALL BE EQUAL TO AWWA C-900 CLASS 150, SDR 18, OR APPROVED EQUAL.
2. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17, UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
3. ALL PVC WATERMAINS SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W36.
4. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS AS PER CITY OF OTTAWA STD. W40 AND W42.
5. CONTRACTOR TO SUPPLY HYDRANT EXTENSION TO ADJUST THE LENGTH OF HYDRANT BARREL IF REQUIRED.
6. FIRE HYDRANTS SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W19, AND LOCATED AS PER CITY STD. W18.
7. VALVE IN BOXES SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W24.
8. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS AS PER CITY OF OTTAWA STD. W25.5 AND W25.6.
9. THRUST BLOCKING OF WATERMAIN TO BE INSTALLED AS PER CITY OF OTTAWA STD. W25.3 AND W25.4.
10. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS AND BLOW-OFFS AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
11. WHERE WATERMAIN COVER IS LESS THAN 2.4m PROVIDE THERMAL INSULATION IN ACCORDANCE WITH CITY OF OTTAWA STD. W22.
12. WHERE WATERMAINS HAVE LESS THAN 2.4m OF SEPARATION TO OPEN STRUCTURES PROVIDE THERMAL INSULATION IN ACCORDANCE WITH CITY OF OTTAWA STD. W23.
13. WATERMAINS CROSSING ABOVE SEWERS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. W25.2. MINIMUM BARREL TO BARREL SEPARATION SHALL BE 500mm.
14. WATERMAINS CROSSING BELOW SEWERS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. W25. MINIMUM BARREL TO BARREL SEPARATION SHALL BE 500mm.
15. CONNECTION TO EXISTING WATERMAIN TO BE PERFORMED BY CITY FORCES. CONTRACTOR TO PROVIDE EXCAVATION, MATERIAL, BACKFILL AND ASSISTANCE AS REQUIRED.
16. SWABBING, DISINFECTION, AND HYDROSTATIC TESTING TO BE CONDUCTED AS PER CITY OF OTTAWA STANDARDS IN THE PRESENCE OF A CITY INSPECTOR AND/OR CONSULTANT.

ROADWORK SPECIFICATIONS:

1. CONCRETE BARRIER CURB SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC1.1.
2. ALL BARRIER CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
3. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC1.4.
4. TWSIs SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF OTTAWA STD. SC7.3.
5. ANY PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. R10.
6. GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300mm AROUND ALL STRUCTURES WITHIN PAVEMENT AREA.
7. ALL GRANULARS FOR ROADS SHALL BE COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR DENSITY.
8. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300mm LIFTS.
9. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW-CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW ASPHALT.
10. PAVEMENT STRUCTURE DETAILS TO BE PROVIDED BY THE GEOTECHNICAL CONSULTANT.
11. GEOTECHNICAL CONSULTANT SHALL REVIEW SUBGRADE PRIOR TO PLACEMENT OF GRANULAR SUB-BASE.



KEY PLAN



CONCRETE BARRIER CURB

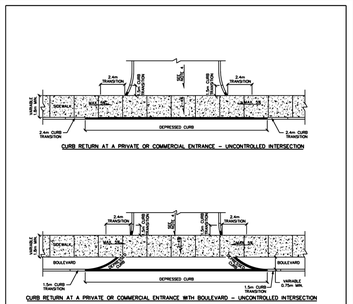
NOTES:

1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE EXPANSION BITUMINOUS MATERIAL AND THE 15 mm EXPANSION JOINT TO BE PLACED AT THE ENDS OF THE EXTRUSION
4. EXPANSION JOINTS TO BE PLACED AT 12m C/C.
5. DEPRESSED CURB HEIGHT - 7 FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm.

(DIMENSIONS mm)

NTS

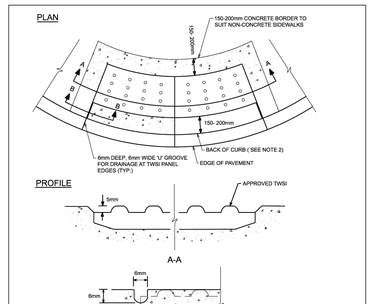
Ottawa	CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD 600.110)	DATE:	JAN 2003
		REV. DATE:	JANUARY 2026
		DWG No.:	SC1.1



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. CURB DETAILS SEE SC1.1, SC1.2 AND SC1.3.
3. SIDEWALK DETAILS SEE SC2 AND SC3.
4. MAXIMUM SLOPE VARIES, SEE PRIVATE APPROACH BYLAW.
5. UNCONTROLLED INTERSECTION MEANS AN ENTRANCE NOT LOCATED AT A TRAFFIC SIGNAL OR ALL-WAY STOP CONTROL.

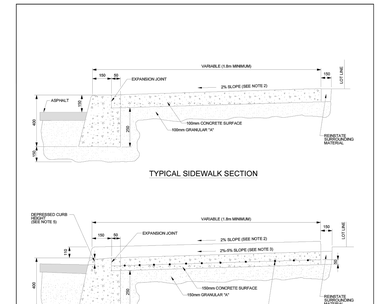
Ottawa	CURB RETURN ENTRANCES - UNCONTROLLED INTERSECTIONS	DATE:	MARCH 2007
		REV. DATE:	MARCH 2021
		DWG No.:	SC7.1



NOTES:

1. TOPS OF TWSI'S (TACTILE WALKING SURFACE INDICATOR) SHALL BE ALIGNED & LEVEL WITH THE ADJACENT CONCRETE SURFACE & INSTALLATION IN WET CONCRETE SHALL BE EFFECTIVE IN PERMANENTLY SECURING THE TWSI IN PLACE ONCE DRY.
2. CURB RAMPS, WHERE SIDEWALKS, TWSI SHALL BE 300 TO 350mm BACK FROM THE CURB FACE.
3. JOINTS SHALL BE CONSTRUCTED TRANSVERSELY ACROSS THE SIDEWALK, PERPENDICULAR TO THE FACE OF CURB FOR SIDEWALK.
4. WHEN JOINTS ARE CONSTRUCTED ADJACENT TO TWSI'S, THE JOINTS SHALL EXTEND FROM THE BACK CORNERS OF THE OUTSIDE TWSI PLATES TO THE BACK OF SIDEWALK, OR TERMINATE AT AN ADJACENT JOINT
5. THE TERMINATION OF THE JOINTS AT BOTH THE FRONT AND BACK OF SIDEWALK SHALL BE NO LESS THAN 600mm APART.
6. JOINTS IN ALL CONCRETE ELEMENTS SHALL BE LAID OUT TO ENSURE THAT NO INDIVIDUAL RESULTING CONCRETE PANEL IS LESS THAN 0.6m² OR GREATER THAN 6m²

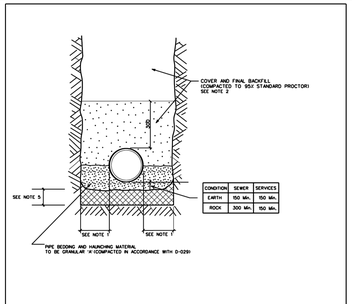
Ottawa	TITLE: ATTENTION TWSI DETAIL	DATE:	MAR 2015
		REV:	JAN 2026
		DWG No:	SC7.3



NOTES:

1. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED
2. THE MAXIMUM SLOPE IS NOT TO EXCEED 2%
3. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%
4. EXPANSION AND DUMMY JOINTS AS PER SC5
5. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm

Ottawa	TITLE: CONCRETE BARRIER CURB WITH SIDEWALK	DATE:	JAN 2003
		REV:	JULY 2023
		DWG No:	SC1.4



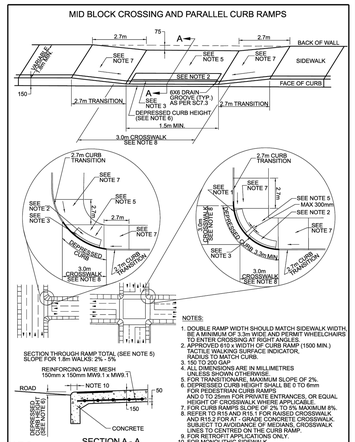
NOTES:

1.

PIPE INSIDE DIAMETER (mm)	CLEARANCE (mm)	
900 OR LESS	CONC PVC	450 450
OVER 900	500	

2. FINAL BACKFILL - APPROVED NATIVE MATERIAL OR SELECT SUBGRADE IN ACCORDANCE WITH F-1-00 AND F-2-00.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
4. INITIAL BACKFILL MATERIAL
   - CONCRETE PIPE - GRANULAR 'A', GRANULAR 'B' OR SELECT SUBGRADE MATERIAL WITH 100% PASSING THE 37.5mm SIEVE
   - PVC PIPE - GRANULAR 'A'
5. WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, POOR SOILS SHALL BE EXCAVATED TO CREATE A FOUNDATION THAT SHALL BE FILLED TO THE BOTTOM OF THE BEDDING WITH GRANULAR 'B'.

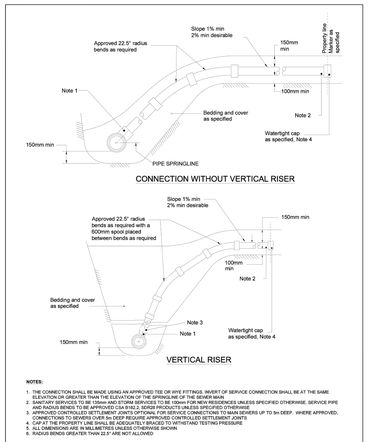
Ottawa	SINGLE TRENCH (SEWER & SEWER SERVICES)	DATE:	MAY 2001
		REV. DATE:	JAN 2026
		DWG. No.:	S6



NOTES:

1. DOUBLE RAMP WIDTH SHOULD MATCH SIDEWALK WIDTH, BE A MINIMUM OF 3.1m WIDE AND PERMIT WHEELCHAIRS TO ENTER CROSSING AT RIGHT ANGLES
2. APPROVED 610 x WIDTH OF CURB RAMP (1500 MIN.) TACTILE WALKING SURFACE INDICATOR, RADIUS TO MATCH CURB.
3. 150 TO 200mm.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. FOR TRANSITIONARE, MAXIMUM SLOPE OF 2%.
6. DEPRESSED CURB HEIGHT SHALL BE 0 TO 6mm FOR PEDESTRIAN CURB RAMPS.
7. FOR CURB RAMPS SLOPE OF 2% TO 5% MAXIMUM 8%.
8. REFER TO R15 AND R15.1 FOR RAISED CROSSWALK AND R15.2 FOR AT - GRADE CONCRETE CROSSWALK.
9. THE CENTRE OF THE CURB RAMP TO BE ALIGNED CROSSWALK LINES TO CENTRED ON THE CURB RAMP.
10. FOR RETROFIT APPLICATIONS ONLY.
11. FOR MONOLITHIC SIDEWALK, TWSI SHALL BE 300 TO 350mm BACK FROM CURB FACE.

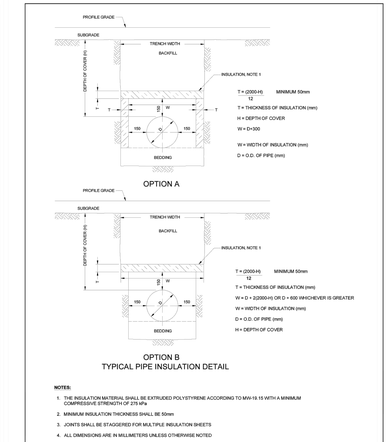
Ottawa	PEDESTRIAN CURB RAMP WITHOUT BOULEVARD	DATE:	MAY 2001
		REV. DATE:	MARCH 2022
		DWG. No.:	SC6



NOTES:

1. THE CONNECTION SHALL BE MADE USING AN APPROVED TEE OR WYE FITTINGS. INVERT OF SERVICE CONNECTION SHALL BE AT THE SAME ELEVATION OR HIGHER THAN THE INVERT OF THE MAIN SEWER AT THE POINT OF CONNECTION.
2. SANITARY SERVICES TO BE 135mm AND STORM SERVICES TO BE 160mm FOR MEW RESIDENCES UNLESS SPECIFIED OTHERWISE. SERVICE PIPE AND RADIUS BENDS TO BE APPROVED CSA B182.2, SDR35 PRODUCTS UNLESS SPECIFIED OTHERWISE
3. ALL CONNECTIONS TO BE MADE WATERTIGHT. ALL SERVICE CONNECTIONS TO MAIN SEWERS UP TO 5m DEEP. WHERE APPROVED, CONNECTIONS TO GRADED CURB 5m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS
4. CAP AT THE PROPERTY LINE SHALL BE ADEQUATELY BRACED TO WITHSTAND TESTING PRESSURE
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
6. RADIUS BENDS GREATER THAN 22.5° ARE NOT ALLOWED

Ottawa	SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN SEWER PIPE	DATE:	MAR 2006
		REV:	JULY 2024
		DWG No:	S11.1



T = (2000-H) / 12 MINIMUM 50mm

T = THICKNESS OF INSULATION (mm)

H = DEPTH OF COVER

W = D+300

W = WIDTH OF INSULATION (mm)

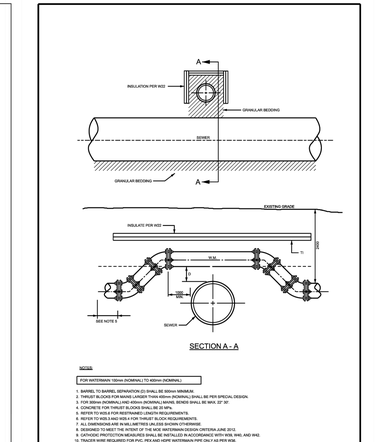
D = O.D. OF PIPE (mm)

TYPICAL PIPE INSULATION DETAIL

NOTES:

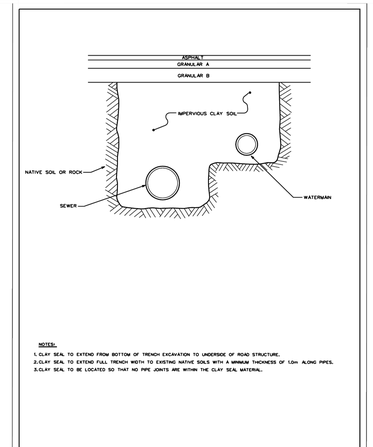
1. THE INSULATION MATERIAL SHALL BE EXTRUDED POLYSTYRENE ACCORDING TO MW-19.15 WITH A MINIMUM COMPRESSIVE STRENGTH OF 275 kPa
2. MINIMUM INSULATION THICKNESS SHALL BE 50mm
3. JOINTS SHALL BE STAGGERED FOR MULTIPLE INSULATION SHEETS
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

Ottawa	TITLE: INSULATION FOR SHALLOW SEWERS	DATE:	MAY 2001
		REV:	JULY 2024
		DWG No:	S35



1. BARREL TO BARREL SEPARATION (O) SHALL BE 500mm MINIMUM.
2. VERTICAL SEPARATION (V) BETWEEN SEWER AND WATERMAIN SHALL BE PER SPECIAL DESIGN.
3. FOR 300mm (NOMINAL) AND 400mm (NOMINAL) MAINS, BENDS SHALL BE MAX. 22.5°.
4. CONCRETE FOR THRUST BLOCKS SHALL BE 20 MPa.
5. REFER TO W25.4 FOR RESTRAINED LENGTH REQUIREMENTS.
6. REFER TO W25.3 AND W25.4 FOR THRUST BLOCK REQUIREMENTS.
7. ALL JOINTS SHALL BE RESTRAINED WITHIN THE CROSSING TRENCH.
8. DESIGNED TO MEET THE INTENT OF THE MOE WATERMAIN DESIGN CRITERIA JUNE 2012.
9. CATHODIC PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH W39, W40, AND W42.
10. TRACER WIRE REQUIRED FOR PVC, PEA AND HDPE WATERMAIN PIPE ONLY AS PER W36.

Ottawa	WATERMAIN CROSSING OVER SEWER	DATE:	MAY 2000
		REV. DATE:	JANUARY 2026
		DWG No:	W25.2



NOTES:

1. CLAY SEAL TO EXTEND FROM BOTTOM OF TRENCH EXCAVATION TO UNDERSIDE OF ROAD STRUCTURE.
2. CLAY SEAL TO EXTEND FULL TRENCH WIDTH TO EXISTING NATIVE SOILS WITH A MINIMUM THICKNESS OF 1.0m ALONG PIPES.
3. CLAY SEAL TO BE LOCATED SO THAT NO PIPE JOINTS ARE WITHIN THE CLAY SEAL MATERIAL.

Ottawa	CLAY SEAL FOR PIPE TRENCHES	DATE:	MAY 2001
		REV. DATE:	MARCH 2006
		DWG. No.:	S8

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHIC PLAN OF PART OF WATER RIDGE DEVELOPMENT BEING SHOWN AS BLOCK 21 ON DRAFT M-PLAN LOCATED NORTH OF TAWADINA ROAD AND EAST OF CODD'S ROAD, GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA, MONUMENT-URSO SURVEYING LTD. ELEVATIONS ARE GEODETIC AND REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD28:78).

NO.	REVISION DESCRIPTION	DATE	BY
6	REVISED PER COMMENTS	21/07/26	BLM
5	REVISED PER COMMENTS	10/06/26	BLM
4	ISSUED FOR BUILDING PERMIT	05/05/26	BLM
3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE

LICENSED PROFESSIONAL ENGINEER — B.L. MACKECHNIE 100199554 — 21 July '26 — PROVINCE OF ONTARIO

Robinson Land Development

2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

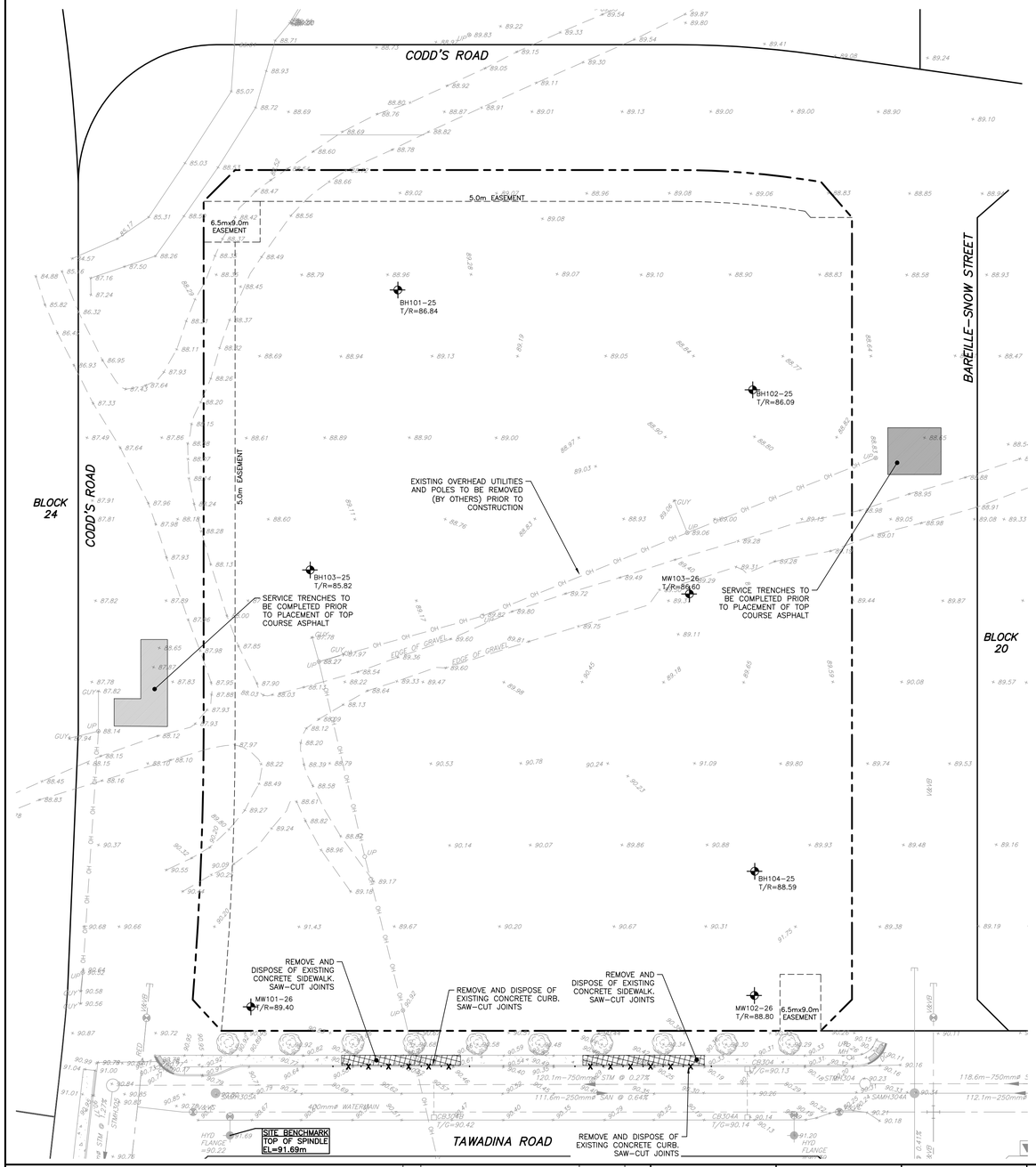
WATERIDGE LIFESTYLES LTD.

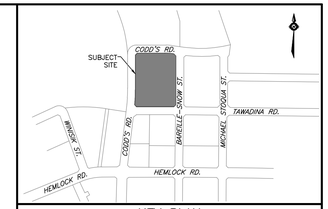
WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

NOTES & DETAILS

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG No:	25117-N1

FILE No. D07-12-26-0020





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- × 88.00 EXISTING ELEVATION
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING WATERMAIN
- VALVE EXISTING VALVE & VALVE BOX
- VALVE EXISTING VALVE & VALVE CHAMBER
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- EXISTING TREE
- UP GUY EXISTING UTILITY POLE AND GUY
- OH OH EXISTING OVERHEAD UTILITIES
- BOREHOLE/MONITORING WELL (REFER TO GEOTECHNICAL)
- CONCRETE SIDEWALK REMOVAL
- CONCRETE CURB REMOVAL

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

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NO.	REVISION DESCRIPTION	DATE	BY
6	REVISED PER COMMENTS	21/07/26	BLM
5	REVISED PER COMMENTS	10/06/26	BLM
4	ISSUED FOR BUILDING PERMIT	05/05/26	BLM
3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B. L. MACKECHNIE
100199554
21 July '26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

WATERIDGE LIFESTYLES LTD.

WATERIDGE VILLAGE
100 BAREILLE–SNOW STREET
CITY OF OTTAWA, ON

EXISTING CONDITIONS AND REMOVALS PLAN

PROJECT No.	25117
SURVEY	MONUMENT–URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-R1

FILE No. D07-12-26-0020

Appendix C

Figure 2.1 – Proposed Water Plant
(prepared by Arcadis)

Water Demand Calculations
(prepared by Arcadis)

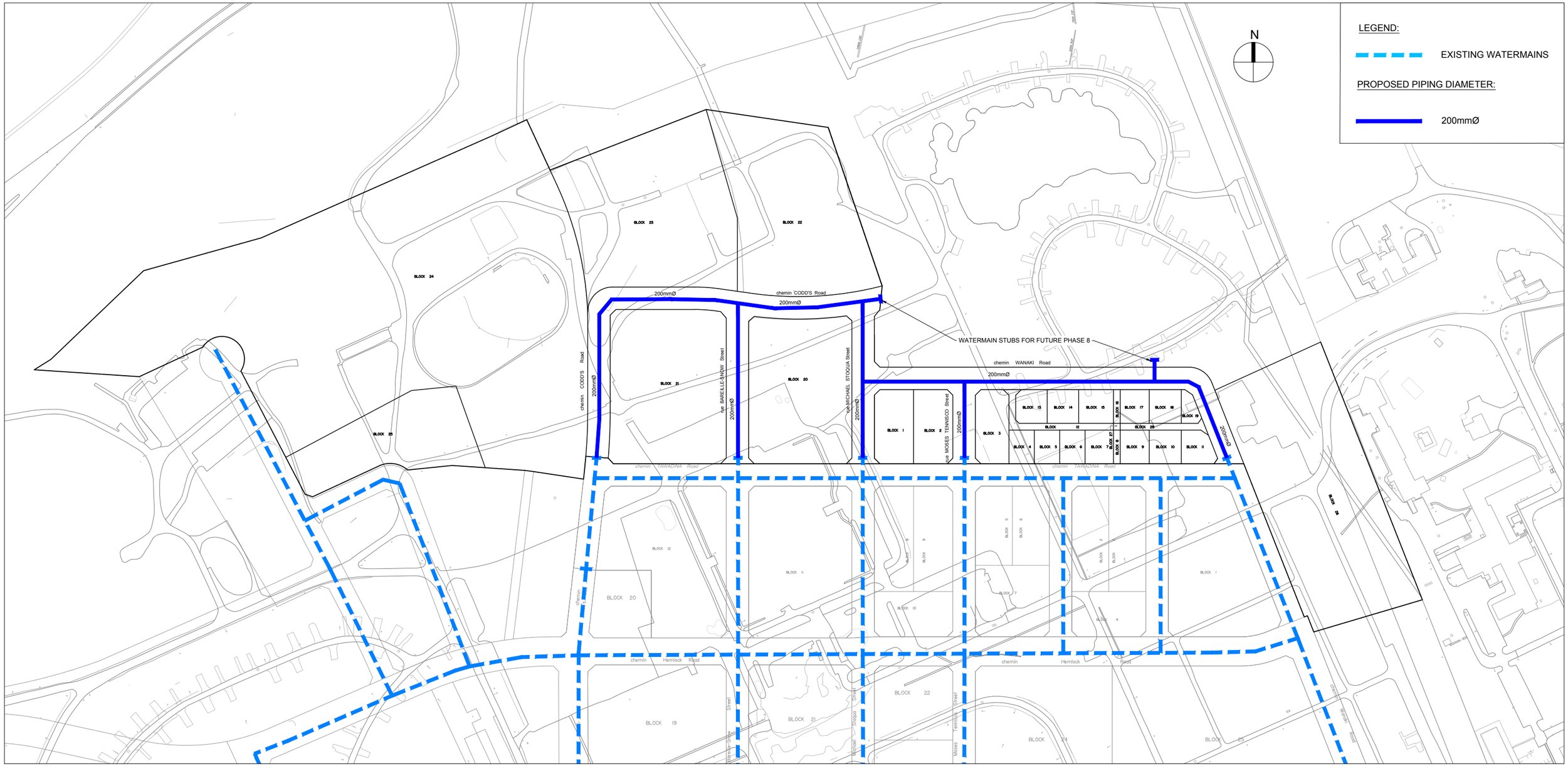
Water Demand Calculations

Hydraulic Water Model Figure
(prepared by Arcadis)

Hydraulic Water Model Outputs
(prepared by Arcadis)

Fire Flow Calculations

Figure 3.0: Hydrant Coverage Plan



J:\139653_600399-49__W\7.0_Production\7.03_Design\04_Civil\Sheets\Design Brief\Figure 2.1 PROPOSED WATER PLAN.dwg Last Saved By: milnem4626 Last Saved At: Jun. 25, 25

ARCADIS

Project Title

DESIGN BRIEF
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASES 6 & 7

Drawing Title

PROPOSED WATER PLAN

Sheet No.

FIGURE 2.1
2025-06-27

WATERMAIN DEMAND CALCULATION SHEET

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

PROJECT : Wateridge Village Phases 6, 7, 8
LOCATION : City of Ottawa

FILE: 139653.6.04
DATE PRINTED: 2025-01-27
DESIGN: SEL
PAGE : 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND
	Single	Town	Apt	POP'N	INDTRL (ha.)	COMM. (ha.)	RETAIL (m^2)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	(l/min)
Block 10 and 31		70		189			-	0.61	0.00	**0.61**	1.53	0.00	**1.53**	3.37	0.00	**3.37**	**13,000**
Block 30			367	661			493	2.14	0.01	**2.15**	5.35	0.04	**5.39**	11.77	0.06	**11.83**	**9,000**
Block 29			402	724			2,292	2.35	0.07	**2.42**	5.86	0.17	**6.03**	12.90	0.30	**13.20**	**9,000**
Block 35 and 44		76	258	670			-	2.17	0.00	**2.17**	5.43	0.00	**5.43**	11.94	0.00	**11.94**	**13,000**
Phase 8		22	296	592			-	1.92	0.00	**1.92**	4.80	0.00	**4.80**	10.56	0.00	**10.56**	**11,000**
TOTALS										**9.27**			**23.16**			**50.89**	

ASSUMPTIONS

RESIDENTIAL DENSITIES

Singles	3.4	p / p / u
Towns	2.7	p / p / u
Apartment (avg)	1.8	p / p / u

** Residential Daily Demand reduced to coincide with current waste water guidelines

AVG. DAILY DEMAND

Residential:**	280	l / cap / day
Industrial:		l / ha / day
Commercial:		l / ha / day
Retail:	2,500	l / 1000m^2 / day

MAX. DAILY DEMAND

Residential:	700	l / cap / day
Industrial:		l / ha / day
Commercial:		l / ha / day
Retail:	6,250	l / 1000m^2 / day

MAX. HOURLY DEMAND

Residential:	1,540	l / cap / day
Industrial:		l / ha / day
Commercial:		l / ha / day
Retail:	11,250	l / 1000m^2 / day

FIRE FLOW

From FUS Calculation	13,000	l / min

WATER DEMAND CALCULATIONS

Wateridge Lifestyles, Wateridge Village at Rockcliffe
Project No. 25117

Robinson Land Development

JUNCTION NODE	RESIDENTIAL POPULATION					No. OF BEDS	COMMERCIAL RETAIL AREA (m^2)	BASIC DAY DEMAND (L/s)				MAX. DAY DEMAND (L/s)				PEAK HOUR DEMAND (L/s)				BASIC DAY DEMAND (m^3/day)
	AVERAGE	BACHELOR	1-BEDROOM	2-BEDROOM	TOTAL POPULATION			RES.	COMM.	INST.	TOTAL	RES.	COMM.	INST.	TOTAL	RES.	COMM.	INST.	TOTAL	
PHASE 1		30	47	13	135.1	98.0		0.44		0.51	0.95	1.09		0.77	1.86	2.41		1.38	3.79	81.9
PHASE 2	170				306.0		2292.0	0.99	0.07		1.06	2.48	0.17		2.64	5.45	0.30		5.75	91.4
PHASE 3	100				180.0			0.58			0.58	1.46			1.46	3.21			3.21	50.4
Total	**270**	**30**	**47**	**13**	**621.1**		**2292.0**	**2.01**	**0.07**	**0.51**	**2.59**	**5.03**	**0.17**	**0.77**	**5.96**	**11.07**	**0.30**	**1.38**	**12.75**	**223.7**

Notes:
1. Per unit populations as per OWDG Table 4.1.

Apartment Per Unit Populations

Bachelor =	1.4	persons/unit
1-Bedroom =	1.4	persons/unit
2-Bedroom =	2.1	persons/unit
Average =	1.8	persons/unit

Basic Day Demand:

Residential	**280**	**L/person/day**
Commercial Retail	**2500**	**L/1000 m^2/day**
Nursing & Rest. Homes	**450**	**L/bed/day**

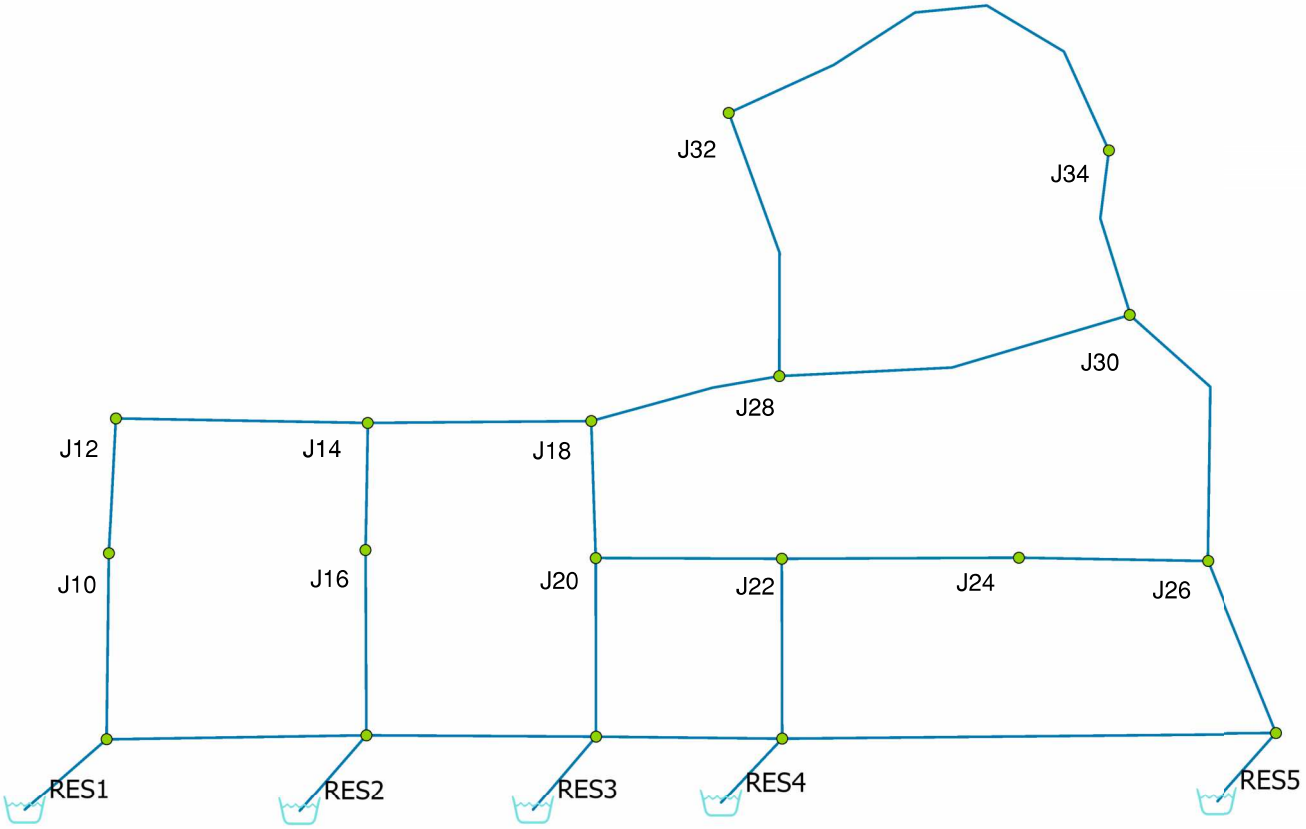
Max. Day Demand:

Residential	**2.5**	**x Avg. Day**
Commercial	**2.5**	**x Avg. Day**
Institutional	**1.5**	**x Avg. Day**

Peak Hour Demand:

Residential	**2.2**	**x Max. Day**
Commercial	**1.8**	**x Max. Day**
Institutional	**1.8**	**x Max. Day**

Node IDs


J32
J34
J30
J28
J12
J14
J18
J10
J16
J20
J22
J24
J26
RES1
RES2
RES3
RES4
RES5

Average Day

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	CONN1	0.00	91.00	143.00	509.54
2	☐	CONN2	0.00	90.35	143.00	515.91
3	☐	CONN3	0.00	90.67	143.00	512.78
4	☐	CONN4	0.00	92.60	143.00	493.87
5	☐	CONN5	0.00	94.00	143.00	480.15
6	☐	J10	1.16	89.70	142.99	522.24
7	☐	J12	1.13	89.70	142.99	522.23
8	☐	J14	0.00	89.45	142.99	524.68
9	☐	J16	2.30	89.70	142.99	522.23
10	☐	J18	1.04	89.33	142.99	525.86
11	☐	J20	1.19	89.80	143.00	521.27
12	☐	J22	0.37	91.00	143.00	509.52
13	☐	J24	0.00	92.20	143.00	497.77
14	☐	J26	0.17	92.85	143.00	491.40
15	☐	J28	0.65	86.20	142.99	556.53
16	☐	J30	0.00	84.50	142.99	573.19
17	☐	J32	0.78	83.20	142.99	585.92
18	☐	J34	0.48	83.40	142.99	583.96

Peak Hour

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	CONN1	0.00	91.00	143.60	515.43
2	☐	CONN2	0.00	90.35	143.60	521.80
3	☐	CONN3	0.00	90.67	143.60	518.66
4	☐	CONN4	0.00	92.60	143.60	499.75
5	☐	CONN5	0.00	94.00	143.60	486.04
6	☐	J10	6.36	89.70	143.50	527.19
7	☐	J12	6.19	89.70	143.48	527.02
8	☐	J14	0.00	89.45	143.48	529.47
9	☐	J16	12.58	89.70	143.48	527.02
10	☐	J18	5.74	89.33	143.48	530.65
11	☐	J20	6.53	89.80	143.53	526.49
12	☐	J22	2.02	91.00	143.55	514.98
13	☐	J24	0.00	92.20	143.55	503.22
14	☐	J26	0.91	92.85	143.55	496.84
15	☐	J28	3.59	86.20	143.47	561.24
16	☐	J30	0.00	84.50	143.49	578.04
17	☐	J32	4.32	83.20	143.47	590.55
18	☐	J34	2.65	83.40	143.47	588.67

Side	Phase 1 Building		Phase 2 Building		Phase 3 Building	
	Exposure Distance (m)	S_{side}	Exposure Distance (m)	S_{side}	Exposure Distance (m)	S_{side}
West	17.8	0.0	17.8	0.0	5.0	0.5
North	5.0	0.5	18.9	0.0	18.9	0.0
East	17.7	0.0	5.0	0.5	17.7	0.0
South	19.0	0.0	5.0	0.5	19.0	0.0
Total		1.5		2.0		1.5

FIGURE 1

SPATIAL COEFFICIENT VS EXPOSURE DISTANCE

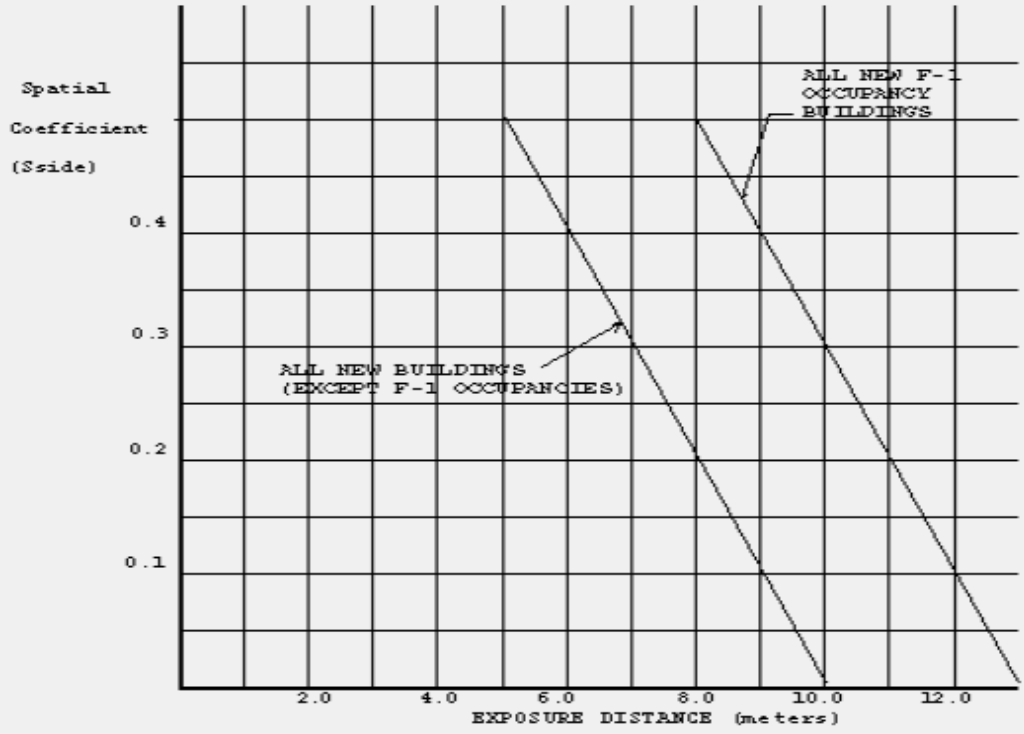


Table 1: Water Supply Coefficient - K					
TYPE OF CONSTRUCTION	Classification by Group or Division in Accordance with Table 3.1.2.1 of the Ontario Building Code				
	A-2 B-1 B-2 B-3 C D	A-4 F-3	A-1 A-3<	E F-2	F-1
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2. of the OBC, including loadbearing walls, columns and arches.	10	12	14	17	23
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. of the OBC. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	16	19	22	27	37
Building is of combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2. of the OBC, including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2. of the OBC.	18	22	25	31	41
Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	23	28	32	39	53
Column 1	2	3	4	5	6

Table 2: **Minimum Water Supply Flow Rates**	
Building Code, **Part 3 Buildings**	**Required Minimum Water Supply Flow Rate (L/min.)**
One-storey building with building area not exceeding 600m² (excluding F-1 occupancies)	1800
All other buildings	2700 (If **Q** ≤ 108,000L)[1] 3600 (If **Q** > 108,000L **and** ≤ 135,000L)[1] 4500 (If **Q** > 135,000L **and** ≤ 162,000L)[1] 5400 (If **Q** > 162,000L **and** ≤ 190,000L)[1] 6300 (If **Q** > 190,000L **and** ≤ 270,000L)[1] 9000 (If **Q** > 270,000L)[1]

Note: [1] $\mathbf{Q=KVS_{Tot}}$ as referenced in Section 3(a)

Project Name:	Wateridge Lifestyles
Project Location:	200 Codd's Road, Ottawa
Project No:	25117
Date:	Feb. 27-26
Building Type:	6-Storey Retirement Home
Building Being Considered:	Phase 1 Building

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area			(100% of area used in calculation)	2925.0	m^2
	2nd Floor Area			(25% of area used in calculation)	693.8	m^2
	3rd Floor Area			(25% of area used in calculation)	693.8	m^2
	Total Effective Floor Area				**4,312.5**	**m^2**
C	**Fire Flow**				**12,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1800**	**L/min**
	Fire Flow				**10,200**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-5,100**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				0	m
	Exposed Wall No. of Storeys				0	
	Length-Height Factor of Exposed Wall				0	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	31	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			28	m
	Exposed Wall No. of Storeys			9	
	Length-Height Factor of Exposed Wall			252	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			10	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			0	m
	Exposed Wall No. of Storeys			0	
	Length-Height Factor of Exposed Wall			0	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	31	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			0	m
	Exposed Wall No. of Storeys			0	
	Length-Height Factor of Exposed Wall			0	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	31	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**5,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	Wateridge Lifestyles
Project Location:	200 Codd's Road, Ottawa
Project No:	25117
Date:	Feb. 27-26
Building Type:	9-Storey Senior's Apartment
Building Being Considered:	Phase 2 Building

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area			(100% of area used in calculation)	1900.0	m^2
	2nd Floor Area			(25% of area used in calculation)	516.5	m^2
	3rd Floor Area			(25% of area used in calculation)	516.5	m^2
	Total Effective Floor Area				**2,933.0**	**m^2**
C	**Fire Flow**				**10,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1500**	**L/min**
	Fire Flow				**8,500**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-4,250**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				0	m
	Exposed Wall No. of Storeys				0	
	Length-Height Factor of Exposed Wall				0	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	31	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			0	m
	Exposed Wall No. of Storeys			0	
	Length-Height Factor of Exposed Wall			0	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	31	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			22	m
	Exposed Wall No. of Storeys			9	
	Length-Height Factor of Exposed Wall			198	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			10	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			66	m
	Exposed Wall No. of Storeys			6	
	Length-Height Factor of Exposed Wall			396	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			10	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**4,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	Wateridge Lifestyles
Project Location:	200 Codd's Road, Ottawa
Project No:	25117
Date:	Feb. 27-25
Building Type:	9-Storey Apartment
Building Being Considered:	Phase 3 Building

Robinson Land Development

Calculations for Total Required Fire Flow

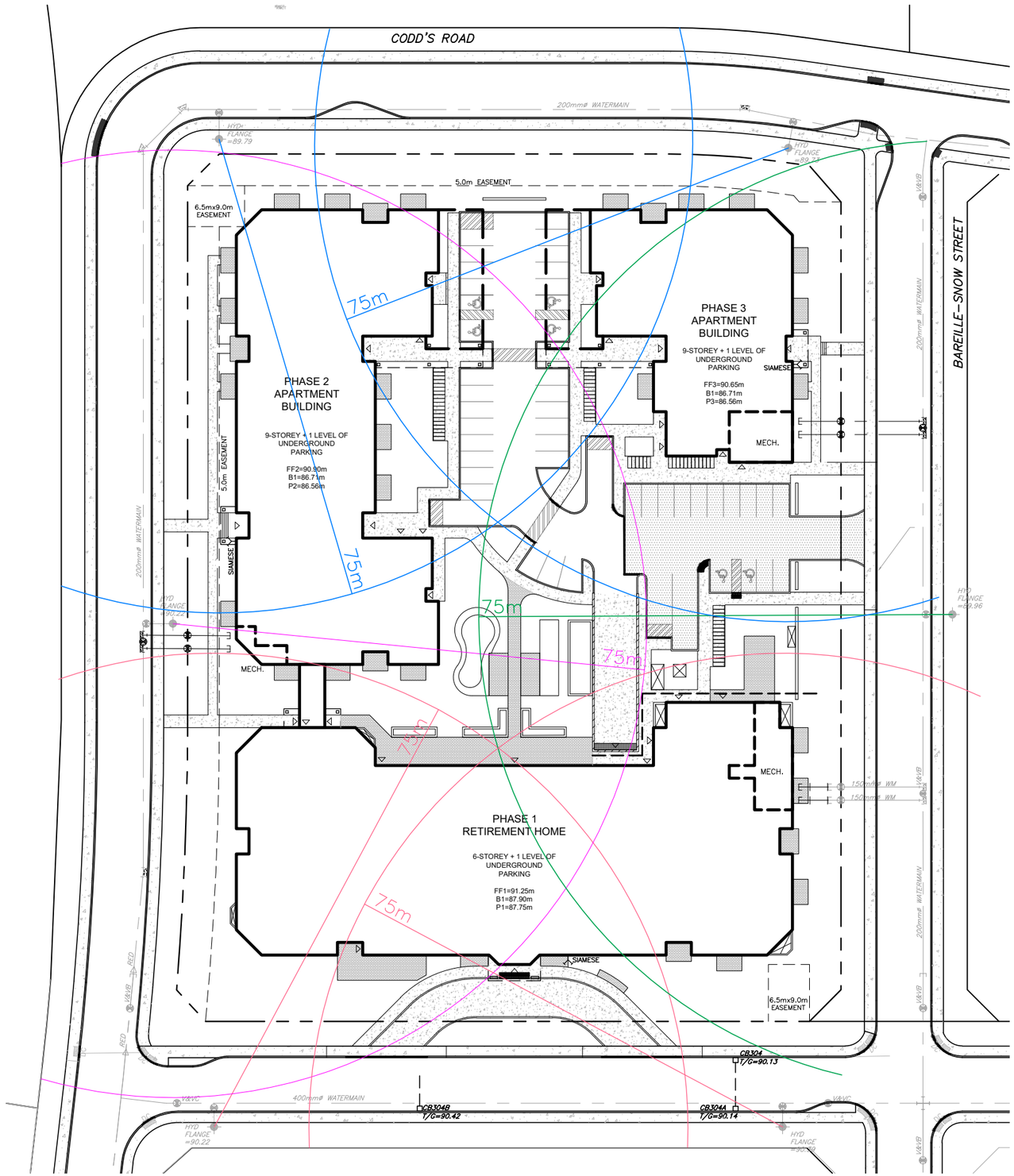
Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area			(100% of area used in calculation)	1012.0	m^2
	2nd Floor Area			(25% of area used in calculation)	294.5	m^2
	3rd Floor Area			(25% of area used in calculation)	294.5	m^2
	Total Effective Floor Area				**1,601.0**	**m^2**
C	**Fire Flow**				**7,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1050**	**L/min**
	Fire Flow				**5,950**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-2,975**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				22	m
	Exposed Wall No. of Storeys				9	
	Length-Height Factor of Exposed Wall				198	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				10	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			0	m
	Exposed Wall No. of Storeys			0	
	Length-Height Factor of Exposed Wall			0	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	31	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			0	m
	Exposed Wall No. of Storeys			0	
	Length-Height Factor of Exposed Wall			0	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	31	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			18	m
	Exposed Wall No. of Storeys			6	
	Length-Height Factor of Exposed Wall			108	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	38	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**3,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).





