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NOKIA OTTAWA INNOVATION CAMPUS
570 March Road

Development Servicing Study and
Stormwater Management Report

NOKIA OTTAWA INNOVATION CAMPUS
570 MARCH ROAD

DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT

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Revised: October 24, 2025

Ref: R-2023-082
Novatech File No. 123043

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Engineers, Planners & Landscape Architects

October 24, 2025

Nokia Ottawa Innovation Campus
600 March Road
Ottawa, ON
K2K 2T6

Attention: Stephen Martin, Program Manager

Re: Development Servicing Study and Stormwater Management Report
Nokia Ottawa Innovation Campus
570 March Road, Ottawa, ON
Novatech File No.: 123043

Enclosed is a copy of the revised 'Development Servicing Study and Stormwater Management Report' prepared for the proposed Nokia Ottawa Innovation Campus development located at 570 March Road. This report addresses the approach to site servicing, grading, and stormwater management, and is being submitted in support of a Site Plan Control application.

Please contact the undersigned, should you have any questions or require additional information.

NOVATECH

François Thauvette, P. Eng.
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98066-SAN - Sanitary Drainage Area Plan

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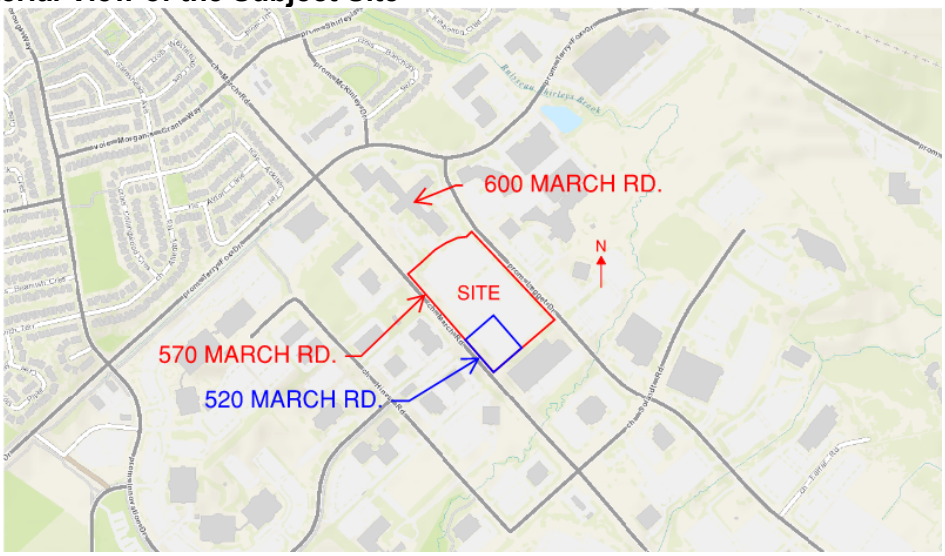
1.0 INTRODUCTION

Nokia has recently severed their 10.39 ha (post road widening) property into three parcels; the 600 March Road property to the north including the existing office tower and adjacent parking lots (5.14 ha), and the existing surface parking lots to the south, which will be re-developed as the new Nokia Ottawa Innovation Campus (4.47 ha) at 570 March Road as well as what is being referred to as the Retained Lands (0.78ha) at 520 March Road, which will be developed in the future. As part of the proposed re-development, Nokia has retained Novatech to complete the site servicing, grading, and stormwater management design for the new Nokia campus. This report is being submitted in support of a Site Plan Control application for the recently severed portion of the previously larger property.

1.1 Location and Site Description

The subject site consists of the recently severed portion of the Nokia property located at 570 March Road within the Kanata Research Park (KRP). The area to be redeveloped currently consists of the main surface parking lots for Nokia employees. The severed portions of the original property cover an approximate area of 5.25 ha (post road widening), including the new Nokia Ottawa Innovation Campus (4.47 ha) and Retained Lands (0.78ha) to be developed in the future. The subject site is generally surrounded by other commercial properties. The legal description of the Nokia site is designated as Part 5 and Part 7, while the Retained Lands consists of Part 8 on Registered Plan 4R-35453.

Figure 1: Aerial View of the Subject Site



1.2 Pre-Consultation Information

An initial pre-consultation meeting was held with the City of Ottawa on February 8, 2023, at which time the client was advised of the general submission requirements. Subsequent meetings were held with City of Ottawa staff to further discuss the project and the approach to site servicing, drainage, and stormwater management. Based on a review of **O. Reg. 525/98: Approval Exemptions**, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) for on-site stormwater management will be required for the proposed development as multiple properties are being serviced by shared sewer systems. An ECA will also be required for the extension of the sanitary sewer in Legget Drive. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

1.3 Proposed Development

The proposed development will consist of the new Nokia Ottawa Innovation Campus, as outlined in RED on **Figure 1**. Although not part of this specific Site Plan Control Application, the Retained Lands, outlined in BLUE, are also depicted. The new Nokia campus will consist of several buildings, including an 8-storey office tower and adjacent 1-storey commercial buildings at the north end of the property, while a 5-storey R&D Lab is being proposed along Legget Drive. A central 2-storey Common Area (Social Café) will link these buildings while also providing access to the central courtyard (outdoor amenity area). A large surface parking lot is being proposed within the southwestern portion of the 570 March Road property, including a portion of the Retained Lands which consist of a separate property parcel (520 March Road) to be developed in the future. The remainder of the property will consist of access roads and a large exterior work yard, which will house electrical equipment, battery banks and generators. The proposed development will include two private roadways between March Road and Legget Drive: the Lifestyle Street along the north end of the property to provide access to the office tower and commercial spaces, as well as a service road at the south end of the property to provide access to the Retained Lands and the 'back' of the Nokia Campus. Visitor parking will be provided off March Road, on the west side of the office tower, adjacent to the central courtyard. Shipping and receiving will be provided off Legget Drive, both at-grade near the southwest corner of the Lab building and/or via the underground truck dock at the north end of the Lab building.

The proposed Nokia Campus and future development of the Retained Lands will be serviced by the municipal sanitary and storm sewers in Legget Drive, including the construction of new private on-site sewers, as well as an extension of the municipal sanitary sewer within Legget Drive. A new private looped watermain network running along the Lifestyle Street, the west property line and the south service road will be required to provide necessary water to the proposed Nokia development. **The full servicing, grading and stormwater management (SWM) design associated with the future development of the 520 March Road property (Retained Lands) is not part of the subject Site Plan Control Application. The detailed design of the 520 March Road property will be completed when the site is developed in the future. All preliminary analysis pertaining to the Retained Lands contained within this report, excluding the interim SWM design, is for <u>information purposes only</u> to assist in the future development of the property.**

1.4 Reference Material

The following design guidelines have been used to establish the servicing and stormwater management requirements for the proposed development:

- Ottawa Sewer Design Guidelines (2012) and Technical Bulletins (2010-present)
- Ottawa Design Guidelines for Water Distribution (2010) & Tech. Bulletins (2010-present)
- Ministry of the Environment Design Guidelines for Sewage Works (2008)
- Ministry of the Environment Stormwater Management Planning and Design Manual (2003)
- Ministry of the Environment Design Guidelines for Drinking Water Systems (2008)
- Fire Underwriters Survey (FUS) Water Supply for Public Fire protection

The following reports and studies were reviewed and/or prepared as part of the design process:

1. The "Shirley's Brook and Watts Creek Subwatershed Study" prepared by Dillon Consulting in September 1999.
2. The "Stormwater Management Plan, Kanata Research Park" prepared by Novatech Engineering Consultants Ltd., revised in April 2000.

3. The “Sanitary and Storm Trunk Sewer Design Brief - Kanata Research Park Lands” prepared by Novatech, dated November 12, 2014.
4. The “Assessment of Adequacy of Public Services Report,” prepared by CIMA+, dated July 28, 2022.
5. The Geotechnical Investigation and Hydrogeological Assessment (No.: 12667557-RPT-2), prepared by GHD, dated October 2, 2025.
6. The “Sanitary and Storm Trunk Sewer Design Brief – Nokia Ottawa Innovation Campus” prepared by Novatech, dated October 24, 2025.

2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply, and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, the expected sewage flows, and the water demands are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the enclosed **General Plan of Services** (C-100), to the Plan and Profiles (C-600 & C-601) and to the subsequent sections of the report for further details.

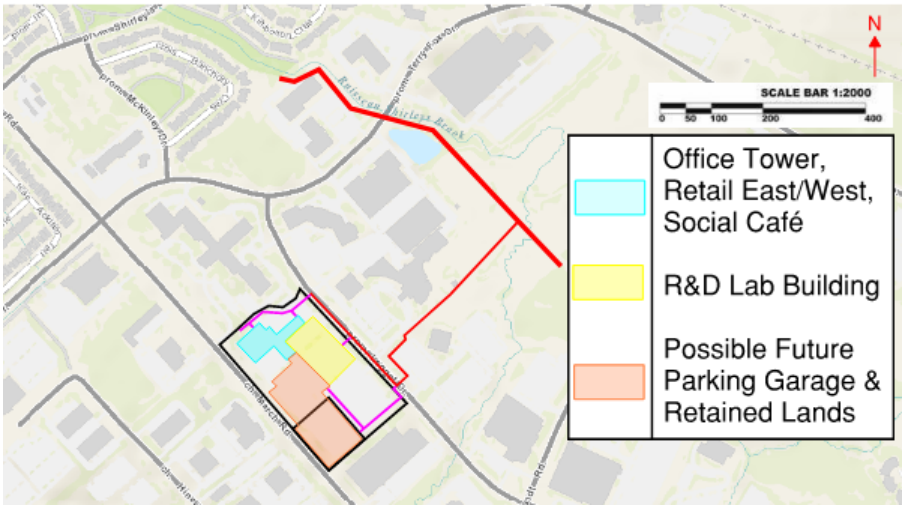
The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist be included in the report to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. A completed checklist is enclosed in **Appendix B** of the report.

2.1 Sanitary Sewage

The proposed development will be serviced by extending a new 250mm dia. municipal sanitary sewer north along Legget Drive, as well as by extending private on-site sanitary sewers and building services. A private sewer is being proposed along the Lifestyle Street at the north end of the property to service the office tower and commercial/retail buildings (shown in BLUE); while another private sanitary sewer is required at the south end to service the Retained Lands parcel and possible future parking garage (shown in ORANGE). The intent is to install the sanitary sewer as part of the proposed works (and cap it at the property line) until such time as the southern portion of the campus is developed. This will minimize disruptions to the operations of the site in the future as a new sewer will not need to be installed within the south service road. The R&D Lab building (shown in YELLOW) will be serviced directly from the municipal sanitary sewer in Legget Drive. As the proposed use of the buildings will consist of office space, commercial retail, and lab uses (electrical/microelectronic research works), the Nokia Campus is not considered an industrial site as defined by O. Reg. 525/98. The proposed battery banks, lab generators, and hydro equipment located within the work yard will not contribute flows to the sanitary sewer system. All proposed sanitary service laterals will be equipped with a backflow preventer. Refer to **Figure 2** for details of the on-site sanitary sewer drainage plan.

All sanitary flows will be directed to the 250mm dia. sanitary sewer routed through the KRP lands. This sewer currently outlets into the 750mm dia. March Trunk Sewer on the Marshes Golf Course. As indicated on the previously approved Sanitary Drainage Area Plan (98066-SAN) and described in the ‘Sanitary and Storm Trunk Sewer Design Brief – Kanata Research Park Lands’[3], prepared as part of the Sanmina development (located at 500 March Road), sanitary flows from the subject site were always intended to be directed into this municipal sanitary sewer system. An easement is already in place for the sanitary sewers located on the KRP lands.

Figure 2: Sanitary Sewer Drainage Plan



The 'Sanitary and Storm Trunk Sewer Design Brief – Nokia Ottawa Innovation Campus'[6] has been prepared as part of the proposed development to include anticipated sewage flows from the new Nokia campus and future development of the Retained Lands. An amendment to the existing Joint Use and Maintenance Agreement (JUMA) will also be required to account for these newly anticipated sanitary sewage flows. The Updated Sanitary and Storm Trunk Sewer Design Brief[6] also identifies the excess capacity available within the sanitary sewer system should it be required for a portion of the sewage flows from the 'future' mixed-use lands to the north (600 March Road), once the existing Nokia Office building is demolished.

2.1.1 Post-Development Sanitary Flows

The City of Ottawa design criteria were used to calculate the theoretical sanitary flows for the proposed development. The following design criteria were taken from the City of Ottawa Sewer Design Guidelines and/or from subsequent Technical Bulletins:

Nokia Campus and Future Retained Lands - Commercial Uses

- Design Population (Employees): 700 office, 600 lab, and Gym/Café/Restaurant users
- Average Daily Sanitary Flows: 75 L/person/day (Office and Lab staff)
- Average Daily Sanitary Flows: 40 L/user/day (Gym + Showers)
- Average Daily Sanitary Flows: 125 L/seat/day (Café/Restaurant, Quick Service)
- Commercial Peaking Factor = 1.5
- Infiltration Allowance: 0.33 L/s/ha (ISTB-2018-01)

Table 1 identifies the theoretical sanitary flows for the proposed development based on the above design criteria and breaks it down per sanitary connection point to the municipal sanitary sewer system in Legget Drive.

Table 1: **Theoretical Post-Development Sanitary Flows**

Building ID	Use	Staff / Seats / Area	Average Flow (L/s)	Peaking Factor**	Peak Flow (L/s) ***
Sewage Flows to Legget Sanitary Sewer via Sewer in Lifestyle Street					
Office Tower	Office	700 staff	0.61	1.5	0.91
Retail East	Gym + Showers	200 users*	0.19		0.28
Retail West	Café/Restaurant	50 seats*	0.22		0.33
Social Café	Quick Service	50 seats*	0.22		0.33
Bldg. Infiltration (ha)	-	0.743 ha.	-	-	0.24
Lifestyle Street + Plaza Infiltration (ha)	-	0.902 ha.	-	-	0.30
Sub-Total	**-**	**-**	**1.24**	**-**	**2.39**
Sewage Flows Directly to Legget Sanitary Sewer					
R&D Lab	Lab	600 staff	0.52	1.5	0.78
Bldg. Infiltration (ha)	-	0.832 ha.	-	-	0.27
Sub-Total	-	-	**0.52**	**-**	**1.06**
Sewage Flows to Legget Sanitary Sewer via Sewer in South Access Road					
Retained Lands	Assumed Future Office Building	500 staff	0.43	1.5	0.65
Infiltration (ha)	-	0.777 ha.	-	-	0.26
Sub-Total Retained Lands	**-**	-	0.43	**-**	**0.91**
Surface Parking, Access Road, and Workyard Infiltration (ha)	-	2.006 ha.	-	-	0.66
Sub-Total		**-**	**0.43**	**-**	**1.57**
Total	**-**	**-**	**2.19**	**-**	**5.02**

*Total of 200 Gym users assumed 2 x per day and 50 Café/Quick Service seats assumed to be used 3 x per day.

**A peaking factor of 1.5 is appropriate for the intended use and is consistent with the previous design of the KRP sanitary trunk sewer system.

***Represents rounded values.

New 250mm dia. sanitary sewers are being proposed both along Legget Drive and along Lifestyle Street to match the size of the municipal sanitary sewer in Legget Drive and to maximize the conveyance capacity of the system. The sanitary sewer system (both private and public) will have more than sufficient capacity to service the proposed development, as demonstrated in the attached sanitary sewer design sheet, and has been designed to provide excess capacity for the future mixed-use lands to the north (once the existing Nokia Office building is demolished). The potential excess capacity for future mixed-use lands to the north cannot exceed the overall capacity of the downstream sewer system on KRP Lands. If additional capacity is required in the future to accommodate the future mixed-use lands to the north, it may be possible to upsize the downstream pipe segment(s) upstream of the connection to the municipal sanitary trunk sewer within the golf course. Additional analysis would need to be completed in the future.

The anticipated sanitary flows generated by the proposed development will not facilitate self-cleansing velocities within the sewers in Lifestyle Street per the Ottawa Sewer Design Guidelines. Periodic maintenance (flushing) of these sewers by the owner may be required as an interim condition. Self-cleansing velocities are anticipated to be achieved following the addition of sanitary flows from the future mixed-use lands to the north, as demonstrated in the attached sanitary sewer design sheet; however, additional analysis would need to be completed in the future.

At the client's request, a new 200mm dia. sanitary sewer is also being proposed along the south service road to provide flexibility for the future development of the Retained Lands parcel. This sewer will have sufficient capacity to service the future development on the Retained Lands and possible future parking garage.

This sanitary servicing approach is generally consistent with the approach outlined in the 'Assessment of Adequacy of Public Services Report'[4]. Refer to **Appendix C** for detailed sanitary sewage calculations and the sanitary sewer design sheet. Also refer to the 'Sanitary and Storm Trunk Sewer Design Brief – Nokia Ottawa Innovation Campus'[6] for further details.

2.2 Water for Domestic Use and Fire Protection

The subject site is located within the City of Ottawa 2W watermain pressure zone. Based on correspondence with the City of Ottawa, new connections to the 610mm dia. feedermain in Legget Drive will not be permitted. The proposed development will therefore be serviced by a new municipal watermain along Legget Drive up to the northern boundary of the subject site (to be extended south by the City in the future) as well as the extension of a new private looped watermain on site. Connections will be made to the 406mm dia. municipal watermain in Terry Fox and to the 203mm dia. watermain servicing the 515 Legget Drive property. The on-site looped watermain network will be extended from Legget Drive west along Lifestyle Street, south along the west property line, through the Retained Lands and out to Legget Drive along the south service road (all within an easement(s)). The proposed watermain configuration will ensure the proposed development has a looped system. Bulk water meter chambers will be provided at the property line, while valves will be provided along the municipal and private watermains and building services. It is anticipated that individual water meters will be located inside the respective buildings with remote water meters installed on the exterior face of the buildings. The proposed Nokia buildings will be fully sprinklered with their respective fire department (siamese) connections located within 45m of a nearby fire hydrant. The future development of the Retained Lands and possible future parking garage are not included in the current hydraulic model.

This water servicing approach is generally consistent with the approach outlined in the 'Assessment of Adequacy of Public Services Report'[4].

2.2.1 Water Demands and Watermain Analysis

The theoretical water demands for the proposed development are based on the design criteria from the City of Ottawa Water Distribution Guidelines and/or from subsequent Technical Bulletins. The Fire Underwriters Survey (FUS) method was used to calculate the fire flow requirements based on building information (i.e., building materials, occupancy hazards, etc.) provided by the architect. The water demands are calculated based on the following criteria:

<u>Nokia Campus and Future Retained Lands - Commercial Uses</u>

- Design Population (Employees): 700 office, 600 lab, and Gym/Café/Restaurant users
- Average Daily Water Demands: 75 L/person/day (Office and Lab staff)

- Average Daily Water Demands: 40 L/user/day (Gym + Showers)
- Average Daily Water Demands: 125 L/seat/day (Café/Restaurant, Quick Service)
- Maximum Day Demand Peaking Factor = 1.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 1.8 x Max. Day Demand (City Water Table 4.2)

Table 2 identifies the theoretical domestic water demands and fire flow requirements for the development based on the above design criteria.

Table 2: **Theoretical Water Demand and FUS Fire Flows for Proposed Development**

Building ID	Use	Staff / Seats / Area	Avg. Day Demand (L/s)	Max. Day Demand (L/s)	Peak Hour Demand (L/s)**	FUS Fire Flow (L/s) ***
Water Supplied by (Looped) Watermain in Lifestyle Street						
Office Tower	Office	700 staff	0.61	0.91	1.64	117
Retail East	Gym + Showers	200 users*	0.19	0.28	0.50	50
Retail West	Café/Restaurant	50 seats*	0.22	0.33	0.59	100
Social Café & Amenity	Quick Service Retail	50 seats*	0.22	0.33	0.59	117
Sub-Total	-	-	**1.24**	**1.85**	**3.32**	-
Water Supplied by (Looped) Watermain in Lifestyle Street						
Lab	Lab	600 staff	0.52	0.78	1.41	233
Sub-Total	-	**600 staff**	**0.52**	**0.78**	**1.41**	**233**
Water Supplied by (Looped) Watermain in South Service Road						
Future Garage	Parking	Not included in calculations				
Retained Lands	Assumed Future Office Building					
Sub-Total		-	-	-	-	-
Total	-	-	**1.76**	**2.63**	**4.73**	-

*Total of 200 Gym users assumed 2 x per day and 50 Café/Quick Service seats assumed to be used 3 x per day.

A peaking factor of **1.5 x Max Day is appropriate for the intended use and is consistent with the previous design of the KRP sanitary trunk sewer system.

***FUS Fire Flow for Social Café is combined with the Office Tower FUS Fire Flow.

The following design criteria were taken from Section 4.2.2 – 'Watermain Pressure and Demand Objectives' of the City of Ottawa Design Guidelines for Water Distribution:

- Normal operating pressures are to range between 345 kPa (50 psi) and 483 kPa (70 psi) under Max Day demands.
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour demands.
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands.

The size of the proposed municipal watermain in Legget Drive was determined to be 305mm dia. based on direction from the City of Ottawa to avoid connection implications to a 'large' diameter (>305mm dia.) watermain. The proposed on-site private watermain was determined to be 305mm

dia. to maximize the water available to the Nokia campus, assuming a single feed interim scenario in the event the 600mm dia. feedermain in Legget Drive is shut down. This possible interim measure would only be applicable until such time as the new local municipal watermain is extended south and looped at Solandt Road. A private 300mm dia. watermain would also allow for a possible connection of the future mixed-use lands to the north (600 March Road). Any future connection to the private watermain will be contingent on modelling that demonstrates no negative impacts to the network.

Preliminary domestic water demands, and fire flow requirements were provided to the City of Ottawa to obtain municipal watermain boundary conditions. **Tables 2.1** and **2.2** summarize preliminary hydraulic analysis results based on municipal watermain boundary conditions provided by the City of Ottawa.

Table 2.1: Hydraulic Boundary Conditions Provided by the City (Scenario 1)

Municipal Watermain Boundary Condition	Boundary Condition	Normal Operating Pressure Range (psi)	Anticipated WM Pressure (psi)*
Connection #1 - 406mm dia. WM in Terry Fox Drive Right-of-Way (North of subject site)			
Minimum HGL (Peak Hour Demand)	126.3 m	40 psi (min.)	~ 71 psi
Maximum HGL (Max Day Demand)	131.0 m	50 - 70 psi	~ 78 psi
HGL Max Day + Fire Flow (50-300 L/s)	127.5 m to 120.3 m	20 psi (min.)	~ 63-73 psi
Connection #2 - 203mm dia. WM servicing 515 Legget Drive (Southeast of subject site)			
Minimum HGL (Peak Hour Demand)	126.3 m	40 psi (min.)	~ 69 psi
Maximum HGL (Max Day Demand)	131.0 m	50 - 70 psi	~ 76 psi
HGL Max Day + Fire Flow (50-300 L/s)	127.5 m to 120.6 m	20 psi (min.)	~ 61-71 psi

*Based on approximate watermain elevations of 75.8m at service connection location #1 (Terry Fox Drive) and 77.2 m at connection location #2 (515 Legget Drive). Design pressure = (HGL – watermain elevation) x 1.42197 PSI/m.

Table 2.2: Hydraulic Boundary Conditions Provided by the City (Scenario 2)

Municipal Watermain Boundary Condition	Boundary Condition	Normal Operating Pressure Range (psi)	Anticipated WM Pressure (psi)*
Connection #1 - 406mm dia. WM in Terry Fox Drive Right-of-Way (North of subject site)			
Minimum HGL (Peak Hour Demand)	125.6 m	40 psi (min.)	~ 70 psi
Maximum HGL (Max Day Demand)	130.9 m	50 - 70 psi	~ 78 psi
HGL Max Day + Fire Flow (50-300 L/s)	126.3 m to 107.6 m	20 psi (min.)	~ 45-71 psi

*Based on approximate watermain elevation of 75.8m at service connection location (Terry Fox Drive). Design pressure = (HGL – watermain elevation) x 1.42197 PSI/m.

The hydraulic model EPANET was used to analyze the performance of the proposed watermain configuration for the following three (3) theoretical conditions under all three scenarios requested by the City of Ottawa, as described below:

- Maximum Day + Fire Flow Demand
- Peak Hour Demand
- Maximum HGL

At the request of the City of Ottawa, the hydraulic analysis is based on three (3) watermain scenarios:

- **Scenario 0** includes no future demands to the municipal water network and is used to determine the existing conditions for service to the 515 Legget Drive property.

- **Scenario 1** includes a looped watermain with two (2) feeds off the municipal watermain network (Connection #1 off the 406mm dia. watermain in Terry Fox Drive as well as Connection #2 off the 203mm dia. watermain servicing the 515 Legget Drive property, within the municipal ROW). The hydraulic analysis includes the 515 Legget Drive service to ensure that the proposed development would not cause negative impacts to the 515 Legget Drive service.

- **Scenario 2** includes Connection #1 off the 406 mm dia. watermain in Terry Fox Drive only, potentially simulating a closure of the 610m backbone watermain in Legget Drive.

A schematic representation of the hydraulic networks for each scenario depicts the node and pipe numbers used in the model. The model is based on hydraulic boundary conditions provided by the City of Ottawa. **Tables 2.3, 2.4** and **2.5** summarize the hydraulic model results under **Scenario 0**; while **Tables 2.6, 2.7,** and **2.8** summarize the hydraulic model results under **Scenario 1**; and **Tables 2.9, 2.10,** and **2.11** summarize the hydraulic model results under **Scenario 2**.

Table 2.3: Maximum Day + Fire Flow Demand (Scenario 0 – Existing Conditions)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day Demands: 1.44 L/s at J80 (515 Legget Building) **Fire Flow Demand (515 Legget):** 133 L/s at J79 (Existing Private Hydrant)	Minimum system pressure of 40.2 psi is available at Node J79 (Existing Private Hydrant)	Maximum system pressure of 60.3 psi is available at Node J75 (Existing Valve at property line)

Table 2.4: Peak Hour Demand (Scenario 0 – Existing Conditions)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Peak Hour Demands: 2.59 L/s at J80 (515 Legget Building)	Minimum system pressure of 70.0 psi is available at Nodes J78 and J79 (Existing Hydrant Tee and Private Hydrant)	Maximum system pressure of 71.2 psi is available at Node J80 (515 Legget Building)

Table 2.5: Maximum HGL (Scenario 0 – Existing Conditions)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day Demands: 1.44 L/s at J80 (515 Legget Building)	Minimum system pressure of 76.7 psi is available at Nodes J78 and J79 (Existing Hydrant Tee and Private Hydrant)	Maximum system pressure of 77.9 psi is available at Node J80 (515 Legget Building)

The modelling results indicate that the existing watermain will provide adequate system flows and pressures to the 515 Legget Drive property during all conditions (i.e., Max Day + Fire Flow, Peak Hour and Max HGL) under **Scenario 0**. In some instances, the system pressures will be at the higher end of the normal operation pressure range.

Table 2.6: Maximum Day + Fire Flow Demand (Scenario 1 – Two Watermain Feeds)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings), 1.44 L/s at J80 (515 Legget Building) **Fire Flow Demand (Office & Link Building):** 59 L/s at J30 and J36 (Private Hydrants 3 and 4)	Minimum system pressure of 55.5 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 65.1 psi is available at Node J63 (Watermain just south of Connection #2)
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings),1.44 L/s at J80 (515 Legget Building) **Fire Flow Demand (Retail East Building):** 50 L/s at J22 (Private Hydrant 2)	Minimum system pressure of 67.3 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 75.0 psi is available at Nodes J62 and J63 (Watermain just south of Connection #2)
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings), 1.44 L/s at J80 (515 Legget Building) **Fire Flow Demand (Retail West Building):** 50 L/s at J22 and J30 (Private Hydrants 2 and 3)	Minimum system pressure of 56.1 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 65.1 psi is available at Node J63 (Watermain just south of Connection #2)

Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings), 1.44 L/s at J80 (515 Legget Building) **Fire Flow Demand (R&D Lab Building):** 95 L/s at J11 and J53, 40 L/s at J18 (Municipal Hydrant and Private Hydrants 1 and 10).	Minimum system pressure of 55.7 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 64.7 psi is available at Node J63 (Watermain just south of Connection #2)
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings), 1.44 L/s at J80 (515 Legget Building) **Fire Flow Demand (515 Legget Building):** 133 L/s at J79 (Existing Private Hydrant)	Minimum system pressure of 40.2 psi is available at Node J79 (Existing Private Hydrant)	Maximum system pressure of 65.2 psi is available at Nodes J62 and J63 (Watermain just south of Connection #2)

Table 2.7: Peak Hour Demand (Scenario 1 – Two Watermain Feeds)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Peak Hour Demands: 4.72 L/s at J26 (Office/Retail/Link/Lab Buildings), 2.59 L/s at J80 (515 Legget Building)	Minimum system pressure of 65.9 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 73.3 psi is available at Nodes J58, J59, J60, J61, J62, and J63 (Watermain south and west of Connection #2)

Table 2.8: Maximum HGL (Scenario 1 – Two Watermain Feeds)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings), 1.44 L/s at J80 (515 Legget Building)	Minimum system pressure of 72.6 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 80.0 psi is available at Nodes J58, J59, J60, J61, J62, and J63 (Watermain south and west of Connection #2)

The modelling results indicate that the looped watermain will provide adequate system flows and pressures during all conditions (i.e., Max Day + Fire Flow, Peak Hour and Max HGL). In some instances, the system pressures will be at the higher end of the normal operation pressure range. Furthermore, the 515 Legget Drive property will not be negatively affected by the proposed looped watermain (**Scenario 1**).

Table 2.9: Maximum Day + Fire Flow Demand (Scenario 2 – Single Watermain Feed)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings) **Fire Flow Demand (Office & Link Building):** 59 L/s at J30 and J36 (Private Hydrants 3 and 4)	Minimum system pressure of 33.1 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 44.9 psi is available at Node J1 (Municipal watermain near Connection #1)
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings) **Fire Flow Demand (Retail East Building):** 50 L/s at J22 (Private Hydrant 2)	Minimum system pressure of 64.9 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 71.7 psi is available at Node J1 (Municipal watermain near Connection #1)
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings) **Fire Flow Demand (Retail West Building):** 50 L/s at J22 and J30 (Private Hydrants 2 and 3)	Minimum system pressure of 35.4 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 45.0 psi is available at Node J1 (Municipal watermain near Connection #1)
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings) **Fire Flow Demand (R&D Lab Building)** 95 L/s at J11 and J53, 40 L/s at J18 (Municipal Hydrant and Private Hydrants 1 and 10).	Minimum system pressure of 25.7 psi is available at Node J43 (Watermain west of Surface Parking Lot)	Maximum system pressure of 44.2 psi is available at Node J1 (Municipal watermain near Connection #1)

Table 2.10: Peak Hour Demand (Scenario 2 – Single Watermain Feed)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Peak Hour Demands: 4.72 L/s at J26 (Office/Retail/Link/Lab Buildings)	Minimum system pressure of 64.9 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 70.8 psi is available at Node J1 (Municipal watermain near Connection #1)

Table 2.11: Maximum HGL (Scenario 2 – Single Watermain Feed)

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day Demands: 2.62 L/s at J26 (Office/Retail/Link/Lab Buildings)	Minimum system pressure of 72.4 psi is available at Node J30 (Private Hydrant 3)	Maximum system pressure of 78.3 psi is available at Node J1 (Municipal watermain near Connection #1)

The **Scenario 2** modelling results indicate that the single feed watermain will provide adequate system flows and pressures during all conditions (i.e., Max Day + Fire Flow, Peak Hour and Max HGL). **Scenario 2** will act as an interim condition until such a time that the proposed 305mm dia. municipal watermain is extended south along Legget Drive and looped at Solandt Road. It is anticipated that the new 305mm dia. watermain in Legget Drive will be extended before the Retained Lands are developed. The City of Ottawa's Infrastructure Planning Group has confirmed that the HGLs in the future fully looped municipal watermain will improve; therefore, it is anticipated that the fire flow requirements for the Retained Lands will be met in the future.

Booster pump(s) are anticipated to be required to provide adequate water pressure to the upper floors of the on-site building. Refer to **Appendix D** for City of Ottawa boundary conditions, the hydraulic modeling schematics, modeling results and correspondence from the City of Ottawa.

As indicated in the model, a multi-hydrant approach to firefighting will be required to supply adequate fire flow to the proposed development using new municipal and new private on-site hydrants. There are several Class AA (blue bonnet) hydrants within 150m of the proposed development, including both municipal hydrants along Legget Drive and private hydrants fed off the proposed looped watermain. Based on the City of Ottawa Technical Bulletin ISTB-2018-02, Class AA (blue bonnet) hydrants within 75m of the site have a maximum capacity 95 L/s while hydrants between 75m and 150m of the site have a maximum capacity 63 L/s (at a pressure of 20 PSI). The combined maximum flow from the nearby hydrants will provide the Max Day + Fire Flow requirement for the proposed development assuming a looped system. **Table 2.12** summarizes the total theoretical combined fire flow available from the nearby fire hydrants (municipal and private) and compares it to the fire flow demands based on FUS calculations assuming a looped system.

Table 2.12: **Theoretical Fire Protection Summary Table**

Building	Fire Flow Demand (L/s)	Fire Hydrant(s) within 75m (~ 95 L/s each)	Fire Hydrant(s) within 150m (~ 63 L/s each)	Theoretical Combined Available Fire Flow (L/s)
Water Supplied by Hydrants in Lifestyle St., Legget Dr., March Rd., and/or Visitor Parking				
Office Tower + Social Cafe	117	4	4	>117
Retail East	50	4	2	>50
Retail West	100	3	2	>100
Water Supplied by Hydrants in Legget Drive and/or South Service Road				
Lab	233	5	2	>233
Water Supplied by Hydrants along March Rd., Visitor Parking and/or South Service Road				
Fut. Parking Garage	Not included in calculations			
Retained Lands				

Refer to **Appendix D** for detailed calculations and correspondence from the City of Ottawa.

2.2.2 Water Age Analysis

A cursory water age analysis was conducted for the watermain network, including the section of proposed 305mm dia. municipal watermain along Legget Drive that will be required to service the proposed development. The purpose of this analysis is to confirm that drinking water quality can be maintained under a dead-end watermain condition (**Scenario 2)**. The analysis only includes domestic demands from the proposed development on the 570 March Road property, as the timing of the future development of the 520 March Road property is unknown.

Table 2.13 provides a summary of the water volume calculations for the proposed watermain network from the connection to the existing 406mm dia. watermain in Terry Fox Drive to the dead-end in Legget Drive, including the 305mm dia. looped private watermain, hydrant leads and stubs (for future connections).

Table 2.13: Water Volume Calculations

Pipe Size / Material	Area of Pipe (m^2)	Length of Pipe (m)	Volume of Water*
305mm dia. / PVC	0.072 m^2	885 m	64,660 L
203mm dia. / PVC	0.032 m^2	35 m	1,133 L
152mm dia. PVC	0.018 m^2	40 m	726 L
TOTAL	**-**	**-**	**66,519 L (or 66.5 m^3)**

*Volumes are based on actual ID of pipes.

The average daily demand for the proposed Nokia development (570 March Road) is anticipated to be 1.75 L/s (151,200 L/day or 151 m^3/day). Section 4.1.2 of the City of Ottawa Water Distribution Design Guidelines requires a 5-day turnover rate for basic day demand conditions. Based on the values calculated above, the domestic water used by the Nokia development will turn over the volume of water within the watermain at least twice a day. As a result, there are no concerns that drinking water quality would be compromised.

2.3 Storm Drainage and Stormwater Management

On-site stormwater management will be required for the proposed development to meet the requirements of the City of Ottawa. The stormwater strategy for this development will be consistent with previously approved KRP SWM reports.

2.3.1 Pre-Development Conditions and Allowable Release Rate

Under current conditions, stormwater runoff from the subject site is being directed into two (2) separate storm sewer systems. Both sewer systems are discharged into the existing stormwater management (SWM) Facility No. 1, located behind the Brookstreet Hotel on KRP lands. To maintain consistency with approved designs, the previous SMP KRP Reports were reviewed to determine existing stormwater management criteria including allowable release rates for the subject site. As indicated on the previously approved Storm Drainage Area Plan (98066-STM), stormwater runoff from the subject site (i.e., existing surface parking lots) flows into the two (2) distinct storm outlets as follows:

- The northern portion of the existing parking lot (Area “PRE-A”) currently flows into the northern storm sewer system located on the KRP lands directly across Legget Drive to the east. The maximum allowable release rate from this portion of the subject site into this sewer system is 63.8 L/s.

- The southern portion of the existing parking lot (Area “PRE-B1”) currently flows into the southern storm sewer system located on the KRP lands via the municipal storm sewer in Legget Drive. Most of the runoff from the undeveloped strip along the south property line (Area “PRE-B2”) currently sheet-drains uncontrolled into the Legget Drive municipal Right-of-Way or directly onto the adjacent Sanmina property (500 March Road) before flowing into the southern storm sewer system. The maximum allowable release rate from this portion of the subject site is 235.1 L/s (152 L/s + 83.1 L/s).

Refer to the enclosed Pre-Development Stormwater Management Plan (C-300) for sub-catchment areas, **Appendix J** for excerpts from the previously approved 'Stormwater Management Plan, Kanata Research Park'[2], and to **Appendix K** for a copy of the previously approved Storm Drainage Area Plan (98066-STM) and Brookstreet Hotel Storm Plan (99089-STM).

2.3.2 Stormwater Management Criteria and Objectives

The stormwater management (SWM) criteria have been provided during pre-consultation meetings with the City of Ottawa. The SWM criteria and design objectives are as follows:

- Provide a dual drainage system (i.e., minor, and major system flows).
- Maintain consistency with the previously approved Kanata Research Park - Stormwater Management Plans and Reports, by providing the following stormwater quantity and quality control measures:
    - Control post-development flows into the northern storm sewer system located on the KRP lands to a maximum allowable release rate of 63.8 L/s.
    - Control post-development flows into the southern storm sewer system located on the KRP lands to a maximum allowable release rate of 235.1 L/s.
    - Store and control post-development on-site runoff in excess of the allowable release rates specified above, prior to releasing flows into the downstream storm sewer systems. Provide on-site stormwater quantity control measures for storms up to and including the 100-year design event.
    - Provide on-site stormwater quality control equivalent to an "Enhanced" Level of Protection (i.e., minimum 80% TSS removal and 90% of annual runoff treated) via a "treatment train", combining raingardens and mechanical separators, prior to releasing flows from the site. The proposed on-site treatment train measures are in addition to the water quality treatment provided by the downstream stormwater management facility located on KRP Lands to the east.
    - Water temperature target mitigation measures as described in the previously approved Shirleys Brook Subwatershed report[1].
- Ensure that no surface ponding will occur on the paved surfaces (parking lots and drive aisles) during the 2-year storm event.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion a Sediment Control.

2.3.3 Post-Development Conditions

Under post-development conditions, the proposed development, including the Nokia Campus and Retained Lands, will be serviced by extending new on-site storm sewer systems. Flows will be attenuated on-site prior to being directed to the existing stormwater management (SWM) Facility No. 1 on KRP lands, via the sewer systems on the north and south sides of the Brookstreet Hotel.

To mitigate the stormwater related impacts due to the increase in imperviousness of the site, stormwater runoff will be attenuated using control flow drains on certain building roofs, using inlet control devices (ICD) within the on-site storm sewer system, and the internal SWM cistern of the R&D Lab building. Flows will be controlled for storms up to and including the 100-year design

event. All proposed storm service laterals will be equipped with backflow prevention devices to protect the buildings from any potential sewer back-ups. Due to the existing grades, runoff from a small portion of the site will drain uncontrolled off site.

On-site stormwater quality control will be achieved using a "treatment train", with flows being treated by a combination of rain gardens and oil and grit separator (OGS) units installed at the site's north and south stormwater outlets. Additional off-site stormwater quality treatment will be provided by the existing downstream stormwater management facility, as outlined in the previously approved 'Stormwater Management Plan, Kanata Research Park'[2]. This design is generally consistent with the MVCA's quality control recommendations, as outlined in the approved 'Assessment of Adequacy of Public Services Report'[4]. Refer to **Appendix A** for correspondence with the MVCA.

Stormwater runoff from the visitor parking area and central courtyard will be directed to nearby storm sewer system or rain garden, thus mitigating the potential for stormwater management on the surface of paved parking lots prone to increase water temperatures. Furthermore, most of the on-site stormwater management (storage) will be provided within underground SWM storage chambers, within an internal SWM cistern, or on light coloured (white) building roofs, thus providing thermal mitigation measures to meet water temperature targets. This design is consistent with the MVCA's recommendations to implement thermal mitigation measures in the overall SWM design, as outlined in the MVCA's Shirley's Brook 2016 Summary Report.

The two storm sewer outlets have limited conveyance capacity (maximum allowable release rate). As a result, drainage from the subject site will have to be split based on the relative size of the sub-catchment areas, the imperviousness of these areas, and potential on-site storage. In general, stormwater runoff from Lifestyle Street, Office Tower, Retail East/West building roofs will be directed to the northern storm sewer system located on KRP lands, while runoff from the remainder of the Nokia site, including the R&D Lab, parking lot, work yard, south service road, and Retained Lands will be directed to the southern storm sewer system on KRP lands. As indicated above, the stormwater management design for the proposed development will include on-site water quantity control prior to releasing flows from the site. Refer to the enclosed Post-Development Stormwater Management Plan (C-301) for sub-catchment areas and to **Appendix E** for detailed stormwater calculations and the storm sewer design sheets. Also refer to the 'Sanitary and Storm Trunk Sewer Design Brief – Nokia Ottawa Innovation Campus'[6] for further details.

2.3.4 Post-Development Flows to North Outlet Sewer

To maintain consistency with the previously approved 'Stormwater Management Plan, Kanata Research Park Report'[2], post-development stormwater flows from sub-catchment Areas A-0 to A-6 will be controlled to a maximum release rate of 63.8 L/s, prior to being released into northern storm sewer system located on the KRP lands.

2.3.4.1 Area A-0: Uncontrolled Runoff

The uncontrolled post-development flows from sub-catchment area A-0a, which sheet drain to the adjacent Nokia property (600 March Road), were calculated using the Rational Method to be approximately 1.2 L/s during the 2-year design event, 1.6 L/s during the 5-year design event and 3.5 L/s during the 100-year design event.

The uncontrolled post-development flows from sub-catchment area A-0b, which sheet drain directly to Legget Drive, were calculated using the Rational Method to be approximately 0.3 L/s during the 2-year design event, 0.4 L/s during the 5-year design event and 0.9 L/s during the 100-year design event. Refer to the Post-Development Stormwater Management Plan (C-301) and **Appendix E** for detailed SWM calculations.

2.3.4.2 Area A-1 – Controlled Flow from Lifestyle Street – Upper End

The post-development flow from this sub-catchment area, including contributing off-site flows from drainage area OS-1 due to the adjustment of the property line, will be attenuated by an ICD installed in the outlet pipe of STMMH 102. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

Table 3.1 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3.1: Stormwater Flows, ICD & Storage

Design Event	Controlled Site Flows from Area A-1 + OS-1					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest MHF Type A ICD	10.9 L/s	0.00 m (80.29 m)	5.5 L/s	23.9 m³	~76.4 m³
5-Year		12.5 L/s	0.00 m (80.46 m)	6.3 L/s	34.5 m³	
100-Year		17.0 L/s	0.00 m (81.09 m)	8.5 L/s	74.1 m³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

2.3.4.3 Area A-2 – Controlled Flow from Lifestyle Street – Lower End

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 251. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

Table 3.2 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3.2: Stormwater Flows, ICD & Storage

Design Event	Controlled Site Flows from Area A-2					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest MHF Type A ICD	11.6 L/s	0.00 m (78.51 m)	5.8 L/s	41.1 m³	~126.3 m³
5-Year		13.5 L/s	0.00 m (78.67 m)	6.8 L/s	58.4 m³	
100-Year		19.0 L/s	0.00 m (79.23 m)	9.5 L/s	122.3 m³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

2.3.4.4 Area A-3 – Controlled Flow from Retail West Roof

The post-development flow from this sub-catchment area will be attenuated using Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the downstream storm sewer via the proposed building service.

Table 3.3 summarizes the post-development design flows from this sub-catchment area as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required and storage volumes provided for the 2-year, 5-year and 100-year design events.

Table 3.3 - Controlled Flow Roof Drains

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)			Approximate Ponding Depth Above Drains (m)			Storage Volume Required (m³)			Max. Storage Available (m³)
			2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	
A3-RD 1	1	RD-100-A-ADJ (Fully Exposed)	0.95	1.26	1.89	0.08	0.10	0.15	7.5	10.1	20.6	21.2
A3-RD 2	1	RD-100-A-ADJ (Fully Exposed)	0.95	1.26	1.89	0.08	0.10	0.15	7.5	10.1	20.6	20.8
Total Roof (0.098 ha)	**2**	**-**	**1.9***	**2.5***	**3.8***	**-**	**-**	**-**	**14.9***	**20.1***	**41.2***	**42.0***

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information.

2.3.4.5 Area A-4 – Controlled Flow from Retail East Roof

The post-development flow from this sub-catchment area will be attenuated using Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the downstream storm sewer via the proposed building service.

Table 3.4 summarizes the post-development design flows from this sub-catchment area as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required and storage volumes provided for the 2-year, 5-year and 100-year design events.

Table 3.4: Controlled Flow Roof Drains

Roof Drain ID & Drainage Area (ha)	No. of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)			Approximate Ponding Depth Above Drains (m)			Storage Volume Required (m^3)			Max. Storage Available (m^3)
			2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	
A4-RD 1	1	RD-100-A-ADJ (Fully Exposed)	0.95	1.26	1.89	0.08	0.10	0.15	5.0	6.1	14.1	14.5
A4-RD 2	1	RD-100-A-ADJ (Fully Exposed)	0.95	1.26	1.89	0.08	0.10	0.15	5.2	7.1	14.6	15.4
Total Roof (0.075 ha)	**2**	**-**	**1.9***	**2.5***	**3.8***	**-**	**-**	**-**	**10.2***	**13.9***	**28.7***	**29.9***

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information.

2.3.4.6 Area A-5 – Controlled Flow from Office Tower Roof

The post-development flow from this sub-catchment area will be attenuated using Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the downstream storm sewer via the proposed building service.

Table 3.5 summarizes the post-development design flows from this sub-catchment area as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required and storage volumes provided for the 2-year, 5-year and 100-year design events.

Table 3.5: Controlled Flow Roof Drains

Roof Drain ID & Drainage Area (ha)	No. of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)			Approximate Ponding Depth Above Drains (m)			Storage Volume Required (m^3)			Max. Storage Available (m^3)
			2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	
A5-RD 1	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	1.2	1.8	4.3	5.1
A5-RD 2	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	1.9	2.9	6.6	7.1
A5-RD 3	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	0.7	1.1	2.6	2.9
A5-RD 4	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	0.6	1.0	2.4	2.8
A5-RD 5	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	0.8	1.3	3.1	3.3

Roof Drain ID & Drainage Area (ha)	No. of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)			Approximate Ponding Depth Above Drains (m)			Storage Volume Required (m^3)			Max. Storage Available (m^3)
			2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	
A5-RD 6	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	0.2	0.4	1.1	1.5
A5-RD 7	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	1.5	2.3	5.3	5.7
A5-RD 8	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	1.6	2.4	5.6	5.8
A5-RD 9	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	1.3	2.0	4.8	5.0
A5-RD 10	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	1.4	2.1	5.0	5.0
A5-RD 11	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	2.3	3.4	7.8	8.7
A5-RD 12	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	3.2	4.7	10.5	10.9
A5-RD 13	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	2.2	3.3	7.4	8.4
A5-RD 14	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	3.0	4.4	9.9	11.1
A5-RD 15	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	2.2	3.3	7.5	8.4
A5-RD 16	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	3.0	4.4	9.9	11.1
A5-RD 17	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	3.7	5.4	12.0	12.1
A5-RD 18	1	RD-100-A-ADJ (1/2 Exposed)	0.79	0.95	1.26	0.08	0.10	0.15	4.8	6.8	14.5	15.1
Total Roof (0.288 ha)	**18**	**-**	**9.0***	**9.7***	**11.1***	**-**	**-**	**-**	**35.8***	**53.0***	**120.6***	**130.0***

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information.

2.3.4.7 Area A-6 – Controlled Flow from Social Café and Amenity Roof

The post-development flow from this sub-catchment area will be attenuated using Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the downstream storm sewer via the proposed building service.

Table 3.6 summarizes the post-development design flows from this sub-catchment area as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required and storage volumes provided for the 2-year, 5-year and 100-year design events.

Table 3.6: Controlled Flow Roof Drains

Roof Drain ID & Drainage Area (ha)	No. of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)			Approximate Ponding Depth Above Drains (m)			Storage Volume Required (m^3)			Max. Storage Available (m^3)
			2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	
A6-RD 1	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	1.3	2.0	4.8	8.6
A6-RD 2	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	4.1	5.9	13.0	16.6
A6-RD 3	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	0.7	1.2	2.9	3.8
A6-RD 4	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	0.7	1.1	2.8	3.8
A6-RD 5	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	0.5	0.8	1.9	2.2
A6-RD 6	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.32	0.08	0.10	0.15	0.4	0.7	1.9	2.2
A6-RD 7	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	2.7	4.0	9.0	9.2
A6-RD 8	1	RD-100-A-ADJ (1/4 Exposed)	0.71	0.79	0.95	0.08	0.10	0.15	2.7	3.9	8.9	9.3
Total Roof (0.117 ha)	**8**	**-**	**3.7***	**4.0***	**4.5***	**-**	**-**	**-**	**13.2***	**19.6***	**45.1***	**55.7***

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information.

2.3.4.8 Summary of Post- Development Flows to North Storm Outlet

As indicated in **Tables 3.1** to **3.6**, the respective sub-catchment areas will provide sufficient storage for the 2-year, 5-year and 100-year design events, whether underground, on the surface, or on the building roofs. The site has also been designed to ensure that no stormwater will pond on the paved surfaces during the 2-year storm event. Furthermore, the site grading design will ensure that surface ponding depths will not touch the building envelope or lowest building openings during the 100-year+20% stress test.

Table 3.7 compares the post-development site flows from the proposed development to the maximum allowable release rate for the 2-year, 5-year, and the 100-year design events.

Table 3.7: Stormwater Flow Comparison Table

Design Event	Pre-Development Conditions	Drainage Areas A-0 to A-6							
		Post-Development Conditions							
	Max Release Rate (L/s)	A-0 Flow (L/s)	A-1 Flow (L/s)	A-2 Flow (L/s)	A-3 Flow (L/s)	A-4 Flow (L/s)	A-5 Flow (L/s)	A-6 Flow (L/s)	Total Flow (L/s)
2-Yr	**63.8**	1.5	10.9	11.6	1.9	1.9	9.0	3.7	**40.5**
5-Yr		2.0	12.5	13.5	2.5	2.5	9.7	4.0	**46.7**
100-Yr		4.4	17.0	19.0	3.8	3.8	11.1	4.5	**63.6**

As indicated in the table above, the 2-year, 5-year and 100-year post-development flows will be less than the maximum allowable release rate for this portion of the site. Refer to **Appendix E** for detailed SWM calculations.

2.3.5 Post-Development Flows to South Outlet Sewer

To maintain consistency with the previously approved 'Stormwater Management Plan, Kanata Research Park Report'[2], post-development stormwater flows from sub-catchment Areas B-0 to B4 (570 March Road) and C-0 to C-2 (520 March Road) will be controlled to a maximum release rate of 235.1 L/s, prior to being released into southern storm sewer system located on the KRP lands.

2.3.5.1 Area B-0 – Uncontrolled Direct Runoff

The uncontrolled post-development flows from sub-catchment area B-0a, which sheet drain to Legget Drive, were calculated using the Rational Method to be approximately 2.0 L/s during the 2-year design event, 2.7 L/s during the 5-year design event and 5.7 L/s during the 100-year design event.

The uncontrolled post-development flows from sub-catchment area B-0b, which sheet drain to the adjacent Sanmina property (500 March Road), per existing conditions and to prevent impacts on the mature trees along the common property line, were calculated using the Rational Method to be approximately 3.0 L/s during the 2-year design event, 4.1 L/s during the 5-year design event and 8.8 L/s during the 100-year design event. Refer to the Post-Development Stormwater Management Plan (C-301) and **Appendix E** for detailed SWM calculations.