Robinson Land Development

scale 1:750	BLOCK 21, WATERIDGE VILLAGE	project no. 25117
date 27/02/26	HYDRANT COVERAGE PLAN	FIG. 3.0
drawn by BLM		

Appendix D

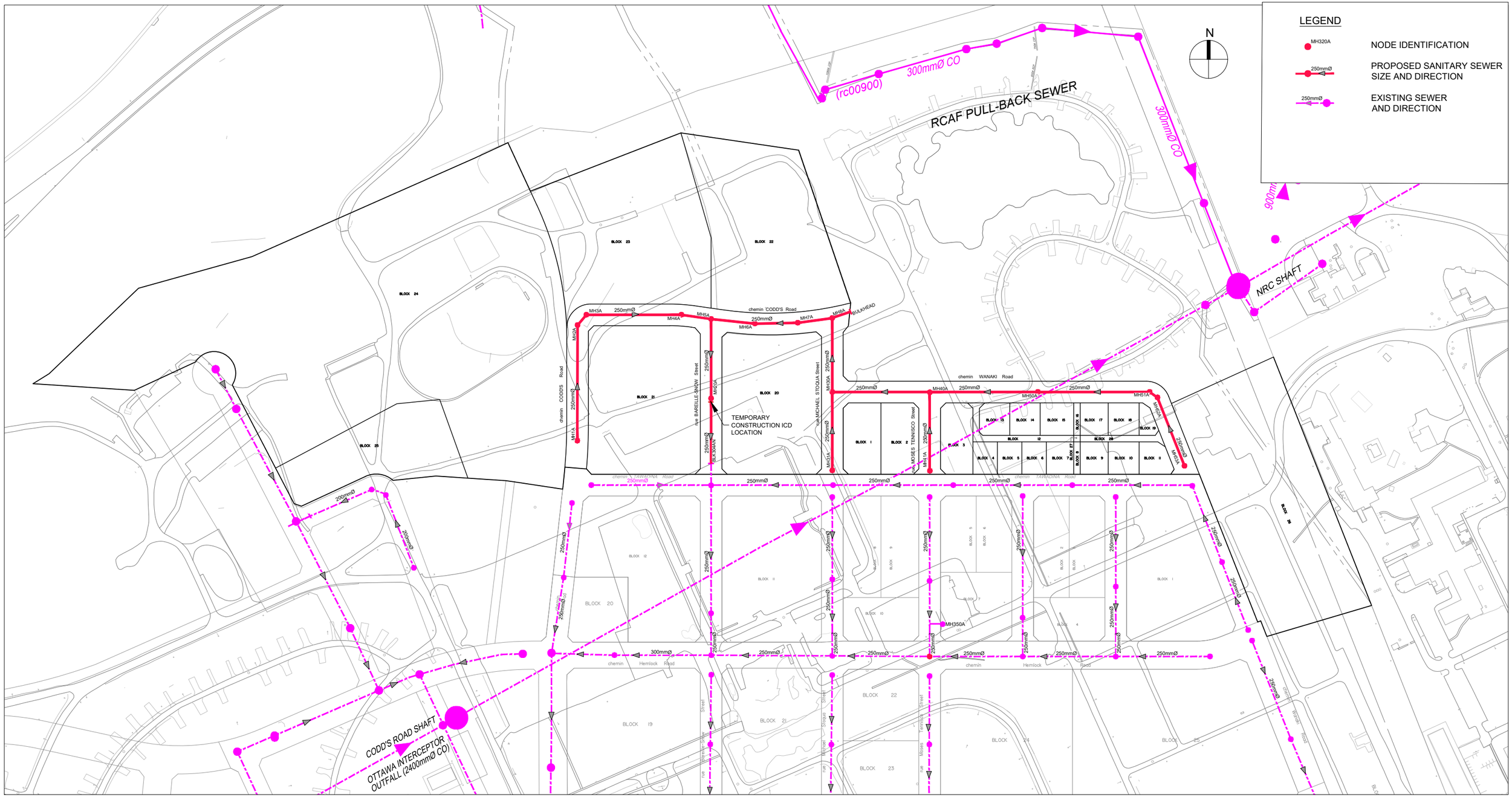
Figure 3.1 – Proposed Wastewater Plan (prepared by Arcadis)

Sanitary Sewer Design Sheet (prepared by Arcadis)

Sanitary Drainage Area Plan (prepared by Arcadis)

Sanitary Sewer Design Sheet

J:\139653_600399-49__W\7.0_Production\7.03_Design\04_Civil\Sheets\Design Brief\Figure 3.1 PROPOSED WASTEWATER PLAN.dwg Last Saved By: milnem4626 Last Saved At: Jun. 25, 25



Project Title

DESIGN BRIEF
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASES 6 & 7

Drawing Title

PROPOSED WASTEWATER PLAN

Sheet No.

FIGURE 3.1
2025-06-27

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

SANITARY SEWER DESIGN SHEET

Wateridge Village Phase 6, 7
CITY OF OTTAWA
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN							
				AREA w/ Units (Ha)	UNIT TYPES			AREA w/o Units (Ha)	POPULATION		RES PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)						ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full)	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH		SF	TH/SD	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL				IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
													IND	CUM	IND	CUM	IND	CUM															
CODDS ROAD	MH1A, Blk21W	MH1A	MH2A	0.84			192		345.6	345.6	3.44	3.85		0.0	0.15	0.15		0.0	1.00	0.05	0.99	0.99	0.33		0.0	4.23	52.06	106.79	250	0.70	1.027	47.83	91.87%
CODDS ROAD	MH2A	MH2A	MH3A	0.03					0.0	345.6	3.44	3.85		0.0		0.15		0.0	1.00	0.05	0.03	1.02	0.34		0.0	4.24	31.80	12.56	250	0.26	0.628	27.56	86.67%
CODDS ROAD	MH3A, Blk23	MH3A	MH4A	2.16		42	130		347.4	693.0	3.32	7.45		0.0		0.15		0.0	1.00	0.05	2.16	3.18	1.05		0.0	8.55	31.05	87.82	250	0.25	0.613	22.50	72.47%
CODDS ROAD	MH4A	MH4A	MH5A	0.05					0.0	693.0	3.32	7.45		0.0		0.15		0.0	1.00	0.05	0.05	3.23	1.07		0.0	8.57	31.17	27.73	250	0.25	0.615	22.60	72.52%
WANAKI ROAD	53A, Com	MH53A	MH52A	0.16					0.0	0.0	3.80	0.00		0.0	0.82	0.82		0.0	1.50	0.40	0.98	0.98	0.32		0.0	0.72	76.03	67.91	250	1.50	1.500	75.31	99.05%
WANAKI ROAD	52A	MH52A	MH51A	0.02					0.0	0.0	3.80	0.00		0.0		0.82		0.0	1.50	0.40	0.02	1.00	0.33		0.0	0.73	76.03	8.85	250	1.50	1.501	75.30	99.04%
WANAKI ROAD	51A, Blk4-19	MH51A	MH50A	1.35		43			116.1	116.1	3.58	1.35		0.0		0.82		0.0	1.50	0.40	1.35	2.35	0.78		0.0	2.52	43.87	103.37	250	0.50	0.866	41.35	94.25%
WANAKI ROAD	50A	MH50A	MH40A	0.19					0.0	116.1	3.58	1.35		0.0		0.82		0.0	1.50	0.40	0.19	2.54	0.84		0.0	2.58	71.01	100.00	250	1.31	1.401	68.42	96.36%
MOSES TENNISCO STRE	41A, Blk2, Blk3	MH41A	MH40A	0.56		18			48.6	48.6	3.65	0.58		0.0		0.00		0.0	1.00	0.00	0.56	0.56	0.18		0.0	0.76	97.70	72.50	250	2.48	1.928	96.94	99.22%
MOSES TENNISCO STRE	40A	MH40A	MH30A	0.17					0.0	164.7	3.54	1.89		0.0		0.82		0.0	1.50	0.40	0.17	3.27	1.08		0.0	3.37	53.73	90.00	250	0.75	1.060	50.36	93.73%
MICHAEL STOQUA STRE	MH31A, Blk20E, Blk1	MH31A	MH30A	0.98		9	190		366.3	366.3	3.43	4.07		0.0		0.00		0.0	1.00	0.00	0.98	0.98	0.32		0.0	4.40	66.26	72.51	250	1.14	1.308	61.86	93.36%
MICHAEL STOQUA STRE	MH30A	MH30A	MH8A	0.12					0.0	531.0	3.37	5.80		0.0		0.82		0.0	1.00	0.27	0.12	4.37	1.44		0.0	7.50	39.01	68.28	250	0.40	0.770	31.51	80.76%
CODDS ROAD (FUTURE)		*MH8A*	*CAP (FUT)*						*0.0*	*531.0*	*3.37*	*5.80*		*0.0*		*0.82*		*0.0*	*1.00*	*0.27*	*0.00*	*4.37*	*1.44*		*0.0*	*7.50*	*116.06*	*18.00*	*250*	*3.50*	*2.291*	*108.56*	*93.53%*
CODDS ROAD	MH8A, Blk22	MH8A	MH7A	1.77		34	128		322.2	853.2	3.27	9.05		0.0		0.82		0.0	1.00	0.27	1.77	6.14	2.03		0.0	11.35	40.93	32.17	250	0.44	0.808	29.58	72.28%
CODDS ROAD	MH7A	MH7A	MH6A	0.08					0.0	853.2	3.27	9.05		0.0		0.82		0.0	1.00	0.27	0.08	6.22	2.05		0.0	11.37	31.10	39.78	250	0.25	0.614	19.73	63.44%
CODDS ROAD	MH6A	MH6A	MH5A	0.08					0.0	853.2	3.27	9.05		0.0		0.82		0.0	1.00	0.27	0.08	6.30	2.08		0.0	11.40	30.80	40.58	250	0.25	0.608	19.40	62.98%
BAREILLE-SNOW STRE	MH5A, Blk21E, Blk20W	MH5A	MH20A	1.31			387		696.6	2242.8	3.04	22.08		0.0	0.13	1.10		0.0	1.00	0.36	1.44	10.97	3.62		0.0	26.05	30.72	73.43	250	0.25	0.606	4.67	15.19%
BAREILLE-SNOW STRE	MH20A	MH20A	BLK304AN	0.12					0.0	2242.8	3.04	22.08		0.0		1.10		0.0	1.00	0.36	0.12	11.09	3.66		0.0	26.09	31.02	60.00	250	0.25	0.612	4.93	15.89%
BAREILLE-SNOW STRE	MH21A	BLK304AN	EXMH304A	0.03					0.0	2242.8	3.04	22.08		0.0		1.10		0.0	1.00	0.36	0.03	11.12	3.67		0.0	26.10	31.02	20.00	250	0.25	0.612	4.92	15.85%

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/SD	2.7	p/p/u	COM	28,000	L/Ha/day	
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
MSS	1.0	p/p/u		17000	L/Ha/day	
Other	60	p/p/Ha				

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,

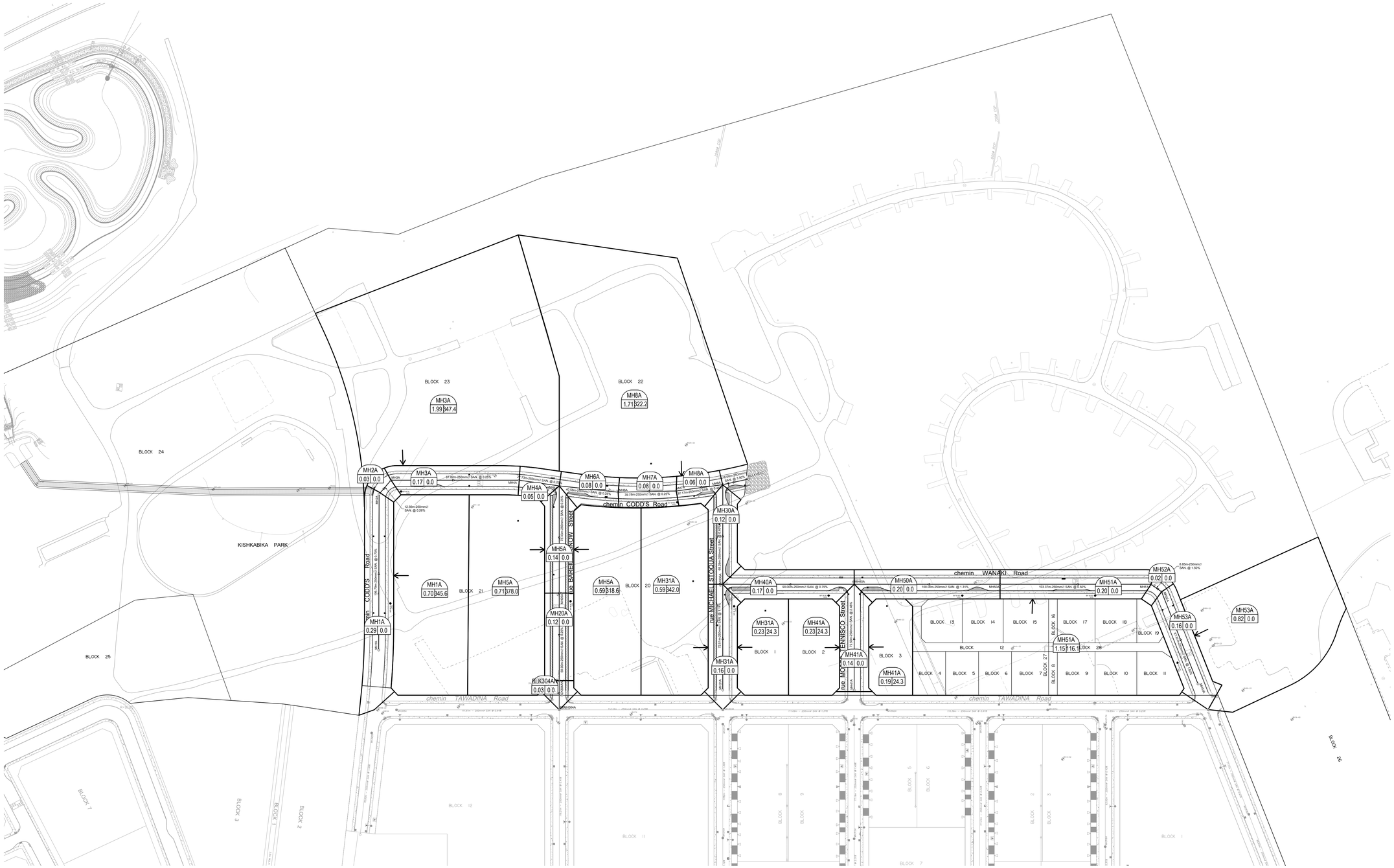
Designed: SEL
Checked: JIM
Dwg. Reference: 139653-400

No.	Revision	Date
1.	Submission No. 1	2023-09-29
2.	Submission No. 2	2024-05-13
3.	Submission No. 3	2024-11-11
1.	Submission No. 4	2025-05-14

File Reference: **Date:** **Sheet No:**

LEGEND :

MH10A
0.31 | 0.0
AREA NUMBER
POPULATION
AREA IN HECTARES



CLIENT

CANADA LANDS COMPANY

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA

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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2023-10-05
2	ISSUED FOR CLIENT REVIEW	2024-06-12
3	SUBMISSION NO.2 FOR CITY REVIEW	2024-06-21
4	ISSUED FOR GEOTECHNICAL REVIEW	2024-11-26
5	SUBMISSION NO.3 FOR CITY REVIEW	2024-12-20
6	SUBMISSION NO.4 FOR CITY REVIEW	2025-06-27
7	SUBMISSION NO.5 FOR CITY REVIEW	2025-07-31
8		

SEE 010, 011 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN



1:1250 0 12.5 37.5 62.5m

SEAL

LICENCED PROFESSIONAL ENGINEER
S. E. LABADIE
100214983
2025/07/31
PROVINCE OF ONTARIO

ARCADIS
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www.arcadis.com

PROJECT

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASES 6 AND 7

PROJECT NO: 139653

DRAWN BY:	CHECKED BY:
M.M.	**J.I.M.**
PROJECT MGR:	APPROVED BY:
S.L.	**S.L.**

SHEET TITLE

SANITARY DRAINAGE AREA PLAN

SHEET NUMBER 400

ISSUE 7

SCALE CHECK

CITY PLAN No. 19055 CITY FILE No. D07-16-15-0003

File Location: J:\139653_600399-49__W7-0_Production\7.03_Design\04_Civil\Sheets\400 SANITARY DRAINAGE AREA PLAN.dwg Last Saved: June 26, 2025, by mlivens4926 Plotted: July 31, 2025 2:39:53 PM by Milne, Marian

SANITARY SEWER DESIGN SHEET
BLOCK 21, WATERIDGE VILLAGE AT ROCKCLIFFE

Robinson Land Development

LOCATION			APARTMENT UNIT COUNT				RESIDENTIAL FLOW						INSTITUTIONAL				COMMERCIAL				INFILTRATION			PEAK DESIGN FLOW (L/s)	PIPE							
							INDIVIDUAL		CUMULATIVE																							
STREET	FROM MH	TO MH	AVERAGE	BACHELOR	1-BEDROOM	2-BEDROOM	POP.	AREA (ha)	POP.	AREA (ha)	PEAK FACTOR	PEAK RES. FLOW (L/s)	No. OF BEDS	CUM. No. OF BEDS	PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)	CUM. AREA (ha)	PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)	CUM. AREA (ha)	EXTRAN. FLOW (L/s)		LENGTH (m)	DIAMETER (mm)	SLOPE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	EXCESS CAPACITY (L/s)	PERCENT FULL
TO BAREILLE-SNOW STREET SEWER (MH20A TO MH304A)																															
PHASE 1	BLDG	EX101		30	47	13	135.1	0.63	135.1	0.63	3.56	1.56	98	98	1.50	0.77	0.00	0.00	1.50	0.00	0.63	0.63	0.21	2.53	4.8	251.46	3.96	120.31	2.42	0.96	117.78	2.11
TO CODD'S ROAD SEWER (MH1A TO MH2A)																															
PHASE 2	BLDG	102	170				306.0	0.47	306.0	0.47	3.46	3.43	0	0	1.50	0.00	0.23	0.23	1.50	0.11	0.47	0.47	0.16	3.70	1.3	251.46	2.31	91.89	1.85	0.89	88.19	4.02
	102	MAIN					0.0	0.00	306.0	0.47	3.46	3.43	0	0	1.50	0.00	0.00	0.23	1.50	0.11	0.00	0.47	0.16	3.70	19.5	251.46	2.00	85.50	1.72	0.85	81.80	4.32
TO BAREILLE-SNOW STREET SEWER (MH5A TO MH20A)																															
PHASE 3	BLDG	103	100				180.0	0.31	180.0	0.31	3.53	2.06	0	0	1.50	0.00	0.00	0.00	1.50	0.00	0.31	0.31	0.10	2.16	5.8	251.46	2.07	86.99	1.75	0.73	84.82	2.49
	103	MAIN					0.0	0.00	180.0	0.31	3.53	2.06	0	0	1.50	0.00	0.00	0.00	1.50	0.00	0.00	0.31	0.10	2.16	9.2	251.46	1.96	84.64	1.70	0.72	82.48	2.55
							621.1	**1.41**				**7.05**	**98**			**0.77**	**0.23**			**0.11**	**1.41**		**0.47**	**8.39**								

DESIGN PARAMETERS

Average Daily Flow =	280	L/person/day
Institutional Flow =	28,000	L/ha/day
Commercial Flow =	28,000	L/ha/day
Maximum Residential Peak Factor =	4.0	
Harmon - Correction Factor (K) =	0.8	
Commercial/Institutional Peak Factor =	1.5	
Extraneous Flow =	0.33	L/s/ha
Minimum Velocity =	0.6	m/s
Maximum Velocity =	3.0	m/s

Per Unit Populations:

Single Family	3.4	persons/unit
Semi-detached	2.7	persons/unit
Duplex	2.3	persons/unit
Townhouse	2.7	persons/unit
Apartments:		
Bachelor	1.4	persons/unit
1 Bedroom	1.4	persons/unit
2 Bedroom	2.1	persons/unit
3 Bedroom	3.1	persons/unit
Average Apt.	1.8	persons/unit

Institutions:

Nursing Homes & Rest Homes	450	L/bed/day	(OSDG Appendix 4-A)

Appendix E

Figure 4.1 – Proposed Minor Storm Plan (prepared by Arcadis)

Storm Sewer Design Sheet (prepared by Arcadis)

Storm Drainage Area Plan (prepared by Arcadis)

Storm Drainage Area Plan (DWG. 25117-STM1)

Storm Sewer Design Sheet

Interim Storm Drainage Area Plan (DWG. 25117-STM2)

Interim Storm Sewer Design Sheet

Runoff Coefficient Calculations

J:\139653_600399-49__W7.0_Production\7.03_Design\04_Civil\Sheets\Design Brief\Figure 4.1 PROPOSED MINOR STORM PLAN.dwg Last Saved By: milnem4626 Last Saved At: Jun. 25, 25

N

LEGEND

- MH200 — NODE IDENTIFICATION
- 450mmØ — PROPOSED STORM SEWER SIZE AND DIRECTION
- 1200ø STM — EXISTING STORM SEWER SIZE AND DIRECTION

TEMPORARY CONSTRUCTION ICD LOCATION

1050ø STM OUTFALL

1050ø STM

1050ø STM

3000ø STM

3000ø STM

1200ø STM

MH332 MH331 MH333 MH334 MH2 MH3 MH4 MH5 MH6 MH7 MH8 MH1 MH20 MH21 MH30 MH31 MH40 MH41 MH50 MH51 MH52 MH53

1650mmØ 1200mmØ 200mmØ 450mmØ 600mmØ 525mmØ 750mmØ 300mmØ 675mmØ 375mmØ 1350mmØ

chemin CODD'S Road

chemin WANAKI Road

chemin TAMARINA Road

chemin Hemlock Road

rue BARELLE-SNOW Street

rue MICHAEL STOOJA Street

rue MOSES TENNISCO Street

BLOCK 1 BLOCK 2 BLOCK 3 BLOCK 4 BLOCK 5 BLOCK 6 BLOCK 7 BLOCK 8 BLOCK 9 BLOCK 10 BLOCK 11 BLOCK 12 BLOCK 13 BLOCK 14 BLOCK 15 BLOCK 16 BLOCK 17 BLOCK 18 BLOCK 19 BLOCK 20 BLOCK 21 BLOCK 22 BLOCK 23 BLOCK 24 BLOCK 25 BLOCK 26 BLOCK 27 BLOCK 28 BLOCK 29

Project Title	Drawing Title	Sheet No.
DESIGN BRIEF WATERIDGE VILLAGE AT ROCKCLIFFE PHASES 6 & 7	PROPOSED MINOR STORM PLAN	FIGURE 4.1 2025-06-27

ARCADIS

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

STORM SEWER DESIGN SHEET

Wateridge Village Phase 6, 7
CITY OF OTTAWA
Canada Lands Company

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW														SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.30	C= 0.50	C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.75	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
CODDS ROAD	S1, S1A, S1B	MH1	MH2						0.30				0.70	2.10	2.10	10.00	1.18	11.18	76.81	104.19	122.14	178.56	161.21	218.69	256.36	374.78		0.00	161.21	248.81	107.18	450			0.70	1.516	87.61	35.21%
BAREILLE-SNOW ST	S21, S21A, S21B	MH21	MH20						0.08				1.30	3.04	3.04	10.00	0.53	10.53	76.81	104.19	122.14	178.56	233.16	316.31	370.79	542.06		0.00	233.16	425.62	60.00	525			0.90	1.905	192.46	45.22%
BAREILLE-SNOW ST	S20, S20A	MH20	MH5						0.16					0.29	3.32	10.53	0.40	10.93	74.85	101.50	118.97	173.90	248.85	337.47	395.56	578.19		0.00	248.85	906.40	75.16	600			2.00	3.106	657.55	72.54%
TRANSITWAY	S60	MH60	MH53									0.25		0.52	0.52	12.11	0.18	12.29	69.56	94.24	110.42	161.35	36.26	49.12	57.56	84.10		0.00	36.26	71.62	10.71	300			0.50	0.982	35.36	49.37%
WANAKI ROAD	S53, S53A	MH53	MH52						0.16				0.58	1.58	2.10	12.29	0.69	12.98	69.01	93.48	109.53	160.03	144.93	196.33	230.03	336.11		0.00	144.93	224.04	81.65	375			1.50	1.965	79.11	35.31%
WANAKI ROAD		MH52	MH51											0.00	2.10	12.98	0.07	13.05	66.98	90.70	106.26	155.23	140.68	190.50	223.17	326.03		0.00	140.68	224.10	7.79	375			1.50	1.966	83.41	37.22%
WANAKI ROAD	S51, S51A	MH51	MH50						0.28				1.06	2.86	4.96	13.05	0.99	14.03	66.80	90.45	105.96	154.79	331.55	448.94	525.93	768.32		0.00	331.55	820.89	106.49	750			0.50	1.800	489.34	59.61%
WANAKI ROAD	S50	MH50	MH40						0.25					0.45	5.42	14.03	0.56	14.60	64.15	86.81	101.68	148.52	347.38	470.14	550.66	804.29		0.00	347.38	1,349.45	100.00	750			1.35	2.959	1002.07	74.26%
MOSES TENNISCO ST	S41, S41A	MH41	MH40						0.28				0.15	0.84	0.84	10.00	0.55	10.55	76.81	104.19	122.14	178.56	64.48	87.48	102.55	149.91		0.00	64.48	158.87	72.50	300			2.48	2.177	94.39	59.41%
WANAKI ROAD	S40	MH40	MH30						0.21					0.38	6.63	14.60	0.65	15.25	62.74	84.88	99.41	145.18	416.21	563.15	659.53	963.20		0.00	416.21	1,047.42	90.00	750			0.81	2.297	631.21	60.26%
MICHAEL STOQUA ST	S31, S31A, S31B	MH31	MH30						0.19				0.74	1.99	1.99	10.00	0.60	10.60	76.81	104.19	122.14	178.56	152.77	207.25	242.95	355.17		0.00	152.77	332.30	72.50	450			1.25	2.024	179.53	54.03%
MICHAEL STOQUA ST	S30	MH30	MH8						0.14					0.25	8.88	15.25	0.52	15.77	61.18	82.76	96.91	141.51	543.10	734.60	860.24	1,256.16		0.00	543.10	2,602.73	69.60	1200			0.41	2.229	2059.63	79.13%
CODDS ROAD	S8, S8A, S8B	MH8	MH7						0.09				1.48	3.45	12.33	15.77	0.26	16.03	60.01	81.15	95.02	138.74	739.93	1,000.61	1,171.65	1,710.72		0.00	739.93	2,390.10	31.85	1200			0.35	2.047	1650.17	69.04%
CODDS ROAD		MH7	MH6											0.00	12.33	16.03	0.32	16.35	59.44	80.37	94.11	137.40	732.93	991.04	1,160.39	1,694.20		0.00	732.93	2,408.23	39.93	1200			0.35	2.063	1675.30	69.57%
CODDS ROAD	S6, S6A	MH6	MH5						0.27					0.49	12.82	16.35	0.33	16.68	58.75	79.43	93.00	135.77	753.09	1,018.16	1,192.08	1,740.38		0.00	753.09	2,422.13	40.89	1200			0.35	2.075	1669.05	68.91%
CODDS ROAD	S5, S5A	MH5	MH4						0.01				1.68	3.75	19.90	16.68	0.22	16.90	58.07	78.49	91.90	134.16	1,155.38	1,561.84	1,828.55	2,669.42		0.00	1,155.38	2,237.75	24.78	1200			0.30	1.917	1082.37	48.37%
CODDS ROAD	S4, S4A	MH4	MH3						0.20					0.36	20.26	16.90	0.96	17.85	57.63	77.89	91.19	133.12	1,167.47	1,578.04	1,847.46	2,696.93		0.00	1,167.47	1,838.53	90.54	1200			0.20	1.575	671.06	36.50%
CODDS ROAD		MH3	MH2											0.00	20.26	17.85	0.15	18.01	55.76	75.34	88.19	128.72	1,129.65	1,526.36	1,786.71	2,607.83		0.00	1,129.65	1,815.62	14.05	1200			0.20	1.555	685.97	37.78%
PHASE 4 PARK	S2	MH2	MH334			1.28								1.07	21.33	18.01	0.58	18.58	55.48	74.96	87.74	128.06	1,183.18	1,598.60	1,871.23	2,731.12		0.00	1,183.18	1,802.28	53.48	1200			0.20	1.544	619.10	34.35%
		MH334	STUB																												200						
		MH334	MH333											0.00	21.33	18.58	0.08	18.67	54.43	73.52	86.06	125.59	1,160.80	1,568.04	1,835.31	2,678.44		0.00	1,160.80	1,976.44	8.47	1200			0.24	1.693	815.64	41.27%
	S333	MH333	MH331			1.25								1.04	22.37	18.67	0.44	19.11	54.28	73.32	85.82	125.24	1,214.24	1,640.17	1,919.72	2,801.58		0.00	1,214.24	2,170.89	49.14	1200			0.28	1.860	956.65	44.07%
	S331	MH331	MH332			2.45								2.04	24.41	19.11	1.08	20.18	53.51	72.28	84.59	123.44	1,306.43	1,764.44	2,065.05	3,013.46		0.00	1,306.43	2,164.98	120.00	1200			0.28	1.854	858.54	39.66%
		MH332	EXSTMH											0.00	24.41	20.18	0.18	20.36	51.74	69.85	81.74	119.26	1,263.01	1,705.17	1,995.41	2,911.35		0.00	1,263.01	3,699.47	17.84	1650			0.15	1.676	2436.46	65.86%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: SEL

Checked: JIM

Dwg. Reference: 139653-500

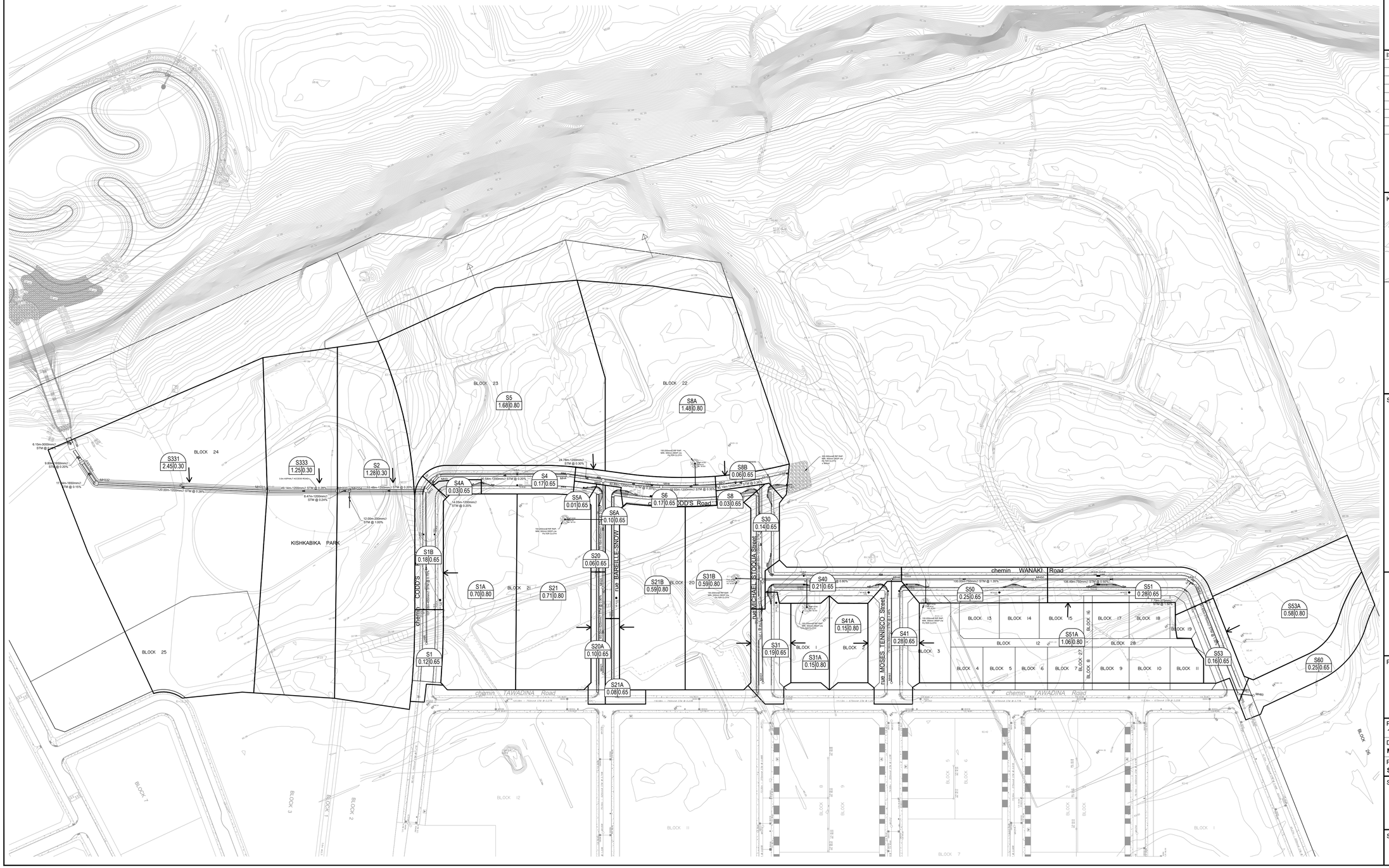
No.	Revision	Date
1.	Submission No. 1	2023-09-11
2.	Submission No. 2	2024-05-13
3.	Submission No. 4	2025-05-14

File Reference: 139653.6.04.04
Date: 2025-05-14
Sheet No: 1 of 1

LEGEND :

MH8
0.10|0.70

AREA NUMBER
RUNOFF COEFFICIENT
AREA IN HECTARES



CLIENT

CANADA LANDS COMPANY

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA

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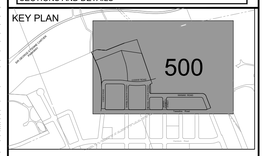
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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2023-10-05
2	ISSUED FOR CLIENT REVIEW	2024-06-12
3	SUBMISSION NO.2 FOR CITY REVIEW	2024-06-21
4	ISSUED FOR GEOTECHNICAL REVIEW	2024-11-26
5	SUBMISSION NO.3 FOR CITY REVIEW	2024-12-20
6	SUBMISSION NO.4 FOR CITY REVIEW	2025-06-27
7	SUBMISSION NO.5 FOR CITY REVIEW	2025-07-31
8		

SEE 010, 011 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN



1:1250 0 12.5 25 37.5 62.5m
0 12.5 25 37.5 62.5m

SEAL

LICENSED PROFESSIONAL ENGINEER
S. É. LABADIE
100214983
2025/07/31
PROVINCE OF ONTARIO

ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASES 6 AND 7

PROJECT NO: 139653	
DRAWN BY: **M.M.**	CHECKED BY: **J.I.M.**
PROJECT MGR: **S.L.**	APPROVED BY: **S.L.**

SHEET TITLE

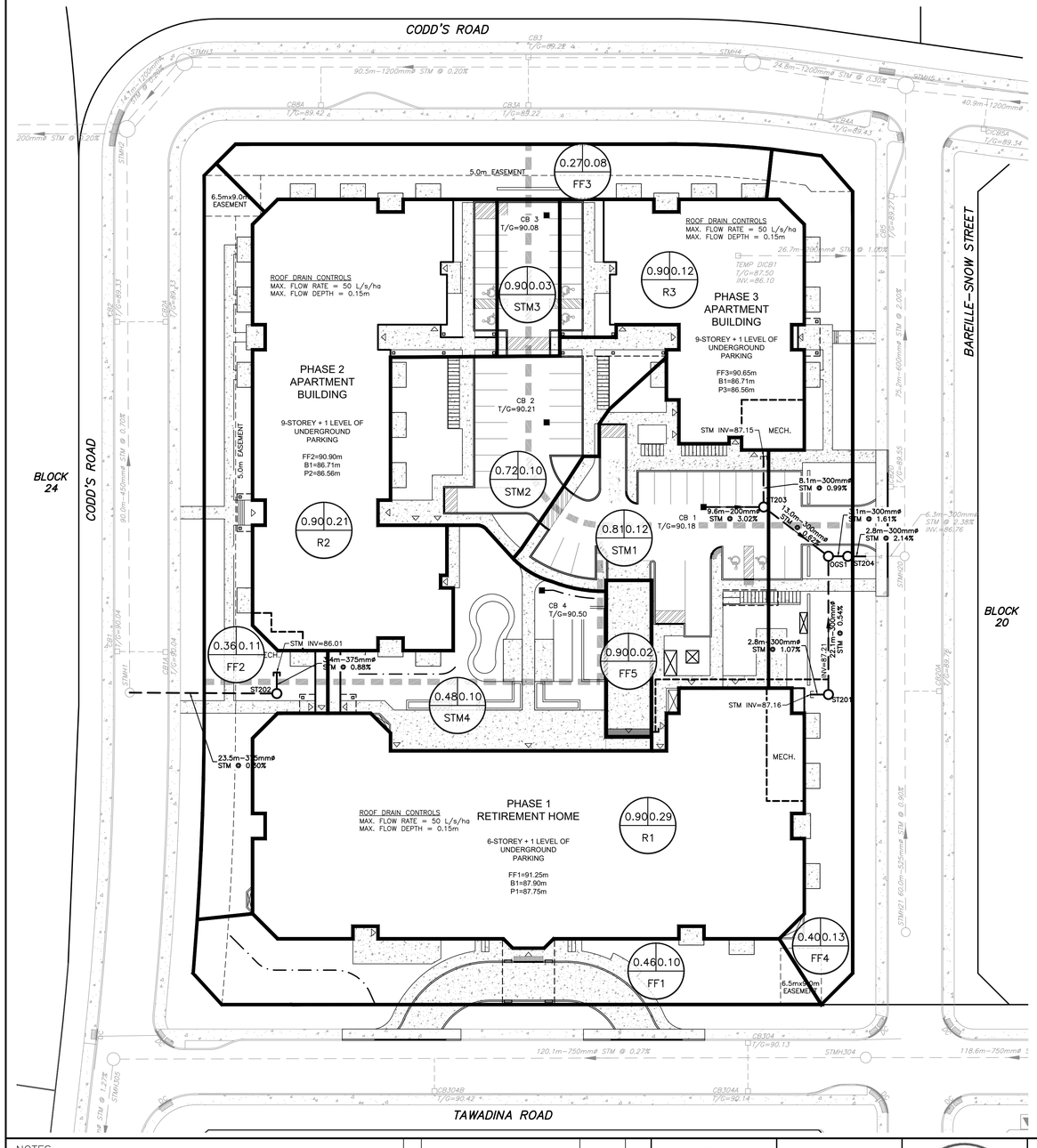
STORM DRAINAGE AREA PLAN

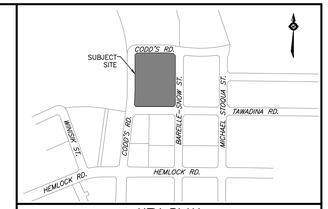
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SCALE CHECK

CITY PLAN No. 19055 CITY FILE No. D07-16-15-0003

File Location: J:\139653_800399-49__W7.0_Production\7.03_Design\04_Civil\Sheets\500 STORM DRAINAGE AREA PLAN.dwg Last Saved: June 25, 2025, by milnem4826 Plotted: July 31, 2025 2:42:14 PM by Milne, Marian





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- CATCH BASIN
- STORM SEWER & MANHOLE
- SWALE
- STORM DRAINAGE AREA BOUNDARY

RUNOFF COEFFICIENT
0.85 0.10 — AREA (ha)
STM1 — DRAINAGE AREA ID

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

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5	REVISED PER COMMENTS	21/07/26	BLM
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3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B. L. MACKECHNIE
100199554
21 July '26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

WATERIDGE LIFESTYLES LTD.

WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

STORM DRAINAGE AREA PLAN

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-STM1

FILE No. D07-12-26-0020

STORM SEWER DESIGN SHEET
BLOCK 21, WATERIDGE VILLAGE AT ROCKCLIFFE

LOCATION			AREA (ha)	C	C (100 YR)	2-YR		100-YR		TIME OF CONC. (min)	2-YR RAINFALL INTENSITY (mm/hr)	2-YR PEAK FLOW (L/s)	100-YR RAINFALL INTENSITY (mm/hr)	100-YR PEAK FLOW (L/s)	100-YR RESTRICTED FLOW (L/s)	CUMULATIVE RESTRICTED FLOW (L/s)	PROPOSED SEWER							
DRAINAGE AREA	FROM MH	TO MH				INDIV. 2.78AC	ACCUM. 2.78AC	INDIV. 2.78AC	ACCUM. 2.78AC								PIPE DIA. (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	2-YR PERCENT FULL	100-YR PERCENT FULL WITH RESTRICTED CONTROLS
TO CODD'S ROAD STORM SEWER (MH1 TO MH2)																								
STM3	CB 3	BLDG	0.03	0.90	1.00	0.06	0.06	0.07	0.07	10.00	76.81	4.81	178.56	12.43	12.43	12.43	251.46	1.00	1.0	60.46	1.22	0.01	8%	21%
STM2	CB 2	BLDG	0.10	0.72	0.80	0.20	0.20	0.22	0.22	10.00	76.81	15.17	178.56	39.54	39.54	39.54	251.46	1.00	1.0	60.46	1.22	0.01	25%	65%
STM4	CB 4	BLDG	0.10	0.48	0.55	0.14	0.14	0.16	0.16	10.00	76.81	10.53	178.56	28.07	28.07	28.07	251.46	1.00	1.0	60.46	1.22	0.01	17%	46%
R2	BLDG	202	0.21	0.90	1.00	0.54	0.93	0.60	1.04	10.00	76.81	71.72	178.56	186.48	10.72	90.76	366.42	0.88	3.4	154.79	1.47	0.04	46%	59%
	202	EX1	0.00	0.00	0.00	0.00	0.93	0.00	1.04	10.04	76.66	71.58	178.21	186.11	0.00	90.76	366.42	0.30	23.5	90.38	0.86	0.46	79%	100%
			0.44																					
TO BAREILLE-SNOW STREET STORM SEWER (MH20 TO MH5)																								
R3	BLDG	203	0.12	0.90	1.00	0.29	0.29	0.33	0.33	10.00	76.81	22.64	178.56	58.48	5.89	5.89	299.36	0.99	8.1	95.77	1.36	0.10	24%	6%
STM1	CB 1	203	0.12	0.81	0.90	0.28	0.28	0.31	0.31	10.00	76.81	21.18	178.56	54.93	54.93	54.93	201.16	3.02	9.6	57.94	1.82	0.09	37%	95%
	203	OGS1	0.00	0.00	0.00	0.00	0.57	0.00	0.64	10.10	76.43	43.60	177.66	112.83	0.00	60.82	299.36	0.62	13.0	75.79	1.08	0.20	58%	80%
R1 + FF5	BLDG	201	0.31	0.90	1.00	0.78	0.78	0.86	0.86	10.00	76.81	59.71	178.56	154.24	23.68	23.68	299.36	1.07	2.8	99.56	1.41	0.03	60%	24%
	201	OGS1	0.00	0.00	0.00	0.00	0.78	0.00	0.86	10.03	76.68	59.61	178.26	153.98	0.00	23.68	299.36	0.54	22.1	70.73	1.00	0.37	84%	33%
	OGS1	204	0.00	0.00	0.00	0.00	1.35	0.00	1.50	10.40	75.30	101.50	174.99	262.29	0.00	84.50	299.36	1.61	3.1	122.13	1.74	0.03	83%	69%
	204	STUB	0.00	0.00	0.00	0.00	1.35	0.00	1.50	10.43	75.19	101.35	174.73	261.90	0.00	84.50	299.36	2.14	2.8	140.80	2.00	0.02	72%	60%
			0.55																					
												172.94												

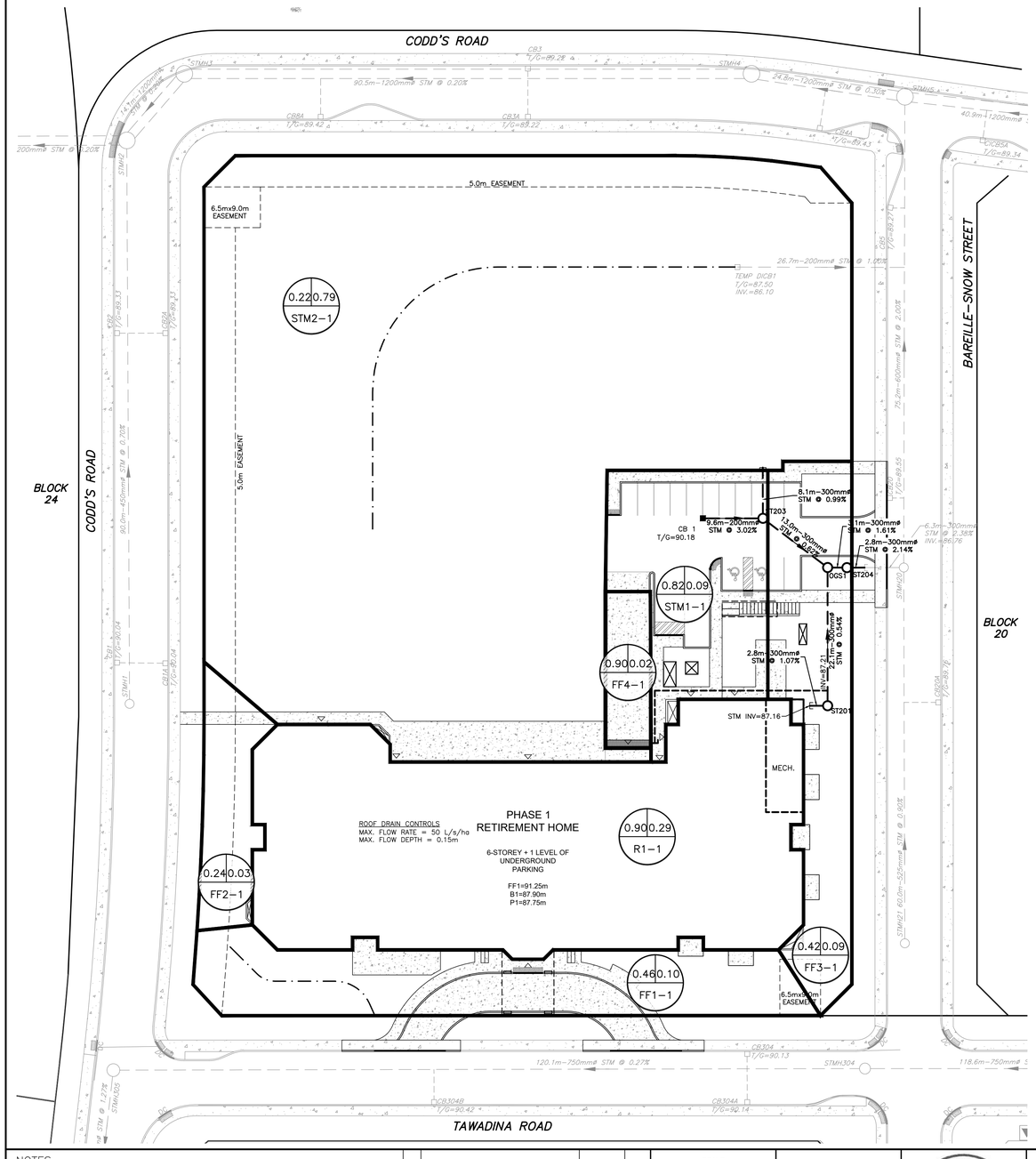
Design Parameters

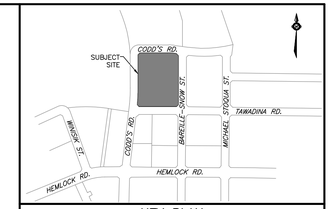
Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Peak flows calculated using the Rational Method.
   Q = 2.78CIA, where:
   Q = Peak Flow (L/s)
   A = Drainage Area (ha)
   I = Rainfall Intensity (mm/hr)
   C = Runoff Coefficient
3. Manning's roughness coefficient = 0.013
4. Full flow velocity: MIN 0.8 m/s; MAX 3.0 m/s (City of Ottawa Sewer Design Guidelines, v.2012)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
50 year Intensity = 1569.580 / (Time in min + 6.014) $^{0.820}$
25 year Intensity = 1402.884 / (Time in min + 6.018) $^{0.819}$
10 year Intensity = 1174.184 / (Time in min + 6.014) $^{0.816}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- CATCH BASIN
- STORM SEWER & MANHOLE
- SWALE
- STORM DRAINAGE AREA BOUNDARY

RUNOFF COEFFICIENT
0.85 0.10 ← AREA (ha)
STM1
DRAINAGE AREA ID

NOTES

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4	REVISED PER COMMENTS	10/06/26	BLM
3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B. L. MACKECHNIE
100199554
21 July '26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

WATERIDGE LIFESTYLES LTD.

WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

INTERIM
STORM DRAINAGE AREA PLAN

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-STM2

FILE No. D07-12-26-0020

INTERIM STORM SEWER DESIGN SHEET
BLOCK 21, WATERIDGE VILLAGE AT ROCKCLIFFE

LOCATION			AREA (ha)	C	C (100 YR)	2-YR		100-YR		TIME OF CONC. (min)	2-YR RAINFALL INTENSITY (mm/hr)	2-YR PEAK FLOW (L/s)	100-YR RAINFALL INTENSITY (mm/hr)	100-YR PEAK FLOW (L/s)	100-YR RESTRICTED FLOW (L/s)	CUMULATIVE RESTRICTED FLOW (L/s)	PROPOSED SEWER							
DRAINAGE AREA	FROM MH	TO MH				INDIV. 2.78AC	ACCUM. 2.78AC	INDIV. 2.78AC	ACCUM. 2.78AC								PIPE DIA. (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	2-YR PERCENT FULL	100-YR PERCENT FULL WITH RESTRICTED CONTROLS
TO BAREILLE-SNOW STREET STORM SEWER (MH20 TO MH5)																								
STM1-1	CB 1	203	0.09	0.82	0.91	0.19	0.19	0.22	0.22	10.00	76.81	14.92	178.56	38.69	38.69	38.69	201.16	3.02	9.6	57.94	1.82	0.09	26%	67%
	203	OGS1	0.00	0.00	0.00	0.00	0.19	0.00	0.22	10.09	76.47	14.86	177.76	38.51	0.00	38.69	299.36	0.62	13.0	75.79	1.08	0.20	20%	51%
R1-1 + FF4-1	BLDG	201	0.31	0.90	1.00	0.78	0.78	0.86	0.86	10.00	76.81	59.71	178.56	154.24	23.68	23.68	299.36	1.07	2.8	99.56	1.41	0.03	60%	24%
	201	OGS1	0.00	0.00	0.00	0.00	0.78	0.00	0.86	10.03	76.68	59.61	178.26	153.98	0.00	23.68	299.36	0.54	22.1	70.73	1.00	0.37	84%	33%
	OGS1	204	0.00	0.00	0.00	0.00	0.97	0.00	1.08	10.40	75.30	73.18	174.99	189.07	0.00	62.37	299.36	1.61	3.10	122.13	1.74	0.03	60%	51%
	204	STUB	0.00	0.00	0.00	0.00	0.97	0.00	1.08	10.43	75.19	73.07	174.73	188.79	0.00	62.37	299.36	2.14	2.80	140.80	2.00	0.02	52%	44%
STM2-1	DICB 1	MAIN	0.79	0.22	0.27	0.48	0.48	0.59	0.59	15.00	61.77	29.73	142.89	84.90	84.90	84.90	201.16	1.00	26.7	33.34	1.05	0.42	89%	255%

Design Parameters

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Peak flows calculated using the Rational Method.
   Q = 2.78CIA, where:
   Q = Peak Flow (L/s)
   A = Drainage Area (ha)
   I = Rainfall Intensity (mm/hr)
   C = Runoff Coefficient
3. Manning's roughness coefficient = 0.013
4. Full flow velocity: MIN 0.8 m/s; MAX 3.0 m/s (City of Ottawa Sewer Design Guidelines, v.2025)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = $1735.688 / (\text{Time in min} + 6.014)^{0.820}$
50 year Intensity = $1569.580 / (\text{Time in min} + 6.014)^{0.820}$
25 year Intensity = $1402.884 / (\text{Time in min} + 6.018)^{0.819}$
10 year Intensity = $1174.184 / (\text{Time in min} + 6.014)^{0.816}$
5 year Intensity = $998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity = $732.951 / (\text{Time in min} + 6.199)^{0.810}$

Runoff Coefficient Calculations

Drainage Area ID	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)	Percent Impervious (%)
R1	0.29	0.00	0.00	0.29	0.90	1.00	100.0
R2	0.21	0.00	0.00	0.21	0.90	1.00	100.0
R3	0.12	0.00	0.00	0.12	0.90	1.00	100.0
STM1	0.11	0.02	0.00	0.12	0.81	0.90	86.8
STM2	0.07	0.03	0.00	0.10	0.72	0.80	73.9
STM3	0.03	0.00	0.00	0.03	0.90	1.00	100.0
STM4	0.04	0.06	0.00	0.10	0.48	0.55	39.7
FF1	0.04	0.07	0.00	0.10	0.46	0.53	37.4
FF2	0.03	0.08	0.00	0.11	0.36	0.43	23.5
FF3	0.01	0.07	0.00	0.08	0.27	0.33	10.4
FF4	0.04	0.09	0.00	0.13	0.40	0.46	28.5
FF5	0.02	0.00	0.00	0.02	0.90	1.00	100.0

Runoff Coefficient Calculations (Interim - Phase 1)

Drainage Area ID	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)	Percent Impervious (%)
R1-1	0.29	0.00	0.00	0.29	0.90	1.00	100.0
STM1-1	0.08	0.01	0.00	0.09	0.82	0.91	88.5
STM2-1	0.02	0.77	0.00	0.79	0.22	0.27	2.7
FF1-1	0.04	0.07	0.00	0.10	0.46	0.53	37.4
FF2-1	0.002	0.03	0.00	0.03	0.24	0.30	6.3
FF3-1	0.03	0.06	0.00	0.09	0.42	0.49	31.5
FF4-1	0.02	0.00	0.00	0.02	0.90	1.00	100.0

Cumulative Runoff Coefficient Calculations

Drainage Area ID	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)	Percent Impervious (%)
R2 + STM2 + STM3 + STM4	0.35	0.09	0.00	0.44	0.76	0.85	80.1
R1 + FF5	0.31	0.00	0.00	0.31	0.90	1.00	100.0
R1-1 + FF4-1	0.31	0.00	0.00	0.31	0.90	1.00	100.0
To OGS1	0.54	0.02	0.00	0.55	0.88	0.98	97.1

Runoff Coefficients (100-YR):
$C_{impervious}$ = 0.90 (1.0)
$C_{pervious}$ = 0.20 (0.25)
C_{gravel} = 0.80 (1.0)

Appendix F

DDWMM Model Schematic
(prepared by Arcadis)

Table 5-3 Minor Flow Capture
(prepared by Arcadis)

Table 5-7 Major Flow from Development Blocks
(prepared by Arcadis)

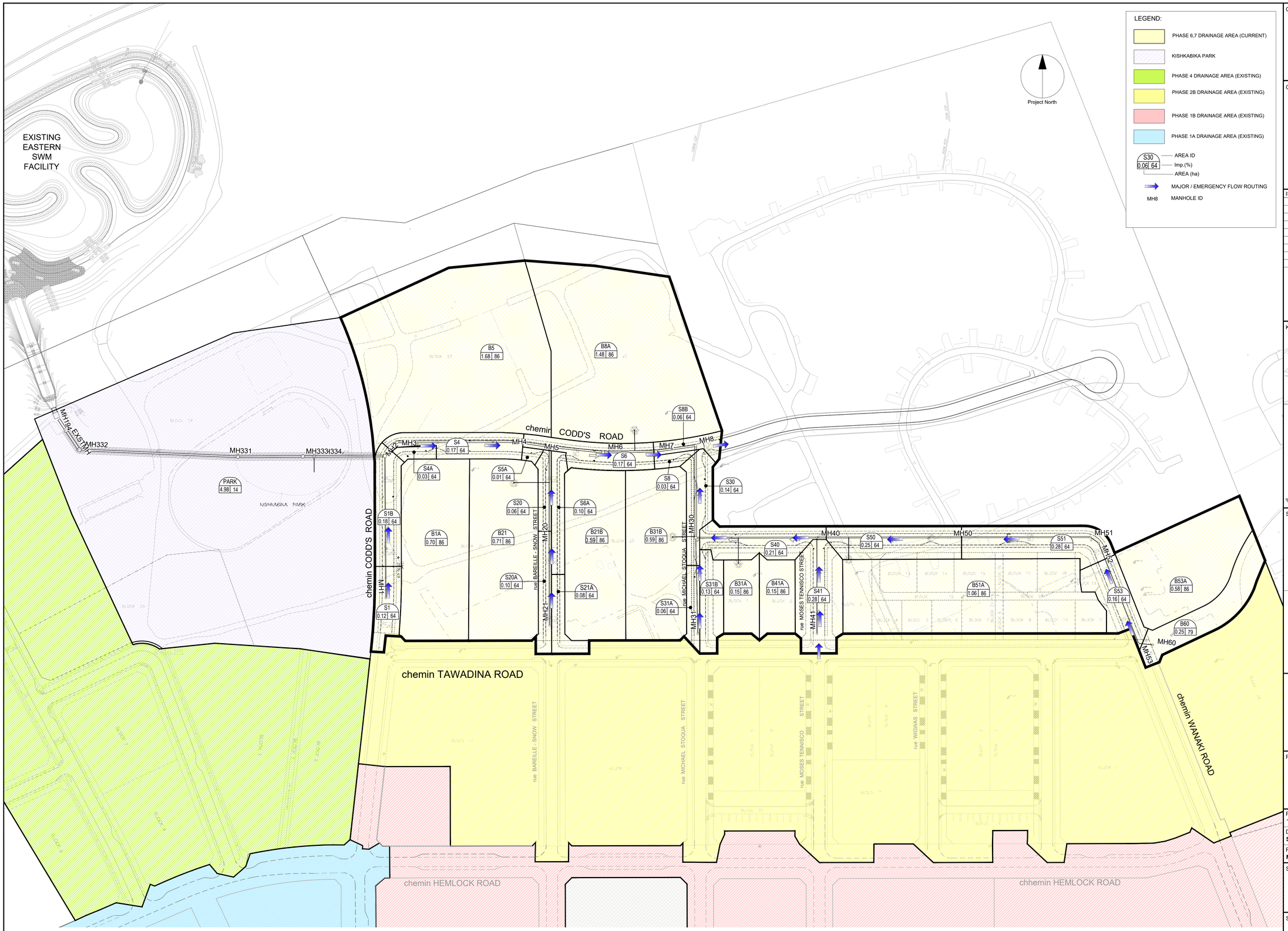
Table F1: Ponding and Orifice Calculations

Roof Drain Specification Sheet

Free Flow Calculations

Storage Volume Tables

Ponding Area Plan (DWG. 25117-PA1)


EXISTING EASTERN SWM FACILITY
Project North
LEGEND:
PHASE 6,7 DRAINAGE AREA (CURRENT)
KISHKABIKA PARK
PHASE 4 DRAINAGE AREA (EXISTING)
PHASE 2B DRAINAGE AREA (EXISTING)
PHASE 1B DRAINAGE AREA (EXISTING)
PHASE 1A DRAINAGE AREA (EXISTING)
S30 0.06 64
AREA ID
Imp.(%)
AREA (ha)
MAJOR / EMERGENCY FLOW ROUTING
MH8 MANHOLE ID
B5 1.68 86
B8A 1.48 86
S8B 0.06 64
S4 0.17 64
S4A 0.03 64
S5A 0.01 64
S6 0.17 64
S8 0.03 64
S30 0.14 64
S20 0.06 64
S6A 0.10 64
S1B 0.18 64
B1A 0.70 86
B21 0.71 86
B21B 0.59 86
B31B 0.59 86
S20A 0.10 64
S21A 0.08 64
S31A 0.06 64
S1 0.12 64
S40 0.21 64
S50 0.25 64
S51 0.28 64
S31B 0.13 64
B31A 0.15 86
B41A 0.15 86
S41 0.28 64
B51A 1.06 86
S53 0.16 64
B53A 0.58 86
B60 0.25 79
PARK 4.98 14
MH194 EXIST MH1
MH332
MH331
MH333I334
MH1
MH2
MH3
MH4
MH5
MH6
MH7
MH8
MH20
MH21
MH30
MH31
MH40
MH41
MH50
MH51
MH52
MH53
MH60
chemin CODD'S ROAD
chemin TAWADINA ROAD
chemin HEMLOCK ROAD
chhemin HEMLOCK ROAD
chemin WANAKI ROAD
rue BARELLE- SNOW STREET
rue MICHAEL STODJA STREET
rue MOSES TENNISCO STREET
rue WIGWAS STREET
NISHKABIKA PARK
1 HW
BLOCK 23
BLOCK 24
BLOCK 25
BLOCK 26
BLOCK 27
BLOCK 28
BLOCK 29
BLOCK 30
BLOCK 31
BLOCK 32
BLOCK 33
BLOCK 34
BLOCK 35
BLOCK 36
BLOCK 37
BLOCK 38
BLOCK 39
BLOCK 40
BLOCK 41
BLOCK 42
BLOCK

Drainage Area ID	Area (ha)	D/S Segment ID	XPSWMM Node ID	IMP Ratio [Tp (h)]	Segment Length (m)	Subcatchment Width (m)	Available Static Ponding (m^3)
B8A	1.48	S6	MH6	0.86	167	333	0.0

Table 5-3 Minor Flow Capture

Drainage Area ID	Continuous/Sag[1],[2]	Road Type	Minor System Design Target	Generated Flow on Individual Segment for Minor System Design Target (DDSWMM Simulation) (l/s)	ICD (l/s)	Note
S1	Continuous	20m Row, 8.5m asphalt	100	41	12	
S1B	Sag	20m Row, 8.5m asphalt	100	59	126	
S20	Sag	20m Row, 8.5m asphalt	100	20	86	
S20A	Continuous	20m Row, 8.5m asphalt	100	33	19	
S21A	Continuous	20m Row, 8.5m asphalt	100	28	19	
S30	Sag	20m Row, 8.5m asphalt	100	49	95	
S31A	Sag	20m Row, 8.5m asphalt	100	21	86	
S31B	Sag	20m Row, 8.5m asphalt	100	42	86	
S4	Sag	20m Row, 8.5m asphalt	100	59	172	
S40	Sag	20m Row, 8.5m asphalt	100	68	172	
S41	Continuous	20m Row, 8.5m asphalt	100	93	43	
S4A	Sag	20m Row, 8.5m asphalt	100	11	28	

Drainage Area ID	Continuous/Sag[1],[2]	Road Type	Minor System Design Target	Generated Flow on Individual Segment for Minor System Design Target (DDSWMM Simulation) (l/s)	ICD (l/s)	Note
S50	Continuous	20m Row, 8.5m asphalt	100	84	25	
S51	Sag	20m Row, 8.5m asphalt	100	95	416	
S53	Continuous	20m Row, 8.5m asphalt	100	55	76	
S5A	Sag	20m Row, 8.5m asphalt	100	5	6	
S6	Sag	20m Row, 8.5m asphalt	100	59	228	
S6A	Sag	20m Row, 8.5m asphalt	100	31	86	
S8	Sag	20m Row, 8.5m asphalt	100	10	19	
S8B	Continuous	20m Row, 8.5m asphalt	100	21	57	
Park & Development Blocks						
Park	Rear Yard	Rear Yard	5	200	200	
B1A	Rear Yard	Rear Yard	5	142	142	
B21	Rear Yard	Rear Yard	5	144	144	
B21B	Rear Yard	Rear Yard	5	120	120	
B31A	Rear Yard	Rear Yard	5	31	31	
B31B	Rear Yard	Rear Yard	5	120	120	
B41A	Rear Yard	Rear Yard	5	31	31	
B5	Rear Yard	Rear Yard	5	338	338	
B51A	Rear Yard	Rear Yard	5	215	215	

Drainage Area ID	D/S Segment ID	Overflow (l/s)[1]	Velocity (m/s)[2]	Max. Static Ponding Depth Utilized (Where Applicable) (m)	Dynamic Depth of Flow (where applicable) (m)[3]	Max. Depth (Static + Dynamic, where applicable) (m)	Velocity x Depth (m^2/s)
S8	D13	0.00	0.00	0.06	0.00	0.06	0.00
S8B		0.93	2.41	0.00	0.11	0.11	0.26

(1) Overflow from DDSWMM output 139653-3CHI120.out
(2) Velocity from SWMHYMO output 139653VD.out
(3) Depth of the cascading overflow was determined from the Calculation Sheet: Overflow From Typical Road Ponding Area provided in the February 2014 Technical Bulletin ISDTB-2014-01. For those areas which have a continuous road grade (or no dummy segment), the depth was taken from SWMHYMO VxD simulation.

During the 100 year 3 hour Chicago storm, the summation of depth of ponding and depth of cascading flow for all street segments is less than the City guideline of 0.35 m. The product of depth and velocity is also less than the City guideline of 0.6 m^2/s.

During the sensitivity analysis applying the 100 year 3 hour Chicago storm increased by 20%, the summation of depth of ponding and depth of cascading flow for all street segments is less than 0.35 m except at drainage areas S30, S4, S51 and S6. At all locations, the product of depth and velocity is less than the City guideline of 0.6 m^2/s.

To assist in the design of future site plan proposals, a summary of major flow from development blocks is summarized in the below table. Refer also to **Drawing 139653-750** for major flow connectivity.

Table 5-7 Major Flow from Development Blocks (100 year 3 hour Chicago storm and stress test)

Drainage Area ID	Major Flow Recipient		Major Flow (cms)	
	Street	Model Drainage Area ID	100 year 3 hour Chicago Storm	100 year 3 hour Chicago Storm + 20%
B1A	Codd's Road	S1	0.121	0.184
B21	Bareille-Snow Street	S20A	0.122	0.186
B21B	Bareille-Snow Street	S21A	0.101	0.154
B31A	Michael Stoqua Street	S31B	0.027	0.040
B31B	Michael Stoqua Street	S31A	0.102	0.155
B41A	Moses Tennisco Street	S41	0.027	0.400
B5	Codd's Road	S4	0.287	0.437

Table F1: Ponding and Orifice Calculations

Structure	Drainage Area	Outlet Pipe Inv. Elev. (m)	Outlet Pipe Diam. (m)	C/L Orifice Elev. (m)	T/G Elev. (m)	2-YR Ponding Depth (m)	2-YR Ponding Elev. (m)	2-YR Head (m)	5-YR Ponding Depth (m)	5-YR Ponding Elev. (m)	5-YR Head (m)	100-YR Ponding Depth (m)	100-YR Ponding Elev. (m)	100-YR Head (m)	100-YR + 20% Ponding Depth (m)	100-YR + 20% Ponding Elev. (m)	100-YR + 20% Head (m)	2-YR Outflow (L/s)	5-YR Outflow (L/s)	100-YR Outflow (L/s)	100-YR + 20% Outflow (L/s)	Orifice Area (m^2)	Orifice Diameter (mm)	Orifice Type
Temp. DICB 1	STM2-1	86.10	0.201	86.20	87.50	0.00	87.50	1.30	0.00	87.50	1.30	0.00	87.50	1.30	0.00	87.50	1.30	131.6	131.6	131.6	131.6	0.032	201	Pipe lead

Notes:

1. Ponding depths are measured from the ponding elevation to the T/G elevation.
2. Heads are measured from the ponding elevation to the centreline of orifice elevation.
3. Orifice Area = (Q/1000) / 0.82(2*9.81*H_{100})$^{0.5}$ (see note 6)
4. Orifice areas are calculated using 2-year head and outflow values.
5. Equivalent orifice diameter would be less than 83mm.

WATTS®	Adjustable Accutrol Weir Tag: _____	Adjustable Flow Control for Roof Drains

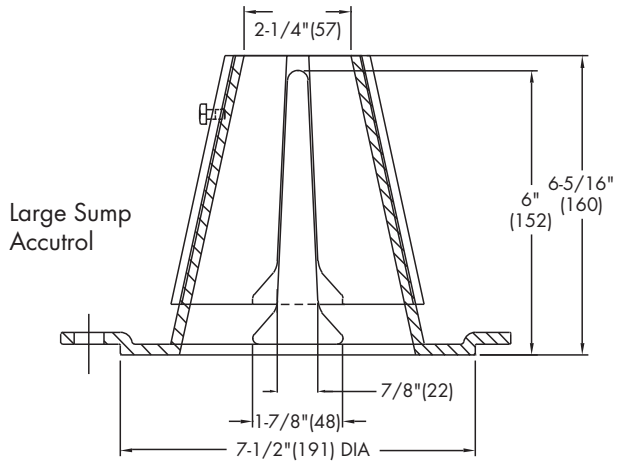
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

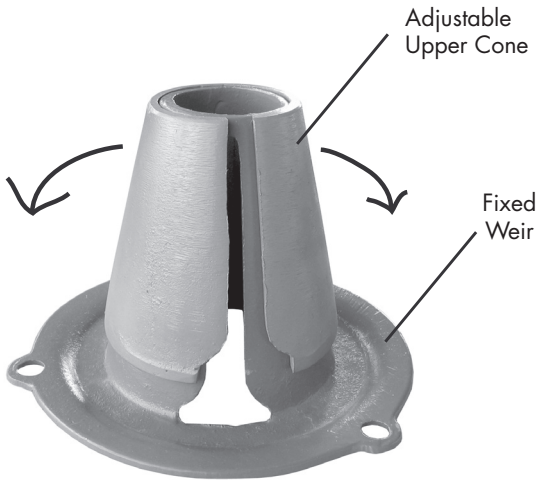
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

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Free Flow Calculations - Area FF1 (to Tawadina Road - Pipe Run MH304 to MH305)

Area ID = FF1
Area (ha) = 0.10
C = 0.46
C (100 YR) = 0.53

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**10.3**
	15	61.8	8.3
	20	52.0	7.0
	25	45.2	6.1
	30	40.0	5.4
	35	36.1	4.9
5 Year	**10**	**104.2**	**14.0**
	15	83.6	11.3
	20	70.3	9.5
	25	60.9	8.2
	30	53.9	7.3
	35	48.5	6.5
100 Year	**10**	**178.6**	**27.6**
	15	142.9	22.1
	20	120.0	18.6
	25	103.8	16.1
	30	91.9	14.2
	35	82.6	12.8

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - Area FF2 (to Codd's Road - Pipe Run MH1 to MH2)

Area ID = FF2
Area (ha) = 0.11
C = 0.36
C (100 YR) = 0.43

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**8.4**
	15	61.8	6.8
	20	52.0	5.7
	25	45.2	5.0
	30	40.0	4.4
	35	36.1	4.0
5 Year	**10**	**104.2**	**11.5**
	15	83.6	9.2
	20	70.3	7.7
	25	60.9	6.7
	30	53.9	5.9
	35	48.5	5.3
100 Year	**10**	**178.6**	**23.0**
	15	142.9	18.4
	20	120.0	15.4
	25	103.8	13.3
	30	91.9	11.8
	35	82.6	10.6

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - Area FF3 (to Codd's Road - Pipe Run MH4 to MH3)

Area ID = FF3
Area (ha) = 0.08
C = 0.27
C (100 YR) = 0.33

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**4.5**
	15	61.8	3.6
	20	52.0	3.0
	25	45.2	2.6
	30	40.0	2.3
	35	36.1	2.1
5 Year	**10**	**104.2**	**6.1**
	15	83.6	4.9
	20	70.3	4.1
	25	60.9	3.6
	30	53.9	3.2
	35	48.5	2.8
100 Year	**10**	**178.6**	**12.6**
	15	142.9	10.1
	20	120.0	8.4
	25	103.8	7.3
	30	91.9	6.5
	35	82.6	5.8

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - Area FF4 (to Bareille-Snow St. - Pipe Run MH20 to MH5)

Area ID = FF4
Area (ha) = 0.13
C = 0.40
C (100 YR) = 0.46

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**11.3**
	15	61.8	9.1
	20	52.0	7.7
	25	45.2	6.7
	30	40.0	5.9
	35	36.1	5.3
5 Year	**10**	**104.2**	**15.3**
	15	83.6	12.3
	20	70.3	10.3
	25	60.9	9.0
	30	53.9	7.9
	35	48.5	7.1
100 Year	**10**	**178.6**	**30.5**
	15	142.9	24.4
	20	120.0	20.5
	25	103.8	17.8
	30	91.9	15.7
	35	82.6	14.1

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - Area FF5 (to Phase 1 Building Storm Service)

Area ID = FF5
Area (ha) = 0.02
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**3.5**
	15	61.8	2.8
	20	52.0	2.4
	25	45.2	2.1
	30	40.0	1.8
	35	36.1	1.6
5 Year	**10**	**104.2**	**4.8**
	15	83.6	3.8
	20	70.3	3.2
	25	60.9	2.8
	30	53.9	2.5
	35	48.5	2.2
100 Year	**10**	**178.6**	**9.1**
	15	142.9	7.2
	20	120.0	6.1
	25	103.8	5.3
	30	91.9	4.7
	35	82.6	4.2

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Storage Volume Calculations - Area R1 (PHASE 1 ROOF)

Area ID =	R1	Roof Drain Release Rate (L/s/ha) =	50.0
Area (ha) =	0.29	2-Year Release Rate (L/s) =	14.6
C =	0.90	5-Year Release Rate (L/s) =	14.6
C (100 YR) =	1.00	100-Year Release Rate (L/s) =	14.6
		100-Year + 20% Release Rate (L/s) =	14.6
		Available Storage Volume (m^3) =	146.2

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	56.2	14.6	41.6	24.9
	15	61.8	45.2	14.6	30.6	27.5
	20	**52.0**	**38.1**	**14.6**	**23.5**	**28.1**
	25	45.2	33.1	14.6	18.4	27.6
	30	40.0	29.3	14.6	14.7	26.4
	35	36.1	26.4	14.6	11.8	24.7
5 Year	15	83.6	61.1	14.6	46.5	41.9
	20	70.3	51.4	14.6	36.8	44.1
	25	**60.9**	**44.6**	**14.6**	**29.9**	**44.9**
	30	53.9	39.5	14.6	24.8	44.7
	35	48.5	35.5	14.6	20.9	43.8
	40	44.2	32.3	14.6	17.7	42.5
100 Year	40	75.1	61.1	14.6	46.5	111.5
	45	69.1	56.1	14.6	41.5	112.1
	50	**64.0**	**52.0**	**14.6**	**37.4**	**112.1**
	55	59.6	48.5	14.6	33.9	111.7
	60	55.9	45.4	14.6	30.8	111.0
	65	52.6	42.8	14.6	28.2	109.9
100 Year + 20%	50	76.7	62.4	14.6	47.8	143.3
	55	71.5	58.2	14.6	43.6	143.7
	60	**67.1**	**54.5**	**14.6**	**39.9**	**143.7**
	65	63.2	51.4	14.6	36.7	143.3
	70	59.7	48.6	14.6	34.0	142.6
	75	56.7	46.1	14.6	31.5	141.7

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA

Storage Volume Calculations - Area R2 (PHASE 2 ROOF)

Area ID =	R2	Roof Drain Release Rate (L/s/ha) =	50.0
Area (ha) =	0.21	2-Year Release Rate (L/s) =	10.7
C =	0.90	5-Year Release Rate (L/s) =	10.7
C (100 YR) =	1.00	100-Year Release Rate (L/s) =	10.7
		100-Year + 20% Release Rate (L/s) =	10.7
		Available Storage Volume (m^3) =	107.2

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	41.2	10.7	30.5	18.3
	15	61.8	33.1	10.7	22.4	20.2
	20	**52.0**	**27.9**	**10.7**	**17.2**	**20.6**
	25	45.2	24.2	10.7	13.5	20.3
	30	40.0	21.5	10.7	10.8	19.4
	35	36.1	19.3	10.7	8.6	18.1
5 Year	15	83.6	44.8	10.7	34.1	30.7
	20	70.3	37.7	10.7	27.0	32.4
	25	**60.9**	**32.7**	**10.7**	**22.0**	**32.9**
	30	53.9	28.9	10.7	18.2	32.8
	35	48.5	26.0	10.7	15.3	32.1
	40	44.2	23.7	10.7	13.0	31.2
100 Year	40	75.1	44.8	10.7	34.1	81.8
	45	69.1	41.2	10.7	30.4	82.2
	50	**64.0**	**38.1**	**10.7**	**27.4**	**82.2**
	55	59.6	35.5	10.7	24.8	81.9
	60	55.9	33.3	10.7	22.6	81.4
	65	52.6	31.4	10.7	20.7	80.6
100 Year + 20%	45	82.9	49.4	10.7	38.7	104.4
	50	76.7	45.8	10.7	35.0	105.1
	55	**71.5**	**42.7**	**10.7**	**31.9**	**105.4**
	60	67.1	40.0	10.7	29.3	105.3
	65	63.2	37.7	10.7	26.9	105.1
	70	59.7	35.6	10.7	24.9	104.6

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA

Storage Volume Calculations - Area R3 (PHASE 3 ROOF)

Area ID =	R3	Roof Drain Release Rate (L/s/ha) =	50.0
Area (ha) =	0.12	2-Year Release Rate (L/s) =	5.9
C =	0.90	5-Year Release Rate (L/s) =	5.9
C (100 YR) =	1.00	100-Year Release Rate (L/s) =	5.9
		100-Year + 20% Release Rate (L/s) =	5.9
		Available Storage Volume (m^3) =	58.9

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	22.6	5.9	16.7	10.0
	15	61.8	18.2	5.9	12.3	11.1
	20	**52.0**	**15.3**	**5.9**	**9.4**	**11.3**
	25	45.2	13.3	5.9	7.4	11.1
	30	40.0	11.8	5.9	5.9	10.6
	35	36.1	10.6	5.9	4.7	9.9
5 Year	15	83.6	24.6	5.9	18.7	16.9
	20	70.3	20.7	5.9	14.8	17.8
	25	**60.9**	**17.9**	**5.9**	**12.1**	**18.1**
	30	53.9	15.9	5.9	10.0	18.0
	35	48.5	14.3	5.9	8.4	17.7
	40	44.2	13.0	5.9	7.1	17.1
100 Year	40	75.1	24.6	5.9	18.7	44.9
	45	69.1	22.6	5.9	16.7	45.2
	50	**64.0**	**20.9**	**5.9**	**15.1**	**45.2**
	55	59.6	19.5	5.9	13.6	45.0
	60	55.9	18.3	5.9	12.4	44.7
	65	52.6	17.2	5.9	11.4	44.3
100 Year + 20%	45	82.9	27.1	5.9	21.2	57.4
	50	76.7	25.1	5.9	19.2	57.7
	55	**71.5**	**23.4**	**5.9**	**17.5**	**57.9**
	60	67.1	22.0	5.9	16.1	57.9
	65	63.2	20.7	5.9	14.8	57.7
	70	59.7	19.6	5.9	13.7	57.4

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA

Storage Volume Calculations - Area STM1 (CB 1)

Area ID = STM1
Area (ha) = 0.12
C = 0.81
C (100 YR) = 0.90

2-Year Release Rate (L/s) = UNCONTROLLED
5-Year Release Rate (L/s) = UNCONTROLLED
100-Year Release Rate (L/s) = UNCONTROLLED
100-Year + 20% Release Rate (L/s) = UNCONTROLLED
Available Surface Storage Volume (m^3) = 3.6

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	21.2	21.2	0.0	0.0
	15	61.8	17.0	17.0	0.0	0.0
	20	52.0	14.3	14.3	0.0	0.0
	25	45.2	12.5	12.5	0.0	0.0
	30	40.0	11.0	11.0	0.0	0.0
	35	36.1	9.9	9.9	0.0	0.0
5 Year	10	104.2	28.7	28.7	0.0	0.0
	15	83.6	23.0	23.0	0.0	0.0
	20	70.3	19.4	19.4	0.0	0.0
	25	60.9	16.8	16.8	0.0	0.0
	30	53.9	14.9	14.9	0.0	0.0
	35	48.5	13.4	13.4	0.0	0.0
100 Year	10	178.6	54.9	54.9	0.0	0.0
	15	142.9	44.0	44.0	0.0	0.0
	20	120.0	36.9	36.9	0.0	0.0
	25	103.8	31.9	31.9	0.0	0.0
	30	91.9	28.3	28.3	0.0	0.0
	35	82.6	25.4	25.4	0.0	0.0
100 Year + 20%	10	214.3	65.9	65.9	0.0	0.0
	15	171.5	52.7	52.7	0.0	0.0
	20	143.9	44.3	44.3	0.0	0.0
	25	124.6	38.3	38.3	0.0	0.0
	30	110.2	33.9	33.9	0.0	0.0
	35	99.1	30.5	30.5	0.0	0.0

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA

Storage Volume Calculations - Area STM2 (CB 2)

Area ID = STM2
Area (ha) = 0.10
C = 0.72
C (100 YR) = 0.80

2-Year Release Rate (L/s) = UNCONTROLLED
5-Year Release Rate (L/s) = UNCONTROLLED
100-Year Release Rate (L/s) = UNCONTROLLED
100-Year + 20% Release Rate (L/s) = UNCONTROLLED
Available Storage Volume (m^3) = 5.1

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	15.2	15.2	0.0	0.0
	15	61.8	12.2	12.2	0.0	0.0
	20	52.0	10.3	10.3	0.0	0.0
	25	45.2	8.9	8.9	0.0	0.0
	30	40.0	7.9	7.9	0.0	0.0
	35	36.1	7.1	7.1	0.0	0.0
5 Year	10	104.2	20.6	20.6	0.0	0.0
	15	83.6	16.5	16.5	0.0	0.0
	20	70.3	13.9	13.9	0.0	0.0
	25	60.9	12.0	12.0	0.0	0.0
	30	53.9	10.7	10.7	0.0	0.0
	35	48.5	9.6	9.6	0.0	0.0
100 Year	10	178.6	39.5	39.5	0.0	0.0
	15	142.9	31.6	31.6	0.0	0.0
	20	120.0	26.6	26.6	0.0	0.0
	25	103.8	23.0	23.0	0.0	0.0
	30	91.9	20.3	20.3	0.0	0.0
	35	82.6	18.3	18.3	0.0	0.0
100 Year + 20%	10	214.3	47.5	47.5	0.0	0.0
	15	171.5	38.0	38.0	0.0	0.0
	20	143.9	31.9	31.9	0.0	0.0
	25	124.6	27.6	27.6	0.0	0.0
	30	110.2	24.4	24.4	0.0	0.0
	35	99.1	21.9	21.9	0.0	0.0

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA

Storage Volume Calculations - Area STM3 (CB 3)

Area ID = STM3
Area (ha) = 0.03
C = 0.90
C (100 YR) = 1.00

2-Year Release Rate (L/s) = UNCONTROLLED
5-Year Release Rate (L/s) = UNCONTROLLED
100-Year Release Rate (L/s) = UNCONTROLLED
100-Year + 20% Release Rate (L/s) = UNCONTROLLED
Available Storage Volume (m3) = 21.1

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m3)
2 Year	10	76.8	4.8	4.8	0.0	0.0
	15	61.8	3.9	3.9	0.0	0.0
	20	52.0	3.3	3.3	0.0	0.0
	25	45.2	2.8	2.8	0.0	0.0
	30	40.0	2.5	2.5	0.0	0.0
	35	36.1	2.3	2.3	0.0	0.0
5 Year	10	104.2	6.5	6.5	0.0	0.0
	15	83.6	5.2	5.2	0.0	0.0
	20	70.3	4.4	4.4	0.0	0.0
	25	60.9	3.8	3.8	0.0	0.0
	30	53.9	3.4	3.4	0.0	0.0
	35	48.5	3.0	3.0	0.0	0.0
100 Year	10	178.6	12.4	12.4	0.0	0.0
	15	142.9	9.9	9.9	0.0	0.0
	20	120.0	8.3	8.3	0.0	0.0
	25	103.8	7.2	7.2	0.0	0.0
	30	91.9	6.4	6.4	0.0	0.0
	35	82.6	5.7	5.7	0.0	0.0
100 Year + 20%	10	214.3	14.9	14.9	0.0	0.0
	15	171.5	11.9	11.9	0.0	0.0
	20	143.9	10.0	10.0	0.0	0.0
	25	124.6	8.7	8.7	0.0	0.0
	30	110.2	7.7	7.7	0.0	0.0
	35	99.1	6.9	6.9	0.0	0.0

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA

Storage Volume Calculations - Area STM2-1 (Temp. DICB 1)

Area ID = STM2-1
Area (ha) = 0.79
C = 0.22
C (100 YR) = 0.27

2-Year Release Rate (L/s) = 131.6
5-Year Release Rate (L/s) = 131.6
100-Year Release Rate (L/s) = 131.6
100-Year + 20% Release Rate (L/s) = 131.6
Available Storage Volume (m^3) =

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	37.0	131.6	-94.6	-56.8
	15	61.8	29.7	131.6	-101.8	-91.7
	20	52.0	25.0	131.6	-106.5	-127.8
	25	45.2	21.7	131.6	-109.8	-164.8
	30	40.0	19.3	131.6	-112.3	-202.2
	35	36.1	17.4	131.6	-114.2	-239.9
5 Year	10	104.2	50.2	131.6	-81.4	-48.9
	15	83.6	40.2	131.6	-91.4	-82.2
	20	70.3	33.8	131.6	-97.8	-117.3
	25	60.9	29.3	131.6	-102.3	-153.4
	30	53.9	26.0	131.6	-105.6	-190.1
	35	48.5	23.4	131.6	-108.2	-227.3
100 Year	10	178.6	106.1	131.6	-25.5	-15.3
	15	142.9	84.9	131.6	-46.7	-42.0
	20	120.0	71.3	131.6	-60.3	-72.4
	25	103.8	61.7	131.6	-69.9	-104.8
	30	91.9	54.6	131.6	-77.0	-138.6
	35	82.6	49.1	131.6	-82.5	-173.3
100 Year + 20%	10	214.3	127.3	131.6	-4.3	-2.6
	15	171.5	101.9	131.6	-29.7	-26.7
	20	143.9	85.5	131.6	-46.1	-55.3
	25	124.6	74.0	131.6	-57.5	-86.3
	30	110.2	65.5	131.6	-66.1	-118.9
	35	99.1	58.9	131.6	-72.7	-152.7

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA

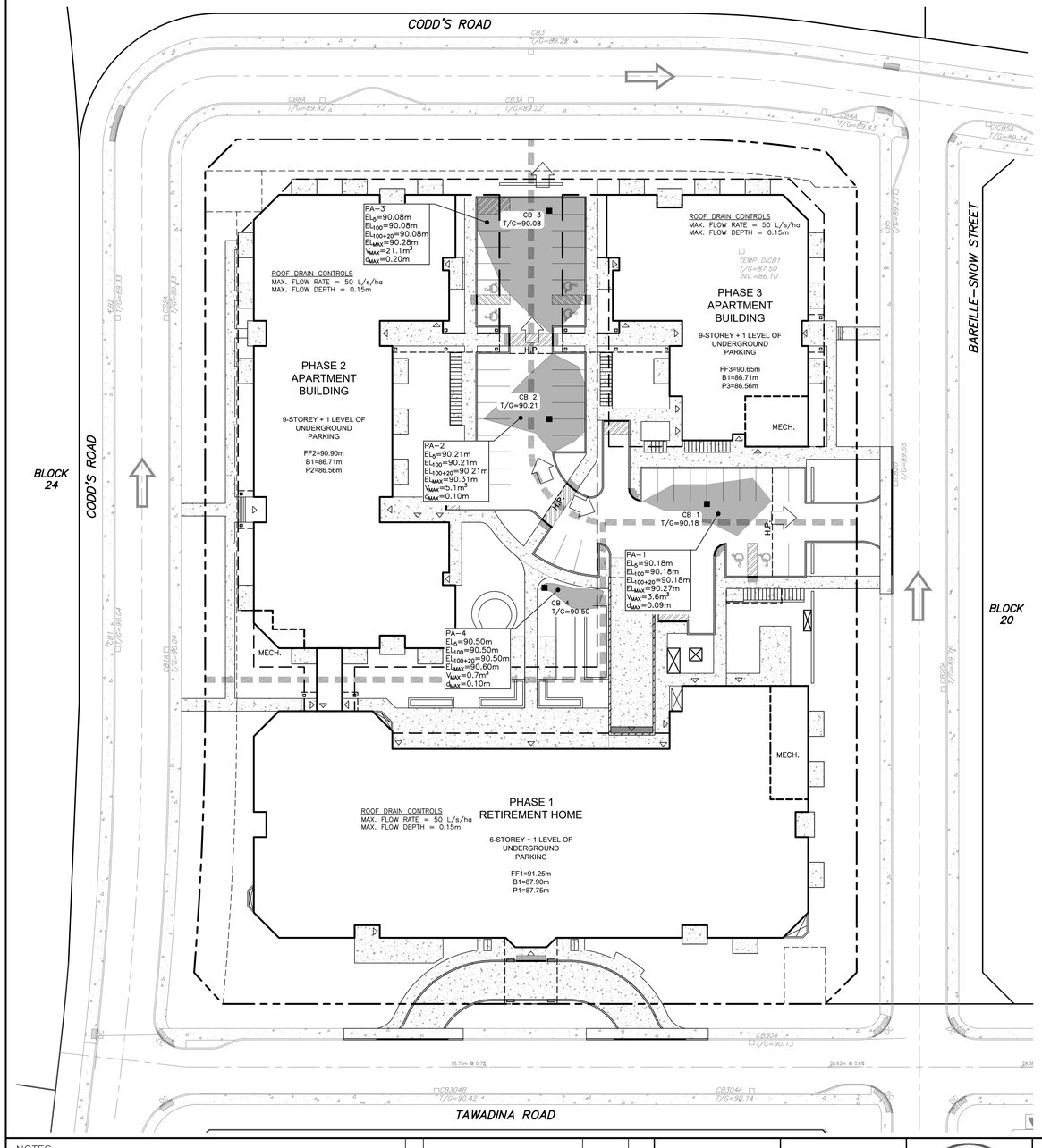
Storage Volume Calculations - Area STM4 (CB 4)

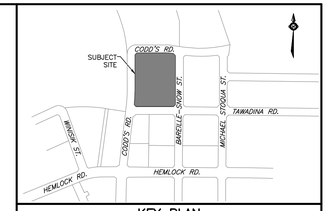
Area ID = STM4
Area (ha) = 0.10
C = 0.48
C (100 YR) = 0.55

2-Year Release Rate (L/s) = UNCONTROLLED
5-Year Release Rate (L/s) = UNCONTROLLED
100-Year Release Rate (L/s) = UNCONTROLLED
100-Year + 20% Release Rate (L/s) = UNCONTROLLED
Available Storage Volume (m3) = 0.7

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m3)
2 Year	10	76.8	10.5	10.5	0.0	0.0
	15	61.8	8.5	8.5	0.0	0.0
	20	52.0	7.1	7.1	0.0	0.0
	25	45.2	6.2	6.2	0.0	0.0
	30	40.0	5.5	5.5	0.0	0.0
	35	36.1	4.9	4.9	0.0	0.0
5 Year	10	104.2	14.3	14.3	0.0	0.0
	15	83.6	11.5	11.5	0.0	0.0
	20	70.3	9.6	9.6	0.0	0.0
	25	60.9	8.4	8.4	0.0	0.0
	30	53.9	7.4	7.4	0.0	0.0
	35	48.5	6.7	6.7	0.0	0.0
100 Year	10	178.6	28.1	28.1	0.0	0.0
	15	142.9	22.5	22.5	0.0	0.0
	20	120.0	18.9	18.9	0.0	0.0
	25	103.8	16.3	16.3	0.0	0.0
	30	91.9	14.4	14.4	0.0	0.0
	35	82.6	13.0	13.0	0.0	0.0
100 Year + 20%	10	214.3	33.7	33.7	0.0	0.0
	15	171.5	27.0	27.0	0.0	0.0
	20	143.9	22.6	22.6	0.0	0.0
	25	124.6	19.6	19.6	0.0	0.0
	30	110.2	17.3	17.3	0.0	0.0
	35	99.1	15.6	15.6	0.0	0.0

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- EXISTING CATCH BASIN
- CATCH BASIN
- BUILDING ENTRANCE
- 100-YR PONDING LIMIT
- H.P. HIGH POINT
- MAJOR OVERLAND FLOW ROUTE
- EXTERNAL MAJOR OVERLAND FLOW ROUTE
- MAX. STATIC PONDING LIMIT

PA-1 PONDING AREA ID
EL_5 5-YEAR PONDING ELEVATION
EL_{100} 100-YEAR PONDING ELEVATION
EL_{100+20} 100-YEAR + 20% PONDING ELEVATION
EL_{MAX} MAXIMUM STATIC PONDING ELEVATION
V_{MAX} MAXIMUM AVAILABLE SURFACE STORAGE
q_{MAX} MAXIMUM STATIC PONDING DEPTH

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHIC PLAN OF PART OF WATER RIDGE DEVELOPMENT BEING SHOWN AS BLOCK 21 ON DRAFT M-PLAN LOCATED NORTH OF TAWADINA ROAD AND EAST OF CODD'S ROAD, GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA, MONUMENT-URSO SURVEYING LTD. ELEVATIONS ARE GEODETIC AND REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD28:78).

NO.	REVISION DESCRIPTION	DATE	BY
6	REVISED PER COMMENTS	21/07/26	BLM
5	REVISED PER COMMENTS	10/06/26	BLM
4	ISSUED FOR BUILDING PERMIT	05/05/26	BLM
3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B. L. MACKECHNIE
100199554
21 July '26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

WATERIDGE LIFESTYLES LTD.

WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

PONDING AREA PLAN

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-PA1

FILE No. D07-12-26-0020

Appendix G

Cambium Reports
- Bedrock Excerpts
- Groundwater Excerpts
- Test Hole Location Plan
- Borehole Logs
- Infiltration Rates

PurePave Brochure
PurePave Specifications

Table 3.4.1

Soil Amendment Options

LID Drainage Area Plan & Details
(DWG. 25117-LID1)

Tempest ICD Correspondence

OGS Correspondence

Docusign Envelope ID: B8A6D17B-22A4-41A6-B2DB-C731D3A830EA

Table 5 presents the depths and elevations of (presumed) bedrock in all boreholes. The relevant boreholes completed by Others are also summarized in the table.

Table 5 Depths and Elevations of the Bedrock

Borehole	Surface Elevation (mASL)	Bedrock or Refusal Depth/Elevation (mbgs / mASL)
BH101-25	88.8	2.0 / 86.8
BH102-25	88.7	2.6 / 86.1
BH103-25	88.6	2.8 / 85.8
BH104-25	89.9	1.3 / 88.6
MW101-26	91.9	2.5 / 89.4
MW102-26	91.3	2.5 / 88.8
MW103-26	89.8	3.2 / 86.6
Boreholes Advanced by Others		
BH1-22	87.9	1.8 / 86.1
BH2-22	89.2	1.3 / 87.9
BH3-22	88.4	1.1 / 87.3
BH4-22	89.2	2.1 / 87.1
BH8-22	88.8	2.3 / 86.6
BH27-22	89.7	0.4 / 89.3
BH59-22	88.0	2.0 / 86.0
BH61-22	89.8	2.5 / 87.2
BH1-23	89.0	2.2 / 86.8
BH2-23	89.2	3.1 / 86.2
BH14-27	90.5	1.8 / 88.7

It should be noted that site grades have changed since the time of completion of the geotechnical investigation report by Others. Surface elevations and depth to refusal noted will likely differ, however refusal elevations encountered at each location should be the similar. As previously discussed, refusal may have also occurred on boulders within the overburden and do not necessarily indicate bedrock. This is likely the case for BH27-22.

Docusign Envelope ID: B8A6D17B-22A4-41A6-B2DB-C731D3A830EA

4.4 Groundwater

4.4.1 Bedrock Wells

No groundwater was encountered in the boreholes immediately following drilling. Stabilized groundwater readings were measured in following drilling. The following table provides a summary of the groundwater readings within the wells installed in boreholes BH101-25 through BH104-25 and MW101-26 through MW103-26.

Table 6 Depths and Elevations of Groundwater – Bedrock Wells

Borehole	Surface Elevation (mASL)	Depth/Elevation of Groundwater (mbgs/mASL)
		December 16, 2025
BH101-25	88.8	4.3 / 84.5
BH102-25	88.7	2.2 / 86.5
BH103-25	88.6	3.2 / 85.4
BH104-25	89.9	4.6 / 85.3

Groundwater levels at the Site appear to vary between the borehole locations and will fluctuate on a seasonal basis and in response to significant precipitation or snowmelt events.