2.3.5.2 Area B-1 – Controlled Flow from R&D Lab Building

The post-development flow from this sub-catchment area will be captured by the Lab Building and Loading Dock roof drains and directed to an internal SWM storage tank. Stormwater collected within the internal SWM cistern will be controlled prior to being discharged into the existing 525mm dia. storm sewer in Legget Drive, via the storm service lateral. The post-development flows will be attenuated by an ICD installed in the outlet pipe of the internal SWM tank. The internal SWM tank will be equipped with an emergency overflow pipe through the foundation wall which will spill to the surface outside the building. The internal plumbing is to be pressure rated piping specified by the mechanical engineer.

Table 3.8 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3.8: Stormwater Flows, ICD & Storage

Design Event	Controlled Site Flows from Area B-1					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest HF Type C ICD	21.9 L/s	0.00 m (78.58 m)	11.0 L/s	137.1 m³	~389 m³
5-Year		27.0 L/s	0.00 m (78.83 m)	13.5 L/s	188.9 m³	
100-Year		41.0 L/s	0.00 m (79.76 m)	20.5 L/s	380.0 m³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

2.3.5.3 Area B-2 – Controlled Flow from Plaza and Entrance Dropoff

The post-development flow from this sub-catchment area, including contributing off-site flows from drainage area OS-2 due to the adjustment of the property line, will be attenuated by an ICD installed in the outlet pipe of CBMH 260. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and within the landscaped area rain garden prior to being discharged into the downstream storm sewer system. Refer to **Appendix E** for supporting calculations.

Table 3.9 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3.9: Stormwater Flows, ICD & Underground and Surface Storage

Design Event	Controlled Site Flows from Area B-2 + OS-2					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest HF Type B ICD	19.0 L/s	0.00 m (79.83 m)	9.5 L/s	53.9 m³	~169 m³
5-Year		21.0 L/s	0.00 m (80.02 m)	10.5 L/s	78.3 m³	
100-Year		30.0 L/s	0.00 m (81.13 m)	15.0 L/s	167.0 m³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

2.3.5.4 Area B-3 – Controlled Flow from the Surface Parking Lot

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 279. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

Table 3.10 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3.10: Stormwater Flows, ICD & Underground and Surface Storage

Design Event	Controlled Site Flows from Area B-3					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest HF Type E ICD	23.7 L/s	0.00 m (78.55 m)	11.9 L/s	186.4 m³	~616 m³
5-Year		29.8 L/s	0.00 m (78.68 m)	14.9 L/s	254.8 m³	
100-Year		46.0 L/s	0.0 m (79.16 m)	23.0 L/s	510.5 m³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

2.3.5.5 Area B-4 – Controlled Flow from South Access Route and Work Yard

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 265. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

Table 3.11 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3.11: Stormwater Flows, ICD & Underground and Surface Storage

Design Event	Controlled Site Flows from Area B-4					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest HF Type E ICD	29.4 L/s	0.00 m (78.18 m)	14.7 L/s	103.2 m³	~311 m³
5-Year		35.7 L/s	0.00 m (78.34 m)	17.9 L/s	144.2 m³	
100-Year		53.0 L/s	0.00 m (78.93 m)	26.5 L/s	303.1 m³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

2.3.5.6 Area C-0 – Uncontrolled Direct Runoff from Access Route

The uncontrolled post-development flow from sub-catchment area C-0, which sheet drains to the adjacent Sanmina property (500 March Road) per existing conditions and to prevent impacts on the mature trees along the common property line, were calculated using the Rational Method to be approximately 2.7 L/s during the 2-year design event, 3.7 L/s during the 5-year design event and 7.9 L/s during the 100-year design event. Refer to the Post-Development Stormwater Management Plan (C-301) and **Appendix E** for detailed SWM calculations.

2.3.5.7 Area C-1 – Controlled Flow from the Surface Parking Lot (Retained Lands)

The post-development flows from this sub-catchment area under interim conditions will be attenuated by an ICD installed in the outlet pipe of CBMH 272 and temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface, prior to being discharged into the downstream storm sewer system. When the property is fully developed in the future, flows from this sub-catchment area must match the pre-development allotted release rate specified in this report.

Table 3.12 summarizes the temporary post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3.12: Stormwater Flows, ICD & Internal SWM Storage

Design Event	Controlled Site Flows from Area C-1					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest HF Type B ICD	11.0 L/s	0.00 m (78.81 m)	5.5 L/s	100.9 m³	304.3 m³
5-Year		13.6 L/s	0.00 m (78.99 m)	6.8 L/s	138.4 m³	
100-Year		27.0 L/s	0.04-0.09 m (80.54 m)	13.5 L/s	258.0 m³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and **Appendix F** for ICD information.

2.3.5.8 Area C-2 – Controlled Flow from the Retained Lands ROW

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 261. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

Table 3.13 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3.13: Stormwater Flows, ICD & Internal SWM Storage

Design Event	Controlled Site Flows from Area C-2					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest MHF Type A ICD	7.8 L/s	0.00 m (78.55 m)	3.9 L/s	12.9 m³	~44.2 m³
5-Year		9.7 L/s	0.00 m (78.69 m)	4.9 L/s	18.0 m³	
100-Year		15.0 L/s	0.00 m (79.24 m)	7.5 L/s	37.6 m³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

2.3.5.9 Summary of Post- Development Flows to South Stormwater Outlet

As indicated in **Tables 3.8** to **3.13**, the respective sub-catchment areas will provide sufficient storage for the 2-year, 5-year and 100-year design events, whether underground or on the surface. The site has also been designed to ensure that no stormwater will pond on the paved surfaces during the 2-year storm event. Furthermore, the site grading design will ensure that surface ponding depths will not touch the building envelope or lowest building openings during the 100-year+20% stress test.

Table 3.14 compares the post-development site flows from the proposed development to the maximum allowable release rate for the 2-year, 5-year, and the 100-year design events.

Table 3.14: Stormwater Flow Comparison Table

Design Event	Pre-Dev. Conditions	Drainage Areas B and C								
		Post-Development Conditions								
	Max Release Rate (L/s)	B-0 Flow (L/s)	B-1 Flow (L/s)	B-2 Flow (L/s)	B-3 Flow (L/s)	B-4 Flow (L/s)	C-0 Flow (L/s)	C-1 Flow (L/s)	C-2 Flow (L/s)	Total Flow (L/s)
2-Yr	**235.1 L/s**	5.0	21.9	19.0	23.7	29.4	2.7	11.0	7.8	**120.5**
5-Yr		6.8	27.0	21.0	29.8	35.7	3.7	13.6	9.7	**147.3**
100-Yr		14.5	41.0	30.0	46.0	53.0	7.9	27.0	15.0	**234.4**

As indicated in the table above, the 2-year, 5-year and 100-year post-development flows will be less than the maximum allowable release rate for this portion of the site. Refer to **Appendix E** for detailed SWM calculations.

2.3.6 Stormwater Quality Control

Typically, stormwater quality control measures are required for drive aisles and paved parking areas. Building roofs and landscaped areas are generally considered clean for the purposes of water quality and aquatic habitat protection. The building roofs and landscaped areas comprise approximately 46% of the total site area. On-site stormwater quality control will be provided based on recommendations from the MVCA.

On-site stormwater quality control will mainly be achieved by oil and grit separator (OGS) units installed at the site's north and south stormwater outlets. Furthermore, a rain garden in the central courtyard will provide additional stormwater quality control. Flows entering the municipal storm sewer system from the R&D Lab building will not require on-site stormwater quality control, as runoff from buildings roofs are deemed clean from a water quality perspective. Additional stormwater quality treatment will be provided by the existing downstream SWM Facility located on adjacent KRP lands, as outlined in the previously approved 'Stormwater Management Plan, Kanata Research Park'[2]. This design is consistent with the MVCA's quality control recommendations, as outlined in the approved 'Assessment of Adequacy of Public Services Report'[4]. Refer to **Appendix A** for correspondence with the MVCA, and to **Appendix I** for the OGS unit design parameters, sizing analysis, and annual TSS removal efficiency rates.

Most of the on-site parking will be provided within the surface parking lot and stormwater runoff from the parking lot and other paved areas, including the driveways, south service road, visitor parking and Lifestyle Street will be stored within underground SWM storage chambers with minimal surface storage during the 100-year storm event. Furthermore, runoff from the R&D Lab roof will be directed to an internal SWM cistern. As a result, thermal mitigation measures will be implemented into the overall SWM design per the recommendations outlined in the MVCA's Shirley's Brook 2016 Summary Report.

3.0 ANTICIPATED SITE SERVICING EASEMENTS & JOINT USE MAINTENANCE AGREEMENTS

Easement(s) and Joint Use Maintenance Agreement(s) (JUMA) are anticipated to be required for the following site servicing infrastructure; however, the details remain to be finalized:

Sanitary Sewers

- The proposed sanitary sewer between SANMH 7a and SANMH 11 will require an easement over the Nokia Campus and a JUMA to service the future development of the Retained Lands (520 March Road), as there is no existing sanitary sewer in March Road, along the frontage of the 520 March Road property.
- Should the future development of the mixed-use lands to the north (600 March Road) require a connection to the sanitary sewer in Lifestyle Street (due to the excess capacity available as described in Section 2.1.1 above), then an easement and JUMA would be required for the private sanitary sewer system within Lifestyle Street.

Watermain

- As discussed with City staff, the proposed private 305mm dia. watermain will require an easement over the 520 Legget Drive property to facilitate a looped watermain network that is necessary to service the Nokia campus (570 March Road).
- An easement and a JUMA between the east property line of the Nokia campus (570 March Road) and the common property line with the Retained Lands (520 March Road) will be required in favour of the Retained Lands as there is no existing watermain in March Road, along the frontage of the 520 March Road property.
- Should the future development of the mixed-use lands to the north (600 March Road) require a connection to the private watermain network within the Lifestyle Street (as described in Section 2.2.1 above), then an easement over the Nokia Campus and a JUMA would be required.

Storm Sewers

- The proposed storm sewer between STMMH 107 and STMMH 109 will require an easement over the Retained Lands (520 March Road) property to convey flows from the Nokia entrance drop-off and plaza area to the existing storm sewer in Legget Drive.
- The proposed storm sewer segments between STMMH 109 & CBMH 261 and STMMH 117 will require an easement(s) over the Nokia Campus (570 March Road) and a JUMA(s) to convey stormwater flows from the Retained Lands (520 March Road) to the existing storm sewer in Legget Drive. As indicated on the previously approved Storm Drainage Area Plan (98066-STM), the intent was always to convey flows from this area to the storm sewer system on KRP lands via the municipal storm sewer in Legget Drive.
- There is no excess capacity within the proposed storm sewer in Lifestyle Street to allow for possible flows from the future development of the mixed-use lands to the north (600 March Road). As a result, there would be no need for a future easement or JUMA for the storm sewers within Lifestyle Street.

4.0 SITE GRADING

The existing site generally slopes in a northeastern direction from March Road down to Legget Drive. Under post-development conditions, the proposed Lifestyle Street ROW will slope down along the northwest property line from ~82.6m at March Road to ~79.8m at Legget Drive. The proposed service road at the south end of the subject site will drop from ~81.2m at March Road to ~79.4m at Legget Drive. The finished floor elevations (FFE) of the proposed buildings have been set based on the existing topography and elevation of the internal roadways and will range from 82.50m (Office Tower, Retail East, Central Link and Courtyard), 82.25-82.50m (Retail West), and 81.00m (R&D Lab Building). The major overland flow route is shown on the enclosed Grading and ESC Plan (C-200).

5.0 GEOTECHNICAL INVESTIGATIONS

The Geotechnical Investigation and Hydrogeological Assessment (No.: 12667557-RPT-2), dated October 2, 2025, has been prepared by GHD for the proposed development. Groundwater levels were measured at depths ranging from 0.78-6.02 meters below ground surface. All proposed sewers and maintenance holes installed lower than 0.6m below the Seasonally High Groundwater Table have been designed to minimize infiltration in accordance with the MECP Guidelines for Sewers Installed Below Seasonally High Groundwater Table. Several water-tight measures have been implemented in the servicing design per recommendations from this report, including water-tight pipe joints, water-tight manhole frame and covers, non-woven geotextile around underground SWM tanks, and pipeline/chamber buoyancy mitigation measures where required. Refer to the Geotechnical Report[5] for subsurface conditions, construction recommendations and geotechnical inspection requirements.

6.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the storm sewer system, temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter bags / catch basin inserts (sediment sacks) will be placed under the grates of nearby catchbasins and manholes and will remain in place until vegetation has been established and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 along the surrounding construction limits.
- Mud mats will be installed at the site entrances.
- Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.
- Any stockpiled material will be properly managed to prevent those materials from entering the sewer system and/or the downstream ditch or watercourse.

The temporary erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken.

In addition, the following measure will provide permanent erosion and sediment control on site:

- An EFO5 Oil/Grit Separator will be installed at the northern storm sewer outlet to provide water quality control prior to releasing stormwater from sub-catchment areas A-1, A-2, A-3, A-4, A-5, and A-6 inclusively.
- An EFO8 Oil/Grit Separator will be installed at the southern storm sewer outlet to provide water quality control prior to releasing stormwater from sub-catchment areas B-2, B-3, B-4, C-1, and C-2 inclusively.

7.0 CONCLUSION

This report has been prepared in support of a Site Plan Control application for the proposed Nokia Ottawa Innovation Campus located at 570 March Road.

The conclusions are as follows:

- Sanitary flows from the buildings will be directed to the private sanitary sewers and/or directly to the municipal sanitary sewer in Legget Drive. This will be facilitated by extending the 250mm dia. sanitary sewer along Legget Drive and installing new private 250mm dia. sanitary sewers in the proposed Lifestyle Street and 200mm dia. sanitary sewers within the south service road.
- The proposed watermain extension along Legget Drive will provide water service to the site and allow for the creation of a looped watermain network on-site, with the second connection being made to the 203mm dia. water service that currently services the 515 Legget Drive property. The looped watermain network will provide the necessary building service redundancy and will allow for system maintenance without service disruption. Adequate water and system pressures will exist throughout the watermain network under the specified 'Max Day + Fire Flow' and 'Peak Hour' conditions' under **Scenario 1** (Double Watermain Feed) and **Scenario 2** (Single Watermain Feed).

- The proposed Nokia buildings will be fully sprinklered.
- The proposed stormwater design control measures will reduce peak flows into the storm sewer system.
    - Post-development flow from sub-catchment areas A-1 and A-2 will be controlled by inlet control devices (ICD) installed within the on-site storm sewer system, while flows from the building roofs area A-3 to A-6 will be attenuated by control flow roof drains.
    - Post-development flow from sub-catchment area B-1 will be directed to an internal SWM tank and controlled prior to being discharged into the 525mm dia. municipal storm sewer in Legget Drive, via the building service.
    - Post-development flow from sub-catchment areas B-1 to B-4, C-1 and C-2 will be controlled by ICDs installed within the on-site storm sewer system.
    - The total post-development flow from the northern portion of the subject site will be approximately 40.5 L/s during the 2-year design event, 46.7 L/s during the 5-year event and 63.6 L/s during the 100-year event, all less than the maximum allowable release rate of 63.8 L/s.
    - The total post-development flow from the southern portion of the subject site will be approximately 120.5 L/s during the 2-year design event, 147.3 L/s during the 5-year event and 234.4 L/s during the 100-year event, all less than the maximum allowable release rate of 235.1 L/s. All post-development flows are also significantly reduced when compared to current uncontrolled conditions.
- Regular inspection and maintenance of the storm sewer system, including the inlet control devices, control flow roof drains, internal SWM cistern and oil and grit separator (OGS) water quality treatment units is recommended to ensure that the storm drainage system is clean and operational.
- On-site stormwater quality control will be achieved using a “treatment train”, with flows being treated by a combination of rain gardens in landscaped areas and OGS units installed at the site’s north and south stormwater outlets. Additional stormwater quality treatment will be provided by the existing downstream SWM Facility located on adjacent KRP lands.
- All proposed sewers and maintenance holes installed lower than 0.6m below the Seasonally High Groundwater Table have been designed to minimize infiltration through the implementation of water-tight measures outlined in the Geotechnical Report.
- Erosion and sediment controls are to be provided during construction.

It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

NOVATECH

Prepared by:

Kynan D’sa, B.A.Sc. (Engineering)
CAD Designer

Reviewed by:

François Thauvette, P. Eng
Senior Project Manager

APPENDIX A

Project Correspondence

Pre-Application Consultation
Site Plan Control

570 March Road Meeting Date: 2023.02.08

Owner:	Nokia Canada Inc.	**Ward:**	4 – Kanata North
Applicant:	Peter Henley, First Gulf	**Councillor:**	Cathy Curry
Proposal Summary:	To permit the development of the new Nokia Canada corporate headquarters and office.		

Attendees:	**Internal**	**External**
	Krishon Walker, Planner II, Economic Development Services	Peter Henley, Development Manager, First Gulf
	Nader Kadri, Planner II, Public Realm and Urban Design	Peter Nikolakakos, EVP, Development & Planning, First Gulf
	Max Walker, Sr. Project Manager, Transportation Planning	Andrew Srgo, Director, Development at First Gulf Corporation
	Mike Giampa, Sr. Transportation Project Manager, Planning Services	Aaron Clodd, Director, Development Management, Colliers
	Adwoa Achireko, Planner (*coop*), Planning Services	
	Samuel Farkas, Planner (*coop*), Planning Services	

Meeting Notes

Planning Comments (Provided by Krishon Walker)

- The site is located within the City's Suburban Transect as outlined on Schedule A – Transect Policy Areas of the Official Plan, is designated Kanata North Economic District on Schedule B5 – Suburban (West) Transect of the Official Plan (the Plan) and is along the March Road Mainstreet Corridor. The Kanata North Economic District is one of two Special Economic Districts identified in the Plan and is intended to support the City's economic development and growth.
- The site is currently zoned as Mixed-Use Centre Zone, Urban Exception 2816, Holding Provision (MC[2816]-h) and is currently subject to a Zoning By-law Amendment application which is scheduled to be considered by the Planning and Housing Committee on February 27, 2023, and City Council on March 8, 2023. Please ensure that your proposal complies with all applicable provisions under the Zoning By-law.
- Given that the proposed site redevelopment is a significant development initiative that support the City's Economic Development Strategy and city building priorities and has identified by the as a High Economic Impact Project (HEIP). As such, it will be managed by the Economic Development Services team.
- Please ensure that Site Plan clearly show:
  - Title, location and date of the project. The title and location referenced on plans and studies should be consistent.

- The name and address of the owner and applicant, architect(s), designer(s), engineer(s) and surveyor(s) with their full address including Postal Code and telephone number.
- Legend (including bar scale and written ratio scale in metric, and any graphic symbols used) on the plan.
- North arrow (orientated to the top of the page).
- Area of site, and bearings and lengths of all property lines.
- Clear delineation of limit of site development and existing features within 5 metres of limit. This includes the retained parcel along March Road as a driveway is proposed to run across that site.
- Location of buildings, site features and landscape elements on adjacent land and in the public right-of ways.
- Existing features to be retained, removed or relocated.
- Areas labelled by function or type (landscape areas, parking areas, access points, etc.).
- Proposed fire route and fire route sign locations.
- Dimensions of all proposed buildings, roads, radii of turns, overhead clearances, parking areas with defined parking spaces, steps, terraces, fences, walks, aisles and private approaches (driveways).
- Dimensions required for zoning compliance.
- Gross floor area of all buildings.
- Location of snow storage. Storage shall not interfere with approved grading and drainage patterns or servicing. If snow is to be removed from the site, then please make a note of that on the Site Plan and include where the snow will be placed in the interim. Temporary snow storage areas should not conflict with utility box, landscaping, required parking, and site circulation.
- Waste management and recycling enclosure location and design details
- Pedestrian walking areas and surface treatment/materials

▪ Please ensure that Landscape Plan clearly show:

- Title, location and date of the project. The title and location referenced on plans and studies should be consistent.
- The name and address of the owner and applicant, architect(s), designer(s), engineer(s) and surveyor(s) with their full address including Postal Code and telephone number.
- Legend (including bar scale and written ratio scale in metric, and any graphic symbols used) on the plan.
- North arrow (orientated to the top of the page).
- Existing plant material to be retained, removed or relocated on site and within the road allowance:
  - In a table, include species type, size and condition of all existing plant material.
  - Describe and/or illustrate the conservation methods during and after construction.
- Proposed vegetation – trees, shrubs, ground covers to be planted on site and within the road allowance:
  - In a table, list each species including its common and botanical names, size, total quantity, and its condition or special requirements (example - bare root, 4" pot, 2-year old stock etc.).
- Location of existing and proposed site features including, electrical transformer boxes, utility pedestals, light standards, overhead wires, or below grade services, mail boxes, bus stops, snow storage areas, waste management and recycling enclosure, or other features that may impact on the location of landscape elements.
- Location, materials, dimensions and design details of existing and proposed landscape elements such as retaining walls, railings, site furniture, decorative and acoustical fencing, gateways features, signs, etc.

- Location of buildings, site features and landscaping on adjacent land and in the public right-of ways.
- Note and/or dimension any offsets from site features and landscape elements required for technical reasons or zoning compliance.
- Turf areas noting seed, sod or other treatments.
- Pedestrian walking areas and surface treatment/materials.

- As you are proposing to have a driveway across the retained parcel along March Road, you will need to establish an easement across the site. Please consider reorienting that driveway so that it does not run across the entire frontage of that site, limiting access via March Road.

Feel free to contact Krishon Walker at Krishon.Walker@ottawa.ca for follow-up questions.

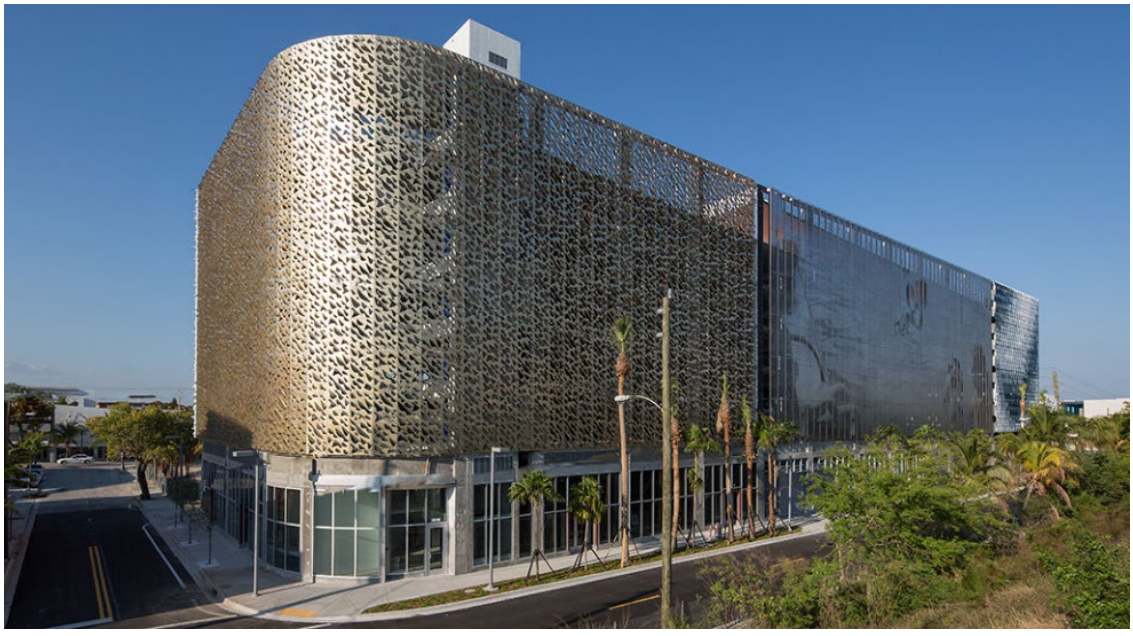
Urban Design Comments (Provided by Nader Kadri)

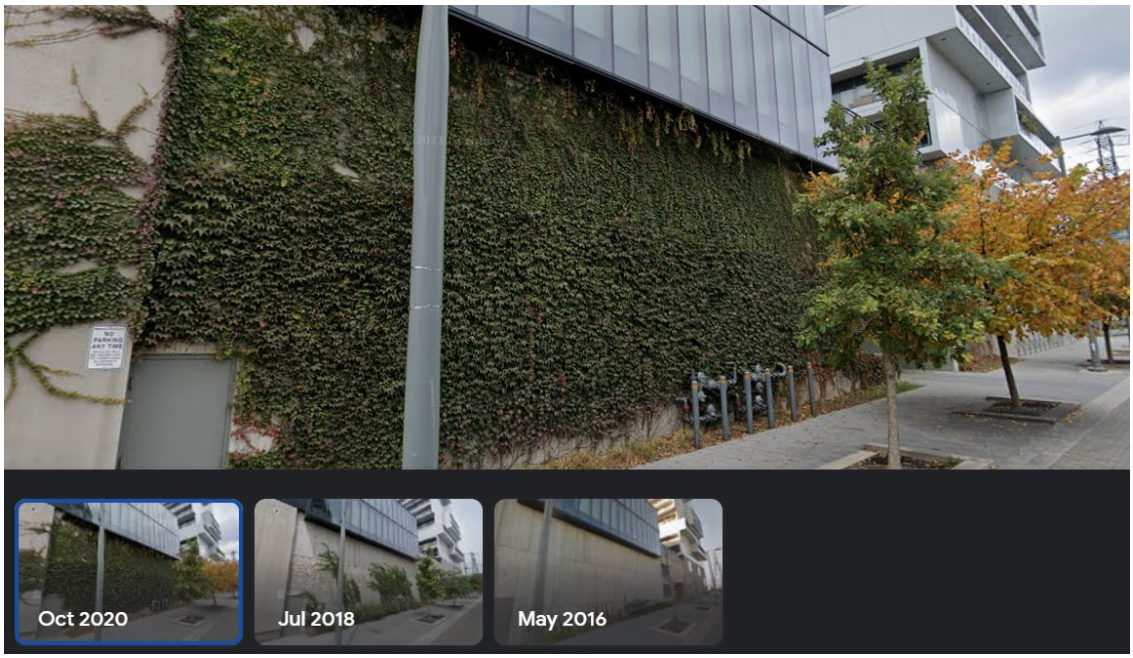
General Comment

- The site is with a Design Priority Area. You are encouraged visit to the UDRP even though a visit to the UDRP is not required for properties within the Kanata North Economic District.
- A Design Brief required. Please refer to the attached Terms of Reference.

Public Realm

- Treatment of the building along proposed "lifestyle street" appropriate. Would like additional details on how the lifestyle street, including cross sections and paver treatment patterns.
- Per the criteria in OP, there needs to be more consideration to how the development interacts with the existing public streets. As proposed, the development turns it back on March Road and Legget Drive. Recommend at-grade retail or non-residential uses (amenity for office users). For areas where this is not possible, consider green walls and murals. See examples below:





- Public realm treatment needed – please refer to criteria in the OP for March Road and Legget Drive.
  - Sidewalk details needed – please go beyond the 2 metre minimum.
  - The March Road connection is especially important in the context of the Phase 2 commercial parcel.
  - Recommend heavy planting between the building and the sidewalk in addition to the double alley of trees contemplated through the OPA.
- Per the OP, surface parking in and around the pick-up drop off area along March Road needs to be removed. This area should be treated like a woonerf.
- Details on the equipment yard, and its relationship to Legget Drive are needed.

Public Realm

- Appreciate the three dimensionality of the façades.
- Please detail sustainability strategy as part of your formal submission.
- Explore the potential for additional green roofs.

Feel free to contact Nader Kadri at Nader.Kadri@ottawa.ca for follow-up questions.

Transportation Comments (Provided by Mike Giampa)

- An updated TIA is required.

Feel free to contact Mike Giampa at Mike.Giampa@ottawa.ca for follow-up questions.

Transportation Planning Comments (Provided by Max Walker)

- By over-providing parking spaces and a full-access intersection along March Road, we continue to encourage vehicular usage and maintain the existing transportation equilibrium rather than supporting the City's investment in transit, i.e. the March Rd BRT. By increasing the friction and cost of driving at the source, i.e. reduced parking spaces and convenience of vehicular use, we are working toward achieving a balance between modes of transportation and providing an incentive to reduce the total travel time of journeys, help create a city of proximity, reduce the equity gap and minimize the ecological footprint of transportation.

- We look forward to reviewing an updated TIA to better understand the site's mobility patterns. For the area within 600m of transit stations, it is suggested that they proceed with typical TOD modal shares(15% Auto; 5% Auto Passenger, 65 %Transit, 15% Other).
- To support the shift towards sustainable transportation modes and build healthy communities, we must also provide positive incentives to encourage the adoption of a car-free lifestyle. This could mean breaking up the superblocks on both sides of the street through an active transportation connection and ensuring the continuity of the 'lifestyle street'.

Feel free to contact Max Walker at Max.Walker@ottawa.ca for follow-up questions.

Application Submission Information

Application Type**: Complex – Manager's Approval**

Site plan control application approval timelines vary based on the development complexity, scale, the quality of the submission and public consultation process if applicable. The legislated timeline under the Planning Act is 60 days. For more information on standard processing timelines, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

Prior to submitting a formal application, it is recommended that you pre-consult with the Ward Councillor, Cathy Curry.

For information on application fees, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/fees-and-funding-programs/development-application-fees

To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre: InformationCentre@ottawa.ca or (613) 580-2424 ext. 44455

Application Submission Requirements

For information on the preparation of Studies and Plans and the City's requirements, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

Please provide electronic copies (PDF) of all plans and studies required. Hard copies are not required at this time.

Note that many of the plans and studies collected with this application must be signed, sealed and dated by a qualified engineer, architect, surveyor, planner or designated specialist.

Francois Thauvette

From: Andrew Sgro <asgro@firstgulf.com>
Sent: Tuesday, November 7, 2023 11:45 AM
To: Francois Thauvette
Cc: Peter Henley; Peter Nikolakakos
Subject: Nokia - Updated Municipal Pre-Con Comments

Francois – see below for the updated comments from the City:

Apologies, there seemed to be some confusion between sites.

The watermain pre-consultation notes should have been in keeping with the February 2, 2022 Notes, and the following would apply to water:

a) A new local watermain will be required on Legget Drive. Connection to the 610mm diameter transmission watermain will not be permitted. A water boundary condition request is needed for any new water connection to the City main.
b) Existing watermain connections may be considered for interim phasing. Further comments to be provided at the Site Plan Control stage.
c) As per Section 4.4.7.2 of the Ottawa Design Guidelines – Water Distribution, a DMA (District Metering Area) chamber will be required for private developments serviced by a connection 150mm or larger.
d) Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development.

Sanitary should have read:

Sanitary Infrastructure:

a) A new local sanitary sewer will be required on Legget Drive. The 750 mm sanitary sewer on Legget Drive, south of Solandt Road, should have capacity to accommodate this redevelopment. Additional information on sewer capacity will be available once the Wastewater Master Plan is complete (anticipated June 2022).
b) Existing sanitary connections may be considered for interim phasing. Further comments to be provided at the Site Plan Control stage.
c) The City would not accept a development of this scale to outlet to the private sanitary sewer that currently exists east of Legget Drive, through the Kanata Research Park lands.

Stormwater Management Criteria:

For the subject site, is to be based on the following: a) Please refer to following background reports: Planning, Infrastructure and Economic Development Department Services de la planification, de l'infrastructure et du développement économique a. Shirley's Brook and Watts Creek Subwatershed Study, prepared by Dillon Consulting Ltd., 1999 b. Kanata Research Park, Storm Water Management Report, prepared by Novatech, dated June 1987 c. Stormwater Management Plan, Kanata Research Park, City of Kanata, prepared by Novatech, dated April 2000 d. Kanata Research Park Subdivision Design Brief, prepared by Novatech, dated August 2000 The stormwater management criteria shall be in

accordance with the minor and major system storm allocations presented in the above mentioned reports.
b) If the capacity of the receiving storm sewer is in question, over-controlling may be required, in which case all runoff must be controlled to the 2-year predevelopment level, and all flow depth must be controlled on-site. In such a case the pre-development condition will be determined using the smaller of a runoff coefficient of 0.5 or the actual existing site runoff coefficient.
c) Quality control to be provided as specified by the MVCA. d) Review of the existing legal agreements related to the private SWM pond outlet located to the east on KRP lands will be reviewed at the Site Plan Control stage.

Sorry for the confusion, the notes provided had been miss-filed.
Thanks,
Eric Surprenant, CET
Sr, Project Manager, Infrastructure Projects, West
Planning, Real Estate & Economic Development
613 580-2424 ext.: 27794

FIRST GULF

Andrew Sgro
Director Development

T: 416.773.7140 C: 437.223.6027
351 King Street East, 13th Floor
Toronto, ON, Canada M5A 0L6

Please do not feel obliged to reply to this email outside of your normal working hours.

Jaymeson Adams

From: Tim Kennedy
Sent: April 25, 2022 10:29 AM
To: Jaymeson Adams
Cc: Gavin Joseph
Subject: FW: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

Follow Up Flag: Follow up
Flag Status: Flagged

File: A001218

Hi Jaymeson,

Please see below from MVCA and ensure one of you gets this added to the appendices and the body of the report as required.

Thanks,
Tim

TIM KENNEDY, P.Eng.
Senior Project Manager / Infrastructure

T 613-860-2462 ext. 6620 **M** 613-462-3627 **F** 613-860-1870
110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA

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CONFIDENTIALITY WARNING This email is confidential. If you are not the intended recipient, please notify the sender immediately and delete it in its entirety.

From: Erica Ogden <eogden@mvc.on.ca>
Sent: Monday, April 25, 2022 9:59 AM
To: Tim Kennedy <Tim.Kennedy@cima.ca>
Cc: Matt Craig <mcraig@mvc.on.ca>
Subject: RE: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

EXTERNAL EMAIL

Hello Tim,

Our engineering staff would have to review the particular approach proposed, but we have previously accepted a combination of approaches to meet the water quality requirements.

Thank you,

Erica C. Ogden, MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |c. 613 451 0463 |o. 613 253 0006 ext. 229| eogden@mvc.on.ca

---

From: Tim Kennedy <Tim.Kennedy@cima.ca>
Sent: April 25, 2022 9:50 AM
To: Erica Ogden <eogden@mvc.on.ca>
Cc: Matt Craig <mcraig@mvc.on.ca>
Subject: RE: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

Hi Erica,

Thanks for getting back to me.

We are certain the south cell of the pond can provide the 80% TSS removal from previous reports (this was built more recently).

For the area released to the north cell we would look at adding a mechanical separator (and possibly LID's) to achieve the 80% TSS removal.

Would this approach meet the requirements of the MVCA for water quality control?

Thanks again!
Tim

TIM KENNEDY, P.Eng.
Senior Project Manager / Infrastructure

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From: Erica Ogden <eogden@mvc.on.ca>
Sent: Monday, April 25, 2022 9:28 AM
To: Tim Kennedy <Tim.Kennedy@cima.ca>
Cc: Matt Craig <mcraig@mvc.on.ca>
Subject: RE: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

EXTERNAL EMAIL

Good Morning Tim,

My apologies for the delay in responding. MVCA has reviewed the subject properties and offer the following comments. The subject properties are not regulated by MVCA under Ontario Regulation 153/06.

We do not have information available to confirm the water quality treatment provided by the existing pond. An enhanced level of water quality treatment (80% TSS Removal) is recommended for the site. Please review the Shirley's Brook and Watts Creek Subwatershed Study for further information regarding Shirley's Brook.

MVCA completed a Catchment Report for Shirley's Brook in 2016 as a part of the City Stream Watch program which may also provide some relevant background materials.

I also recommend you contact the City of Ottawa to discuss the proposed development, as they may have additional requirements or restrictions.

If you have any questions, please feel free to contact me.

Thank you,

Erica C. Ogden, MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |c. 613 451 0463 |o. 613 253 0006 ext. 229| eogden@mvc.on.ca

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From: Matt Craig <mcraig@mvc.on.ca>
Sent: April 20, 2022 3:46 PM
To: Erica Ogden <eogden@mvc.on.ca>
Subject: FW: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

---

From: Tim Kennedy <Tim.Kennedy@cima.ca>
Sent: April 20, 2022 3:05 PM
To: Matt Craig <mcraig@mvc.on.ca>
Subject: RE: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

Hi Matt,

Just wanted to follow up on the email below.

Did you get a chance to look at this one? We are hoping to wrap up our report this week. Let me know if we should have a quick meeting to discuss.

Thanks,
Tim

TIM KENNEDY, P.Eng.
Senior Project Manager / Infrastructure

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From: Tim Kennedy
Sent: Thursday, April 14, 2022 12:22 PM
To: mcraig@mvc.on.ca
Cc: Jaymeson Adams <Jaymeson.Adams@cima.ca>; Gavin Joseph <Gavin.Joseph@cima.ca>
Subject: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

Good afternoon Matt,

We are working on a development project in the City of Ottawa and I wanted to get your input on Natural Heritage/Hazards features that may impact the development as well as any Storm Water Management Criteria for the site and required approvals/permits. Note that this file is sensitive in nature and we appreciate your discretion on this one.

The proposed development will be split into two areas as follows:

- North Site Area - Approximately 9 residential buildings are proposed to the north, ranging in height from 7 to 29 storeys. Approximately 1900 residential units are proposed. Retail uses are proposed on the ground floor of a number of the buildings, with a total floor area of approximately 8,250 m2. Approximately 1900 residential parking spaces are planned and 250 retail parking spaces. Most of the parking would be located in underground parking garage but some is also expected along the proposed private roadway.
- South Site Area - The current Nokia office/lab space will be relocated to the south end of the site. Three new buildings are proposed with a total floor area of 49,100 m2, which includes the laboratory, office and parking garage, with interconnecting podium and ground floor retail of 3,100 m2. Approximately 1344 parking spaces are planned within an above grade parking garage.

I have attached a key plan with the site location as well as the flow path for the storm sewers currently servicing the site. Currently the north site area drains to the north cell of the pond shown in the attached sketches, while the south area drains to the south cell of the pond. The ponds outlet to Shirley's Brook before making it's way to the Ottawa River, approximately 3.0 km northeast of the subject site.

Currently quality control of stormwater runoff for each site area is addressed off site in the existing ponds behind the Brook Street Hotel (see attached sketch for location) and as follows for additional information:

- North Site Area – The north site area currently flows to the north cell of the pond. Major and minor system flows will be limited to those flows currently sent to the pond. I have not been able to confirm the level of treatment in this cell of the pond from the available reports which are quite old. Can you confirm if the existing pond would still be sufficient in terms of quality control or if additional measures would be required?
- South Site Area – The south site area currently flows to the south cell of the pond. Again major and minor system flows would be limited to those flows currently sent to the pond from our site area. Section 3.0 and 3.2.2 of the attached

report identify that the south cell (Pond 1) will provide 80% TSS removal for this area of our site. I expect this would be sufficient.

Hoping to have a response rather quickly on this one in order to wrap up our report next week. Apologies for the late request.

If you need anything further please let me know. Feel free to call me on my cell if you would like to discuss or we could set up a Teams meeting.

Thanks and have a great long weekend!
Tim

TIM KENNEDY, P.Eng.
Senior Project Manager / Infrastructure

T 613-860-2462 ext. 6620 **M** 613-462-3627 **F** 613-860-1870
110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA

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APPENDIX B

Development Servicing Study Checklist

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☒ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☒ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available
☒ Availability of public infrastructure to service proposed development
☒ Identification of system constraints
☒ Identify boundary conditions
☒ Confirmation of adequate domestic supply and pressure
☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
☒ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☒ Address reliability requirements such as appropriate location of shut-off valves
☐ Check on the necessity of a pressure zone boundary modification.
☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- ☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☒ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix ‘C’) format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☒ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☒ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☐ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX C

Sanitary Sewage Calculations, Sanitary Sewer Design Sheet

570 & 520 March Road - Nokia Innovation Campus
Summary
SANITARY SEWAGE ANALYSIS

Nokia Campus Peak Sanitary Flow		
8-Storey Office Tower	1.01	L/s
1-Storey Retail West	0.37	L/s
Subtotal - Retail West Outlet	1.38	L/s
1-Storey Retail East	0.30	L/s
2-Storey Social Café	0.41	L/s
Subtotal - Retail East Outlet	0.71	L/s
5-Storey R&D Lab Building	1.06	L/s
Subtotal - R&D Lab Outlet	1.06	L/s
Assumed Future 8-Storey Office Building	0.91	L/s
Subtotal - Retained Lands Outlet	0.91	L/s
Right-of-Ways	0.96	L/s
Subtotal - Other Site Infiltration	0.96	L/s
Total Peak Sanitary Flow	**5.01**	**L/s**

570 March Road - Nokia Innovation Campus
8-Storey Office Tower
SANITARY SEWAGE ANALYSIS

Nokia Campus - Office Tower		
Office Design Population	700	
Average Daily Sanitary Flows	75	L/person/day
Peaking Factor	1.50	
Peak Office Flows	**0.91**	L/s
Extraneous Flow		
Area	0.285	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.09	L/s
Total Peak Sanitary Flow	**1.01**	**L/s**

570 March Road - Nokia Innovation Campus
1-Storey Retail West
SANITARY SEWAGE ANALYSIS

Nokia Campus - Retail West Commericial		
Quick Service Design Population	50	seats (used 3x/day)
Average Daily Sanitary Flows	125	L/seat/day
Peaking Factor	1.5	
Peak Commericial Flows	**0.33**	L/s
Extraneous Flow		
Area	0.135	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.04	L/s
Total Peak Sanitary Flow	**0.37**	**L/s**

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570 March Road - Nokia Innovation Campus
1-Storey Retail East
SANITARY SEWAGE ANALYSIS

Nokia Campus - Retail East Commericial		
Gym Design Population	200	Users (2x day)
Average Daily Sanitary Flows	40	L/user/day
Peaking Factor	1.5	
Peak Commericial Flows	**0.28**	L/s
Extraneous Flow		
Area	0.073	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.02	L/s
Total Peak Sanitary Flow	**0.30**	**L/s**

570 March Road - Nokia Innovation Campus
2-Storey Social Café
SANITARY SEWAGE ANALYSIS

Nokia Campus - Social Café		
Quick Service Design Population	50	seats (used 3x/day)
Average Daily Sanitary Flows	125	L/seat/day
Peaking Factor	1.5	
Peak Commericial Flows	**0.33**	L/s
Extraneous Flow		
Area	0.250	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.08	L/s
Total Peak Sanitary Flow	**0.41**	**L/s**

570 March Road - Nokia Innovation Campus
5-Storey R&D Lab Building
SANITARY SEWAGE ANALYSIS

R&D Lab Building		
Design Population	600	
Average Daily Sanitary Flows	75	L/person/day
Peaking Factor	1.50	
Peak Office Flows	**0.78**	L/s
Extraneous Flow		
Area	0.832	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.27	L/s
Total Peak Sanitary Flow	**1.06**	**L/s**

520 March Road - Retained Lands
Assumed Future 8-Storey Office Building
SANITARY SEWAGE ANALYSIS

Retained Lands - Assumed Future Office Building		
Office Design Population	500	
Average Daily Sanitary Flows	75	L/person/day
Peaking Factor	1.50	
Peak Office Flows	**0.65**	L/s
Extraneous Flow		
Area	0.777	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.26	L/s
Total Peak Sanitary Flow	**0.91**	**L/s**

570 March Road - Nokia Innovation Campus
Right-of-Ways
SANITARY SEWAGE ANALYSIS

Upper Lifestyle Street + Plaza ROW		
Area	0.660	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	**0.22**	L/s
Lower Lifestyle Street ROW		
Area	0.242	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	**0.08**	L/s
Surface Parking, Access Road, Workyard		
Area	2.006	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	**0.66**	L/s
Total Peak Sanitary Flow	**0.96**	**L/s**

SANITARY TRUNK SEWER
Sanitary Sewer Design Sheet

PROJECT : 123043
DESIGNED BY: KD
CHECKED BY: FST
DATE: 10/23/2025

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LOCATION			INDIVIDUAL		CUMULATIVE		PEAK FLOWS				PROPOSED SEWER								
AREA	FROM MH	TO MH	FLOW RATE (L/s)	Infiltration Area (ha)	FLOW RATE (L/s)	Infiltration Area (ha)	PEAK FACTOR M	PEAK FLOW Q (p) (L/s)	PEAK EXTRAN FLOW Q(i) (L/s)	***PEAK DESIGN FLOW Q (d) (L/s)***	LENGTH (m)	PIPE SIZE D (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Q/Q_{full}	d/D (Interim Condition)	d/D * (Final Condition)
Lifestyle Street	SAN MH 1	SAN MH 2	0.00	0.00	0.00	0.00	1.5	0.00	0.00	***0.00***	23.4	250	PVC	0.35	36.70	0.72	0.00%	0%	36%
Office Tower + Retail West	NOKIA-1	SAN MH 2	0.83	0.42	0.83	1.08	1.5	1.24	0.36	***1.59***	13.0	200	PVC	1.00	34.22	1.06	4.66%		
Upper Lifestyle Street + Plaza			0.00	0.66															
Lifestyle Street	SAN MH 2	SAN MH 3	0.00	0.00	0.83	1.08	1.5	1.24	0.36	***1.59***	7.1	250	PVC	0.35	36.70	0.72	4.35%	14% *	38%
	SAN MH 3	SAN MH 4	0.00	0.00	0.83	1.08	1.5	1.24	0.36	***1.59***	45.3	250	PVC	0.35	36.70	0.72	4.35%	14% *	38%
	SAN MH 4	SAN MH 5	0.00	0.00	0.83	1.08	1.5	1.24	0.36	***1.59***	18.5	250	PVC	0.35	36.70	0.72	4.35%	14% *	38%
Social Café + Retail East	NOKIA-2	SAN MH 5	0.40	0.32	0.40	0.57	1.5	0.60	0.19	***0.79***	12.6	200	PVC	1.00	34.22	1.06	2.31%		
Lower Lifestye Street			0.00	0.24															
Lifestyle Street	SAN MH 5	SAN MH 5a	0.00	0.00	1.23	1.65	1.5	1.84	0.54	***2.38***	37.2	250	PVC	0.35	36.70	0.72	6.50%	17% *	40%
	SAN MH 5a	SAN MH 6	0.00	0.00	1.23	1.65	1.5	1.84	0.54	***2.38***	13.8	250	PVC	0.35	36.70	0.72	6.50%	17% *	40%
R&D Lab	NOKIA-3	SAN MH 12	0.52	0.83	0.52	0.83	1.5	0.78	0.00	***0.78***	1.2	200	PVC	1.00	34.22	1.06	2.28%		
	SAN MH 12	NEW SAN SEWER	0.00	0.83	0.52	0.83	1.5	0.78	0.00	***0.78***	13.9	200	PVC	1.00	34.22	1.06	2.28%		
Legget-1	SAN MH 6	EX SAN MH A	0.00	0.34	1.75	2.82	1.5	2.62	0.93	***3.55***	113.2	250	PVC	0.35	36.70	0.72	9.68%	21% *	42%
Legget-2	EX SAN MH A	EX SAN MH B	0.00	0.15	1.75	2.97	1.5	2.62	0.98	***3.60***	60.2	250	PVC	0.30	33.98	0.67	10.60%	21%	42%
Legget-3	EX SAN MH B	EX SAN MH C	0.00	0.17	1.75	3.15	1.5	2.62	1.04	***3.66***	68.0	250	PVC	0.29	33.41	0.66	10.96%	22%	42%
Surface Parking, Access Road, and Workyard	NOKIA-4	SAN MH 7a	0.00	2.01	0.00	2.01	1.5	0.00	0.66	***0.66***	3.0	200	PVC	1.00	34.22	1.06	1.93%		
Retained Lands	RET LANDS	SAN MH 7a	0.43	0.78	0.43	0.78	1.5	0.65	0.26	***0.91***	3.0	200	PVC	1.00	34.22	1.06	2.65%		
South Access Road	SAN MH 7a	SAN MH 9	0.00	0.00	0.43	2.78	1.5	0.65	0.92	***1.57***	27.3	200	PVC	0.50	24.19	0.75	6.49%		
	SAN MH 9	SAN MH 10	0.00	0.00	0.43	2.78	1.5	0.65	0.92	***1.57***	36	200	PVC	0.50	24.19	0.75	6.49%		
	SAN MH 10	SAN MH 11	0.00	0.00	0.43	2.78	1.5	0.65	0.92	***1.57***	33.9	200	PVC	0.50	24.19	0.75	6.49%		
	SAN MH 11	EX SAN MH C	0.00	0.00	0.43	2.78	1.5	0.65	0.92	***1.57***	14.4	200	PVC	0.50	24.19	0.75	6.49%		
Sanmina (500 March Road)	EX SAN MH	EX. SAN MH D	0.35	2.20	0.35	2.20	5.7	2.00	0.72	***2.72***	25.4	250	PVC	0.50	43.87	0.87	6.20%	16%	16%
Legget-4	EX. SAN MH D	EX. SAN MH C	0.00	0.17	0.35	2.37	5.7	2.00	0.78	***2.78***	55.1	250	PVC	0.33	35.64	0.70	7.79%	18%	18%
Legget Drive	EX. SAN MH C	EX SAN MH E	0.00	0.00	2.53	8.29	1.5	3.80	2.74	***6.54***	26.7	250	PVC	0.34	36.17	0.71	18.07%	28%	47%
KRP Site	EX SAN MH E	EX. SAN MH F	0.00	0.00	2.53	8.29	1.5	3.80	2.74	***6.54***	50.4	250	PVC	0.50	43.87	0.87	14.90%	26%	42%
	EX SAN MH F	EX SAN MH G	0.00	0.00	2.53	8.29	1.5	3.80	2.74	***6.54***	44.0	250	PVC	0.50	43.87	0.87	14.90%	26%	42%
	EX SAN MH G	EX. SAN MH H	0.00	0.00	2.53	8.29	1.5	3.80	2.74	***6.54***	9.1	250	PVC	1.00	62.04	1.22	10.54%	21%	35%
KRP Site (Tower C)	TOWER C	EX. SAN MH H	0.65	1.24	0.65	1.24	3.5	2.29	0.41	***2.70***	114.3	250	PVC	0.40	39.24	0.77	6.87%	17%	17%
KRP Site	EX. SAN MH H	EX. SAN MH I	0.00	0.00	3.18	9.53	1.5	4.77	3.14	***7.92***	9.5	250	PVC	1.00	62.04	1.22	12.76%	24%	37%
	EX. SAN MH I	EX. SAN MH J	0.00	0.00	3.18	9.53	1.5	4.77	3.14	***7.92***	48.1	250	PVC	0.67	50.78	1.00	15.59%	26%	41%
KRP Site (Tower D)	TOWER D	EX. SAN MH J	0.96	3.37	0.96	3.37	1.5	1.44	1.11	***2.55***	34.0	200	PVC	1.30	39.01	1.20	6.55%		
KRP Site	EX. SAN MH J	EX. SAN MH K	0.00	0.00	4.14	12.90	1.5	6.22	4.26	***10.47***	61.9	250	PVC	0.35	36.70	0.72	28.53%	36%	53%
KRP Site (Brookstreet Hotel)	HOTEL	EX. SAN MH K	2.21	4.38	2.21	4.38	1.0 - 3.8	6.80	1.45	***8.25***	22.0	200	PVC	0.90	32.46	1.00	25.40%		
KRP Site	EX. SAN MH K	EX. SAN MH L	0.00	0.00	6.35	17.28	1.5	9.53	5.70	***15.23***	21.0	250	PVC	0.38	38.24	0.75	39.84%	43%	59%
KRP Site (Parking Structure)	PARKING	FUTURE SAN MH 3	0.00	1.07	0.00	1.07	1.5	0.00	0.35	***0.35***	13.7	250	PVC	0.40	39.24	0.77	0.90%	6%	6%
Future Brookstreet Apts.	FUTURE APTS.	FUTURE SANMH 1	1.80	0.39	1.80	0.39	1.0-3.4	5.39	0.13	***5.52***	6.1	250	PVC	2.00	87.74	1.73	6.29%	17%	17%
KRP Site	FUTURE SANMH 1	FUTURE SANMH 2	0.00	0.00	1.80	0.39	1.0-3.4	5.39	0.13	***5.52***	24.0	250	PVC	0.50	43.87	0.87	12.58%	23%	23%
	FUTURE SANMH 2	FUTURE SANMH 3	0.00	0.00	1.80	0.39	1.0-3.4	5.39	0.13	***5.52***	35.9	250	PVC	0.50	43.87	0.87	12.58%	23%	23%
KRP Site	FUTURE SANMH 3	EX. SAN MH L	0.00	0.00	1.80	1.46	1.0-3.4	5.39	0.48	***5.87***	77.4	250	PVC	0.40	39.24	0.77	14.96%	26%	26%
KRP Site	EX. SAN MH L	EX. SAN MH M	0.00	0.00	8.15	18.74	1.5	12.23	6.18	***18.42***	88.9	250	PVC	0.38	38.24	0.75	48.15%	48%	64%
KRP Site	EX. SAN MH M	EX. 750 TRUNK	0.00	0.00	8.15	18.74	1.5	12.23	6.18	***18.42***	100.1	250	PVC	0.52	44.74	0.88	41.16%	44%	58%

* Periodic flushing of the indicated sewer segment may be required as an interim condtion until the mixed-use development of 600 March Road, at which time flow depth under peak flow is anticipated to exceed 30% of the pipe diameter and self-cleansing velocities are anticipated.

** Flow depth under peak flow following the mixed -use development of 600 March Road, which is anticipated to allocate 10.2 L/s to the sanitary sewer in Lifestyle Street as per the "Nokia Mixed Use Development - Revised Adequacy of Public Services Report", prepared by CIMA +, dated July 28, 2022.

Notes:
1. Q(d) = Q(p) + Q(i) , where
   Q(d) = Design Flow (L/sec)
   Q(p) = Population Flow (L/sec)
   Q(i) = Extraneous Flow (L/sec)
2. Q(i) = 0.33 L/sec/ha
3. Daily Sanitary Flows from Residential Development = 280L/person/day (Section 4, Ottawa Sewer Design Guidelines)
4. Daily Sanitary Flows from Office Towers = 75 L/person/day (Appendix 4-A, Ottawa Sewer Design Guidelines)
5. Residential Peaking Factor: Harmon Equation (Maximum Peaking Factor = 3.8)
6. Commercial Peaking Factor = 1.5 (Figure 4.3 Ottawa Sewer Design Guidelines)
7. Sanmina (500 March Road) Peaking Factor = 5.7 (Appendix 4-B Ottawa Sewer Design Guidelines)
8. Refer to Sanitary Drainage Area Plan (C400) for details of drainage areas and sanitary manhole number designation.
9. Refer to the 'Sanitary and Storm Sewer Design Brief - Kanata Research Park Lands' for a breakdown of Daily Sewage Flow components and applicable peaking factors from the KRP lands.

Sanitary sewer flows from Nokia and Retained Lands properties to Legget sanitary sewer.
Extension of sanitary sewer in Legget Drive.
Sanitary drainage area design based on future residential redevelopment.
Sanitary sewer segment with least available excess capacity.

- *Connecting to the existing 250mm diameter sanitary sewer on Legget Drive at the northern portion of the site.*
    - This is the preferred connection point for the northern area of the MU Site Area.

      Considering there were no existing Sanitary Sewer Design Sheets available from previous reports in the area, CIMA+ has completed an analysis of the existing network utilizing available as-built information and GeoOttawa (refer to **Appendix F** for SSDS and supporting flow calculations). Further analysis would be required at the site plan control stage to confirm connection points of abutting properties, etc. which have been assumed based on the available information as part of this analysis.

      A sanitary flow of 12.32 L/s has been determined for the Nokia Site under existing conditions and utilized in the attached SSDS. Under this scenario the downstream sewer segment between MHSA12515 and MHSA48493 along Terry Fox would just reach capacity under existing peak conditions. To accommodate the additional flow from the MU Site Area the available capacity to the south (10.2 L/s) would be utilized and the sewer segment from MHSA12515 along Terry Fox to the 750 mm Trunk Sewer would require upsizing to accommodate the additional flow of 12.15 L/s.

      For clarity the total required flow for the MU Site Area (34.67 L/s) would be accomplished by directing 10.2 L/s to the south outletting through the golf course and the remaining flow of 24.47 L/s (12.15 L/s + 12.32 L/s) to the north along Leggett Drive to Terry Fox, which outlets to the 750 mm diameter trunk sewer.

      Additional analysis such as flow monitoring of the north and south networks may provide further insight into available capacity and potentially eliminate the need for upsizing at the Site Plan Control Stage.

A conceptual site servicing plan has been prepared demonstrating the internal sewer layout as outlined in this report and in support of the master plan concept (refer to **Appendix F**).

3.3 Sanitary Servicing Summary and Conclusions

The sanitary servicing design for the proposed development conforms to the requirements of the City of Ottawa Sewer Design Guidelines, 2012, and Technical Bulletin ISTB-2018-01.

Peak wastewater demands were provided to the City, who informed CIMA+ that the required capacity is available in the 750 mm diameter trunk sewer running along the golf course.

APPENDIX D

Water Demands, FUS Calculations, Watermain Boundary Conditions, Schematic of the Hydraulic Model, Modelling Results and Correspondence from the City of Ottawa

570 & 520 March Road - Nokia Campus
Summary
WATER ANALYSIS

DOMESTIC WATER DEMANDS

Commercial, Office, Retail and Other Uses	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Office Tower	0.61	0.91	1.64
East Retail Building (Gym with Showers)	0.19	0.28	0.50
West Retail Building (Quick Food Service)	0.22	0.33	0.59
Social Café & Link (Quick Service Retail)	0.22	0.33	0.59
R&D Lab Building	0.52	0.78	1.41
Total	**1.75**	**2.62**	**4.72**

BOUNDARY CONDITIONS (CONNECTION #1 - 406mm dia. WM IN TERRY FOX DRIVE ROW)

Minimum HGL (Peak Hour) =	**126.3**	**m**
Maximum HGL =	**131.0**	**m**
Max Day + Fire Flow =	**120.3**	**m**

BOUNDARY CONDITIONS (CONNECTION #2 - 203mm dia. WM SERVICING 515 LEGGET DRIVE)

Minimum HGL (Peak Hour) =	**126.3**	**m**
Maximum HGL =	**131.0**	**m**
Max Day + Fire Flow =	**120.6**	**m**

PRESSURE TESTS

	CONNECTION #1	CONNECTION #2	UNITS
Existing watermain elevation at connection	**75.8**	**77.2**	**m**

Low Pressure Pressure =(Min. HGL - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be > 40 PSI)	**71.0**	**69.0**	**PSI**
High Pressure Pressure = (Max HGL - (Existing Ground Elevation Watermain Elevation)) x 1.42 PSI/m (should be between 50- 70 PSI)	**78.0**	**76.0**	**PSI**
Max Day + Fire Flow Pressure = (Max Day + Fire Flow - (Existing Ground Elevation -Watermain Elevation)) x 1.42 PSI/m (should be > 20 PSI)	**63.0**	**61.0**	**PSI**

To convert Head(m) to PSI: multiply by 1.42

PSI	m OF HEAD
1.42197	1

570 March Road - Nokia Campus
8-Storey Office Tower
WATER ANALYSIS

DOMESTIC WATER DEMANDS

Office Use	Post-Development	
Office Tower	700	Staff
Average Day Demand (75 L/staff/day)	**0.61**	**L/s**
Maximum Day Demand (1.5 x avg. day)	**0.91**	**L/s**
Peak Hour Demand (1.8 x max. day)	**1.64**	**L/s**
Total Average Day Demand	**0.61**	**L/s**
Total Maximum Day Demand	**0.91**	**L/s**
Total Peak Hour Demand	**1.64**	**L/s**

570 March Road - Nokia Campus
1-Storey Retail East
WATER ANALYSIS

DOMESTIC WATER DEMANDS

Commercial Use	Post-Development	
East Retail Building (Gym with Showers)	200	Users (2x per day)
Average Day Demand (40 L/User/day)	**0.19**	**L/s**
Maximum Day Demand (1.5 x avg. day)	**0.28**	**L/s**
Peak Hour Demand (1.8 x max. day)	**0.50**	**L/s**
Total Average Day Demand	**0.19**	**L/s**
Total Maximum Day Demand	**0.28**	**L/s**
Total Peak Hour Demand	**0.50**	**L/s**

570 March Road - Nokia Campus
1-Storey Retail West
WATER ANALYSIS

DOMESTIC WATER DEMANDS

Commercial Use	Post-Development	
West Retail Building (Quick Food Service)	50	Seats (3x per day)
Average Day Demand (125 L/seat/day)	**0.22**	**L/s**
Maximum Day Demand (1.5 x avg. day)	**0.33**	**L/s**
Peak Hour Demand (1.8 x max. day)	**0.59**	**L/s**
Total Average Day Demand	**0.22**	**L/s**
Total Maximum Day Demand	**0.33**	**L/s**
Total Peak Hour Demand	**0.59**	**L/s**

570 March Road - Nokia Campus
2-Storey Social Café/Link
WATER ANALYSIS

DOMESTIC WATER DEMANDS

Commercial and Other Uses	Post-Development	
Social Café & Link (Quick Service Retail)	50	Seats (3x per day)
Average Day Demand (125 L/seat/day)	**0.22**	**L/s**
Maximum Day Demand (1.5 x avg. day)	**0.33**	**L/s**
Peak Hour Demand (1.8 x max. day)	**0.59**	**L/s**
Total Average Day Demand	**0.22**	**L/s**
Total Maximum Day Demand	**0.33**	**L/s**
Total Peak Hour Demand	**0.59**	**L/s**

570 March Road - Nokia Campus
5-Storey R&D Lab Building
WATER ANALYSIS

DOMESTIC WATER DEMANDS

Office and Other Uses	Post-Development	
R&D Lab Building	600	Employees
Average Day Demand (75 L/employee/day)	**0.52**	**L/s**
Maximum Day Demand (1.5 x avg. day)	**0.78**	**L/s**
Peak Hour Demand (1.8 x max. day)	**1.41**	**L/s**
Total Average Day Demand	**0.52**	**L/s**
Total Maximum Day Demand	**0.78**	**L/s**
Total Peak Hour Demand	**1.41**	**L/s**

FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

Novatech Project #: 123043
Project Name: 570 & 520 March Road
Date: 8/19/2024
Input By: K. D'sa
Reviewed By: F. Thauvette

Legend: Input by User / No Input Required
Reference: Fire Underwriter's Survey Guideline (2020) Formula Method

Building Description: 8-Storey Office Building and Social Café
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	5348			
		Total Floors/Storeys (Podium)	3			
		Tower Footprint (m^2)	2910			
		Total Floors/Storeys (Tower)	5			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**8,022**	
	F	**Base fire flow without reductions**				**16,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**13,600**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-6,800**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	30594	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	2Hr Firewall		0%	**0**
		East Side	2Hr Firewall		0%	
		South Side	2Hr Firewall		0%	
		West Side	>30m		0%	
				Cumulative Total	**0%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**7,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**117**
				or	USGPM	1,849

FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

Novatech Project #: 123043
Project Name: 570 & 520 March Road
Date: 8/19/2024
Input By: K. D'sa
Reviewed By: François Thauvette

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 1-Storey Retail East Building
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	740			
		Number of Floors/Storeys	1			
		Protected Openings (1 hr) if C<1.0				
		Area of structure considered (m^2)			**740**	
	F	**Base fire flow without reductions**				**5,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**5,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,500**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	740	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**500**
		East Side	>30m		0%	
		South Side	2Hr Firewall		0%	
		West Side	2Hr Firewall		0%	
				Cumulative Total	**10%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**3,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**50**
				or	USGPM	793

FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

Novatech Project #: 123043
Project Name: 570 & 520 March Road
Date: 8/19/2024
Input By: K. D'sa
Reviewed By: François Thauvette

Legend: Input by User / No Input Required
Reference: Fire Underwriter's Survey Guideline (2020) Formula Method

Building Description: 1-Storey Retail West Building
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1430			
		Number of Floors/Storeys	1			
		Protected Openings (1 hr) if C<1.0				
		Area of structure considered (m^2)			**1,430**	
	F	**Base fire flow without reductions**				**7,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**7,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,500**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	1,430	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**2,100**
		East Side	3.1 - 10 m		20%	
		South Side	2Hr Firewall		0%	
		West Side	>30m		0%	
				Cumulative Total	**30%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**6,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**100**
				or	USGPM	1,585

FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

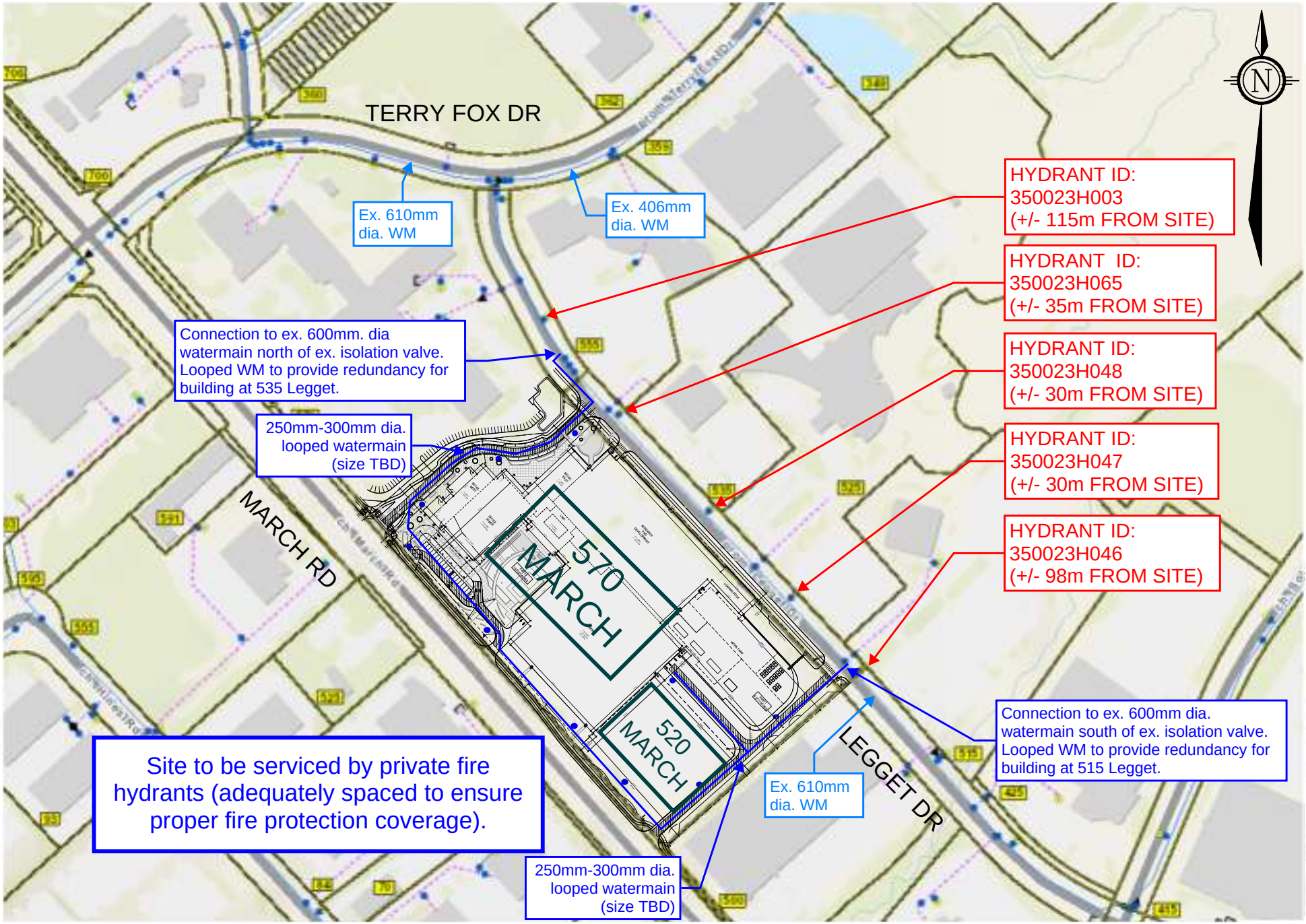
Novatech Project #: 123043
Project Name: 570 & 520 March Road
Date: 8/19/2024
Input By: K. D'sa
Reviewed By: François Thauvette

Legend: Input by User / No Input Required
Reference: Fire Underwriter's Survey Guideline (2020) Formula Method

Building Description: 5-Storey R&D Lab Building
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	7345			
		Number of Floors/Storeys	5			
		Protected Openings (1 hr) if C<1.0				
		Area of structure considered (m^2)			**25,708**	
	F	**Base fire flow without reductions**				**28,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**28,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-14,000**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	36,725	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	2Hr Firewall		0%	**0**
		East Side	>30m		0%	
		South Side	>30m		0%	
		West Side	2Hr Firewall		0%	
				Cumulative Total	**0%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**14,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**233**
				or	USGPM	3,699

FIRE HYDRANT SKETCH AND WATERMAIN INFRSTRUCTURE



Kynan Dsa

From: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Sent: Monday, August 26, 2024 11:32 AM
To: Francois Thauvette
Cc: Kynan Dsa; Walker, Krishon; Brault, Ryan
Subject: RE: 570 and 520 March Road - Nokia - Request for Municipal WM boundary conditions (123043)

Hi Francois,

As discussed over the phone this morning, the City will not allow the new Nokia Innovation Campus located at 570 March Road to connect to the existing 600mm dia. backbone watermain located on Legget Drive. This watermain is a 610mm concrete pressure pipe (C-301) that is periodically isolated by the City for structural inspections. The City does not want to bring additional connections to the backbone watermain – directly or indirectly.

The City's position on this is that a local watermain will need to be built on Legget Drive by the developer(s) from Terry Fox Drive to Solandt Road in order to service this site. It is our understanding that this discussion has been initiated with the developer at 535 Legget Drive already. We can provide contact information from this development if needed.

Please let us know if you have any questions or concerns and we can schedule a meeting.

Best Regards,

Jean-Miguel Roy
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department
Services de la planification, Direction générale de la planification, de l'immobilier et du développement économique
110 Laurier Avenue West | 110 avenue Laurier Ouest
City of Ottawa | Ville d'Ottawa
613.580.2424 x 27566

From: Kynan Dsa <k.dsa@novatech-eng.com>
Sent: August 21, 2024 10:07 AM
To: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: 570 and 520 March Road - Nokia - Request for Municipal WM boundary conditions (123043)

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Hi Jean-Miguel,

The purpose of this email is to request municipal watermain boundary conditions to complete a hydraulic network analysis to support the proposed development of the new Nokia Innovation Campus located at 570 March Road (southern portion of the recently severed larger Nokia property). The proposed service would provide water services to the Nokia campus (570 March Road), future

development on the severed parcel at 520 March Road , and redundancy for the buildings at 515 and 535 Legget Drive. Please refer to the attached sketch that identifies the existing water infrastructure along Legget Drive, as well as the proposed looped watermain network and hydrants. The sketch also identifies the two (2) proposed connection locations along Legget Drive. The northern segment of the waterloop proposes a standard connection to the existing 600mm dia. watermain north of the existing isolation valve. The southern segment of the waterloop proposes a standard connection to the existing 600mm dia. watermain south of the existing isolation valve. This watermain configuration will allow the proposed development to have a looped system that can adequately service the proposed development on the subject lands. The size of the private watermain and spacing of the on-site hydrants will be based on the fire flow requirements (calculated per FUS guidelines) and modeling results. The total anticipated water demands for the proposed development are as follows:

- Average Day Demand = 2.18 L/s
- Maximum Day Demand = 3.27 L/s
- Peak Hour Demand = 5.89 L/s
- Maximum Fire Flow Demand Range = 50-333 L/s

See attached calculation sheets for details.

Please review and let me know if you require any additional information.

Thanks,

Kynan D'sa, B.A.Sc. (Engineering) (He/Him)
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6
Tel: 613.254.9643 Ext. 276 | Cell: 705.821.2278
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Kynan Dsa

From: Walker, Krishon <krishon.walker@ottawa.ca>
Sent: Wednesday, November 20, 2024 9:48 AM
To: Greg Winters; James Ireland; Francois Thauvette
Cc: Roy, Jean-Miguel; Brault, Ryan; Bougadis, John
Subject: Servicing Approach for 570 March Road

Importance: High

Hi all,

I hope that you are well. I wanted to provide you with an update on where things are for this file. Following our internal discussions, we have come up with a solution to service Nokia's site. As mentioned earlier, the site requires two service connections, and connecting to the backbone watermain along Legget Drive is not a viable option. The City recognizes the need to build a new local watermain along Legget Drive and is prepared to invest in this infrastructure. However, the timeline required for the City to design and construct this watermain would not align with Nokia's redevelopment schedule.

To address this, we propose the following approach:

1. **First Connection Point:**
    - The City will permit Nokia to design and construct a local watermain along Legget Drive, extending from Terry Fox to the northern boundary of their site at 570 March Road.
    - City staff will prepare a report to Council in Q1 2025 to request approval for reimbursing Nokia for the costs of these works. We will recommend that the funds be approved in conjunction with this report. Once the watermain is commissioned and accepted by the City, reimbursement will be made in accordance with the terms approved.
    - Nokia will be responsible for a standard connection fee to the new watermain, based on a Special Area Charge (if implemented by Council) or the fee outlined in the Water By-law.
2. **Second Connection Point:**
    - Nokia will connect to the 203 mm valve currently linked to the backbone watermain servicing 515 Legget Drive. Nokia will need to confirm that this connection will not negatively impact service to 515 Legget Drive.
    - Should this be the case, Nokia will be required to extend the local watermain to the southern boundary of their site at 570 March Road. The City would then commit funding for this extension through the Q1 2025 report to Council.
    - The City will complete the remaining portion of the local watermain to Solandt Drive. Other property owners will be responsible for a standard connection fee to the new watermain, based on a Special Area Charge (if implemented by Council) or the fee outlined in the Water By-law.

We will include a condition of approval in the Site Plan agreement requiring Nokia to enter into a Third-Party Infrastructure Agreement with the City for this work. Once the report is approved by Council, we will begin drafting the agreement. We believe this approach is fair to Nokia and aligns with their redevelopment timelines. This information has been communicated to Andy Thompson at Nokia.

We are working through reviewing your submission for completeness and will provide you with an update by tomorrow but given this information, at the very least, your servicing report would need to be updated. You might want to get started on this work.

Please let me know if you have any questions or if you would like to discuss, either today or tomorrow. Thanks!

Krishon Walker, MCIP, RPP, PMP
Planner II | Urbaniste II
Economic Development Services | Services de développement économique
Strategic Initiatives Department | Direction générale des initiatives stratégiques

City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110, avenue Laurier Ouest
Ottawa, Ontario, K1P 1J1
T. 613-580-2424 ext. | poste 24161

My pronouns are he/him | Mes pronoms sont il / lui

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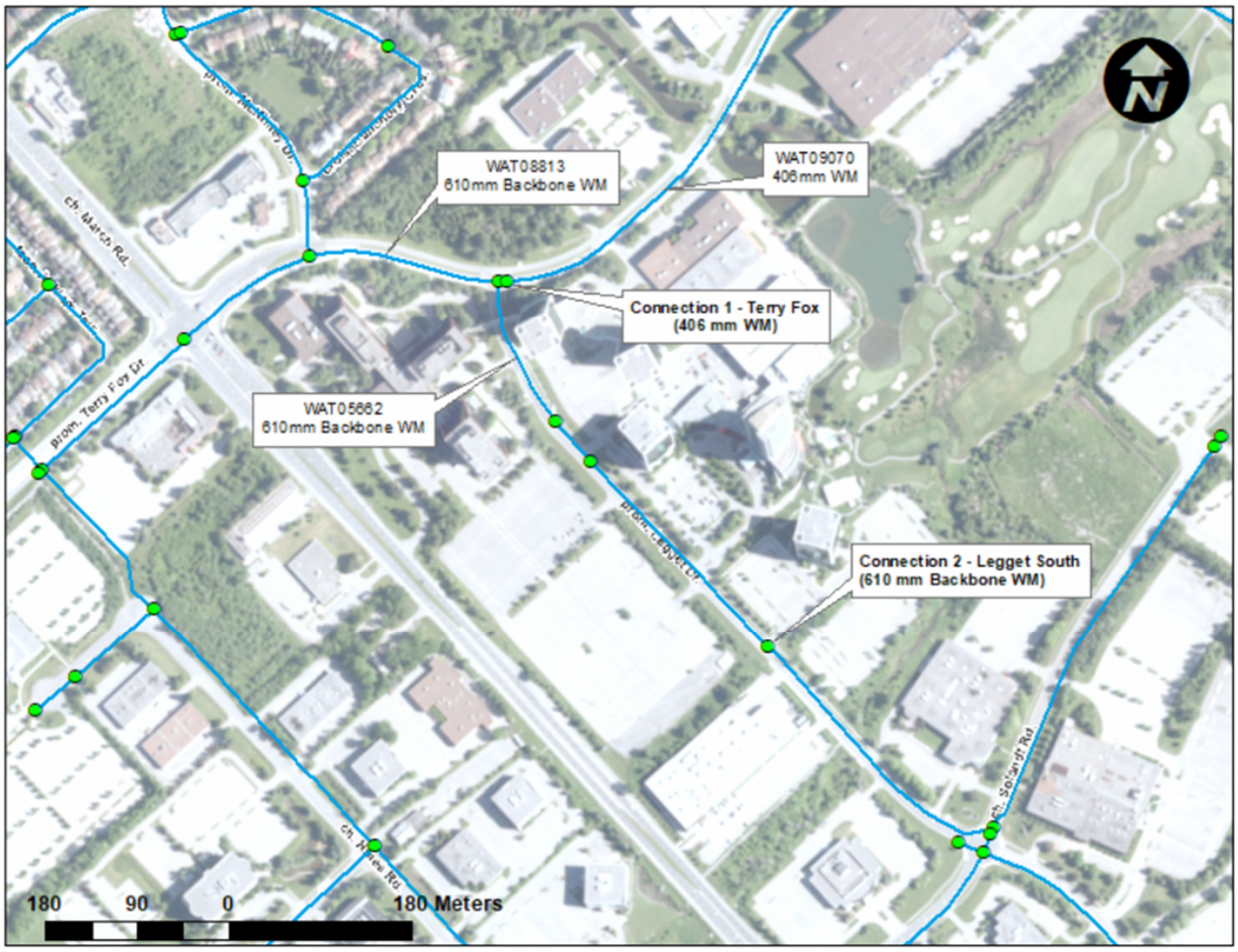
Boundary Conditions
570 March Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	131	2.18
Maximum Daily Demand	196	3.27
Peak Hour	353	5.89
Fire Flow Demand #1	3,000	50.00
Fire Flow Demand #2	18,000	300.00
Fire Flow Demand #3	20,000	333.33

Location



Results

Scenario 0 – Existing conditions (No future demands)

Connection 2 – Legget South

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.1	74.3
Peak Hour	126.4	67.7
[1] Ground Elevation =	78.8	m

Scenario 1 – Looping from 406mm watermain to 610mm backbone watermain

Connection 1 – Terry Fox

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	75.3
Peak Hour	126.3	68.6
Max Day plus Fire Flow 1	127.5	70.3
Max Day plus Fire Flow 2	120.3	60.2
Max Day plus Fire Flow 3	119.0	58.3
[1] Ground Elevation =	78.0	m

Connection 2 – Legget South

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	74.2
Peak Hour	126.3	67.5
Max Day plus Fire Flow 1	127.5	69.2
Max Day plus Fire Flow 2	120.6	59.3
Max Day plus Fire Flow 3	119.3	57.5
[1] Ground Elevation =	78.8	m

Operational Scenario 2 – Closure of 610mm backbone watermain along Legget Drive

Connection 1 – Terry Fox

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.9	75.1
Peak Hour	125.6	67.6
Max Day plus Fire Flow 1	126.3	68.7
Max Day plus Fire Flow 2	107.6	42.0
Max Day plus Fire Flow 3	103.8	36.7
[1] Ground Elevation =	78.0	m

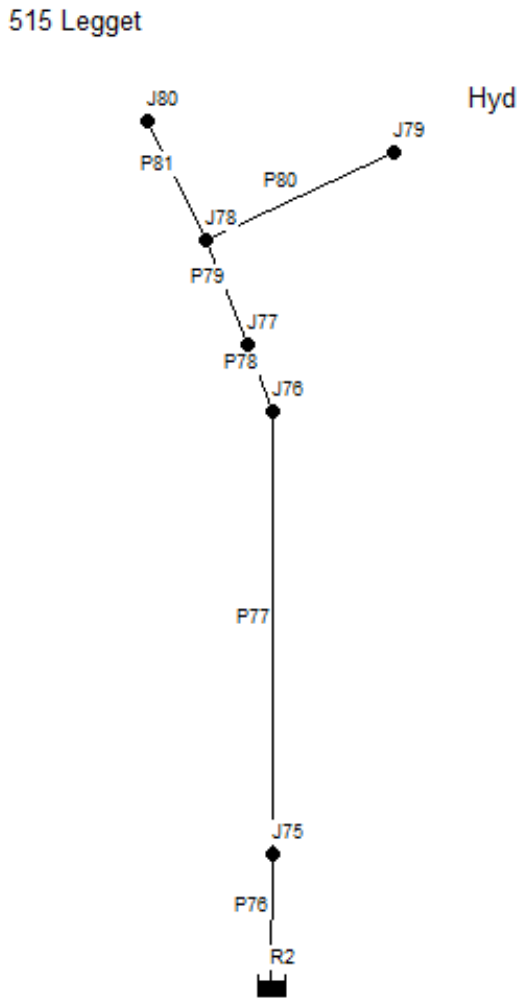
Notes

1. *Considering scenario 1: any connection to a watermain 400 mm or larger should be approved by DWS as per the Water Design Guidelines Section 2.4 Review by Drinking Water Services.*
2. *Considering operational scenario 2: Same conditions as scenario 1, except for closure of the 610mm backbone WM (WAT08813 & WAT05662) during modelling.*

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Scenario 0 - Existing Conditions



Legget Dr

515 Legget Drive
Existing 10-Storey Office Tower
WATER ANALYSIS

DOMESTIC WATER DEMANDS

Office Use	Post-Development	
Office Tower	±1110	Staff
Average Day Demand (Based on Avg. Daily Sanitary Flows)*	**0.96**	**L/s**
Maximum Day Demand (1.5 x avg. day)	**1.44**	**L/s**
Peak Hour Demand (1.8 x max. day)	**2.59**	**L/s**
Total Average Day Demand	**0.96**	**L/s**
Total Maximum Day Demand	**1.44**	**L/s**
Total Peak Hour Demand	**2.59**	**L/s**

*0.96 L/s Average Daily Sanitary Flows (Taken from San Trunk Sheet)

FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

Novatech Project #: 123043
Project Name: 570 March Road
Date: 2/1/2025
Input By: K. D'sa
Reviewed By: François Thauvette

Legend: Input by User / No Input Required
Reference: Fire Underwriter's Survey Guideline (2020) Formula Method

Building Description: 515 Legget Drive - Existing 10-Storey Office Building
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1330			
		Number of Floors/Storeys	10			
		Protected Openings (1 hr) if C<1.0				
		Area of structure considered (m^2)			**7,980**	
	F	**Base fire flow without reductions**				**16,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**13,600**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-5,440**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System		-10%		
				Cumulative Sub-Total	**-40%**	
		Area of Sprinklered Coverage (m^2)	13,300	100%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge**		**FUS Table 6**		**Surcharge**	
	(3)	North Side	20.1 - 30 m		1%	**136**
		East Side	>30m		0%	
		South Side	>30m		0%	
		West Side	>30m		0%	
				Cumulative Total	**1%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**8,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**133**
				or	USGPM	2,114

515 Legget Drive - Existing Office Tower
Water Model Results

Max Day + Fire Flow Demand
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J75	77.14	0.00	119.54	42.40	415.94	60.33
Junc J76	76.70	0.00	112.14	35.44	347.67	50.42
Junc J77	76.85	0.00	111.49	34.64	339.82	49.29
Junc J78	77.15	0.00	109.53	32.38	317.65	46.07
Junc J79	77.15	133.00	105.40	28.25	277.13	40.19
Junc J80	76.32	1.44	109.53	33.21	325.79	47.25
Resvr R2	120.60	-134.44	120.60	0.00	0.00	0.00

Min=	40.19
Max=	60.33

Max Day + Fire Flow Demand
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P76	9.7	200	110	134.44	4.28	109.17
Pipe P77	67.76	200	110	134.44	4.28	109.17
Pipe P78	6	200	110	134.44	4.28	109.17
Pipe P79	17.92	200	110	134.44	4.28	109.17
Pipe P80	7.97	150	100	-133	7.53	518.4
Pipe P81	1.85	200	110	1.44	0.05	0.03

515 Legget Drive - Existing Office Tower
Water Model Results

Peak Hour Demand
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J75	77.14	0.00	126.40	49.26	483.24	70.09
Junc J76	76.70	0.00	126.39	49.69	487.46	70.70
Junc J77	76.85	0.00	126.39	49.54	485.99	70.49
Junc J78	77.15	0.00	126.39	49.24	483.04	70.06
Junc J79	77.15	0.00	126.39	49.24	483.04	70.06
Junc J80	76.32	2.59	126.39	50.07	491.19	71.24
Resvr R2	127.50	-2.59	126.40	0	0.00	0.00

Min=	70.06
Max=	71.24

Peak Hour Demand
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P76	9.70	200	110	2.59	0.08	0.07
Pipe P77	67.76	200	110	2.59	0.08	0.07
Pipe P78	6.00	200	110	2.59	0.08	0.07
Pipe P79	17.92	200	110	2.59	0.08	0.07
Pipe P80	7.97	150	100	0	0	0.00
Pipe P81	1.85	200	110	2.59	0.08	0.07

515 Legget Drive - Existing Office Tower
Water Model Results

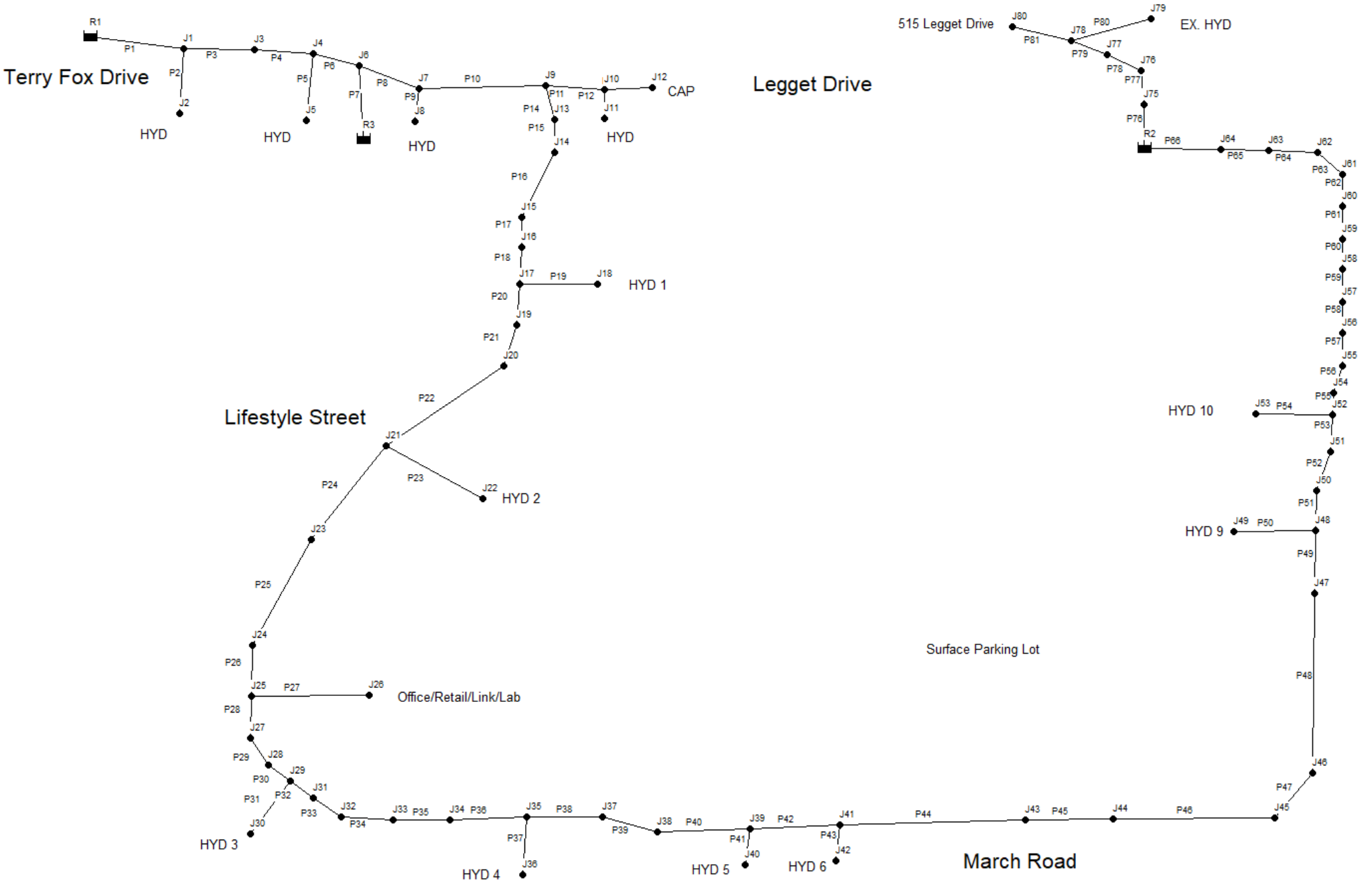
Maximum HGL
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J75	77.14	0.00	131.10	53.96	529.35	76.78
Junc J76	76.70	0.00	131.10	54.40	533.66	77.40
Junc J77	76.85	0.00	131.10	54.25	532.19	77.19
Junc J78	77.15	0.00	131.10	53.95	529.25	76.76
Junc J79	77.15	0.00	131.10	53.95	529.25	76.76
Junc J80	76.32	1.44	131.10	54.78	537.39	77.94
Resvr R2	131.10	-1.44	131.10	0	0.00	0.00

Min=	76.76
Max=	77.94

Maximum HGL
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P76	9.70	200	110	1.44	0.05	0.02
Pipe P77	67.76	200	110	1.44	0.05	0.02
Pipe P78	6.00	200	110	1.44	0.05	0.02
Pipe P79	17.92	200	110	1.44	0.05	0.02
Pipe P80	7.97	150	100	0	0	0.00
Pipe P81	1.85	200	110	1.44	0.05	0.03


Terry Fox Drive
Legget Drive
Lifestyle Street
March Road
515 Legget Drive
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HYD
HYD
HYD
HYD 1
HYD 2
Office/Retail/Link/Lab
HYD 3
HYD 4
HYD 5
HYD 6
Surface Parking Lot
HYD 9
HYD 10
CAP
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R2
R3
J1
J2
J3
J4
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J6
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J9
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570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (Office + Link Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	75.85	0.00	120.28	44.43	435.86	63.22
Junc J2	76.00	0.00	120.28	44.28	434.39	63.00
Junc J3	76.20	0.00	120.25	44.05	432.13	62.68
Junc J4	76.80	0.00	120.18	43.38	425.56	61.72
Junc J5	76.80	0.00	120.18	43.38	425.56	61.72
Junc J6	77.00	0.00	120.15	43.15	423.30	61.39
Junc J7	77.00	0.00	119.99	42.99	421.73	61.17
Junc J8	77.00	0.00	119.99	42.99	421.73	61.17
Junc J9	76.60	0.00	119.89	43.29	424.67	61.59
Junc J10	77.40	0.00	119.89	42.49	416.83	60.46
Junc J11	77.40	0.00	119.89	42.49	416.83	60.46
Junc J12	77.40	0.00	119.89	42.49	416.83	60.46
Junc J13	76.00	0.00	119.87	43.87	430.36	62.42
Junc J14	76.80	0.00	119.86	43.06	422.42	61.27
Junc J15	76.90	0.00	119.82	42.92	421.05	61.07
Junc J16	76.90	0.00	119.82	42.92	421.05	61.07
Junc J17	77.10	0.00	119.78	42.68	418.69	60.73
Junc J18	77.30	0.00	119.78	42.48	416.73	60.44
Junc J19	77.40	0.00	119.70	42.30	414.96	60.19
Junc J20	78.30	0.00	119.64	41.34	405.55	58.82
Junc J21	78.80	0.00	119.60	40.80	400.25	58.05
Junc J22	79.00	0.00	119.60	40.60	398.29	57.77
Junc J23	79.50	0.00	119.52	40.02	392.60	56.94
Junc J24	79.50	0.00	119.49	39.99	392.30	56.90
Junc J25	79.50	0.00	119.45	39.95	391.91	56.84
Junc J26	79.60	2.62	119.45	39.85	390.93	56.70
Junc J27	79.90	0.00	119.37	39.47	387.20	56.16
Junc J28	79.90	0.00	119.35	39.45	387.00	56.13
Junc J29	79.90	0.00	119.33	39.43	386.81	56.10
Junc J30	80.00	59.00	118.99	38.99	382.49	55.48
Junc J31	79.84	0.00	119.33	39.49	387.40	56.19
Junc J32	79.71	0.00	119.33	39.62	388.67	56.37
Junc J33	79.60	0.00	119.33	39.73	389.75	56.53
Junc J34	79.60	0.00	119.33	39.73	389.75	56.53
Junc J35	79.55	0.00	119.33	39.78	390.24	56.60
Junc J36	79.60	59.00	118.90	39.30	385.53	55.92
Junc J37	79.50	0.00	119.40	39.90	391.42	56.77
Junc J38	79.50	0.00	119.45	39.95	391.91	56.84
Junc J39	79.45	0.00	119.51	40.06	392.99	57.00
Junc J40	79.50	0.00	119.51	40.01	392.50	56.93
Junc J41	79.30	0.00	119.67	40.37	396.03	57.44
Junc J42	79.35	0.00	119.67	40.32	395.54	57.37
Junc J43	79.20	0.00	119.84	40.64	398.68	57.82
Junc J44	78.70	0.00	119.84	41.14	403.58	58.53
Junc J45	78.00	0.00	119.88	41.88	410.84	59.59
Junc J46	78.00	0.00	119.92	41.92	411.24	59.64
Junc J47	77.85	0.00	120.11	42.26	414.57	60.13
Junc J48	77.85	0.00	120.12	42.27	414.67	60.14
Junc J49	78.00	0.00	120.12	42.12	413.20	59.93
Junc J50	77.50	0.00	120.16	42.66	418.49	60.70
Junc J51	77.30	0.00	120.17	42.87	420.55	61.00
Junc J52	76.45	0.00	120.27	43.82	429.87	62.35
Junc J53	76.45	0.00	120.27	43.82	429.87	62.35
Junc J54	76.90	0.00	120.31	43.41	425.85	61.76
Junc J55	76.90	0.00	120.33	43.43	426.05	61.79
Junc J56	76.80	0.00	120.37	43.57	427.42	61.99
Junc J57	76.80	0.00	120.37	43.57	427.42	61.99
Junc J58	74.80	0.00	120.39	45.59	447.24	64.87
Junc J59	74.80	0.00	120.42	45.62	447.53	64.91
Junc J60	74.80	0.00	120.44	45.64	447.73	64.94
Junc J61	74.80	0.00	120.47	45.67	448.02	64.98
Junc J62	74.80	0.00	120.49	45.69	448.22	65.01
Junc J63	74.80	0.00	120.52	45.72	448.51	65.05
Junc J64	77.00	0.00	120.58	43.58	427.52	62.01
Junc J75	77.14	0.00	120.60	43.46	426.34	61.84
Junc J76	76.70	0.00	120.60	43.90	430.66	62.46
Junc J77	76.85	0.00	120.60	43.75	429.19	62.25
Junc J78	77.15	0.00	120.60	43.45	426.24	61.82
Junc J79	77.15	0.00	120.60	43.45	426.24	61.82
Junc J80	76.32	1.44	120.60	44.28	434.39	63.00
Resvr R1	120.30	-39.00	120.30	0.00	0.00	0.00
Resvr R2	120.60	-59.60	120.60	0.00	0.00	0.00
Resvr R3	120.30	-23.46	120.30	0.00	0.00	0.00
					Min=	55.48
					Max=	65.05

Max Day + Fire Flow Demand (Office + Link Building) - DOUBLE WM
Feed - 300mm
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	39	0.55	1.3
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	39	0.55	1.3
Pipe P4	49	300	120	39	0.55	1.3
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	39	0.55	1.3
Pipe P7	7	150	100	23.46	1.33	20.85
Pipe P8	53	300	120	62.46	0.88	3.12
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	62.46	0.88	3.12
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	62.46	0.88	3.12
Pipe P15	4.5	300	120	62.46	0.88	3.12
Pipe P16	11.5	300	120	62.46	0.88	3.12
Pipe P17	1.5	300	120	62.46	0.88	3.12
Pipe P18	13	300	120	62.46	0.88	3.12
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	62.46	0.88	3.12
Pipe P21	17	300	120	62.46	0.88	3.12
Pipe P22	15	300	120	62.46	0.88	3.12
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	62.46	0.88	3.12
Pipe P25	9	300	120	62.46	0.88	3.12
Pipe P26	14	300	120	62.46	0.88	3.12
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	59.84	0.85	2.88
Pipe P29	7	300	120	59.84	0.85	2.88
Pipe P30	4	300	120	59.84	0.85	2.88
Pipe P31	3	150	100	59	3.34	115.05
Pipe P32	11	300	120	0.84	0.01	0
Pipe P33	22	300	120	0.84	0.01	0
Pipe P34	42	300	120	0.84	0.01	0
Pipe P35	8	300	120	-0.84	0.01	0
Pipe P36	3	300	120	0.84	0.01	0
Pipe P37	3.8	150	100	59	3.34	115.06
Pipe P38	25	300	120	-58.16	0.82	2.73
Pipe P39	18	300	120	-58.16	0.82	2.73
Pipe P40	23	300	120	-58.16	0.82	2.73
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	-58.16	0.82	2.73
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	-58.16	0.82	2.73
Pipe P45	2.6	300	120	-58.16	0.82	2.73
Pipe P46	14.5	300	120	-58.16	0.82	2.73
Pipe P47	15	300	120	-58.16	0.82	2.73
Pipe P48	69	300	120	-58.16	0.82	2.73
Pipe P49	4	300	120	-58.16	0.82	2.73
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	-58.16	0.82	2.73
Pipe P52	5	300	120	58.16	0.82	2.73
Pipe P53	35.5	300	120	58.16	0.82	2.73
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	-58.16	0.82	2.73
Pipe P56	10	300	120	-58.16	0.82	2.73
Pipe P57	12	300	120	-58.16	0.82	2.73
Pipe P58	2.5	300	120	-58.16	0.82	2.73
Pipe P59	4.7	300	120	-58.16	0.82	2.73
Pipe P60	12	300	120	-58.16	0.82	2.73
Pipe P61	1	200	110	58.16	1.85	23.13
Pipe P62	1	200	110	-58.16	1.85	23.13
Pipe P63	1.2	200	110	58.16	1.85	23.13
Pipe P64	1.1	200	110	58.16	1.85	23.14
Pipe P65	2.5	200	110	58.16	1.85	23.13
Pipe P66	1	200	110	-58.16	1.85	23.12
Pipe P76	9.7	200	110	1.44	0.05	0.02
Pipe P77	67.76	200	110	1.44	0.05	0.02
Pipe P78	6	200	110	-1.44	0.05	0.02
Pipe P79	17.92	200	110	-1.44	0.05	0.02
Pipe P80	7.97	150	100	0	0	0
Pipe P81	1.85	200	110	-1.44	0.05	0.03

570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (Retail East Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	75.85	0.00	127.49	51.64	506.59	73.47
Junc J2	76.00	0.00	127.49	51.49	505.12	73.26
Junc J3	76.20	0.00	127.48	51.28	503.06	72.96
Junc J4	76.80	0.00	127.46	50.66	496.97	72.08
Junc J5	76.80	0.00	127.46	50.66	496.97	72.08
Junc J6	77.00	0.00	127.45	50.45	494.91	71.78
Junc J7	77.00	0.00	127.40	50.40	494.42	71.71
Junc J8	77.00	0.00	127.40	50.40	494.42	71.71
Junc J9	76.60	0.00	127.37	50.77	498.05	72.24
Junc J10	77.40	0.00	127.37	49.97	490.21	71.10
Junc J11	77.40	0.00	127.37	49.97	490.21	71.10
Junc J12	77.40	0.00	127.37	49.97	490.21	71.10
Junc J13	76.00	0.00	127.37	51.37	503.94	73.09
Junc J14	76.80	0.00	127.36	50.56	495.99	71.94
Junc J15	76.90	0.00	127.35	50.45	494.91	71.78
Junc J16	76.90	0.00	127.35	50.45	494.91	71.78
Junc J17	77.10	0.00	127.34	50.24	492.85	71.48
Junc J18	77.30	0.00	127.34	50.04	490.89	71.20
Junc J19	77.40	0.00	127.31	49.91	489.62	71.01
Junc J20	78.30	0.00	127.29	48.99	480.59	69.70
Junc J21	78.80	0.00	127.28	48.48	475.59	68.98
Junc J22	79.00	50.00	127.08	48.08	471.66	68.41
Junc J23	79.50	0.00	127.29	47.79	468.82	68.00
Junc J24	79.50	0.00	127.29	47.79	468.82	68.00
Junc J25	79.50	0.00	127.29	47.79	468.82	68.00
Junc J26	79.60	2.62	127.29	47.69	467.84	67.85
Junc J27	79.90	0.00	127.30	47.40	464.99	67.44
Junc J28	79.90	0.00	127.30	47.40	464.99	67.44
Junc J29	79.90	0.00	127.31	47.41	465.09	67.46
Junc J30	80.00	0.00	127.31	47.31	464.11	67.31
Junc J31	79.84	0.00	127.31	47.47	465.68	67.54
Junc J32	79.71	0.00	127.32	47.61	467.05	67.74
Junc J33	79.60	0.00	127.33	47.73	468.23	67.91
Junc J34	79.60	0.00	127.34	47.74	468.33	67.93
Junc J35	79.55	0.00	127.34	47.79	468.82	68.00
Junc J36	79.60	0.00	127.34	47.74	468.33	67.93
Junc J37	79.50	0.00	127.35	47.85	469.41	68.08
Junc J38	79.50	0.00	127.35	47.85	469.41	68.08
Junc J39	79.45	0.00	127.36	47.91	470.00	68.17
Junc J40	79.50	0.00	127.36	47.86	469.51	68.10
Junc J41	79.30	0.00	127.38	48.08	471.66	68.41
Junc J42	79.35	0.00	127.38	48.03	471.17	68.34
Junc J43	79.20	0.00	127.40	48.20	472.84	68.58
Junc J44	78.70	0.00	127.40	48.70	477.75	69.29
Junc J45	78.00	0.00	127.41	49.41	484.71	70.30
Junc J46	78.00	0.00	127.41	49.41	484.71	70.30
Junc J47	77.85	0.00	127.44	49.59	486.48	70.56
Junc J48	77.85	0.00	127.44	49.59	486.48	70.56
Junc J49	78.00	0.00	127.44	49.44	485.01	70.34
Junc J50	77.50	0.00	127.44	49.94	489.91	71.06
Junc J51	77.30	0.00	127.44	50.14	491.87	71.34
Junc J52	76.45	0.00	127.46	51.01	500.41	72.58
Junc J53	76.45	0.00	127.46	51.01	500.41	72.58
Junc J54	76.90	0.00	127.46	50.56	495.99	71.94
Junc J55	76.90	0.00	127.47	50.57	496.09	71.95
Junc J56	76.80	0.00	127.47	50.67	497.07	72.09
Junc J57	76.80	0.00	127.47	50.67	497.07	72.09
Junc J58	74.80	0.00	127.47	52.67	516.69	74.94
Junc J59	74.80	0.00	127.48	52.68	516.79	74.95
Junc J60	74.80	0.00	127.48	52.68	516.79	74.95
Junc J61	74.80	0.00	127.48	52.68	516.79	74.95
Junc J62	74.80	0.00	127.49	52.69	516.89	74.97
Junc J63	74.80	0.00	127.49	52.69	516.89	74.97
Junc J64	77.00	0.00	127.50	50.50	495.41	71.85
Junc J75	77.14	0.00	127.50	50.36	494.03	71.65
Junc J76	76.70	0.00	127.50	50.80	498.35	72.28
Junc J77	76.85	0.00	127.50	50.65	496.88	72.07
Junc J78	77.15	0.00	127.50	50.35	493.93	71.64
Junc J79	77.15	0.00	127.50	50.35	493.93	71.64
Junc J80	76.32	1.44	127.50	51.18	502.08	72.82
Resvr R1	127.50	-20.83	127.50	0.00	0.00	0.00
Resvr R2	127.50	-20.70	127.50	0.00	0.00	0.00
Resvr R3	127.50	-12.53	127.50	0.00	0.00	0.00
					Min=	67.31
					Max=	74.97