4.4.2 Overburden Wells

No groundwater was encountered in the boreholes immediately following drilling. Stabilized groundwater readings were measured in following drilling, on multiple events, as displayed in

Table 7 Depths and Elevations of Groundwater – Overburden Wells

Borehole	Surface Elevation (mASL)	Depth/Elevation of Groundwater (mbgs/mASL)	
		April 2, 2026	May 14, 2026
MW101-26	91.9	Dry at 2.5 / 89.4	Dry at 2.5 / 89.4
MW102-26	91.3	Dry at 2.5 / 88.8	Dry at 2.5 / 88.8
MW103-26	89.8	0.97 / 88.83	0.87 / 88.93



GEOTECHNICAL INVESTIGATION

WATERIDGE LIFESTYLES LTD.
Block 21 - Wateridge Village
Ottawa, Ontario

LEGEND

- Benchmark
- Borehole
- Paterson Borehole
- Monitoring Well
- Rock Point
- Guelph Permeameter Testing Location
- Proposed Road
- Site (approximate)
- Subject Property (approximate)

Notes:
- BM1 and BM2 are top nut of fire hydrant.
- Aerial imagery from the Digital Raster Acquisition Project Eastern Ontario (DRAPE) 2024. Source: Ontario Ministry of Natural Resources and Forestry © Copyright 2024 King's Printer of Ontario. All Rights Reserved.
- This document contains information licensed under the Open Government License - Ontario.
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
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CAMBIUM
194 Sophia Street
Peterborough, Ontario, K9H 1E5
Tel. (705) 742-7900 Fax. (705) 742-7907
www.cambium-inc.com

TEST HOLE LOCATION PLAN

Project No:	24896.001	Date:	May 2026
Scale:	1:1,000	Projection:	NAD 1983 UTM Zone 18N
Created by:	NLB	Checked by:	BV
Figure:	2		

CAMBIUM

Client:	Wateridge Lifestyles Ltd. and Canada Lands Corporation	**Project Name:**	Wateridge Lifestyles Block 21	**Log of Borehole:**	BH101-25
Contractor:	Marathon Underground	**Method:**	Track Mounted Hollow Stem Auger	Page:	1 of 1
Project No.:	24896-001	**Elevation:**	88.80 mASL	**Date Completed:**	Dec. 8, 2025
Location:	Block 21, 200 Codd's Road, Ottawa ON	**UTM:**	18T **N:** 5033762.49 **E:** 450486.51		

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI (25 50 75) / % Moisture (25 50 75)	Shear Strength Cu, kPa nat V. rem V. (20 40 60 80) / SPT (N) (20 40 60 80)	Well Installation	Log Notes
88.8	0	**(SW) SAND and SILT:** trace gravel; dark brown, with rootlets and plastic debris; non-cohesive, moist, loose [FILL]		1	SS	46	5	30.1%	5	Cap	Borehole caving not observed. Groundwater not encountered. Standing water not observed.
88.3	0.5										
87.8	1	brown, very dense, with cobbles and boulders		2A	SS	100	54	15.5%	54		
				2B	SS			9.8%			
87.3	1.5										
		dark brown	86.84	3	SS	100	50 / 100 mm	38.9%	50	Bentonite Plug	
86.8	2	**Limestone:** See rock core logs for details.	1.96							Riser	
86.3	2.5										
85.8	3										
85.3	3.5										
84.8	4										
84.3	4.5										Groundwater measured on Dec. 16, 2025.
83.8	5									Sand Pack	
83.3	5.5									PVC Screen	
82.8	6		82.65							Cap	
		Borehole terminated @ 6.1 mbgs due to target depth achieved.	6.15								
82.3	6.5										
81.8	7										
81.3											

GRAINSIZE DISTRIBUTION	SAMPLE	GRAVEL	SAND	SILT	CLAY
	SS 2B	5	60	35	

Logged By: RR **Input By:** RR

CAMBIUM

Client:	Wateridge Lifestyles Ltd. and Canada Lands Corporation	**Project Name:**	Wateridge Lifestyles Block 21	**Log of Borehole:**	BH102-25
Contractor:	Marathon Underground	**Method:**	Track Mounted Hollow Stem Auger	Page:	1 of 1
Project No.:	24896-001	**Elevation:**	88.71 mASL	**Date Completed:**	Dec. 8, 2025
Location:	Block 21, 200 Codd's Road, Ottawa ON	**UTM:**	18T **N:** 5033746.77 **E:** 450542.86		

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V., rem V.) 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
88.7	0	**(SW) SAND and SILT:** trace gravel; dark brown, with rootlets; non-cohesive, moist, compact [FILL]	87.95	1	SS	40	16	21.8%	16	Cap	ENV: BH102-25_1.5-2.3: Corrosivity, Sulfides, Redox Potential
88.2	0.5		0.76								
87.7	1	**(SM) SILTY SAND:** some gravel, trace clay, contains cobbles and boulders; brown; non-cohesive, moist, compact		2	SS	50	19	14.3%	19		
87.2	1.5										
		increase in silt content		3	SS	83	23	10.3%	23	Bentonite Plug	
86.7	2										
		light brown, SAND and SILT	86.09	4	SS	92	50 / 25 mm	10.3%	50	Riser	Groundwater measured on Dec. 16, 2025.
86.2	2.5		2.62								
85.7	3	**Limestone:** See bedrock core logs for details.									Borehole caving not observed. Groundwater not encountered. Standing water not observed.
85.2	3.5										
84.7	4										
84.2	4.5										
83.7	5									Sand Pack	
83.2	5.5									PVC Screen	
82.7	6		82.56							Cap	
		Borehole terminated @ 6.1 mbgs due to target depth achieved.	6.15								
82.2	6.5										
81.7	7										
81.2											

GRAINSIZE DISTRIBUTION	SAMPLE	GRAVEL	SAND	SILT	CLAY
	SS 4	7	54	35	4

Logged By: RR **Input By:** RR

CAMBIUM

Client:	Wateridge Lifestyles Ltd. and Canada Lands Corporation	**Project Name:**	Wateridge Lifestyles Block 21	**Log of Borehole:**	BH103-25
Contractor:	Marathon Underground	**Method:**	Track Mounted Hollow Stem Auger	Page:	1 of 1
Project No.:	24896-001	**Elevation:**	88.64 mASL	**Date Completed:**	Dec. 8, 2025
Location:	Block 21, 200 Codd's Road, Ottawa ON	**UTM:**	18T **N:** 5033718.24 **E:** 450472.47		

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V., rem V.) 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
88.6	0	**(SW) SAND and SILT:** some gravel; dark brown with cobbles and boulders; non-cohesive; moist, compact [FILL]		1	SS	46	16	14%	16	Cap	
88.1	0.5										
87.6	1			2	SS	75	32	10.4%	32		
87.1	1.5										
86.6	2			3	SS	29	75	11.2%	75	Bentonite Plug	
			86.35								
86.1	2.5	**(SM) SILTY SAND:** some gravel, trace clay; grey-brown; non-cohesive, moist, compact	2.29 / 85.82	4	SS	71	10	11.1%	10	Riser	
85.6	3	**Limestone:** See bedrock core logs for details.	2.82								Borehole caving not observed. Groundwater not encountered. Standing water not observed. 3.2m: Groundwater measured on Dec. 16, 2025.
85.1	3.5										
84.6	4										
84.1	4.5										
83.6	5									Sand Pack	
83.1	5.5									PVC Screen	
82.6	6		82.52							Cap	
		Borehole terminated @ 6.1 mbgs due to target depth achieved.	6.12								
82.1	6.5										
81.6	7										
81.1											

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

Logged By: RR **Input By:** RR

CAMBIUM

Client:	Wateridge Lifestyles Ltd. and Canada Lands Corporation	**Project Name:**	Wateridge Lifestyles Block 21	**Log of Borehole:**	BH104-25
Contractor:	Marathon Underground	**Method:**	Track Mounted Hollow Stem Auger	Page:	1 of 1
Project No.:	24896-001	**Elevation:**	89.91 mASL	**Date Completed:**	Dec. 8, 2025
Location:	Block 21, 200 Codd's Road, Ottawa ON	**UTM:**	18T **N:** 5033670.21 **E:** 450542.03		

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa (nat V, rem V) 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
89.9	0	**(SM) SILTY SAND:** trace clay; dark brown with brick and asphalt debris; non-cohesive, moist, dense [FILL]	89.15	1	SS	83	34	7.9%	34	Cap	Borehole caving not observed. Groundwater not encountered. Standing water not observed.
89.4	0.5										
88.9	1	**(SW) SAND and SILT:** trace clay, trace gravel, contains cobbles and boulders; light brown; non-cohesive, moist, very dense	0.76 / 88.59	2	SS		50 / 25 mm	10.5%	50		
88.4	1.5	**Limestone:** See bedrock core logs for details.	1.32							Bentonite Plug	
87.9	2										
87.4	2.5									Riser	
86.9	3										
86.4	3.5										
85.9	4										
85.4	4.5										Groundwater measured on Dec. 16, 2025.
84.9	5									Sand Pack	
84.4	5.5									PVC Screen	
83.9	6		83.76							Cap	
83.4	6.5	Borehole terminated @ 6.1 mbgs due to target depth achieved.	6.15								
82.9	7										
82.4											

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

Logged By: RR **Input By:** RR

CAMBIUM

Client:	Wateridge Lifestyles Ltd. and Canada Lands Corporation	**Project Name:**	Wateridge Lifestyles Block 21	**Log of Borehole:**	BH101-25
Contractor:	Marathon Underground	**Method:**	Track Mounted Hollow Stem Auger	Page:	1 of 1
Project No.:	24896-001	**Ground Elevation:**	88.80 mASL	**Date Completed:**	Dec. 9, 2025
Location:	Block 21, 200 Codd's Road, Ottawa ON	**UTM:**	18 T **N:** 5033762.49 **E:** 450486.51		

SUBSURFACE PROFILE

Elevation (m)	Depth	Lithology	Description	Elevation / Depth	Core Run	UCS (MPa) 10 50 100 250	Natural Fractures	Lab Notes	Log Notes
87	1.8		**Limestone:** grey, moderate to strong, thinly to medium bedded slightly decomposed, moderately fractured [Gull River Formation]		Run 1 TCR = 96% SCR = 83% RQD = 88%		3 5 2 1		
86.5	2.3								
86	2.8								
85.5	3.3				Run 2 TCR = 98% SCR = 59% RQD = 60%		3 5 3 30		
85	3.8								
84.5	4.3								
84	4.8				Run 3 TCR = 98% SCR = 87% RQD = 77%		3 17 3 0 0 1		
83.5	5.3								
83	5.8			82.65					
82.5	6.3		Rock core terminated @ 6.1m due to due to target depth achieved.	6.15					
82	6.8								
81.5	7.3								
81	7.8								
80.5	8.3								
80									

Logged By: RR **Input By:** RR

CAMBIUM

Client:	Wateridge Lifestyles Ltd. and Canada Lands Corporation	**Project Name:**	Wateridge Lifestyles Block 21	**Log of Borehole:**	BH102-25
Contractor:	Marathon Underground	**Method:**	Track Mounted Hollow Stem Auger	Page:	1 of 1
Project No.:	24896-001	**Ground Elevation:**	88.71 mASL	**Date Completed:**	Dec. 9, 2025
Location:	Block 21, 200 Codd's Road, Ottawa ON	**UTM:**	18 T **N:** 5033746.77 **E:** 450542.85		

SUBSURFACE PROFILE

Elevation (m)	Depth	Lithology	Description	Elevation / Depth	Core Run	UCS (MPa) 10 50 100 250	Natural Fractures	Lab Notes	Log Notes
86.3	2.4		**Limestone:** grey, moderate to strong, thinly to medium bedded, slightly decomposed, moderately fractured [Gull River Formation]		Run 1 TCR = **100%** SCR = **32%** RQD = **63%**		2		
85.8	2.9						3		
							4		
85.3	3.4				Run 2 TCR = **100%** SCR = **88%** RQD = **80%**		0		
84.8	3.9						1		
							1		
84.3	4.4						3		
83.8	4.9				Run 3 TCR = **96%** SCR = **75%** RQD = **70%**		2		
							3		
83.3	5.4						4		
							4		
82.8	5.9			82.56			4		
			Rock core terminated @ 6.1m due to due to target depth achieved.	6.15			0		
82.3	6.4								
81.8	6.9								
81.3	7.4								
80.8	7.9								
80.3	8.4								
79.8	8.9								
79.3									

Logged By: RR **Input By:** RR

CAMBIUM

Client:	Wateridge Lifestyles Ltd. and Canada Lands Corporation	**Project Name:**	Wateridge Lifestyles Block 21	**Log of Borehole:**	BH103-25
Contractor:	Marathon Underground	**Method:**	Track Mounted Hollow Stem Auger	Page:	1 of 1
Project No.:	24896-001	**Ground Elevation:**	88.64 mASL	**Date Completed:**	Dec. 9, 2025
Location:	Block 21, 200 Codd's Road, Ottawa ON	**UTM:**	18 T **N:** 5033718.24 **E:** 450472.47		

SUBSURFACE PROFILE

Elevation (m)	Depth	Lithology	Description	Elevation / Depth	Core Run	UCS (MPa) 10 50 100 250	Natural Fractures	Lab Notes	Log Notes
85.9	2.7		**Limestone:** grey, moderate to strong, thinly to medium bedded, slightly decomposed, moderately fractured [Gull River Formation]		Run 1 TCR = **100%** SCR = **75%** RQD = **67%**		2 3 6		
85.4	3.2								
84.9	3.7				Run 2 TCR = **96%** SCR = **75%** RQD = **72%**		2 1 2		
84.4	4.2								
83.9	4.7				Run 3 TCR = **98%** SCR = **83%** RQD = **76%**		4 1 1 1 1		
83.4	5.2								
82.9	5.7			82.49					
82.4	6.2		Rock core terminated @ 6.1m due to due to target depth achieved.	6.15					
81.9	6.7								
81.4	7.2								
80.9	7.7								
80.4	8.2								
79.9	8.7								
79.4	9.2								
78.9									

Logged By: RR **Input By:** RR

CAMBIUM

Client:	Wateridge Lifestyles Ltd. and Canada Lands Corporation	**Project Name:**	Wateridge Lifestyles Block 21	**Log of Borehole:**	BH104-25
Contractor:	Marathon Underground	**Method:**	Track Mounted Hollow Stem Auger	Page:	1 of 1
Project No.:	24896-001	**Ground Elevation:**	89.91 mASL	**Date Completed:**	Dec. 9, 2025
Location:	Block 21, 200 Codd's Road, Ottawa ON	**UTM:**	18 T **N:** 5033670.21 **E:** 450542.03		

SUBSURFACE PROFILE

Elevation (m) / Depth	Lithology	Description	Core Run	UCS (MPa) 10 50 100 250	Natural Fractures	Lab Notes	Log Notes
88.7 / 1.2		**Limestone:** grey, moderate to strong, thinly to medium bedded, slightly decomposed, moderately fractured [Gull River Formation]	Run 1 TCR = **100%** SCR = **58%** RQD = **58%**		10		
88.2 / 1.7					1		
					4		
87.7 / 2.2			Run 2 TCR = **92%** SCR = **59%** RQD = **30%**		5		
					12		
87.2 / 2.7					23		
86.7 / 3.2					5		
					16		
86.2 / 3.7		no water return, brown staining on fractures and joints	Run 3 TCR = **78%** SCR = **29%** RQD = **17%**		6		
					22		
85.7 / 4.2					30		
85.2 / 4.7		125 mm clay seem at 4.8 mbgs			10		
					7		
84.7 / 5.2			Run 4 TCR = **98%** SCR = **64%** RQD = **59%**		3		
					3		
84.2 / 5.7					2		
		83.76					
83.7 / 6.2		Rock core terminated @ 6.1m[6.15] due to due to target depth achieved.			0		
83.2 / 6.7							
82.7 / 7.2							
82.2 / 7.7							
81.7							

Logged By: RR **Input By:** RR

Docusign Envelope ID: B8A6D17B-22A4-41A6-B2DB-C731D3A830EA

Table 8 Infiltration Testing Summary

Test ID	Ground Surface Elevation (m)	Testing Interval Depth (m bgs)	Testing Interval Elevation (m)	Average K_{fs} (m/s)	Average Infiltration Rate (mm/hr)	Average Percolation Time (min/cm)
GP101-26	91.94	0.80 (Sand & Silt)	91.14	1.81×10^{-6}	54	11
		1.2 (Silty Sand)	90.74	8.12×10^{-8}	24	25
GP102-26	91.30	0.85 (Sand and Silt)	90.45	1.07×10^{-5}	87	7
		1.05 (Silty Sand)	90.25	4.40×10^{-6}	68	9
GP103-26	89.83	0.74 (Sand and Silt)	89.09	3.94×10^{-6}	66	9
GP104-26	89.72	0.90 (Sand and Silt)	88.82	6.15×10^{-6}	75	8

5.1 Design Infiltration Rates

A safety factor should be applied to the infiltration rate used for design, as recommended in the TRCA LID manual soil testing protocol (Toronto Region Conservation Authority, 2012). The safety factor compensates for the potential reductions in soil permeability due to compaction or smearing during construction, and the gradual accumulation of fine sediments over the lifespan of the designed feature.

To apply the safety factor, the infiltration rate of the proposed bottom elevation of the feature must be divided by a safety correction factor from Table C2 of the TRAC LID manual (Toronto Region Conservation Authority, 2012). To select a safety factor, the ratio of the geometric mean measured infiltration rate of the proposed bottom elevation of the feature to the rate in the least permeable soil horizon within 1.5 meters below the bottom of the design feature must be calculated.

Docusign Envelope ID: B8A6D17B-22A4-41A6-B2DB-C731D3A830EA

Based on the testing completed, it is assumed that the bottom of the infiltration features on the Site will be completed approximately 1 meter above the bedrock or static groundwater level. Table 9 below the estimated design infiltration rate for each testing location, and associated LID feature displayed on the Site Plan in .

At each testing location, the least permeable soil horizon was identified within 1.5 m of the proposed bottom elevation of the LID feature. As a result, the geometric mean infiltration rate at the bottom elevation is equal to that of the least permeable underlying horizon, and an infiltration ratio of 1.0, and corresponding safety factor of 2.5 was applied at each test location.

Table 9 Design Infiltration Rates

Test ID	Infiltration Ratio[1]	Safety Factor	Design Infiltration Rates (mm/hr)[2]
GP101-26	1 (8.12×10^{-8} / 8.12×10^{-8})	2.5	9.6
GP102-26	1 (4.40×10^{-6} / 4.40×10^{-6})	2.5	27.2
GP103-26	1 (3.94×10^{-6} / 3.94×10^{-6})	2.5	26.4
GP104-26	1 (6.15×10^{-6} / 6.15×10^{-6})	2.5	30.0

1. *Ratio is determined by dividing the geometric mean measured infiltration rate at the proposed bottom elevation of the BMP by the geometric mean measured infiltration rate of the least permeable soil horizon within 1.5 metres below the proposed bottom elevation of the feature.*
2. *The design infiltration rate is calculated by dividing the geometric mean measured infiltration rate at the proposed bottom elevation of the feature by the safety correction factor.*


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PERMEABLE MANUFACTURING AND SUPPLY



Why PurePave?

PurePave technology was developed with funding from the National Research Council of Canada**.** They needed a way to produce permeable surfaces for **winter climates, erosion control, flood mitigation and hot climates alike.** A system that could resist freeze-thaw, support snow plows, immune to salt and **filter an enormous amount of water.**

Chemists joined forces with our engineers. After years of testing at the University of Ottawa, we developed the first completely freeze-thaw resistant material composite, 35-70x more infiltration than permeable pavers and 6x stronger than asphalt!

OUR VISION: MANAGE STORMWATER IN EVERY CITY



PERFORMANCE MEETS VALUE

Porous Driveways

PurePave driveways blend upscale beauty with strength and practicality. Our resin-bound surfacing offers endless design possibilities, from interlock borders to glow stones, creating a custom look you'll love.

Crushed granite and quartz are bound by our proprietary dual-resin system, topped with PurePave Spray-Tech for durability. With a 10+ year warranty, PurePave driveways are as stunning as they are long-lasting.

Superior Strength and Durability

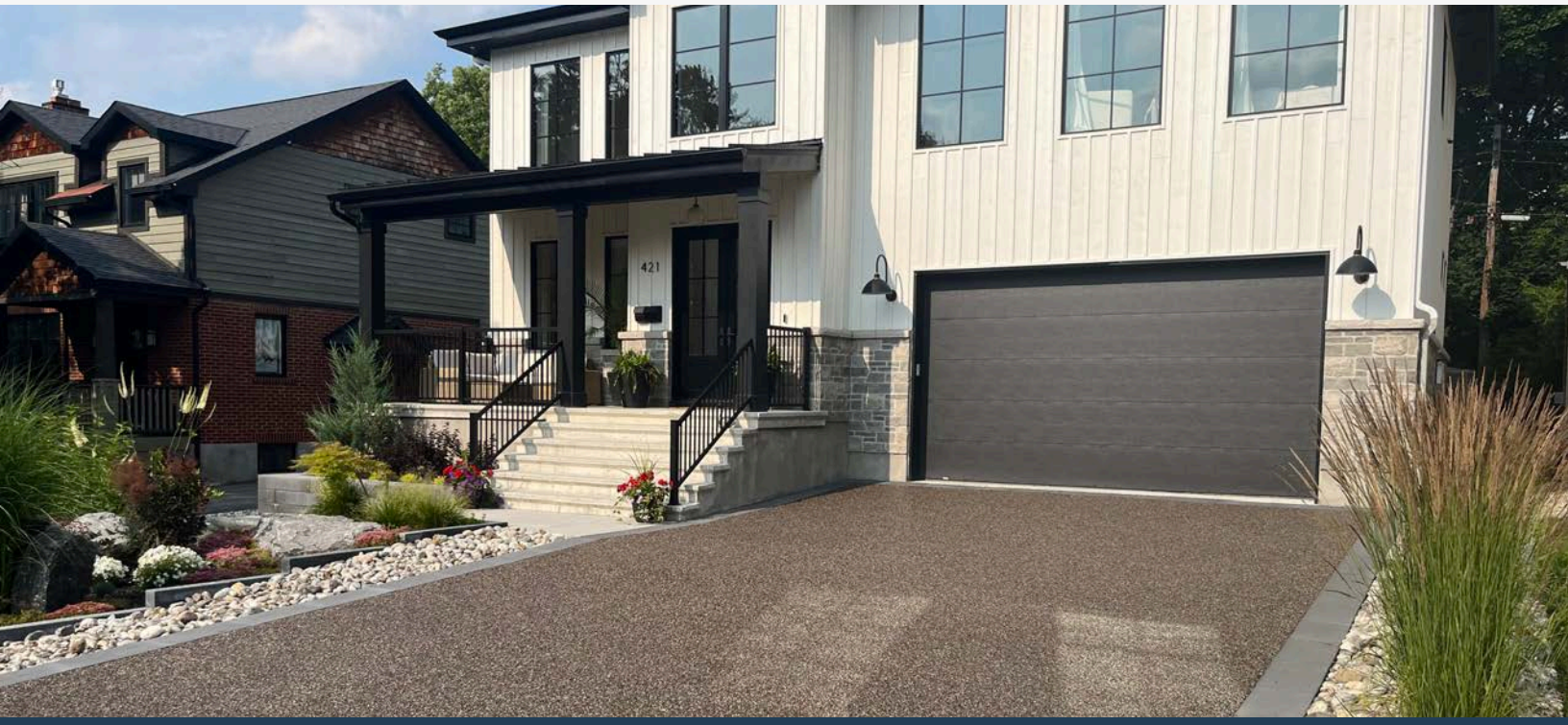
PurePave's dual-resin system is 6 times stronger than regular asphalt and is resistant to freeze-thaw cycles, ensuring that your driveway withstands the harshest conditions for decades.

Impressive Warranty

We stand behind the quality of our work. Our driveways come with a 10-year warranty, so you can rest assured that your investment is protected.

Aesthetic Appeal

The upscale beauty of resin-bound surfacing combined with the practicality of permeable paving makes PurePave driveways a designer's dream. We offer over 10 granite, quartz, and marble color options, along with additional design elements like interlock borders and glow stones.



Intro to PurePave Design

PurePave flood proofs your property, and controls stormwater for entire parking lots or neighbourhoods.

Home Builders can install PurePave systems for less and get a product that actually works long-term in any climate.

Cities can install bike paths, road shoulders, boulevards for the price of concrete.

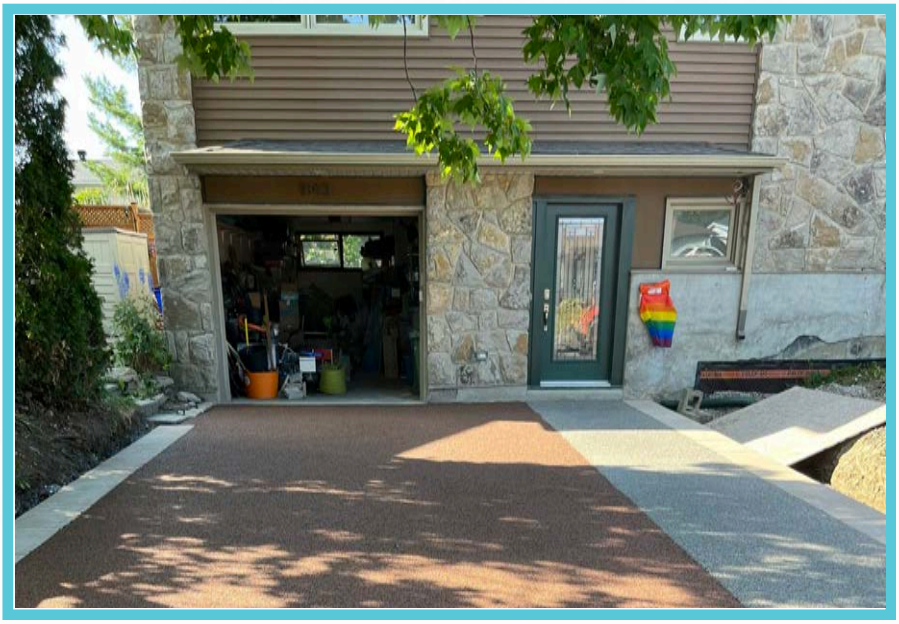
And they get to meet their sustainability goals, flood-proof their city and provide a stunning and functional surface.

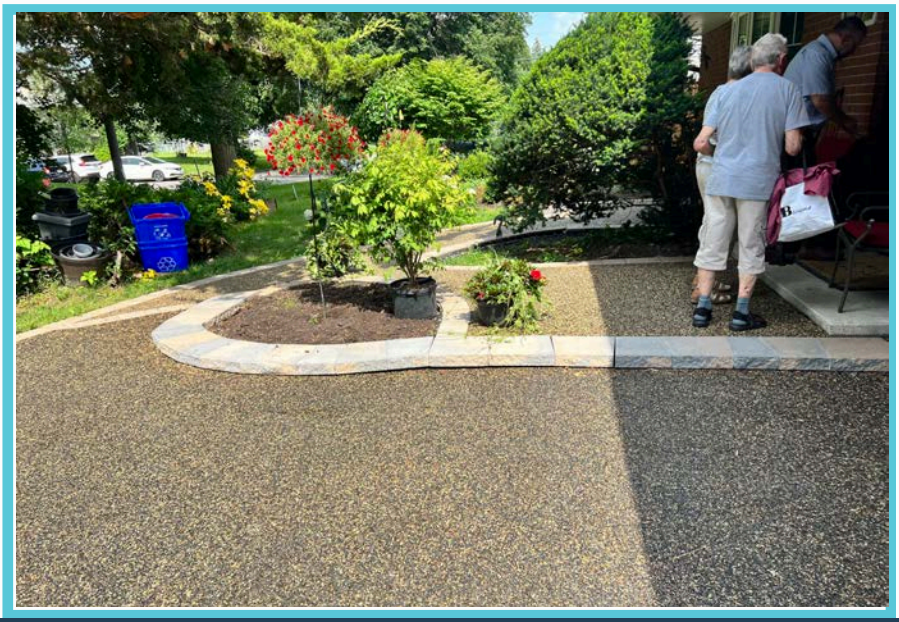
Reduce the Heat-Island Effect in hot climates, melt snow and ice in cold climates.

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- **Neighbourhood Pond Reduction**
- **Safety Surfacing in public space**
- **Increased Climate Resilliance**
- **Flood mitigation strategies**
- **Snow plow, fire truck friendly**
- **Save Land, Build Bigger.**







Designer Driveways - Stormwater Management

Design / Advantages / Warranty

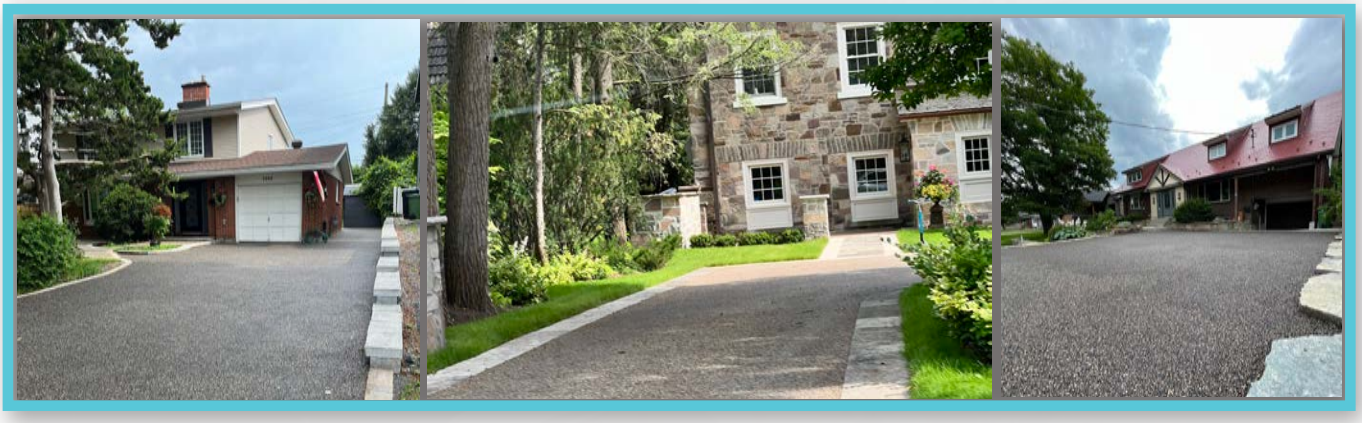
Our most famous innovation has been supplied and installed everywhere from the city of Toronto's Boulevards to the most exclusive golf courses in New York City to developer's full-scale parking lots.

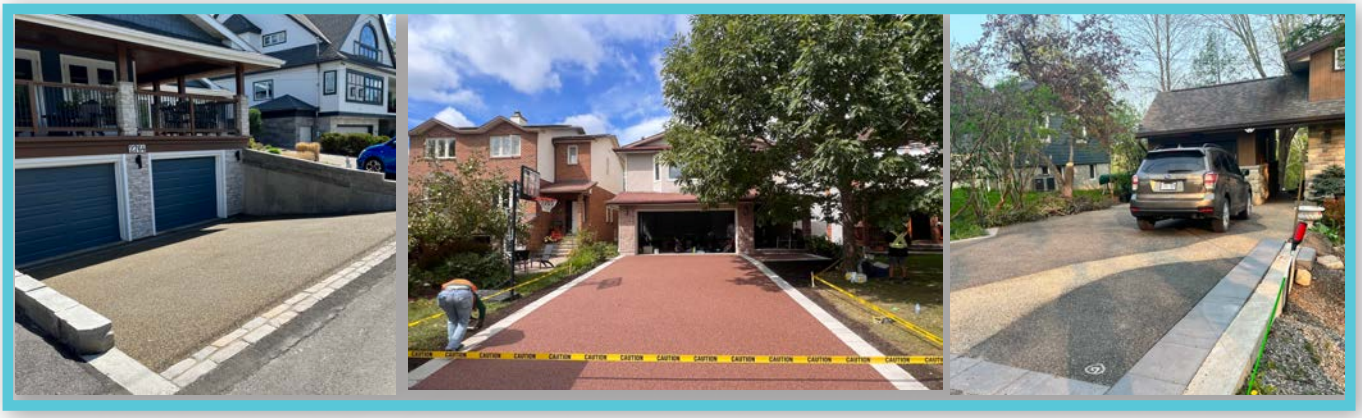
The upscale beauty of Resin-Bound Surfacing meets the practicality and strength of Permeable Paving. This uniquely beautiful pavement is a designers dream. Interlock borders, glow stones and landscape design elements enable us to create a completely custom driveway you will love and be proud of.

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With Journal Publications, Federal Specification, Airports and Cities Standardizing it's use in Green Infrastructure, PurePave ensures the highest quality in permeable systems North-America Wide.

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Premium Materials and Patents
High-quality granite, quartz, and marble, rigorously inspected for strength and consistency.

Advanced Bonding
Our proprietary resin system delivers superior durability and weather resistance in any climate.

Proven Performance
Over three decades of lab testing ensure exceptional infiltration, strength, and freeze-thaw resilience.



Over 2400 permeable formulations tested by our PhD Civil Eng and Science Team.



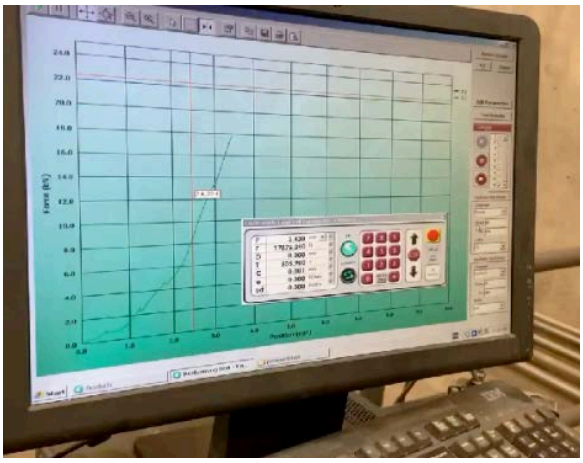
PurePave's material composite Patent contains recycled materials, is the most affordable system with highest strength, permeability, and Freeze-thaw to heat resistance.

In The Lab With PurePave

PurePave is the result of years of scientific research and material engineering, designed to revolutionize permeable systems technology. Developed with funding from the National Research Council of Canada, **our proprietary system has been published in scientific and engineering journals as a material composite breakthrough**. With superior infiltration, unmatched durability, and low maintenance, PurePave surpasses traditional permeable materials in every aspect.



Ottawa University Testing with Professor Majeed - Civil Engineer



Ottawa University Flexural Strength and Freeze Thaw Testing

THE KEY BENEFITS OF PUREPAVE PERMEABLE SYSTEMS

Superior Infiltration

35-70x more permeable than traditional brick pavers, allowing water to drain quickly and efficiently.

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No Freeze-Thaw Loss

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Canadian Science Publishing

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Sustainable Civil Engineering

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PUREPAVE
Earth Conscious Surfacing

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  Ideal for road shoulders, driveways, walkways, and parking lots, bike paths and sidewalks. Helping cities achieve long-term environmental resilience.



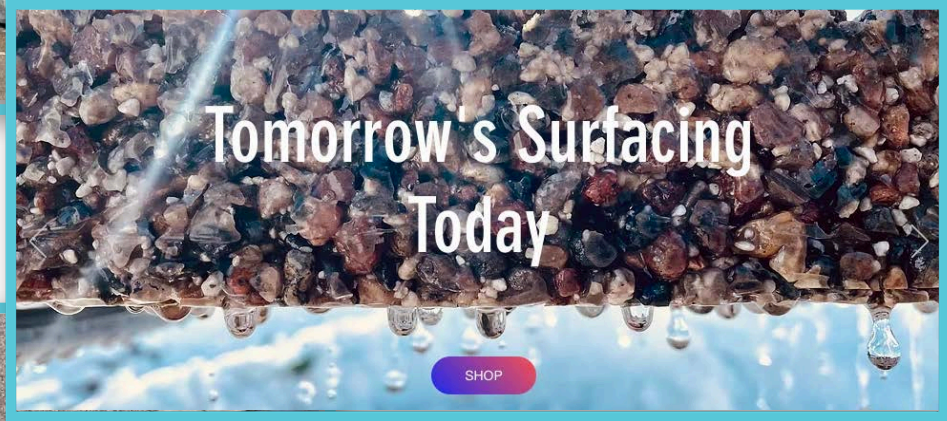
SUSTAINABLE DESIGN

Landscaping Features

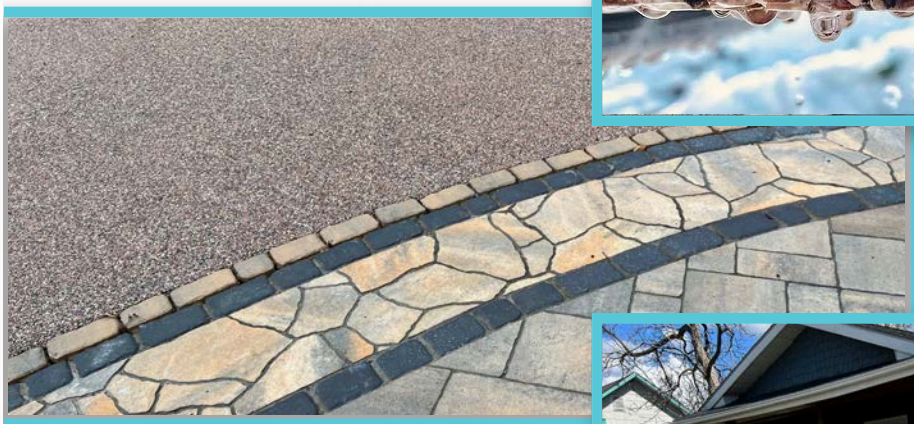
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Earth Conscious Surfacing



Sponge Cities, one driveway at a time.



LOVE Your Front Yard.



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Imagine a neighborhood where every surface prevents stormwater runoff and reduces flood risks. That's the future of urban design with PurePave.

Developers can save space by eliminating stormwater ponds, cutting infrastructure costs, and securing faster permit approvals. Our permeable systems eliminate runoff where applied, maximize land use, and integrate sponge city principles for sustainable drainage.

Choose PurePave Technology and build a flood-resilient future.



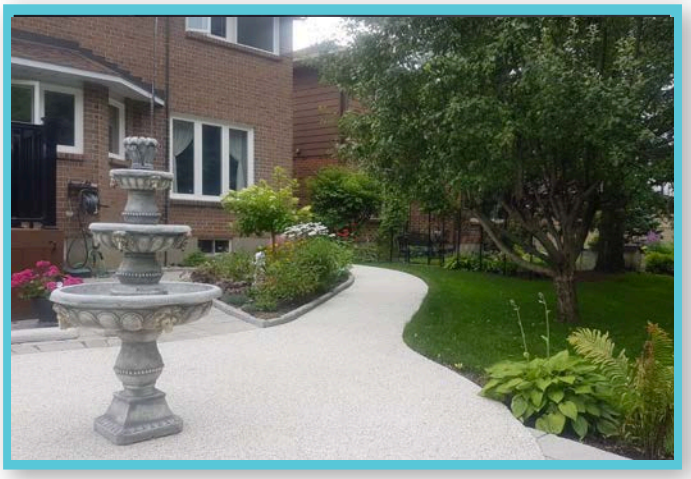
Sustainable Landscape Design

PERMEABLE PAVERS, FILTER STONE AND PUREPAVE

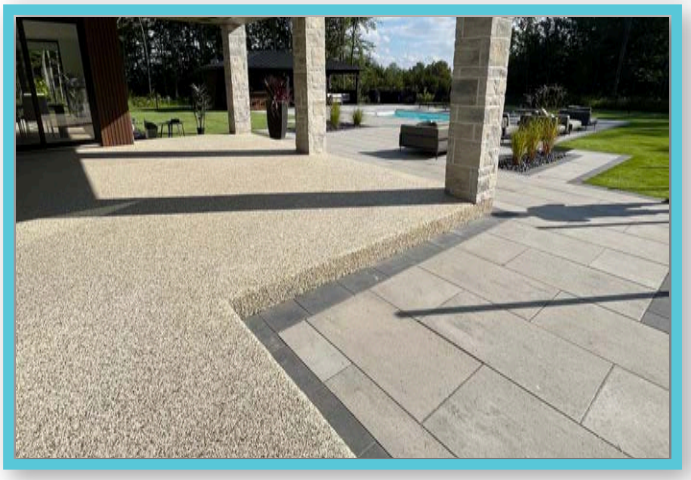
Landscape features can now significantly reduce your stormwater requirements. Unique design meets functional surfacing for your clients and sustainable development leading to savings for builders.











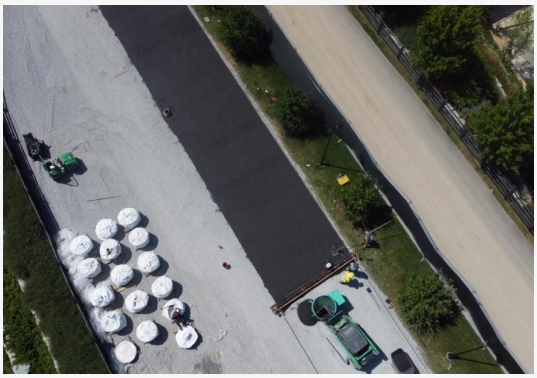


Developers: Save on Stormwater

PurePave is selected for large-scale parking lot projects, delivering premium infiltration at the best rate possible. Developers secure faster city approvals and significantly reduced infrastructure expenses.

The **projects** to date have **saved between 28-47% overall** by eliminating the need for traditional drainage systems, showcasing PurePave as a smart, sustainable solution for large commercial developments.

With market forces like these, we are making sponge cities a reality in NA.











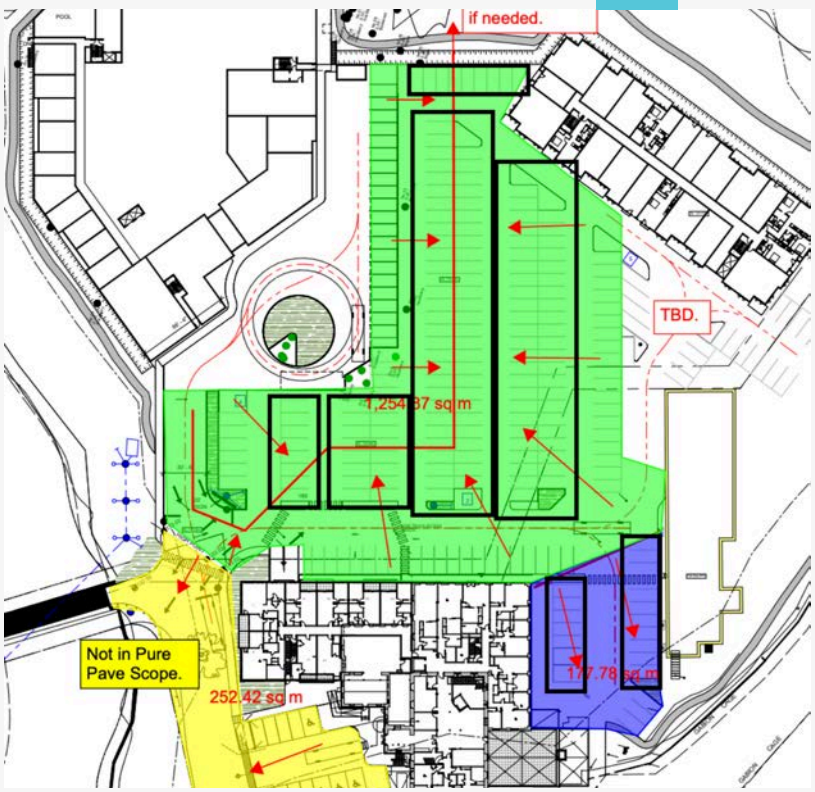
30% - 50%

SAVED ON INFRASTRURE COSTS - $$

Developers have reduced infrastructure costs by 30-50% with PurePave's efficient and cost-effective permeable system.

By eliminating ALL runoff, we reduce or delete the need for costly drainage solutions.

A **cost effective design** uses the majority of **parking stalls as PurePave drainage area,** and keeps **driving lanes asphalt** to balance costs with infiltration needs.



PurePave Contractor Training

“We installed over $2.8 Million of PurePave in our first full season” - Dylan Sandarage, Owner PermeablePlus.ca, PurePave PRO contractor

FREE **TRAINING INCLUDES:**

Technical Education
Installation expertise in PurePave’s proprietary materials and their benefits, including freeze-thaw resistance, durability and permeability.

Sales and Marketing
From sales templates and funnels to marketing videos, PR Stories, launch strategies and more. **We already know what works. Plug into profits.**

By referring a contractor to PurePave, your company will earn commissions, tracked by your profile.
Login on PurePave.com



PurePave Contractor Options

GROW WITH US, OWN YOUR MARKET

Order PurePave materials online and have them shipped anywhere nationwide. Our high-performance, permeable systems are now easier than ever to access and install.

Better materials, best prices, happy clients.



MANUFACTURED IN USA OR CANADA FOR BEST RATES IN NA.

PurePave Certified

Certified Installer Price List
Rebate after 20,000 SF
Referral Bonuses
National Brand Exposure
1 Day Sales Crash Course
1/2 Day Installation Training
Equipment: Distributor Prices

Get Started

PurePave PRO

All Certified Features+
PurePave PRO Price List
Shared Cost Marketing Plan
Co-branding PR Stories (your city)
Monthly Sales Coaching calls
Advanced Sales Presentation Training
2 Day Training at your facility
Project Support on site (5 / year)
Rental options for PurePave Paver

Go PRO

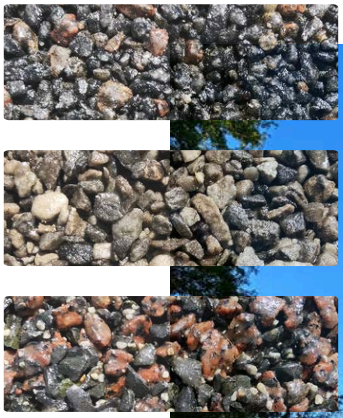
PurePave Partner

All PRO Features +
Partner Prices, priority shipping
Territory growth plan (CEO Team)
Sales services: cities, commercial
Project Support as requested
Preferred Rate Paver+Mixer Rental
Exclusivity with QA + Targets

Apply

Install PurePave in your territory and get leads, marketing, branding, sales support and more.

Luxury Home Builders





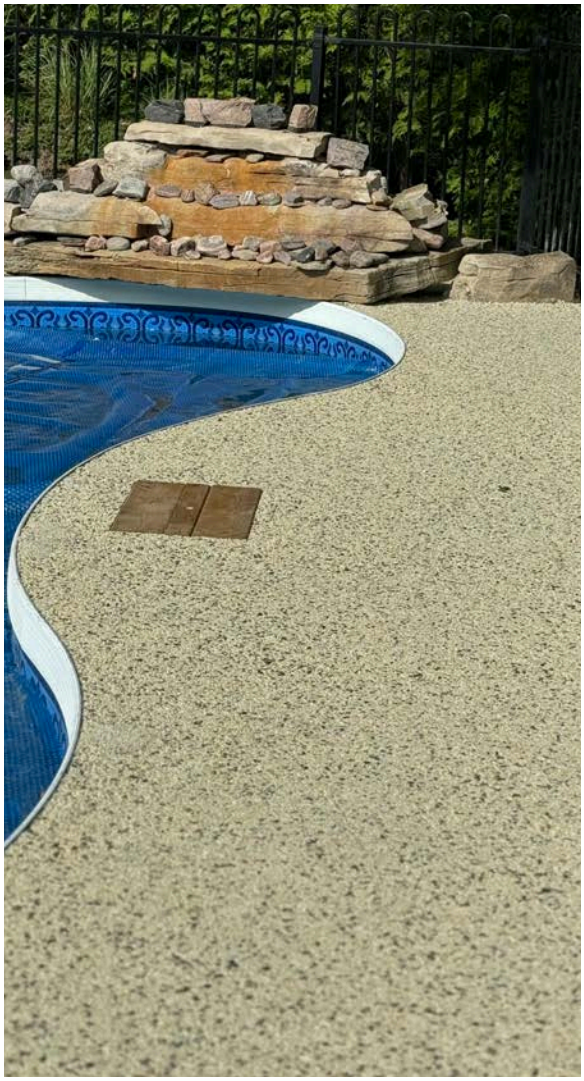


High-end, customizable granite surfacing that enhances the beauty, sustainability and value of luxury homes. Choose from a variety of colors, textures, and designs to create a driveway that matches any aesthetic. PurePave provides the perfect balance of style and function, with the added benefits of permeability, strength, and durability for any climate.

Heat Reducing Pool Solutions

PurePave is redefining pool decks with a surface that stays cool underfoot, resists mold and ants, and eliminates puddles. “PurePave HeatShield” was designed for Florida’s climate. This innovative permeable pool surfacing system provides a safe, durable, and beautiful solution without the hassle of constant maintenance.

Upgrade your poolside experience with PurePave



WHY CHOOSE PUREPAVE FOR YOUR POOL DECK?

Cool & Comfortable
No more scorching hot surfaces on sunny days.

Slip-Resistant
Safe for wet areas, reducing the risk of slips and falls.

No Puddles or Mold
Water drains instantly, preventing standing water and mold growth.

Ant-Free & Maintenance-Free
No cracks or gaps for ants to nest in, and no need for constant upkeep.

High-Value Luxury.

PurePave Parking lots

More practical paving assets

Stronger, permeable, more natural looking pavement that drinks an entire 100 year storm for fun.

Typically used to create larger eco-friendly surfaces where permeability, longevity, storm water solutions are required.

1. **Eliminate need for costly drainage systems.**
2. **Increase lot coverage on your property.**
3. **Save money on maintenance.**

Excellent for new parking lots that don't have an existing drainage system. Developers have saved hundreds of thousands using PurePave parking stalls to drain all water.

Reverse-grade asphalt to flow toward the permeable parking stalls, get the design approved by the City, and save with a sustainable drainage plan.



This developer in Ontario increased lot coverage 10% on his site.



Property managers love our all-season systems.

PUREPAVE
Earth Conscious Surfacing

Commercial Property

Advantages / Options / Design / Glowstone

Deal with water issues, melt snow / ice for safety surfacing and make your insurance provider happy.

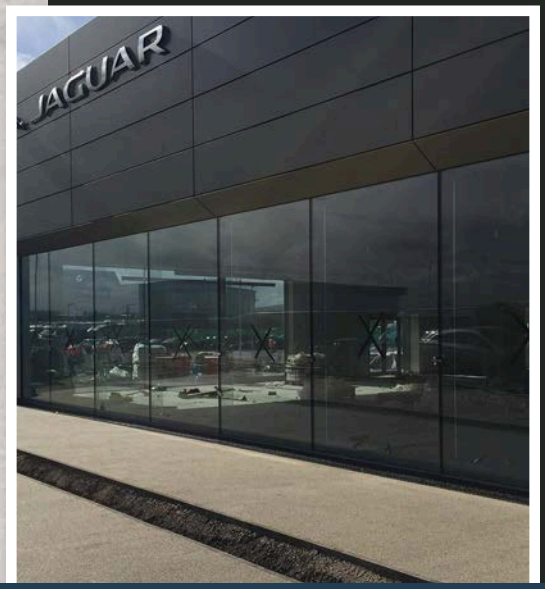
Unique Designs with local aggregates can provide an impressive wow-factor for any property.

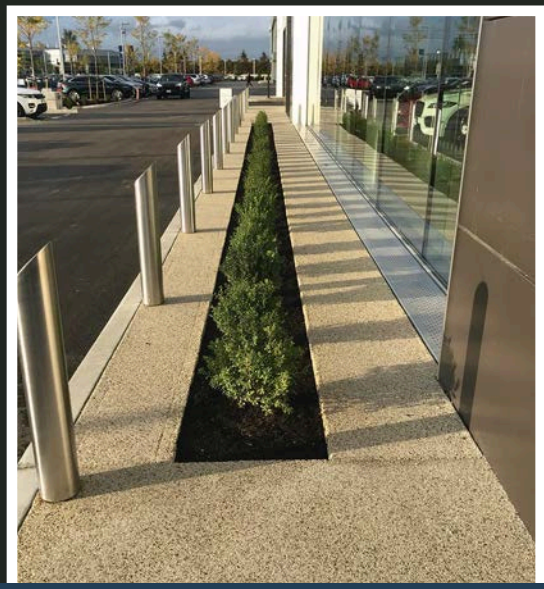
Design Entirely Permeable communities for natural stormwater management.

Benefits

- Net-zero runoff property
- Eliminate Drainage Issues
- Snow Plow friendly
- Remarkably Durable
- Anti-slip, no ice build-up
- Stunning natural aggregates
- Lower insurance premiums (regional)

- Permeable Driveways
- Parking Lots for Stormwater
- Pathways + Bike Paths
- Premium auto dealerships
- Green Street City Medians Public
- Space Patios
- Sidewalks / Walkways
- Pool Surrounds Sport Courts
- Can Overlay Concrete / Asphalt







Granite and Marble Colour Selection

Check Online for updated colours in your area.
Enhance your space with the natural beauty and durability of PurePave's permeable surfacing. Our premium selection of Granite, Quartz, and Marble offers both stunning aesthetics and superior anti-slip grip. Whether you're looking for a classic or modern finish, we have over 10+ colours to match your vision.

Black Granite



Canadian Shield



Sunset Shield



Sunset Granite



Sunset Black



Green Marble



EXPLORE MORE OPTIONS AT PUREPAVE.COM

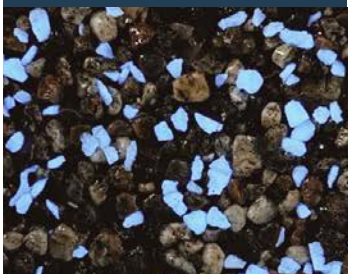
Stones, Colours and Textures (manufactured in-house)

PurePave Permeable Surfacing and anti-slip grip: Granite, Quartz & Marble.
For many other options visit our website www.PurePave.com

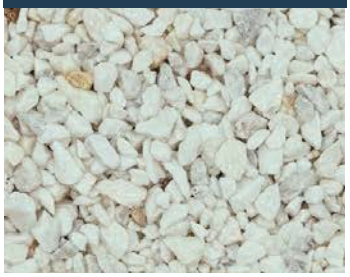
Canadian Snow



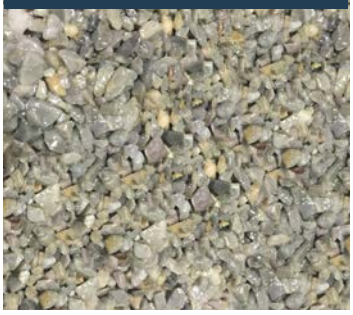
Canadian Glow



White Marble



Tremblant Grey



Smokey Black



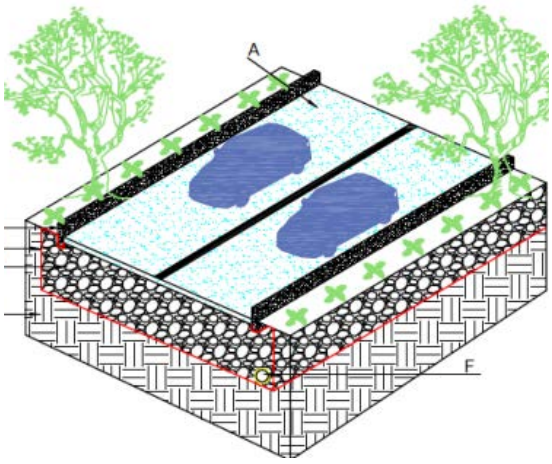
Scandinavia



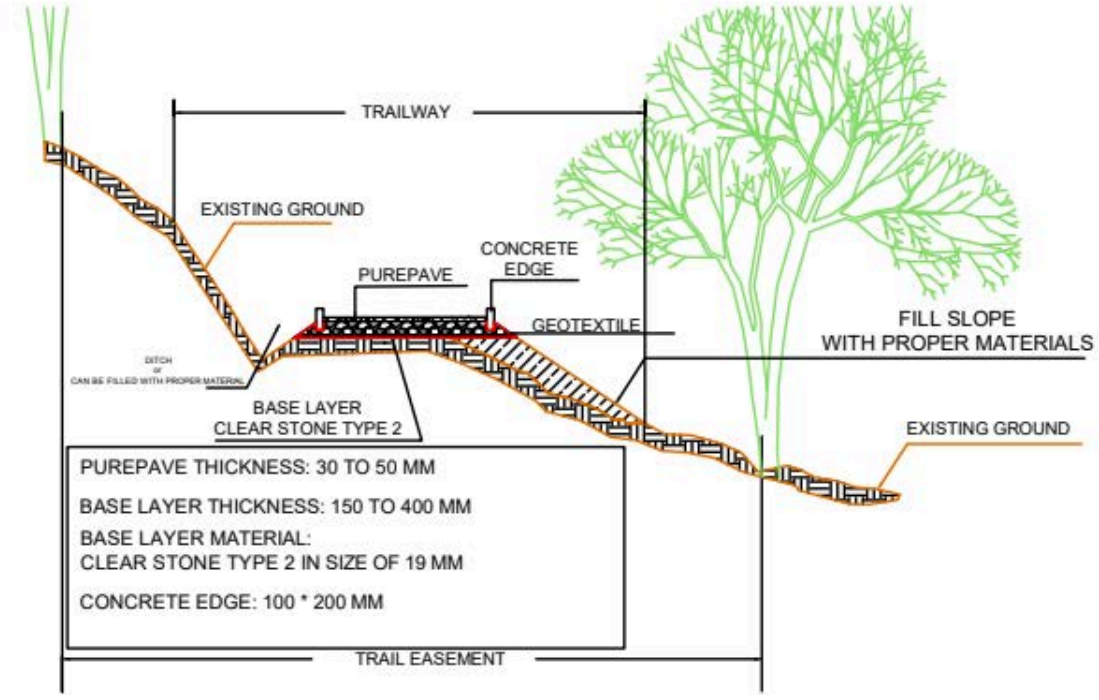


DESIGNERS AND ENGINEERS, WE HAVE **EVERYTHING YOU NEED.**

SCAN ME:



EXCLUSIVE ACCESS: SPEC DOCS, JOURNAL PUBLICATIONS, PROJECT DETAILS, RESEARCH, WHITEPAPERS, ETC.



PROJECTS@PUREPAVE.COM - 705-220-8286

INTRODUCING: PURECOAST



ENGINEERING FIRMS CONTACT US TODAY.

Coastal Erosion Prevention Starts Here.

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Earth Conscious Surfacing

Contact us today

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projects@purepave.com

+1 (705) 220-8286



PRODUCT SPECIFICATION

PurePave Winterized Permeable Surfacing

SCOPE

A. These 3-part specifications outline the general requirements for PurePave permeable surfacing (PurePave) construction work in projects involving either the construction of new or the rehabilitation of old parking lots and areas with light-duty applications.

B. These 3-part specifications cover the requirements for the installation of PurePave in urban stormwater management applications as a Low Impact Development (LID) feature designed to manage the Water Quality Volume (WQV), reduce flooding risk, mitigate runoff, and improve stormwater quality.

C. These 3-part specifications also apply to the use of PurePave in residential and commercial landscaping applications, including driveways, patios, pool decks, and walkways as well as in urban infrastructure such as sidewalks, pedestrian pathways, walking trails, cycling trails, multi-use paths, green spaces, tree pits, and boulevards, where enhanced drainage, slip resistance, and aesthetic appeal are desired.

D. These 3-part specifications apply to the use of PurePave in cold climate regions for infrastructure susceptible to freeze-thaw damage. PurePave's properties enhances durability through multiple freeze–thaw cycles, enhance drainage, reduce ice buildup, and minimize the need for de-icing treatments.

E. The design of PurePave is consistent with the *"Low Impact Development Stormwater Management Planning and Design Guide" (Toronto and Region Conservation Authority, Version 1.0, 2010)*, the *"Low Impact Development Technical Guidance Report for Implementation in Areas with Hydrological Constraints" (February 2021, Report No. 19-9327)*, *"Permeable pavement in northern North American urban areas: research review and knowledge gaps" (Weiss et al. 2019)*, the *"City of Toronto Design Criteria for Green Infrastructure in the Right-of-Way manual" September 2021,* and *"City of New York Department of Environmental Protection (NYC DEP) Standard Green Infrastructure Specifications" (August 1, 2024)*. Any deviations or adaptations have been made only where necessary to accommodate the specific design characteristics, installation methods, and material performance requirements of the PurePave system, while maintaining alignment with established LID and green infrastructure performance objectives.

NOTE: *The design and configuration of each PurePave system is project-specific and shall be developed based on site conditions, performance requirements, and engineering considerations.*

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes providing all materials, labor, tools, and equipment for the installation of the PurePave.

B. PurePave systems are designed to function as ecological recovery and sustainability systems, enabling the utility of vehicular and human traffic in natural settings while minimizing harm to the environment.

C. PurePave system incorporates engineered design features intended to support stormwater management objectives through the following functions:

- Reduction of stormwater peak flow rates and runoff volume through infiltration and temporary subsurface storage.
- Enhancing groundwater recharge by facilitating infiltration to underlying native soil subject to site conditions.
- Reduction of pollutant transport (e.g., sediments, hydrocarbons, road debris, and metals) through filtration, retention, and treatment of captured WQV prior to discharge.

The PurePave system provides:

- A permeable surface capable of capturing and managing the WQV.
- Subsurface storage for temporary detention of stormwater prior to infiltration and/or controlled discharge.
- Full, partial, or zero-infiltration configurations based on site-specific geotechnical and environmental conditions.
- Controlled conveyance of excess runoff through an underdrain system where infiltration capacity is limited.
- Reduction of surface runoff through distributed infiltration and subsurface storage.
- Filtration and retention of suspended solids and associated urban pollutants.
- Rapid post-storm drainage to reduce prolonged saturation and associated freeze–thaw risks.
- Reduced surface ponding through distributed infiltration and internal storage.
- Resistance to ice buildup under winter conditions.
- Reduced ice formation during melting and refreezing periods.
- Accelerated snowmelt relative to conventional impervious surfaces.
- Structural support suitable for pedestrian areas and low to medium traffic applications.
- High flexural strength to resist surface stresses and localized loading.
- Durability under repeated freeze–thaw cycles.
- Anti-slip surface characteristics to enhance user safety.
- Compatibility with routine snow removal and maintenance operations where applicable.
- Long-term hydraulic performance when maintained in accordance with recommended inspection and cleaning practices.
- Integration with stormwater infrastructure where required.
- Support for inspection, maintenance, and long-term performance monitoring.
- Accessibility-compliant surface where applicable.
- Contribution to reduction of peak runoff rates from adjacent impervious areas.
- Support of LID objectives across a variety of site development applications.

1.2 REFERENCES

This specification refers to the following standards, specifications or publications:

City of Toronto Standard Specifications

- TS 2.10 General Excavation
- TS 501 Amendment to OPSS.MUNI 501 – Construction Specification for Compacting
- TS 1010 Material Specification for Aggregate – Base, Subbase, Select Subgrade, and Backfill Material
- TS 856 Construction Specification for Pipes in Green Infrastructure
- TS 858 Construction Specification for Monitoring Wells

City of Toronto Standard Drawings

- T-708.01-5 Surface Cleanout
- T-850.041 Monitoring Well

Ontario Provincial Standard Specifications

- OPSS.MUNI 180 General Specification for the Management of Excess Materials
- OPSS.MUNI 1860 Material Specification for Geotextiles
- OPSS.PROV 1001 Material Specification for Aggregates – General
- OPSS.PROV 1004 Material Specification for Aggregates - Miscellaneous
- OPSS.MUNI 1010 Material Specification for Aggregate – Base, Subbase, Select Subgrade, Granular Surface, Shouldering, Bedding and Backfill Material
- OPSS.MUNI 320 Construction Specification for Open Graded Drainage Aggregate

Canadian Standards Association

- A23.1 Concrete Materials and Methods of Concrete Construction/ Methods of Test and Standard Practices for Concrete
- A23.2A Sieve Analysis of Fine and Coarse Aggregates
- A23.2-16A Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact
- A23.2-17A Resistance to Degradation of Large-size Coarse Aggregate by Abrasion and Impact

ASTM Standards

- C78 Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
- C127 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
- C128 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate

- C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- C535 Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- C666 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
- C1688 Standard Test Method for Density and Void Content of Freshly Mixed Pervious Concrete
- C1701 Standard Test Method for Infiltration Rate of In Place Pervious Concrete
- D448 Standard Classification for Sizes of Aggregate for Road and Bridge Construction
- D638 Standard Test Method for Tensile Properties of Plastics
- D695 Standard Test Method for Compressive Properties of Rigid Plastics
- D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil using Standard Effort
- D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- D2240 Standard Test Method for Rubber Property—Durometer Hardness
- D2434 Standard Test Methods for Measurement of Hydraulic Conductivity of Coarse-Grained Soils
- D2937 Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method
- D3385 Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer

Other Standards

- City of New York Department of Transportation, Infrastructure Design Standards, Standard Highway Specifications and
- The city of New York Department of Environmental Protection; Standard Green Infrastructure Specifications. More Info

1.3 DEFINITIONS

The PurePave system provides:

For the purpose of this specification, the following definitions apply:

PurePave Winterized Permeable Surfacing (PurePave) means a permeable pavement system consisting of a resin-bound aggregate surface installed over an open-graded aggregate storage layer and associated drainage components, designed to provide structural support while enabling stormwater infiltration, storage, and controlled conveyance.

Polymeric Binder means the engineered polyurethane-based binding material that coats and bonds aggregates together to form a continuous, permeable, load-distributing surface layer.

Storage Layer or Aggregate Reservoir means a layer of open-graded aggregate placed below the PurePave to provide temporary subsurface storage and conveyance of stormwater.

Open-Graded Aggregate Storage Layer means a layer of clean, uniformly graded aggregate placed above the prepared subgrade to provide structural support and temporary subsurface storage.

Underdrain means a perforated pipe installed within the aggregate reservoir to convey excess water from the system when infiltration capacity is exceeded.

Raised Underdrain means an underdrain installed above the base of the aggregate reservoir to allow internal water storage and promote partial infiltration prior to discharge.

Full Infiltration System means a permeable pavement system configured to infiltrate captured stormwater entirely into the underlying native soils without reliance on an underdrain for routine drainage.

Partial Infiltration System means a permeable pavement system configured to allow a portion of captured stormwater to infiltrate into the underlying native soils while conveying excess water through an underdrain system.

Zero-Infiltration System means a permeable pavement system configured to prevent infiltration into the underlying soils through the use of an impermeable liner or equivalent barrier, with captured stormwater conveyed through an underdrain or drainage system for discharge.

Water Quality Volume (WQV) means the stormwater runoff volume associated with the design rainfall event intended to be captured, treated, and managed within the PurePave system.

Edge Restraint means a curb, edging, building interface, or other appurtenance intended to confine the permeable pavement system and prevent lateral movement of the surface or underlying aggregates.

Joint means a vertical interface between the permeable pavement system and adjacent pavement or rigid infrastructure.

Subgrade means the native soil or prepared surface upon which the permeable pavement structure is constructed.

Inspection and Maintenance Access means provisions within the system allowing for monitoring, cleaning, and flushing of underdrains or aggregate layers.

Monitoring Well means a vertical access point installed within the system to allow observation and measurement of subsurface water levels or system performance.

Surface Cleanout means a surface-accessible maintenance point connected to the underdrain system to allow inspection and flushing.

Impermeable Liner means a continuous geomembrane barrier installed within or beneath the PurePave system to prevent infiltration into underlying soils and to direct captured stormwater toward controlled drainage systems where required by design.

Geotextile means a permeable nonwoven fabric installed within the PurePave system to provide separation, filtration, and stabilization between soil and aggregate layers, and to protect drainage components such as underdrains and monitoring wells from migration of fines.

Stiff Biaxial Geogrid means a polymeric grid structure with high junction strength and stiffness, installed within the PurePave system—typically at the subgrade interface—to improve load distribution, enhance subgrade stabilization, and provide lateral confinement of the aggregate base.

Structural Internal Grid (SIG) means a load-distributing structural layer installed between the PurePave surface course and the aggregate reservoir to enhance structural stability and support load transfer.

Drainage Cell means a modular subsurface component installed to provide additional void space for stormwater storage while supporting load distribution.

Concrete Divider means a cast-in-place or precast concrete element installed within the system to enhance structural integrity and load distribution where required by design.

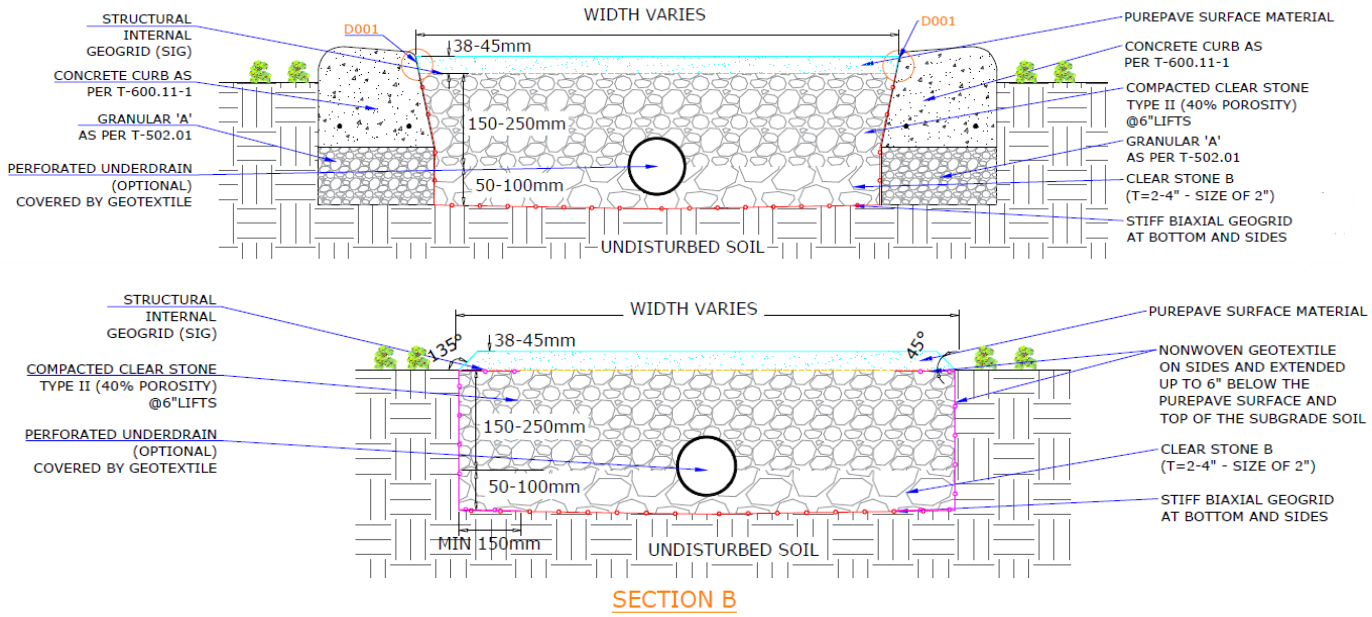
Full Depth Concrete Flush Header means a cast-in-place or precast concrete element extending through the full depth of the PurePave system, installed flush with adjacent surfaces to provide lateral separation between the permeable system and adjoining infrastructure.

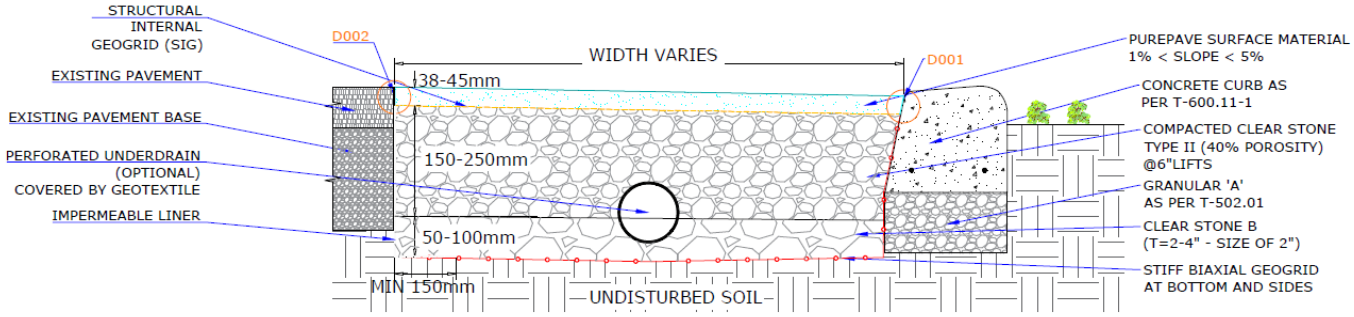
1.4 SUBMITTALS

A. PurePave product information can be found at: https://www.purepave.com/

B. Installation guidelines:

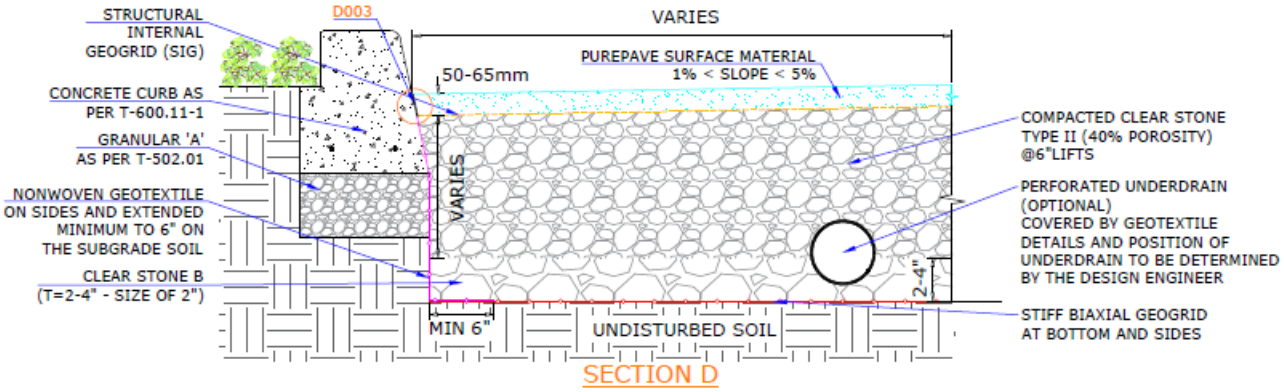
- Site preparation, mixing instructions, CAD illustrations, installation, equipment, and post-installation care are created for each individual project; show materials properties, dimensions of the area, the portion of mixing materials, cross-section of PurePave, edge details, and required tests.
- Example images of PurePave for light-duty applications:



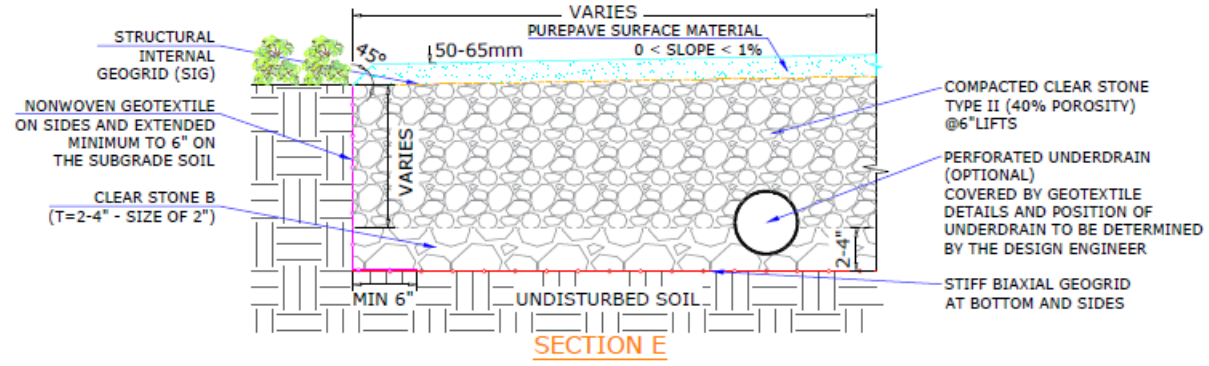


SECTION C

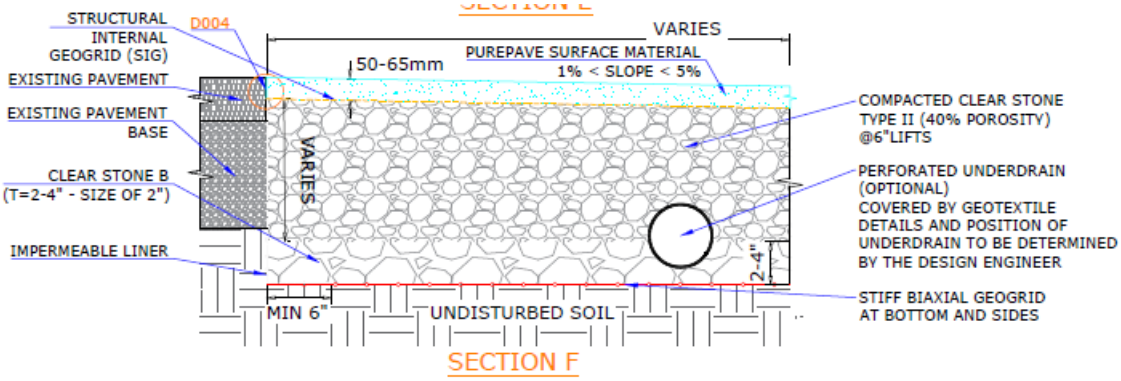
- Example images of PurePave for parking lots.



SECTION D



SECTION E



- Equipment data sheets confirming the paving machine meets the performance requirements in Part 2.
- Calibration documentation for paving thickness controls and leveling systems.
- Operator qualifications demonstrating experience with fully automatic paving equipment for uniform thin-lift aggregate placement.
- Maintenance and inspection records (if applicable) showing the machine is in proper working condition.

C. Closeout Submittals:

- Pre-Installation Meeting: Prior to installation of any materials, a pre-installation meeting shall be conducted to discuss the scope of work and review installation requirements. The pre-installation meeting shall be attended by all parties involved in the installation of the PurePave system.
- Installation should be performed by certified contractors of PurePave and verified by emailing projects@PurePave.com.
- PurePave provides a 5-10-year guarantee for cracking, settlement, and deflection for the installed PurePave by certified contractors of PurePave. Installers also offer to renew the warranty indefinitely, with maintenance checks and cleaning every 3 years.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURE

- PurePave Technology Inc., 1505 Laperriere Ave, K1Z 7T1, Ottawa, ON, Canada. Phone: (613) 614-1868 | (613) 691-4751 | E-mail: Taylor@purepave.com | Website: www.purepave.com

2.2 PUREPAVE

A. Material specifications:

1. PurePave uses a polymeric binder, a 2-part blend, partial plant-based polyurethane (PU) binder, or single-part binder, depending on use case and climate.
2. PurePave can be installed in cold temperatures down to 14 °F/-10°C
3. PurePave uses a wide range of aggregate types (granite, dolomite, marble) and colors (white, multi-red, grey, sunset red, black).
4. PurePave uses different aggregate sizes with different PU contents in the mixtures.

5. PurePave uses clear stone granular B and clear stone type 2 as a base material.
6. PurePave uses a stiff biaxial geogrid to ensure structural integrity.
7. PurePave uses SIG between PurePave surface layer and Open-graded Coarse aggregate layer to increase structural integrity and prevent cracking.
8. PurePave uses perforated HDPE/PVC underdrain pipes if the subgrade soil infiltration rates are insufficient (< 15mm/hr or 0.59 inch/hr).
9. PurePave might use R-tank drainage cells[1] with a minimum void area of 85% in base layer.
10. PurePave might use microgrid to prevent the clear stones from entering the R-tank drainage cells, while allowing for the free flow of water within the system.
11. PurePave uses Terrafix 360R non-woven geotextile fabric layer to cover the perforated underdrain pipes and monitoring wells for infiltration purposes, and in weak soils.
12. PurePave uses Terrafix 360R non-woven geotextile fabric where required to provide separation, filtration, and stabilization at interfaces where native soils or adjacent materials may migrate into the open-graded aggregate base of the PurePave system..
13. PurePave should be separated from the existing pavement (asphalt or concrete) to prevent lateral water migration and protect the structural integrity of the existing pavement.
14. PurePave should be separated from the existing sidewalk with proper edge restraint incorporating proper non-woven geotextile layer as defined in #12.[2]
15. PurePave may include concrete dividers to increase structural integrity and improve load-bearing capacity. In this case, the properties to be determined by the design engineer.
16. Check dams may be installed within the PurePave storage layer, if specified in the design, to control longitudinal flow, reduce runoff velocity, and provide additional storage. Properties, spacing, elevations, and dimensions to be determined by the design engineer.
17. PurePave may incorporate monitoring wells in accordance with T-850.041 for the purpose of observing subsurface water levels, evaluating system performance, and supporting long-term maintenance and performance monitoring.
18. PurePave may incorporate water level sensors, water quality sensors, pavement deflection sensors, and load-bearing sensors to support performance monitoring. The type and location of sensors shall be determined by the Design Engineer.
19. PurePave may be installed with different edge configurations as illustrated in Section 1.4B, including curbed edges, 45° sloped edges, and mixed interfaces with adjacent pavement separated by flexible joints.
20. PurePave may incorporate surface cleanouts for inspection, flushing, and maintenance of the underdrain system, in accordance with T-708.01-5.

B. Physical Properties:

1. PU binder of PurePave has a tensile strength of 75.8 MPa (11,000 psi) and elongation of up to 209%.
2. Aggregate sizes of PurePave ranges are Size 0: < 0.075 mm (0.0029”), Size 1: 2.36-4.75 mm (No.8-No.4), and Size 2: 4.75 mm (No.4) which mix with different PU content (5-7%).
3. The aggregate specific gravity is about 1.6 g/cm^3 (100 lb/ft^3).

[1] PPRS may incorporate drainage cells where required by the design; the use of such cells is not mandatory and is determined based on project-specific hydraulic and structural requirements.
[2] Concrete curb as per T-600.11-1 or to be determined by designed engineer.

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4. Clear stone granular B, single graded, with particle size of 50 mm (2”); used in depth of 50-100 mm (2-4”) on top of the subgrade soil.
5. Clear stone Type 2, single-graded, with particle sizes of 19 mm (3/4”), used in successive layers as specified.
6. PurePave should have a minimum flexural strength of 2.76 MPa (400 psi) when tested in accordance with ASTM C78, a porosity between 15% and 25% conforming ASTM C1688, and a minimum permeability of 6530 L/m^2/hr (250 inch/hr) when tested in accordance with ASTM C1701.
7. Titan Gladiator Grid® 650 has a flexural rigidity of 3,500,000 mg-cm based on ASTM D7748, Radial stiffness at 0.5% strain of 44,551 lb/ft (650 kN/m) according to ASTM D6637, 100% resistance to UV degradation at 500 hours in accordance with ASTM D4355, 100% resistance to chemical degradation based on EPA 9090, and aperture size of 33.0 mm (1.30 inch) in both directions.
8. The SIG properties should be in accordance with the manufacturer’s specifications, shall be installed between the PurePave permeable surfacing material and the open-graded aggregate storage layer.
9. Terrafix 360R non-woven geotextile to wrap the perforated underdrain pipes and monitoring wells for infiltration purposes and to provide separation in areas with weak soils and to provide separation along the interface with the PPRS and sidewalk where required.
10. R-tank drainage cell[3] units have a minimum surface void area of 85%, minimum compressive strength of 1.65 MPa (240.2 psi) in accordance with ASTM D2412 and ASTM F2418 and required 150 mm (6 inches) cover to support HS-20 loads.
11. Microgrid should have an ultimate strength – machine direction (MD) of 1,700+/- 5% lbs./ft and ultimate strength – cross machine direction (XMD) of 1,400 +/- 5% lbs./ft based on ASTM 4595, aperture size of 0.08 +/- 5% inches, and ultraviolet resistance (500 hours) of 78% conforming ASTM D4355.
12. The Impermeable Liner types include EPDM (Ethylene Propylene Diene Monomer), GCL (Geosynthetic Clay Liner), RPE (Reinforced Polyethylene), PVC (Poly Vinyl Chloride), and others as approved. Impermeable liner seams shall be sealed per manufacturer specifications. Impermeable liner suggested to be made of of PVC geomembrane of minimum 10 mil thickness, meeting or exceeding the requirements of ASTM D7176 Standard Specification for PVC geomembranes used in buried applications.
13. When concrete dividers are required, their properties and spacing must be specified by the design engineer.
14. Edge restraint is concrete curb as per T-600.11-1 or to be determined by designed engineer.
15. Monitoring Wells as per T-850.041.
16. Surface cleanouts shall be provided in accordance with T-708.01-5 to allow access for inspection, flushing, and maintenance of the underdrain system.

C. Performance Characteristics:

1. PurePave has a flexural strength of 6.18 MPa (896.3 psi) with no strength loss after 40 cycles of freeze-thaw (-40°C in a freezer followed by one hour at +35°C in a heated storage unit).
2. PurePave has high flexibility and is crack-resistant.
3. PurePave has a high resistance to UV, salt, vehicle weight, or water.
4. PurePave has an average surface infiltration rate of 38,000 l/m^2/hr (933 gal/ft^2/hr).

[3] R-Tank drainage cells are optional. If R-Tank units are not used, the base layer shall be filled with clear stone B and Type 2 in accordance with the design specifications.

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5. PurePave has an average porosity of 20% and infiltrates water over the entire surface.
6. PurePave is resistant to ice build-up and with a permeable clear stone base, has the ability to melt snow ~ 50% faster compared to standard surfaces.
7. PurePave has a ~ 30 times lower carbon footprint compared to concrete/asphalt.
8. PurePave has the ability to infiltrate polluted stormwaters and contributes to reducing the urban heat island effect.
9. PurePave is an Accessibility for Ontarians with Disabilities Act (AODA) compliant, ideal for wheelchair access.

D. Dimensions

1. The base layer thickness varies for each project depending on the specific project requirements, surface slope, existing storm sewer, necessity of underdrain, traffic load and hydrological conditions.
2. The thickness of the PurePave surface is typically between 38 and 45 mm for light-duty applications and between 50 and 65 mm for parking lot applications, as determined based on traffic loads.
3. PurePave width and length has no restrictions for parking lot applications. PurePave width for light-duty applications varies based on the project conditions, with no restrictions on length.
4. The dimensions and locations of check dams shall vary based on project-specific design requirements, including longitudinal slope, hydraulic performance objectives, and drainage configuration.
5. The HDPE/PVC 200 mm (8") diameter perforated underdrain shall be installed with lengths determined by the design and elevations set in accordance with the selected system configuration (full infiltration, partial infiltration, or zero infiltration). Raised underdrains shall be designed to meet applicable LID guidelines and achieve a drawdown time of less than 48 hours. The effects of frost penetration shall also be considered; where underdrain elevation cannot meet frost depth requirements, the associated limitations shall be identified and documented in the design.

E. Equipment

E.1. Automatic Paving Machine Requirements

PurePave uses a fully automatic custom permeable paving machine specifically engineered for the placement of thin-lift PurePave Rustic HD permeable surfacing layers. Equipment used to finish PurePave layer differs significantly from conventional asphalt or concrete paving machinery. Unlike asphalt pavers or concrete screeds, designed for high-temperature mixes or rigid cementitious materials, the PurePave paving system is developed to handle polymeric binder mixes, maintain aggregate coating integrity, and place PurePave without segregation or compaction damage. The system incorporates controlled heating, binder-compatible delivery components, and a precision self-leveling screed suitable for PurePave materials.

Key machine features include:

- **Working Width:** Variable paving width up to 2,700 mm or 107.3 inches (adjustable).
- **Paving Speed and Productivity:** Continuously variable paving speed from 0.8 to 4.5 m/min (2.62 to 14.75 ft/min).
- **Area production capacity:** Up to 730 m²/hr (8180 ft²/hr) under optimal conditions.
- **Thickness Control:** Automated layer thickness from 0 to 65 mm (0 to 2.5”), adjustable from both sides of the machine.
- **Material Compatibility:** Engineered to spread PurePave mixtures uniformly without segregation or

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over-compaction.

- **Self-Leveling System:** Includes lateral screed bar, automatic grade and curve control, and sensor-based leveling to ensure a smooth, jointless surface.
- **Binder-Compatible Handling:** Equipped with appropriate heating elements and overflow systems to ensure uniform distribution of elastic, polymer-bound aggregates.

E.2. Manual and Hand-Application Equipment

Hand Spreaders / Rakes:

- Aluminum or steel landscape rakes with non-damaging tines, suitable for spreading clear stone and leveling thin-lift aggregates.
- Must enable consistent distribution without causing particle segregation.

Hand Tamping Tools:

- Manual tampers used for localized compaction near edges, structures, posts, catch basins, guardrails, or areas inaccessible to mechanical equipment.
- Must not alter the air void structure or damage permeable materials.

Screeding Bars / Straightedges:

- Adjustable aluminum or steel screed bars for hand-leveling and surface refinement.
- Must be lightweight, rigid, and capable of achieving flatness tolerance required for PurePave systems.

Mixing / Measuring Tools

- Graduated containers, mixing paddles, and handheld mixing equipment.

Edge-Forming Tools

Trowels, edging tools, or form boards for shaping edges, transitions, and utility interface zones.

PART 3 EXECUTION

3.1 EXAMINATION

A. Conduct a site inspection prior to design and installation to assess existing conditions relevant to the PurePave system.

B. Geotechnical and hydrological reports might be required to support the design of PurePave.

B.1. Geotechnical investigations to determine soil composition/types, stratification, properties, bearing capacity, depth to bedrock, soil management option in view of their quality, i.e. to determine if contamination is present under Part XV.1 of the Environmental Protection Act (EPA).

B.2. Hydrological Investigations:

i. In-situ infiltration testing to confirm hydraulic conductivity and design infiltration rates
ii. Groundwater conditions, including seasonally high groundwater elevation, seasonal fluctuation, and potential for groundwater contamination.

C. Verify that site conditions match those shown on the drawings. Confirmation of subgrade conditions is essential for proper PurePave design and performance.

3.2 PREPARATION

A. Site Preparation

1. Remove all surface debris, organic material, vegetation, and unsuitable soils from areas designated for PurePave installation.
2. Ensure access is available for mechanical and manual installation equipment.
3. Protect adjacent pavements, structures, utilities, and vegetation from damage during excavation and material placement.

B. Subgrade Preparation

1. Excavate to the required depth as indicated on the drawings and as required to achieve design elevations.
2. Excavation must be made to dimensions enough to accommodate placement of the biaxial geogrid, clean open graded stone, drainage cells if applicable, microgrid geotextile and leveling course with PurePave. NOTE: The existence of drainage cells depends on the design requirements.
3. Any overcut underlying soil must be removed from the excavation, and the bottom must be compacted only as specified and required elsewhere.
4. Inspect the exposed subgrade for stability, uniformity, and moisture content.
5. The subgrade under the storage layer must not be compacted unless specified in the design.
6. Prepared subgrades under all infiltration areas must not be compacted and must not be subjected to construction equipment traffic. Where erosion has caused accumulation of sediment or ponding on the subgrade, remove sediment with light equipment and/or manually.
7. Install check dams where specified in the design. Check dam dimensions, spacing, and elevations shall be determined by the design engineer. Construct check dams on the prepared subgrade prior to placement of biaxial geogrid and open-graded stone base, ensuring they are keyed into the subgrade and aligned perpendicular to flow. In most cases, check dams consist of in-situ subgrade material formed during excavation and grading, and do not require imported materials.

C. Impermeable Liner

1. The Impermeable Liner must be made of Polyvinyl Chloride (PVC) geomembrane of 30 mil thickness or approved materials, meeting or exceeding the requirements of ASTM D7176 Standard Specification for PVC geomembranes used in buried applications.
2. The finished liner must be free of pinholes, blisters, and contaminants.
3. The impermeable liner will be sized, cut and installed in accordance with the approved shop drawings and specifications. The impermeable liner will cover the entire footprint of which concrete is intended to be poured.
4. The impermeable liner will cover the interface between PurePave base layer and adjacent pavement.

D. Edge Restraint

1. Dimensioned in accordance with specifications, Contract Drawings, and directions of the Engineer.
2. Edge restraint type shall be selected based on the project configuration and may include concrete curb as per T-600.11-1, sloped edge transitions, or flexible interfaces adjacent to asphalt or other hardscape surfaces.

3. Installed over undisturbed subgrade or a well-compacted Granular 'A' unless otherwise noted.
4. Where concrete curb is used, it shall maintain the profile and elevation required to match adjacent surfaces and provide proper grade separation.
5. Where sloped edges or mixed interfaces are used, the edge treatment shall be constructed to provide lateral confinement and prevent migration of base materials, in accordance with the design drawings.

E. Geotechnical Components

1. Each biaxial geogrid roll must be wrapped with an overlaying material that will protect the material, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants.
2. Each geotextile roll must be wrapped with an overlaying material that will protect the geotextile, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants. The protective wrapping must be maintained during periods of shipment and storage.
3. Each microgrid roll must be wrapped with an overlaying material that will protect the material, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants. The protective wrapping must be maintained during periods of shipment and storage.
4. Install geotextile fabric, if specified, in accordance with manufacturer recommendations and project drawings.
5. Place a stiff biaxial geogrid, as specified in the drawings, on the prepared subgrade where required to ensure structural stability and load distribution.
6. The biaxial geogrid to be continued up along the trench sides as specified in the drawings.
7. Ensure geosynthetic materials are placed smooth, without wrinkles, folds, or tension.

F. Underdrain Preparation (If specified)

Follow the manufacturer's drawings and documents.

G. Verification Prior to Installation

1. Confirm all elevations, grades, slopes, and drainage features match design intent.
2. Ensure subgrade elevation and check dam position are within tolerance required for PurePave layer uniformity.
3. Obtain approval from the Owner's Representative or Engineer before placing subbase materials.

3.3 INSTALLATION

A. General Installation Requirements

1. Install all PurePave components in accordance with the approved design drawings, manufacturer recommendations, and these specifications.
2. Do not install materials during rain, excessive surface moisture, or when temperatures fall below the minimum binder installation requirements.
3. Ensure all layers are placed true to line, grade, and thickness as specified.

B. Monitoring Well (If Required)

1. Install Monitoring wells at the locations and depths indicated on the drawings to allow monitoring of subbase and subgrade drainage performance.
2. Monitoring wells may extend to the subgrade soil or terminate at the top of the geomembrane layer, as indicated on the drawings.
3. Construct wells using 150 mm (6”) perforated HDPE/PVC pipe, or as specified in the documents (T-850.041), surrounded by clear stone and wrapped in geotextile as specified.
4. Ensure the top of the well is fitted with a secure cap, flush with or slightly above finished grade, as required.
1. Verify wells remain vertical, unobstructed, and protected during construction.

C. Biaxial Geogrid

2. Install the biaxial geogrid directly over the prepared subgrade, free of wrinkles, folds, or tension. Ensure the geogrid is placed in intimate contact with the subgrade to provide proper reinforcement.
3. If the biaxial geogrid is damaged during installation, the damaged section(s) must be removed, and the damaged area must be covered with a patch of new fabric which will overlap the undamaged fabric with twelve (12) inches in all directions.
4. Secure the geogrid in place using pins, stakes, or stone ballast to prevent movement during stone placement. Do not allow construction equipment to disturb or displace the geogrid after placement.

D. Geotextile

1. Install the non-woven geotextile, if specified, on the prepared cast-in-place concrete curb in accordance with the drawings.
2. The non-woven geotextile to be continued on the subgrade soil as specified in the drawings.

E. Underdrain Installation (If Required)

1. Install perforated HDPE/PVC underdrain pipes, fittings, and cleanouts at the locations and elevations shown on the drawings.
2. Wrap underdrain pipes with geotextile fabric as specified to enhance treatment and reduce clogging.
3. Perforated underdrain pipes with single-sided perforations shall be installed with the perforations located along the lower half of the pipe. Where pipes with 360° perforations are used, a geotextile or membrane strip shall be placed over the pipe to minimize migration of fines from the overlying media. or PurePave applications, covering the underdrain with geotextile is preferred.
4. Backfill underdrain trenches with Clear Stone B and Type 2 based on the design and ensure positive drainage to the specified outlet.
5. Verify that underdrain components do not shift during placement of subbase or PurePave materials.
6. The underdrain shall be installed at a longitudinal slope between 1% and 5%, as determined by project-specific design requirements. Where check dams are incorporated, a continuous underdrain may not be required along the full length of the PurePave. The underdrain length and configuration shall be as specified in the design documents and drawings.

F. Drainage Cells[4]

1. Base of the excavation for the drainage cells must be uniform, level, and free of lumps, debris, or soft yielding subgrade areas.
2. If indications of the water table are observed during excavation, the Engineer must be contacted to provide recommendations. It is recommended that the bottom of the PurePave remain at least 1 m above the seasonal high water table.
3. Place a thin layer (80.0 mm (3") unless otherwise specified) of clean open-graded stone base, over the biaxial geogrid on the subgrade to establish a level working platform for the drainage cells. Level to within 13.0 mm (+/-6.35 mm) (½" (+/- ¼")) or as shown on the plans. Bedding materials must be prepared in accordance with the contract documents.
4. Install drainage cells in layers in accordance with the contract drawings. drainage cell components must be connected to all other components for each layer. Layers must stack on top of each preceding layer evenly. No vertical connection between layers is required. The panels are to be oriented and at the required depth as per the contract drawings.
5. Wrap the drainage cells top and sides in specified microgrid material as approved and directed by the Engineer. Use special care to avoid any damage to microgrid during installation.

G. Storage Layer

1. Place Clear Stone B to a depth of 50-100 mm (2-4") on the prepared subgrade and incorporated geotextile/geogrid/geomembrane layers, followed by Clear Stone Type 2 base placed in lifts with a maximum thickness of 150 mm (6") and compacted accordingly.
2. Where the PurePave incorporates drainage cells, the perimeter of the drainage cells shall be surrounded with Clear Stone Type 2 placed in 150 mm (6") lifts. Each lift shall be placed around the entire perimeter such that the difference in elevation between adjacent backfill locations does not exceed 600 mm (24") at any point along the perimeter of the drainage cells.
3. Open-graded stone base shall be carefully placed and compacted in the perimeter spaces around the drainage cells. No fill shall be placed over top of drainage cells until the perimeter backfill has been completed.
4. Each lift must be compacted until no further densification is observed. The side lifts must be compacted by walk plate compactor.
5. Use special care to ensure the compaction process does not allow machinery to come into contact with the drainage cells due to the potential for damage to the Microgrid and drainage cells.
6. No compaction equipment is permissible to operate directly on drainage cells.
7. During construction, keep the drainage cells free from foreign matter. The cells must be left thoroughly clean to the satisfaction of the Engineer.
8. If no drainage cells are used in PurePave system, the clean open-graded stone base must be compacted. A minimum 200-pound walk-behind plate compactor must be used on each lift of 150 mm (6"). Compaction using the plate compactor must include four (4) passes in each direction longitudinally along length of the

[4] R-Tank drainage cells are optional. If R-Tank units are not used, the base layer shall be filled with clear stone Type 2 in accordance with the design specifications.

trench.

9. The surface tolerance of the compacted clean open-graded stone base must be a maximum of +/- 19.0 mm (¾") under a 3.0 m (10') straightedge in all directions.
10. If specified on the drawings, install a biaxial geogrid layer between clear stone lifts for added reinforcement and stability.

H. Sensor Installation (If Required)

1. Install water level and water quality sensors within monitoring wells or designated locations within the storage layer prior to placement of the PurePave surface layer, as indicated on the drawings.
2. Ensure sensors intended for hydraulic monitoring are installed after completion of the storage layer and underdrain system but before placement of the SIG and surface course.
3. Install pavement deflection sensors and load-bearing sensors within or directly above the storage layer as specified in the design.
4. Verify all sensors are securely positioned, protected from construction damage, and connected in accordance with manufacturer recommendations before placement of overlying materials.
5. Sensor types, elevations, and locations shall be as specified in the design documents.

I. PurePave Mixture Placement

J. Place SIG layer on top of the storage layer before placing the PurePave.

1. Prepare binder and aggregate components per manufacturer requirements, ensuring proper mixing ratios and PU content for the specified aggregate size.
2. Place PurePave mix immediately after blending to ensure workable viscosity and uniform coating.
3. Spread material using either:

   a. Mechanical paving equipment (automatic paver with adjustable screed, thickness control, and leveling features), or

   b. Manual tools such as rakes, spreaders, or hand screeds for restricted-access areas.
4. Install PurePave mixture to the thickness indicated on the drawings.
5. Ensure even distribution without segregation or resin pooling.

K. Mechanical Screeding and Leveling

1. Use an automated, self-leveling paver equipped with a lateral moving screed bar to compact and finish the polyurethane-based PurePave surface.
2. Ensure the paver includes automatic grade/curve control and an integrated sensor-based leveling system to maintain elevation accuracy and produce a smooth, jointless finish.
3. Equipment must be capable of handling elastic, binder-based mixes using appropriate heating and overflow mechanisms to ensure uniform distribution of PurePave-coated aggregates.
4. Set paving width, speed, and screed inclination according to required lift and surface tolerances.
5. Operate the paver at a consistent, uniform speed to avoid ridges, dips, and surface irregularities.
6. Inspect and adjust machine settings regularly to maintain consistent installation quality.

L. Manual Finishing

7. Use hand screeds, trowels, and straightedges to finish areas inaccessible to mechanical equipment.
8. Blend manual edges into machine-finished surfaces to maintain uniform appearance.
9. Remove and rework areas with visible aggregate segregation or binder-rich spots.

M. Joint Treatment Between PurePave and Existing Pavement

1. Provide a properly constructed joint between the PurePave and the adjacent asphalt or concrete pavement.
2. Joint filler and joint sealing materials shall meet the requirements specified in the designed documents.
3. Install joint filler or expansion joint material to the full depth indicated, ensuring full contact with both the PurePave material and the existing pavement edge.
4. Ensure the joint creates a physical separation that:
   a. Prevents water migration from the permeable shoulder into the underlying layers of the existing pavement.
   b. Accommodates differential movement between pavement structures.
   c. Protects the edges of both pavement systems from raveling and erosion.
5. Final joint condition shall be flush, uniform, and free of gaps, deformation, or discontinuities.

N. Curing

1. Allow PurePave to cure undisturbed for the duration specified by the manufacturer, considering climate and temperature.
2. Protect the surface from traffic, precipitation, debris, and freezing during the curing period.
3. Prevent premature loading by pedestrians or vehicles until full strength is achieved.

O. Cleanup

1. Remove excess materials, packaging, and debris from the work area.
2. Clean adjacent pavements, curbs, and structures from any binder or aggregate spills.
3. Restore all disturbed areas to their original condition or as specified.

3.4 POST-INSTALLATION

1. Protect the completed PurePave from traffic, equipment, and loads until curing is complete and the material has reached sufficient structural strength.
2. Inspect all surfaces for defects, irregularities, or damage caused during curing and repair as required.
3. Confirm all joints, edges, observation wells, and interface components have been installed according to the drawings and specifications.
4. Remove all temporary protection, debris, and construction materials after installation is complete and the surface is ready for service.
5. Perform on-site permeability tests at multiple locations across the installed PurePave surface after curing, following the manufacturer's guidelines, to verify that the system meets the required infiltration rates.

3.5 MAINTENANCE

1. Maintain PurePave in accordance with manufacturer guidelines and the project maintenance plan.
2. Perform routine inspections to identify sediment buildup, surface clogging, or structural distress; clean surface pores as needed using vacuum sweeping, low-pressure washing, or other approved methods.
3. Inspect joints, edges, and observation wells periodically to ensure proper function and drainage.
4. Conduct maintenance by PurePave-certified contractors to maintain warranty validity, including scheduled cleaning and checks every three years or as specified.
5. Inspect installed sensors, including water level, water quality, pavement deflection, and load-bearing sensors, to ensure proper operation. Repair, recalibrate, or replace sensors as required in accordance with manufacturer recommendations.
6. Repair minor surface defects promptly to prevent moisture infiltration, freeze–thaw damage, or progressive deterioration.