Max Day + Fire Flow Demand (Retail East Building) - DOUBLE WM
Feed - 300mm
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	20.83	0.29	0.41
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	20.83	0.29	0.41
Pipe P4	49	300	120	20.83	0.29	0.41
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	20.83	0.29	0.41
Pipe P7	7	150	100	12.53	0.71	6.53
Pipe P8	53	300	120	33.36	0.47	0.98
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	33.36	0.47	0.98
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	33.36	0.47	0.97
Pipe P15	4.5	300	120	33.36	0.47	0.98
Pipe P16	11.5	300	120	33.36	0.47	0.98
Pipe P17	1.5	300	120	33.36	0.47	0.98
Pipe P18	13	300	120	33.36	0.47	0.98
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	33.36	0.47	0.98
Pipe P21	17	300	120	33.36	0.47	0.98
Pipe P22	15	300	120	33.36	0.47	0.98
Pipe P23	2.3	150	100	50	2.83	84.68
Pipe P24	25	300	120	-16.64	0.24	0.27
Pipe P25	9	300	120	-16.64	0.24	0.27
Pipe P26	14	300	120	-16.64	0.24	0.27
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	-19.26	0.27	0.35
Pipe P29	7	300	120	-19.26	0.27	0.35
Pipe P30	4	300	120	-19.26	0.27	0.35
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	-19.26	0.27	0.35
Pipe P33	22	300	120	-19.26	0.27	0.35
Pipe P34	42	300	120	-19.26	0.27	0.35
Pipe P35	8	300	120	19.26	0.27	0.35
Pipe P36	3	300	120	-19.26	0.27	0.35
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	-19.26	0.27	0.35
Pipe P39	18	300	120	-19.26	0.27	0.35
Pipe P40	23	300	120	-19.26	0.27	0.35
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	-19.26	0.27	0.35
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	-19.26	0.27	0.35
Pipe P45	2.6	300	120	-19.26	0.27	0.35
Pipe P46	14.5	300	120	-19.26	0.27	0.35
Pipe P47	15	300	120	-19.26	0.27	0.35
Pipe P48	69	300	120	-19.26	0.27	0.35
Pipe P49	4	300	120	-19.26	0.27	0.35
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	-19.26	0.27	0.35
Pipe P52	5	300	120	19.26	0.27	0.35
Pipe P53	35.5	300	120	19.26	0.27	0.35
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	-19.26	0.27	0.35
Pipe P56	10	300	120	-19.26	0.27	0.35
Pipe P57	12	300	120	-19.26	0.27	0.35
Pipe P58	2.5	300	120	-19.26	0.27	0.35
Pipe P59	4.7	300	120	-19.26	0.27	0.35
Pipe P60	12	300	120	-19.26	0.27	0.35
Pipe P61	1	200	110	19.26	0.61	2.99
Pipe P62	1	200	110	-19.26	0.61	2.99
Pipe P63	1.2	200	110	19.26	0.61	2.98
Pipe P64	1.1	200	110	19.26	0.61	2.99
Pipe P65	2.5	200	110	19.26	0.61	2.99
Pipe P66	1	200	110	-19.26	0.61	2.99
Pipe P76	9.7	200	110	1.44	0.05	0.02
Pipe P77	67.76	200	110	1.44	0.05	0.02
Pipe P78	6	200	110	-1.44	0.05	0.02
Pipe P79	17.92	200	110	-1.44	0.05	0.02
Pipe P80	7.97	150	100	0	0	0
Pipe P81	1.85	200	110	-1.44	0.05	0.02

570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (Retail West Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	75.85	0.00	120.28	44.43	435.86	63.22
Junc J2	76.00	0.00	120.28	44.28	434.39	63.00
Junc J3	76.20	0.00	120.25	44.05	432.13	62.68
Junc J4	76.80	0.00	120.20	43.40	425.75	61.75
Junc J5	76.80	0.00	120.20	43.40	425.75	61.75
Junc J6	77.00	0.00	120.17	43.17	423.50	61.42
Junc J7	77.00	0.00	120.03	43.03	422.12	61.22
Junc J8	77.00	0.00	120.03	43.03	422.12	61.22
Junc J9	76.60	0.00	119.94	43.34	425.17	61.67
Junc J10	77.40	0.00	119.94	42.54	417.32	60.53
Junc J11	77.40	0.00	119.94	42.54	417.32	60.53
Junc J12	77.40	0.00	119.94	42.54	417.32	60.53
Junc J13	76.00	0.00	119.93	43.93	430.95	62.50
Junc J14	76.80	0.00	119.91	43.11	422.91	61.34
Junc J15	76.90	0.00	119.88	42.98	421.63	61.15
Junc J16	76.90	0.00	119.88	42.98	421.63	61.15
Junc J17	77.10	0.00	119.84	42.74	419.28	60.81
Junc J18	77.30	0.00	119.84	42.54	417.32	60.53
Junc J19	77.40	0.00	119.77	42.37	415.65	60.28
Junc J20	78.30	0.00	119.73	41.43	406.43	58.95
Junc J21	78.80	0.00	119.69	40.89	401.13	58.18
Junc J22	79.00	50.00	119.49	40.49	397.21	57.61
Junc J23	79.50	0.00	119.68	40.18	394.17	57.17
Junc J24	79.50	0.00	119.68	40.18	394.17	57.17
Junc J25	79.50	0.00	119.68	40.18	394.17	57.17
Junc J26	79.60	2.62	119.68	40.08	393.18	57.03
Junc J27	79.90	0.00	119.68	39.78	390.24	56.60
Junc J28	79.90	0.00	119.68	39.78	390.24	56.60
Junc J29	79.90	0.00	119.68	39.78	390.24	56.60
Junc J30	80.00	50.00	119.43	39.43	386.81	56.10
Junc J31	79.84	0.00	119.70	39.86	391.03	56.71
Junc J32	79.71	0.00	119.74	40.03	392.69	56.96
Junc J33	79.60	0.00	119.81	40.21	394.46	57.21
Junc J34	79.60	0.00	119.82	40.22	394.56	57.23
Junc J35	79.55	0.00	119.83	40.28	395.15	57.31
Junc J36	79.60	0.00	119.83	40.23	394.66	57.24
Junc J37	79.50	0.00	119.87	40.37	396.03	57.44
Junc J38	79.50	0.00	119.90	40.40	396.32	57.48
Junc J39	79.45	0.00	119.94	40.49	397.21	57.61
Junc J40	79.50	0.00	119.94	40.44	396.72	57.54
Junc J41	79.30	0.00	120.03	40.73	399.56	57.95
Junc J42	79.35	0.00	120.03	40.68	399.07	57.88
Junc J43	79.20	0.00	120.13	40.93	401.52	58.24
Junc J44	78.70	0.00	120.14	41.44	406.53	58.96
Junc J45	78.00	0.00	120.16	42.16	413.59	59.99
Junc J46	78.00	0.00	120.19	42.19	413.88	60.03
Junc J47	77.85	0.00	120.30	42.45	416.43	60.40
Junc J48	77.85	0.00	120.31	42.46	416.53	60.41
Junc J49	78.00	0.00	120.31	42.31	415.06	60.20
Junc J50	77.50	0.00	120.33	42.83	420.16	60.94
Junc J51	77.30	0.00	120.34	43.04	422.22	61.24
Junc J52	76.45	0.00	120.40	43.95	431.15	62.53
Junc J53	76.45	0.00	120.40	43.95	431.15	62.53
Junc J54	76.90	0.00	120.42	43.52	426.93	61.92
Junc J55	76.90	0.00	120.44	43.54	427.13	61.95
Junc J56	76.80	0.00	120.46	43.66	428.30	62.12
Junc J57	76.80	0.00	120.46	43.66	428.30	62.12
Junc J58	74.80	0.00	120.47	45.67	448.02	64.98
Junc J59	74.80	0.00	120.49	45.69	448.22	65.01
Junc J60	74.80	0.00	120.50	45.70	448.32	65.02
Junc J61	74.80	0.00	120.52	45.72	448.51	65.05
Junc J62	74.80	0.00	120.53	45.73	448.61	65.07
Junc J63	74.80	0.00	120.55	45.75	448.81	65.09
Junc J64	77.00	0.00	120.59	43.59	427.62	62.02
Junc J75	77.14	0.00	120.60	43.46	426.34	61.84
Junc J76	76.70	0.00	120.60	43.90	430.66	62.46
Junc J77	76.85	0.00	120.60	43.75	429.19	62.25
Junc J78	77.15	0.00	120.60	43.45	426.24	61.82
Junc J79	77.15	0.00	120.60	43.45	426.24	61.82
Junc J80	76.32	1.44	120.60	44.28	434.39	63.00
Resvr R1	120.30	-36.22	120.30	0.00	0.00	0.00
Resvr R2	120.60	-46.06	120.60	0.00	0.00	0.00
Resvr R3	120.30	-21.79	120.30	0.00	0.00	0.00
					Min=	56.10
					Max=	65.09

Max Day + Fire Flow Demand (Retail West Building) - DOUBLE WM
Feed - 300mm
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	36.22	0.51	1.14
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	36.22	0.51	1.14
Pipe P4	49	300	120	36.22	0.51	1.14
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	36.22	0.51	1.14
Pipe P7	7	150	100	21.79	1.23	18.18
Pipe P8	53	300	120	58	0.82	2.72
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	58	0.82	2.72
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	58	0.82	2.72
Pipe P15	4.5	300	120	58	0.82	2.72
Pipe P16	11.5	300	120	58	0.82	2.72
Pipe P17	1.5	300	120	58	0.82	2.72
Pipe P18	13	300	120	58	0.82	2.72
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	58	0.82	2.72
Pipe P21	17	300	120	58	0.82	2.72
Pipe P22	15	300	120	58	0.82	2.72
Pipe P23	2.3	150	100	50	2.83	84.68
Pipe P24	25	300	120	8	0.11	0.07
Pipe P25	9	300	120	8	0.11	0.07
Pipe P26	14	300	120	8	0.11	0.07
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	5.38	0.08	0.03
Pipe P29	7	300	120	5.38	0.08	0.03
Pipe P30	4	300	120	5.38	0.08	0.03
Pipe P31	3	150	100	50	2.83	84.68
Pipe P32	11	300	120	-44.62	0.63	1.67
Pipe P33	22	300	120	-44.62	0.63	1.67
Pipe P34	42	300	120	-44.62	0.63	1.67
Pipe P35	8	300	120	44.62	0.63	1.67
Pipe P36	3	300	120	-44.62	0.63	1.67
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	-44.62	0.63	1.67
Pipe P39	18	300	120	-44.62	0.63	1.67
Pipe P40	23	300	120	-44.62	0.63	1.67
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	-44.62	0.63	1.67
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	-44.62	0.63	1.67
Pipe P45	2.6	300	120	-44.62	0.63	1.67
Pipe P46	14.5	300	120	-44.62	0.63	1.67
Pipe P47	15	300	120	-44.62	0.63	1.67
Pipe P48	69	300	120	-44.62	0.63	1.67
Pipe P49	4	300	120	-44.62	0.63	1.67
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	-44.62	0.63	1.67
Pipe P52	5	300	120	44.62	0.63	1.67
Pipe P53	35.5	300	120	44.62	0.63	1.67
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	-44.62	0.63	1.67
Pipe P56	10	300	120	-44.62	0.63	1.67
Pipe P57	12	300	120	-44.62	0.63	1.67
Pipe P58	2.5	300	120	-44.62	0.63	1.67
Pipe P59	4.7	300	120	-44.62	0.63	1.67
Pipe P60	12	300	120	-44.62	0.63	1.67
Pipe P61	1	200	110	44.62	1.42	14.16
Pipe P62	1	200	110	-44.62	1.42	14.16
Pipe P63	1.2	200	110	44.62	1.42	14.15
Pipe P64	1.1	200	110	44.62	1.42	14.16
Pipe P65	2.5	200	110	44.62	1.42	14.16
Pipe P66	1	200	110	-44.62	1.42	14.15
Pipe P76	9.7	200	110	1.44	0.05	0.02
Pipe P77	67.76	200	110	1.44	0.05	0.02
Pipe P78	6	200	110	-1.44	0.05	0.02
Pipe P79	17.92	200	110	-1.44	0.05	0.02
Pipe P80	7.97	150	100	0	0	0
Pipe P81	1.85	200	110	-1.44	0.05	0.03

570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (R&D Lab Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	75.85	0.00	120.23	44.38	435.37	63.14
Junc J2	76.00	0.00	120.23	44.23	433.90	62.93
Junc J3	76.20	0.00	120.14	43.94	431.05	62.52
Junc J4	76.80	0.00	119.95	43.15	423.30	61.39
Junc J5	76.80	0.00	119.95	43.15	423.30	61.39
Junc J6	77.00	0.00	119.86	42.86	420.46	60.98
Junc J7	77.00	0.00	119.36	42.36	415.55	60.27
Junc J8	77.00	0.00	119.36	42.36	415.55	60.27
Junc J9	76.60	0.00	119.06	42.46	416.53	60.41
Junc J10	77.40	0.00	118.97	41.57	407.80	59.15
Junc J11	77.40	95.00	118.41	41.01	402.31	58.35
Junc J12	77.40	0.00	118.97	41.57	407.80	59.15
Junc J13	76.00	0.00	119.05	43.05	422.32	61.25
Junc J14	76.80	0.00	119.05	42.25	414.47	60.11
Junc J15	76.90	0.00	119.05	42.15	413.49	59.97
Junc J16	76.90	0.00	119.05	42.15	413.49	59.97
Junc J17	77.10	0.00	119.04	41.94	411.43	59.67
Junc J18	77.30	40.00	118.85	41.55	407.61	59.12
Junc J19	77.40	0.00	119.06	41.66	408.68	59.27
Junc J20	78.30	0.00	119.06	40.76	399.86	57.99
Junc J21	78.80	0.00	119.07	40.27	395.05	57.30
Junc J22	79.00	0.00	119.07	40.07	393.09	57.01
Junc J23	79.50	0.00	119.08	39.58	388.28	56.32
Junc J24	79.50	0.00	119.08	39.58	388.28	56.32
Junc J25	79.50	0.00	119.09	39.59	388.38	56.33
Junc J26	79.60	2.62	119.09	39.49	387.40	56.19
Junc J27	79.90	0.00	119.11	39.21	384.65	55.79
Junc J28	79.90	0.00	119.11	39.21	384.65	55.79
Junc J29	79.90	0.00	119.11	39.21	384.65	55.79
Junc J30	80.00	0.00	119.11	39.11	383.67	55.65
Junc J31	79.84	0.00	119.12	39.28	385.34	55.89
Junc J32	79.71	0.00	119.13	39.42	386.71	56.09
Junc J33	79.60	0.00	119.15	39.55	387.99	56.27
Junc J34	79.60	0.00	119.16	39.56	388.08	56.29
Junc J35	79.55	0.00	119.16	39.61	388.57	56.36
Junc J36	79.60	0.00	119.16	39.56	388.08	56.29
Junc J37	79.50	0.00	119.17	39.67	389.16	56.44
Junc J38	79.50	0.00	119.18	39.68	389.26	56.46
Junc J39	79.45	0.00	119.19	39.74	389.85	56.54
Junc J40	79.50	0.00	119.19	39.69	389.36	56.47
Junc J41	79.30	0.00	119.23	39.93	391.71	56.81
Junc J42	79.35	0.00	119.23	39.88	391.22	56.74
Junc J43	79.20	0.00	119.26	40.06	392.99	57.00
Junc J44	78.70	0.00	119.26	40.56	397.89	57.71
Junc J45	78.00	0.00	119.27	41.27	404.86	58.72
Junc J46	78.00	0.00	119.28	41.28	404.96	58.73
Junc J47	77.85	0.00	119.31	41.46	406.72	58.99
Junc J48	77.85	0.00	119.31	41.46	406.72	58.99
Junc J49	78.00	0.00	119.31	41.31	405.25	58.78
Junc J50	77.50	0.00	119.32	41.82	410.25	59.50
Junc J51	77.30	0.00	119.32	42.02	412.22	59.79
Junc J52	76.45	0.00	119.34	42.89	420.75	61.02
Junc J53	76.45	95.00	117.81	41.36	405.74	58.85
Junc J54	76.90	0.00	119.49	42.59	417.81	60.60
Junc J55	76.90	0.00	119.60	42.70	418.89	60.75
Junc J56	76.80	0.00	119.72	42.92	421.05	61.07
Junc J57	76.80	0.00	119.75	42.95	421.34	61.11
Junc J58	74.80	0.00	119.79	44.99	441.35	64.01
Junc J59	74.80	0.00	119.92	45.12	442.63	64.20
Junc J60	74.80	0.00	120.01	45.21	443.51	64.33
Junc J61	74.80	0.00	120.09	45.29	444.29	64.44
Junc J62	74.80	0.00	120.20	45.40	445.37	64.60
Junc J63	74.80	0.00	120.29	45.49	446.26	64.72
Junc J64	77.00	0.00	120.51	43.51	426.83	61.91
Junc J75	77.14	0.00	120.60	43.46	426.34	61.84
Junc J76	76.70	0.00	120.60	43.90	430.66	62.46
Junc J77	76.85	0.00	120.60	43.75	429.19	62.25
Junc J78	77.15	0.00	120.60	43.45	426.24	61.82
Junc J79	77.15	0.00	120.60	43.45	426.24	61.82
Junc J80	76.32	1.44	120.60	44.28	434.39	63.00
Resvr R1	120.30	-70.79	120.30	0.00	0.00	0.00
Resvr R2	120.60	-120.69	120.60	0.00	0.00	0.00
Resvr R3	120.30	-42.58	120.30	0.00	0.00	0.00
					Min=	55.65
					Max=	64.72

Max Day + Fire Flow Demand (R&D Lab Building) - DOUBLE WM Feed - 300mm

Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	70.79	1	3.93
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	70.79	1	3.93
Pipe P4	49	300	120	70.79	1	3.93
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	70.79	1	3.93
Pipe P7	7	150	100	42.58	2.41	62.89
Pipe P8	53	300	120	113.37	1.6	9.4
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	113.37	1.6	9.4
Pipe P11	13	300	120	95	1.34	6.78
Pipe P12	2	150	100	95	5.38	277.99
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	18.37	0.26	0.32
Pipe P15	4.5	300	120	18.37	0.26	0.32
Pipe P16	11.5	300	120	18.37	0.26	0.32
Pipe P17	1.5	300	120	18.37	0.26	0.32
Pipe P18	13	300	120	18.37	0.26	0.32
Pipe P19	3.5	150	100	40	2.26	56.02
Pipe P20	26	300	120	-21.63	0.31	0.44
Pipe P21	17	300	120	-21.63	0.31	0.44
Pipe P22	15	300	120	-21.63	0.31	0.44
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	-21.63	0.31	0.44
Pipe P25	9	300	120	-21.63	0.31	0.44
Pipe P26	14	300	120	-21.63	0.31	0.44
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	-24.25	0.34	0.54
Pipe P29	7	300	120	-24.25	0.34	0.54
Pipe P30	4	300	120	-24.25	0.34	0.54
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	-24.25	0.34	0.54
Pipe P33	22	300	120	-24.25	0.34	0.54
Pipe P34	42	300	120	-24.25	0.34	0.54
Pipe P35	8	300	120	24.25	0.34	0.54
Pipe P36	3	300	120	-24.25	0.34	0.54
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	-24.25	0.34	0.54
Pipe P39	18	300	120	-24.25	0.34	0.54
Pipe P40	23	300	120	-24.25	0.34	0.54
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	-24.25	0.34	0.54
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	-24.25	0.34	0.54
Pipe P45	2.6	300	120	-24.25	0.34	0.54
Pipe P46	14.5	300	120	-24.25	0.34	0.54
Pipe P47	15	300	120	-24.25	0.34	0.54
Pipe P48	69	300	120	-24.25	0.34	0.54
Pipe P49	4	300	120	-24.25	0.34	0.54
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	-24.25	0.34	0.54
Pipe P52	5	300	120	24.25	0.34	0.54
Pipe P53	35.5	300	120	24.25	0.34	0.54
Pipe P54	5.5	150	100	95	5.38	277.99
Pipe P55	14.5	300	120	-119.25	1.69	10.33
Pipe P56	10	300	120	-119.25	1.69	10.33
Pipe P57	12	300	120	-119.25	1.69	10.33
Pipe P58	2.5	300	120	-119.25	1.69	10.32
Pipe P59	4.7	300	120	-119.25	1.69	10.33
Pipe P60	12	300	120	-119.25	1.69	10.33
Pipe P61	1	200	110	119.25	3.8	87.43
Pipe P62	1	200	110	-119.25	3.8	87.43
Pipe P63	1.2	200	110	119.25	3.8	87.43
Pipe P64	1.1	200	110	119.25	3.8	87.43
Pipe P65	2.5	200	110	119.25	3.8	87.43
Pipe P66	1	200	110	-119.25	3.8	87.43
Pipe P76	9.7	200	110	1.44	0.05	0.02
Pipe P77	67.76	200	110	1.44	0.05	0.02
Pipe P78	6	200	110	-1.44	0.05	0.02
Pipe P79	17.92	200	110	-1.44	0.05	0.02
Pipe P80	7.97	150	100	0	0	0
Pipe P81	1.85	200	110	-1.44	0.05	0.03

570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (515 Legget Office Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	75.85	0.00	120.30	44.45	436.05	63.24
Junc J2	76.00	0.00	120.30	44.30	434.58	63.03
Junc J3	76.20	0.00	120.30	44.10	432.62	62.75
Junc J4	76.80	0.00	120.31	43.51	426.83	61.91
Junc J5	76.80	0.00	120.31	43.51	426.83	61.91
Junc J6	77.00	0.00	120.31	43.31	424.87	61.62
Junc J7	77.00	0.00	120.33	43.33	425.07	61.65
Junc J8	77.00	0.00	120.33	43.33	425.07	61.65
Junc J9	76.60	0.00	120.34	43.74	429.09	62.23
Junc J10	77.40	0.00	120.34	42.94	421.24	61.10
Junc J11	77.40	0.00	120.34	42.94	421.24	61.10
Junc J12	77.40	0.00	120.34	42.94	421.24	61.10
Junc J13	76.00	0.00	120.34	44.34	434.98	63.09
Junc J14	76.80	0.00	120.34	43.54	427.13	61.95
Junc J15	76.90	0.00	120.34	43.44	426.15	61.81
Junc J16	76.90	0.00	120.34	43.44	426.15	61.81
Junc J17	77.10	0.00	120.35	43.25	424.28	61.54
Junc J18	77.30	0.00	120.35	43.05	422.32	61.25
Junc J19	77.40	0.00	120.36	42.96	421.44	61.12
Junc J20	78.30	0.00	120.36	42.06	412.61	59.84
Junc J21	78.80	0.00	120.37	41.57	407.80	59.15
Junc J22	79.00	0.00	120.37	41.37	405.84	58.86
Junc J23	79.50	0.00	120.37	40.87	400.93	58.15
Junc J24	79.50	0.00	120.38	40.88	401.03	58.16
Junc J25	79.50	0.00	120.38	40.88	401.03	58.16
Junc J26	79.60	2.62	120.38	40.78	400.05	58.02
Junc J27	79.90	0.00	120.39	40.49	397.21	57.61
Junc J28	79.90	0.00	120.39	40.49	397.21	57.61
Junc J29	79.90	0.00	120.39	40.49	397.21	57.61
Junc J30	80.00	0.00	120.39	40.39	396.23	57.47
Junc J31	79.84	0.00	120.40	40.56	397.89	57.71
Junc J32	79.71	0.00	120.41	40.70	399.27	57.91
Junc J33	79.60	0.00	120.42	40.82	400.44	58.08
Junc J34	79.60	0.00	120.42	40.82	400.44	58.08
Junc J35	79.55	0.00	120.43	40.88	401.03	58.16
Junc J36	79.60	0.00	120.43	40.83	400.54	58.09
Junc J37	79.50	0.00	120.44	40.94	401.62	58.25
Junc J38	79.50	0.00	120.44	40.94	401.62	58.25
Junc J39	79.45	0.00	120.45	41.00	402.21	58.34
Junc J40	79.50	0.00	120.45	40.95	401.72	58.26
Junc J41	79.30	0.00	120.47	41.17	403.88	58.58
Junc J42	79.35	0.00	120.47	41.12	403.39	58.51
Junc J43	79.20	0.00	120.50	41.30	405.15	58.76
Junc J44	78.70	0.00	120.50	41.80	410.06	59.47
Junc J45	78.00	0.00	120.50	42.50	416.93	60.47
Junc J46	78.00	0.00	120.51	42.51	417.02	60.48
Junc J47	77.85	0.00	120.53	42.68	418.69	60.73
Junc J48	77.85	0.00	120.53	42.68	418.69	60.73
Junc J49	78.00	0.00	120.53	42.53	417.22	60.51
Junc J50	77.50	0.00	120.54	43.04	422.22	61.24
Junc J51	77.30	0.00	120.54	43.24	424.18	61.52
Junc J52	76.45	0.00	120.55	44.10	432.62	62.75
Junc J53	76.45	0.00	120.55	44.10	432.62	62.75
Junc J54	76.90	0.00	120.56	43.66	428.30	62.12
Junc J55	76.90	0.00	120.56	43.66	428.30	62.12
Junc J56	76.80	0.00	120.57	43.77	429.38	62.28
Junc J57	76.80	0.00	120.57	43.77	429.38	62.28
Junc J58	74.80	0.00	120.57	45.77	449.00	65.12
Junc J59	74.80	0.00	120.58	45.78	449.10	65.14
Junc J60	74.80	0.00	120.58	45.78	449.10	65.14
Junc J61	74.80	0.00	120.58	45.78	449.10	65.14
Junc J62	74.80	0.00	120.59	45.79	449.20	65.15
Junc J63	74.80	0.00	120.59	45.79	449.20	65.15
Junc J64	77.00	0.00	120.60	43.60	427.72	62.03
Junc J75	77.14	0.00	119.54	42.40	415.94	60.33
Junc J76	76.70	0.00	112.14	35.44	347.67	50.42
Junc J77	76.85	0.00	111.49	34.64	339.82	49.29
Junc J78	77.15	0.00	109.53	32.38	317.65	46.07
Junc J79	77.15	133.00	105.40	28.25	277.13	40.19
Junc J80	76.32	1.44	109.53	33.21	325.79	47.25
Resvr R1	120.30	10.80	120.30	0.00	0.00	0.00
Resvr R2	120.60	-154.36	120.60	0.00	0.00	0.00
Resvr R3	120.30	6.50	120.30	0.00	0.00	0.00
					Min=	40.19
					Max=	65.15

Max Day + Fire Flow Demand (515 Legget Office Building) - DOUBLE
WM Feed - 300mm
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	-10.8	0.15	0.12
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	-10.8	0.15	0.12
Pipe P4	49	300	120	-10.8	0.15	0.12
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	-10.8	0.15	0.12
Pipe P7	7	150	100	-6.5	0.37	1.93
Pipe P8	53	300	120	-17.3	0.24	0.29
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	-17.3	0.24	0.29
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	-17.3	0.24	0.29
Pipe P15	4.5	300	120	-17.3	0.24	0.29
Pipe P16	11.5	300	120	-17.3	0.24	0.29
Pipe P17	1.5	300	120	-17.3	0.24	0.29
Pipe P18	13	300	120	-17.3	0.24	0.29
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	-17.3	0.24	0.29
Pipe P21	17	300	120	-17.3	0.24	0.29
Pipe P22	15	300	120	-17.3	0.24	0.29
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	-17.3	0.24	0.29
Pipe P25	9	300	120	-17.3	0.24	0.29
Pipe P26	14	300	120	-17.3	0.24	0.29
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	-19.92	0.28	0.38
Pipe P29	7	300	120	-19.92	0.28	0.37
Pipe P30	4	300	120	-19.92	0.28	0.38
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	-19.92	0.28	0.38
Pipe P33	22	300	120	-19.92	0.28	0.38
Pipe P34	42	300	120	-19.92	0.28	0.38
Pipe P35	8	300	120	19.92	0.28	0.38
Pipe P36	3	300	120	-19.92	0.28	0.38
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	-19.92	0.28	0.38
Pipe P39	18	300	120	-19.92	0.28	0.38
Pipe P40	23	300	120	-19.92	0.28	0.38
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	-19.92	0.28	0.38
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	-19.92	0.28	0.38
Pipe P45	2.6	300	120	-19.92	0.28	0.38
Pipe P46	14.5	300	120	-19.92	0.28	0.38
Pipe P47	15	300	120	-19.92	0.28	0.38
Pipe P48	69	300	120	-19.92	0.28	0.38
Pipe P49	4	300	120	-19.92	0.28	0.38
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	-19.92	0.28	0.38
Pipe P52	5	300	120	19.92	0.28	0.38
Pipe P53	35.5	300	120	19.92	0.28	0.38
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	-19.92	0.28	0.38
Pipe P56	10	300	120	-19.92	0.28	0.37
Pipe P57	12	300	120	-19.92	0.28	0.38
Pipe P58	2.5	300	120	-19.92	0.28	0.38
Pipe P59	4.7	300	120	-19.92	0.28	0.38
Pipe P60	12	300	120	-19.92	0.28	0.38
Pipe P61	1	200	110	19.92	0.63	3.18
Pipe P62	1	200	110	-19.92	0.63	3.18
Pipe P63	1.2	200	110	19.92	0.63	3.18
Pipe P64	1.1	200	110	19.92	0.63	3.17
Pipe P65	2.5	200	110	19.92	0.63	3.18
Pipe P66	1	200	110	-19.92	0.63	3.17
Pipe P76	9.7	200	110	134.44	4.28	109.17
Pipe P77	67.76	200	110	134.44	4.28	109.17
Pipe P78	6	200	110	-134.44	4.28	109.17
Pipe P79	17.92	200	110	-134.44	4.28	109.17
Pipe P80	7.97	150	100	133	7.53	518.4
Pipe P81	1.85	200	110	-1.44	0.05	0.03

570 & 520 March Road - Nokia OIC
Water Model Results

Peak Hour Demand - DOUBLE WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	75.85	0.00	126.30	50.45	494.91	71.78
Junc J2	76.00	0.00	126.30	50.30	493.44	71.57
Junc J3	76.20	0.00	126.30	50.10	491.48	71.28
Junc J4	76.80	0.00	126.30	49.50	485.60	70.43
Junc J5	76.80	0.00	126.30	49.50	485.60	70.43
Junc J6	77.00	0.00	126.30	49.30	483.63	70.15
Junc J7	77.00	0.00	126.30	49.30	483.63	70.15
Junc J8	77.00	0.00	126.30	49.30	483.63	70.15
Junc J9	76.60	0.00	126.30	49.70	487.56	70.71
Junc J10	77.40	0.00	126.30	48.90	479.71	69.58
Junc J11	77.40	0.00	126.30	48.90	479.71	69.58
Junc J12	77.40	0.00	126.30	48.90	479.71	69.58
Junc J13	76.00	0.00	126.30	50.30	493.44	71.57
Junc J14	76.80	0.00	126.30	49.50	485.60	70.43
Junc J15	76.90	0.00	126.30	49.40	484.61	70.29
Junc J16	76.90	0.00	126.30	49.40	484.61	70.29
Junc J17	77.10	0.00	126.30	49.20	482.65	70.00
Junc J18	77.30	0.00	126.30	49.00	480.69	69.72
Junc J19	77.40	0.00	126.30	48.90	479.71	69.58
Junc J20	78.30	0.00	126.30	48.00	470.88	68.30
Junc J21	78.80	0.00	126.30	47.50	465.98	67.58
Junc J22	79.00	0.00	126.30	47.30	464.01	67.30
Junc J23	79.50	0.00	126.30	46.80	459.11	66.59
Junc J24	79.50	0.00	126.30	46.80	459.11	66.59
Junc J25	79.50	0.00	126.30	46.80	459.11	66.59
Junc J26	79.60	4.72	126.29	46.69	458.03	66.43
Junc J27	79.90	0.00	126.30	46.40	455.18	66.02
Junc J28	79.90	0.00	126.30	46.40	455.18	66.02
Junc J29	79.90	0.00	126.30	46.40	455.18	66.02
Junc J30	80.00	0.00	126.30	46.30	454.20	65.88
Junc J31	79.84	0.00	126.30	46.46	455.77	66.10
Junc J32	79.71	0.00	126.30	46.59	457.05	66.29
Junc J33	79.60	0.00	126.30	46.70	458.13	66.45
Junc J34	79.60	0.00	126.30	46.70	458.13	66.45
Junc J35	79.55	0.00	126.30	46.75	458.62	66.52
Junc J36	79.60	0.00	126.30	46.70	458.13	66.45
Junc J37	79.50	0.00	126.30	46.80	459.11	66.59
Junc J38	79.50	0.00	126.30	46.80	459.11	66.59
Junc J39	79.45	0.00	126.30	46.85	459.60	66.66
Junc J40	79.50	0.00	126.30	46.80	459.11	66.59
Junc J41	79.30	0.00	126.30	47.00	461.07	66.87
Junc J42	79.35	0.00	126.30	46.95	460.58	66.80
Junc J43	79.20	0.00	126.30	47.10	462.05	67.01
Junc J44	78.70	0.00	126.30	47.60	466.96	67.73
Junc J45	78.00	0.00	126.30	48.30	473.82	68.72
Junc J46	78.00	0.00	126.30	48.30	473.82	68.72
Junc J47	77.85	0.00	126.30	48.45	475.29	68.94
Junc J48	77.85	0.00	126.30	48.45	475.29	68.94
Junc J49	78.00	0.00	126.30	48.30	473.82	68.72
Junc J50	77.50	0.00	126.30	48.80	478.73	69.43
Junc J51	77.30	0.00	126.30	49.00	480.69	69.72
Junc J52	76.45	0.00	126.30	49.85	489.03	70.93
Junc J53	76.45	0.00	126.30	49.85	489.03	70.93
Junc J54	76.90	0.00	126.30	49.40	484.61	70.29
Junc J55	76.90	0.00	126.30	49.40	484.61	70.29
Junc J56	76.80	0.00	126.30	49.50	485.60	70.43
Junc J57	76.80	0.00	126.30	49.50	485.60	70.43
Junc J58	74.80	0.00	126.30	51.50	505.22	73.28
Junc J59	74.80	0.00	126.30	51.50	505.22	73.28
Junc J60	74.80	0.00	126.30	51.50	505.22	73.28
Junc J61	74.80	0.00	126.30	51.50	505.22	73.28
Junc J62	74.80	0.00	126.30	51.50	505.22	73.28
Junc J63	74.80	0.00	126.30	51.50	505.22	73.28
Junc J64	77.00	0.00	126.30	49.30	483.63	70.15
Junc J75	77.14	0.00	126.30	49.16	482.26	69.95
Junc J76	76.70	0.00	126.29	49.59	486.48	70.56
Junc J77	76.85	0.00	126.29	49.44	485.01	70.34
Junc J78	77.15	0.00	126.29	49.14	482.06	69.92
Junc J79	77.15	0.00	126.29	49.14	482.06	69.92
Junc J80	76.32	2.59	126.29	49.97	490.21	71.10
Resvr R1	126.30	-1.77	126.30	0.00	0.00	0.00
Resvr R2	126.30	-4.47	126.30	0.00	0.00	0.00
Resvr R3	126.30	-1.07	126.30	0.00	0.00	0.00
					Min=	65.88
					Max=	73.28

Peak Hour Demand - DOUBLE WM Feed - 300mm
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	1.77	0.03	0
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	1.77	0.03	0
Pipe P4	49	300	120	1.77	0.03	0
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	1.77	0.03	0
Pipe P7	7	150	100	1.07	0.06	0.07
Pipe P8	53	300	120	2.84	0.04	0.01
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	2.84	0.04	0.01
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	2.84	0.04	0.01
Pipe P15	4.5	300	120	2.84	0.04	0.01
Pipe P16	11.5	300	120	2.84	0.04	0.01
Pipe P17	1.5	300	120	2.84	0.04	0.01
Pipe P18	13	300	120	2.84	0.04	0.01
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	2.84	0.04	0.01
Pipe P21	17	300	120	2.84	0.04	0.01
Pipe P22	15	300	120	2.84	0.04	0.01
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	2.84	0.04	0.01
Pipe P25	9	300	120	2.84	0.04	0.01
Pipe P26	14	300	120	2.84	0.04	0.01
Pipe P27	10	200	110	4.72	0.15	0.22
Pipe P28	28	300	120	-1.88	0.03	0
Pipe P29	7	300	120	-1.88	0.03	0.01
Pipe P30	4	300	120	-1.88	0.03	0
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	-1.88	0.03	0
Pipe P33	22	300	120	-1.88	0.03	0.01
Pipe P34	42	300	120	-1.88	0.03	0
Pipe P35	8	300	120	1.88	0.03	0
Pipe P36	3	300	120	-1.88	0.03	0.01
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	-1.88	0.03	0
Pipe P39	18	300	120	-1.88	0.03	0.01
Pipe P40	23	300	120	-1.88	0.03	0
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	-1.88	0.03	0
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	-1.88	0.03	0
Pipe P45	2.6	300	120	-1.88	0.03	0.01
Pipe P46	14.5	300	120	-1.88	0.03	0
Pipe P47	15	300	120	-1.88	0.03	0
Pipe P48	69	300	120	-1.88	0.03	0
Pipe P49	4	300	120	-1.88	0.03	0
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	-1.88	0.03	0
Pipe P52	5	300	120	1.88	0.03	0.01
Pipe P53	35.5	300	120	1.88	0.03	0
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	-1.88	0.03	0
Pipe P56	10	300	120	-1.88	0.03	0
Pipe P57	12	300	120	-1.88	0.03	0
Pipe P58	2.5	300	120	-1.88	0.03	0.01
Pipe P59	4.7	300	120	-1.88	0.03	0
Pipe P60	12	300	120	-1.88	0.03	0
Pipe P61	1	200	110	1.88	0.06	0.04
Pipe P62	1	200	110	-1.88	0.06	0.05
Pipe P63	1.2	200	110	1.88	0.06	0.04
Pipe P64	1.1	200	110	1.88	0.06	0.04
Pipe P65	2.5	200	110	1.88	0.06	0.04
Pipe P66	1	200	110	-1.88	0.06	0.05
Pipe P76	9.7	200	110	2.59	0.08	0.07
Pipe P77	67.76	200	110	2.59	0.08	0.07
Pipe P78	6	200	110	-2.59	0.08	0.07
Pipe P79	17.92	200	110	-2.59	0.08	0.07
Pipe P80	7.97	150	100	0	0	0
Pipe P81	1.85	200	110	-2.59	0.08	0.07

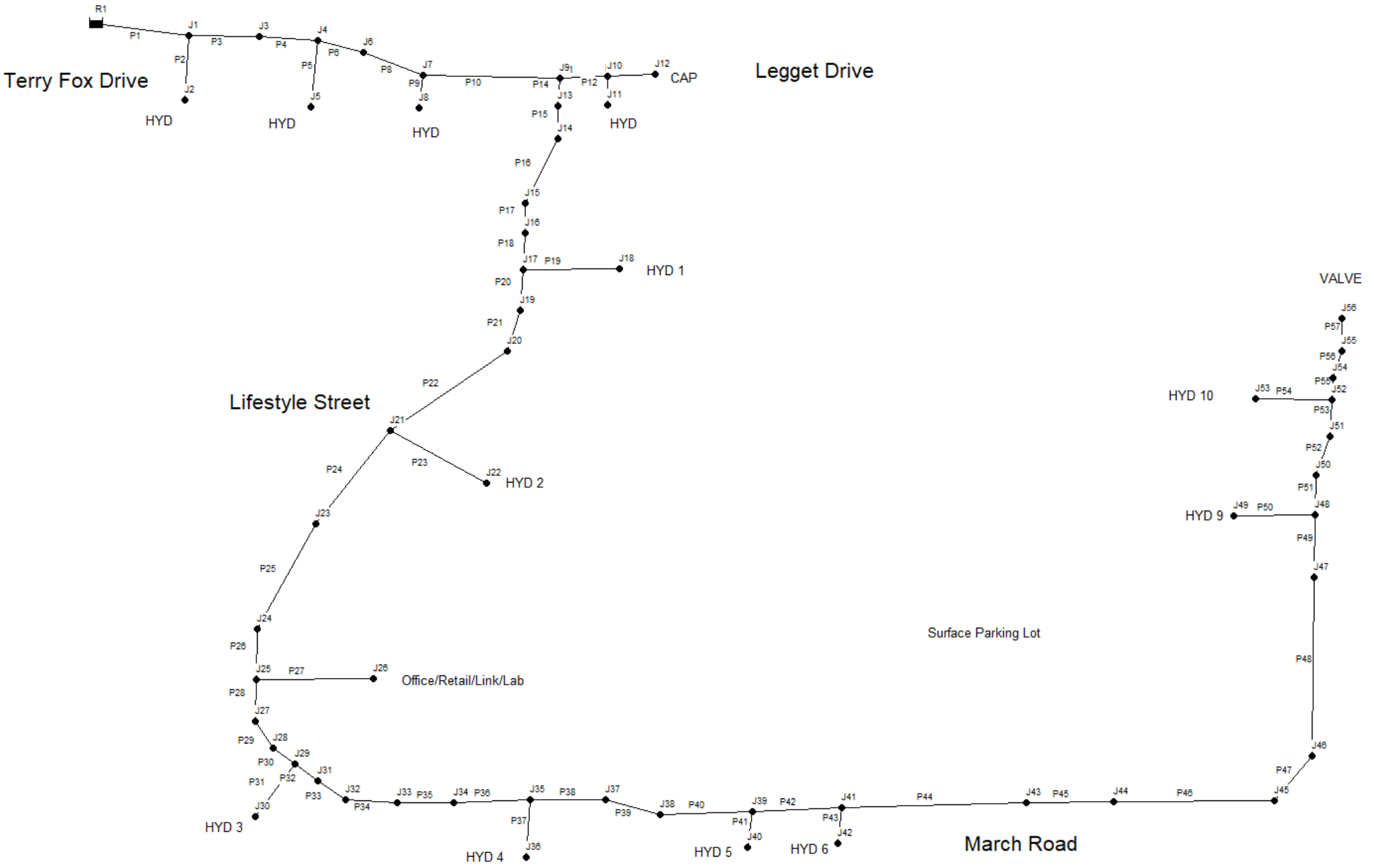
570 & 520 March Road - Nokia OIC
Water Model Results

Max HGL - DOUBLE WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	75.85	0.00	131.00	55.15	541.02	78.47
Junc J2	76.00	0.00	131.00	55.00	539.55	78.26
Junc J3	76.20	0.00	131.00	54.80	537.59	77.97
Junc J4	76.80	0.00	131.00	54.20	531.70	77.12
Junc J5	76.80	0.00	131.00	54.20	531.70	77.12
Junc J6	77.00	0.00	131.00	54.00	529.74	76.83
Junc J7	77.00	0.00	131.00	54.00	529.74	76.83
Junc J8	77.00	0.00	131.00	54.00	529.74	76.83
Junc J9	76.60	0.00	131.00	54.40	533.66	77.40
Junc J10	77.40	0.00	131.00	53.60	525.82	76.26
Junc J11	77.40	0.00	131.00	53.60	525.82	76.26
Junc J12	77.40	0.00	131.00	53.60	525.82	76.26
Junc J13	76.00	0.00	131.00	55.00	539.55	78.26
Junc J14	76.80	0.00	131.00	54.20	531.70	77.12
Junc J15	76.90	0.00	131.00	54.10	530.72	76.97
Junc J16	76.90	0.00	131.00	54.10	530.72	76.97
Junc J17	77.10	0.00	131.00	53.90	528.76	76.69
Junc J18	77.30	0.00	131.00	53.70	526.80	76.41
Junc J19	77.40	0.00	131.00	53.60	525.82	76.26
Junc J20	78.30	0.00	131.00	52.70	516.99	74.98
Junc J21	78.80	0.00	131.00	52.20	512.08	74.27
Junc J22	79.00	0.00	131.00	52.00	510.12	73.99
Junc J23	79.50	0.00	131.00	51.50	505.22	73.28
Junc J24	79.50	0.00	131.00	51.50	505.22	73.28
Junc J25	79.50	0.00	131.00	51.50	505.22	73.28
Junc J26	79.60	2.62	131.00	51.40	504.23	73.13
Junc J27	79.90	0.00	131.00	51.10	501.29	72.71
Junc J28	79.90	0.00	131.00	51.10	501.29	72.71
Junc J29	79.90	0.00	131.00	51.10	501.29	72.71
Junc J30	80.00	0.00	131.00	51.00	500.31	72.56
Junc J31	79.84	0.00	131.00	51.16	501.88	72.79
Junc J32	79.71	0.00	131.00	51.29	503.15	72.98
Junc J33	79.60	0.00	131.00	51.40	504.23	73.13
Junc J34	79.60	0.00	131.00	51.40	504.23	73.13
Junc J35	79.55	0.00	131.00	51.45	504.72	73.20
Junc J36	79.60	0.00	131.00	51.40	504.23	73.13
Junc J37	79.50	0.00	131.00	51.50	505.22	73.28
Junc J38	79.50	0.00	131.00	51.50	505.22	73.28
Junc J39	79.45	0.00	131.00	51.55	505.71	73.35
Junc J40	79.50	0.00	131.00	51.50	505.22	73.28
Junc J41	79.30	0.00	131.00	51.70	507.18	73.56
Junc J42	79.35	0.00	131.00	51.65	506.69	73.49
Junc J43	79.20	0.00	131.00	51.80	508.16	73.70
Junc J44	78.70	0.00	131.00	52.30	513.06	74.41
Junc J45	78.00	0.00	131.00	53.00	519.93	75.41
Junc J46	78.00	0.00	131.00	53.00	519.93	75.41
Junc J47	77.85	0.00	131.00	53.15	521.40	75.62
Junc J48	77.85	0.00	131.00	53.15	521.40	75.62
Junc J49	78.00	0.00	131.00	53.00	519.93	75.41
Junc J50	77.50	0.00	131.00	53.50	524.84	76.12
Junc J51	77.30	0.00	131.00	53.70	526.80	76.41
Junc J52	76.45	0.00	131.00	54.55	535.14	77.61
Junc J53	76.45	0.00	131.00	54.55	535.14	77.61
Junc J54	76.90	0.00	131.00	54.10	530.72	76.97
Junc J55	76.90	0.00	131.00	54.10	530.72	76.97
Junc J56	76.80	0.00	131.00	54.20	531.70	77.12
Junc J57	76.80	0.00	131.00	54.20	531.70	77.12
Junc J58	74.80	0.00	131.00	56.20	551.32	79.96
Junc J59	74.80	0.00	131.00	56.20	551.32	79.96
Junc J60	74.80	0.00	131.00	56.20	551.32	79.96
Junc J61	74.80	0.00	131.00	56.20	551.32	79.96
Junc J62	74.80	0.00	131.00	56.20	551.32	79.96
Junc J63	74.80	0.00	131.00	56.20	551.32	79.96
Junc J64	77.00	0.00	131.00	54.00	529.74	76.83
Junc J75	77.14	0.00	131.00	53.86	528.37	76.63
Junc J76	76.70	0.00	131.00	54.30	532.68	77.26
Junc J77	76.85	0.00	131.00	54.15	531.21	77.05
Junc J78	77.15	0.00	131.00	53.85	528.27	76.62
Junc J79	77.15	0.00	131.00	53.85	528.27	76.62
Junc J80	76.32	1.44	131.00	54.68	536.41	77.80
Resvr R1	131.00	-0.98	131.00	0.00	0.00	0.00
Resvr R2	131.00	-2.48	131.00	0.00	0.00	0.00
Resvr R3	131.00	-0.59	131.00	0.00	0.00	0.00
					Min=	72.56
					Max=	79.96

Max HGL - DOUBLE WM Feed - 300mm
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	0.98	0.01	0
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	0.98	0.01	0
Pipe P4	49	300	120	0.98	0.01	0
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	0.98	0.01	0
Pipe P7	7	150	100	0.59	0.03	0.02
Pipe P8	53	300	120	1.58	0.02	0
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	1.58	0.02	0
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	1.58	0.02	0
Pipe P15	4.5	300	120	1.58	0.02	0
Pipe P16	11.5	300	120	1.58	0.02	0
Pipe P17	1.5	300	120	1.58	0.02	0
Pipe P18	13	300	120	1.58	0.02	0
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	1.58	0.02	0
Pipe P21	17	300	120	1.58	0.02	0
Pipe P22	15	300	120	1.58	0.02	0
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	1.58	0.02	0
Pipe P25	9	300	120	1.58	0.02	0
Pipe P26	14	300	120	1.58	0.02	0
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	-1.04	0.01	0
Pipe P29	7	300	120	-1.04	0.01	0
Pipe P30	4	300	120	-1.04	0.01	0
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	-1.04	0.01	0
Pipe P33	22	300	120	-1.04	0.01	0
Pipe P34	42	300	120	-1.04	0.01	0
Pipe P35	8	300	120	1.04	0.01	0
Pipe P36	3	300	120	-1.04	0.01	0
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	-1.04	0.01	0
Pipe P39	18	300	120	-1.04	0.01	0
Pipe P40	23	300	120	-1.04	0.01	0
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	-1.04	0.01	0
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	-1.04	0.01	0
Pipe P45	2.6	300	120	-1.04	0.01	0
Pipe P46	14.5	300	120	-1.04	0.01	0
Pipe P47	15	300	120	-1.04	0.01	0
Pipe P48	69	300	120	-1.04	0.01	0
Pipe P49	4	300	120	-1.04	0.01	0
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	-1.04	0.01	0
Pipe P52	5	300	120	1.04	0.01	0
Pipe P53	35.5	300	120	1.04	0.01	0
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	-1.04	0.01	0
Pipe P56	10	300	120	-1.04	0.01	0
Pipe P57	12	300	120	-1.04	0.01	0
Pipe P58	2.5	300	120	-1.04	0.01	0
Pipe P59	4.7	300	120	-1.04	0.01	0
Pipe P60	12	300	120	-1.04	0.01	0
Pipe P61	1	200	110	1.04	0.03	0.02
Pipe P62	1	200	110	-1.04	0.03	0.01
Pipe P63	1.2	200	110	1.04	0.03	0.02
Pipe P64	1.1	200	110	1.04	0.03	0.02
Pipe P65	2.5	200	110	1.04	0.03	0.01
Pipe P66	1	200	110	-1.04	0.03	0.02
Pipe P76	9.7	200	110	1.44	0.05	0.02
Pipe P77	67.76	200	110	1.44	0.05	0.02
Pipe P78	6	200	110	-1.44	0.05	0.02
Pipe P79	17.92	200	110	-1.44	0.05	0.02
Pipe P80	7.97	150	100	0	0	0
Pipe P81	1.85	200	110	-1.44	0.05	0.02


R1
J1
J3
J4
J6
J7
J9
J10
J12
P1
P2
P3
P4
P5
P6
P8
P9
P10
P14
P12
CAP
Terry Fox Drive
Legget Drive
J2
J5
J8
J13
J11
HYD
HYD
HYD
HYD
P15
J14
P16
J15
P17
J16
P18
J17
P19
J18
HYD 1
P20
J19
P21
J20
P22
Lifestyle Street
J21
P24
P23
J22
HYD 2
J23
P25
J24
P26
J25
P27
J26
Office/Retail/Link/Lab
P28
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HYD 9
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P52
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J52
P54
J53
HYD 10
P55
J54
P56
J55
P57
J56
VALVE
HYD 3
HYD 4
P41
J40
HYD 5
P43
J42
HYD 6
Surface Parking Lot
March Road