END OF SECTION

Table 3.4.1 Comparison of site constraints for a range of structural LID SWM practices

LID Stormwater Management Practice	Depth to high water table or bedrock[1] (m)	Typical Ratio of Impervious Drainage Area to Treatment Facility Area	Native Soil Infiltration Rate (mm/hr)[3]	Head[4] (m)	Space[5] %	Slope[6] %	Pollution Hot Spots[7]	Set backs[8]
Rain barrel	Not applicable	[5 to 50 m^2][2]	Not applicable	1	0	NA	Yes	None
Cistern	1	[50 to 3000 m^2][2]	Not applicable	1 to 2	0 to 1	NA	Yes	U, T
Green roof	Not applicable	1:1	Not applicable	0	0	0	Yes	None
Roof downspout disconnection	Not applicable	[5 to 100 m^2][2]	Amend if < 15 mm/hr[9]	0.5	5 to 20	1 to 5	Yes	B
Soakaway, infiltration trench or chamber	1	5:1 to 20:1	Not a constraint	1 to 2	0 to 1	< 15%	No	B, U, T, W
Bioretention	1	5:1 to 15:1	Underdrain required if < 15 mm/hr	1 to 2	5 to 10	0 to 2	No	B, U, W
Biofilter (filtration only Bioretention design)	Not applicable	5:1	Not applicable	1 to 2	2 to 5	0 to 2	Yes	B, T
Vegetated filter strip	1	5:1	Amend if < 15 mm/hr[9]	0 to 1	15 to 20	1 to 5	No	None
Permeable pavement	1	1:1 to 1.2:1	Underdrain required if < 15 mm/hr	0.5 to 1	0	1 to 5	No	U, W
Enhanced grass swale	1	5:1 to 10:1	Not applicable	1 to 3	5 to 15	0.5 to 6	No	B, U
Dry swale	1	5:1 to 15:1	Underdrain required if < 15 mm/hr	1 to 3	5 to 10	0.5 to 6	No	B, U, W
Perforated pipe system	1	5:1 to 10:1	Not a constraint	1 to 3	0	< 15%	No	B, U, T, W

Notes:
1. Minimum depth between the base of the facility and the elevation of the seasonally high water table or top of bedrock.
2 Values for rain barrels, cisterns and roof downspout disconnection represent typical ranges for impervious drainage area treated.
3. Infiltration rate estimates based on measurements of hydraulic conductivity under field saturated conditions at the proposed location and depth of the practice.
4. Vertical distance between the inlet and outlet of the LID practice.
5. Percent of open pervious land on the site that is required for the LID practice.
6. Slope at the LID practice location.
7. Suitable in pollution hot spots or runoff source areas where land uses or activities have the potential to generate highly contaminated runoff (*e.g.*, vehicle fueling, servicing or demolition areas, outdoor storage or handling areas for hazardous materials and some heavy industry sites).
8. Setback codes: B = Building foundation; U = Underground utilities; T = Trees; W = drinking water wellhead protection areas.
9. Native soils should be tilled and amended with compost to improve infiltration rate, moisture retention capacity and fertility.

OPTION 1
On-Site Soil Amendment - Default Ratio 3:1
All Building Types

Materials

- Amend existing site topsoil using 3:1 ratio by volume (3 parts existing topsoil, 1 part amendment material)
- Amendment Material: organic matter primarily leaf, yard and bark waste compost of 20-30% by dry weight as determined by Loss-on-Ignition (LOI) and a pH of 6.0 to 8.0
- No uncomposted manure or other organic materials, sphagnum peat or organic amendments that contain sphagnum peat

Placement and Amendments

1. Remove existing topsoil and preserve on-site.
2. Rip native subsoil (decompaction) using the teeth of an excavator or bobcat bucket or equivalent to a depth of 100-200mm. Rip using a perpendicular pattern (See Detail No.1) ensuring full site coverage. No ripping within tree protection areas (See Detail No.2) or within 3m of building foundations (See Detail No.3).
3. Amend existing site topsoil to meet post construction soil amendment requirements using 3:1 ratio by volume (topsoil : amendment material).
4. Two (2) methods for amending the existing soils in place are acceptable:

Method No.1 - Layer and Incorporate (Detail No.4)

i. Apply 100mm of existing site topsoil followed by 50mm of amendment material and incorporate/mix amended material.
ii. Lightly roll or smooth using the back of the machinery bucket.
iii. Repeat i. and ii.
iv. Adjust layer quantities to ensure a settled amended topsoil depth of 300m and compliance with site grading. Placement should account for 10% settlement.

Method No.2 - Mechanical or Bucket Mix

i. Successively add, mix and pile one (1) unit of amendment material with three (3) units of existing site topsoil.
ii. Thoroughly mix.
iii. Repeat i. and ii to ensure thorough mixing until required volume is achieved.
iv. Place 150mm of amended topsoil, lightly roll or smooth using the back of the machinery bucket.
v. Repeat iv.
vi. Adjust layer quantities to ensure a settled amended topsoil depth of 300m and compliance with site grading.

Amended topsoil should be wetted after application, allowed to settle for a minimum of one (1) week and grades adjusted as required prior to installation of turf.

-IMPORTANT-

Documentation Requirements

As part of verification, the owners shall produce delivery tickets, receipts and specifications detailing the delivery address, quantities and product description and sources for verification by City inspectors. Delivery address is to be listed and must correspond to the property/site being inspected. Site without proper documentation may be subject to additional verification procedures including laboratory testing at the expense of the owner. The owner's engineer shall provide a duly notarized letter with all supporting documentation certifying the proper installation and placement of amended soil.

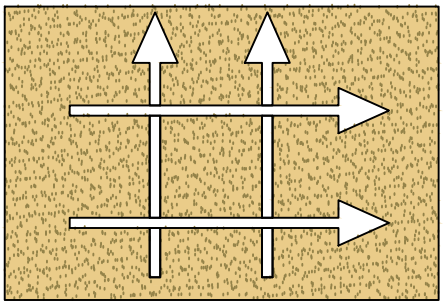
Consultant Verification/Inspection

Verification may occur after the minimum one (1) week settlement period. Verification is suggested prior to turf placement. Non-compliant sites shall be rectified at the expense of the owner.

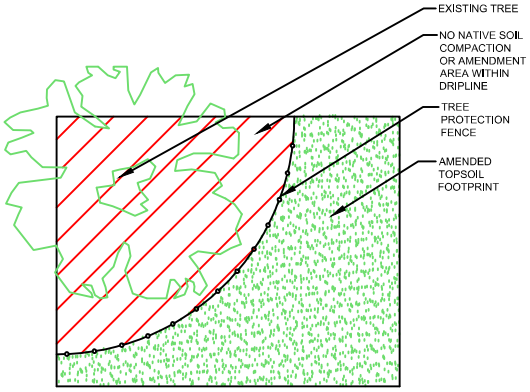
At random, the Developer's consultant shall dig at least one (1) test hole to verify amended topsoil depth and uncompacted soil depths.

Requirements:

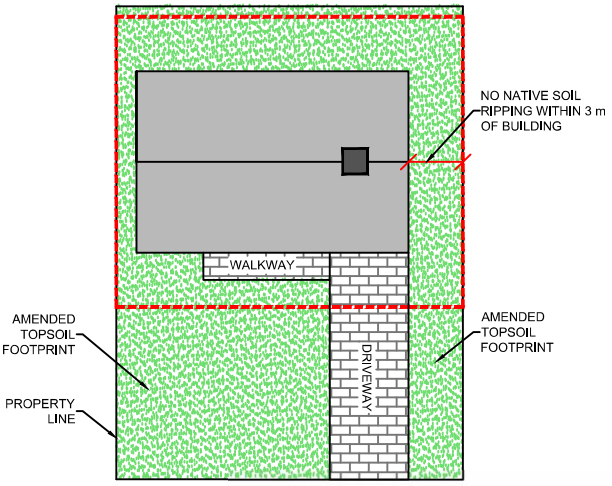
1. Amended topsoil layer shall be easily dug using only the inspector's weight or cored without other mechanical assistance.
2. The amended topsoil layer shall be darker in color than the unamended- ripped subsoil and particles of organic matter should be easily visible.
3. Measured amended topsoil depths shall be deemed to be in conformance based on the following:
   - Using a common garden spade, the measured depth of amended topsoil shall be equal to the required 300mm depth (±25mm)
   - Using a small diameter coring unit, the measured core depth of amended topsoil shall be equal to the required 300mm depth (±50mm)



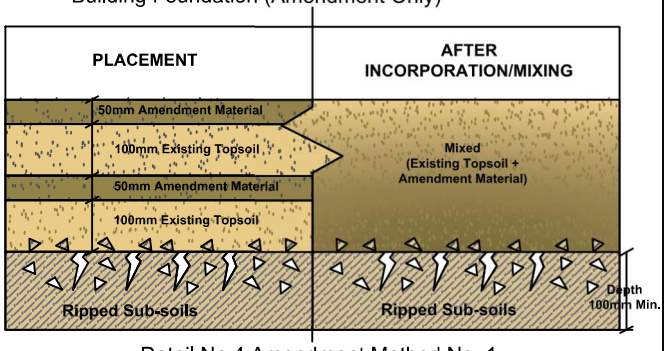
Detail No.1 - Perpendicular Native Soil Ripping Pattern



Detail No.2 - No Native Soil Ripping within Tree Protection Areas or Amendment



Detail No.3 - No native soil ripping within 3.0m of Building Foundation (Amendment Only)



Detail No.4 Amendment Method No. 1

Soil Amendment Requirements for Wateridge Village - For Development Requiring a Building Permit Only

City of Ottawa

May 13, 2019

OPTION 2
On-Site Soil Amendment
Import and Replace Topsoil with Amendment Material
All Building Types and Parks

Materials

- Amendment material shall be obtained from a Compost Quality Assurance (CQA) licensed and OMOE/ CCME approved facility and shall comply with the Category "A" compost designation. The amendment material must contain:
  - Organic matter primarily leaf, yard and bark waste compost of 8-15% by dry weight as determined by Loss-on-Ignition (LOI) and a pH of 6.0 to 8.0.
  - No uncomposted manure or other organic materials, sphagnum peat or organic amendments that contain sphagnum peat.

Placement and Amendments

1. Remove existing topsoil and dispose off-site in accordance with OPSS 206 and OPSS 180, O. Reg. 153/06, the Environmental Protection Act or municipal by-laws and policies, whichever supersedes.
2. Rip native subsoil (decompaction) using the teeth of an excavator or bobcat bucket or equivalent to a native subsoil at depth of 100-200mm. Rip using a perpendicular pattern (See Detail No.1) ensuring full site coverage. No ripping within tree protection areas (See Detail No.2) or within 3m of building foundations (See Detail No.3).
3. Import pre-mixed amended topsoil (300mm depth of coverage required).
4. Place imported pre-mixed amended topsoil in 150mm lifts, lightly roll or smooth using machinery bucket and repeat. Adjust layer quantities to ensure a settled amended topsoil depth of 300mm and compliance with site grading. (See Detail No.4).

Amended topsoil should be wetted after application, allowed to settle for a minimum of one (1) week and grades adjusted as required prior to installation of turf.

-IMPORTANT-

Documentation Requirements

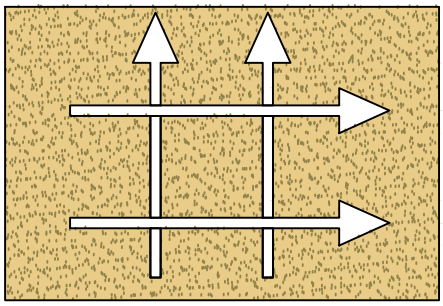
As part of verification, the owners shall produce delivery tickets, receipts and specifications detailing the delivery address, quantities and product description and sources for verification by City inspectors. Delivery address is to be listed and must correspond to the property/site being inspected. Sites without proper documentation may be subject to additional verification procedures including laboratory testing at the expense of the owner. The owner's engineer shall provide a duly notarized letter with all supporting documentation certifying the proper installation and placement of amended soil.

Consultant Verification/Inspection

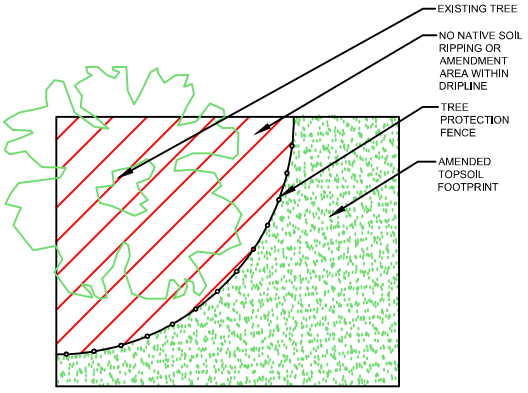
Verification may occur after the minimum one (1) week settlement period. Verification is suggested prior to turf placement. Non-compliant sites shall be rectified at the expense of the owner

At random, the Developer's consultant shall dig at least one (1) test hole to verify amended topsoil depth and uncompacted soil depths.
Requirements:

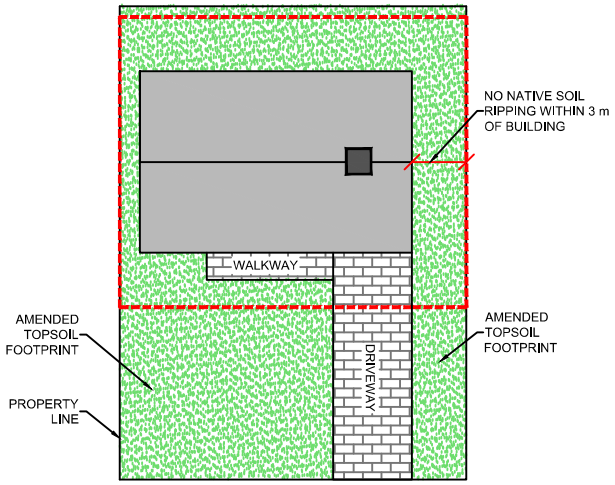
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3. Measured amended topsoil depths shall be deemed to be in conformance based on the following:
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   - Using a small diameter coring unit, the measured core depth of amended topsoil shall be equal to the required 300mm depth (±50mm)



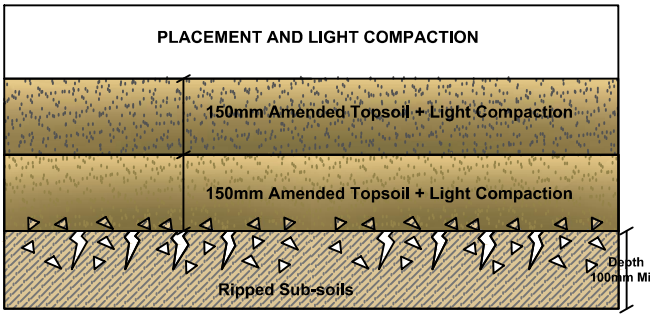
Detail No.1 - Perpendicular Native Soil Ripping Pattern



Detail No.2 - No Native Soil Ripping within Tree Protection Areas or Amendment



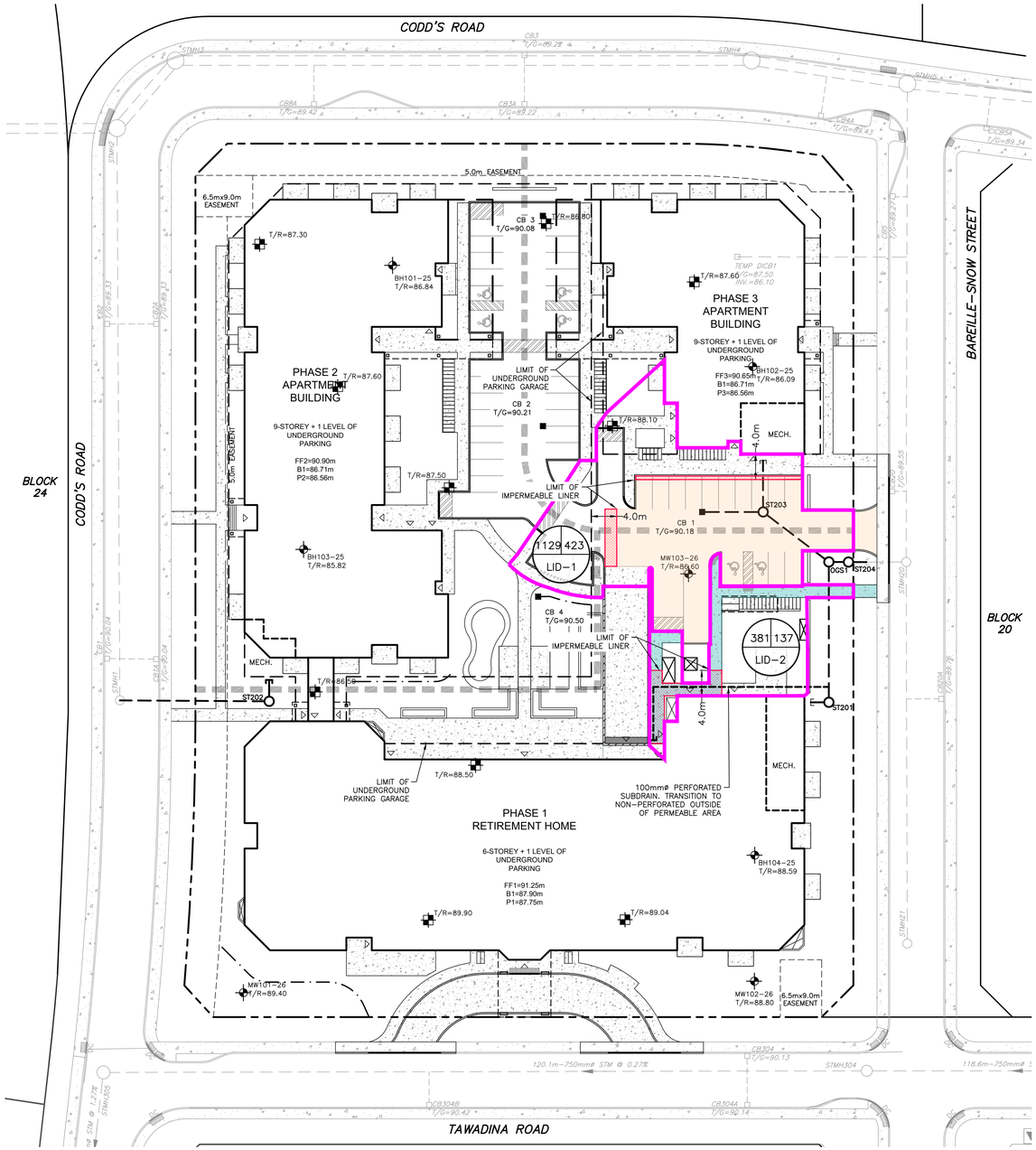
Detail No.3 - No Native Soil Ripping within 3.0m of Building Foundation (Amendment Only)

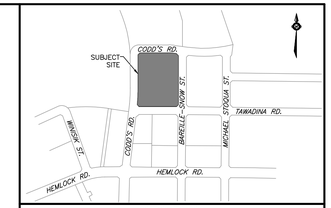


Detail No.4 Placement and Compaction Lifts for Amended Topsoil

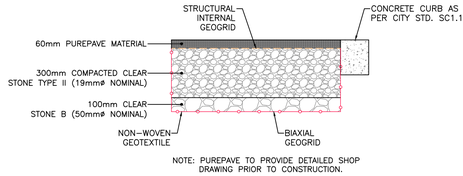
Soil Amendment Requirements for Wateridge Village
- For Development Requiring a Building Permit Only

City of Ottawa
May 13, 2019



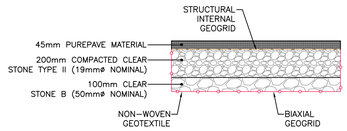


KEY PLAN



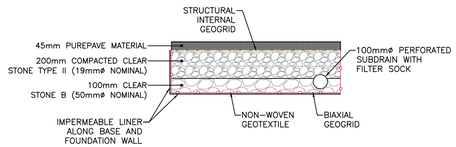
NOTE: PUREPAVE TO PROVIDE DETAILED SHOP DRAWING PRIOR TO CONSTRUCTION.

PUREPAVE DETAIL FOR PAVEMENT AREAS
N.T.S.



NOTE: PUREPAVE TO PROVIDE DETAILED SHOP DRAWING PRIOR TO CONSTRUCTION.

PUREPAVE DETAIL FOR SIDEWALK AREAS
N.T.S.



NOTE: PUREPAVE TO PROVIDE DETAILED SHOP DRAWING PRIOR TO CONSTRUCTION.

PUREPAVE DETAIL FOR SIDEWALK AREAS WITH PERORATED SUBDRAIN/IMPERMEABLE LINER
N.T.S.

LEGEND

- PROPERTY BOUNDARY
- PHASING LIMIT
- EASEMENT
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- CATCH BASIN
- STORM SEWER & MANHOLE
- SWALE
- BOREHOLE/MONITORING WELL (REFER TO GEOTECHNICAL)
- TEST PIT
- CATCHMENT AREA BOUNDARY
- PERMEABLE PAVEMENT
- PERMEABLE SIDEWALK
- IMPERMEABLE LINER

TOTAL CATCHMENT AREA (m^2)
100 | 50 — CONTRIBUTING IMPERVIOUS AREA (m^2)
LID-1
LID CATCHMENT AREA ID

IMPERMEABLE LINER:
1. WHERE PERMEABLE SURFACES ARE PROPOSED WITHIN 4.0m OF A BUILDING FOUNDATION AN IMPERMEABLE LINER SHALL BE INSTALLED BENEATH THE PUREPAVE SYSTEM CONFORMING TO:
   - 1.1. EPDM (ETHYLENE PROPYLENE DIENE MONOMER), GCL (GEOSYNTHETIC CLAY LINER), RPE (REINFORCED POLYETHYLENE), PVC (POLY VINYL CHLORIDE), OR OTHER MATERIAL APPROVED BY PUREPAVE.
   - 1.2. IMPERMEABLE LINERS SEAMS SHALL BE SEALED PER MANUFACTURER SPECIFICATIONS.
   - 1.3. IMPERMEABLE LINER SUGGESTED TO BE MADE OF PVC GEOMEMBRANE OF MINIMUM 10 MIL THICKNESS, MEETING OR EXCEEDING THE REQUIREMENTS OF ASTM D7176 STANDARD SPECIFICATION FOR PVC GEOMEMBRANES USED IN BURIED APPLICATIONS.

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHIC PLAN OF PART OF WATER RIDGE DEVELOPMENT BEING SHOWN AS BLOCK 21 ON DRAFT M-PLAN LOCATED NORTH OF TAWADINA ROAD AND EAST OF CODD'S ROAD, GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA, MONUMENT-URSO SURVEYING LTD. ELEVATIONS ARE GEODETIC AND REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD28:78).

NO.	REVISION DESCRIPTION	DATE	BY
6	REVISED PER COMMENTS	21/07/26	BLM
5	REVISED PER COMMENTS	10/06/26	BLM
4	ISSUED FOR BUILDING PERMIT	05/05/26	BLM
3	REISSUED FOR TENDER	23/03/26	BLM
2	REVISED PER CLC COMMENTS	27/02/26	BLM
1	ISSUED FOR REVIEW	16/01/26	BLM

SCALE
0 4m 8m 16m
HORIZONTAL 1:400

LICENSED PROFESSIONAL ENGINEER
B.L. MACKECHNIE
100199554
21 July '26
PROVINCE OF ONTARIO

Robinson Land Development
2936 Baseline Road
Suite 200
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SM
DRAWN	BLM
CHECKED	SM
APPROVED	BLM

WATERIDGE LIFESTYLES LTD.

WATERIDGE VILLAGE
100 BAREILLE-SNOW STREET
CITY OF OTTAWA, ON

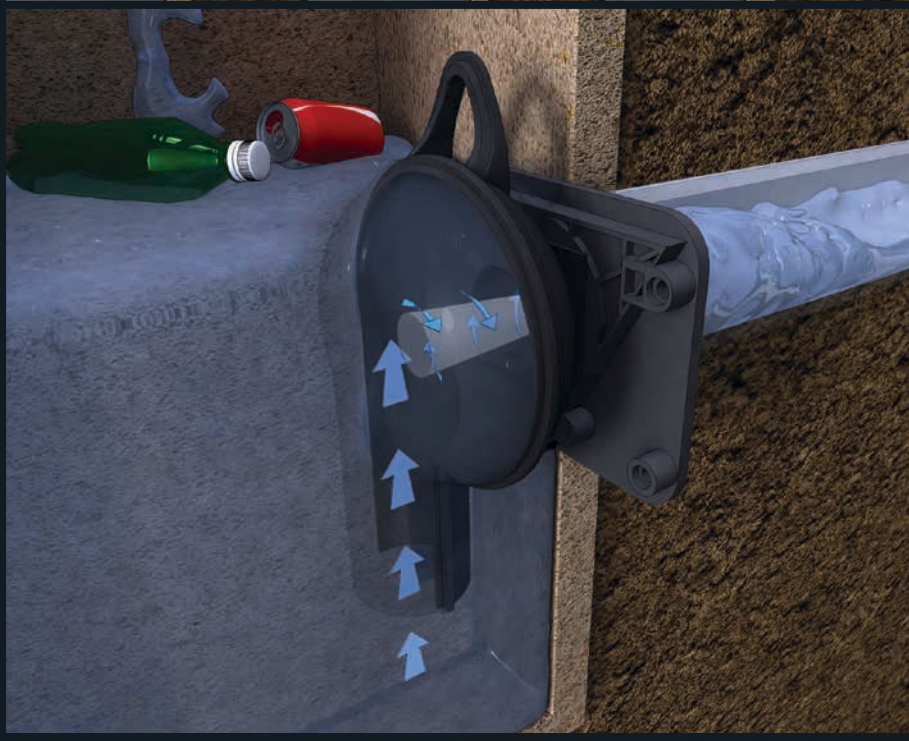
LID DRAINAGE AREA PLAN & DETAILS

PROJECT No.	25117
SURVEY	MONUMENT-URSO SURVEYING LTD.
DATED	JULY 2026
DWG. No:	25117-LID1

FILE No. D07-12-26-0020

THE NEXT GENERATION IN STORM SEWER INLET CONTROLS





TEMPEST™
INLET CONTROL DEVICES





STORM WATER FLOW CONTROL

THE COST-EFFECTIVE SOLUTION TO YOUR STORM WATER SURCHARGE PROBLEMS

- Conserves sewer system capacity
- System accommodates low to high flows
- Integrated odour and floatable control
- Fast and easy to install and maintain

IPEX
by aliaxis

We build tough products for tough environments®

TEMPEST™
INLET CONTROL DEVICES

THE NEXT GENERATION IN STORM SEWER INLET CONTROLS

✓ Reduces Sewer Overflows & Basement Backups

Tempest is a family of cost-effective inlet control devices that work together across a series of catch basins to limit the amount of storm water runoff that can enter a combined sewer system during a storm event. Basement backups and sewer overflows are avoided because storm water surcharges are controlled at the sewer inlet and are allowed to remain in catch basins or temporarily above ground.

✓ Integrated Odour & Floatable Control

In addition to flow control, Tempest systems can also alleviate sewer system odour emissions as well as prevent floating debris from entering the sewer system.

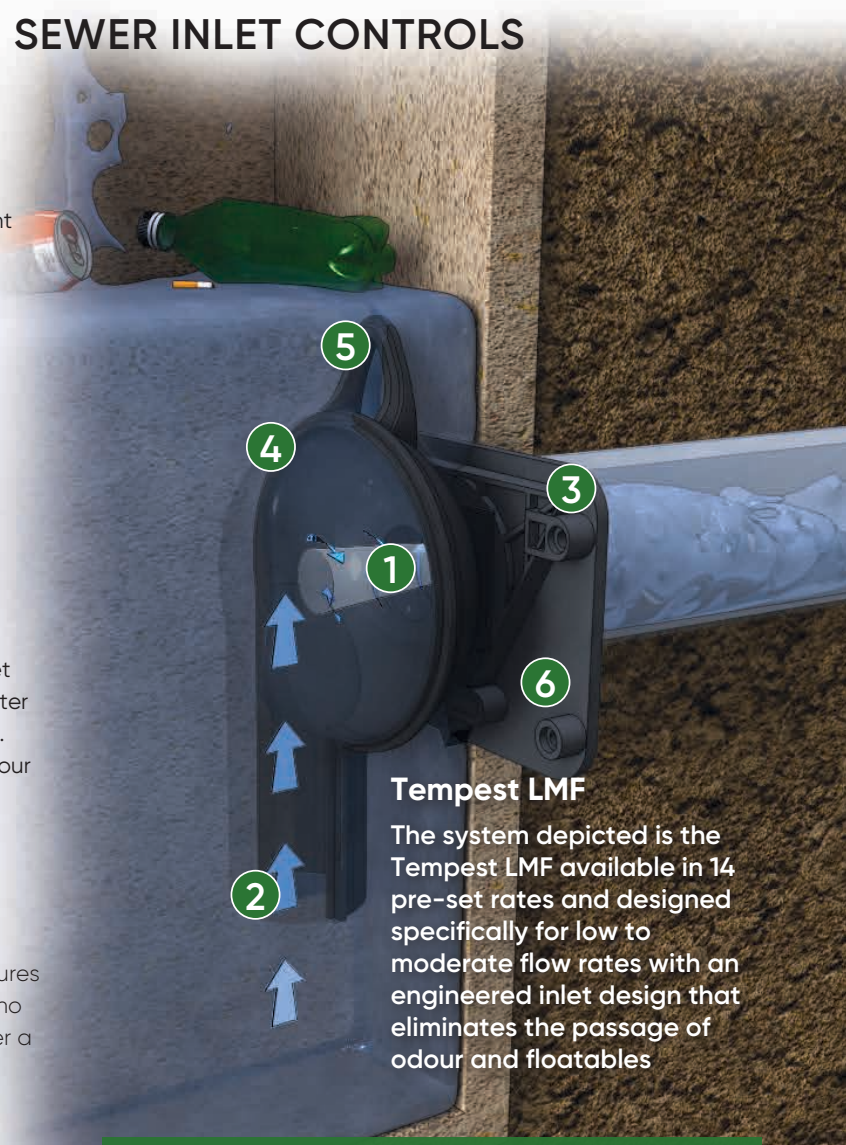
✓ Wide Range of Models & Pre-set Flow Rates

Available in a wide range of patent pending models and pre-set flow rates, Tempest systems can accommodate most storm water flow control requirements from 32 GPM to 270 GPM and beyond. Application specific solutions can also be engineered to meet your unique needs in both wet and dry catch basin environments.

✓ Easy to Install & Maintain

Constructed from durable PVC, Tempest units are corrosion free and built to last. The Tempest's light weight design accommodates both square and round catch basins and features a universal back plate and interchangeable components with no moving parts that makes the units quick and easy to install over a catch basin outlet pipe.

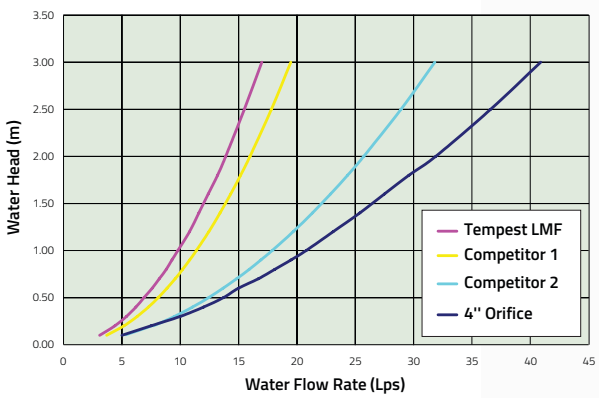
These devices also include a quick release mechanism to allow easy access for service without the need to drain the installation.



Tempest LMF

The system depicted is the Tempest LMF available in 14 pre-set rates and designed specifically for low to moderate flow rates with an engineered inlet design that eliminates the passage of odour and floatables

Tempest Inlet Control Devices restrict flow to a narrower range than traditional methods regardless of head



FEATURES & BENEFITS

1. Restricts flow to a narrow range regardless of head
2. Unit design prevents the passage of floatables and odours
3. Neoprene gasket for air-tight seal*
4. Virtually maintenance free and corrosion free durable PVC construction
5. Features a quick release mechanism that's accessed with reach bar. Unit can then be simply lifted out for easy maintenance*
6. Universal back plates available for both square and round catch basins*

* Excluding Tempest HF Sump

THE TEMPEST FAMILY OF SYSTEMS

TEMPEST LMF



Restricts:
- ✓ Flow
- ✓ Odours
- ✓ Floatables

LOW to MODERATE FLOW RATES
32 GPM (2 L/s) – 270 GPM (17 L/s)
14 pre-set flow rates

The Tempest LMF system features a vortex inlet design that allows a low flow rate to be set and eliminates the passage of odours and floatables and allows for debris and sediment to collect in the structure.

TEMPEST MHF



Restricts:
- ✓ Flow

MEDIUM TO HIGH FLOW RATES
143 GPM (9L/s) or greater
Specified pre-set flow rates

The Tempest MHF is a standard orifice plate or plug device designed to allow a specified flow volume through the outlet pipe at a specified head.

TEMPEST HF & HF SUMP



Restricts:
- ✓ Flow
- ✓ Odours
- ✓ Floatables

HIGH FLOW RATES
240 GPM (15 L/s) or greater
5 pre-set flow rates

The standard Tempest HF system allows a near constant discharge rate to be set and eliminates the passage of odours and floatables and allows for debris and sediment to collect in the structure.

The Tempest HF SUMP system is designed for catch basins & manholes in which there is no sump or the outlet pipe is too low to install standard Tempest device.

UNIVERSAL BACK PLATES

Available for BOTH square and round catch basins.*



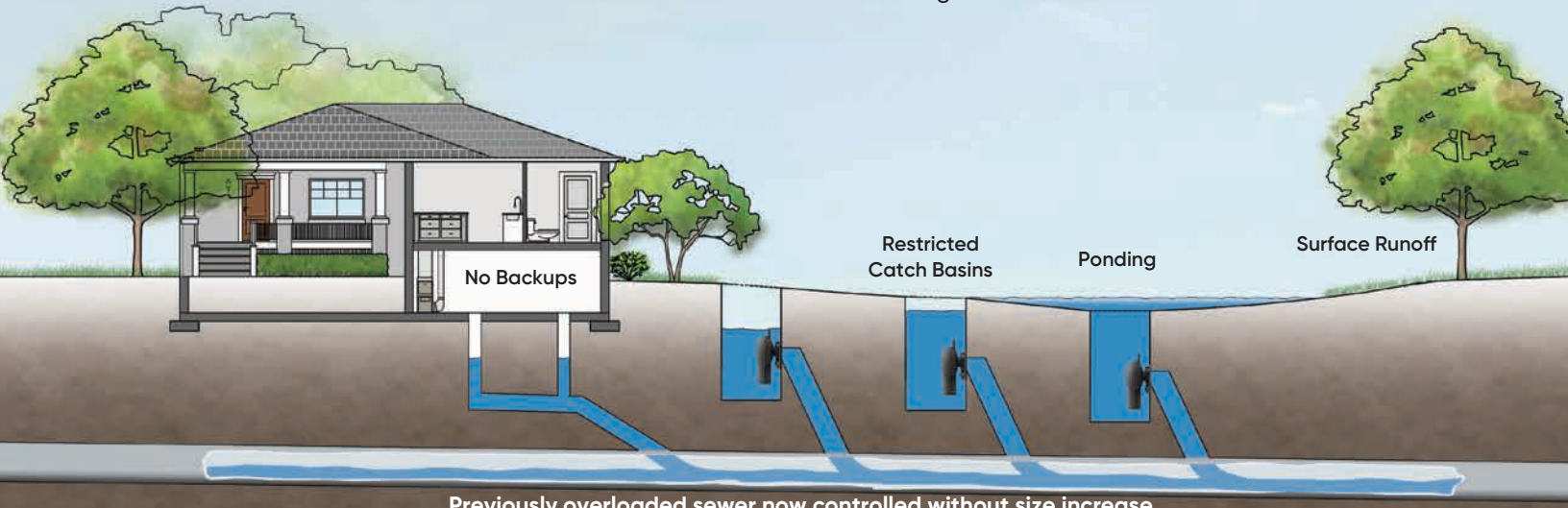
For square catch basins



For round catch basins

SOLUTION: TEMPEST INLET CONTROL SYSTEMS

- Provides control by restricting flow into the sewer system
- Provides temporary ponding in catch basins, parking lots & roadways
- Helps preserve sewer capacity, slows down the inlet flow
- Reduces residential flooding and flash flooding
- Water surcharge is controlled and directed as per engineer design
- Can accommodate outlet pipes 6" and larger



Previously overloaded sewer now controlled without size increase

CUSTOMER SERVICE CENTRE

IPEX Inc.
Toll Free: (866) 473-9462
ipexna.com

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Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, PVDF, PE, ABS, and PEX pipe and fittings
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems



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TEMPEST™ is a trademark of IPEX Branding Inc.

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A policy of ongoing product improvement is maintained. This may result in modifications of features and/or specifications without notice.

IPEX by aliaxis

BRMNTPIP170103RC
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Volume III: TEMPEST INLET CONTROL DEVICES



Municipal Technical Manual Series

SECOND EDITION

LMF (Low to Medium Flow) ICD

HF (High Flow) ICD

MHF (Medium to High Flow) ICD

IPEX
by aliaxis

IPEX Tempest™ Inlet Control Devices

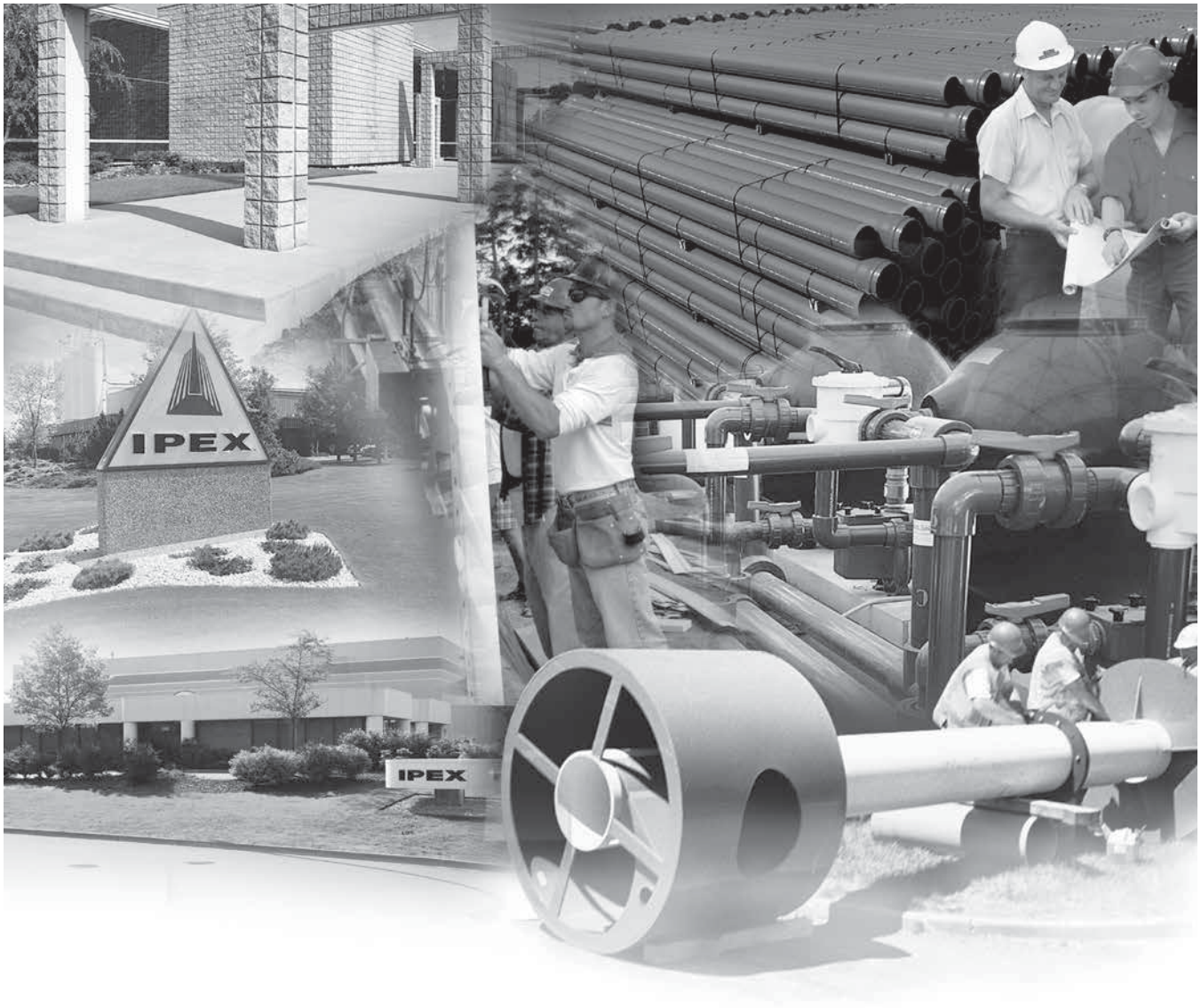
Municipal Technical Manual Series

Vol. I, 2nd Edition

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For information contact: IPEX, Marketing,
1425 North Service Road East, Oakville, Ontario, Canada, L6H 1A7

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ABOUT IPEX

At IPEX, we have been manufacturing non-metallic pipe and fittings since 1951. We formulate our own compounds and maintain strict quality control during production. Our products are made available for customers thanks to a network of regional stocking locations throughout North America. We offer a wide variety of systems including complete lines of piping, fittings, valves and custom-fabricated items.

More importantly, we are committed to meeting our customers' needs. As a leader in the plastic piping industry, IPEX continually develops new products, modernizes manufacturing facilities and acquires innovative process technology. In addition, our staff take pride in their work, making available to customers their extensive thermoplastic knowledge and field experience. IPEX personnel are committed to improving the safety, reliability and performance of thermoplastic materials. We are involved in several standards committees and are members of and/or comply with the organizations listed on this page.

For specific details about any IPEX product, contact our customer service department.

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TEMPEST INLET CONTROL DEVICES Technical Manual

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Dimensioning 7
Installation 7

Section Two: Product Information: TEMPEST High Flow (HF) & Medium, High Flow (MHF) ICD

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Materials 11
Dimensioning 11
Installation 11

NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

PRODUCT INFORMATION: TEMPEST LOW, MEDIUM FLOW (LMF) ICD

Purpose

To control the amount of storm water runoff entering a sewer system by allowing a specified flow volume out of a catch basin or manhole at a specified head. This approach conserves pipe capacity so that catch basins downstream do not become uncontrollably surcharged, which can lead to basement floods, flash floods and combined sewer overflows.

Product Description

Our LMF ICD is designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter and larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 14 preset flow curves, the LMF ICD has the ability to provide flow rates: 2lps – 17lps (31gpm – 270gpm)

Product Function

The LMF ICD vortex flow action allows the LMF ICD to provide a narrower flow curve using a larger orifice than a conventional orifice plate ICD, making it less likely to clog. When comparing flows at the same head level, the LMF ICD has the ability to restrict more flow than a conventional ICD during a rain event, preserving greater sewer capacity.

Product Construction

Constructed from durable PVC, the LMF ICD is light weight 8.9 Kg (19.7 lbs).

Product Applications

Will accommodate both square and round applications:

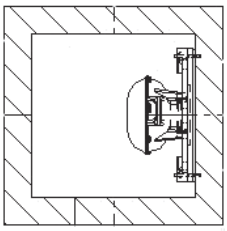


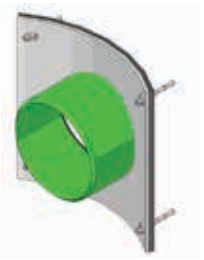
Square Application

Round Application



Universal Mounting Plate





+

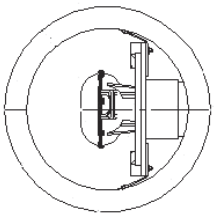


Spigot CB Wall Plate

=



Universal Mounting Plate Hub Adapter



NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

Chart 1: LMF 14 Preset Flow Curves

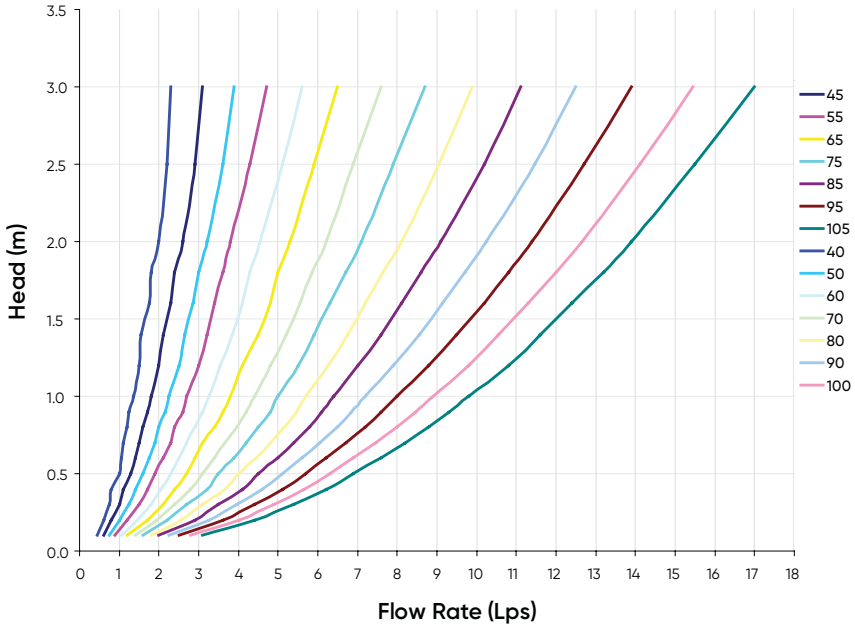
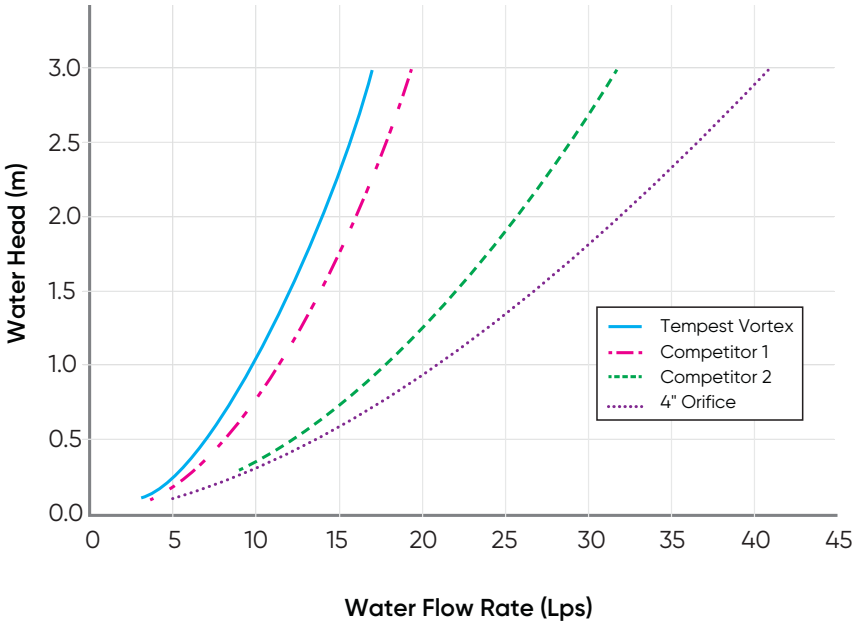


Chart 2: LMF Flow vs. ICD Alternatives



NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

PRODUCT INSTALLATION

Instructions to assemble a TEMPEST LMF ICD into a Square Catch Basin:

STEPS:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device.
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST LMF ICD into a Round Catch Basin:

STEPS:

1. Materials and tooling verification.
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut back the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at ipexna.com.
- Call your IPEX representative for more information or if you have any questions about our products.

NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

PRODUCT TECHNICAL SPECIFICATION

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

PRODUCT INFORMATION: TEMPEST HF & MHF ICD

Product Description

Our HF, HF Sump and MHF ICD's are designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter or larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 5 preset flow curves, these ICDs have the ability to provide constant flow rates: 9lps (143 gpm) and greater

Product Function



TEMPEST HF (High Flow): designed to manage moderate to higher flows 15 L/s (240 gpm) or greater and prevent the propagation of odour and floatables. With this device, the cross-sectional area of the device is larger than the orifice diameter and has been designed to limit head losses. The HF ICD can also be ordered without flow control when only odour and floatable control is required.



TEMPEST HF (High Flow) Sump: The height of a sewer outlet pipe in a catch basin is not always conveniently located. At times it may be located very close to the catch basin floor, not providing enough sump for one of the other TEMPEST ICDs with universal back plate to be installed. In these applications, the HF Sump is offered. The HF Sump offers the same features and benefits as the HF ICD; however, is designed to raise the outlet in a square or round catch basin structure. When installed, the HF sump is fixed in place and not easily removed. Any required service to the device is performed through a clean-out located in the top of the device which can be often accessed from ground level.



TEMPEST MHF (Medium to High Flow): The MHF plate or plug is designed to control flow rates 9 L/s (143 gpm) or greater. It is not designed to prevent the propagation of odour and floatables.

Product Construction

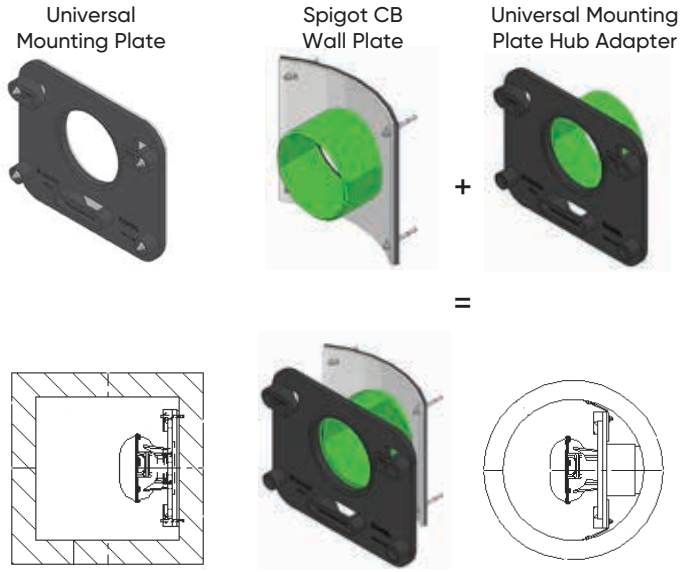
The HF, HF Sump and MHF ICDs are built to be light weight at a maximum weight of 6.8 Kg (14.6 lbs).