570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (Office + Link Building) - Single WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	75.85	0.00	107.40	31.55	309.51	44.89
Junc J2	76.00	0.00	107.40	31.40	308.03	44.68
Junc J3	76.20	0.00	107.18	30.98	303.91	44.08
Junc J4	76.80	0.00	106.66	29.86	292.93	42.49
Junc J5	76.80	0.00	106.66	29.86	292.93	42.49
Junc J6	77.00	0.00	106.42	29.42	288.61	41.86
Junc J7	77.00	0.00	105.86	28.86	283.12	41.06
Junc J8	77.00	0.00	105.86	28.86	283.12	41.06
Junc J9	76.60	0.00	105.52	28.92	283.71	41.15
Junc J10	77.40	0.00	105.52	28.12	275.86	40.01
Junc J11	77.40	0.00	105.52	28.12	275.86	40.01
Junc J12	77.40	0.00	105.52	28.12	275.86	40.01
Junc J13	76.00	0.00	105.46	29.46	289.00	41.92
Junc J14	76.80	0.00	105.42	28.62	280.76	40.72
Junc J15	76.90	0.00	105.30	28.40	278.60	40.41
Junc J16	76.90	0.00	105.28	28.38	278.41	40.38
Junc J17	77.10	0.00	105.14	28.04	275.07	39.90
Junc J18	77.30	0.00	105.14	27.84	273.11	39.61
Junc J19	77.40	0.00	104.87	27.47	269.48	39.08
Junc J20	78.30	0.00	104.69	26.39	258.89	37.55
Junc J21	78.80	0.00	104.53	25.73	252.41	36.61
Junc J22	79.00	0.00	104.53	25.53	250.45	36.32
Junc J23	79.50	0.00	104.27	24.77	242.99	35.24
Junc J24	79.50	0.00	104.17	24.67	242.01	35.10
Junc J25	79.50	0.00	104.02	24.52	240.54	34.89
Junc J26	79.60	2.62	104.02	24.42	239.56	34.75
Junc J27	79.90	0.00	103.74	23.84	233.87	33.92
Junc J28	79.90	0.00	103.67	23.77	233.18	33.82
Junc J29	79.90	0.00	103.63	23.73	232.79	33.76
Junc J30	80.00	59.00	103.28	23.28	228.38	33.12
Junc J31	79.84	0.00	103.60	23.76	233.09	33.81
Junc J32	79.71	0.00	103.54	23.83	233.77	33.91
Junc J33	79.60	0.00	103.42	23.82	233.67	33.89
Junc J34	79.60	0.00	103.40	23.80	233.48	33.86
Junc J35	79.55	0.00	103.39	23.84	233.87	33.92
Junc J36	79.60	59.00	102.95	23.35	229.06	33.22
Junc J37	79.50	0.00	103.39	23.89	234.36	33.99
Junc J38	79.50	0.00	103.39	23.89	234.36	33.99
Junc J39	79.45	0.00	103.39	23.94	234.85	34.06
Junc J40	79.50	0.00	103.39	23.89	234.36	33.99
Junc J41	79.30	0.00	103.39	24.09	236.32	34.28
Junc J42	79.35	0.00	103.39	24.04	235.83	34.20
Junc J43	79.20	0.00	103.39	24.19	237.30	34.42
Junc J44	78.70	0.00	103.39	24.69	242.21	35.13
Junc J45	78.00	0.00	103.39	25.39	249.08	36.13
Junc J46	78.00	0.00	103.39	25.39	249.08	36.13
Junc J47	77.85	0.00	103.39	25.54	250.55	36.34
Junc J48	77.85	0.00	103.39	25.54	250.55	36.34
Junc J49	78.00	0.00	103.39	25.39	249.08	36.13
Junc J50	77.50	0.00	103.39	25.89	253.98	36.84
Junc J51	77.30	0.00	103.39	26.09	255.94	37.12
Junc J52	76.45	0.00	103.39	26.94	264.28	38.33
Junc J53	76.45	0.00	103.39	26.94	264.28	38.33
Junc J54	76.90	0.00	103.39	26.49	259.87	37.69
Junc J55	76.90	0.00	103.39	26.49	259.87	37.69
Junc J56	76.80	0.00	103.39	26.59	260.85	37.83
Resvr R1	107.60	-120.62	107.60	0.00	0.00	0.00
				Min=		33.12
				Max=		44.89

Max Day + Fire Flow Demand (Office + Link Building) - Single WM Feed - 300mm

Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	120.62	1.71	10.55
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	120.62	1.71	10.55
Pipe P4	49	300	120	120.62	1.71	10.55
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	120.62	1.71	10.55
Pipe P8	53	300	120	120.62	1.71	10.55
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	120.62	1.71	10.55
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	120.62	1.71	10.55
Pipe P15	4.5	300	120	120.62	1.71	10.55
Pipe P16	11.5	300	120	120.62	1.71	10.55
Pipe P17	1.5	300	120	120.62	1.71	10.55
Pipe P18	13	300	120	120.62	1.71	10.55
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	120.62	1.71	10.55
Pipe P21	17	300	120	120.62	1.71	10.55
Pipe P22	15	300	120	120.62	1.71	10.55
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	120.62	1.71	10.55
Pipe P25	9	300	120	120.62	1.71	10.55
Pipe P26	14	300	120	120.62	1.71	10.55
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	118	1.67	10.13
Pipe P29	7	300	120	118	1.67	10.13
Pipe P30	4	300	120	118	1.67	10.12
Pipe P31	3	150	100	59	3.34	115.06
Pipe P32	11	300	120	59	0.83	2.81
Pipe P33	22	300	120	59	0.83	2.8
Pipe P34	42	300	120	59	0.83	2.81
Pipe P35	8	300	120	-59	0.83	2.8
Pipe P36	3	300	120	59	0.83	2.81
Pipe P37	3.8	150	100	59	3.34	115.06
Pipe P38	25	300	120	0	0	0
Pipe P39	18	300	120	0	0	0
Pipe P40	23	300	120	0	0	0
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	0	0	0
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	0	0	0
Pipe P45	2.6	300	120	0	0	0
Pipe P46	14.5	300	120	0	0	0
Pipe P47	15	300	120	0	0	0
Pipe P48	69	300	120	0	0	0
Pipe P49	4	300	120	0	0	0
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	0	0	0
Pipe P52	5	300	120	0	0	0
Pipe P53	35.5	300	120	0	0	0
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	0	0	0
Pipe P56	10	300	120	0	0	0
Pipe P57	12	300	120	0	0	0

570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (Retail West Building) - Single WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	75.85	0.00	126.26	50.41	494.52	71.72
Junc J2	76.00	0.00	126.26	50.26	493.05	71.51
Junc J3	76.20	0.00	126.21	50.01	490.60	71.16
Junc J4	76.80	0.00	126.10	49.30	483.63	70.15
Junc J5	76.80	0.00	126.10	49.30	483.63	70.15
Junc J6	77.00	0.00	126.05	49.05	481.18	69.79
Junc J7	77.00	0.00	125.93	48.93	480.00	69.62
Junc J8	77.00	0.00	125.93	48.93	480.00	69.62
Junc J9	76.60	0.00	125.85	49.25	483.14	70.07
Junc J10	77.40	0.00	125.85	48.45	475.29	68.94
Junc J11	77.40	0.00	125.85	48.45	475.29	68.94
Junc J12	77.40	0.00	125.85	48.45	475.29	68.94
Junc J13	76.00	0.00	125.84	49.84	488.93	70.91
Junc J14	76.80	0.00	125.83	49.03	480.98	69.76
Junc J15	76.90	0.00	125.80	48.90	479.71	69.58
Junc J16	76.90	0.00	125.80	48.90	479.71	69.58
Junc J17	77.10	0.00	125.77	48.67	477.45	69.25
Junc J18	77.30	0.00	125.77	48.47	475.49	68.96
Junc J19	77.40	0.00	125.71	48.31	473.92	68.74
Junc J20	78.30	0.00	125.67	47.37	464.70	67.40
Junc J21	78.80	0.00	125.64	46.84	459.50	66.64
Junc J22	79.00	50.00	125.44	46.44	455.58	66.08
Junc J23	79.50	0.00	125.64	46.14	452.63	65.65
Junc J24	79.50	0.00	125.64	46.14	452.63	65.65
Junc J25	79.50	0.00	125.64	46.14	452.63	65.65
Junc J26	79.60	2.62	125.64	46.04	451.65	65.51
Junc J27	79.90	0.00	125.64	45.74	448.71	65.08
Junc J28	79.90	0.00	125.64	45.74	448.71	65.08
Junc J29	79.90	0.00	125.64	45.74	448.71	65.08
Junc J30	80.00	0.00	125.64	45.64	447.73	64.94
Junc J31	79.84	0.00	125.64	45.80	449.30	65.17
Junc J32	79.71	0.00	125.64	45.93	450.57	65.35
Junc J33	79.60	0.00	125.64	46.04	451.65	65.51
Junc J34	79.60	0.00	125.64	46.04	451.65	65.51
Junc J35	79.55	0.00	125.64	46.09	452.14	65.58
Junc J36	79.60	0.00	125.64	46.04	451.65	65.51
Junc J37	79.50	0.00	125.64	46.14	452.63	65.65
Junc J38	79.50	0.00	125.64	46.14	452.63	65.65
Junc J39	79.45	0.00	125.64	46.19	453.12	65.72
Junc J40	79.50	0.00	125.64	46.14	452.63	65.65
Junc J41	79.30	0.00	125.64	46.34	454.60	65.93
Junc J42	79.35	0.00	125.64	46.29	454.10	65.86
Junc J43	79.20	0.00	125.64	46.44	455.58	66.08
Junc J44	78.70	0.00	125.64	46.94	460.48	66.79
Junc J45	78.00	0.00	125.64	47.64	467.35	67.78
Junc J46	78.00	0.00	125.64	47.64	467.35	67.78
Junc J47	77.85	0.00	125.64	47.79	468.82	68.00
Junc J48	77.85	0.00	125.64	47.79	468.82	68.00
Junc J49	78.00	0.00	125.64	47.64	467.35	67.78
Junc J50	77.50	0.00	125.64	48.14	472.25	68.49
Junc J51	77.30	0.00	125.64	48.34	474.22	68.78
Junc J52	76.45	0.00	125.64	49.19	482.55	69.99
Junc J53	76.45	0.00	125.64	49.19	482.55	69.99
Junc J54	76.90	0.00	125.64	48.74	478.14	69.35
Junc J55	76.90	0.00	125.64	48.74	478.14	69.35
Junc J56	76.80	0.00	125.64	48.84	479.12	69.49
Resvr R1	126.30	-52.62	126.30	0.00	0.00	0.00
				Min=		64.94
				Max=		71.72

Max Day + Fire Flow Demand (Retail West Building) - Single WM Feed - 300mm

Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	52.62	0.74	2.27
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	52.62	0.74	2.27
Pipe P4	49	300	120	52.62	0.74	2.27
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	52.62	0.74	2.27
Pipe P8	53	300	120	52.62	0.74	2.27
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	52.62	0.74	2.27
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	52.62	0.74	2.27
Pipe P15	4.5	300	120	52.62	0.74	2.27
Pipe P16	11.5	300	120	52.62	0.74	2.27
Pipe P17	1.5	300	120	52.62	0.74	2.27
Pipe P18	13	300	120	52.62	0.74	2.27
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	52.62	0.74	2.27
Pipe P21	17	300	120	52.62	0.74	2.27
Pipe P22	15	300	120	52.62	0.74	2.27
Pipe P23	2.3	150	100	50	2.83	84.68
Pipe P24	25	300	120	2.62	0.04	0.01
Pipe P25	9	300	120	2.62	0.04	0.01
Pipe P26	14	300	120	2.62	0.04	0.01
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	0	0	0
Pipe P29	7	300	120	0	0	0
Pipe P30	4	300	120	0	0	0
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	0	0	0
Pipe P33	22	300	120	0	0	0
Pipe P34	42	300	120	0	0	0
Pipe P35	8	300	120	0	0	0
Pipe P36	3	300	120	0	0	0
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	0	0	0
Pipe P39	18	300	120	0	0	0
Pipe P40	23	300	120	0	0	0
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	0	0	0
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	0	0	0
Pipe P45	2.6	300	120	0	0	0
Pipe P46	14.5	300	120	0	0	0
Pipe P47	15	300	120	0	0	0
Pipe P48	69	300	120	0	0	0
Pipe P49	4	300	120	0	0	0
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	0	0	0
Pipe P52	5	300	120	0	0	0
Pipe P53	35.5	300	120	0	0	0
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	0	0	0
Pipe P56	10	300	120	0	0	0
Pipe P57	12	300	120	0	0	0

570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (Retail West Building) - Single WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	75.85	0.00	107.45	31.60	310.00	44.96
Junc J2	76.00	0.00	107.45	31.45	308.52	44.75
Junc J3	76.20	0.00	107.29	31.09	304.99	44.24
Junc J4	76.80	0.00	106.90	30.10	295.28	42.83
Junc J5	76.80	0.00	106.90	30.10	295.28	42.83
Junc J6	77.00	0.00	106.72	29.72	291.55	42.29
Junc J7	77.00	0.00	106.31	29.31	287.53	41.70
Junc J8	77.00	0.00	106.31	29.31	287.53	41.70
Junc J9	76.60	0.00	106.06	29.46	289.00	41.92
Junc J10	77.40	0.00	106.06	28.66	281.15	40.78
Junc J11	77.40	0.00	106.06	28.66	281.15	40.78
Junc J12	77.40	0.00	106.06	28.66	281.15	40.78
Junc J13	76.00	0.00	106.02	30.02	294.50	42.71
Junc J14	76.80	0.00	105.98	29.18	286.26	41.52
Junc J15	76.90	0.00	105.89	28.99	284.39	41.25
Junc J16	76.90	0.00	105.88	28.98	284.29	41.23
Junc J17	77.10	0.00	105.78	28.68	281.35	40.81
Junc J18	77.30	0.00	105.78	28.48	279.39	40.52
Junc J19	77.40	0.00	105.57	28.17	276.35	40.08
Junc J20	78.30	0.00	105.44	27.14	266.24	38.62
Junc J21	78.80	0.00	105.32	26.52	260.16	37.73
Junc J22	79.00	50.00	105.13	26.13	256.34	37.18
Junc J23	79.50	0.00	105.27	25.77	252.80	36.67
Junc J24	79.50	0.00	105.25	25.75	252.61	36.64
Junc J25	79.50	0.00	105.22	25.72	252.31	36.59
Junc J26	79.60	2.62	105.22	25.62	251.33	36.45
Junc J27	79.90	0.00	105.16	25.26	247.80	35.94
Junc J28	79.90	0.00	105.14	25.24	247.60	35.91
Junc J29	79.90	0.00	105.14	25.24	247.60	35.91
Junc J30	80.00	50.00	104.88	24.88	244.07	35.40
Junc J31	79.84	0.00	105.14	25.30	248.19	36.00
Junc J32	79.71	0.00	105.14	25.43	249.47	36.18
Junc J33	79.60	0.00	105.14	25.54	250.55	36.34
Junc J34	79.60	0.00	105.14	25.54	250.55	36.34
Junc J35	79.55	0.00	105.14	25.59	251.04	36.41
Junc J36	79.60	0.00	105.14	25.54	250.55	36.34
Junc J37	79.50	0.00	105.14	25.64	251.53	36.48
Junc J38	79.50	0.00	105.14	25.64	251.53	36.48
Junc J39	79.45	0.00	105.14	25.69	252.02	36.55
Junc J40	79.50	0.00	105.14	25.64	251.53	36.48
Junc J41	79.30	0.00	105.14	25.84	253.49	36.77
Junc J42	79.35	0.00	105.14	25.79	253.00	36.69
Junc J43	79.20	0.00	105.14	25.94	254.47	36.91
Junc J44	78.70	0.00	105.14	26.44	259.38	37.62
Junc J45	78.00	0.00	105.14	27.14	266.24	38.62
Junc J46	78.00	0.00	105.14	27.14	266.24	38.62
Junc J47	77.85	0.00	105.14	27.29	267.71	38.83
Junc J48	77.85	0.00	105.14	27.29	267.71	38.83
Junc J49	78.00	0.00	105.14	27.14	266.24	38.62
Junc J50	77.50	0.00	105.14	27.64	271.15	39.33
Junc J51	77.30	0.00	105.14	27.84	273.11	39.61
Junc J52	76.45	0.00	105.14	28.69	281.45	40.82
Junc J53	76.45	0.00	105.14	28.69	281.45	40.82
Junc J54	76.90	0.00	105.14	28.24	277.03	40.18
Junc J55	76.90	0.00	105.14	28.24	277.03	40.18
Junc J56	76.80	0.00	105.14	28.34	278.02	40.32
Resvr R1	107.60	-102.62	107.60	0.00	0.00	0.00

Min=	35.40
Max=	44.96

Max Day + Fire Flow Demand (Retail West Building) - Single WM Feed - 300mm

Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	102.62	1.45	7.82
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	102.62	1.45	7.82
Pipe P4	49	300	120	102.62	1.45	7.82
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	102.62	1.45	7.82
Pipe P8	53	300	120	102.62	1.45	7.82
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	102.62	1.45	7.82
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	102.62	1.45	7.82
Pipe P15	4.5	300	120	102.62	1.45	7.82
Pipe P16	11.5	300	120	102.62	1.45	7.82
Pipe P17	1.5	300	120	102.62	1.45	7.82
Pipe P18	13	300	120	102.62	1.45	7.82
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	102.62	1.45	7.82
Pipe P21	17	300	120	102.62	1.45	7.82
Pipe P22	15	300	120	102.62	1.45	7.82
Pipe P23	2.3	150	100	50	2.83	84.68
Pipe P24	25	300	120	52.62	0.74	2.27
Pipe P25	9	300	120	52.62	0.74	2.27
Pipe P26	14	300	120	52.62	0.74	2.27
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	50	0.71	2.06
Pipe P29	7	300	120	50	0.71	2.06
Pipe P30	4	300	120	50	0.71	2.06
Pipe P31	3	150	100	50	2.83	84.68
Pipe P32	11	300	120	0	0	0
Pipe P33	22	300	120	0	0	0
Pipe P34	42	300	120	0	0	0
Pipe P35	8	300	120	0	0	0
Pipe P36	3	300	120	0	0	0
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	0	0	0
Pipe P39	18	300	120	0	0	0
Pipe P40	23	300	120	0	0	0
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	0	0	0
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	0	0	0
Pipe P45	2.6	300	120	0	0	0
Pipe P46	14.5	300	120	0	0	0
Pipe P47	15	300	120	0	0	0
Pipe P48	69	300	120	0	0	0
Pipe P49	4	300	120	0	0	0
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	0	0	0
Pipe P52	5	300	120	0	0	0
Pipe P53	35.5	300	120	0	0	0
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	0	0	0
Pipe P56	10	300	120	0	0	0
Pipe P57	12	300	120	0	0	0

570 & 520 March Road - Nokia OIC
Water Model Results

Max Day + Fire Flow Demand (R&D Lab Building) - Single WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	75.85	0.00	106.92	31.07	304.80	44.21
Junc J2	76.00	0.00	106.92	30.92	303.33	43.99
Junc J3	76.20	0.00	106.18	29.98	294.10	42.66
Junc J4	76.80	0.00	104.43	27.63	271.05	39.31
Junc J5	76.80	0.00	104.43	27.63	271.05	39.31
Junc J6	77.00	0.00	103.61	26.61	261.04	37.86
Junc J7	77.00	0.00	101.73	24.73	242.60	35.19
Junc J8	77.00	0.00	101.73	24.73	242.60	35.19
Junc J9	76.60	0.00	100.57	23.97	235.15	34.10
Junc J10	77.40	0.00	100.48	23.08	226.41	32.84
Junc J11	77.40	95.00	99.93	22.53	221.02	32.06
Junc J12	77.40	0.00	100.48	23.08	226.41	32.84
Junc J13	76.00	0.00	100.50	24.50	240.35	34.86
Junc J14	76.80	0.00	100.44	23.64	231.91	33.64
Junc J15	76.90	0.00	100.29	23.39	229.46	33.28
Junc J16	76.90	0.00	100.27	23.37	229.26	33.25
Junc J17	77.10	0.00	100.09	22.99	225.53	32.71
Junc J18	77.30	40.00	99.90	22.60	221.71	32.16
Junc J19	77.40	0.00	99.91	22.51	220.82	32.03
Junc J20	78.30	0.00	99.79	21.49	210.82	30.58
Junc J21	78.80	0.00	99.68	20.88	204.83	29.71
Junc J22	79.00	0.00	99.68	20.68	202.87	29.42
Junc J23	79.50	0.00	99.50	20.00	196.20	28.46
Junc J24	79.50	0.00	99.44	19.94	195.61	28.37
Junc J25	79.50	0.00	99.34	19.84	194.63	28.23
Junc J26	79.60	2.62	99.34	19.74	193.65	28.09
Junc J27	79.90	0.00	99.15	19.25	188.84	27.39
Junc J28	79.90	0.00	99.10	19.20	188.35	27.32
Junc J29	79.90	0.00	99.07	19.17	188.06	27.28
Junc J30	80.00	0.00	99.07	19.07	187.08	27.13
Junc J31	79.84	0.00	99.00	19.16	187.96	27.26
Junc J32	79.71	0.00	98.85	19.14	187.76	27.23
Junc J33	79.60	0.00	98.56	18.96	186.00	26.98
Junc J34	79.60	0.00	98.51	18.91	185.51	26.91
Junc J35	79.55	0.00	98.49	18.94	185.80	26.95
Junc J36	79.60	0.00	98.49	18.89	185.31	26.88
Junc J37	79.50	0.00	98.32	18.82	184.62	26.78
Junc J38	79.50	0.00	98.20	18.70	183.45	26.61
Junc J39	79.45	0.00	98.04	18.59	182.37	26.45
Junc J40	79.50	0.00	98.04	18.54	181.88	26.38
Junc J41	79.30	0.00	97.65	18.35	180.01	26.11
Junc J42	79.35	0.00	97.65	18.30	179.52	26.04
Junc J43	79.20	0.00	97.24	18.04	176.97	25.67
Junc J44	78.70	0.00	97.23	18.53	181.78	26.36
Junc J45	78.00	0.00	97.13	19.13	187.67	27.22
Junc J46	78.00	0.00	97.03	19.03	186.68	27.08
Junc J47	77.85	0.00	96.56	18.71	183.55	26.62
Junc J48	77.85	0.00	96.53	18.68	183.25	26.58
Junc J49	78.00	0.00	96.53	18.53	181.78	26.36
Junc J50	77.50	0.00	96.45	18.95	185.90	26.96
Junc J51	77.30	0.00	96.42	19.12	187.57	27.20
Junc J52	76.45	0.00	96.17	19.72	193.45	28.06
Junc J53	76.45	95.00	94.65	18.20	178.54	25.90
Junc J54	76.90	0.00	96.17	19.27	189.04	27.42
Junc J55	76.90	0.00	96.17	19.27	189.04	27.42
Junc J56	76.80	0.00	96.17	19.37	190.02	27.56
Resvr R1	107.60	-232.62	107.60	0.00	0.00	0.00

Min=	25.67
Max=	44.21

Max Day + Fire Flow Demand (R&D Lab Building) - Single WM Feed - 300mm

Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	232.62	3.29	35.59
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	232.62	3.29	35.59
Pipe P4	49	300	120	232.62	3.29	35.59
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	232.62	3.29	35.59
Pipe P8	53	300	120	232.62	3.29	35.59
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	232.62	3.29	35.59
Pipe P11	13	300	120	95	1.34	6.78
Pipe P12	2	150	100	95	5.38	278
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	137.62	1.95	13.46
Pipe P15	4.5	300	120	137.62	1.95	13.46
Pipe P16	11.5	300	120	137.62	1.95	13.46
Pipe P17	1.5	300	120	137.62	1.95	13.46
Pipe P18	13	300	120	137.62	1.95	13.46
Pipe P19	3.5	150	100	40	2.26	56.02
Pipe P20	26	300	120	97.62	1.38	7.13
Pipe P21	17	300	120	97.62	1.38	7.13
Pipe P22	15	300	120	97.62	1.38	7.13
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	97.62	1.38	7.13
Pipe P25	9	300	120	97.62	1.38	7.13
Pipe P26	14	300	120	97.62	1.38	7.13
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	95	1.34	6.78
Pipe P29	7	300	120	95	1.34	6.78
Pipe P30	4	300	120	95	1.34	6.78
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	95	1.34	6.78
Pipe P33	22	300	120	95	1.34	6.78
Pipe P34	42	300	120	95	1.34	6.78
Pipe P35	8	300	120	-95	1.34	6.78
Pipe P36	3	300	120	95	1.34	6.78
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	95	1.34	6.78
Pipe P39	18	300	120	95	1.34	6.78
Pipe P40	23	300	120	95	1.34	6.78
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	95	1.34	6.78
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	95	1.34	6.78
Pipe P45	2.6	300	120	95	1.34	6.78
Pipe P46	14.5	300	120	95	1.34	6.78
Pipe P47	15	300	120	95	1.34	6.78
Pipe P48	69	300	120	95	1.34	6.78
Pipe P49	4	300	120	95	1.34	6.78
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	95	1.34	6.78
Pipe P52	5	300	120	-95	1.34	6.78
Pipe P53	35.5	300	120	-95	1.34	6.78
Pipe P54	5.5	150	100	95	5.38	277.99
Pipe P55	14.5	300	120	0	0	0
Pipe P56	10	300	120	0	0	0
Pipe P57	12	300	120	0	0	0

570 & 520 March Road - Nokia OIC
Water Model Results

Max HGL - Single WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	75.85	0.00	130.90	55.05	540.04	78.33
Junc J2	76.00	0.00	130.90	54.90	538.57	78.11
Junc J3	76.20	0.00	130.90	54.70	536.61	77.83
Junc J4	76.80	0.00	130.90	54.10	530.72	76.97
Junc J5	76.80	0.00	130.90	54.10	530.72	76.97
Junc J6	77.00	0.00	130.90	53.90	528.76	76.69
Junc J7	77.00	0.00	130.90	53.90	528.76	76.69
Junc J8	77.00	0.00	130.90	53.90	528.76	76.69
Junc J9	76.60	0.00	130.90	54.30	532.68	77.26
Junc J10	77.40	0.00	130.90	53.50	524.84	76.12
Junc J11	77.40	0.00	130.90	53.50	524.84	76.12
Junc J12	77.40	0.00	130.90	53.50	524.84	76.12
Junc J13	76.00	0.00	130.90	54.90	538.57	78.11
Junc J14	76.80	0.00	130.90	54.10	530.72	76.97
Junc J15	76.90	0.00	130.90	54.00	529.74	76.83
Junc J16	76.90	0.00	130.90	54.00	529.74	76.83
Junc J17	77.10	0.00	130.90	53.80	527.78	76.55
Junc J18	77.30	0.00	130.90	53.60	525.82	76.26
Junc J19	77.40	0.00	130.90	53.50	524.84	76.12
Junc J20	78.30	0.00	130.90	52.60	516.01	74.84
Junc J21	78.80	0.00	130.90	52.10	511.10	74.13
Junc J22	79.00	0.00	130.90	51.90	509.14	73.84
Junc J23	79.50	0.00	130.90	51.40	504.23	73.13
Junc J24	79.50	0.00	130.90	51.40	504.23	73.13
Junc J25	79.50	0.00	130.90	51.40	504.23	73.13
Junc J26	79.60	2.62	130.90	51.30	503.25	72.99
Junc J27	79.90	0.00	130.90	51.00	500.31	72.56
Junc J28	79.90	0.00	130.90	51.00	500.31	72.56
Junc J29	79.90	0.00	130.90	51.00	500.31	72.56
Junc J30	80.00	0.00	130.90	50.90	499.33	72.42
Junc J31	79.84	0.00	130.90	51.06	500.90	72.65
Junc J32	79.71	0.00	130.90	51.19	502.17	72.83
Junc J33	79.60	0.00	130.90	51.30	503.25	72.99
Junc J34	79.60	0.00	130.90	51.30	503.25	72.99
Junc J35	79.55	0.00	130.90	51.35	503.74	73.06
Junc J36	79.60	0.00	130.90	51.30	503.25	72.99
Junc J37	79.50	0.00	130.90	51.40	504.23	73.13
Junc J38	79.50	0.00	130.90	51.40	504.23	73.13
Junc J39	79.45	0.00	130.90	51.45	504.72	73.20
Junc J40	79.50	0.00	130.90	51.40	504.23	73.13
Junc J41	79.30	0.00	130.90	51.60	506.20	73.42
Junc J42	79.35	0.00	130.90	51.55	505.71	73.35
Junc J43	79.20	0.00	130.90	51.70	507.18	73.56
Junc J44	78.70	0.00	130.90	52.20	512.08	74.27
Junc J45	78.00	0.00	130.90	52.90	518.95	75.27
Junc J46	78.00	0.00	130.90	52.90	518.95	75.27
Junc J47	77.85	0.00	130.90	53.05	520.42	75.48
Junc J48	77.85	0.00	130.90	53.05	520.42	75.48
Junc J49	78.00	0.00	130.90	52.90	518.95	75.27
Junc J50	77.50	0.00	130.90	53.40	523.85	75.98
Junc J51	77.30	0.00	130.90	53.60	525.82	76.26
Junc J52	76.45	0.00	130.90	54.45	534.15	77.47
Junc J53	76.45	0.00	130.90	54.45	534.15	77.47
Junc J54	76.90	0.00	130.90	54.00	529.74	76.83
Junc J55	76.90	0.00	130.90	54.00	529.74	76.83
Junc J56	76.80	0.00	130.90	54.10	530.72	76.97
Resvr R1	130.90	-2.62	130.90	0.00	0.00	0.00
				Min=		72.42
				Max=		78.33

Max HGL - Single WM Feed - 300mm
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	232.62	3.29	35.59
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	232.62	3.29	35.59
Pipe P4	49	300	120	232.62	3.29	35.59
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	232.62	3.29	35.59
Pipe P8	53	300	120	232.62	3.29	35.59
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	232.62	3.29	35.59
Pipe P11	13	300	120	95	1.34	6.78
Pipe P12	2	150	100	95	5.38	278
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	137.62	1.95	13.46
Pipe P15	4.5	300	120	137.62	1.95	13.46
Pipe P16	11.5	300	120	137.62	1.95	13.46
Pipe P17	1.5	300	120	137.62	1.95	13.46
Pipe P18	13	300	120	137.62	1.95	13.46
Pipe P19	3.5	150	100	40	2.26	56.02
Pipe P20	26	300	120	97.62	1.38	7.13
Pipe P21	17	300	120	97.62	1.38	7.13
Pipe P22	15	300	120	97.62	1.38	7.13
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	97.62	1.38	7.13
Pipe P25	9	300	120	97.62	1.38	7.13
Pipe P26	14	300	120	97.62	1.38	7.13
Pipe P27	10	200	110	2.62	0.08	0.07
Pipe P28	28	300	120	95	1.34	6.78
Pipe P29	7	300	120	95	1.34	6.78
Pipe P30	4	300	120	95	1.34	6.78
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	95	1.34	6.78
Pipe P33	22	300	120	95	1.34	6.78
Pipe P34	42	300	120	95	1.34	6.78
Pipe P35	8	300	120	-95	1.34	6.78
Pipe P36	3	300	120	95	1.34	6.78
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	95	1.34	6.78
Pipe P39	18	300	120	95	1.34	6.78
Pipe P40	23	300	120	95	1.34	6.78
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	95	1.34	6.78
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	95	1.34	6.78
Pipe P45	2.6	300	120	95	1.34	6.78
Pipe P46	14.5	300	120	95	1.34	6.78
Pipe P47	15	300	120	95	1.34	6.78
Pipe P48	69	300	120	95	1.34	6.78
Pipe P49	4	300	120	95	1.34	6.78
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	95	1.34	6.78
Pipe P52	5	300	120	-95	1.34	6.78
Pipe P53	35.5	300	120	-95	1.34	6.78
Pipe P54	5.5	150	100	95	5.38	277.99
Pipe P55	14.5	300	120	0	0	0
Pipe P56	10	300	120	0	0	0
Pipe P57	12	300	120	0	0	0

570 & 520 March Road - Nokia OIC
Water Model Results

Peak Hour Demand - Single WM Feed - 300mm
Network Table - Nodes

Node ID	Elevation	Demand	Head	Pressure	Pressure	Pressure
	m	L/s	m	m	kPa	psi
Junc J1	75.85	0.00	125.60	49.75	488.05	70.79
Junc J2	76.00	0.00	125.60	49.60	486.58	70.57
Junc J3	76.20	0.00	125.60	49.40	484.61	70.29
Junc J4	76.80	0.00	125.60	48.80	478.73	69.43
Junc J5	76.80	0.00	125.60	48.80	478.73	69.43
Junc J6	77.00	0.00	125.60	48.60	476.77	69.15
Junc J7	77.00	0.00	125.60	48.60	476.77	69.15
Junc J8	77.00	0.00	125.60	48.60	476.77	69.15
Junc J9	76.60	0.00	125.59	48.99	480.59	69.70
Junc J10	77.40	0.00	125.59	48.19	472.74	68.57
Junc J11	77.40	0.00	125.59	48.19	472.74	68.57
Junc J12	77.40	0.00	125.59	48.19	472.74	68.57
Junc J13	76.00	0.00	125.59	49.59	486.48	70.56
Junc J14	76.80	0.00	125.59	48.79	478.63	69.42
Junc J15	76.90	0.00	125.59	48.69	477.65	69.28
Junc J16	76.90	0.00	125.59	48.69	477.65	69.28
Junc J17	77.10	0.00	125.59	48.49	475.69	68.99
Junc J18	77.30	0.00	125.59	48.29	473.72	68.71
Junc J19	77.40	0.00	125.59	48.19	472.74	68.57
Junc J20	78.30	0.00	125.59	47.29	463.91	67.29
Junc J21	78.80	0.00	125.59	46.79	459.01	66.57
Junc J22	79.00	0.00	125.59	46.59	457.05	66.29
Junc J23	79.50	0.00	125.59	46.09	452.14	65.58
Junc J24	79.50	0.00	125.59	46.09	452.14	65.58
Junc J25	79.50	0.00	125.59	46.09	452.14	65.58
Junc J26	79.60	4.72	125.59	45.99	451.16	65.44
Junc J27	79.90	0.00	125.59	45.69	448.22	65.01
Junc J28	79.90	0.00	125.59	45.69	448.22	65.01
Junc J29	79.90	0.00	125.59	45.69	448.22	65.01
Junc J30	80.00	0.00	125.59	45.59	447.24	64.87
Junc J31	79.84	0.00	125.59	45.75	448.81	65.09
Junc J32	79.71	0.00	125.59	45.88	450.08	65.28
Junc J33	79.60	0.00	125.59	45.99	451.16	65.44
Junc J34	79.60	0.00	125.59	45.99	451.16	65.44
Junc J35	79.55	0.00	125.59	46.04	451.65	65.51
Junc J36	79.60	0.00	125.59	45.99	451.16	65.44
Junc J37	79.50	0.00	125.59	46.09	452.14	65.58
Junc J38	79.50	0.00	125.59	46.09	452.14	65.58
Junc J39	79.45	0.00	125.59	46.14	452.63	65.65
Junc J40	79.50	0.00	125.59	46.09	452.14	65.58
Junc J41	79.30	0.00	125.59	46.29	454.10	65.86
Junc J42	79.35	0.00	125.59	46.24	453.61	65.79
Junc J43	79.20	0.00	125.59	46.39	455.09	66.00
Junc J44	78.70	0.00	125.59	46.89	459.99	66.72
Junc J45	78.00	0.00	125.59	47.59	466.86	67.71
Junc J46	78.00	0.00	125.59	47.59	466.86	67.71
Junc J47	77.85	0.00	125.59	47.74	468.33	67.93
Junc J48	77.85	0.00	125.59	47.74	468.33	67.93
Junc J49	78.00	0.00	125.59	47.59	466.86	67.71
Junc J50	77.50	0.00	125.59	48.09	471.76	68.42
Junc J51	77.30	0.00	125.59	48.29	473.72	68.71
Junc J52	76.45	0.00	125.59	49.14	482.06	69.92
Junc J53	76.45	0.00	125.59	49.14	482.06	69.92
Junc J54	76.90	0.00	125.59	48.69	477.65	69.28
Junc J55	76.90	0.00	125.59	48.69	477.65	69.28
Junc J56	76.80	0.00	125.59	48.79	478.63	69.42
Resvr R1	125.60	-4.72	125.60	0.00	0.00	0.00
				Min=		64.87
				Max=		70.79

Peak Hour Demand - Single WM Feed - 300mm
Network Table - Links

Link ID	Length	Diameter	Roughness	Flow	Velocity	Unit Headloss
	m	mm		L/s	m/s	m/km
Pipe P1	19	300	120	4.72	0.07	0.03
Pipe P2	3	150	100	0	0	0
Pipe P3	21	300	120	4.72	0.07	0.03
Pipe P4	49	300	120	4.72	0.07	0.03
Pipe P5	2	150	100	0	0	0
Pipe P6	23	300	120	4.72	0.07	0.03
Pipe P8	53	300	120	4.72	0.07	0.03
Pipe P9	2	150	100	0	0	0
Pipe P10	32.5	300	120	4.72	0.07	0.03
Pipe P11	13	300	120	0	0	0
Pipe P12	2	150	100	0	0	0
Pipe P13	3.5	300	120	0	0	0
Pipe P14	5	300	120	4.72	0.07	0.03
Pipe P15	4.5	300	120	4.72	0.07	0.03
Pipe P16	11.5	300	120	4.72	0.07	0.03
Pipe P17	1.5	300	120	4.72	0.07	0.02
Pipe P18	13	300	120	4.72	0.07	0.03
Pipe P19	3.5	150	100	0	0	0
Pipe P20	26	300	120	4.72	0.07	0.03
Pipe P21	17	300	120	4.72	0.07	0.03
Pipe P22	15	300	120	4.72	0.07	0.03
Pipe P23	2.3	150	100	0	0	0
Pipe P24	25	300	120	4.72	0.07	0.03
Pipe P25	9	300	120	4.72	0.07	0.03
Pipe P26	14	300	120	4.72	0.07	0.03
Pipe P27	10	200	110	4.72	0.15	0.22
Pipe P28	28	300	120	0	0	0
Pipe P29	7	300	120	0	0	0
Pipe P30	4	300	120	0	0	0
Pipe P31	3	150	100	0	0	0
Pipe P32	11	300	120	0	0	0
Pipe P33	22	300	120	0	0	0
Pipe P34	42	300	120	0	0	0
Pipe P35	8	300	120	0	0	0
Pipe P36	3	300	120	0	0	0
Pipe P37	3.8	150	100	0	0	0
Pipe P38	25	300	120	0	0	0
Pipe P39	18	300	120	0	0	0
Pipe P40	23	300	120	0	0	0
Pipe P41	2	150	100	0	0	0
Pipe P42	58	300	120	0	0	0
Pipe P43	2	150	100	0	0	0
Pipe P44	60	300	120	0	0	0
Pipe P45	2.6	300	120	0	0	0
Pipe P46	14.5	300	120	0	0	0
Pipe P47	15	300	120	0	0	0
Pipe P48	69	300	120	0	0	0
Pipe P49	4	300	120	0	0	0
Pipe P50	7	150	100	0	0	0
Pipe P51	12	300	120	0	0	0
Pipe P52	5	300	120	0	0	0
Pipe P53	35.5	300	120	0	0	0
Pipe P54	5.5	150	100	0	0	0
Pipe P55	14.5	300	120	0	0	0
Pipe P56	10	300	120	0	0	0
Pipe P57	12	300	120	0	0	0

Kynan Dsa

From: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Sent: Friday, April 4, 2025 11:26 AM
To: Kynan Dsa
Cc: Francois Thauvette
Subject: RE: 570 March (Nokia) - Response to Comments (123043)

Good morning Kynan,

Thank you for reaching out. Please see below:

Comments Answered:

Comment #50 – After doing some spot checks on our end, we're not overly concerned with the d/D being < 0.3 in some upstream pipes, especially considering that a) this criterion is likely going to be met in the near future if 600 March discharges some flow to those pipes and b) downsizing to a 200mm wouldn't permit you to meet the d/D > 0.3 for these upstream pipes anyway. That said, to clear this comment, we would simply ask that you include a column in the sanitary sewer design sheet that shows the d/D values for each pipe that are 250mm or greater, even if it's not met, and discuss it briefly in your report.

Comment #62 – Following discussions with Infrastructure Planning, the HGLs should improve in the future once the system is looped to Solandt, so we no longer have concerns. It would be greatly appreciated if you could include a sentence to the report that summarizes the above (saying the City's Infrastructure Planning Group confirmed the HGLs in the future looped watermain will improve and thus a scenario was not completed by Novatech). We would then consider this comment cleared.

Comment #110 – Following discussions with the Planner, the watermain plan and profile drawing should be approved through the 3rd Party Agreement rather than the Site Plan Approval. That said, this comment will be a condition to the Site Plan Agreement, stating that the Legget Drive Watermain Plan and Profile drawing is to be stamped and approved through the 3rd Party Agreement so we do not cause further delay to the Site Plan Approval.

Waiting for a response:
Comment #21 – A conversation with Asset Management and Drinking Water Services is ongoing on the preferred configuration. A response will be provided asap. **Update: We are still in conversations with them. I'm hoping that a response is provided early next week.**

Comment #60 – A conversation with Drinking Water Services is ongoing to allow for a connection to the existing hydrant lead to provide an additional 50l/s of FF to the site. **Update: We are still in conversations with them. I'm hoping that a response is provided early next week.**

Merci,
Jean-Miguel

Classified as City of Ottawa - Internal / Ville d'Ottawa - classé interne

From: Kynan Dsa <k.dsa@novatech-eng.com>
Sent: April 04, 2025 10:51 AM
To: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>

Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: RE: 570 March (Nokia) - Response to Comments (123043)

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Hi Jean-Miguel,

Can you provide us with an update on the status of the City review comments below listed under "Waiting for a response"?

Thanks,

Kynan D'sa, B.A.Sc. (Engineering) (He/Him)
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6
Tel: 613.254.9643 Ext. 276 | Cell: 705.821.2278
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From: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Sent: Friday, March 28, 2025 8:15 AM
To: Francois Thauvette <f.thauvette@novatech-eng.com>; Kynan Dsa <k.dsa@novatech-eng.com>
Subject: 570 March (Nokia) - Reponse to Comments

Salut Francois et Kynan,

Thank you for scheduling this meeting to go over our comments on the application.

Comment responded:
Comment #68 – Per Section 6.2 of the sewer guidelines a storm monitoring maintenance hole would also be required at the property line.
Comment #97 – It seems like there was some confusion on our end during the last meeting when we agreed that you should stick with the post-development conditions. Gabrielle and I discussed this topic again after our call, and we agreed that the most conservative approach is likely the pre-development conditions (not the post-development like it was noted by us during our meeting), as the existing stormwater conditions are likely less restrictive. I think your original proposed approach of comparing the pre and post-dev conditions to confirm the most conservative is reasonable. We apologize for this misunderstanding. If this causes any delays on your end, please feel free to give me a call.

Waiting for a response:
Comment #21 – A conversation with Asset Management and Drinking Water Services is ongoing on the preferred configuration. A response will be provided asap.
Comment #50 – A conversation with our Water Resources team is ongoing on this topic to determine if oversizing the Legget Drive sewer will be allowed.

Comment #60 – A conversation with Drinking Water Services is ongoing to allow for a connection to the existing hydrant lead to provide an additional 50l/s of FF to the site.
Comment #62 – A conversation with Infrastructure Planning is ongoing to get the hydraulic modeling results for a future looped system.
Comment #110 – We will speak to Krishon in the upcoming days to clarify the process and confirm when this watermain plan and profile needs to be stamped.

We'll do our best to get a response for the above comments by early next week.

Regards,
Jean-Miguel Roy
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department
Services de la planification, Direction générale de la planification, de l'immobilier et du développement économique
110 Laurier Avenue West | 110 avenue Laurier Ouest
City of Ottawa | Ville d'Ottawa
613.580.2424 x 27566

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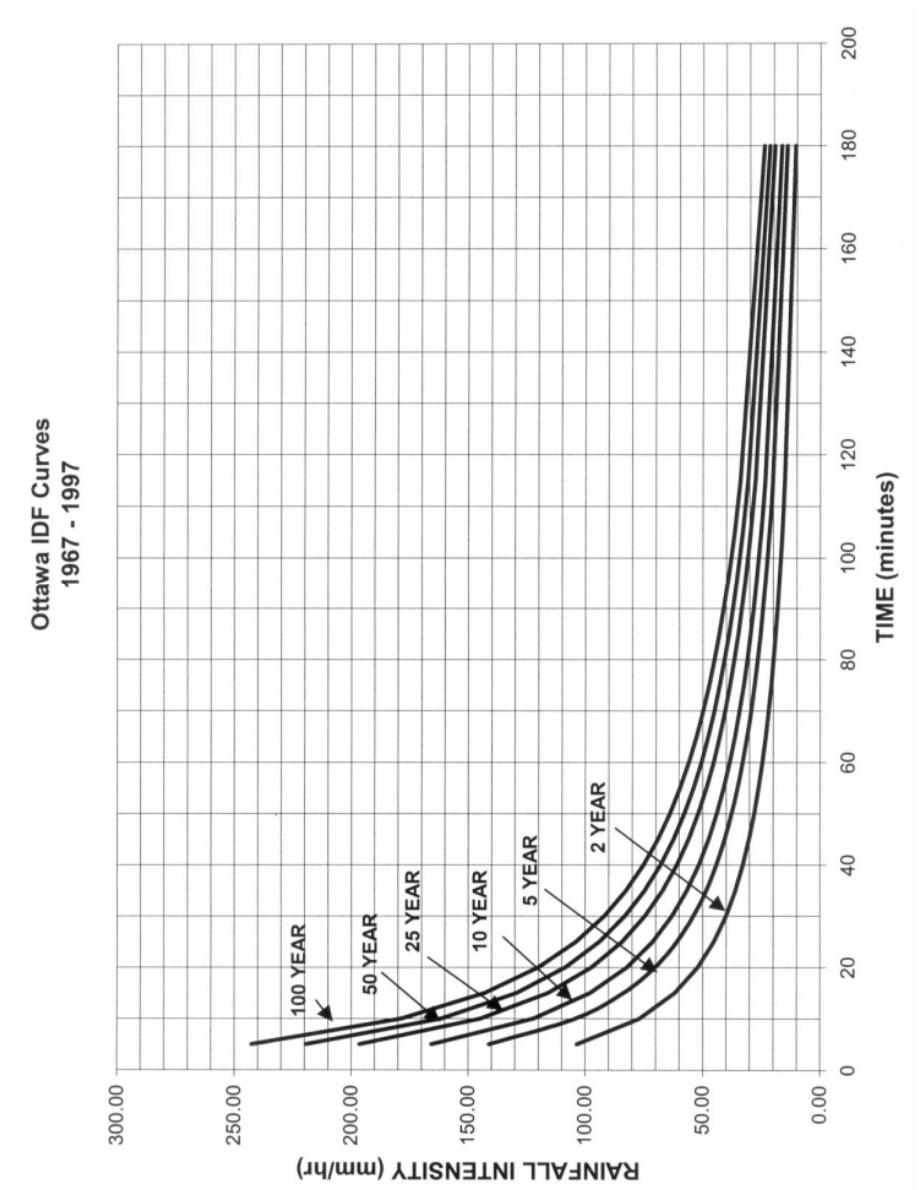
APPENDIX E

IDF Curves, SWM Calculations, Storm Sewer Design Sheets, Culvert Capacity Calculations

APPENDIX 5-A OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



Proposed Nokia Ottawa Innovation Campus
570 and 520 March Road

Pre - Development Stormwater Flows		
Description	***Area (ha)***	**Allowable Flows***
Allowable through ex. 375mm STM	1.772	**63.8**
Allowable through ex. 575mm STM	3.497	**235.1**

*allowables from KRP SWM report

Post - Development Stormwater Flows (Controlled to a maximum release rate of 63.8 L/s)

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	$A_{planter}$ (ha) C=0.6	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s)			Controlled Flow (L/s)			Storage Required (m^3)			Storage Provided (m^3)
								2-year	5-year	100-year	2-year	5-year	100-year	2-year	5-year	100-year	
A-0a	Direct Runoff (Lifestyle Street)	0.028	0.000	0.000	0.028	0.20	0.25	1.2	1.6	3.5	-	-	-	-	-	-	-
A-0b	Direct Runoff (Legget Drive)	0.007	0.000	0.000	0.007	0.20	0.25	0.3	0.4	0.9	-	-	-	-	-	-	-
A-1 + OS-1	Controlled Flow - ICD (Lifestyle Street - Upper Side)	0.188	0.183	0.005	0.000	0.89	0.99	-	-	-	10.9	12.5	17.0	23.9	34.5	74.1	76.4
A-2	Controlled Flow - ICD (Lifestyle Street - Lower Side)	0.290	0.261	0.025	0.005	0.86	0.96	-	-	-	11.6	13.5	19.0	41.1	58.4	122.3	126.3
A-3	Retail West Roof	0.098	0.098	0.000	0.000	0.90	1.00	-	-	-	1.9	2.5	3.8	14.9	20.1	41.2	42.0
A-4	Retail East Roof	0.075	0.075	0.000	0.000	0.90	1.00	-	-	-	1.9	2.5	3.8	10.2	13.9	28.7	29.9
A-5	Office Tower Roof	0.288	0.288	0.000	0.000	0.90	1.00	-	-	-	9.0	9.7	11.1	35.8	53.0	120.6	130.0
A-6	Common Area and Amenity Roof	0.117	0.117	0.000	0.000	0.90	1.00	-	-	-	3.7	4.0	4.5	13.2	19.6	45.1	55.7
	Totals :	1.090	-		-	-	-	**1.5**	**2.0**	**4.4**	**39.0**	**44.7**	**59.2**	**139.2**	**199.5**	**432.0**	

Total On-Site Stormwater Flows	**40.5**	**46.7**	**63.6**

T_c = 10mins

Post - Development Stormwater Flows (Controlled to a maximum release rate of 235.1 L/s)

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	$A_{planter/gravel}$ (ha) C=0.6/0.75*	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s)			Controlled Flow (L/s)			Storage Required (m^3)			Storage Provided (m^3)
								2-year	5-year	100-year	2-year	5-year	100-year	2-year	5-year	100-year	
B-0a	Direct Runoff (Legget Drive)	0.038	0.003	0.000	0.036	0.25	0.30	2.0	2.7	5.7	-	-	-	-	-	-	-
B-0b	Direct Runoff (Access Route)	0.071	0.000	0.000	0.071	0.20	0.25	3.0	4.1	8.8	-	-	-	-	-	-	-
B-1	Controlled Flow - SWM Tank & ICD (R&D Lab)	0.795	0.795	0.000	0.000	0.90	1.00	-	-	-	21.9	27.0	41.0	137.1	188.9	380.0	389.3
B-2 + OS-2	Controlled Flow - ICD (Plaza & Entrance Dropoff)	0.550	0.325	0.031	0.195	0.64	0.72	-	-	-	19.0	21.0	30.0	53.9	78.3	167.0	168.8
B-3	Controlled Flow - ICD (Surface Parking)	1.127	0.992	0.000	0.135	0.82	0.91	-	-	-	23.7	29.8	46.0	186.4	254.8	510.5	616.3
B-4	Controlled Flow - ICD (Access Route / Workyard)	0.800	0.475	0.250	0.075	0.79	0.89	-	-	-	29.4	35.7	53.0	103.2	144.2	303.1	311.4
C-0	Direct Runoff (Retained Lands)	0.064	0.000	0.000	0.064	0.20	0.25	2.7	3.7	7.9	-	-	-	-	-	-	-
C-1	Controlled Flow - ICD (Retained Lands - Parking)	0.624	0.507	0.000	0.117	0.77	0.86	-	-	-	11.0	13.6	27.0	100.9	138.4	258.0	304.3
C-2	Controlled Flow - ICD (Retained Lands - ROW	0.124	0.106	0.000	0.018	0.80	0.89	-	-	-	7.8	9.7	15.0	12.9	18.0	37.6	44.2
	Totals :	4.193	-	-	-	-	-	**7.7**	**10.5**	**22.4**	**112.8**	**136.8**	**212.0**	**594.4**	**822.6**	**1656.1**	

Total On-Site Stormwater Flows	**120.5**	**147.3**	**234.4**

T_c = 10mins

*The workyard within Area B-4 is the only area considered to have a c-value of 0.75 (gravel). All other areas (planters) are considered to have a C value of 0.6.

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:2 YEAR EVENT
AREA A-0a Un-Controlled Runoff - 600 March Road

OTTAWA IDF CURVE

Area = 0.028 ha Qallow = 1.2 L/s
C = 0.20 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.64	0.42	0.13
10	76.81	1.21	0.00	0.00
15	61.77	0.98	-0.24	-0.21
20	52.03	0.82	-0.39	-0.47
25	45.17	0.71	-0.50	-0.75
30	40.04	0.63	-0.58	-1.05
35	36.06	0.57	-0.64	-1.35
40	32.86	0.52	-0.69	-1.67
45	30.24	0.48	-0.74	-1.99
50	28.04	0.44	-0.77	-2.31
55	26.17	0.41	-0.80	-2.64
60	24.56	0.39	-0.83	-2.97
65	23.15	0.37	-0.85	-3.31
70	21.91	0.35	-0.87	-3.64
75	20.81	0.33	-0.88	-3.98
90	18.14	0.29	-0.93	-5.00
105	16.13	0.25	-0.96	-6.04
120	14.56	0.23	-0.98	-7.08
135	13.30	0.21	-1.00	-8.13
150	12.25	0.19	-1.02	-9.18

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:5 YEAR EVENT
AREA A-0a Un-Controlled Runoff - 600 March Road

OTTAWA IDF CURVE

Area = 0.028 ha Qallow = 1.6 L/s
C = 0.20 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.23	0.58	0.18
10	104.19	1.65	0.00	0.00
15	83.56	1.32	-0.33	-0.29
20	70.25	1.11	-0.54	-0.64
25	60.90	0.96	-0.68	-1.03
30	53.93	0.85	-0.79	-1.43
35	48.52	0.77	-0.88	-1.85
40	44.18	0.70	-0.95	-2.28
45	40.63	0.64	-1.00	-2.71
50	37.65	0.59	-1.05	-3.15
55	35.12	0.55	-1.09	-3.60
60	32.94	0.52	-1.13	-4.05
65	31.04	0.49	-1.16	-4.51
70	29.37	0.46	-1.18	-4.96
75	27.89	0.44	-1.21	-5.42
90	24.29	0.38	-1.26	-6.82
105	21.58	0.34	-1.31	-8.22
120	19.47	0.31	-1.34	-9.64
135	17.76	0.28	-1.37	-11.06
150	16.36	0.26	-1.39	-12.49

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YEAR EVENT
AREA A-0a Un-Controlled Runoff - 600 March Road

OTTAWA IDF CURVE

Area = 0.028 ha Qallow = 3.5 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.79	1.27	0.38
10	178.56	3.53	0.00	0.00
15	142.89	2.82	-0.70	-0.63
20	119.95	2.37	-1.16	-1.39
25	103.85	2.05	-1.48	-2.21
30	91.87	1.81	-1.71	-3.08
35	82.58	1.63	-1.90	-3.98
40	75.15	1.48	-2.04	-4.90
45	69.05	1.36	-2.16	-5.84
50	63.95	1.26	-2.26	-6.79
55	59.62	1.18	-2.35	-7.75
60	55.89	1.10	-2.42	-8.72
65	52.65	1.04	-2.49	-9.70
70	49.79	0.98	-2.54	-10.68
75	47.26	0.93	-2.59	-11.67
90	41.11	0.81	-2.71	-14.66
105	36.50	0.72	-2.81	-17.67
120	32.89	0.65	-2.88	-20.71
135	30.00	0.59	-2.93	-23.76
150	27.61	0.55	-2.98	-26.83

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YR + 20% IDF Increase
AREA A-0a Un-Controlled Runoff - 600 March Road

OTTAWA IDF CURVE

Area = 0.028 ha Qallow = 4.2 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	5.75	1.52	0.46
10	214.27	4.23	0.00	0.00
15	171.47	3.39	-0.85	-0.76
20	143.94	2.84	-1.39	-1.67
25	124.62	2.46	-1.77	-2.66
30	110.24	2.18	-2.05	-3.70
35	99.09	1.96	-2.27	-4.78
40	90.17	1.78	-2.45	-5.88
45	82.86	1.64	-2.60	-7.01
50	76.74	1.52	-2.72	-8.15
55	71.55	1.41	-2.82	-9.30
60	67.07	1.32	-2.91	-10.46
65	63.18	1.25	-2.98	-11.64
70	59.75	1.18	-3.05	-12.82
75	56.71	1.12	-3.11	-14.00
90	49.33	0.97	-3.26	-17.59
105	43.80	0.86	-3.37	-21.21
120	39.47	0.78	-3.45	-24.85
135	36.00	0.71	-3.52	-28.52
150	33.13	0.65	-3.58	-32.19

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:2 YEAR EVENT
AREA A-0b Un-Controlled Runoff - Legget Drive

OTTAWA IDF CURVE

Area = 0.007 ha Qallow = 0.3 L/s
C = 0.20 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	0.40	0.10	0.03
10	76.81	0.29	0.00	0.00
15	61.77	0.24	-0.06	-0.05
20	52.03	0.20	-0.09	-0.11
25	45.17	0.17	-0.12	-0.18
30	40.04	0.15	-0.14	-0.25
35	36.06	0.14	-0.16	-0.33
40	32.86	0.13	-0.17	-0.40
45	30.24	0.12	-0.18	-0.48
50	28.04	0.11	-0.19	-0.56
55	26.17	0.10	-0.19	-0.64
60	24.56	0.09	-0.20	-0.72
65	23.15	0.09	-0.20	-0.80
70	21.91	0.08	-0.21	-0.88
75	20.81	0.08	-0.21	-0.96
90	18.14	0.07	-0.22	-1.21
105	16.13	0.06	-0.23	-1.46
120	14.56	0.06	-0.24	-1.71
135	13.30	0.05	-0.24	-1.96
150	12.25	0.05	-0.25	-2.22

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:5 YEAR EVENT
AREA A-0b Un-Controlled Runoff - Legget Drive

OTTAWA IDF CURVE

Area = 0.007 ha Qallow = 0.4 L/s
C = 0.20 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	0.54	0.14	0.04
10	104.19	0.40	0.00	0.00
15	83.56	0.32	-0.08	-0.07
20	70.25	0.27	-0.13	-0.16
25	60.90	0.23	-0.17	-0.25
30	53.93	0.21	-0.19	-0.35
35	48.52	0.19	-0.21	-0.45
40	44.18	0.17	-0.23	-0.55
45	40.63	0.16	-0.24	-0.66
50	37.65	0.14	-0.25	-0.76
55	35.12	0.13	-0.26	-0.87
60	32.94	0.13	-0.27	-0.98
65	31.04	0.12	-0.28	-1.09
70	29.37	0.11	-0.29	-1.20
75	27.89	0.11	-0.29	-1.31
90	24.29	0.09	-0.31	-1.65
105	21.58	0.08	-0.32	-1.99
120	19.47	0.07	-0.32	-2.33
135	17.76	0.07	-0.33	-2.67
150	16.36	0.06	-0.34	-3.02

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YEAR EVENT
AREA A-0b Un-Controlled Runoff - Legget Drive

OTTAWA IDF CURVE

Area = 0.007 ha Qallow = 0.9 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	1.16	0.31	0.09
10	178.56	0.85	0.00	0.00
15	142.89	0.68	-0.17	-0.15
20	119.95	0.57	-0.28	-0.34
25	103.85	0.50	-0.36	-0.53
30	91.87	0.44	-0.41	-0.74
35	82.58	0.39	-0.46	-0.96
40	75.15	0.36	-0.49	-1.18
45	69.05	0.33	-0.52	-1.41
50	63.95	0.31	-0.55	-1.64
55	59.62	0.28	-0.57	-1.87
60	55.89	0.27	-0.59	-2.11
65	52.65	0.25	-0.60	-2.34
70	49.79	0.24	-0.61	-2.58
75	47.26	0.23	-0.63	-2.82
90	41.11	0.20	-0.66	-3.54
105	36.50	0.17	-0.68	-4.27
120	32.89	0.16	-0.70	-5.01
135	30.00	0.14	-0.71	-5.74
150	27.61	0.13	-0.72	-6.48

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YR + 20% IDF Increase
AREA A-0b Un-Controlled Runoff - Legget Drive

OTTAWA IDF CURVE

Area = 0.007 ha Qallow = 1.0 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	1.39	0.37	0.11
10	214.27	1.02	0.00	0.00
15	171.47	0.82	-0.20	-0.18
20	143.94	0.69	-0.34	-0.40
25	124.62	0.59	-0.43	-0.64
30	110.24	0.53	-0.50	-0.89
35	99.09	0.47	-0.55	-1.15
40	90.17	0.43	-0.59	-1.42
45	82.86	0.40	-0.63	-1.69
50	76.74	0.37	-0.66	-1.97
55	71.55	0.34	-0.68	-2.25
60	67.07	0.32	-0.70	-2.53
65	63.18	0.30	-0.72	-2.81
70	59.75	0.29	-0.74	-3.10
75	56.71	0.27	-0.75	-3.38
90	49.33	0.24	-0.79	-4.25
105	43.80	0.21	-0.81	-5.13
120	39.47	0.19	-0.83	-6.01
135	36.00	0.17	-0.85	-6.89
150	33.13	0.16	-0.86	-7.78

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-1 Controlled Site Flows (Lifestyle Street - Upper Side)

OTTAWA IDF CURVE — Qpeak = 10.9 L/s
Area = 0.188 ha — Qavg = 5.5 L/s
C = 0.89 — Vol(max) = 23.9 m3
(Vol calculated for Qallow-avg)

Time (min)	Tributary Ar (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	48.35	42.90	12.87
10	76.81	35.86	30.41	18.24
15	61.77	28.84	23.39	21.05
20	52.03	24.29	18.84	22.61
25	45.17	21.09	15.64	23.46
30	40.04	18.70	13.25	23.84
35	36.06	16.84	11.39	23.91
40	32.86	15.34	9.89	23.74
45	30.24	14.12	8.67	23.40
50	28.04	13.09	7.64	22.92
55	26.17	12.22	6.77	22.34
60	24.56	11.47	6.02	21.65
65	23.15	10.81	5.36	20.90
70	21.91	10.23	4.78	20.08
75	20.81	9.72	4.27	19.20
90	18.14	8.47	3.02	16.31
105	16.13	7.53	2.08	13.12
120	14.56	6.80	1.35	9.71
135	13.30	6.21	0.76	6.14
150	12.25	5.72	0.27	2.43

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-1 Controlled Site Flows (Lifestyle Street - Upper Side)

OTTAWA IDF CURVE — Qpeak = 12.5 L/s
Area = 0.188 ha — Qavg = 6.3 L/s
C = 0.89 — Vol(max) = 34.5 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	65.91	59.66	17.90
10	104.19	48.64	42.39	25.44
15	83.56	39.01	32.76	29.48
20	70.25	32.80	26.55	31.86
25	60.90	28.43	22.18	33.27
30	53.93	25.18	18.93	34.07
35	48.52	22.65	16.40	34.44
40	44.18	20.63	14.38	34.51
45	40.63	18.97	12.72	34.34
50	37.65	17.58	11.33	33.99
55	35.12	16.40	10.15	33.49
60	32.94	15.38	9.13	32.87
65	31.04	14.49	8.24	32.15
70	29.37	13.71	7.46	31.34
75	27.89	13.02	6.77	30.47
90	24.29	11.34	5.09	27.48
105	21.58	10.08	3.83	24.11
120	19.47	9.09	2.84	20.44
135	17.76	8.29	2.04	16.56
150	16.36	7.64	1.39	12.50

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-1 Controlled Site Flows (Lifestyle Street - Upper Side)

OTTAWA IDF CURVE — Qpeak = 17.0 L/s
Area = 0.188 ha — Qavg = 8.5 L/s
C = 0.99 — Vol(max) = 74.1 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	126.02	117.52	35.26
10	178.56	92.71	84.21	50.53
15	142.89	74.19	65.69	59.12
20	119.95	62.28	53.78	64.54
25	103.85	53.92	45.42	68.13
30	91.87	47.70	39.20	70.56
35	82.58	42.88	34.38	72.19
40	75.15	39.02	30.52	73.24
45	69.05	35.85	27.35	73.85
50	63.95	33.21	24.71	74.12
55	59.62	30.96	22.46	74.11
60	55.89	29.02	20.52	73.88
65	52.65	27.34	18.84	73.46
70	49.79	25.85	17.35	72.88
75	47.26	24.54	16.04	72.16
90	41.11	21.35	12.85	69.37
105	36.50	18.95	10.45	65.84
120	32.89	17.08	8.58	61.77
135	30.00	15.58	7.08	57.31
150	27.61	14.34	5.84	52.52

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA A-1 Controlled Site Flows (Lifestyle Street - Upper Side)

OTTAWA IDF CURVE — Qpeak = 17.0 L/s
Area = 0.188 ha — Qavg = 8.5 L/s
C = 0.99 — Vol(max) = 94.8 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	151.22	142.72	42.82
10	214.27	111.25	102.75	61.65
15	171.47	89.03	80.53	72.48
20	143.94	74.74	66.24	79.48
25	124.62	64.70	56.20	84.31
30	110.24	57.24	48.74	87.73
35	99.09	51.45	42.95	90.20
40	90.17	46.82	38.32	91.97
45	82.86	43.02	34.52	93.21
50	76.74	39.85	31.35	94.04
55	71.55	37.15	28.65	94.54
60	67.07	34.83	26.33	94.77
65	63.18	32.80	24.30	94.78
70	59.75	31.02	22.52	94.59
75	56.71	29.44	20.94	94.24
90	49.33	25.61	17.11	92.42
105	43.80	22.74	14.24	89.71
120	39.47	20.50	12.00	86.37
135	36.00	18.69	10.19	82.54
150	33.13	17.20	8.70	78.33

NOVATECH
Engineers, Planners & Landscape Architects

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
UG STORAGE	1144	60.88	VARIES		79.97
CBMH 266	1200	1.13	82.20	79.96	79.93
CBMH 267	1200	1.13	81.85	79.81	79.78
STMMH 102	1200	1.13	81.92	79.63	79.60

PI = 3.141592654
PIPE I.D.= 304.8 PVC
U/G Storage Pipe Volume
End Area 0.073 (m^2)
Total Length 50.5 (m)
Pipe Volume 3.7 (m^3)

Area A-1: Storage Table

		Underground Storage					Surface Storage								
							CBMH 266		CBMH 267		STMMH 102				
Elevation (m)	System Depth (m)	UG STORAGE Volume (m^3)	CBMH 266 Volume (m^3)	CBMH 267 Volume (m^3)	STMMH 102 Volume (m^3)	Combined Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
79.60	0.00	0.00	0.00	-0.20	0.00	3.48	-	-	-	-	-	-	-	**0**	-
80.29	0.69	19.48	0.41	0.58	0.78	24.15	-	-	-	-	-	-	-	**24.1**	0.36
80.46	0.86	29.83	0.60	0.77	0.97	34.88	-	-	-	-	-	-	-	**34.9**	0.53
81.09	1.49	68.18	1.31	1.48	1.69	74.66	-	-	-	-	-	-	-	**74.7**	1.16
81.11	1.51	68.18	1.33	1.50	1.71	74.70	-	-	-	-	-	-	-	**74.7**	1.18
81.85	2.25	68.18	2.17	2.34	2.54	76.38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**76.4**	1.92
81.88							0.00	0.00	0.00	0.00	0.00	0.00	0.0	**76.4**	1.95
81.91							0.00	0.00	0.00	0.00	0.00	0.00	0.0	**76.4**	1.98
81.95							0.00	0.00	0.00	0.00	0.00	0.00	0.0	**76.4**	2.02

Tempest MHF Type A ICD

1:100 Yr
Flow (L/s) = 17.0
Head (m) = 1.34
Elevation (m) = **81.09**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 74.1

1:5 Yr
Flow (L/s) = 12.5
Head (m) = 0.71
Elevation (m) = **80.46**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 34.5

1:2 Yr
Flow (L/s) = 10.9
Head (m) = 0.54
Elevation (m) = **80.29**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 23.9

Orifice Size - 1:100 yr Flow Check
Q=0.62xAx(2gh)^0.5

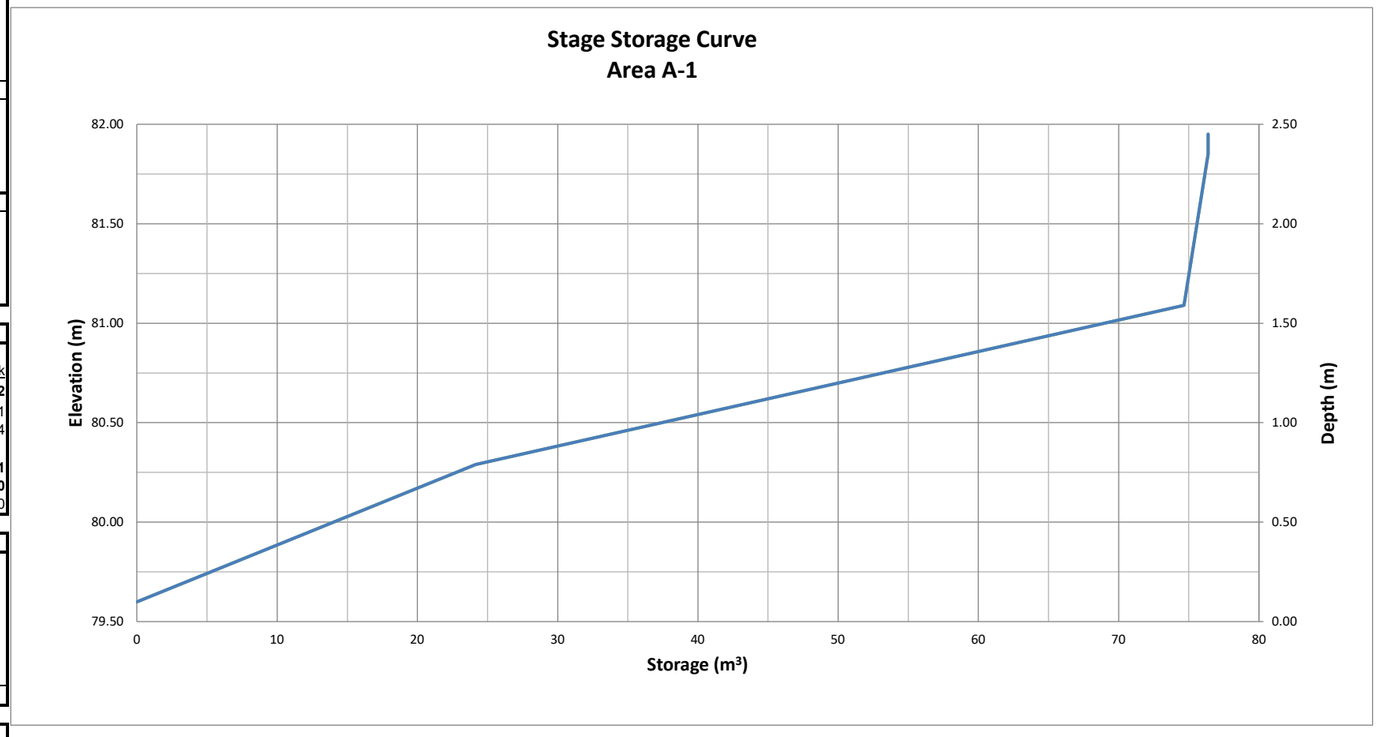
	1:100 yr	Flow Check
Q (m^3/s) =	0.0170	**0.0172**
g (m/s^2) =	9.81	9.81
h (m) =	**1.34**	1.34
A (m^2) =	**0.005352351**	**0.00541**
D (m) =	**0.082551954**	**0.08300**
D (mm) =	**83**	83.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0125
g (m/s^2) =	9.81
h (m) =	**0.71**
A (m^2) =	**0.00541**
D (m) =	**0.083**
D (mm) =	**83**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0109
g (m/s^2) =	9.81
h (m) =	**0.54**
A (m^2) =	**0.00541**
D (m) =	**0.083**
D (mm) =	**83**



Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-2 Controlled Site Flows (Lifestyle Street - Lower Side)

OTTAWA IDF CURVE — Qpeak = 11.6 L/s
Area = 0.290 ha — Qavg = 5.8 L/s
C = 0.86 — Vol(max) = 41.1 m3
(Vol calculated for Qallow-avg)

Time (min)	Tributary Ar (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	72.05	66.25	19.88
10	76.81	53.43	47.63	28.58
15	61.77	42.97	37.17	33.45
20	52.03	36.20	30.40	36.48
25	45.17	31.42	25.62	38.43
30	40.04	27.86	22.06	39.70
35	36.06	25.09	19.29	40.50
40	32.86	22.86	17.06	40.95
45	30.24	21.04	15.24	41.14
50	28.04	19.51	13.71	41.12
55	26.17	18.21	12.41	40.94
60	24.56	17.08	11.28	40.62
65	23.15	16.11	10.31	40.19
70	21.91	15.24	9.44	39.67
75	20.81	14.48	8.68	39.06
90	18.14	12.62	6.82	36.84
105	16.13	11.22	5.42	34.17
120	14.56	10.13	4.33	31.18
135	13.30	9.25	3.45	27.94
150	12.25	8.52	2.72	24.51

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2 Controlled Site Flows (Lifestyle Street - Lower Side)

OTTAWA IDF CURVE — Qpeak = 13.5 L/s
Area = 0.290 ha — Qavg = 6.8 L/s
C = 0.86 — Vol(max) = 58.4 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	98.22	91.47	27.44
10	104.19	72.49	65.74	39.44
15	83.56	58.13	51.38	46.24
20	70.25	48.87	42.12	50.55
25	60.90	42.37	35.62	53.42
30	53.93	37.52	30.77	55.38
35	48.52	33.75	27.00	56.71
40	44.18	30.74	23.99	57.57
45	40.63	28.27	21.52	58.09
50	37.65	26.20	19.45	58.34
55	35.12	24.44	17.69	58.36
60	32.94	22.92	16.17	58.21
65	31.04	21.60	14.85	57.90
70	29.37	20.43	13.68	57.47
75	27.89	19.40	12.65	56.93
90	24.29	16.90	10.15	54.80
105	21.58	15.01	8.26	52.07
120	19.47	13.54	6.79	48.91
135	17.76	12.36	5.61	45.43
150	16.36	11.38	4.63	41.70

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2 Controlled Site Flows (Lifestyle Street - Lower Side)

OTTAWA IDF CURVE — Qpeak = 19.0 L/s
Area = 0.290 ha — Qavg = 9.5 L/s
C = 0.96 — Vol(max) = 122.3 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	188.25	178.75	53.62
10	178.56	138.49	128.99	77.40
15	142.89	110.83	101.33	91.20
20	119.95	93.04	83.54	100.24
25	103.85	80.55	71.05	106.57
30	91.87	71.25	61.75	111.16
35	82.58	64.05	54.55	114.55
40	75.15	58.28	48.78	117.08
45	69.05	53.56	44.06	118.95
50	63.95	49.60	40.10	120.31
55	59.62	46.25	36.75	121.26
60	55.89	43.35	33.85	121.87
65	52.65	40.83	31.33	122.20
70	49.79	38.62	29.12	122.29
75	47.26	36.65	27.15	122.19
90	41.11	31.89	22.39	120.89
105	36.50	28.31	18.81	118.49
120	32.89	25.51	16.01	115.30
135	30.00	23.27	13.77	111.51
150	27.61	21.42	11.92	107.24

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA A-2 Controlled Site Flows (Lifestyle Street - Lower Side)

OTTAWA IDF CURVE — Qpeak = 19.0 L/s
Area = 0.290 ha — Qavg = 9.5 L/s
C = 0.96 — Vol(max) = 155.3 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	225.90	216.40	64.92
10	214.27	166.19	156.69	94.02
15	171.47	133.00	123.50	111.15
20	143.94	111.64	102.14	122.57
25	124.62	96.66	87.16	130.73
30	110.24	85.51	76.01	136.81
35	99.09	76.86	67.36	141.45
40	90.17	69.94	60.44	145.06
45	82.86	64.27	54.77	147.87
50	76.74	59.52	50.02	150.07
55	71.55	55.49	45.99	151.78
60	67.07	52.02	42.52	153.08
65	63.18	49.00	39.50	154.05
70	59.75	46.34	36.84	154.73
75	56.71	43.98	34.48	155.17
90	49.33	38.26	28.76	155.32
105	43.80	33.97	24.47	154.16
120	39.47	30.62	21.12	152.04
135	36.00	27.92	18.42	149.20
150	33.13	25.70	16.20	145.79

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
UG STORAGE	1144	110.40	VARIES		78.16
CBMH 249	1200	1.13	79.80	78.15	78.10
CBMH 250	1200	1.13	79.55	78.05	78.04
CBMH 251	1200	1.13	79.55	78.02	77.92

PI = 3.141592654
PIPE I.D.= 304.8 PVC
U/G Storage Pipe Volume
End Area 0.073 (m^2)
Total Length 21.5 (m)
Pipe Volume 1.6 (m^3)

Area A-2: Storage Table

						Underground Storage	Surface Storage								Total Storage		
							UG STORAGE		CBMH 249		CBMH 250		CBMH 251				
Elevation (m)	System Depth (m)	UG STORAGE Volume (m^3)	CBMH 249 Volume (m^3)	CBMH 250 Volume (m^3)	CBMH 251 Volume (m^3)	Combined Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
77.92	0.00	0.00	0.00	0.00	0.00	1.57	-	-	-	-	-	-	-	-	-	**0**	-
78.51	0.59	38.64	0.46	0.53	0.67	41.20	-	-	-	-	-	-	-	-	-	**41.2**	0.44
78.67	0.75	56.30	0.64	0.71	0.85	59.23	-	-	-	-	-	-	-	-	-	**59.2**	0.60
79.23	1.31	118.13	1.28	1.35	1.48	122.32	-	-	-	-	-	-	-	-	-	**122.3**	1.16
79.30	1.38	118.13	1.36	1.43	1.56	122.48	-	-	-	-	-	-	-	-	-	**122.5**	1.23
79.55	1.63	118.13	1.64	1.71	1.84	123.04	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	**123.0**	1.48
79.60							0.00	0.00	0.00	0.00	15.59	0.39	15.69	0.39	0.4	**123.4**	1.53
79.65							0.00	0.00	0.00	0.00	29.27	1.51	29.27	0.00	1.5	**124.6**	1.58
79.70							0.00	0.00	0.00	0.00	39.37	3.23	39.37	0.00	3.2	**126.3**	1.63

Tempest MHF Type A ICD

1:100 Yr
Flow (L/s) = 19.0
Head (m) = 1.16
Elevation (m) = **79.23**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 122.3

1:5 Yr
Flow (L/s) = 13.5
Head (m) = 0.60
Elevation (m) = **78.67**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 58.4

1:2 Yr
Flow (L/s) = 11.6
Head (m) = 0.44
Elevation (m) = **78.51**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 41.1

Orifice Size - 1:100 yr Flow Check
Q=0.62xAx(2gh)^0.5

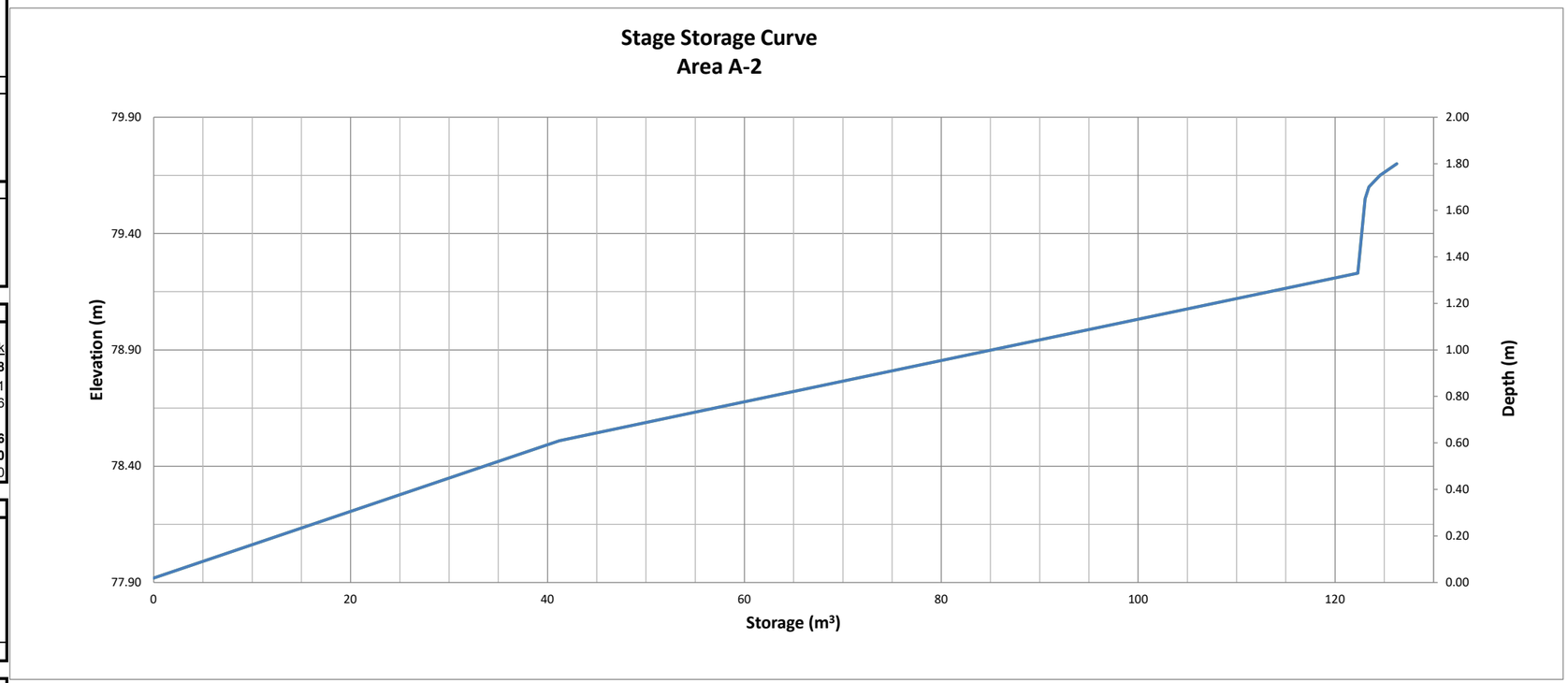
	1:100 yr	Flow Check
Q (m^3/s) =	0.0190	**0.0188**
g (m/s^2) =	9.81	9.81
h (m) =	**1.16**	1.16
A (m^2) =	**0.006430328**	**0.00636**
D (m) =	**0.090483967**	**0.09000**
D (mm) =	**90**	90.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0135
g (m/s^2) =	9.81
h (m) =	**0.60**
A (m^2) =	**0.00636**
D (m) =	**0.09**
D (mm) =	**90**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0116
g (m/s^2) =	9.81
h (m) =	**0.44**
A (m^2) =	**0.00636**
D (m) =	**0.09**
D (mm) =	**90**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-3 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.049	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	7.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	12.70	11.75	3.52
10	76.81	9.42	8.47	5.08
15	61.77	7.57	6.62	5.96
20	52.03	6.38	5.43	6.51
25	45.17	5.54	4.59	6.88
30	40.04	4.91	3.96	7.13
35	36.06	4.42	3.47	7.29
40	32.86	4.03	3.08	7.39
45	30.24	3.71	2.76	7.44
50	28.04	3.44	2.49	7.46
55	26.17	3.21	2.26	7.45
60	24.56	3.01	2.06	7.42
65	23.15	2.84	1.89	7.36
70	21.91	2.69	1.74	7.29
75	20.81	2.55	1.60	7.21
90	18.14	2.22	1.27	6.88
105	16.13	1.98	1.03	6.48
120	14.56	1.79	0.84	6.01

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-3 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.049	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	10.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	17.31	16.05	4.81
10	104.19	12.77	11.51	6.91
15	83.56	10.24	8.98	8.09
20	70.25	8.61	7.35	8.82
25	60.90	7.47	6.21	9.31
30	53.93	6.61	5.35	9.63
35	48.52	5.95	4.69	9.85
40	44.18	5.42	4.16	9.98
45	40.63	4.98	3.72	10.05
50	37.65	4.62	3.36	10.07
55	35.12	4.31	3.05	10.05
60	32.94	4.04	2.78	10.00
65	31.04	3.81	2.55	9.93
70	29.37	3.60	2.34	9.83
75	27.89	3.42	2.16	9.72
90	24.29	2.98	1.72	9.28
105	21.58	2.65	1.39	8.73
120	19.47	2.39	1.13	8.11

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-3 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.049	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	33.06	31.17	9.35
10	178.56	24.32	22.43	13.46
15	142.89	19.47	17.58	15.82
20	119.95	16.34	14.45	17.34
25	103.85	14.15	12.26	18.38
30	91.87	12.51	10.62	19.12
35	82.58	11.25	9.36	19.65
40	75.15	10.24	8.35	20.03
45	69.05	9.41	7.52	20.29
50	63.95	8.71	6.82	20.47
55	59.62	8.12	6.23	20.57
60	55.89	7.61	5.72	20.61
80	44.99	6.13	4.24	20.35
100	37.90	5.16	3.27	19.64
120	32.89	4.48	2.59	18.65
140	29.15	3.97	2.08	17.48
160	26.24	3.57	1.68	16.17
180	23.90	3.26	1.37	14.75

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-3 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.049	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	26.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	39.67	37.78	11.34
10	214.27	29.19	27.30	16.38
15	171.47	23.36	21.47	19.32
20	143.94	19.61	17.72	21.26
25	124.62	16.98	15.09	22.63
30	110.24	15.02	13.13	23.63
35	99.09	13.50	11.61	24.38
40	90.17	12.28	10.39	24.94
45	82.86	11.29	9.40	25.37
50	76.74	10.45	8.56	25.69
55	71.55	9.75	7.86	25.93
60	67.07	9.14	7.25	26.09
65	63.18	8.61	6.72	26.19
70	59.75	8.14	6.25	26.25
75	56.71	7.72	5.83	26.26
90	49.33	6.72	4.83	26.08
105	43.80	5.97	4.08	25.68
120	39.47	5.38	3.49	25.11

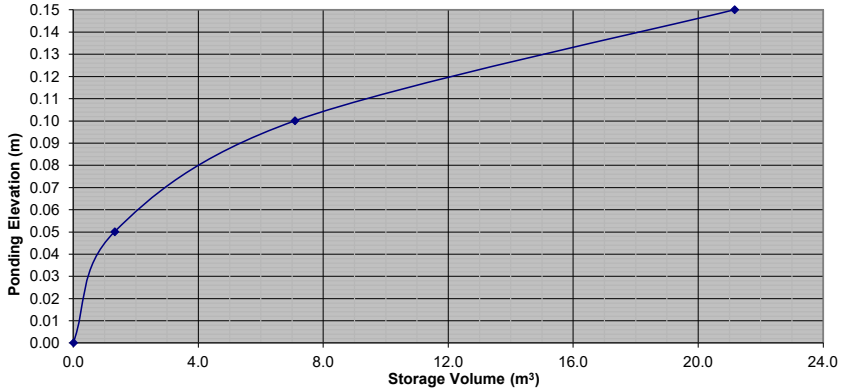
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to fully exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.95	0.95	8	7.5	
1:5 Year	1.26	1.26	10	10.1	21.2
1:100 Year	1.89	1.89	15	20.6	

Roof Drain Storage Table for Area RD 1

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	52.8	1.3
0.10	177.9	7.1
0.15	384.8	21.2

Stage Storage Curve: Area A-3
Controlled Roof Drain #1



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-3 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.049	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	7.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	12.70	11.75	3.52
10	76.81	9.42	8.47	5.08
15	61.77	7.57	6.62	5.96
20	52.03	6.38	5.43	6.51
25	45.17	5.54	4.59	6.88
30	40.04	4.91	3.96	7.13
35	36.06	4.42	3.47	7.29
40	32.86	4.03	3.08	7.39
45	30.24	3.71	2.76	7.44
50	28.04	3.44	2.49	7.46
55	26.17	3.21	2.26	7.45
60	24.56	3.01	2.06	7.42
65	23.15	2.84	1.89	7.36
70	21.91	2.69	1.74	7.29
75	20.81	2.55	1.60	7.21
90	18.14	2.22	1.27	6.88
105	16.13	1.98	1.03	6.48
120	14.56	1.79	0.84	6.01

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-3 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.049	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	10.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	17.31	16.05	4.81
10	104.19	12.77	11.51	6.91
15	83.56	10.24	8.98	8.09
20	70.25	8.61	7.35	8.82
25	60.90	7.47	6.21	9.31
30	53.93	6.61	5.35	9.63
35	48.52	5.95	4.69	9.85
40	44.18	5.42	4.16	9.98
45	40.63	4.98	3.72	10.05
50	37.65	4.62	3.36	10.07
55	35.12	4.31	3.05	10.05
60	32.94	4.04	2.78	10.00
65	31.04	3.81	2.55	9.93
70	29.37	3.60	2.34	9.83
75	27.89	3.42	2.16	9.72
90	24.29	2.98	1.72	9.28
105	21.58	2.65	1.39	8.73
120	19.47	2.39	1.13	8.11

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-3 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.049	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	33.06	31.17	9.35
10	178.56	24.32	22.43	13.46
15	142.89	19.47	17.58	15.82
20	119.95	16.34	14.45	17.34
25	103.85	14.15	12.26	18.38
30	91.87	12.51	10.62	19.12
35	82.58	11.25	9.36	19.65
40	75.15	10.24	8.35	20.03
45	69.05	9.41	7.52	20.29
50	63.95	8.71	6.82	20.47
55	59.62	8.12	6.23	20.57
60	55.89	7.61	5.72	20.61
80	44.99	6.13	4.24	20.35
100	37.90	5.16	3.27	19.64
120	32.89	4.48	2.59	18.65
140	29.15	3.97	2.08	17.48
160	26.24	3.57	1.68	16.17
180	23.90	3.26	1.37	14.75

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-3 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.049	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	26.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	39.67	37.78	11.34
10	214.27	29.19	27.30	16.38
15	171.47	23.36	21.47	19.32
20	143.94	19.61	17.72	21.26
25	124.62	16.98	15.09	22.63
30	110.24	15.02	13.13	23.63
35	99.09	13.50	11.61	24.38
40	90.17	12.28	10.39	24.94
45	82.86	11.29	9.40	25.37
50	76.74	10.45	8.56	25.69
55	71.55	9.75	7.86	25.93
60	67.07	9.14	7.25	26.09
65	63.18	8.61	6.72	26.19
70	59.75	8.14	6.25	26.25
75	56.71	7.72	5.83	26.26
90	49.33	6.72	4.83	26.08
105	43.80	5.97	4.08	25.68
120	39.47	5.38	3.49	25.11

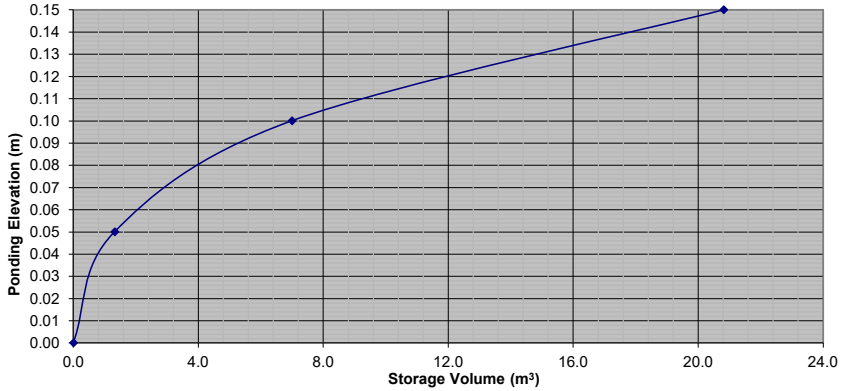
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to fully exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.95	0.95	8	7.5	
1:5 Year	1.26	1.26	10	10.1	20.8
1:100 Year	1.89	1.89	15	20.6	

Roof Drain Storage Table for Area RD 2

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	52.8	1.3
0.10	174.1	7.0
0.15	378.7	20.8

Stage Storage Curve: Area A-3
Controlled Roof Drain #2



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-4 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.037	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	5.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	9.59	8.64	2.59
10	76.81	7.11	6.16	3.70
15	61.77	5.72	4.77	4.29
20	52.03	4.82	3.87	4.64
25	45.17	4.18	3.23	4.85
30	40.04	3.71	2.76	4.96
35	36.06	3.34	2.39	5.02
40	32.86	3.04	2.09	5.02
45	30.24	2.80	1.85	4.99
50	28.04	2.60	1.65	4.94
55	26.17	2.42	1.47	4.86
60	24.56	2.27	1.32	4.76
65	23.15	2.14	1.19	4.65
70	21.91	2.03	1.08	4.53
75	20.81	1.93	0.98	4.40
90	18.14	1.68	0.73	3.94
105	16.13	1.49	0.54	3.42
120	14.56	1.35	0.40	2.87

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-4 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.037	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	6.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	13.07	11.81	3.54
10	104.19	9.65	8.39	5.03
15	83.56	7.74	6.48	5.83
20	70.25	6.50	5.24	6.29
25	60.90	5.64	4.38	6.57
30	53.93	4.99	3.73	6.72
35	48.52	4.49	3.23	6.79
40	44.18	4.09	2.83	6.79
45	40.63	3.76	2.50	6.75
50	37.65	3.49	2.23	6.68
55	35.12	3.25	1.99	6.57
60	32.94	3.05	1.79	6.44
65	31.04	2.87	1.61	6.29
70	29.37	2.72	1.46	6.13
75	27.89	2.58	1.32	5.95
90	24.29	2.25	0.99	5.34
105	21.58	2.00	0.74	4.65
120	19.47	1.80	0.54	3.90

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-4 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.037	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	14.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	24.96	23.07	6.92
10	178.56	18.37	16.48	9.89
15	142.89	14.70	12.81	11.53
20	119.95	12.34	10.45	12.54
25	103.85	10.68	8.79	13.19
30	91.87	9.45	7.56	13.61
35	82.58	8.49	6.60	13.87
40	75.15	7.73	5.84	14.01
45	69.05	7.10	5.21	14.07
50	63.95	6.58	4.69	14.06
55	59.62	6.13	4.24	14.00
60	55.89	5.75	3.86	13.89
80	44.99	4.63	2.74	13.14
100	37.90	3.90	2.01	12.05
120	32.89	3.38	1.49	10.75
140	29.15	3.00	1.11	9.31
160	26.24	2.70	0.81	7.77
180	23.90	2.46	0.57	6.14

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-4 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.037	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	18.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	29.96	28.07	8.42
10	214.27	22.04	20.15	12.09
15	171.47	17.64	15.75	14.17
20	143.94	14.81	12.92	15.50
25	124.62	12.82	10.93	16.39
30	110.24	11.34	9.45	17.01
35	99.09	10.19	8.30	17.44
40	90.17	9.28	7.39	17.72
45	82.86	8.52	6.63	17.91
50	76.74	7.89	6.00	18.01
55	71.55	7.36	5.47	18.05
60	67.07	6.90	5.01	18.03
65	63.18	6.50	4.61	17.97
70	59.75	6.15	4.26	17.87
75	56.71	5.83	3.94	17.74
90	49.33	5.07	3.18	17.20
105	43.80	4.50	2.61	16.47
120	39.47	4.06	2.17	15.63

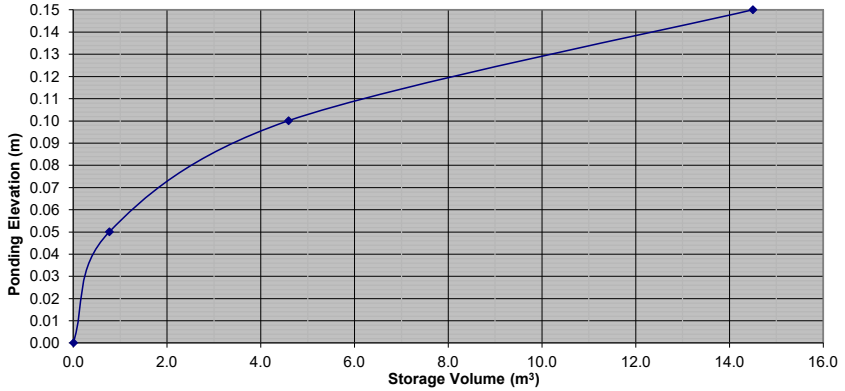
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to fully exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.95	0.95	8	5.0	
1:5 Year	1.26	1.26	10	6.8	14.5
1:100 Year	1.89	1.89	15	14.1	

Roof Drain Storage Table for Area RD 1

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	30.6	0.8
0.10	122.3	4.6
0.15	274.1	14.5

Stage Storage Curve: Area A-4
Controlled Roof Drain #1



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Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-4 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.038	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	5.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	9.85	8.90	2.67
10	76.81	7.30	6.35	3.81
15	61.77	5.87	4.92	4.43
20	52.03	4.95	4.00	4.80
25	45.17	4.29	3.34	5.02
30	40.04	3.81	2.86	5.14
35	36.06	3.43	2.48	5.20
40	32.86	3.12	2.17	5.22
45	30.24	2.88	1.93	5.20
50	28.04	2.67	1.72	5.15
55	26.17	2.49	1.54	5.08
60	24.56	2.33	1.38	4.99
65	23.15	2.20	1.25	4.88
70	21.91	2.08	1.13	4.76
75	20.81	1.98	1.03	4.63
90	18.14	1.72	0.77	4.18
105	16.13	1.53	0.58	3.68
120	14.56	1.38	0.43	3.13

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-4 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.038	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	7.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	13.42	12.16	3.65
10	104.19	9.91	8.65	5.19
15	83.56	7.94	6.68	6.02
20	70.25	6.68	5.42	6.50
25	60.90	5.79	4.53	6.79
30	53.93	5.13	3.87	6.96
35	48.52	4.61	3.35	7.04
40	44.18	4.20	2.94	7.06
45	40.63	3.86	2.60	7.03
50	37.65	3.58	2.32	6.96
55	35.12	3.34	2.08	6.86
60	32.94	3.13	1.87	6.74
65	31.04	2.95	1.69	6.60
70	29.37	2.79	1.53	6.44
75	27.89	2.65	1.39	6.26
90	24.29	2.31	1.05	5.67
105	21.58	2.05	0.79	4.99
120	19.47	1.85	0.59	4.25

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-4 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.038	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	14.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	25.64	23.75	7.12
10	178.56	18.86	16.97	10.18
15	142.89	15.10	13.21	11.88
20	119.95	12.67	10.78	12.94
25	103.85	10.97	9.08	13.62
30	91.87	9.70	7.81	14.07
35	82.58	8.72	6.83	14.35
40	75.15	7.94	6.05	14.52
45	69.05	7.29	5.40	14.59
50	63.95	6.76	4.87	14.60
55	59.62	6.30	4.41	14.55
60	55.89	5.90	4.01	14.45
80	44.99	4.75	2.86	13.74
100	37.90	4.00	2.11	12.68
120	32.89	3.48	1.59	11.41
140	29.15	3.08	1.19	9.99
160	26.24	2.77	0.88	8.47
180	23.90	2.53	0.64	6.86

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-4 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.038	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	18.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	30.77	28.88	8.66
10	214.27	22.64	20.75	12.45
15	171.47	18.11	16.22	14.60
20	143.94	15.21	13.32	15.98
25	124.62	13.16	11.27	16.91
30	110.24	11.65	9.76	17.56
35	99.09	10.47	8.58	18.01
40	90.17	9.53	7.64	18.33
45	82.86	8.75	6.86	18.53
50	76.74	8.11	6.22	18.65
55	71.55	7.56	5.67	18.71
60	67.07	7.09	5.20	18.70
65	63.18	6.67	4.78	18.66
70	59.75	6.31	4.42	18.57
75	56.71	5.99	4.10	18.45
90	49.33	5.21	3.32	17.94
105	43.80	4.63	2.74	17.24
120	39.47	4.17	2.28	16.42

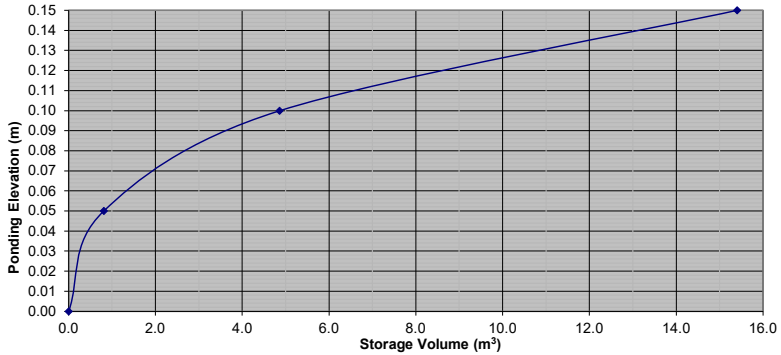
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to fully exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.95	0.95	8	5.2	
1:5 Year	1.26	1.26	10	7.1	15.4
1:100 Year	1.89	1.89	15	14.6	

Roof Drain Storage Table for Area RD 2

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	32.5	0.8
0.10	129.3	4.9
0.15	292.5	15.4

Stage Storage Curve: Area A-4
Controlled Roof Drain #2



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Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	2.54	2.22	0.67
10	76.81	1.88	1.56	0.94
15	61.77	1.51	1.19	1.08
20	52.03	1.28	0.96	1.15
25	45.17	1.11	0.79	1.18
30	40.04	0.98	0.66	1.19
35	36.06	0.88	0.56	1.18
40	32.86	0.81	0.49	1.17
45	30.24	0.74	0.42	1.14
50	28.04	0.69	0.37	1.10
55	26.17	0.64	0.32	1.06
60	24.56	0.60	0.28	1.02
65	23.15	0.57	0.25	0.97
70	21.91	0.54	0.22	0.91
75	20.81	0.51	0.19	0.86
90	18.14	0.44	0.12	0.67
105	16.13	0.40	0.08	0.48
120	14.56	0.36	0.04	0.27

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.46	3.14	0.94
10	104.19	2.55	2.23	1.34
15	83.56	2.05	1.73	1.56
20	70.25	1.72	1.40	1.68
25	60.90	1.49	1.17	1.76
30	53.93	1.32	1.00	1.80
35	48.52	1.19	0.87	1.83
40	44.18	1.08	0.76	1.83
45	40.63	1.00	0.68	1.83
50	37.65	0.92	0.60	1.81
55	35.12	0.86	0.54	1.79
60	32.94	0.81	0.49	1.76
65	31.04	0.76	0.44	1.72
70	29.37	0.72	0.40	1.68
75	27.89	0.68	0.36	1.64
90	24.29	0.60	0.28	1.49
105	21.58	0.53	0.21	1.32
120	19.47	0.48	0.16	1.13

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	4.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.61	6.29	1.89
10	178.56	4.86	4.54	2.73
15	142.89	3.89	3.57	3.22
20	119.95	3.27	2.95	3.54
25	103.85	2.83	2.51	3.76
30	91.87	2.50	2.18	3.93
35	82.58	2.25	1.93	4.05
40	75.15	2.05	1.73	4.15
45	69.05	1.88	1.56	4.22
50	63.95	1.74	1.42	4.27
55	59.62	1.62	1.30	4.30
60	55.89	1.52	1.20	4.33
80	44.99	1.23	0.91	4.35
100	37.90	1.03	0.71	4.28
120	32.89	0.90	0.58	4.15
140	29.15	0.79	0.47	3.98
160	26.24	0.71	0.39	3.79
180	23.90	0.65	0.33	3.58

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	5.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	7.93	7.61	2.28
10	214.27	5.84	5.52	3.31
15	171.47	4.67	4.35	3.92
20	143.94	3.92	3.60	4.32
25	124.62	3.40	3.08	4.61
30	110.24	3.00	2.68	4.83
35	99.09	2.70	2.38	5.00
40	90.17	2.46	2.14	5.13
45	82.86	2.26	1.94	5.23
50	76.74	2.09	1.77	5.31
55	71.55	1.95	1.63	5.38
60	67.07	1.83	1.51	5.43
65	63.18	1.72	1.40	5.46
70	59.75	1.63	1.31	5.49
75	56.71	1.54	1.22	5.51
90	49.33	1.34	1.02	5.53
105	43.80	1.19	0.87	5.50
120	39.47	1.08	0.76	5.44

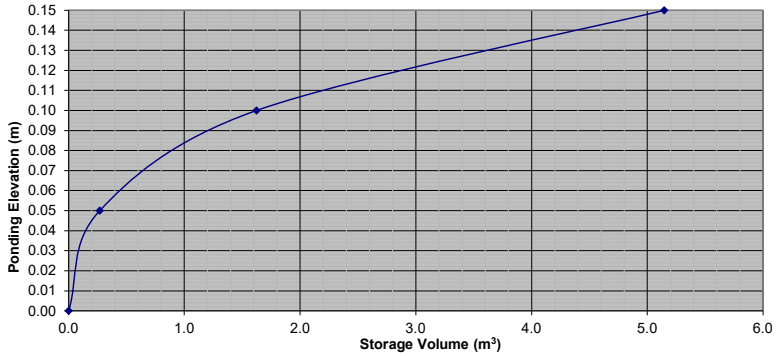
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	1.2	
1:5 Year	0.32	0.32	10	1.8	5.1
1:100 Year	0.32	0.32	15	4.3	

Roof Drain Storage Table for Area RD 1

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.8	0.3
0.10	43.3	1.6
0.15	97.6	5.1

Stage Storage Curve: Area A-5
Controlled Roof Drain #1



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.014	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	3.50	3.18	0.95
10	76.81	2.59	2.27	1.36
15	61.77	2.09	1.77	1.59
20	52.03	1.76	1.44	1.72
25	45.17	1.53	1.21	1.81
30	40.04	1.35	1.03	1.86
35	36.06	1.22	0.90	1.89
40	32.86	1.11	0.79	1.90
45	30.24	1.02	0.70	1.89
50	28.04	0.95	0.63	1.88
55	26.17	0.88	0.56	1.86
60	24.56	0.83	0.51	1.83
65	23.15	0.78	0.46	1.80
70	21.91	0.74	0.42	1.76
75	20.81	0.70	0.38	1.72
90	18.14	0.61	0.29	1.58
105	16.13	0.54	0.22	1.42
120	14.56	0.49	0.17	1.24