Product Applications

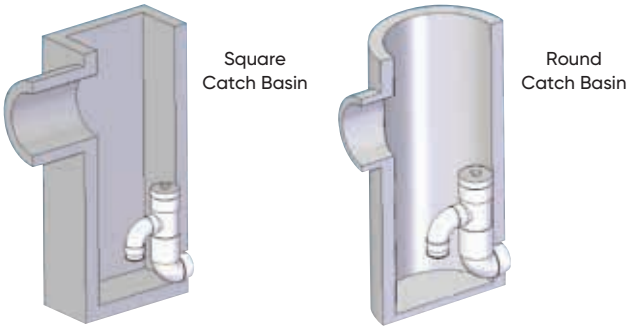
The HF and MHF ICD's are available to accommodate both square and round applications:



Square Application **Round Application**

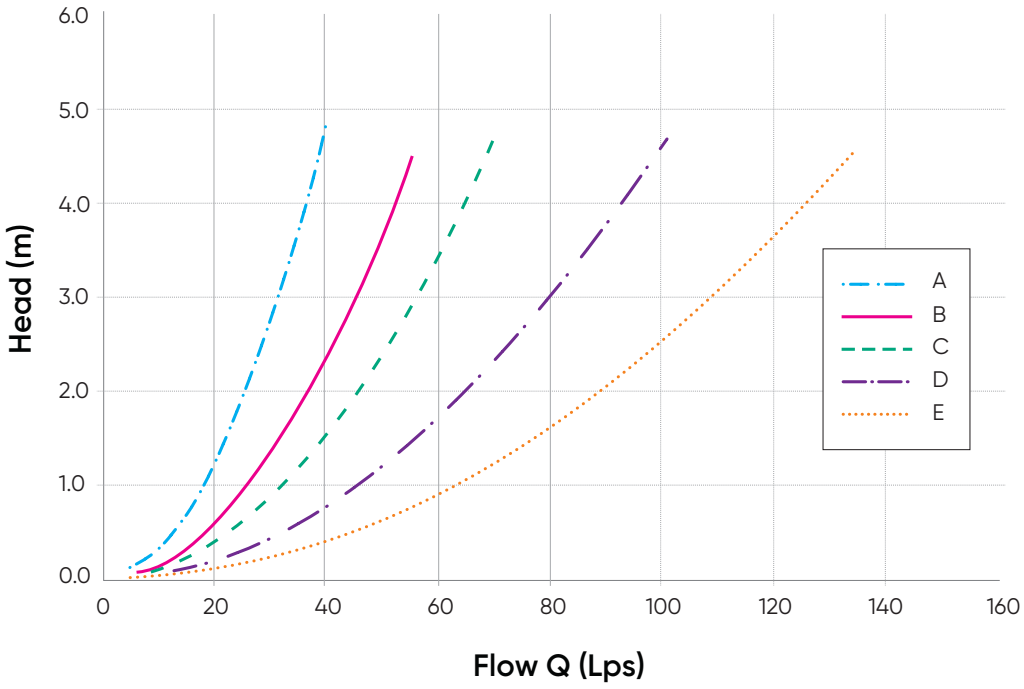


The HF Sump is available to accommodate low to no sump applications in both square and round catch basins:



NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

Chart 3: HF & MHF Preset Flow Curves



NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

PRODUCT INSTALLATION

Instructions to assemble a TEMPEST HF or MHF ICD into a Square Catch Basin:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal wall mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal wall mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST HF or MHF ICD into a Round Catch Basin:

STEPS:

1. Materials and tooling verification.
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the round catch basin spigot adaptor to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the spigot CB wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot CB wall plate and the catch basin wall.
6. Put solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.
- Call your IPEX representative for more information or if you have any questions about our products.

NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

Instructions to assemble a TEMPEST HF Sump into a Square or Round Catch Basin:

STEPS:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, mastic tape and metal strapping
   - Material: (2) concrete anchor 3/8 x 3-1/2, (2) washers, (2) nuts, HF Sump pieces (2).
2. Apply solvent cement to the spigot end of the top half of the sump. Apply solvent cement to the hub of the bottom half of the sump. Insert the spigot of the top half of the sump into the hub of the bottom half of the sump.
3. Install the 8" spigot of the device into the outlet pipe. Use the mastic tape to seal the device spigot into the outlet pipe. You should use a level to be sure that the fitting is standing at the vertical.
4. Use an impact drill with a 3/8" concrete bit to make a series of 2 holes along each side of the body throat. The depth of the hole should be between 1-1/2" to 2-1/2". Clean the concrete dust from the 2 holes.
5. Install the anchors (2) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you hit the anchors. Remove the nuts from the ends of the anchors.
6. Cut the metal strapping to length and connect each end of the strapping to the anchors. Screw the nuts in place with a maximum torque of 40 N.m (30 lbf-ft). The device should be completely flush with the catch basin wall.

⚠ WARNING

- **Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.**
- **The solvent cement which is used in this installation is to be approved for PVC.**
- **The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.**
- **Call your IPEX representative for more information or if you have any questions about our products.**

PRODUCT TECHNICAL SPECIFICATION

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook shall be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above shall not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices shall consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

NOTES

NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

SALES AND CUSTOMER SERVICE

IPEX Inc.
Toll Free: (866) 473-9462
ipexna.com

About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have established a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, ABS, PEX, FR-PVDF and PE pipe and fittings (1/4" to 48")
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

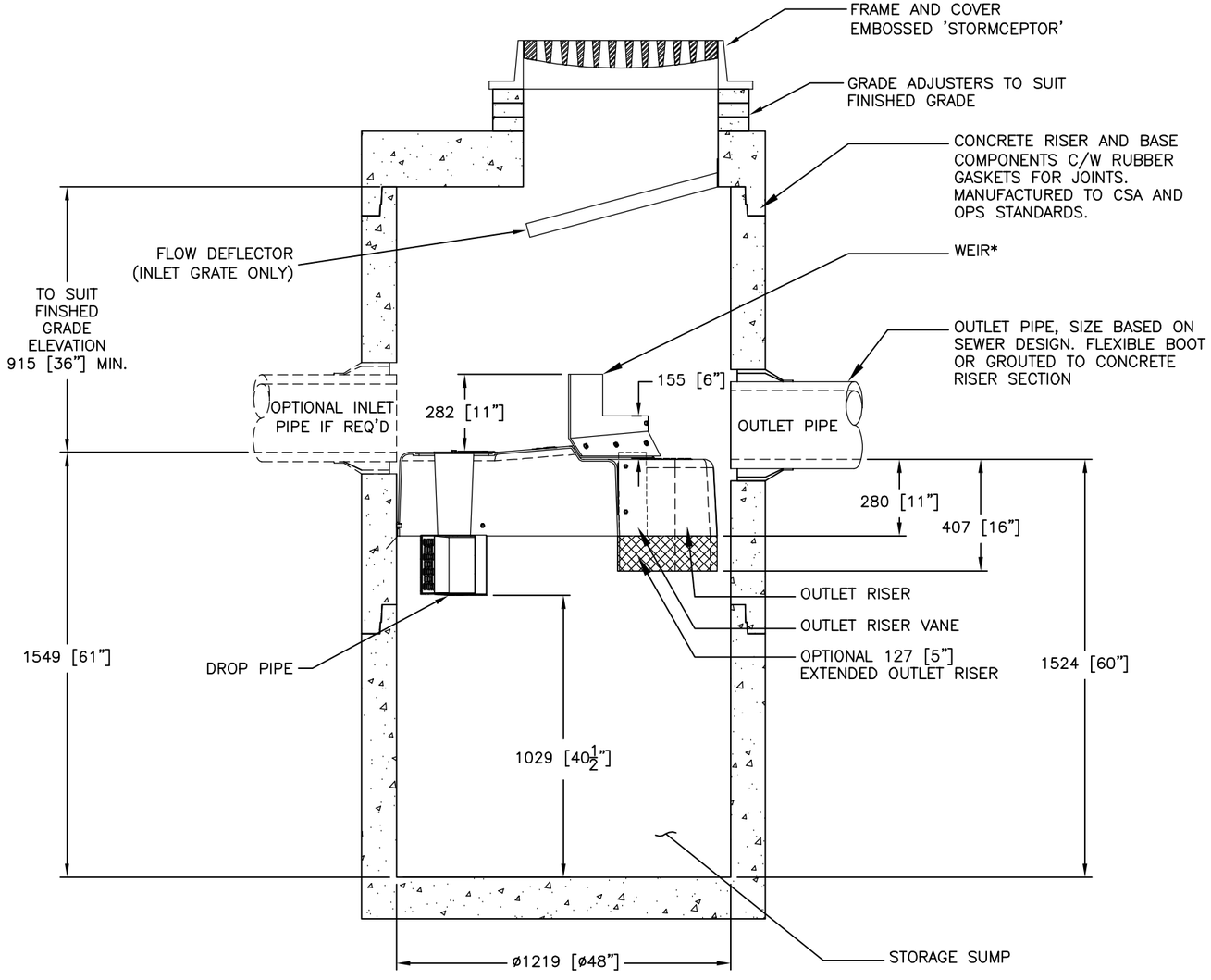
Products manufactured by IPEX Inc.
Tempest™ is a trademark of IPEX Branding Inc.

This literature is published in good faith and is believed to be reliable. However it does not represent and/or warrant in any manner the information and suggestions contained in this brochure. Data presented is the result of laboratory tests and field experience.

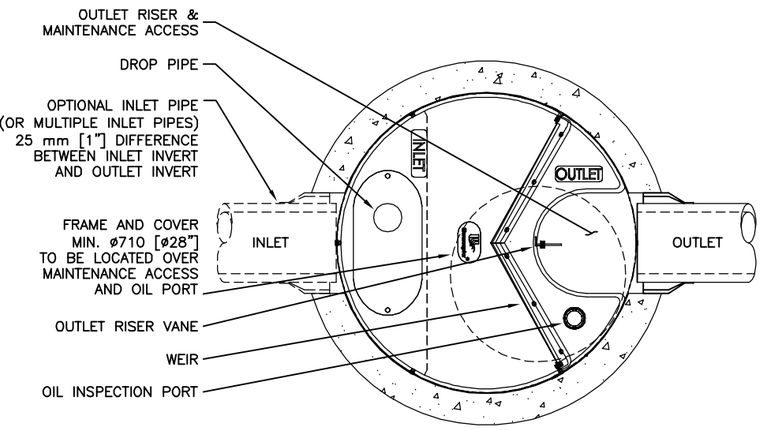
A policy of ongoing product improvement is maintained. This may result in modifications of features and/or specifications without notice.

IPEX by aliaxis

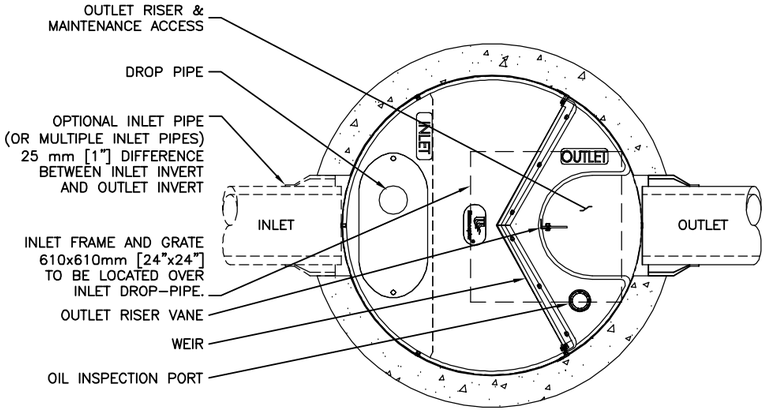
MNMNTPIP110817RC
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SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

The design and information shown on this drawing is provided as a service to the project owner, engineer and contractor by Imbrium Systems ("Imbrium"). Neither this drawing, nor any part thereof, may be used, reproduced or modified in any manner without the prior written consent of Imbrium. Failure to comply is done at the user's own risk and Imbrium expressly disclaims any liability or responsibility for such use.

If discrepancies between the supplied information upon which this drawing is based and actual conditions are encountered, these discrepancies must be reported to Imbrium immediately for re-evaluation of the design. Imbrium accepts no liability for designs based on incorrect, incomplete or inaccurate information supplied by others.

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	UPDATES	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON, L1N 9A9
TF 800-565-4501 CA 416-800-9000 INTL +1-416-800-9000

DATE: 10/13/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EFO4	*

SHEET: 1 OF 1

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

07/20/2026

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	OGS

Drainage Area (ha):	0.55
Runoff Coefficient 'c':	0.88

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	15.62
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	600
Estimated Average Annual Sediment Volume (L/yr):	488

Project Name:	Wateridge Lifestyles
Project Number:	-
Designer Name:	Jessica Steffler
Designer Company:	Rinker Materials
Designer Email:	jessica.steffler@RinkerPipe.com
Designer Phone:	519-239-6958
EOR Name:	Brandon MacKechnie
EOR Company:	Robinson Consultants Inc.
EOR Email:	bmackechnie@rcii.com
EOR Phone:	613-891-6485

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	83
EFO5	88
EFO6	92
EFO8	96
EFO10	98
EFO12	99

Recommended Stormceptor EFO Model:	EFO4
Estimated Net Annual Sediment (TSS) Load Reduction (%):	83
Water Quality Runoff Volume Capture (%):	> 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►Stormceptor® EF and Stormceptor® EFO are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators and performance has been third-party verified in accordance with the ISO 14034 Environmental Technology Verification (ETV) protocol.

PERFORMANCE

►Stormceptor® EF and EFO remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

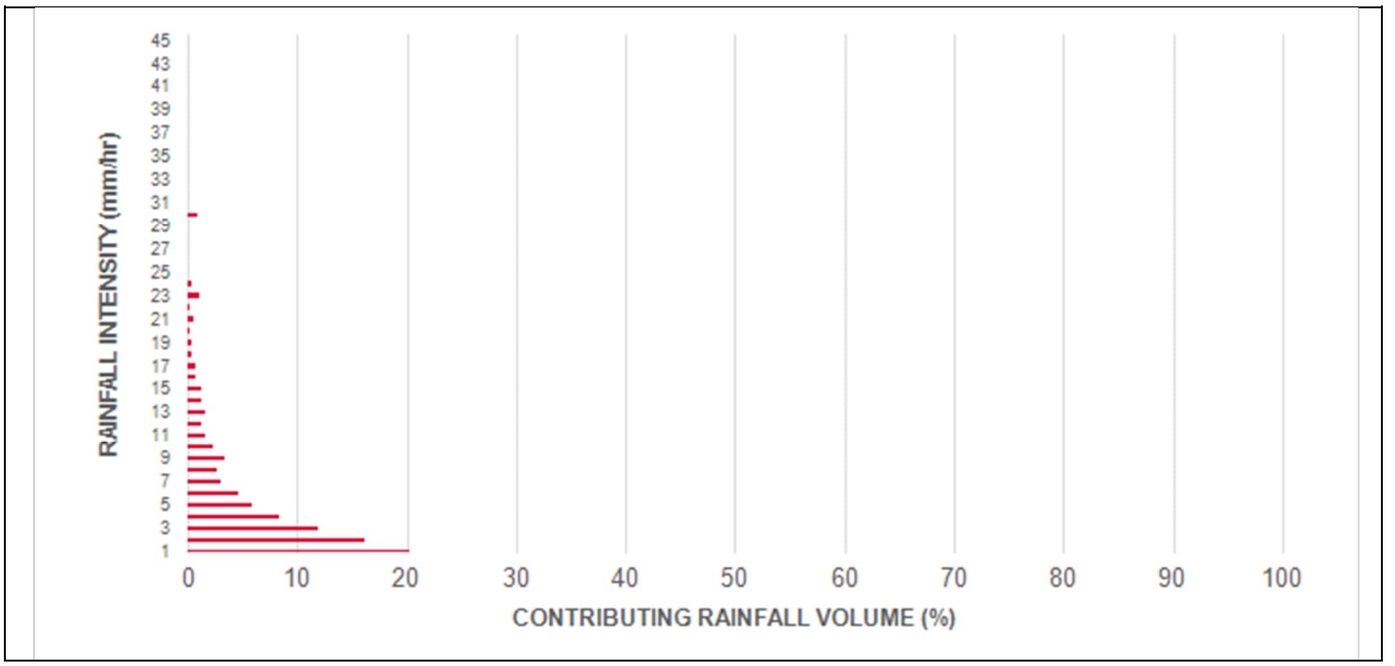
►The Canadian ETV PSD shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV *Procedure for Laboratory Testing of Oil-Grit Separators* for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

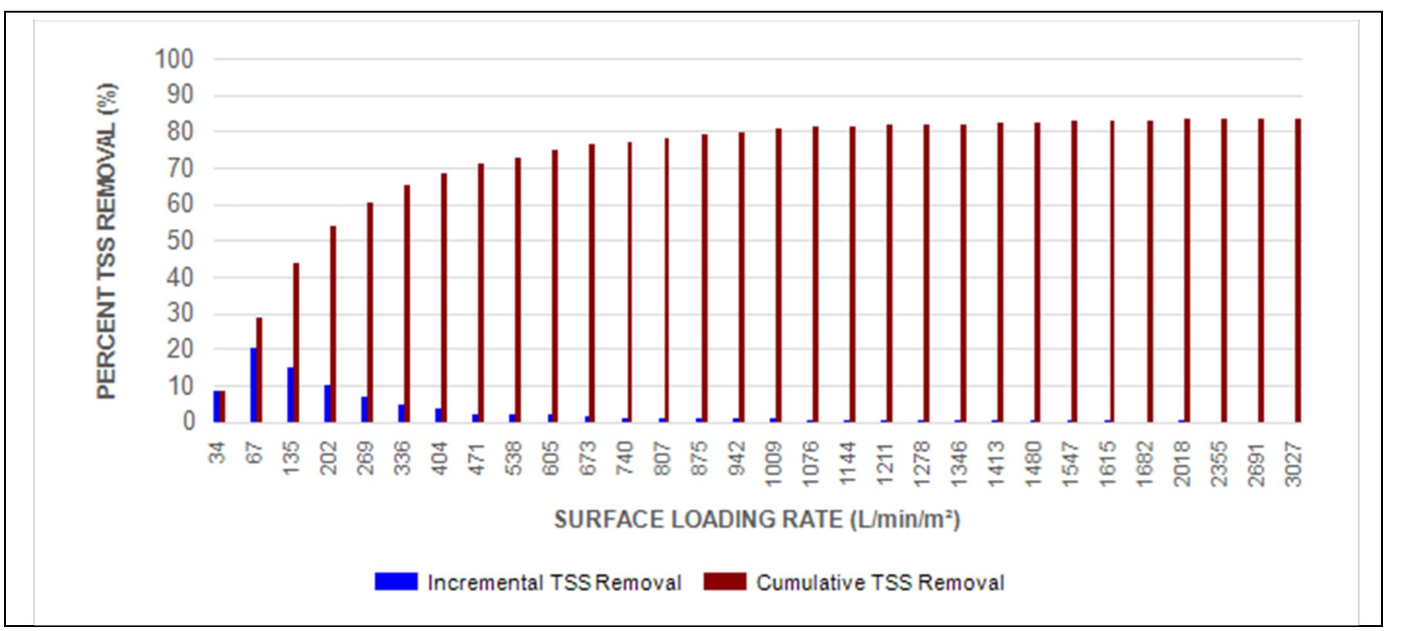
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.67	40.0	34.0	100	8.6	8.6
1.00	20.3	29.0	1.35	81.0	67.0	100	20.3	29.0
2.00	16.2	45.2	2.69	161.0	135.0	92	14.9	43.9
3.00	12.0	57.2	4.04	242.0	202.0	83	10.0	53.9
4.00	8.4	65.6	5.38	323.0	269.0	80	6.7	60.6
5.00	5.9	71.6	6.73	404.0	336.0	77	4.6	65.2
6.00	4.6	76.2	8.07	484.0	404.0	74	3.4	68.6
7.00	3.1	79.3	9.42	565.0	471.0	71	2.2	70.8
8.00	2.7	82.0	10.76	646.0	538.0	68	1.9	72.6
9.00	3.3	85.3	12.11	727.0	605.0	65	2.2	74.8
10.00	2.3	87.6	13.46	807.0	673.0	64	1.5	76.3
11.00	1.6	89.2	14.80	888.0	740.0	64	1.0	77.2
12.00	1.3	90.5	16.15	969.0	807.0	63	0.8	78.1
13.00	1.7	92.2	17.49	1050.0	875.0	63	1.1	79.2
14.00	1.2	93.5	18.84	1130.0	942.0	62	0.8	79.9
15.00	1.2	94.6	20.18	1211.0	1009.0	61	0.7	80.6
16.00	0.7	95.3	21.53	1292.0	1076.0	60	0.4	81.0
17.00	0.7	96.1	22.87	1372.0	1144.0	58	0.4	81.5
18.00	0.4	96.5	24.22	1453.0	1211.0	57	0.2	81.7
19.00	0.4	96.9	25.56	1534.0	1278.0	55	0.2	81.9
20.00	0.2	97.1	26.91	1615.0	1346.0	54	0.1	82.0
21.00	0.5	97.5	28.26	1695.0	1413.0	52	0.2	82.3
22.00	0.2	97.8	29.60	1776.0	1480.0	49	0.1	82.4
23.00	1.0	98.8	30.95	1857.0	1547.0	48	0.5	82.9
24.00	0.3	99.1	32.29	1938.0	1615.0	45	0.1	83.0
25.00	0.0	99.1	33.64	2018.0	1682.0	44	0.0	83.0
30.00	0.9	100.0	40.37	2422.0	2018.0	36	0.3	83.3
35.00	0.0	100.0	47.09	2826.0	2355.0	31	0.0	83.3
40.00	0.0	100.0	53.82	3229.0	2691.0	28	0.0	83.3
45.00	0.0	100.0	60.55	3633.0	3027.0	24	0.0	83.3
Estimated Net Annual Sediment (TSS) Load Reduction =								83 %

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

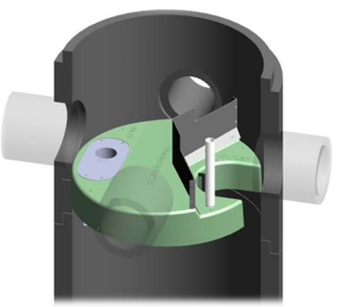
►Stormceptor® EF and EFO feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

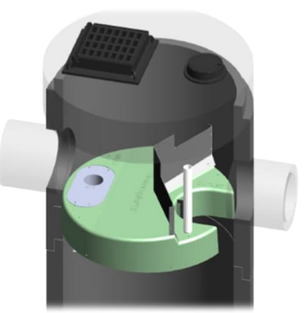
DESIGN FLEXIBILITY

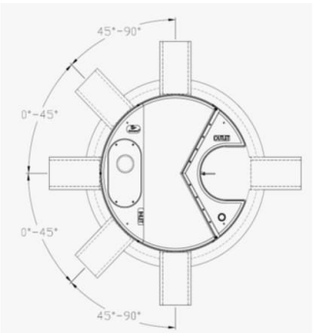
►Stormceptor® EF and EFO offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, Stormceptor® EFO has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

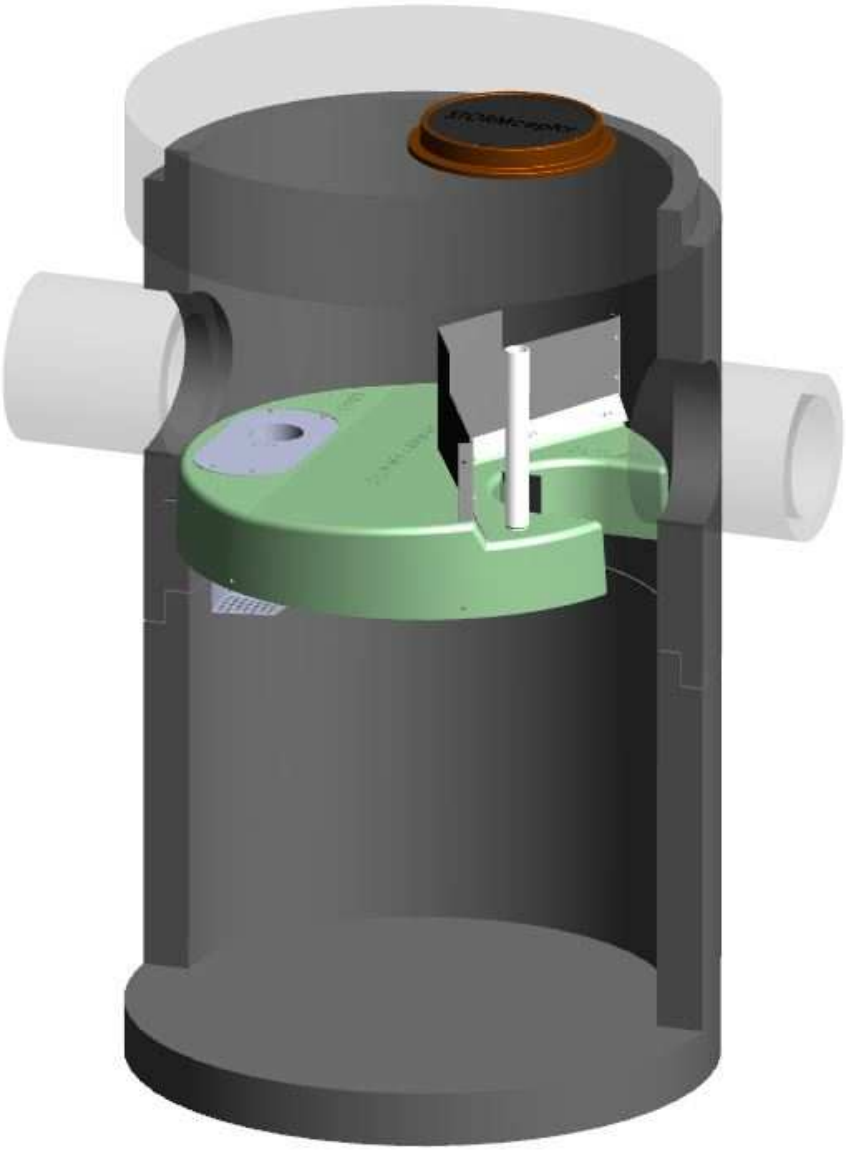
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance

results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor® EF

Owner's Manual



Stormceptor is protected by one or more of the following patents:

Canadian Patent No. 2,137,942
Canadian Patent No. 2,180,305
Canadian Patent No. 2,327,768
Canadian Patent No. 2,694,159
Canadian Patent No. 2,697,287
U.S. Patent No. 6,068,765
U.S. Patent No. 6,371,690
U.S. Patent No. 7,582,216
U.S. Patent No. 7,666,303
Australia Patent No. 693.164
Australia Patent No. 729,096
Australia Patent No. 2008,279,378
Australia Patent No. 2008,288,900
Japanese Patent No. 5,997,750
Japanese Patent No. 5,555,160
Korean Patent No. 0519212
Korean Patent No. 1451593
New Zealand Patent No. 583,008
New Zealand Patent No. 583,583
South African Patent No. 2010/00682
South African Patent No. 2010/01796
Patent pending

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1 - Stormceptor EF Overview

2 - Stormceptor EF Operation, Components

3 - Stormceptor EF Model Details

4 - Stormceptor EF Identification

5 - Stormceptor EF Inspection & Maintenance

6 – Stormceptor Contacts

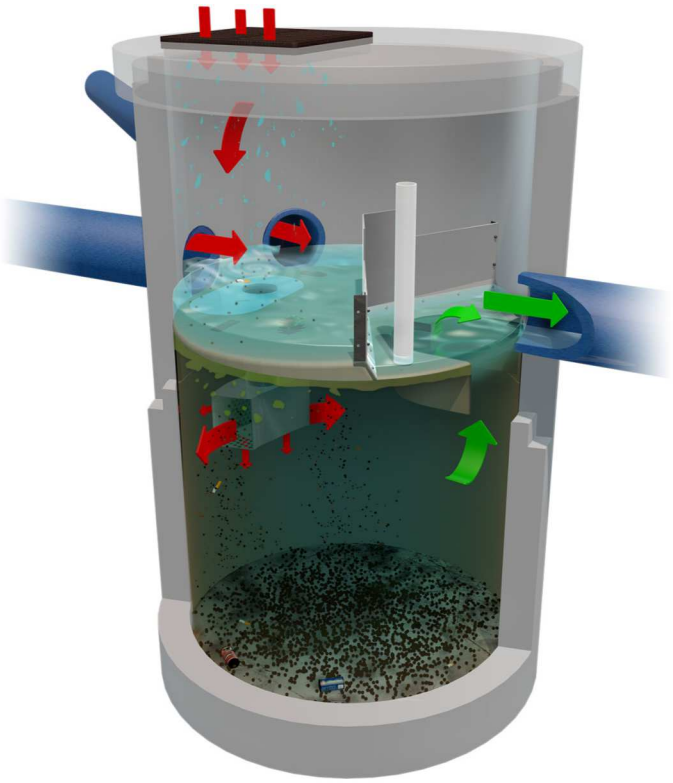
OVERVIEW

Stormceptor® EF is a continuation and evolution of the most globally recognized oil grit separator (OGS) stormwater treatment technology - ***Stormceptor®***. Also known as a hydrodynamic separator, the enhanced flow Stormceptor EF is a high performing oil grit separator that effectively removes a wide variety of pollutants from stormwater and snowmelt runoff at flow rates higher than the original Stormceptor. Stormceptor EF captures and retains sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's patent-pending treatment and scour prevention platform ensures sediment is retained during all rainfall events.

Stormceptor EF offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe, multiple inlet pipes, and/or from the surface through an inlet grate. Stormceptor EF can also serve as a junction structure, accommodate a 90-degree inlet to outlet bend angle, and be modified to ensure performance in submerged conditions. With its scour prevention and internal bypass, Stormceptor EF can be installed online, eliminating the need for costly additional bypass structures.

OPERATION

- Stormwater enters the Stormceptor upper chamber through the inlet pipe(s) or a surface inlet grate. A specially designed insert reduces the influent velocity by creating a pond upstream of the insert's weir. Sediment particles immediately begin to settle. Swirling flow sweeps water, sediment, and floatables across the sloped surface of the insert to the inlet opening of the drop pipe, where a strong vortex draws water, sediment, oil, and debris down the drop pipe cone.
- Influent exits the cone into the drop pipe duct. The duct has two large rectangular outlet openings as well as perforations in the backside and floor of the duct. Influent is diffused through these various opening in multiple directions and at low velocity into the lower chamber.
- Free oils and other floatables rise up within the channel surrounding the central riser pipe and are trapped beneath the insert, while sediment settles to the sump. Pollutants are retained for later removal during maintenance cleaning.
- Treated effluent enters the outlet riser, moves upward, and discharges to the top side of the insert downstream of the weir, where it flows out the outlet pipe.
- During intense storm events with very high influent flow rates, the pond height on the upstream side of the weir may exceed the height of the weir, and the excess flow passes over the top of the weir to the downstream side of the insert, and exits through the outlet pipe. This internal bypass feature allows for in-line installation, avoiding the cost of additional bypass structures. During bypass, the pond separates sediment from all incoming flows, while full treatment in the lower chamber continues at the maximum flow rate.
- Stormceptor EF's patent-pending enhanced flow and scour prevention technology ensures pollutants are captured and retained, allowing excess flows to bypass during infrequent, high intensity storms.



COMPONENTS

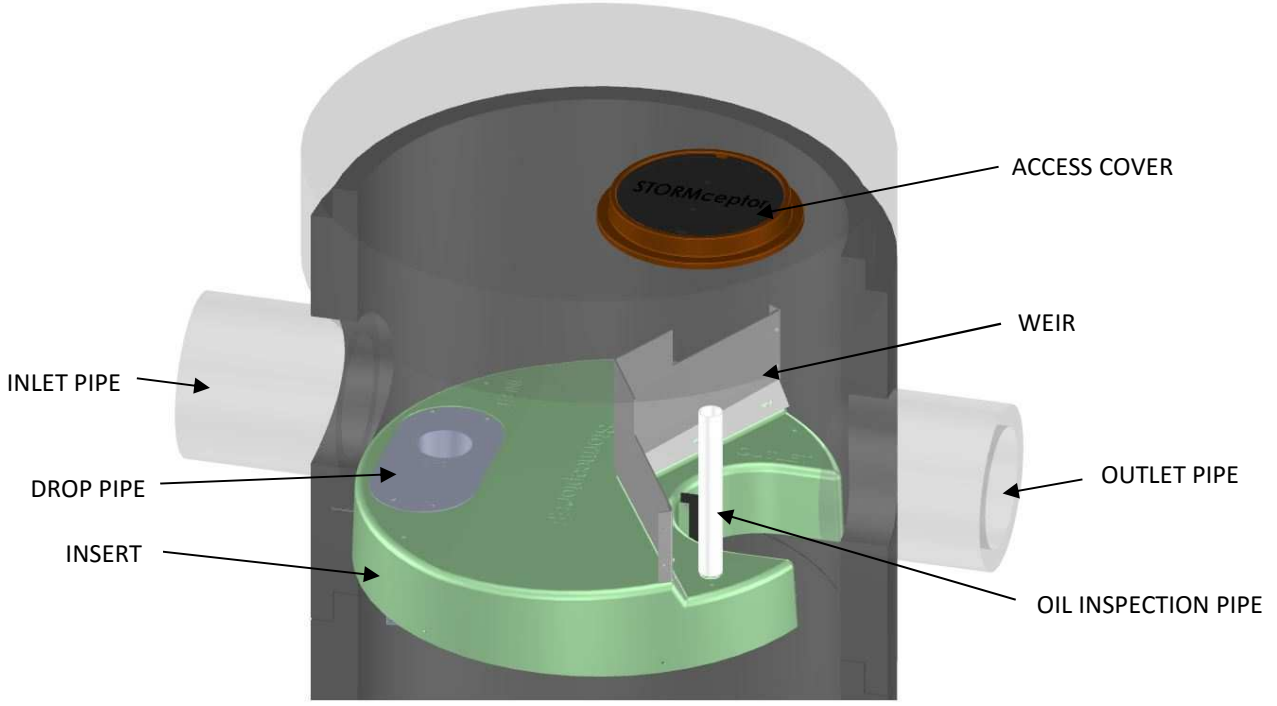


Figure 1

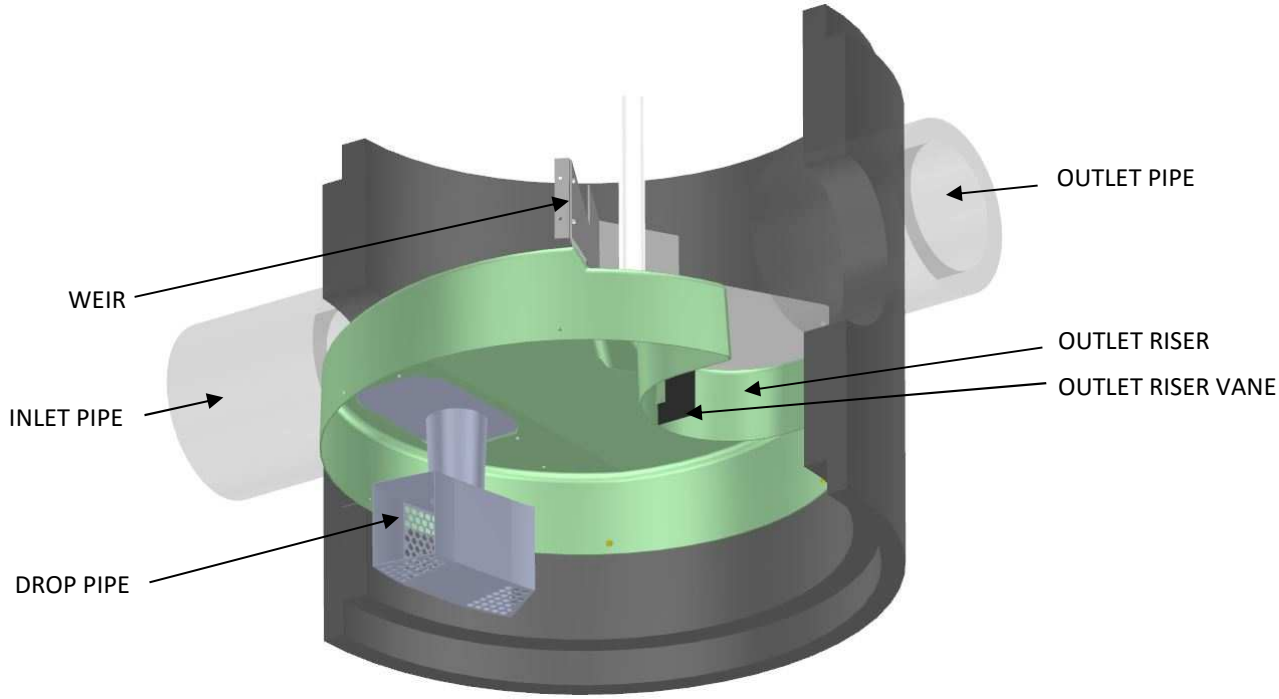


Figure 2

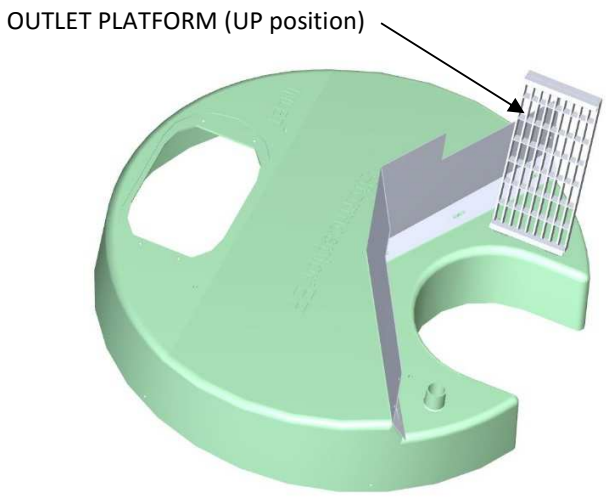


Figure 3A

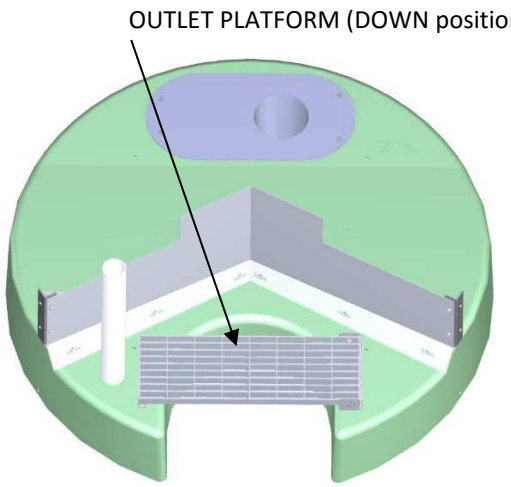


Figure 3B

- **Insert** – separates vessel into upper and lower chambers, and provides double-wall containment of hydrocarbons
- **Weir** – creates stormwater ponding and driving head on top side of insert
- **Drop pipe** – conveys stormwater and pollutants into the lower chamber
- **Outlet riser** – conveys treated stormwater from the lower chamber to the outlet pipe, and provides primary inspection and maintenance access into the lower chamber
- **Outlet riser vane** – prevents formation of a vortex in the outlet riser during high flow rate conditions
- **Outlet platform (optional)** – safety platform in the event of manned entry into the unit
- **Oil inspection pipe** – primary access for measuring oil depth

PRODUCT DETAILS

METRIC DIMENSIONS AND CAPACITIES

Table 1

Stormceptor Model	Inside Diameter (m)	Minimum Surface to Outlet Invert Depth (mm)	Depth Below Outlet Pipe Invert (mm)	Wet Volume (L)	Sediment Capacity [1] (m^3)	Hydrocarbon Storage Capacity [2] (L)	Maximum Flow Rate into Lower Chamber [3] (L/s)	Peak Conveyance Flow Rate [4] (L/s)
EF4 / EFO4	1.22	915	1524	1780	1.19	265	22.1 / 10.4	425
EF6 / EFO6	1.83	915	1930	5070	3.47	610	49.6 / 23.4	990
EF8 / EFO8	2.44	1219	2591	12090	8.78	1070	88.3 / 41.6	1700
EF10 / EFO10	3.05	1219	3251	23700	17.79	1670	138 / 65	2830
EF12 / EFO12	3.66	1524	3886	40800	31.22	2475	198.7 / 93.7	2830

[1] Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[2] Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[3] EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 1135 L/min/m^2.
EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 535 L/min/m^2.
[4] Peak Conveyance Flow Rate is limited by a maximum velocity of 1.5 m/s.

U.S. DIMENSIONS AND CAPACITIES

Table 2

Stormceptor Model	Inside Diameter (ft)	Minimum Surface to Outlet Invert Depth (in)	Depth Below Outlet Pipe Invert (in)	Wet Volume (gal)	Sediment Capacity [1] (ft^3)	Hydrocarbon Storage Capacity [2] (gal)	Maximum Flow Rate into Lower Chamber [3] (cfs)	Peak Conveyance Flow Rate [4] (cfs)
EF4 / EFO4	4	36	60	471	42	70	0.78 / 0.37	15
EF6 / EFO6	6	36	76	1339	123	160	1.75 / 0.83	35
EF8 / EFO8	8	48	102	3194	310	280	3.12 / 1.47	60
EF10 / EFO10	10	48	128	6261	628	440	4.87 / 2.30	100
EF12 / EFO12	12	60	153	10779	1103	655	7.02 / 3.31	100

[1] Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[2] Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[3] EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 27.9 gpm/ft^2.
EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 13.1 gpm/ft^2.
[4] Peak Conveyance Flow Rate is limited by a maximum velocity of 5 fps.

IDENTIFICATION

Each Stormceptor EF/EFO unit is easily identifiable by the trade name ***Stormceptor***® embossed on the access cover at grade as shown in **Figure 3**. The tradename ***Stormceptor***® is also embossed on the top of the insert upstream of the weir as shown in **Figure 3**.

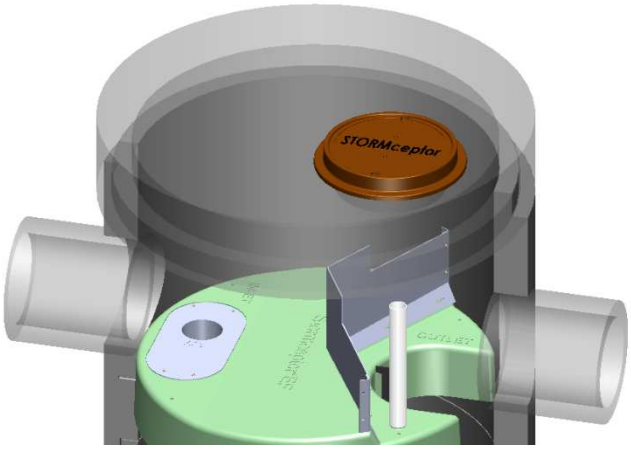


Figure 4

The specific Stormceptor EF/EFO model number is identified on the top of the aluminum Drop Pipe as shown in **Figure 4**. The unit serial number is identified on the top of the insert upstream of the weir as shown in **Figure 4**.

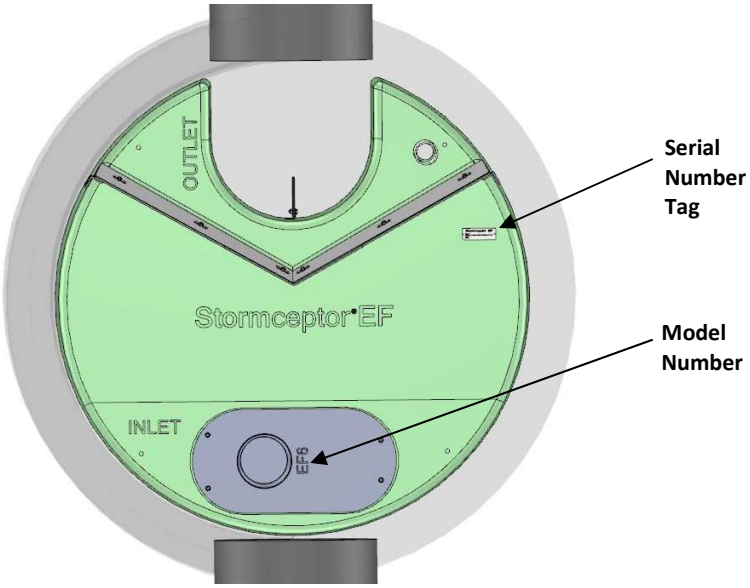


Figure 5

INSPECTION AND MAINTENANCE

It is very important to perform regular inspection and maintenance. Regular inspection and maintenance ensures maximum operation efficiency, keeps maintenance costs low, and provides continued of natural waterways.

Quick Reference

- Typical inspection and maintenance is performed from grade
- Remove manhole **cover(s)** or **inlet grate** to access insert and lower chamber
  NOTE: EF4/EFO4 requires the removal of a **flow deflector** beneath inlet grate
- Use Sludge Judge® or similar sediment probe to check sediment depth through the **outlet riser**
- Oil dipstick can be inserted through the **oil inspection pipe**
- Visually inspect the **insert** for debris, remove debris if present
- Visually inspect the **drop pipe** opening for blockage, remove blockage if present
- Visually inspect **insert** and **weir** for damage, schedule repair if needed
- Insert vacuum hose and jetting wand through the outlet riser and extract sediment and floatables
- Replace flow deflector (EF4/EFO4), inlet grate, and cover(s)
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess pollutant accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

When is maintenance cleaning needed?

- If the post-construction inspection indicates presence of construction sediment of a depth greater than a few inches, maintenance is recommended at that time.
- For optimum performance and normal operation the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, see **Table 3**.
- Maintain immediately after an oil, fuel, or other chemical spill.

Table 3

Recommended Sediment Depths for Maintenance Service*	
MODEL	Sediment Depth (in/mm)
EF4 / EFO4	8 / 203
EF6 / EFO6	12 /305
EF8 / EFO8	24 / 610
EF10 / EFO10	24 / 610
EF12 / EFO12	24 / 610

* Based on a minimum distance of 40 inches (1,016 mm) from bottom of outlet riser to top of sediment bed

The frequency of inspection and maintenance may need to be adjusted based on site conditions to ensure the unit is operating and performing as intended. Maintenance costs will vary based on the size of the unit, site conditions, local requirements, disposal costs, and transportation distance.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required (adhere to all OSHA / CCOSH standards)

What conditions can compromise Stormceptor performance?

- Presence of construction sediment and debris in the unit prior to activation
- Excessive sediment depth beyond the recommended maintenance depth
- Oil spill in excess of the oil storage capacity
- Clogging or restriction of the drop pipe inlet opening with debris
- Downstream blockage that results in a backwater condition

Maintenance Procedures

- Maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is maintained from grade through a standard surface manhole access cover or inlet grate.
- In the case of submerged or tailwater conditions, extra measures are likely required, such as plugging the inlet and outlet pipes prior to conducting maintenance.
- Inspection and maintenance of upstream catch basins and other stormwater conveyance structures is also recommended to extend the time between future maintenance cycles.

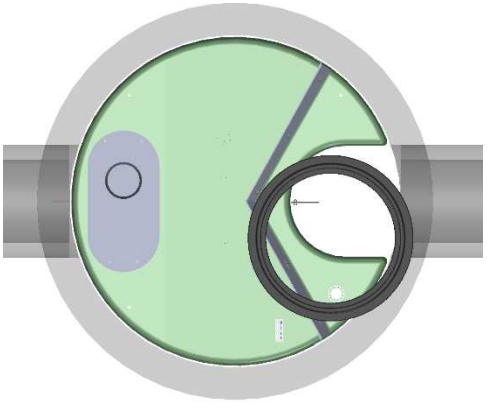


Figure 6

- Sediment depth inspections are performed through the **Outlet Riser** and oil presence can be determined through the **Oil Inspection Pipe**.
- Oil presence and sediment depth are determined by inserting a Sludge Judge® or measuring stick to quantify the pollutant depths.

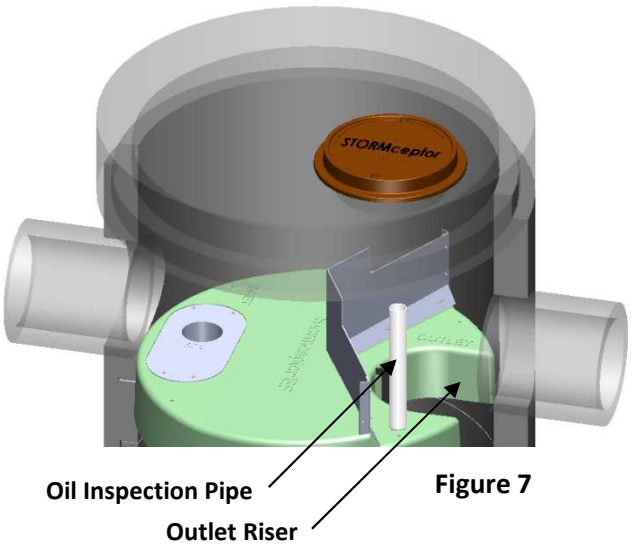


Figure 7



Figure 8

- Visually inspect the insert, weir, and drop pipe inlet opening to ensure there is no damage or blockage.
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

- When maintenance is required, a standard vacuum truck is used to remove the pollutants from the lower chamber of the unit through the **Outlet Riser**.