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.014	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	2.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.77	4.45	1.33
10	104.19	3.52	3.20	1.92
15	83.56	2.82	2.50	2.25
20	70.25	2.37	2.05	2.46
25	60.90	2.06	1.74	2.61
30	53.93	1.82	1.50	2.70
35	48.52	1.64	1.32	2.77
40	44.18	1.49	1.17	2.81
45	40.63	1.37	1.05	2.84
50	37.65	1.27	0.95	2.86
55	35.12	1.19	0.87	2.86
60	32.94	1.11	0.79	2.85
65	31.04	1.05	0.73	2.84
70	29.37	0.99	0.67	2.82
75	27.89	0.94	0.62	2.80
90	24.29	0.82	0.50	2.70
105	21.58	0.73	0.41	2.58
120	19.47	0.66	0.34	2.43

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.014	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	6.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	9.11	8.79	2.64
10	178.56	6.70	6.38	3.83
15	142.89	5.36	5.04	4.54
20	119.95	4.50	4.18	5.02
25	103.85	3.90	3.58	5.37
30	91.87	3.45	3.13	5.63
35	82.58	3.10	2.78	5.84
40	75.15	2.82	2.50	6.00
45	69.05	2.59	2.27	6.13
50	63.95	2.40	2.08	6.24
55	59.62	2.24	1.92	6.33
60	55.89	2.10	1.78	6.40
80	44.99	1.69	1.37	6.57
100	37.90	1.42	1.10	6.62
120	32.89	1.23	0.91	6.58
140	29.15	1.09	0.77	6.50
160	26.24	0.98	0.66	6.38
180	23.90	0.90	0.58	6.23

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.014	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	8.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	10.93	10.61	3.18
10	214.27	8.04	7.72	4.63
15	171.47	6.44	6.12	5.50
20	143.94	5.40	5.08	6.10
25	124.62	4.68	4.36	6.54
30	110.24	4.14	3.82	6.87
35	99.09	3.72	3.40	7.14
40	90.17	3.38	3.06	7.35
45	82.86	3.11	2.79	7.53
50	76.74	2.88	2.56	7.68
55	71.55	2.69	2.37	7.81
60	67.07	2.52	2.20	7.91
65	63.18	2.37	2.05	8.00
70	59.75	2.24	1.92	8.07
75	56.71	2.13	1.81	8.14
90	49.33	1.85	1.53	8.27
105	43.80	1.64	1.32	8.34
120	39.47	1.48	1.16	8.36

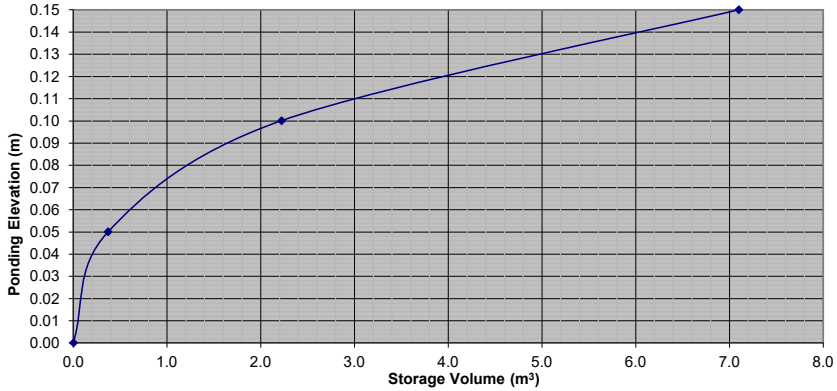
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	1.9	
1:5 Year	0.32	0.32	10	2.9	7.1
1:100 Year	0.32	0.32	15	6.6	

Roof Drain Storage Table for Area RD 2

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	14.8	0.4
0.10	59.1	2.2
0.15	136.1	7.1

Stage Storage Curve: Area A-5
Controlled Roof Drain #2



Prepared By: Novatech

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Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #3**

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.74	1.42	0.42
10	76.81	1.29	0.97	0.58
15	61.77	1.04	0.72	0.64
20	52.03	0.87	0.55	0.66
25	45.17	0.76	0.44	0.66
30	40.04	0.67	0.35	0.63
35	36.06	0.60	0.28	0.60
40	32.86	0.55	0.23	0.55
45	30.24	0.51	0.19	0.50
50	28.04	0.47	0.15	0.45
55	26.17	0.44	0.12	0.39
60	24.56	0.41	0.09	0.33
65	23.15	0.39	0.07	0.27
70	21.91	0.37	0.05	0.20
75	20.81	0.35	0.03	0.13
90	18.14	0.30	-0.02	-0.09
105	16.13	0.27	-0.05	-0.31
120	14.56	0.24	-0.08	-0.55

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #3**

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.37	2.05	0.61
10	104.19	1.75	1.43	0.86
15	83.56	1.40	1.08	0.97
20	70.25	1.18	0.86	1.03
25	60.90	1.02	0.70	1.05
30	53.93	0.90	0.58	1.05
35	48.52	0.81	0.49	1.04
40	44.18	0.74	0.42	1.01
45	40.63	0.68	0.36	0.97
50	37.65	0.63	0.31	0.93
55	35.12	0.59	0.27	0.89
60	32.94	0.55	0.23	0.84
65	31.04	0.52	0.20	0.78
70	29.37	0.49	0.17	0.72
75	27.89	0.47	0.15	0.66
90	24.29	0.41	0.09	0.47
105	21.58	0.36	0.04	0.26
120	19.47	0.33	0.01	0.05

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #3**

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.52	4.20	1.26
10	178.56	3.33	3.01	1.80
15	142.89	2.66	2.34	2.11
20	119.95	2.23	1.91	2.30
25	103.85	1.93	1.61	2.42
30	91.87	1.71	1.39	2.50
35	82.58	1.54	1.22	2.56
40	75.15	1.40	1.08	2.59
45	69.05	1.29	0.97	2.61
50	63.95	1.19	0.87	2.61
55	59.62	1.11	0.79	2.61
60	55.89	1.04	0.72	2.60
80	44.99	0.84	0.52	2.49
100	37.90	0.71	0.39	2.32
120	32.89	0.61	0.29	2.11
140	29.15	0.54	0.22	1.87
160	26.24	0.49	0.17	1.62
180	23.90	0.45	0.13	1.35

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #3**

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	5.42	5.10	1.53
10	214.27	3.99	3.67	2.20
15	171.47	3.19	2.87	2.59
20	143.94	2.68	2.36	2.83
25	124.62	2.32	2.00	3.00
30	110.24	2.05	1.73	3.12
35	99.09	1.85	1.53	3.20
40	90.17	1.68	1.36	3.26
45	82.86	1.54	1.22	3.30
50	76.74	1.43	1.11	3.33
55	71.55	1.33	1.01	3.34
60	67.07	1.25	0.93	3.35
65	63.18	1.18	0.86	3.34
70	59.75	1.11	0.79	3.33
75	56.71	1.06	0.74	3.31
90	49.33	0.92	0.60	3.23
105	43.80	0.82	0.50	3.12
120	39.47	0.74	0.42	2.99

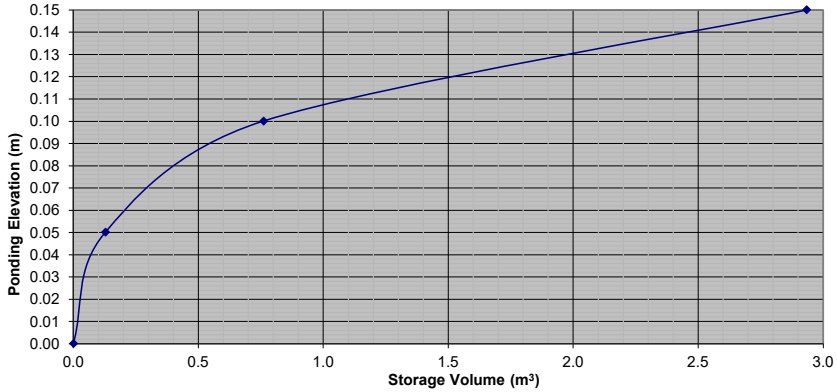
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	0.7	
1:5 Year	0.32	0.32	10	1.1	2.9
1:100 Year	0.32	0.32	15	2.6	

Roof Drain Storage Table for Area RD 3

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	5.1	0.1
0.10	20.2	0.8
0.15	66.7	2.9

Stage Storage Curve: Area A-5
Controlled Roof Drain #3



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #4**

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.65	1.33	0.40
10	76.81	1.22	0.90	0.54
15	61.77	0.98	0.66	0.60
20	52.03	0.83	0.51	0.61
25	45.17	0.72	0.40	0.60
30	40.04	0.64	0.32	0.57
35	36.06	0.57	0.25	0.53
40	32.86	0.52	0.20	0.49
45	30.24	0.48	0.16	0.43
50	28.04	0.45	0.13	0.38
55	26.17	0.42	0.10	0.32
60	24.56	0.39	0.07	0.25
65	23.15	0.37	0.05	0.19
70	21.91	0.35	0.03	0.12
75	20.81	0.33	0.01	0.05
90	18.14	0.29	-0.03	-0.17
105	16.13	0.26	-0.06	-0.40
120	14.56	0.23	-0.09	-0.64

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #4**

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.24	1.92	0.58
10	104.19	1.66	1.34	0.80
15	83.56	1.33	1.01	0.91
20	70.25	1.12	0.80	0.96
25	60.90	0.97	0.65	0.97
30	53.93	0.86	0.54	0.97
35	48.52	0.77	0.45	0.95
40	44.18	0.70	0.38	0.92
45	40.63	0.65	0.33	0.88
50	37.65	0.60	0.28	0.83
55	35.12	0.56	0.24	0.79
60	32.94	0.52	0.20	0.73
65	31.04	0.49	0.17	0.68
70	29.37	0.47	0.15	0.62
75	27.89	0.44	0.12	0.55
90	24.29	0.39	0.07	0.36
105	21.58	0.34	0.02	0.14
120	19.47	0.31	-0.01	-0.08

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #4**

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.28	3.96	1.19
10	178.56	3.15	2.83	1.70
15	142.89	2.52	2.20	1.98
20	119.95	2.12	1.80	2.16
25	103.85	1.83	1.51	2.27
30	91.87	1.62	1.30	2.34
35	82.58	1.46	1.14	2.39
40	75.15	1.33	1.01	2.42
45	69.05	1.22	0.90	2.43
50	63.95	1.13	0.81	2.43
55	59.62	1.05	0.73	2.42
60	55.89	0.99	0.67	2.40
80	44.99	0.79	0.47	2.28
100	37.90	0.67	0.35	2.09
120	32.89	0.58	0.26	1.88
140	29.15	0.51	0.19	1.63
160	26.24	0.46	0.14	1.37
180	23.90	0.42	0.10	1.10

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #4**

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	5.14	4.82	1.45
10	214.27	3.78	3.46	2.08
15	171.47	3.03	2.71	2.44
20	143.94	2.54	2.22	2.67
25	124.62	2.20	1.88	2.82
30	110.24	1.95	1.63	2.93
35	99.09	1.75	1.43	3.00
40	90.17	1.59	1.27	3.05
45	82.86	1.46	1.14	3.09
50	76.74	1.35	1.03	3.10
55	71.55	1.26	0.94	3.11
60	67.07	1.18	0.86	3.11
65	63.18	1.12	0.80	3.10
70	59.75	1.05	0.73	3.09
75	56.71	1.00	0.68	3.06
90	49.33	0.87	0.55	2.97
105	43.80	0.77	0.45	2.85
120	39.47	0.70	0.38	2.71

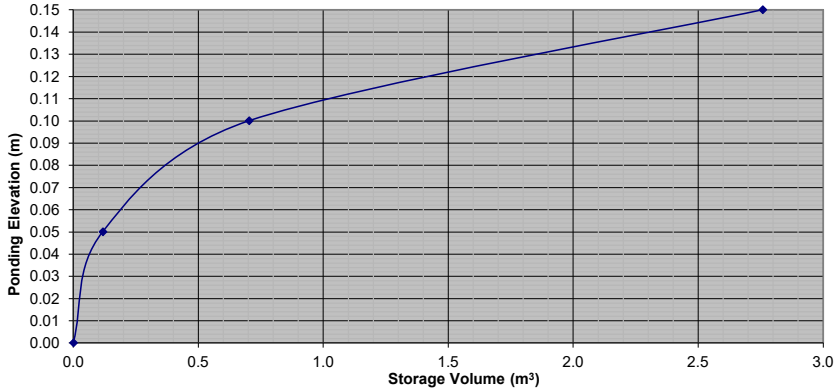
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	0.6	
1:5 Year	0.32	0.32	10	1.0	2.8
1:100 Year	0.32	0.32	15	2.4	

Roof Drain Storage Table for Area RD 4

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.7	0.1
0.10	18.7	0.7
0.15	63.5	2.8

Stage Storage Curve: Area A-5
Controlled Roof Drain #4



Prepared By: Novatech

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Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #5**

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.97	1.65	0.49
10	76.81	1.46	1.14	0.68
15	61.77	1.17	0.85	0.77
20	52.03	0.99	0.67	0.80
25	45.17	0.86	0.54	0.81
30	40.04	0.76	0.44	0.79
35	36.06	0.69	0.37	0.77
40	32.86	0.62	0.30	0.73
45	30.24	0.58	0.26	0.69
50	28.04	0.53	0.21	0.64
55	26.17	0.50	0.18	0.59
60	24.56	0.47	0.15	0.53
65	23.15	0.44	0.12	0.47
70	21.91	0.42	0.10	0.41
75	20.81	0.40	0.08	0.34
90	18.14	0.34	0.02	0.13
105	16.13	0.31	-0.01	-0.08
120	14.56	0.28	-0.04	-0.31

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #5**

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.68	2.36	0.71
10	104.19	1.98	1.66	1.00
15	83.56	1.59	1.27	1.14
20	70.25	1.34	1.02	1.22
25	60.90	1.16	0.84	1.26
30	53.93	1.03	0.71	1.27
35	48.52	0.92	0.60	1.27
40	44.18	0.84	0.52	1.25
45	40.63	0.77	0.45	1.22
50	37.65	0.72	0.40	1.19
55	35.12	0.67	0.35	1.15
60	32.94	0.63	0.31	1.10
65	31.04	0.59	0.27	1.05
70	29.37	0.56	0.24	1.00
75	27.89	0.53	0.21	0.95
90	24.29	0.46	0.14	0.77
105	21.58	0.41	0.09	0.57
120	19.47	0.37	0.05	0.36

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #5**

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	5.13	4.81	1.44
10	178.56	3.77	3.45	2.07
15	142.89	3.02	2.70	2.43
20	119.95	2.53	2.21	2.66
25	103.85	2.19	1.87	2.81
30	91.87	1.94	1.62	2.92
35	82.58	1.74	1.42	2.99
40	75.15	1.59	1.27	3.04
45	69.05	1.46	1.14	3.08
50	63.95	1.35	1.03	3.09
55	59.62	1.26	0.94	3.10
60	55.89	1.18	0.86	3.10
80	44.99	0.95	0.63	3.03
100	37.90	0.80	0.48	2.88
120	32.89	0.70	0.38	2.70
140	29.15	0.62	0.30	2.49
160	26.24	0.55	0.23	2.25
180	23.90	0.51	0.19	2.00

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #5**

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	4.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	6.15	5.83	1.75
10	214.27	4.53	4.21	2.52
15	171.47	3.62	3.30	2.97
20	143.94	3.04	2.72	3.27
25	124.62	2.63	2.31	3.47
30	110.24	2.33	2.01	3.62
35	99.09	2.09	1.77	3.72
40	90.17	1.91	1.59	3.80
45	82.86	1.75	1.43	3.86
50	76.74	1.62	1.30	3.90
55	71.55	1.51	1.19	3.93
60	67.07	1.42	1.10	3.95
65	63.18	1.33	1.01	3.96
70	59.75	1.26	0.94	3.96
75	56.71	1.20	0.88	3.95
90	49.33	1.04	0.72	3.90
105	43.80	0.93	0.61	3.81
120	39.47	0.83	0.51	3.70

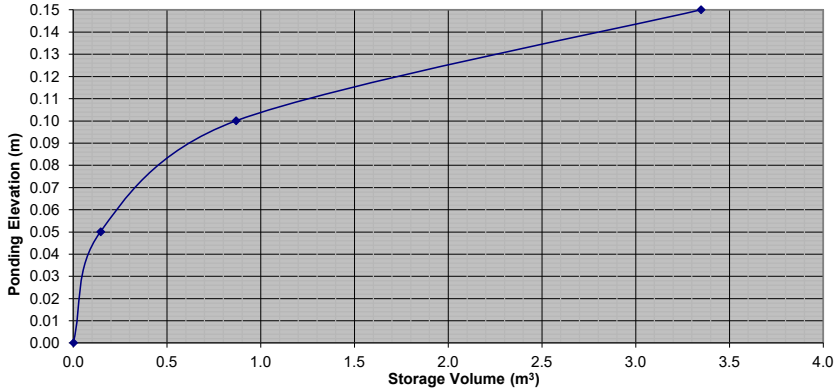
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	0.8	
1:5 Year	0.32	0.32	10	1.3	3.3
1:100 Year	0.32	0.32	15	3.1	

Roof Drain Storage Table for Area RD 5

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	5.8	0.1
0.10	23.1	0.9
0.15	76.1	3.3

Stage Storage Curve: Area A-5
Controlled Roof Drain #5



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #6**

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	0.93	0.61	0.18
10	76.81	0.69	0.37	0.22
15	61.77	0.56	0.24	0.21
20	52.03	0.47	0.15	0.18
25	45.17	0.41	0.09	0.13
30	40.04	0.36	0.04	0.07
35	36.06	0.32	0.00	0.01
40	32.86	0.30	-0.02	-0.06
45	30.24	0.27	-0.05	-0.13
50	28.04	0.25	-0.07	-0.20
55	26.17	0.24	-0.08	-0.28
60	24.56	0.22	-0.10	-0.36
65	23.15	0.21	-0.11	-0.43
70	21.91	0.20	-0.12	-0.52
75	20.81	0.19	-0.13	-0.60
90	18.14	0.16	-0.16	-0.85
105	16.13	0.15	-0.17	-1.10
120	14.56	0.13	-0.19	-1.36

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #6**

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.27	0.95	0.29
10	104.19	0.94	0.62	0.37
15	83.56	0.75	0.43	0.39
20	70.25	0.63	0.31	0.38
25	60.90	0.55	0.23	0.34
30	53.93	0.49	0.17	0.30
35	48.52	0.44	0.12	0.25
40	44.18	0.40	0.08	0.19
45	40.63	0.37	0.05	0.12
50	37.65	0.34	0.02	0.06
55	35.12	0.32	0.00	-0.01
60	32.94	0.30	-0.02	-0.08
65	31.04	0.28	-0.04	-0.16
70	29.37	0.26	-0.06	-0.23
75	27.89	0.25	-0.07	-0.31
90	24.29	0.22	-0.10	-0.55
105	21.58	0.19	-0.13	-0.79
120	19.47	0.18	-0.14	-1.04

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #6**

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	2.43	2.11	0.63
10	178.56	1.79	1.47	0.88
15	142.89	1.43	1.11	1.00
20	119.95	1.20	0.88	1.06
25	103.85	1.04	0.72	1.08
30	91.87	0.92	0.60	1.08
35	82.58	0.83	0.51	1.06
40	75.15	0.75	0.43	1.04
45	69.05	0.69	0.37	1.00
50	63.95	0.64	0.32	0.96
55	59.62	0.60	0.28	0.91
60	55.89	0.56	0.24	0.86
80	44.99	0.45	0.13	0.63
100	37.90	0.38	0.06	0.36
120	32.89	0.33	0.01	0.07
140	29.15	0.29	-0.03	-0.24
160	26.24	0.26	-0.06	-0.55
180	23.90	0.24	-0.08	-0.87

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #6**

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	2.91	2.59	0.78
10	214.27	2.14	1.82	1.09
15	171.47	1.72	1.40	1.26
20	143.94	1.44	1.12	1.34
25	124.62	1.25	0.93	1.39
30	110.24	1.10	0.78	1.41
35	99.09	0.99	0.67	1.41
40	90.17	0.90	0.58	1.40
45	82.86	0.83	0.51	1.38
50	76.74	0.77	0.45	1.34
55	71.55	0.72	0.40	1.31
60	67.07	0.67	0.35	1.26
65	63.18	0.63	0.31	1.22
70	59.75	0.60	0.28	1.17
75	56.71	0.57	0.25	1.11
90	49.33	0.49	0.17	0.94
105	43.80	0.44	0.12	0.75
120	39.47	0.40	0.08	0.54

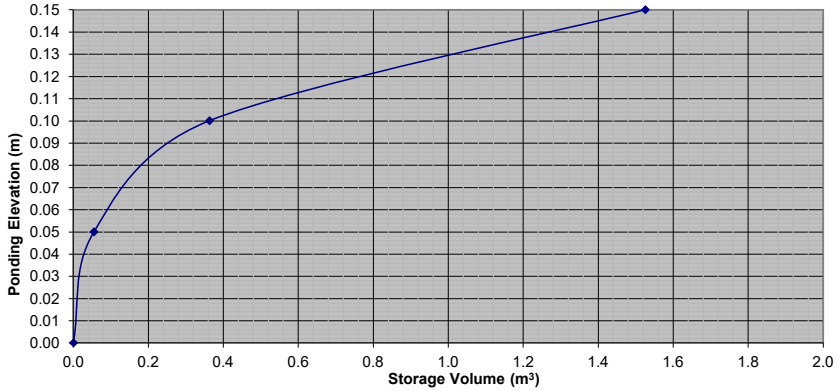
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	0.2	
1:5 Year	0.32	0.32	10	0.4	1.5
1:100 Year	0.32	0.32	15	1.1	

Roof Drain Storage Table for Area RD 6

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	2.2	0.1
0.10	10.1	0.4
0.15	36.4	1.5

Stage Storage Curve: Area A-5
Controlled Roof Drain #6



Prepared By: Novatech

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Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #7**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	3.01	2.69	0.81
10	76.81	2.23	1.91	1.15
15	61.77	1.79	1.47	1.33
20	52.03	1.51	1.19	1.43
25	45.17	1.31	0.99	1.49
30	40.04	1.16	0.84	1.52
35	36.06	1.05	0.73	1.53
40	32.86	0.95	0.63	1.52
45	30.24	0.88	0.56	1.51
50	28.04	0.81	0.49	1.48
55	26.17	0.76	0.44	1.45
60	24.56	0.71	0.39	1.41
65	23.15	0.67	0.35	1.37
70	21.91	0.64	0.32	1.33
75	20.81	0.60	0.28	1.28
90	18.14	0.53	0.21	1.12
105	16.13	0.47	0.15	0.93
120	14.56	0.42	0.10	0.74

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #7**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	2.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.10	3.78	1.13
10	104.19	3.02	2.70	1.62
15	83.56	2.43	2.11	1.89
20	70.25	2.04	1.72	2.06
25	60.90	1.77	1.45	2.17
30	53.93	1.57	1.25	2.24
35	48.52	1.41	1.09	2.29
40	44.18	1.28	0.96	2.31
45	40.63	1.18	0.86	2.32
50	37.65	1.09	0.77	2.32
55	35.12	1.02	0.70	2.31
60	32.94	0.96	0.64	2.29
65	31.04	0.90	0.58	2.27
70	29.37	0.85	0.53	2.24
75	27.89	0.81	0.49	2.20
90	24.29	0.70	0.38	2.08
105	21.58	0.63	0.31	1.93
120	19.47	0.57	0.25	1.76

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #7**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	5.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	7.83	7.51	2.25
10	178.56	5.76	5.44	3.26
15	142.89	4.61	4.29	3.86
20	119.95	3.87	3.55	4.26
25	103.85	3.35	3.03	4.54
30	91.87	2.96	2.64	4.76
35	82.58	2.66	2.34	4.92
40	75.15	2.42	2.10	5.05
45	69.05	2.23	1.91	5.15
50	63.95	2.06	1.74	5.23
55	59.62	1.92	1.60	5.29
60	55.89	1.80	1.48	5.34
80	44.99	1.45	1.13	5.43
100	37.90	1.22	0.90	5.41
120	32.89	1.06	0.74	5.33
140	29.15	0.94	0.62	5.21
160	26.24	0.85	0.53	5.05
180	23.90	0.77	0.45	4.87

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #7**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	6.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	9.39	9.07	2.72
10	214.27	6.91	6.59	3.95
15	171.47	5.53	5.21	4.69
20	143.94	4.64	4.32	5.19
25	124.62	4.02	3.70	5.55
30	110.24	3.56	3.24	5.82
35	99.09	3.20	2.88	6.04
40	90.17	2.91	2.59	6.21
45	82.86	2.67	2.35	6.35
50	76.74	2.47	2.15	6.46
55	71.55	2.31	1.99	6.56
60	67.07	2.16	1.84	6.63
65	63.18	2.04	1.72	6.70
70	59.75	1.93	1.61	6.75
75	56.71	1.83	1.51	6.79
90	49.33	1.59	1.27	6.86
105	43.80	1.41	1.09	6.88
120	39.47	1.27	0.95	6.86

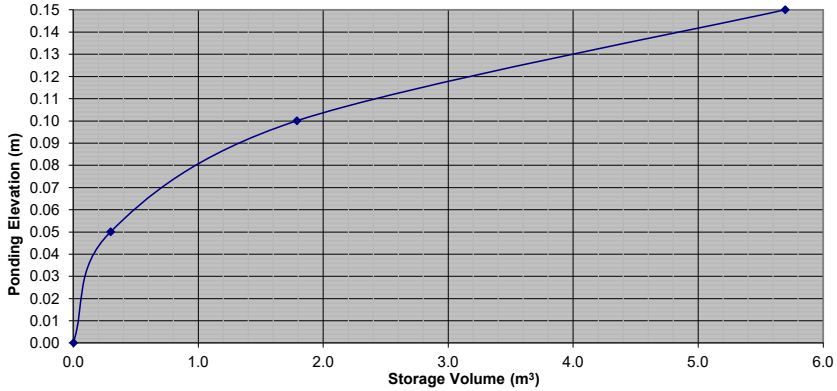
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	1.5	
1:5 Year	0.32	0.32	10	2.3	5.7
1:100 Year	0.32	0.32	15	5.4	

Roof Drain Storage Table for Area RD 7

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	11.9	0.3
0.10	47.7	1.8
0.15	108.6	5.7

Stage Storage Curve: Area A-5
Controlled Roof Drain #7



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #8**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	3.08	2.76	0.83
10	76.81	2.29	1.97	1.18
15	61.77	1.84	1.52	1.37
20	52.03	1.55	1.23	1.48
25	45.17	1.34	1.02	1.54
30	40.04	1.19	0.87	1.57
35	36.06	1.07	0.75	1.58
40	32.86	0.98	0.66	1.58
45	30.24	0.90	0.58	1.57
50	28.04	0.83	0.51	1.54
55	26.17	0.78	0.46	1.52
60	24.56	0.73	0.41	1.48
65	23.15	0.69	0.37	1.44
70	21.91	0.65	0.33	1.40
75	20.81	0.62	0.30	1.35
90	18.14	0.54	0.22	1.19
105	16.13	0.48	0.16	1.01
120	14.56	0.43	0.11	0.82

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #8**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	2.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.20	3.88	1.17
10	104.19	3.10	2.78	1.67
15	83.56	2.49	2.17	1.95
20	70.25	2.09	1.77	2.13
25	60.90	1.81	1.49	2.24
30	53.93	1.61	1.29	2.31
35	48.52	1.44	1.12	2.36
40	44.18	1.32	1.00	2.39
45	40.63	1.21	0.89	2.40
50	37.65	1.12	0.80	2.40
55	35.12	1.05	0.73	2.39
60	32.94	0.98	0.66	2.38
65	31.04	0.92	0.60	2.36
70	29.37	0.87	0.55	2.33
75	27.89	0.83	0.51	2.30
90	24.29	0.72	0.40	2.18
105	21.58	0.64	0.32	2.03
120	19.47	0.58	0.26	1.87

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #8**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	5.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	8.03	7.71	2.31
10	178.56	5.91	5.59	3.35
15	142.89	4.73	4.41	3.97
20	119.95	3.97	3.65	4.38
25	103.85	3.44	3.12	4.67
30	91.87	3.04	2.72	4.89
35	82.58	2.73	2.41	5.06
40	75.15	2.49	2.17	5.20
45	69.05	2.28	1.96	5.30
50	63.95	2.12	1.80	5.39
55	59.62	1.97	1.65	5.45
60	55.89	1.85	1.53	5.50
80	44.99	1.49	1.17	5.61
100	37.90	1.25	0.93	5.60
120	32.89	1.09	0.77	5.53
140	29.15	0.96	0.64	5.41
160	26.24	0.87	0.55	5.26
180	23.90	0.79	0.47	5.08

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #8**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	7.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	9.63	9.31	2.79
10	214.27	7.09	6.77	4.06
15	171.47	5.67	5.35	4.82
20	143.94	4.76	4.44	5.33
25	124.62	4.12	3.80	5.70
30	110.24	3.65	3.33	5.99
35	99.09	3.28	2.96	6.21
40	90.17	2.98	2.66	6.39
45	82.86	2.74	2.42	6.54
50	76.74	2.54	2.22	6.66
55	71.55	2.37	2.05	6.75
60	67.07	2.22	1.90	6.84
65	63.18	2.09	1.77	6.90
70	59.75	1.98	1.66	6.96
75	56.71	1.88	1.56	7.00
90	49.33	1.63	1.31	7.09
105	43.80	1.45	1.13	7.11
120	39.47	1.31	0.99	7.10

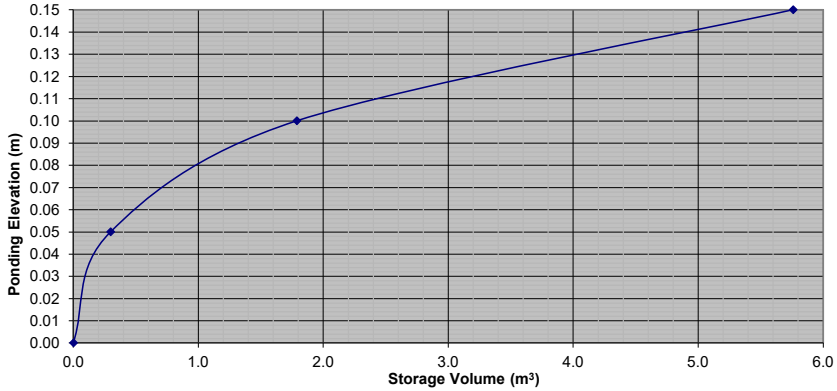
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	1.6	
1:5 Year	0.32	0.32	10	2.4	5.8
1:100 Year	0.32	0.32	15	5.6	

Roof Drain Storage Table for Area RD 8

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	11.9	0.3
0.10	47.7	1.8
0.15	111.1	5.8

Stage Storage Curve: Area A-5
Controlled Roof Drain #8



Prepared By: Novatech

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Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #9**

OTTAWA IDF CURVE

Area =	0.011	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	2.72	2.40	0.72
10	76.81	2.02	1.70	1.02
15	61.77	1.62	1.30	1.17
20	52.03	1.37	1.05	1.26
25	45.17	1.19	0.87	1.30
30	40.04	1.05	0.73	1.32
35	36.06	0.95	0.63	1.32
40	32.86	0.86	0.54	1.30
45	30.24	0.79	0.47	1.28
50	28.04	0.74	0.42	1.25
55	26.17	0.69	0.37	1.21
60	24.56	0.65	0.33	1.17
65	23.15	0.61	0.29	1.12
70	21.91	0.58	0.26	1.07
75	20.81	0.55	0.23	1.02
90	18.14	0.48	0.16	0.85
105	16.13	0.42	0.10	0.65
120	14.56	0.38	0.06	0.45

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #9**

OTTAWA IDF CURVE

Area =	0.011	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	2.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.71	3.39	1.02
10	104.19	2.74	2.42	1.45
15	83.56	2.20	1.88	1.69
20	70.25	1.85	1.53	1.83
25	60.90	1.60	1.28	1.92
30	53.93	1.42	1.10	1.97
35	48.52	1.27	0.95	2.00
40	44.18	1.16	0.84	2.02
45	40.63	1.07	0.75	2.02
50	37.65	0.99	0.67	2.01
55	35.12	0.92	0.60	1.99
60	32.94	0.87	0.55	1.96
65	31.04	0.82	0.50	1.93
70	29.37	0.77	0.45	1.90
75	27.89	0.73	0.41	1.86
90	24.29	0.64	0.32	1.72
105	21.58	0.57	0.25	1.56
120	19.47	0.51	0.19	1.38

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #9**

OTTAWA IDF CURVE

Area =	0.011	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	4.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	7.08	6.76	2.03
10	178.56	5.21	4.89	2.94
15	142.89	4.17	3.85	3.47
20	119.95	3.50	3.18	3.82
25	103.85	3.03	2.71	4.07
30	91.87	2.68	2.36	4.25
35	82.58	2.41	2.09	4.39
40	75.15	2.19	1.87	4.50
45	69.05	2.02	1.70	4.58
50	63.95	1.87	1.55	4.64
55	59.62	1.74	1.42	4.69
60	55.89	1.63	1.31	4.72
80	44.99	1.31	0.99	4.77
100	37.90	1.11	0.79	4.72
120	32.89	0.96	0.64	4.61
140	29.15	0.85	0.53	4.46
160	26.24	0.77	0.45	4.28
180	23.90	0.70	0.38	4.08

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #9**

OTTAWA IDF CURVE

Area =	0.011	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	6.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	8.50	8.18	2.45
10	214.27	6.25	5.93	3.56
15	171.47	5.01	4.69	4.22
20	143.94	4.20	3.88	4.66
25	124.62	3.64	3.32	4.98
30	110.24	3.22	2.90	5.22
35	99.09	2.89	2.57	5.40
40	90.17	2.63	2.31	5.55
45	82.86	2.42	2.10	5.67
50	76.74	2.24	1.92	5.76
55	71.55	2.09	1.77	5.84
60	67.07	1.96	1.64	5.90
65	63.18	1.84	1.52	5.94
70	59.75	1.74	1.42	5.98
75	56.71	1.66	1.34	6.01
90	49.33	1.44	1.12	6.05
105	43.80	1.28	0.96	6.04
120	39.47	1.15	0.83	5.99

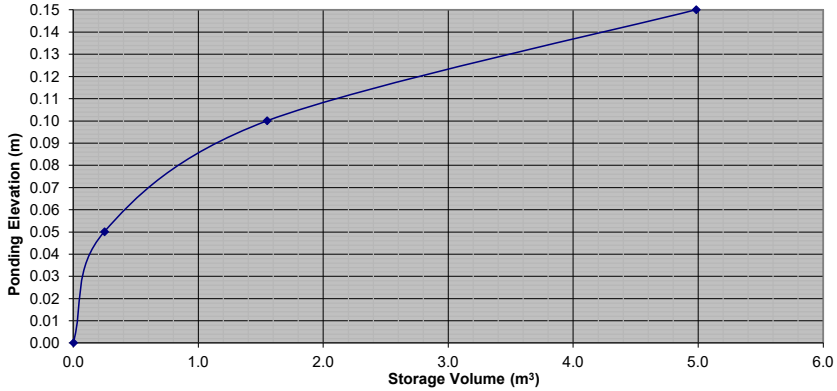
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	1.3	
1:5 Year	0.32	0.32	10	2.0	5.0
1:100 Year	0.32	0.32	14	4.8	

Roof Drain Storage Table for Area RD 9

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	9.9	0.2
0.10	42.2	1.6
0.15	95.1	5.0

Stage Storage Curve: Area A-5
Controlled Roof Drain #9



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Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 Controlled Roof Drain #10

OTTAWA IDF CURVE
Area = 0.011 ha Qallow = 0.32 L/s
C = 0.90 Vol(max) = 1.4 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	2.82	2.50	0.75
10	76.81	2.09	1.77	1.06
15	61.77	1.68	1.36	1.23
20	52.03	1.42	1.10	1.32
25	45.17	1.23	0.91	1.37
30	40.04	1.09	0.77	1.39
35	36.06	0.98	0.66	1.39
40	32.86	0.90	0.58	1.38
45	30.24	0.82	0.50	1.36
50	28.04	0.76	0.44	1.33
55	26.17	0.71	0.39	1.30
60	24.56	0.67	0.35	1.26
65	23.15	0.63	0.31	1.21
70	21.91	0.60	0.28	1.17
75	20.81	0.57	0.25	1.11
90	18.14	0.49	0.17	0.94
105	16.13	0.44	0.12	0.76
120	14.56	0.40	0.08	0.56

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 Controlled Roof Drain #10

OTTAWA IDF CURVE
Area = 0.011 ha Qallow = 0.32 L/s
C = 0.90 Vol(max) = 2.1 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.85	3.53	1.06
10	104.19	2.84	2.52	1.51
15	83.56	2.28	1.96	1.76
20	70.25	1.92	1.60	1.92
25	60.90	1.66	1.34	2.01
30	53.93	1.47	1.15	2.07
35	48.52	1.32	1.00	2.11
40	44.18	1.20	0.88	2.12
45	40.63	1.11	0.79	2.13
50	37.65	1.03	0.71	2.12
55	35.12	0.96	0.64	2.10
60	32.94	0.90	0.58	2.08
65	31.04	0.85	0.53	2.05
70	29.37	0.80	0.48	2.02
75	27.89	0.76	0.44	1.98
90	24.29	0.66	0.34	1.85
105	21.58	0.59	0.27	1.69
120	19.47	0.53	0.21	1.52

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 Controlled Roof Drain #10

OTTAWA IDF CURVE
Area = 0.011 ha Qallow = 0.32 L/s
C = 1.00 Vol(max) = 5.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	7.35	7.03	2.11
10	178.56	5.41	5.09	3.05
15	142.89	4.33	4.01	3.61
20	119.95	3.63	3.31	3.98
25	103.85	3.15	2.83	4.24
30	91.87	2.78	2.46	4.43
35	82.58	2.50	2.18	4.58
40	75.15	2.28	1.96	4.70
45	69.05	2.09	1.77	4.79
50	63.95	1.94	1.62	4.85
55	59.62	1.81	1.49	4.91
60	55.89	1.69	1.37	4.95
80	44.99	1.36	1.04	5.01
100	37.90	1.15	0.83	4.97
120	32.89	1.00	0.68	4.87
140	29.15	0.88	0.56	4.73
160	26.24	0.80	0.48	4.56
180	23.90	0.72	0.40	4.37

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 Controlled Roof Drain #10

OTTAWA IDF CURVE
Area = 0.011 ha Qallow = 0.32 L/s
C = 1.00 Vol(max) = 6.3 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	8.83	8.51	2.55
10	214.27	6.49	6.17	3.70
15	171.47	5.20	4.88	4.39
20	143.94	4.36	4.04	4.85
25	124.62	3.78	3.46	5.18
30	110.24	3.34	3.02	5.44
35	99.09	3.00	2.68	5.63
40	90.17	2.73	2.41	5.79
45	82.86	2.51	2.19	5.92
50	76.74	2.33	2.01	6.02
55	71.55	2.17	1.85	6.10
60	67.07	2.03	1.71	6.16
65	63.18	1.91	1.59	6.22
70	59.75	1.81	1.49	6.26
75	56.71	1.72	1.40	6.29
90	49.33	1.49	1.17	6.34
105	43.80	1.33	1.01	6.34
120	39.47	1.20	0.88	6.31

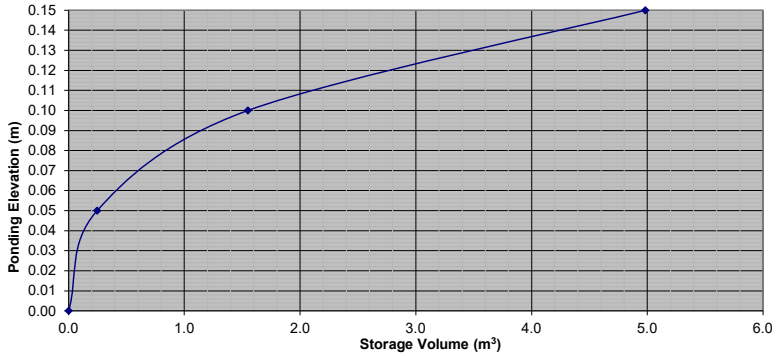
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	1.4	
1:5 Year	0.32	0.32	10	2.1	5.0
1:100 Year	0.32	0.32	14	5.0	

Roof Drain Storage Table for Area RD 10

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	9.9	0.2
0.10	42.2	1.6
0.15	95.1	5.0

Stage Storage Curve: Area A-5
Controlled Roof Drain #10



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #11**

OTTAWA IDF CURVE

Area =	0.020	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	2.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	5.16	4.45	1.33
10	76.81	3.82	3.11	1.87
15	61.77	3.08	2.37	2.13
20	52.03	2.59	1.88	2.26
25	45.17	2.25	1.54	2.31
30	40.04	1.99	1.28	2.31
35	36.06	1.80	1.09	2.28
40	32.86	1.64	0.93	2.22
45	30.24	1.51	0.80	2.15
50	28.04	1.40	0.69	2.06
55	26.17	1.30	0.59	1.96
60	24.56	1.22	0.51	1.85
65	23.15	1.15	0.44	1.73
70	21.91	1.09	0.38	1.60
75	20.81	1.04	0.33	1.47
90	18.14	0.90	0.19	1.04
105	16.13	0.80	0.09	0.59
120	14.56	0.73	0.02	0.11

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #11**

OTTAWA IDF CURVE

Area =	0.020	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	3.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	7.03	6.24	1.87
10	104.19	5.19	4.40	2.64
15	83.56	4.16	3.37	3.03
20	70.25	3.50	2.71	3.25
25	60.90	3.03	2.24	3.36
30	53.93	2.69	1.90	3.41
35	48.52	2.42	1.63	3.41
40	44.18	2.20	1.41	3.38
45	40.63	2.02	1.23	3.33
50	37.65	1.87	1.08	3.25
55	35.12	1.75	0.96	3.16
60	32.94	1.64	0.85	3.06
65	31.04	1.55	0.76	2.95
70	29.37	1.46	0.67	2.82
75	27.89	1.39	0.60	2.69
90	24.29	1.21	0.42	2.26
105	21.58	1.07	0.28	1.79
120	19.47	0.97	0.18	1.29

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #11**

OTTAWA IDF CURVE

Area =	0.020	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	7.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	13.43	12.48	3.74
10	178.56	9.88	8.93	5.36
15	142.89	7.91	6.96	6.26
20	119.95	6.64	5.69	6.82
25	103.85	5.75	4.80	7.19
30	91.87	5.08	4.13	7.44
35	82.58	4.57	3.62	7.60
40	75.15	4.16	3.21	7.70
45	69.05	3.82	2.87	7.75
50	63.95	3.54	2.59	7.76
55	59.62	3.30	2.35	7.75
60	55.89	3.09	2.14	7.71
80	44.99	2.49	1.54	7.39
100	37.90	2.10	1.15	6.88
120	32.89	1.82	0.87	6.26
140	29.15	1.61	0.66	5.57
160	26.24	1.45	0.50	4.82
180	23.90	1.32	0.37	4.02

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #11**

OTTAWA IDF CURVE

Area =	0.020	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	9.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	16.11	15.16	4.55
10	214.27	11.85	10.90	6.54
15	171.47	9.49	8.54	7.68
20	143.94	7.96	7.01	8.42
25	124.62	6.89	5.94	8.92
30	110.24	6.10	5.15	9.27
35	99.09	5.48	4.53	9.52
40	90.17	4.99	4.04	9.69
45	82.86	4.58	3.63	9.81
50	76.74	4.25	3.30	9.89
55	71.55	3.96	3.01	9.93
60	67.07	3.71	2.76	9.94
65	63.18	3.50	2.55	9.93
70	59.75	3.31	2.36	9.89
75	56.71	3.14	2.19	9.84
90	49.33	2.73	1.78	9.61
105	43.80	2.42	1.47	9.28
120	39.47	2.18	1.23	8.88

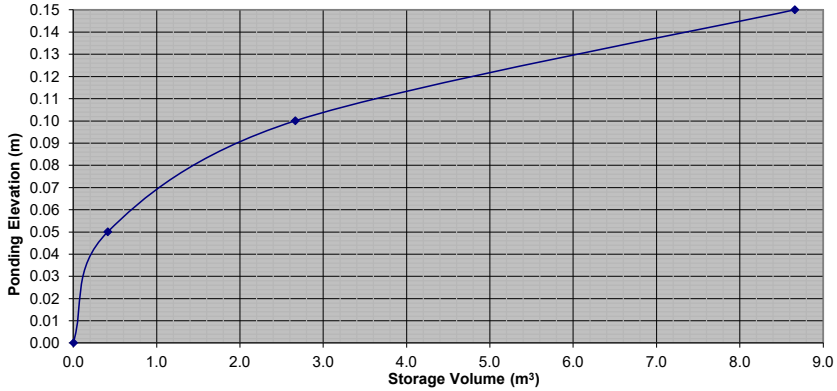
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	2.3	
1:5 Year	0.79	0.79	10	3.4	8.7
1:100 Year	0.95	0.95	15	7.8	

Roof Drain Storage Table for Area RD 11

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	16.5	0.4
0.10	73.5	2.7
0.15	166.3	8.7

Stage Storage Curve: Area A-5
Controlled Roof Drain #11



Prepared By: Novatech

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Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 Controlled Roof Drain #12

OTTAWA IDF CURVE
Area = 0.025 ha Qallow = 0.71 L/s
C = 0.90 Vol(max) = 3.2 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	6.45	5.74	1.72
10	76.81	4.78	4.07	2.44
15	61.77	3.85	3.14	2.82
20	52.03	3.24	2.53	3.04
25	45.17	2.81	2.10	3.16
30	40.04	2.49	1.78	3.21
35	36.06	2.25	1.54	3.23
40	32.86	2.05	1.34	3.21
45	30.24	1.88	1.17	3.17
50	28.04	1.75	1.04	3.11
55	26.17	1.63	0.92	3.04
60	24.56	1.53	0.82	2.95
65	23.15	1.44	0.73	2.86
70	21.91	1.37	0.66	2.75
75	20.81	1.30	0.59	2.64
90	18.14	1.13	0.42	2.27
105	16.13	1.01	0.30	1.86
120	14.56	0.91	0.20	1.42

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 Controlled Roof Drain #12

OTTAWA IDF CURVE
Area = 0.025 ha Qallow = 0.79 L/s
C = 0.90 Vol(max) = 4.7 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	8.80	8.01	2.40
10	104.19	6.49	5.70	3.42
15	83.56	5.21	4.42	3.97
20	70.25	4.38	3.59	4.30
25	60.90	3.79	3.00	4.51
30	53.93	3.36	2.57	4.63
35	48.52	3.02	2.23	4.69
40	44.18	2.75	1.96	4.71
45	40.63	2.53	1.74	4.70
50	37.65	2.35	1.56	4.67
55	35.12	2.19	1.40	4.61
60	32.94	2.05	1.26	4.54
65	31.04	1.93	1.14	4.46
70	29.37	1.83	1.04	4.37
75	27.89	1.74	0.95	4.26
90	24.29	1.51	0.72	3.91
105	21.58	1.34	0.55	3.49
120	19.47	1.21	0.42	3.04

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 Controlled Roof Drain #12

OTTAWA IDF CURVE
Area = 0.025 ha Qallow = 0.95 L/s
C = 1.00 Vol(max) = 10.5 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	16.80	15.85	4.76
10	178.56	12.36	11.41	6.85
15	142.89	9.89	8.94	8.05
20	119.95	8.30	7.35	8.82
25	103.85	7.19	6.24	9.36
30	91.87	6.36	5.41	9.74
35	82.58	5.72	4.77	10.01
40	75.15	5.20	4.25	10.20
45	69.05	4.78	3.83	10.34
50	63.95	4.43	3.48	10.43
55	59.62	4.13	3.18	10.49
60	55.89	3.87	2.92	10.51
80	44.99	3.11	2.16	10.39
100	37.90	2.62	1.67	10.04
120	32.89	2.28	1.33	9.55
140	29.15	2.02	1.07	8.97
160	26.24	1.82	0.87	8.32
180	23.90	1.65	0.70	7.61

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 Controlled Roof Drain #12

OTTAWA IDF CURVE
Area = 0.025 ha Qallow = 0.95 L/s
C = 1.00 Vol(max) = 13.4 m3

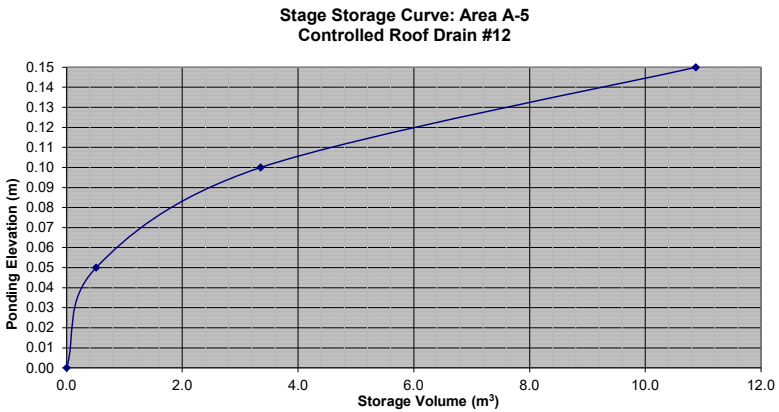
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	20.16	19.21	5.76
10	214.27	14.83	13.88	8.33
15	171.47	11.87	10.92	9.83
20	143.94	9.96	9.01	10.82
25	124.62	8.63	7.68	11.51
30	110.24	7.63	6.68	12.03
35	99.09	6.86	5.91	12.41
40	90.17	6.24	5.29	12.70
45	82.86	5.74	4.79	12.92
50	76.74	5.31	4.36	13.09
55	71.55	4.95	4.00	13.21
60	67.07	4.64	3.69	13.29
65	63.18	4.37	3.42	13.35
70	59.75	4.14	3.19	13.38
75	56.71	3.93	2.98	13.39
90	49.33	3.41	2.46	13.31
105	43.80	3.03	2.08	13.11
120	39.47	2.73	1.78	12.83

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	3.2	
1:5 Year	0.79	0.79	10	4.7	10.9
1:100 Year	0.95	0.95	15	10.5	

Roof Drain Storage Table for Area RD 12

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	20.3	0.5
0.10	93.4	3.4
0.15	207.4	10.9



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Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 Controlled Roof Drain #13

OTTAWA IDF CURVE
Area = 0.019 ha Qallow = 0.71 L/s
C = 0.90 Vol(max) = 2.2 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	5.00	4.29	1.29
10	76.81	3.71	3.00	1.80
15	61.77	2.98	2.27	2.05
20	52.03	2.51	1.80	2.16
25	45.17	2.18	1.47	2.21
30	40.04	1.93	1.22	2.20
35	36.06	1.74	1.03	2.17
40	32.86	1.59	0.88	2.10
45	30.24	1.46	0.75	2.03
50	28.04	1.35	0.64	1.93
55	26.17	1.26	0.55	1.83
60	24.56	1.19	0.48	1.71
65	23.15	1.12	0.41	1.59
70	21.91	1.06	0.35	1.46
75	20.81	1.01	0.30	1.33
90	18.14	0.88	0.17	0.90
105	16.13	0.78	0.07	0.44
120	14.56	0.70	-0.01	-0.05

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 Controlled Roof Drain #13

OTTAWA IDF CURVE
Area = 0.019 ha Qallow = 0.79 L/s
C = 0.90 Vol(max) = 3.3 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	6.82	6.03	1.81
10	104.19	5.03	4.24	2.54
15	83.56	4.03	3.24	2.92
20	70.25	3.39	2.60	3.12
25	60.90	2.94	2.15	3.23
30	53.93	2.60	1.81	3.27
35	48.52	2.34	1.55	3.26
40	44.18	2.13	1.34	3.22
45	40.63	1.96	1.17	3.16
50	37.65	1.82	1.03	3.08
55	35.12	1.70	0.91	2.99
60	32.94	1.59	0.80	2.88
65	31.04	1.50	0.71	2.77
70	29.37	1.42	0.63	2.64
75	27.89	1.35	0.56	2.51
90	24.29	1.17	0.38	2.07
105	21.58	1.04	0.25	1.59
120	19.47	0.94	0.15	1.08