Figure 9

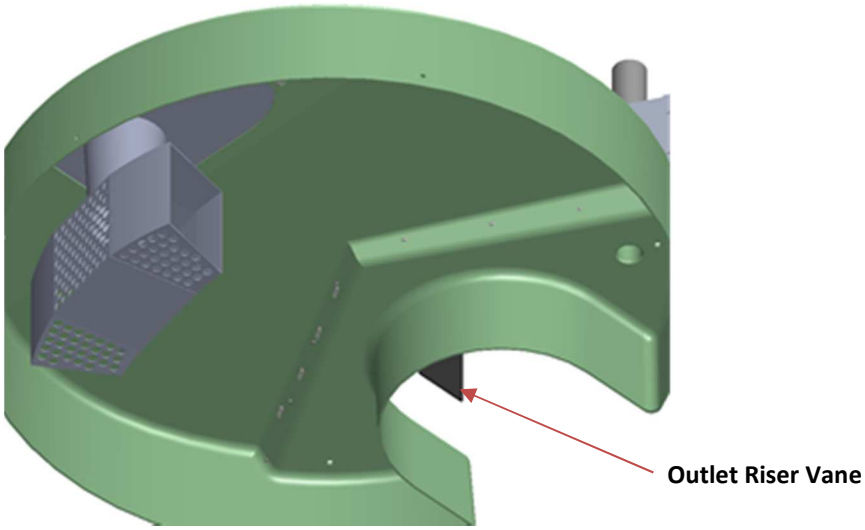
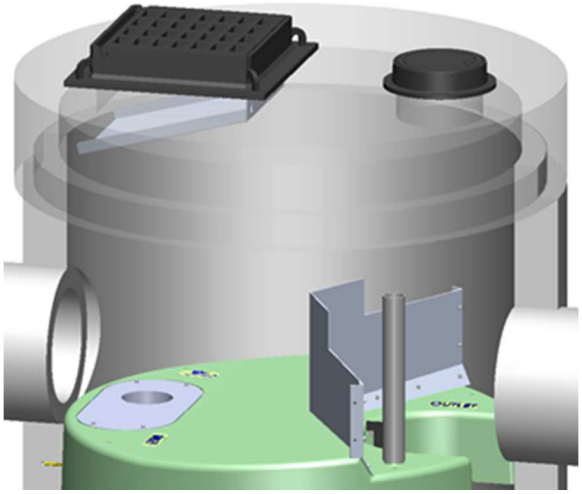


Figure 10

NOTE: The Outlet Riser Vane is durable and flexible and designed to allow maintenance activities with minimal, if any, interference.

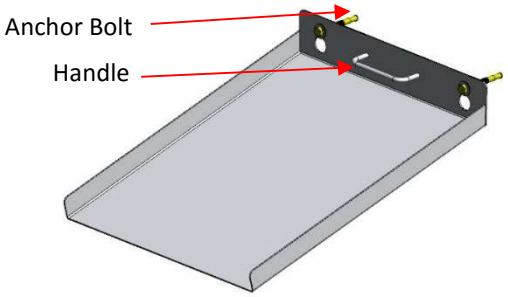
Removable Flow Deflector

- Top grated inlets for the Stormceptor EF4/EFO4 model requires a removable flow deflector staged underneath a 24-inch x 24-inch (600 mm x 600 mm) square inlet grate to direct flow towards the inlet side of the insert, and avoid flow and pollutants from entering the outlet side of the insert from grade. The EF6/EFO6 and larger models do not require the flow deflector.



How to Remove:

1. Loosen anchor bolts
2. Pull up and out using the handle



Removable Flow Deflector

Figure 11

Hydrocarbon Spills

Stormceptor is often installed on high pollutant load hotspot sites with vehicular traffic where hydrocarbon spill potential exists. Should a spill occur, or presence of oil be identified within a Stormceptor EF/EFO, it should be cleaned immediately by a licensed liquid waste hauler.

Disposal

Maintenance providers are to follow all federal, state/ provincial, and local requirements for disposal of material.

Oil Sheens

When oil is present in stormwater runoff, a sheen may be noticeable at the Stormceptor outlet. An oil rainbow or sheen can be noticeable at very low oil concentrations (< 10 mg/L). Despite the appearance of a sheen, Stormceptor EF/EFO may still be functioning as intended.

Oil Level Alarm

To mitigate spill liability with 24/7 detection, an electronic monitoring system can be employed to trigger a visual and audible alarm when a pre-set level of oil is captured within the lower chamber or when an oil spill occurs. The oil level alarm is available as an optional feature to include with Stormceptor EF/EFO as shown in **Figure 11**. For additional details about the Oil Level Alarm please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-systems.

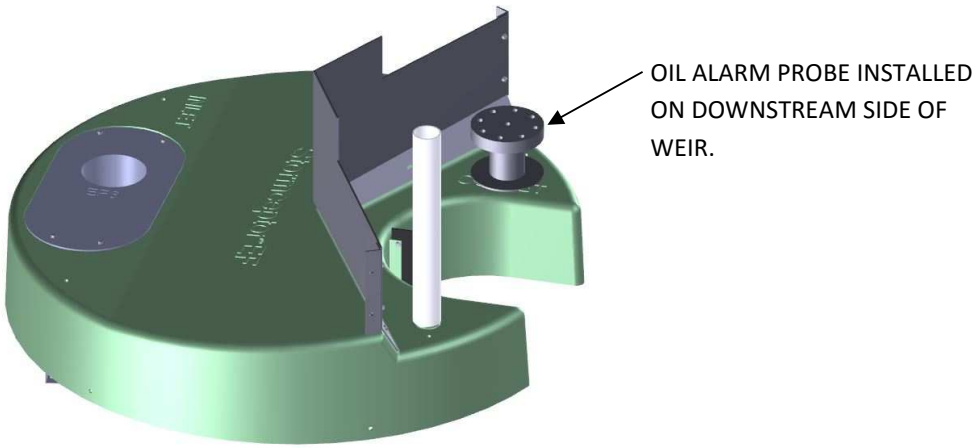


Figure 12

Replacement Parts

Stormceptor has no moving parts to wear out. Therefore inspection and maintenance activities are generally focused on pollutant removal. Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. However, if replacement parts are necessary, they may be purchased by contacting your local Stormceptor representative.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Recommended Sediment Maintenance Depth: _____

DATE	SEDIMENT DEPTH (inch or mm)	OIL DEPTH (inch or mm)	SERVICE REQUIRED (Yes / No)	MAINTENANCE PERFORMED	MAINTENANCE PROVIDER	COMMENTS

Other Comments:

Contact Information

Questions regarding Stormceptor EF/EFO can be addressed by contacting your local Stormceptor representative or by visiting our website at **www.stormceptor.com.**

Imbrium Systems Inc. & Imbrium Systems LLC

Canada	1-416-960-9900 / 1-800-565-4801
United States	1-301-279-8827 / 1-888-279-8826
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STANDARD SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE WITH THIRD-PARTY VERIFIED LIGHT LIQUID RE-ENTRAINMENT SIMULATION PERFORMANCE TESTING RESULTS

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, designing, maintaining, and constructing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, **specifically an OGS device that has been third-party tested for oil and fuel retention capability using a protocol for light liquid re-entrainment simulation testing, with testing results and a Statement of Verification in accordance with all the provisions of ISO 14034 Environmental Management – Environmental Technology Verification (ETV)**. Work includes supply and installation of concrete bases, precast sections, and the appropriate precast section with OGS internal components correctly installed within the system, watertight sealed to the precast concrete prior to arrival to the project site.

1.2 REFERENCE STANDARDS

1.2.1 For Canadian projects only, the following reference standards apply:

CAN/CSA-A257.4-14: Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections, and Fittings Using Rubber Gaskets
CAN/CSA-A257.4-14: Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings
CAN/CSA-S6-00: Canadian Highway Bridge Design Code

1.2.2 For ALL projects, the following reference standards apply:

ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks
ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C 891: Standard Practice for Installation of Underground Precast Concrete Utility Structures
ASTM D2563: Standard Practice for Classification of Visual Defects in Reinforced Plastics

1.3 SHOP DRAWINGS

1.3.1 Shop drawings shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail the precast concrete components and OGS internal components prior to shipment, including the sequence for installation.

1.3.2 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record. Any and all changes to project cost estimates, bonding amounts, plan check fees for revision of approved documents, or design impacts due to regulatory requirements as a result of a product substitution shall be coordinated by the Contractor with the Engineer of Record.

1.4 HANDLING AND STORAGE

Prevent damage to materials during storage and handling.

1.4.1 OGS internal components supplied by the Manufacturer for attachment to the precast concrete vessel shall be pre-fabricated, bolted to the precast and watertight sealed to the precast vessel surface prior to site delivery to ensure Manufacturer's internal assembly process and quality control processes are fully adhered to, and to prevent materials damage on site.

1.4.2 Follow all instructions including the sequence for installation in the shop drawings during installation.

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 The OGS vessel shall be cylindrical and constructed from precast concrete riser and slab components.

2.1.2 The precast concrete OGS internal components shall include a fiberglass insert bolted and watertight sealed inside the precast concrete vessel, prior to site delivery. Primary internal components that are to be anchored and watertight sealed to the precast concrete vessel shall be done so only by the Manufacturer prior to arrival at the job site to ensure product quality.

2.1.3 The OGS shall be allowed to be specified and have the ability to function as a 240-degree bend structure in the stormwater drainage system, or as a junction structure.

2.1.4 The OGS to be specified shall have the capability to accept influent flow from an inlet grate and an inlet pipe.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be designed and manufactured to meet highway loading conditions per State/Provincial or local requirements.

2.3 GASKETS

Only profile neoprene or nitrile rubber gaskets that are oil resistant shall be accepted. For Canadian projects only, gaskets shall be in accordance to CSA A257.4-14. Mastic sealants, butyl tape/rope or Conseal CS-101 alone are not acceptable gasket materials.

2.4 JOINTS

The concrete joints shall be watertight and meet the design criteria according to ASTM C-990. For projects where joints require gaskets, the concrete joints shall be watertight and oil resistant and meet the design criteria according to ASTM C-443. Mastic sealants or butyl tape/rope alone are not an acceptable alternative.

2.5 FRAMES AND COVERS

Frames and covers shall be manufactured in accordance with State/Provincial or local requirements for inspection and maintenance access purposes. A minimum of one cover, at least 22-inch (560 mm) in diameter, shall be clearly embossed with the OGS manufacturer's product name to properly identify this asset's purpose is for stormwater quality treatment.

2.6 PRECAST CONCRETE

All precast concrete components shall conform to the appropriate CSA or ASTM specifications.

2.7 FIBERGLASS

The fiberglass portion of the OGS device shall be constructed in accordance with ASTM D2563, and in accordance with the PS15-69 manufacturing standard, and shall only be installed, bolted and watertight sealed to the precast concrete by the Manufacturer prior to arrival at the project site to ensure product quality.

2.8 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a fiberglass insert for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The total sediment storage capacity shall be a minimum 40 ft^3 (1.1 m^3). The total petroleum hydrocarbon storage capacity shall be a minimum 50 gallons (189 liters). The access opening to the sump of the OGS device for periodic inspection and maintenance purposes shall be a minimum 16 inches (406 mm) in diameter.

2.9 LADDERS

Ladder rungs shall be provided upon request or to comply with State/Provincial or local requirements.

2.10 INSPECTION

All precast concrete sections shall be level and inspected to ensure dimensions, appearance, integrity of internal components, and quality of the product meets State/Provincial or local specifications and associated standards.

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 HYDROLOGY AND RUNOFF VOLUME

The OGS device shall be engineered, designed and sized to treat a minimum of 90 percent of the average annual runoff volume, unless otherwise stated by the Engineer of Record, using historical rainfall data. Rainfall data sets should be comprised of a minimum 15-years of rainfall data or a longer continuous period if available for a given location, but in all cases a minimum 5-year period of rainfall data.

3.3 ANNUAL (TSS) SEDIMIMENT LOAD AND STORAGE CAPACITY

The OGS device shall be capable of removing and have sufficient storage capacity for the calculated annual total suspended solids (TSS) mass load and volume without scouring previously captured pollutants prior to maintenance being required. The annual (TSS) sediment load and volume transported from the drainage area should be calculated and compared to the OGS device's available storage capacity by the specifying Engineer to ensure adequate capacity between maintenance cycles. Sediment loadings shall be determined by land use and defined as a minimum of 450 kg (992 lb) of sediment (TSS) per impervious hectare of drainage area per year, or greater based on land use, as noted in Table 1 below.

Annual sediment volume calculations shall be performed using the projected average annual treated runoff volume, a typical sediment bulk density of 1602 kg/m^3 (100 lbs/ft^3) and an assumed Event Mean Concentration (EMC) of 125 mg/L TSS in the runoff, or as otherwise determined by the Engineer of Record.

Example calculation for a 1.3-hectares parking lot site:

- 1.28 meters of rainfall depth, per year
- 1.3 hectares of 100% impervious drainage area
- EMC of 125 mg/L TSS in runoff
- Treatment of 90% of the average annual runoff volume
- Target average annual TSS removal rate of 60% by OGS

Annual Runoff Volume:

- 1.28 m rain depth x 1.3 ha x 10,000 m^2/ha= 16,640 m^3 of runoff volume
- 16,640 m^3 x 1000 L/m^3 = 16,640,000 L of runoff volume
- 16,640,000 L x 0.90 = 14,976,000 L to be treated by OGS unit

Annual Sediment Mass and Sediment Volume Load Calculation:

- 14,976,000 L x 125 mg/L x kg/1,000,000 mg = 1,872 kg annual sediment mass
- 1,872 kg x m^3/1602 kg = 1.17 m^3 annual sediment volume
- 1.17 m^3 x 60% TSS removal rate by OGS = 0.70 m^3 minimum expected annual storage requirement in OGS

As a guideline, the U.S. EPA has determined typical annual sediment loads per drainage area for various sites by land use (see Table 1). Certain States, Provinces and local jurisdictions have also established such guidelines.

Table 1 – Annual Mass Sediment Loading by Land Use

	Commercial	Parking Lot	Residential			Highways	Industrial	Shopping Center
			High	Med.	Low			
(lbs/acre/yr)	1,000	400	420	250	10	880	500	440
(kg/hectare/yr)	1,124	450	472	281	11	989	562	494

Source: U.S. EPA Stormwater Best Management Practice Design Guide Volume 1, Appendix D, Table D-1, Burton and Pitt 2002

3.4 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in Table 2, Section 3.5, and based on third-party performance testing conducted in accordance with the Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol *Procedure for Laboratory Testing of Oil-Grit Separators*, as follows:

3.4.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.4.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.4.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.4.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 3.3.

3.4.5 The Peclet Number is not an approved method or model for calculating TSS removal, sizing, or scaling OGS devices.

3.4.6 If an alternate OGS device is proposed, supporting documentation shall be submitted that demonstrates:

- Canadian ETV or ISO 14034 ETV Verification Statement which verifies third-party performance testing conducted in accordance with the **Procedure for Laboratory Testing of Oil-Grit Separators,** including the Light Liquid Re-entrainment Simulation Testing.
- Equal or better sediment (TSS) removal of the PSD specified in Table 2 at equivalent surface loading rates, as compared to the OGS device specified herein.
- Equal or better Light Liquid Re-entrainment Simulation Test results (using low-density polyethylene beads as a surrogate for light liquids such as oil and fuel) at equivalent surface loading rates, as compared to the OGS device specified herein. However, an alternative OGS device shall not be allowed as a substitute if the Light Liquid Re-entrainment Simulation Test was performed with screening components within the OGS device that are effective at retaining the low-density polyethylene beads, but would not be expected to retain light liquids such as oil and fuel.
- Equal or greater sediment storage capacity, as compared to the OGS device specified herein.
- Supporting documentation shall be signed and sealed by a local registered Professional Engineer. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

3.5 PARTICLE SIZE DISTRIBUTION (PSD) FOR SIZING

The OGS device shall be sized to achieve the Engineer-specified average annual percent sediment (TSS) removal based solely on the test sediment used in the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** This test sediment is comprised of inorganic ground silica with a specific gravity of 2.65, uniformly mixed, and containing a broad range of particle sizes as specified in Table 2. No alternative PSDs or deviations from Table 2 shall be accepted.

Table 2
Canadian ETV Program Procedure for Laboratory Testing of Oil-Grit Separators
Particle Size Distribution (PSD) of Test Sediment

Particle Diameter (Microns)	% by Mass of All Particles	Specific Gravity
1000	5%	2.65
500	5%	2.65
250	15%	2.65
150	15%	2.65
100	10%	2.65
75	5%	2.65
50	10%	2.65
20	15%	2.65
8	10%	2.65
5	5%	2.65
2	5%	2.65

3.6 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party scour testing conducted and have in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. This scour testing is conducted with the device pre-loaded with test sediment comprised of the particle size distribution (PSD) illustrated in Table 2.

3.6.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

Data generated from laboratory scour testing performed with an OGS device pre-loaded with a coarser PSD than in Table 2 (i.e. the coarser PSD has no particles in the 1-micron to 50-micron size range, or the D_{50} of the test sediment exceeds 75 microns) shall not be acceptable for the determination of the device's suitability for on-line installation.

3.7 DESIGN ACCOUNTING FOR BYPASS

3.7.1 The OGS device shall be specified to achieve the TSS removal performance and water quality objectives without washout of previously captured pollutants. The OGS device shall also have sufficient hydraulic conveyance capacity to convey the peak storm event, in accordance with hydraulic conditions per the Engineer of Record. To ensure this is achieved, there are two design options with associated requirements:

3.7.1.1 The OGS device shall be placed **off-line** with an upstream diversion structure (typically in an upstream manhole) that only allows the water quality volume to be diverted to the OGS device, and excessive flows diverted downstream around the OGS device to prevent high flow washout of pollutants previously captured. This design typically incorporates a triangular layout including an upstream bypass manhole with an appropriately engineered weir wall, the OGS device, and a downstream junction manhole, which is connected to both the OGS device and bypass structure. In this case with an external bypass required, the OGS device manufacturer must provide calculations and designs for all structures, piping and any other required material applicable to the proper functioning of the system, stamped by a Professional Engineer.

3.7.1.2 Alternatively, OGS devices in compliance with Section 3.6 shall be acceptable for an **on-line** design configuration, thereby eliminating the requirement for an upstream bypass manhole and downstream junction manhole.

3.7.2 The OGS device shall also have sufficient hydraulic conveyance capacity to convey the peak storm event, in accordance with hydraulic conditions per the Engineer of Record. If an alternate OGS device is proposed, supporting documentation shall be submitted that demonstrates equal or better hydraulic conveyance capacity as compared to the OGS device specified herein. This documentation shall be signed and sealed by a local registered Professional Engineer. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

3.8 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**, with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.8.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

3.9 PETROLEUM HYDROCARBONS AND FLOATABLES STORAGE CAPACITY

Petroleum hydrocarbons and floatables storage capacity in the OGS device shall be a minimum 50 gallons (189 Liters), or more as specified.

3.9.1 The OGS device shall have gasketed precast concrete joints that are watertight, and oil resistant and meet the design criteria according to ASTM C-443 to provide safe oil and other hydrocarbon materials storage and ground water protection. Mastic sealants or butyl tape/rope alone are not an acceptable alternative.

3.10 SURFACE LOADING RATE SCALING OF DIFFERENT MODEL SIZES

The reference device for scaling shall be an OGS device that has been third-party tested in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. Other model sizes of the tested device shall only be scaled such that the claimed TSS removal efficiency of the scaled device shall be no greater than the TSS removal efficiency of the tested device at identical **surface loading rates** (flow rate divided by settling surface area). The depth of other model sizes of the tested device shall be scaled in accordance with the depth scaling provisions within Section 6.0 of the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**.

3.10.1 The Peclet Number and volumetric scaling are not approved methods for scaling OGS devices.

PART 4 – INSPECTION & MAINTENANCE

The OGS manufacturer shall provide an Owner's Manual upon request.
Maintenance shall be performed by a professional service provider who has experience in cleaning OGS devices and has been trained and certified in applicable health and safety practices, including confined space entry procedures.

4.1 A Quality Assurance Plan that provides inspection for a minimum of 5 years shall be included with the OGS stormwater quality device, and written into the Environmental Compliance Approval (ECA) or the appropriate State/Provincial or local approval document.

4.2 OGS device inspection shall include determination of sediment depth and presence of petroleum hydrocarbons below the insert. Inspection shall be easily conducted from finished grade through a frame and cover of at least 22 inch (560 mm) in diameter.

4.3 Inspection and pollutant removal shall be conducted periodically. For routine maintenance cleaning activities, pollutant removal shall typically utilize a truck equipped with vacuum apparatus, and shall be easily conducted from finished grade through a frame and cover of at least 22-inches (560 mm) in diameter.

4.4 Diameter of the maintenance access opening to the lower chamber and sump shall be scaled consistently across all model sizes, and shall be 1/3 the inside diameter of the OGS structure, or larger.

4.5 No confined space entry shall be required for routine inspection and maintenance cleaning activities.

4.6 For OGS model sizes of diameter 72 inches (1828 mm) and greater, the access opening to the OGS device's lower chamber and sump shall be large enough to allow a maintenance worker to enter the lower chamber to facilitate non-routine maintenance cleaning activities and repairs, as needed.

4.7 The orifice-containing component (i.e. drop pipe, duct, chute, etc.) of the OGS device used to control flow rate into the lower chamber shall be removable from the insert to facilitate cleaning, repair, or replacement of the orifice-containing component, as needed.

PART 5 – EXECUTION

5.1 PRECAST CONCRETE INSTALLATION

The installation of the precast concrete OGS stormwater quality treatment device shall conform to ASTM C 891, ASTM C 478, ASTM C 443, CAN/CSA-A257.4-14, CAN/CSA-A257.4-14, CAN/CSA-S6-00 and all highway, State/Provincial, or local specifications for the construction of manholes. Selected sections of a general specification that are applicable are summarized below. The Contractor shall furnish all labor, equipment and materials necessary to offload, assemble as needed the OGS internal components as specified in the Shop Drawings.

5.2 EXCAVATION

5.2.1 Excavation for the installation of the OGS stormwater quality treatment device shall conform to highway, State/Provincial or local specifications. Topsoil that is removed during the excavation for the OGS stormwater quality treatment device shall be stockpiled in designated areas and not be mixed with subsoil or other materials. Topsoil stockpiles and the general site preparation for the installation of the OGS stormwater quality device shall conform to highway, State/Provincial or local specifications.

5.2.2 The OGS device shall not be installed on frozen ground. Excavation shall extend a minimum of 12 inch (300 mm) from the precast concrete surfaces plus an allowance for shoring and bracing where required. If the bottom of the excavation provides an unsuitable foundation additional excavation may be required.

5.2.3 In areas with a high water table, continuous dewatering shall be provided to ensure that the excavation is stable and free of water.

5.3 BACKFILLING

Backfill material shall conform to highway, State/Provincial or local specifications. Backfill material shall be placed in uniform layers not exceeding 12 inches (300 mm) in depth and compacted to highway, State/Provincial or local specifications.

5.4 OGS WATER QUALITY DEVICE CONSTRUCTION SEQUENCE

5.4.1 The precast concrete OGS stormwater quality treatment device is installed and leveled in sections in the following sequence:

- aggregate base
- base slab, or base
- riser section(s) (if required)
- riser section w/ pre-installed fiberglass insert
- upper riser section(s)
- internal OGS device components
- connect inlet and outlet pipes
- riser section, top slab and/or transition (if required)
- frame and access cover

5.4.2 The precast concrete base shall be placed level at the specified grade. The entire base shall be in contact with the underlying compacted granular material. Subsequent sections, complete with oil resistant, watertight joint seals, shall be installed in accordance with the precast concrete manufacturer's recommendations.

5.4.3 Adjustment of the OGS stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets shall be repaired or replaced as necessary. Once the OGS stormwater quality treatment device has been constructed, any lift holes must be plugged with mortar.

5.5 DROP PIPE AND OIL INSPECTION PIPE

Once the upper precast concrete riser has been attached to the lower precast concrete riser section, the OGS device Drop Pipe and Oil Inspection Pipe must be attached, and watertight sealed to the fiberglass insert using Sikaflex 1a. Installation instructions and required materials shall be provided by the OGS manufacturer.

5.6 INLET AND OUTLET PIPES

Inlet and outlet pipes shall be securely set using grout or approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight. Non-secure inlets and outlets will result in improper performance.

5.7 FRAME AND COVER OR FRAME AND GRATE INSTALLATION

Precast concrete adjustment units shall be installed to set the frame and cover/grate at the required elevation. The adjustment units shall be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover/grate should be set in a full bed of mortar at the elevation specified.

5.7.1 A minimum of one cover, at least 22-inch (560 mm) in diameter, shall be clearly embossed with the OGS device brand or product name to properly identify this asset's purpose is for stormwater quality treatment.

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Stormceptor® EF and EFO Oil-Grit Separators

Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

Registration: GPS-ETV_VR2023-11-15_Imbrium-SC

In accordance with

ISO 14034:2016

Environmental management —
Environmental technology verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

November 15, 2023
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

Technology description and application

The Stormceptor® EF and EFO are treatment devices designed to remove oil, sediment, trash, debris, and pollutants attached to particulates from Stormwater and snowmelt runoff. The device takes the place of a conventional manhole within a storm drain system and offers design flexibility that works with various site constraints. The EFO is designed with a shorter bypass weir height, which accepts lower surface loading rate into the sump, thereby reducing re-entrainment of captured free floating light liquids.

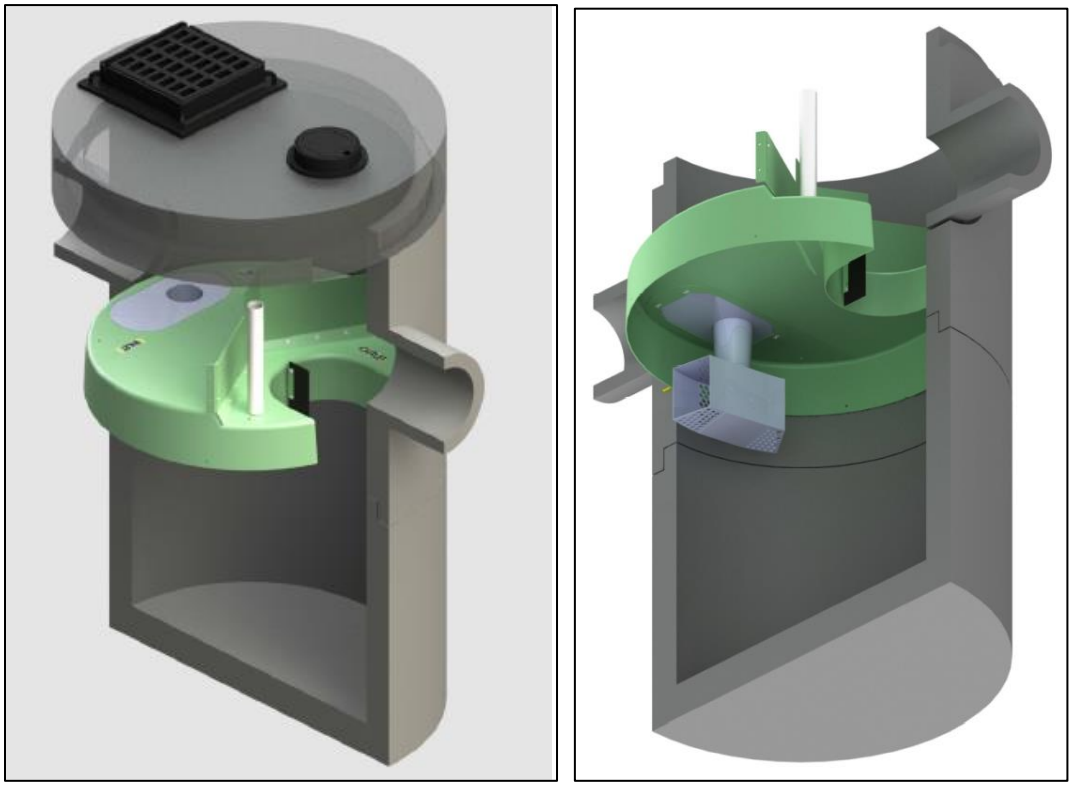


Figure 1. Graphic of typical inline Stormceptor® unit and core components.

Stormwater and snowmelt runoff enters the Stormceptor® EF/EFO's upper chamber through the inlet pipe(s) or a surface inlet grate. An insert divides the unit into lower and upper chambers and incorporates a weir to reduce influent velocity and separate influent (untreated) from effluent (treated) flows. Influent water ponds upstream of the insert's weir providing driving head for the water flowing downwards into the drop pipe where a vortex pulls the water into the lower chamber. The water diffuses at lower velocities in multiple directions through the drop pipe outlet openings. Oil and other floatables rise up and are trapped beneath the insert, while sediments undergo gravitational settling to the sump's bottom. Water from the sump can exit by flowing upward to the outlet riser onto the top side of the insert and downstream of the weir, where it discharges through the outlet pipe.

Maximum flow rate into the lower chamber is a function of weir height and drop pipe orifice diameter. The Stormceptor® EF and EFO are designed to allow a surface loading rate of 1135 L/min/m^2 (27.9 gal/min/ft^2) and 535 L/min/m^2 (13.1 gal/min/ft^2) into the lower chamber, respectively. When prescribed surface loading rates are exceeded, ponding water can overtop the weir height and bypass the lower treatment chamber, exiting directly through the outlet pipe. Hydraulic testing and scour testing demonstrate that the internal bypass effectively prevents scour at all bypass flow rates. Increasing the bypass flow rate does not increase the orifice-controlled flow rate into the lower treatment chamber where sediment is stored. This internal bypass feature allows for in-line installation, avoiding the cost of

additional bypass structures. During bypass, treatment continues in the lower chamber at the maximum flow rate. The Stormceptor® EFO's lower design surface loading rate is favorable for minimizing re-entrainment and washout of captured light liquids. Inspection of Stormceptor® EF and EFO devices is performed from grade by inserting a sediment probe through the outlet riser and an oil dipstick through the oil inspection pipe. The unit can be maintained by using a vacuum hose through the outlet riser.

Performance conditions

The data and results published in this Technology Fact Sheet were obtained from the testing program conducted on the Imbrium Systems Inc.'s Stormceptor® EF4 and EFO4 Oil-Grit Separators, in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014). The Procedure was prepared by the Toronto and Region Conservation Authority (TRCA) for Environment Canada's Environmental Technology Verification (ETV) Program. A copy of the Procedure may be accessed on the Canadian ETV website at www.etvcanada.ca.

Performance claim(s)

Capture test [a]:

During the capture test, the Stormceptor® EF4 OGS device, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 46, 44, and 49 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Stormceptor® EFO4, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 42, 40, and 34 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Scour test [a]:

During the scour test, the Stormceptor® EF4 and Stormceptor® EFO4 OGS devices, with 10.2 cm (4 inches) of test sediment pre-loaded onto a false floor reaching 50% of the manufacturer's recommended maximum sediment storage depth, generate corrected effluent concentrations of 4.6, 0.7, 0, 0.2, and 0.4 mg/L at 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2, respectively.

Light liquid re-entrainment test[a]:

During the light liquid re-entrainment test, the Stormceptor® EFO4 OGS device with surrogate low-density polyethylene beads preloaded within the lower chamber oil collection zone, representing a floating light liquid volume equal to a depth of 50.8 mm over the sedimentation area, retained 100, 99.5, 99.8, 99.8, and 99.9 percent of loaded beads by mass during the 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2.

[a] The claim can be applied to other units smaller or larger than the tested unit as long as the untested units meet the scaling rule specified in the Procedure for Laboratory of Testing of Oil Grit Separators (Version 3.0, June 2014)

Performance results

The test sediment consisted of ground silica (1 – 1000 micron) with a specific gravity of 2.65, uniformly mixed to meet the particle size distribution specified in the testing procedure. The *Procedure for Laboratory Testing of Oil Grit Separators* requires that the three sample average of the test sediment particle size distribution (PSD) meet the specified PSD percent less than values within a boundary threshold of 6%. The comparison of the average test sediment PSD to the CETV specified PSD in Figure 2 indicates that the test sediment used for the capture and scour tests met this condition.

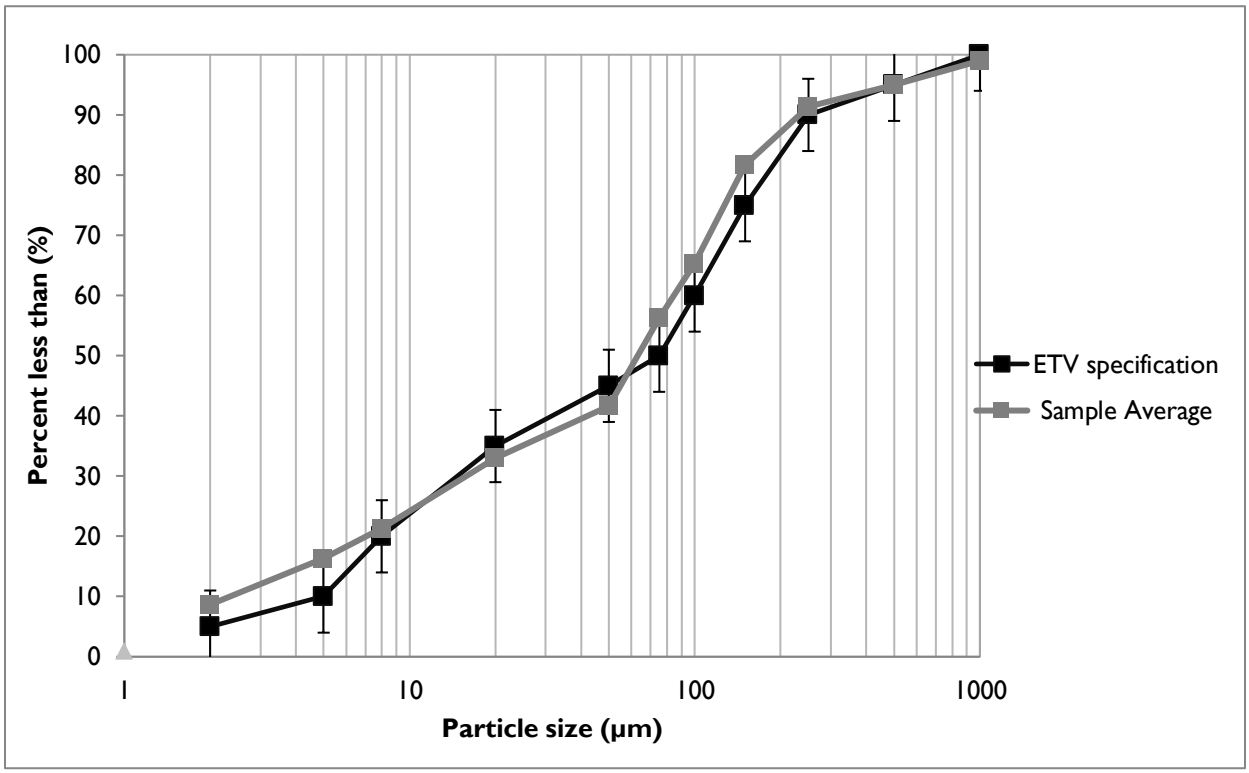


Figure 2. The three sample average particle size distribution (PSD) of the test sediment used for the capture and scour test compared to the specified PSD.

The capacity of the device to retain sediment was determined at seven surface loading rates using the modified mass balance method. This method involved measuring the mass and particle size distribution of the injected and retained sediment for each test run. Performance was evaluated with a false floor simulating the technology filled to 50% of the manufacturer's recommended maximum sediment storage depth. The test was carried out with clean water that maintained a sediment concentration below 20 mg/L. Based on these conditions, removal efficiencies for individual particle size classes and for the test sediment as a whole were determined for each of the tested surface loading rates (Table 1). Since the EF and EFO models are identical except for the weir height, which bypasses flows from the EFO model at a surface loading rate of 535 L/min/m^2 (13.1 gpm/ft^2), sediment capture tests at surface loading rates from 40 to 400 L/min/m^2 were only performed on the EF unit. Surface loading rates of 600, 1000, and 1400 L/min/m^2 were tested on both units separately. Results for the EFO model at these higher flow rates are presented in Table 2.

In some instances, the removal efficiencies were above 100% for certain particle size fractions. These discrepancies are not unique to any one test laboratory and may be attributed to errors relating to the blending of sediment, collection of representative samples for laboratory submission, and laboratory

analysis of PSD. Due to these errors, caution should be exercised in applying the removal efficiencies by particle size fraction for the purposes of sizing the tested device (see Bulletin # CETV 2016-11-0001). The results for "all particle sizes by mass balance" (see Table 1 and 2) are based on measurements of the total injected and retained sediment mass, and are therefore not subject to blending, sampling or PSD analysis errors.

Table 1. Removal efficiencies (%) of the EF4 at specified surface loading rates

Particle size fraction (µm)	**Surface loading rate (L/min/m²)**						
	40	80	200	400	600	1000	1400
>500	90	58	58	100*	86	72	100*
250 - 500	100*	100*	100	100*	100*	100*	100*
150 - 250	90	82	26	100*	100*	67	90
105 - 150	100*	100*	100*	100*	100*	100*	100
75 - 105	100*	92	74	82	77	68	76
53 - 75	Undefined [a]	56	100*	72	69	50	80
20 - 53	54	100*	54	33	36	40	31
8 - 20	67	52	25	21	17	20	20
5 – 8	33	29	11	12	9	7	19
<5	13	0	0	0	0	0	4
All particle sizes by mass balance	**70.4**	**63.8**	**53.9**	**47.5**	**46.0**	**43.7**	**49.0**

[a] An outlier in the feed sample sieve data resulted in a negative removal efficiency for this size fraction.
* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 101 and 171% (average 128%). See text and Bulletin # CETV 2016-11-0001 for more information.

Table 2. Removal efficiencies (%) of the EFO4 at surface loading rates above the bypass rate of 535 L/min/m²

Particle size fraction (µm)	**Surface loading rate (L/min/m²)**		
	600	1000	1400
>500	89	83	100*
250 - 500	90	100*	92
150 - 250	90	67	100*
105 - 150	85	92	77
75 - 105	80	71	65
53 - 75	60	31	36
20 - 53	33	43	23
8 - 20	17	23	15
5 – 8	10	3	3
<5	0	0	0
All particle sizes by mass balance	**41.7**	**39.7**	**34.2**

* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 103 and 111% (average 107%). See text and Bulletin # CETV 2016-11-0001 for more information.

Figure 3 compares the particle size distribution (PSD) of the three sample average of the test sediment to the PSD of the sediment retained by the EF4 at each of the tested surface loading rates. Figure 4 shows the same graph for the EFO4 unit at surface loading rates above the bypass rate of 535 L/min/m².

As expected, the capture efficiency for fine particles in both units was generally found to decrease as surface loading rates increased.

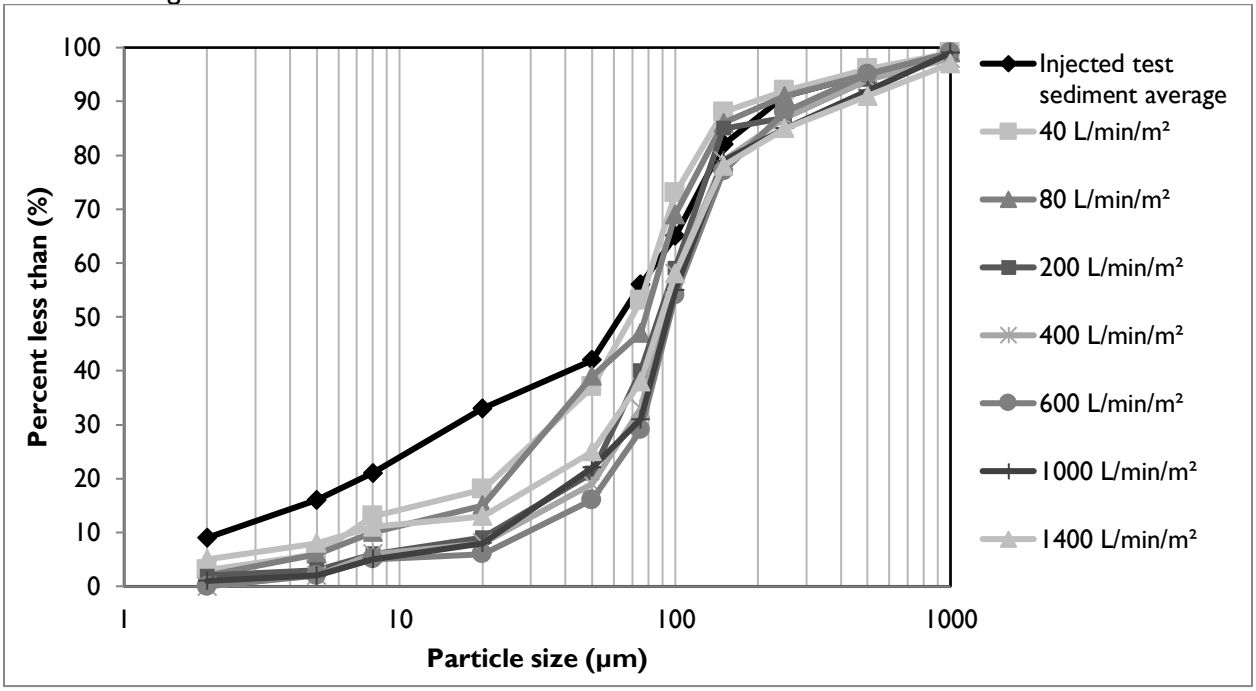


Figure 3. Particle size distribution of sediment retained in the EF4 in relation to the injected test sediment average.

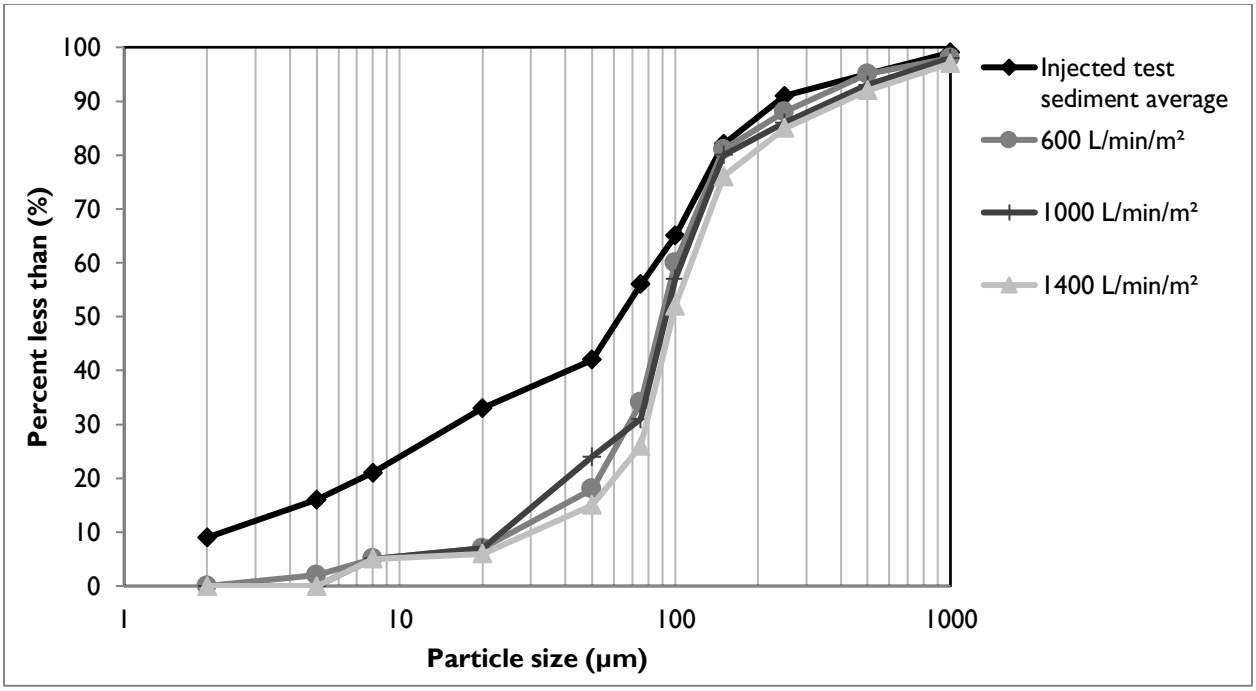


Figure 4. Particle size distribution of sediment retained in the EFO4 in relation to the injected test sediment average at surface loading rates above the bypass rate of 535 L/min/m²

Table 4 shows the results of the sediment scour and re-suspension test for the EF4 unit. The EFO4 was not tested as it was reasonably assumed that scour rates would be lower given that flow bypass occurs at a lower surface loading rate. The scour test involved preloading 10.2 cm of fresh test sediment into

the sedimentation sump of the device. The sediment was placed on a false floor to mimic a device filled to 50% of the maximum recommended sediment storage depth. Clean water was run through the device at five surface loading rates over a 30 minute period. Each flow rate was maintained for 5 minutes with a one minute transition time between flow rates. Effluent samples were collected at one minute sampling intervals and analyzed for Suspended Sediment Concentration (SSC) and PSD by recognized methods. The effluent samples were subsequently adjusted based on the background concentration of the influent water. Typically, the smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test is also used to adjust the concentration, as per the method described in Bulletin # CETV 2016-09-0001. However, since the composites of effluent concentrations were below the Reporting Detection Limit of the Laser Diffraction PSD methodology, this adjustment was not made. Results showed average adjusted effluent sediment concentrations below 5 mg/L at all tested surface loading rates.

It should be noted that the EF4 starts to internally bypass water at 1135 L/min/m^2, potentially resulting in the dilution of effluent concentrations, which would not normally occur under typical field conditions because the field influent concentration would contain a much higher sediment concentration than during the lab test. Recalculation of effluent concentrations to account for dilution at surface loading rates above the bypass rate showed sediment effluent concentrations to be below 1.6 mg/L.

Table 4. Scour test adjusted effluent sediment concentration.

Run	Surface loading rate (L/min/m^2)	Run time (min)	Background sample concentration (mg/L)	Adjusted effluent suspended sediment concentration (mg/L) [a]	Average (mg/L)
1	200	1:00	<RDL	11.9	4.6
		2:00		7.0	
		3:00		4.4	
		4:00		2.2	
		5:00		1.0	
		6:00		1.2	
2	800	7:00	<RDL	1.1	0.7
		8:00		0.9	
		9:00		0.6	
		10:00		1.4	
		11:00		0.1	
		12:00		0	
3	1400	13:00	<RDL	0	0
		14:00		0.1	
		15:00		0	
		16:00		0	
		17:00		0	
		18:00		0	
4	2000	19:00	1.2	0.2	0.2
		20:00		0	
		21:00		0	
		22:00		0.7	
		23:00		0	
		24:00		0.4	

5	2600	25:00	1.6	0.3	0.4
		26:00		0.4	
		27:00		0.7	
		28:00		0.4	
		29:00		0.2	
		30:00		0.4	

[a] The adjusted effluent suspended sediment concentration represents the actual measured effluent concentration minus the background concentration. For more information see Bulletin # CETV 2016-09-0001.

The results of the light liquid re-entrainment test used to evaluate the unit's capacity to prevent re-entrainment of light liquids are reported in Table 5. The test involved preloading 58.3 L (corresponding to a 5 cm depth over the collection sump area of 1.17m^2) of surrogate low-density polyethylene beads within the oil collection skirt and running clean water through the device continuously at five surface loading rates (200, 800, 1400, 2000, and 2600 L/min/m^2). Each flow rate was maintained for 5 minutes with approximately 1 minute transition time between flow rates. The effluent flow was screened to capture all re-entrained pellets throughout the test.

Table 5. Light liquid re-entrainment test results for the EFO4.

Surface Loading Rate (L/min/m2)	Time Stamp	Amount of Beads Re-entrained			
		Mass (g)	Volume (L)[a]	% of Pre-loaded Mass Re-entrained	% of Pre-loaded Mass Retained
200	62	0	0	0.00	100
800	247	168.45	0.3	0.52	99.48
1400	432	51.88	0.09	0.16	99.83
2000	617	55.54	0.1	0.17	99.84
2600	802	19.73	0.035	0.06	99.94
Total Re-entrained		295.60	0.525	0.91	--
Total Retained		32403	57.78	--	99.09
Total Loaded		32699	58.3	--	--

[a] Determined from bead bulk density of 0.56074 g/cm^3

Variances from testing Procedure

The following minor deviations from the *Procedure for Laboratory Testing of Oil-Grit Separators* (Version 3.0, June 2014) have been noted:

1. During the capture test, the 40 L/min/m^2 and 80 L/min/m^2 surface loading rates were evaluated over 3 and 2 days respectively due to the long duration needed to feed the required minimum of 11.3 kg of test sediment into the unit at these lower flow rates. Pumps were shut down at the end of each intermediate day, and turned on again the following morning. The target flow rate was re-established within 30 seconds of switching on the pump. This procedure may have allowed sediments to be captured that otherwise may have exited the unit if the test was continuous. On the basis of practical considerations, this variance was approved by the verifier prior to testing.

2. During the scour test, the coefficient of variation (COV) for the lowest flow rate tested (200 L/min/m^2) was 0.07, which exceeded the specified limit of 0.04 target specified in the OGS Procedure. A pump capable of attaining the highest flow rate of 3036 L/min had difficulty maintaining the lowest flow of 234 L/min but still remained within +/- 10% of the target flow and is viewed as having very little impact on the observed results. Similarly, for the light liquid re-entrainment test the COV for the flow rate of the 200 L/min/m^2 run was 0.049, exceeding the limit of 0.04, but is believed to introduce negligible bias.

3. Due to pressure build up in the filters, the runs at 1000 L/min/m^2 for the Stormceptor® EF4 and 1000 and 1400 L/min/m^2 for the Stormceptor® EFO4 were slightly shorter than the target. The run times were 54, 59 and 43 minutes respectively, versus targets of 60 and 50 minutes. The final feed samples were timed to coincide with the end of the run. Since >25 lbs of sediment was fed, the shortened time did not invalidate the runs.

Verification

The verification was completed by the Verification Expert, Toronto and Region Conservation Authority, contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental management -- Environmental technology verification (ETV)***. Data and information provided by Imbrium Systems Inc. to support the performance claim included the following: Performance test report prepared by Good Harbour Laboratories, and dated September 8, 2017; the report is based on testing completed in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014).

What is ISO14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV), and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

For more information on the Stormceptor® EF and EFO OGS please contact:

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Limitation of verification - Registration: GPS-ETV_VR2023-11-15_Imbrium-SC
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