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 Controlled Roof Drain #13

OTTAWA IDF CURVE
Area = 0.019 ha Qallow = 0.95 L/s
C = 1.00 Vol(max) = 7.4 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	13.02	12.07	3.62
10	178.56	9.58	8.63	5.18
15	142.89	7.67	6.72	6.05
20	119.95	6.44	5.49	6.58
25	103.85	5.57	4.62	6.93
30	91.87	4.93	3.98	7.16
35	82.58	4.43	3.48	7.31
40	75.15	4.03	3.08	7.40
45	69.05	3.70	2.75	7.44
50	63.95	3.43	2.48	7.44
55	59.62	3.20	2.25	7.42
60	55.89	3.00	2.05	7.38
80	44.99	2.41	1.46	7.03
100	37.90	2.03	1.08	6.50
120	32.89	1.76	0.81	5.87
140	29.15	1.56	0.61	5.16
160	26.24	1.41	0.46	4.40
180	23.90	1.28	0.33	3.59

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 Controlled Roof Drain #13

OTTAWA IDF CURVE
Area = 0.019 ha Qallow = 0.95 L/s
C = 1.00 Vol(max) = 9.5 m3

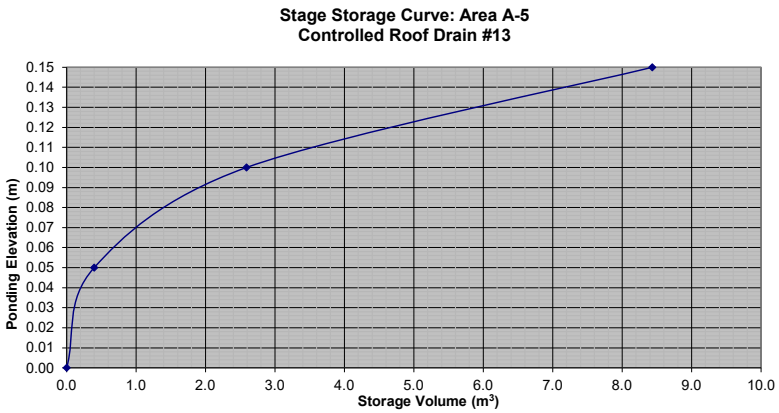
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	15.63	14.68	4.40
10	214.27	11.50	10.55	6.33
15	171.47	9.20	8.25	7.43
20	143.94	7.72	6.77	8.13
25	124.62	6.69	5.74	8.60
30	110.24	5.91	4.96	8.94
35	99.09	5.32	4.37	9.17
40	90.17	4.84	3.89	9.33
45	82.86	4.45	3.50	9.44
50	76.74	4.12	3.17	9.50
55	71.55	3.84	2.89	9.53
60	67.07	3.60	2.65	9.54
65	63.18	3.39	2.44	9.51
70	59.75	3.21	2.26	9.47
75	56.71	3.04	2.09	9.42
90	49.33	2.65	1.70	9.16
105	43.80	2.35	1.40	8.82
120	39.47	2.12	1.17	8.41

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	2.2	
1:5 Year	0.79	0.79	10	3.3	8.4
1:100 Year	0.95	0.95	15	7.4	

Roof Drain Storage Table for Area RD 13

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	15.9	0.4
0.10	71.9	2.6
0.15	161.7	8.4



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #14**

OTTAWA IDF CURVE

Area =	0.024	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	3.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	6.19	5.48	1.65
10	76.81	4.59	3.88	2.33
15	61.77	3.69	2.98	2.69
20	52.03	3.11	2.40	2.88
25	45.17	2.70	1.99	2.99
30	40.04	2.39	1.68	3.03
35	36.06	2.16	1.45	3.04
40	32.86	1.97	1.26	3.01
45	30.24	1.81	1.10	2.97
50	28.04	1.68	0.97	2.90
55	26.17	1.56	0.85	2.82
60	24.56	1.47	0.76	2.73
65	23.15	1.38	0.67	2.63
70	21.91	1.31	0.60	2.52
75	20.81	1.24	0.53	2.41
90	18.14	1.08	0.37	2.02
105	16.13	0.96	0.25	1.60
120	14.56	0.87	0.16	1.16

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #14**

OTTAWA IDF CURVE

Area =	0.024	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	4.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	8.44	7.65	2.30
10	104.19	6.23	5.44	3.26
15	83.56	5.00	4.21	3.79
20	70.25	4.20	3.41	4.09
25	60.90	3.64	2.85	4.28
30	53.93	3.22	2.43	4.38
35	48.52	2.90	2.11	4.43
40	44.18	2.64	1.85	4.45
45	40.63	2.43	1.64	4.43
50	37.65	2.25	1.46	4.38
55	35.12	2.10	1.31	4.32
60	32.94	1.97	1.18	4.25
65	31.04	1.86	1.07	4.16
70	29.37	1.76	0.97	4.06
75	27.89	1.67	0.88	3.95
90	24.29	1.45	0.66	3.58
105	21.58	1.29	0.50	3.15
120	19.47	1.16	0.37	2.69

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #14**

OTTAWA IDF CURVE

Area =	0.024	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	9.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	16.13	15.18	4.55
10	178.56	11.86	10.91	6.55
15	142.89	9.49	8.54	7.69
20	119.95	7.97	7.02	8.42
25	103.85	6.90	5.95	8.92
30	91.87	6.10	5.15	9.28
35	82.58	5.49	4.54	9.53
40	75.15	4.99	4.04	9.70
45	69.05	4.59	3.64	9.82
50	63.95	4.25	3.30	9.90
55	59.62	3.96	3.01	9.94
60	55.89	3.71	2.76	9.95
80	44.99	2.99	2.04	9.79
100	37.90	2.52	1.57	9.41
120	32.89	2.19	1.24	8.90
140	29.15	1.94	0.99	8.29
160	26.24	1.74	0.79	7.62
180	23.90	1.59	0.64	6.89

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #14**

OTTAWA IDF CURVE

Area =	0.024	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	12.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	19.35	18.40	5.52
10	214.27	14.24	13.29	7.97
15	171.47	11.39	10.44	9.40
20	143.94	9.56	8.61	10.34
25	124.62	8.28	7.33	10.99
30	110.24	7.32	6.37	11.47
35	99.09	6.58	5.63	11.83
40	90.17	5.99	5.04	12.10
45	82.86	5.51	4.56	12.30
50	76.74	5.10	4.15	12.45
55	71.55	4.75	3.80	12.55
60	67.07	4.46	3.51	12.62
65	63.18	4.20	3.25	12.67
70	59.75	3.97	3.02	12.68
75	56.71	3.77	2.82	12.68
90	49.33	3.28	2.33	12.57
105	43.80	2.91	1.96	12.35
120	39.47	2.62	1.67	12.04

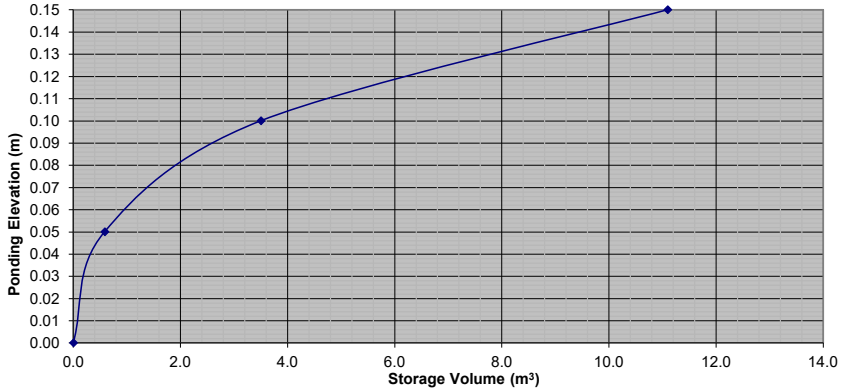
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	3.0	
1:5 Year	0.79	0.79	10	4.4	11.1
1:100 Year	0.95	0.95	15	9.9	

Roof Drain Storage Table for Area RD 14

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	23.3	0.6
0.10	93.4	3.5
0.15	210.3	11.1

Stage Storage Curve: Area A-5
Controlled Roof Drain #14



Prepared By: Novatech

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Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #15**

OTTAWA IDF CURVE

Area =	0.019	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	2.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	5.03	4.32	1.30
10	76.81	3.73	3.02	1.81
15	61.77	3.00	2.29	2.06
20	52.03	2.53	1.82	2.18
25	45.17	2.19	1.48	2.22
30	40.04	1.94	1.23	2.22
35	36.06	1.75	1.04	2.18
40	32.86	1.60	0.89	2.12
45	30.24	1.47	0.76	2.05
50	28.04	1.36	0.65	1.95
55	26.17	1.27	0.56	1.85
60	24.56	1.19	0.48	1.74
65	23.15	1.12	0.41	1.61
70	21.91	1.06	0.35	1.49
75	20.81	1.01	0.30	1.35
90	18.14	0.88	0.17	0.92
105	16.13	0.78	0.07	0.46
120	14.56	0.71	0.00	-0.02

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #15**

OTTAWA IDF CURVE

Area =	0.019	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	3.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	6.85	6.06	1.82
10	104.19	5.06	4.27	2.56
15	83.56	4.06	3.27	2.94
20	70.25	3.41	2.62	3.14
25	60.90	2.96	2.17	3.25
30	53.93	2.62	1.83	3.29
35	48.52	2.35	1.56	3.29
40	44.18	2.14	1.35	3.25
45	40.63	1.97	1.18	3.19
50	37.65	1.83	1.04	3.11
55	35.12	1.70	0.91	3.02
60	32.94	1.60	0.81	2.91
65	31.04	1.51	0.72	2.80
70	29.37	1.43	0.64	2.67
75	27.89	1.35	0.56	2.54
90	24.29	1.18	0.39	2.10
105	21.58	1.05	0.26	1.62
120	19.47	0.94	0.15	1.12

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #15**

OTTAWA IDF CURVE

Area =	0.019	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	7.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	13.09	12.14	3.64
10	178.56	9.63	8.68	5.21
15	142.89	7.71	6.76	6.08
20	119.95	6.47	5.52	6.62
25	103.85	5.60	4.65	6.98
30	91.87	4.95	4.00	7.21
35	82.58	4.45	3.50	7.36
40	75.15	4.05	3.10	7.45
45	69.05	3.72	2.77	7.49
50	63.95	3.45	2.50	7.50
55	59.62	3.22	2.27	7.48
60	55.89	3.01	2.06	7.43
80	44.99	2.43	1.48	7.09
100	37.90	2.04	1.09	6.57
120	32.89	1.77	0.82	5.93
140	29.15	1.57	0.62	5.23
160	26.24	1.42	0.47	4.47
180	23.90	1.29	0.34	3.66

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #15**

OTTAWA IDF CURVE

Area =	0.019	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	9.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	15.71	14.76	4.43
10	214.27	11.56	10.61	6.36
15	171.47	9.25	8.30	7.47
20	143.94	7.76	6.81	8.18
25	124.62	6.72	5.77	8.66
30	110.24	5.95	5.00	8.99
35	99.09	5.34	4.39	9.23
40	90.17	4.86	3.91	9.39
45	82.86	4.47	3.52	9.50
50	76.74	4.14	3.19	9.57
55	71.55	3.86	2.91	9.60
60	67.07	3.62	2.67	9.60
65	63.18	3.41	2.46	9.58
70	59.75	3.22	2.27	9.54
75	56.71	3.06	2.11	9.49
90	49.33	2.66	1.71	9.24
105	43.80	2.36	1.41	8.90
120	39.47	2.13	1.18	8.49

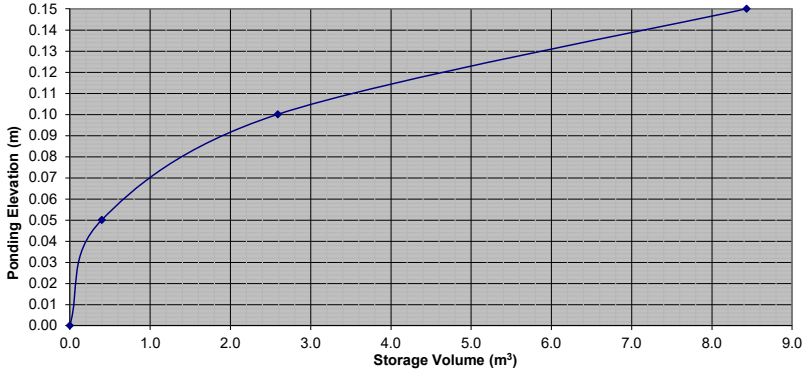
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	2.2	
1:5 Year	0.79	0.79	10	3.3	8.4
1:100 Year	0.95	0.95	15	7.5	

Roof Drain Storage Table for Area RD 15

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	15.9	0.4
0.10	71.9	2.6
0.15	161.7	8.4

Stage Storage Curve: Area A-5
Controlled Roof Drain #15



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 **Controlled Roof Drain #16**

OTTAWA IDF CURVE

Area =	0.024	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	3.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	6.17	5.46	1.64
10	76.81	4.57	3.86	2.32
15	61.77	3.68	2.97	2.67
20	52.03	3.10	2.39	2.87
25	45.17	2.69	1.98	2.97
30	40.04	2.38	1.67	3.01
35	36.06	2.15	1.44	3.02
40	32.86	1.96	1.25	2.99
45	30.24	1.80	1.09	2.94
50	28.04	1.67	0.96	2.88
55	26.17	1.56	0.85	2.80
60	24.56	1.46	0.75	2.71
65	23.15	1.38	0.67	2.61
70	21.91	1.30	0.59	2.50
75	20.81	1.24	0.53	2.38
90	18.14	1.08	0.37	2.00
105	16.13	0.96	0.25	1.58
120	14.56	0.87	0.16	1.13

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 **Controlled Roof Drain #16**

OTTAWA IDF CURVE

Area =	0.024	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	4.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	8.41	7.62	2.29
10	104.19	6.20	5.41	3.25
15	83.56	4.98	4.19	3.77
20	70.25	4.18	3.39	4.07
25	60.90	3.63	2.84	4.25
30	53.93	3.21	2.42	4.36
35	48.52	2.89	2.10	4.41
40	44.18	2.63	1.84	4.42
45	40.63	2.42	1.63	4.40
50	37.65	2.24	1.45	4.36
55	35.12	2.09	1.30	4.29
60	32.94	1.96	1.17	4.22
65	31.04	1.85	1.06	4.13
70	29.37	1.75	0.96	4.03
75	27.89	1.66	0.87	3.92
90	24.29	1.45	0.66	3.54
105	21.58	1.29	0.50	3.12
120	19.47	1.16	0.37	2.66

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 **Controlled Roof Drain #16**

OTTAWA IDF CURVE

Area =	0.024	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	9.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	16.06	15.11	4.53
10	178.56	11.81	10.86	6.52
15	142.89	9.45	8.50	7.65
20	119.95	7.94	6.99	8.38
25	103.85	6.87	5.92	8.88
30	91.87	6.08	5.13	9.23
35	82.58	5.46	4.51	9.48
40	75.15	4.97	4.02	9.65
45	69.05	4.57	3.62	9.77
50	63.95	4.23	3.28	9.84
55	59.62	3.94	2.99	9.88
60	55.89	3.70	2.75	9.89
80	44.99	2.98	2.03	9.73
100	37.90	2.51	1.56	9.35
120	32.89	2.18	1.23	8.83
140	29.15	1.93	0.98	8.22
160	26.24	1.74	0.79	7.55
180	23.90	1.58	0.63	6.82

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 **Controlled Roof Drain #16**

OTTAWA IDF CURVE

Area =	0.024	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	12.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	19.27	18.32	5.50
10	214.27	14.18	13.23	7.94
15	171.47	11.35	10.40	9.36
20	143.94	9.52	8.57	10.29
25	124.62	8.25	7.30	10.94
30	110.24	7.29	6.34	11.42
35	99.09	6.56	5.61	11.77
40	90.17	5.97	5.02	12.04
45	82.86	5.48	4.53	12.24
50	76.74	5.08	4.13	12.38
55	71.55	4.73	3.78	12.49
60	67.07	4.44	3.49	12.56
65	63.18	4.18	3.23	12.60
70	59.75	3.95	3.00	12.61
75	56.71	3.75	2.80	12.61
90	49.33	3.26	2.31	12.50
105	43.80	2.90	1.95	12.27
120	39.47	2.61	1.66	11.96

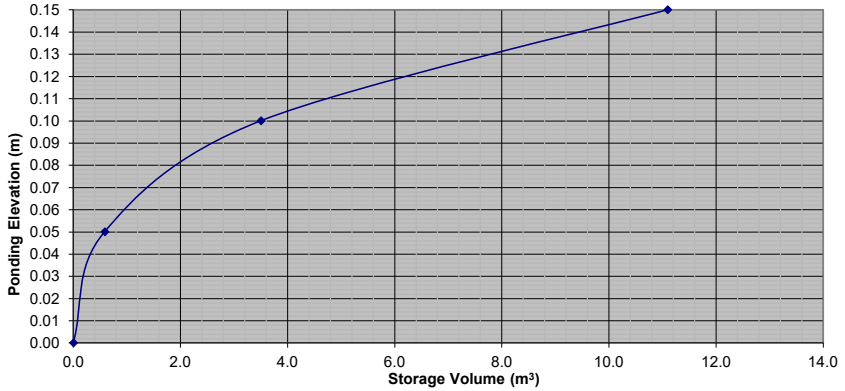
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	3.0	
1:5 Year	0.79	0.79	10	4.4	11.1
1:100 Year	0.95	0.95	15	9.9	

Roof Drain Storage Table for Area RD 16

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	23.3	0.6
0.10	93.4	3.5
0.15	210.3	11.1

Stage Storage Curve: Area A-5
Controlled Roof Drain #16



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 Controlled Roof Drain #17

OTTAWA IDF CURVE

Area =	0.028	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	3.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	7.15	6.44	1.93
10	76.81	5.30	4.59	2.76
15	61.77	4.27	3.56	3.20
20	52.03	3.59	2.88	3.46
25	45.17	3.12	2.41	3.61
30	40.04	2.77	2.06	3.70
35	36.06	2.49	1.78	3.74
40	32.86	2.27	1.56	3.74
45	30.24	2.09	1.38	3.72
50	28.04	1.94	1.23	3.68
55	26.17	1.81	1.10	3.62
60	24.56	1.70	0.99	3.55
65	23.15	1.60	0.89	3.47
70	21.91	1.51	0.80	3.37
75	20.81	1.44	0.73	3.27
90	18.14	1.25	0.54	2.93
105	16.13	1.11	0.40	2.55
120	14.56	1.01	0.30	2.13

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 Controlled Roof Drain #17

OTTAWA IDF CURVE

Area =	0.028	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	5.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	9.75	8.96	2.69
10	104.19	7.20	6.41	3.84
15	83.56	5.77	4.98	4.48
20	70.25	4.85	4.06	4.87
25	60.90	4.21	3.42	5.12
30	53.93	3.72	2.93	5.28
35	48.52	3.35	2.56	5.38
40	44.18	3.05	2.26	5.43
45	40.63	2.81	2.02	5.44
50	37.65	2.60	1.81	5.43
55	35.12	2.43	1.64	5.40
60	32.94	2.27	1.48	5.35
65	31.04	2.14	1.35	5.28
70	29.37	2.03	1.24	5.20
75	27.89	1.93	1.14	5.11
90	24.29	1.68	0.89	4.79
105	21.58	1.49	0.70	4.41
120	19.47	1.34	0.55	3.99

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 Controlled Roof Drain #17

OTTAWA IDF CURVE

Area =	0.028	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	12.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	18.62	17.67	5.30
10	178.56	13.70	12.75	7.65
15	142.89	10.96	10.01	9.01
20	119.95	9.20	8.25	9.90
25	103.85	7.97	7.02	10.53
30	91.87	7.05	6.10	10.98
35	82.58	6.34	5.39	11.31
40	75.15	5.77	4.82	11.56
45	69.05	5.30	4.35	11.74
50	63.95	4.91	3.96	11.87
55	59.62	4.57	3.62	11.96
60	55.89	4.29	3.34	12.02
80	44.99	3.45	2.50	12.01
100	37.90	2.91	1.96	11.75
120	32.89	2.52	1.57	11.33
140	29.15	2.24	1.29	10.81
160	26.24	2.01	1.06	10.21
180	23.90	1.83	0.88	9.55

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 Controlled Roof Drain #17

OTTAWA IDF CURVE

Area =	0.028	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	15.3	m3

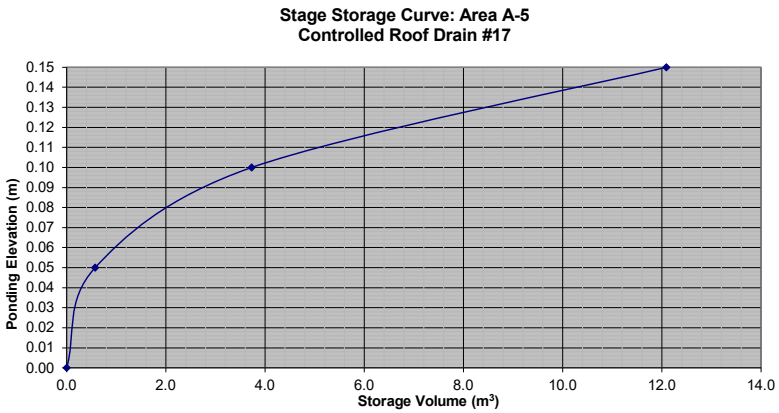
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	22.35	21.40	6.42
10	214.27	16.44	15.49	9.29
15	171.47	13.16	12.21	10.99
20	143.94	11.04	10.09	12.11
25	124.62	9.56	8.61	12.92
30	110.24	8.46	7.51	13.52
35	99.09	7.60	6.65	13.97
40	90.17	6.92	5.97	14.33
45	82.86	6.36	5.41	14.60
50	76.74	5.89	4.94	14.82
55	71.55	5.49	4.54	14.98
60	67.07	5.15	4.20	15.11
65	63.18	4.85	3.90	15.20
70	59.75	4.58	3.63	15.26
75	56.71	4.35	3.40	15.30
90	49.33	3.79	2.84	15.31
105	43.80	3.36	2.41	15.19
120	39.47	3.03	2.08	14.97

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	3.7	
1:5 Year	0.79	0.79	10	5.4	12.1
1:100 Year	0.95	0.95	15	12.0	

Roof Drain Storage Table for Area RD 17

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	23.1	0.6
0.10	102.9	3.7
0.15	231.5	12.1



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 Controlled Roof Drain #18

OTTAWA IDF CURVE

Area =	0.034	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	4.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	8.84	8.05	2.41
10	76.81	6.55	5.76	3.46
15	61.77	5.27	4.48	4.03
20	52.03	4.44	3.65	4.38
25	45.17	3.85	3.06	4.60
30	40.04	3.42	2.63	4.73
35	36.06	3.08	2.29	4.80
40	32.86	2.80	2.01	4.83
45	30.24	2.58	1.79	4.83
50	28.04	2.39	1.60	4.81
55	26.17	2.23	1.44	4.76
60	24.56	2.10	1.31	4.70
65	23.15	1.98	1.19	4.62
70	21.91	1.87	1.08	4.53
75	20.81	1.78	0.99	4.44
90	18.14	1.55	0.76	4.09
105	16.13	1.38	0.59	3.69
120	14.56	1.24	0.45	3.26

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 Controlled Roof Drain #18

OTTAWA IDF CURVE

Area =	0.034	ha	Qallow =	0.95	L/s
C =	0.90		Vol(max) =	6.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	12.05	11.10	3.33
10	104.19	8.89	7.94	4.76
15	83.56	7.13	6.18	5.56
20	70.25	5.99	5.04	6.05
25	60.90	5.20	4.25	6.37
30	53.93	4.60	3.65	6.57
35	48.52	4.14	3.19	6.70
40	44.18	3.77	2.82	6.77
45	40.63	3.47	2.52	6.79
50	37.65	3.21	2.26	6.79
55	35.12	3.00	2.05	6.75
60	32.94	2.81	1.86	6.70
65	31.04	2.65	1.70	6.62
70	29.37	2.51	1.56	6.54
75	27.89	2.38	1.43	6.43
90	24.29	2.07	1.12	6.06
105	21.58	1.84	0.89	5.62
120	19.47	1.66	0.71	5.12

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 Controlled Roof Drain #18

OTTAWA IDF CURVE

Area =	0.034	ha	Qallow =	1.26	L/s
C =	1.00		Vol(max) =	14.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	23.01	21.75	6.52
10	178.56	16.93	15.67	9.40
15	142.89	13.55	12.29	11.06
20	119.95	11.37	10.11	12.13
25	103.85	9.84	8.58	12.88
30	91.87	8.71	7.45	13.41
35	82.58	7.83	6.57	13.79
40	75.15	7.12	5.86	14.07
45	69.05	6.55	5.29	14.27
50	63.95	6.06	4.80	14.41
55	59.62	5.65	4.39	14.49
60	55.89	5.30	4.04	14.54
80	44.99	4.27	3.01	14.42
100	37.90	3.59	2.33	14.00
120	32.89	3.12	1.86	13.38
140	29.15	2.76	1.50	12.63
160	26.24	2.49	1.23	11.78
180	23.90	2.27	1.01	10.86

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-5 Controlled Roof Drain #18

OTTAWA IDF CURVE

Area =	0.034	ha	Qallow =	1.26	L/s
C =	1.00		Vol(max) =	18.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	27.61	26.35	7.90
10	214.27	20.31	19.05	11.43
15	171.47	16.26	15.00	13.50
20	143.94	13.65	12.39	14.86
25	124.62	11.81	10.55	15.83
30	110.24	10.45	9.19	16.54
35	99.09	9.39	8.13	17.08
40	90.17	8.55	7.29	17.49
45	82.86	7.86	6.60	17.81
50	76.74	7.28	6.02	18.05
55	71.55	6.78	5.52	18.22
60	67.07	6.36	5.10	18.35
65	63.18	5.99	4.73	18.44
70	59.75	5.66	4.40	18.50
75	56.71	5.38	4.12	18.52
90	49.33	4.68	3.42	18.45
105	43.80	4.15	2.89	18.22
120	39.47	3.74	2.48	17.87

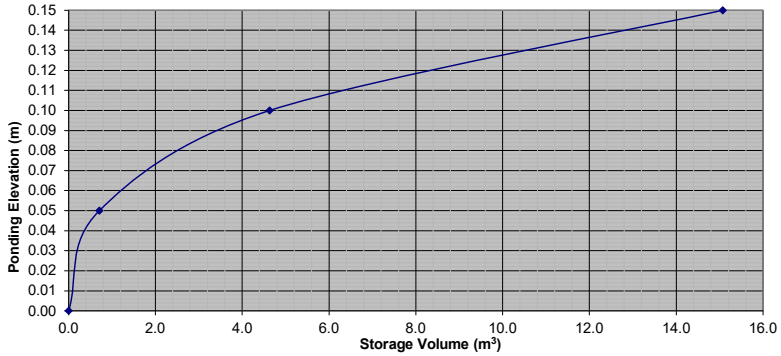
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/2 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.79	0.79	8	4.8	
1:5 Year	0.95	0.95	10	6.8	15.1
1:100 Year	1.26	1.26	15	14.5	

Roof Drain Storage Table for Area RD 18

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	28.4	0.7
0.10	128.4	4.6
0.15	289.2	15.1

Stage Storage Curve: Area A-5
Controlled Roof Drain #18



NOVATECH
Engineers, Planners & Landscape Architects

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.011	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	2.72	2.40	0.72
10	76.81	2.02	1.70	1.02
15	61.77	1.62	1.30	1.17
20	52.03	1.37	1.05	1.26
25	45.17	1.19	0.87	1.30
30	40.04	1.05	0.73	1.32
35	36.06	0.95	0.63	1.32
40	32.86	0.86	0.54	1.30
45	30.24	0.79	0.47	1.28
50	28.04	0.74	0.42	1.25
55	26.17	0.69	0.37	1.21
60	24.56	0.65	0.33	1.17
65	23.15	0.61	0.29	1.12
70	21.91	0.58	0.26	1.07
75	20.81	0.55	0.23	1.02
90	18.14	0.48	0.16	0.85
105	16.13	0.42	0.10	0.65
120	14.56	0.38	0.06	0.45

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.011	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	2.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.71	3.39	1.02
10	104.19	2.74	2.42	1.45
15	83.56	2.20	1.88	1.69
20	70.25	1.85	1.53	1.83
25	60.90	1.60	1.28	1.92
30	53.93	1.42	1.10	1.97
35	48.52	1.27	0.95	2.00
40	44.18	1.16	0.84	2.02
45	40.63	1.07	0.75	2.02
50	37.65	0.99	0.67	2.01
55	35.12	0.92	0.60	1.99
60	32.94	0.87	0.55	1.96
65	31.04	0.82	0.50	1.93
70	29.37	0.77	0.45	1.90
75	27.89	0.73	0.41	1.86
90	24.29	0.64	0.32	1.72
105	21.58	0.57	0.25	1.56
120	19.47	0.51	0.19	1.38

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.011	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	4.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	7.08	6.76	2.03
10	178.56	5.21	4.89	2.94
15	142.89	4.17	3.85	3.47
20	119.95	3.50	3.18	3.82
25	103.85	3.03	2.71	4.07
30	91.87	2.68	2.36	4.25
35	82.58	2.41	2.09	4.39
40	75.15	2.19	1.87	4.50
45	69.05	2.02	1.70	4.58
50	63.95	1.87	1.55	4.64
55	59.62	1.74	1.42	4.69
60	55.89	1.63	1.31	4.72
80	44.99	1.31	0.99	4.77
100	37.90	1.11	0.79	4.72
120	32.89	0.96	0.64	4.61
140	29.15	0.85	0.53	4.46
160	26.24	0.77	0.45	4.28
180	23.90	0.70	0.38	4.08

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-6 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.011	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	6.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	8.50	8.18	2.45
10	214.27	6.25	5.93	3.56
15	171.47	5.01	4.69	4.22
20	143.94	4.20	3.88	4.66
25	124.62	3.64	3.32	4.98
30	110.24	3.22	2.90	5.22
35	99.09	2.89	2.57	5.40
40	90.17	2.63	2.31	5.55
45	82.86	2.42	2.10	5.67
50	76.74	2.24	1.92	5.76
55	71.55	2.09	1.77	5.84
60	67.07	1.96	1.64	5.90
65	63.18	1.84	1.52	5.94
70	59.75	1.74	1.42	5.98
75	56.71	1.66	1.34	6.01
90	49.33	1.44	1.12	6.05
105	43.80	1.28	0.96	6.04
120	39.47	1.15	0.83	5.99

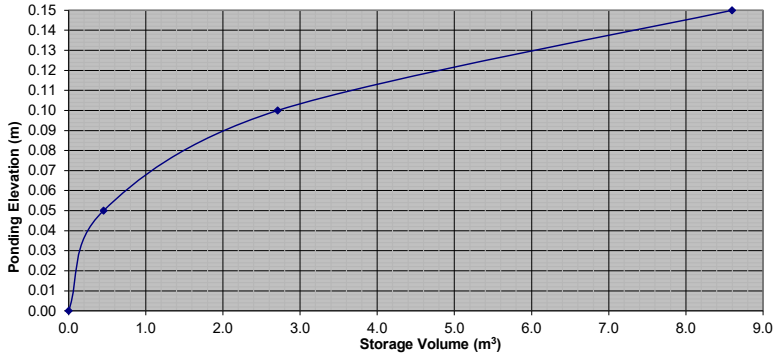
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	1.3	
1:5 Year	0.32	0.32	10	2.0	8.6
1:100 Year	0.32	0.32	15	4.8	

Roof Drain Storage Table for Area RD 1

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	18.1	0.5
0.10	72.2	2.7
0.15	163.3	8.6

Stage Storage Curve: Area A-6
Controlled Roof Drain #1



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.029	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	4.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	7.59	6.88	2.06
10	76.81	5.63	4.92	2.95
15	61.77	4.53	3.82	3.44
20	52.03	3.81	3.10	3.73
25	45.17	3.31	2.60	3.90
30	40.04	2.94	2.23	4.01
35	36.06	2.64	1.93	4.06
40	32.86	2.41	1.70	4.08
45	30.24	2.22	1.51	4.07
50	28.04	2.06	1.35	4.04
55	26.17	1.92	1.21	3.99
60	24.56	1.80	1.09	3.93
65	23.15	1.70	0.99	3.85
70	21.91	1.61	0.90	3.76
75	20.81	1.53	0.82	3.67
90	18.14	1.33	0.62	3.35
105	16.13	1.18	0.47	2.98
120	14.56	1.07	0.36	2.57

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.029	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	5.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	10.35	9.56	2.87
10	104.19	7.64	6.85	4.11
15	83.56	6.13	5.34	4.80
20	70.25	5.15	4.36	5.23
25	60.90	4.46	3.67	5.51
30	53.93	3.95	3.16	5.69
35	48.52	3.56	2.77	5.81
40	44.18	3.24	2.45	5.88
45	40.63	2.98	2.19	5.91
50	37.65	2.76	1.97	5.91
55	35.12	2.57	1.78	5.89
60	32.94	2.42	1.63	5.85
65	31.04	2.28	1.49	5.79
70	29.37	2.15	1.36	5.73
75	27.89	2.04	1.25	5.65
90	24.29	1.78	0.99	5.35
105	21.58	1.58	0.79	4.99
120	19.47	1.43	0.64	4.59

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.029	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	13.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	19.77	18.82	5.65
10	178.56	14.54	13.59	8.16
15	142.89	11.64	10.69	9.62
20	119.95	9.77	8.82	10.58
25	103.85	8.46	7.51	11.26
30	91.87	7.48	6.53	11.76
35	82.58	6.73	5.78	12.13
40	75.15	6.12	5.17	12.41
45	69.05	5.62	4.67	12.62
50	63.95	5.21	4.26	12.78
55	59.62	4.86	3.91	12.89
60	55.89	4.55	3.60	12.97
80	44.99	3.66	2.71	13.03
100	37.90	3.09	2.14	12.82
120	32.89	2.68	1.73	12.45
140	29.15	2.37	1.42	11.97
160	26.24	2.14	1.19	11.40
180	23.90	1.95	1.00	10.77

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-6 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.029	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	16.6	m3

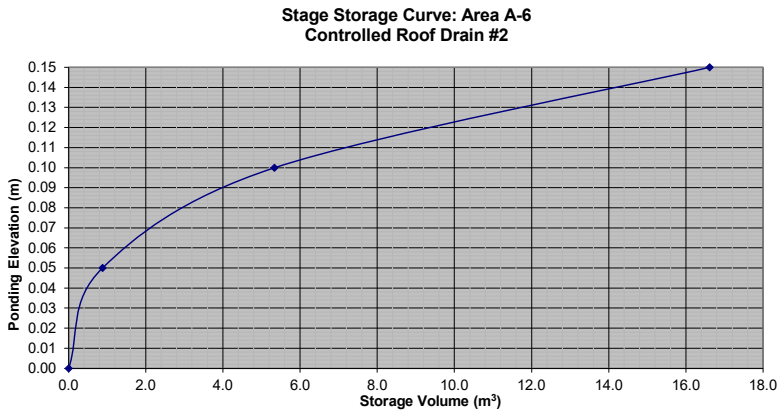
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	23.72	22.77	6.83
10	214.27	17.45	16.50	9.90
15	171.47	13.97	13.02	11.72
20	143.94	11.72	10.77	12.93
25	124.62	10.15	9.20	13.80
30	110.24	8.98	8.03	14.45
35	99.09	8.07	7.12	14.96
40	90.17	7.35	6.40	15.35
45	82.86	6.75	5.80	15.66
50	76.74	6.25	5.30	15.90
55	71.55	5.83	4.88	16.10
60	67.07	5.46	4.51	16.25
65	63.18	5.15	4.20	16.36
70	59.75	4.87	3.92	16.45
75	56.71	4.62	3.67	16.51
90	49.33	4.02	3.07	16.57
105	43.80	3.57	2.62	16.49
120	39.47	3.22	2.27	16.31

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	4.1	
1:5 Year	0.79	0.79	10	5.9	16.6
1:100 Year	0.95	0.95	15	13.0	

Roof Drain Storage Table for Area RD 2

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	35.1	0.9
0.10	143.3	5.3
0.15	307.8	16.6



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Roof Drain #3

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.87	1.55	0.46
10	76.81	1.38	1.06	0.64
15	61.77	1.11	0.79	0.71
20	52.03	0.94	0.62	0.74
25	45.17	0.81	0.49	0.74
30	40.04	0.72	0.40	0.72
35	36.06	0.65	0.33	0.69
40	32.86	0.59	0.27	0.65
45	30.24	0.54	0.22	0.61
50	28.04	0.51	0.19	0.56
55	26.17	0.47	0.15	0.50
60	24.56	0.44	0.12	0.44
65	23.15	0.42	0.10	0.38
70	21.91	0.39	0.07	0.31
75	20.81	0.37	0.05	0.25
90	18.14	0.33	0.01	0.04
105	16.13	0.29	-0.03	-0.18
120	14.56	0.26	-0.06	-0.42

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Roof Drain #3

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.54	2.22	0.67
10	104.19	1.88	1.56	0.93
15	83.56	1.51	1.19	1.07
20	70.25	1.27	0.95	1.13
25	60.90	1.10	0.78	1.17
30	53.93	0.97	0.65	1.17
35	48.52	0.87	0.55	1.16
40	44.18	0.80	0.48	1.14
45	40.63	0.73	0.41	1.11
50	37.65	0.68	0.36	1.07
55	35.12	0.63	0.31	1.03
60	32.94	0.59	0.27	0.98
65	31.04	0.56	0.24	0.93
70	29.37	0.53	0.21	0.88
75	27.89	0.50	0.18	0.82
90	24.29	0.44	0.12	0.63
105	21.58	0.39	0.07	0.43
120	19.47	0.35	0.03	0.22

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Roof Drain #3

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.86	4.54	1.36
10	178.56	3.57	3.25	1.95
15	142.89	2.86	2.54	2.29
20	119.95	2.40	2.08	2.50
25	103.85	2.08	1.76	2.64
30	91.87	1.84	1.52	2.73
35	82.58	1.65	1.33	2.80
40	75.15	1.50	1.18	2.84
45	69.05	1.38	1.06	2.87
50	63.95	1.28	0.96	2.88
55	59.62	1.19	0.87	2.88
60	55.89	1.12	0.80	2.88
80	44.99	0.90	0.58	2.79
100	37.90	0.76	0.44	2.63
120	32.89	0.66	0.34	2.44
140	29.15	0.58	0.26	2.21
160	26.24	0.53	0.21	1.97
180	23.90	0.48	0.16	1.71

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-6 Controlled Roof Drain #3

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	5.83	5.51	1.65
10	214.27	4.29	3.97	2.38
15	171.47	3.43	3.11	2.80
20	143.94	2.88	2.56	3.07
25	124.62	2.49	2.17	3.26
30	110.24	2.21	1.89	3.40
35	99.09	1.98	1.66	3.49
40	90.17	1.80	1.48	3.56
45	82.86	1.66	1.34	3.61
50	76.74	1.54	1.22	3.65
55	71.55	1.43	1.11	3.67
60	67.07	1.34	1.02	3.68
65	63.18	1.26	0.94	3.68
70	59.75	1.20	0.88	3.68
75	56.71	1.14	0.82	3.67
90	49.33	0.99	0.67	3.60
105	43.80	0.88	0.56	3.51
120	39.47	0.79	0.47	3.38

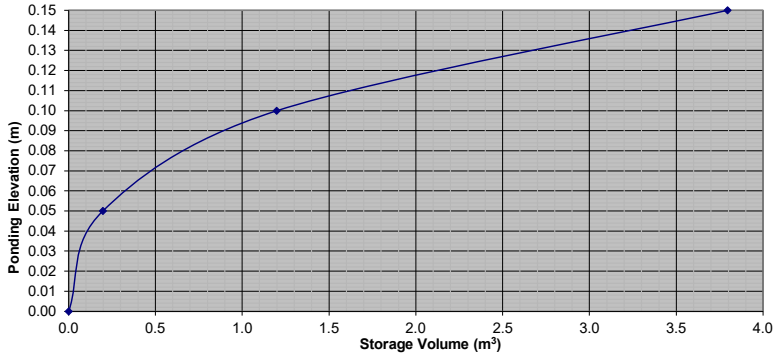
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	0.7	
1:5 Year	0.32	0.32	10	1.2	3.8
1:100 Year	0.32	0.32	15	2.9	

Roof Drain Storage Table for Area RD 3

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	7.9	0.2
0.10	32.1	1.2
0.15	71.8	3.8

Stage Storage Curve: Area A-6
Controlled Roof Drain #3



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Roof Drain #4

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.81	1.49	0.45
10	76.81	1.35	1.03	0.62
15	61.77	1.08	0.76	0.69
20	52.03	0.91	0.59	0.71
25	45.17	0.79	0.47	0.71
30	40.04	0.70	0.38	0.69
35	36.06	0.63	0.31	0.65
40	32.86	0.58	0.26	0.61
45	30.24	0.53	0.21	0.57
50	28.04	0.49	0.17	0.51
55	26.17	0.46	0.14	0.46
60	24.56	0.43	0.11	0.40
65	23.15	0.41	0.09	0.33
70	21.91	0.38	0.06	0.27
75	20.81	0.36	0.04	0.20
90	18.14	0.32	0.00	-0.01
105	16.13	0.28	-0.04	-0.24
120	14.56	0.26	-0.06	-0.47

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Roof Drain #4

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.47	2.15	0.65
10	104.19	1.82	1.50	0.90
15	83.56	1.46	1.14	1.03
20	70.25	1.23	0.91	1.09
25	60.90	1.07	0.75	1.12
30	53.93	0.94	0.62	1.12
35	48.52	0.85	0.53	1.11
40	44.18	0.77	0.45	1.09
45	40.63	0.71	0.39	1.06
50	37.65	0.66	0.34	1.02
55	35.12	0.62	0.30	0.97
60	32.94	0.58	0.26	0.93
65	31.04	0.54	0.22	0.87
70	29.37	0.51	0.19	0.82
75	27.89	0.49	0.17	0.76
90	24.29	0.43	0.11	0.57
105	21.58	0.38	0.06	0.37
120	19.47	0.34	0.02	0.15

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Roof Drain #4

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.72	4.40	1.32
10	178.56	3.47	3.15	1.89
15	142.89	2.78	2.46	2.21
20	119.95	2.33	2.01	2.42
25	103.85	2.02	1.70	2.55
30	91.87	1.79	1.47	2.64
35	82.58	1.61	1.29	2.70
40	75.15	1.46	1.14	2.74
45	69.05	1.34	1.02	2.76
50	63.95	1.24	0.92	2.77
55	59.62	1.16	0.84	2.77
60	55.89	1.09	0.77	2.76
80	44.99	0.88	0.56	2.67
100	37.90	0.74	0.42	2.51
120	32.89	0.64	0.32	2.30
140	29.15	0.57	0.25	2.08
160	26.24	0.51	0.19	1.83
180	23.90	0.47	0.15	1.57

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-6 Controlled Roof Drain #4

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	5.67	5.35	1.60
10	214.27	4.17	3.85	2.31
15	171.47	3.34	3.02	2.72
20	143.94	2.80	2.48	2.98
25	124.62	2.43	2.11	3.16
30	110.24	2.15	1.83	3.29
35	99.09	1.93	1.61	3.38
40	90.17	1.75	1.43	3.44
45	82.86	1.61	1.29	3.49
50	76.74	1.49	1.17	3.52
55	71.55	1.39	1.07	3.54
60	67.07	1.31	0.99	3.55
65	63.18	1.23	0.91	3.55
70	59.75	1.16	0.84	3.54
75	56.71	1.10	0.78	3.53
90	49.33	0.96	0.64	3.46
105	43.80	0.85	0.53	3.35
120	39.47	0.77	0.45	3.23

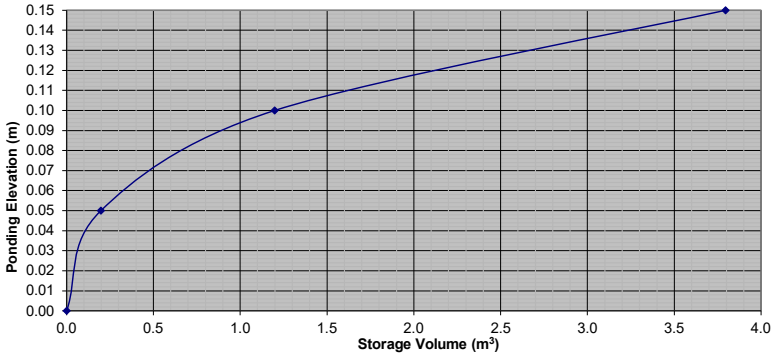
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	0.7	
1:5 Year	0.32	0.32	10	1.1	3.8
1:100 Year	0.32	0.32	15	2.8	

Roof Drain Storage Table for Area RD 4

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	7.9	0.2
0.10	32.1	1.2
0.15	71.8	3.8

Stage Storage Curve: Area A-6
Controlled Roof Drain #4



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Roof Drain #5

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.40	1.08	0.32
10	76.81	1.04	0.72	0.43
15	61.77	0.83	0.51	0.46
20	52.03	0.70	0.38	0.46
25	45.17	0.61	0.29	0.44
30	40.04	0.54	0.22	0.40
35	36.06	0.49	0.17	0.35
40	32.86	0.44	0.12	0.30
45	30.24	0.41	0.09	0.24
50	28.04	0.38	0.06	0.18
55	26.17	0.35	0.03	0.11
60	24.56	0.33	0.01	0.04
65	23.15	0.31	-0.01	-0.03
70	21.91	0.30	-0.02	-0.10
75	20.81	0.28	-0.04	-0.17
90	18.14	0.25	-0.07	-0.40
105	16.13	0.22	-0.10	-0.64
120	14.56	0.20	-0.12	-0.89

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Roof Drain #5

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.91	1.59	0.48
10	104.19	1.41	1.09	0.65
15	83.56	1.13	0.81	0.73
20	70.25	0.95	0.63	0.75
25	60.90	0.82	0.50	0.75
30	53.93	0.73	0.41	0.74
35	48.52	0.66	0.34	0.70
40	44.18	0.60	0.28	0.66
45	40.63	0.55	0.23	0.62
50	37.65	0.51	0.19	0.57
55	35.12	0.47	0.15	0.51
60	32.94	0.45	0.13	0.45
65	31.04	0.42	0.10	0.39
70	29.37	0.40	0.08	0.32
75	27.89	0.38	0.06	0.26
90	24.29	0.33	0.01	0.04
105	21.58	0.29	-0.03	-0.18
120	19.47	0.26	-0.06	-0.41

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Roof Drain #5

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	3.64	3.32	1.00
10	178.56	2.68	2.36	1.42
15	142.89	2.15	1.83	1.64
20	119.95	1.80	1.48	1.78
25	103.85	1.56	1.24	1.86
30	91.87	1.38	1.06	1.91
35	82.58	1.24	0.92	1.93
40	75.15	1.13	0.81	1.94
45	69.05	1.04	0.72	1.93
50	63.95	0.96	0.64	1.92
55	59.62	0.90	0.58	1.90
60	55.89	0.84	0.52	1.87
80	44.99	0.68	0.36	1.71
100	37.90	0.57	0.25	1.49
120	32.89	0.49	0.17	1.25
140	29.15	0.44	0.12	0.99
160	26.24	0.39	0.07	0.71
180	23.90	0.36	0.04	0.42

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-6 Controlled Roof Drain #5

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.5	m3

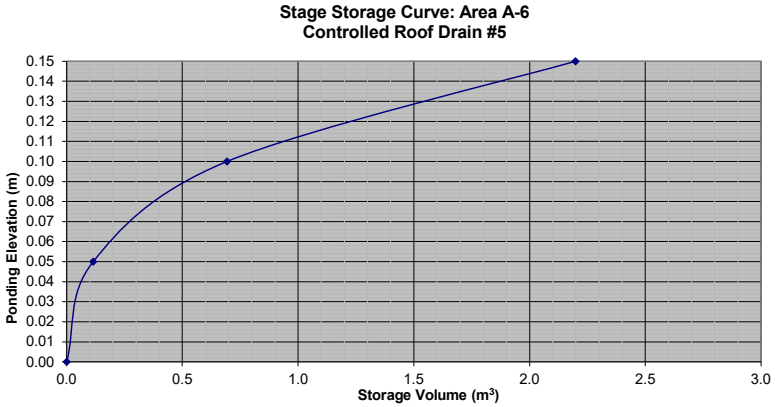
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	4.37	4.05	1.22
10	214.27	3.22	2.90	1.74
15	171.47	2.57	2.25	2.03
20	143.94	2.16	1.84	2.21
25	124.62	1.87	1.55	2.33
30	110.24	1.65	1.33	2.40
35	99.09	1.49	1.17	2.45
40	90.17	1.35	1.03	2.48
45	82.86	1.24	0.92	2.49
50	76.74	1.15	0.83	2.50
55	71.55	1.07	0.75	2.49
60	67.07	1.01	0.69	2.47
65	63.18	0.95	0.63	2.45
70	59.75	0.90	0.58	2.42
75	56.71	0.85	0.53	2.39
90	49.33	0.74	0.42	2.27
105	43.80	0.66	0.34	2.13
120	39.47	0.59	0.27	1.96

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	0.5	
1:5 Year	0.32	0.32	10	0.8	2.2
1:100 Year	0.32	0.32	15	1.9	

Roof Drain Storage Table for Area RD 5

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.6	0.1
0.10	18.5	0.7
0.15	41.7	2.2



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Roof Drain #6

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.37	1.05	0.32
10	76.81	1.02	0.70	0.42
15	61.77	0.82	0.50	0.45
20	52.03	0.69	0.37	0.44
25	45.17	0.60	0.28	0.42
30	40.04	0.53	0.21	0.38
35	36.06	0.48	0.16	0.33
40	32.86	0.44	0.12	0.28
45	30.24	0.40	0.08	0.22
50	28.04	0.37	0.05	0.16
55	26.17	0.35	0.03	0.09
60	24.56	0.33	0.01	0.02
65	23.15	0.31	-0.01	-0.05
70	21.91	0.29	-0.03	-0.12
75	20.81	0.28	-0.04	-0.20
90	18.14	0.24	-0.08	-0.43
105	16.13	0.21	-0.11	-0.67
120	14.56	0.19	-0.13	-0.91

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Roof Drain #6

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.87	1.55	0.47
10	104.19	1.38	1.06	0.64
15	83.56	1.11	0.79	0.71
20	70.25	0.93	0.61	0.73
25	60.90	0.81	0.49	0.73
30	53.93	0.72	0.40	0.71
35	48.52	0.64	0.32	0.68
40	44.18	0.59	0.27	0.64
45	40.63	0.54	0.22	0.59
50	37.65	0.50	0.18	0.54
55	35.12	0.47	0.15	0.48
60	32.94	0.44	0.12	0.42
65	31.04	0.41	0.09	0.36
70	29.37	0.39	0.07	0.29
75	27.89	0.37	0.05	0.22
90	24.29	0.32	0.00	0.01
105	21.58	0.29	-0.03	-0.21
120	19.47	0.26	-0.06	-0.45

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Roof Drain #6

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	3.58	3.26	0.98
10	178.56	2.63	2.31	1.39
15	142.89	2.11	1.79	1.61
20	119.95	1.77	1.45	1.74
25	103.85	1.53	1.21	1.82
30	91.87	1.35	1.03	1.86
35	82.58	1.22	0.90	1.88
40	75.15	1.11	0.79	1.89
45	69.05	1.02	0.70	1.88
50	63.95	0.94	0.62	1.87
55	59.62	0.88	0.56	1.84
60	55.89	0.82	0.50	1.81
80	44.99	0.66	0.34	1.65
100	37.90	0.56	0.24	1.43
120	32.89	0.48	0.16	1.19
140	29.15	0.43	0.11	0.92
160	26.24	0.39	0.07	0.64
180	23.90	0.35	0.03	0.35

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-6 Controlled Roof Drain #6

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	4.29	3.97	1.19
10	214.27	3.16	2.84	1.70
15	171.47	2.53	2.21	1.99
20	143.94	2.12	1.80	2.16
25	124.62	1.84	1.52	2.27
30	110.24	1.62	1.30	2.35
35	99.09	1.46	1.14	2.39
40	90.17	1.33	1.01	2.42
45	82.86	1.22	0.90	2.43
50	76.74	1.13	0.81	2.43
55	71.55	1.05	0.73	2.42
60	67.07	0.99	0.67	2.41
65	63.18	0.93	0.61	2.38
70	59.75	0.88	0.56	2.35
75	56.71	0.84	0.52	2.32
90	49.33	0.73	0.41	2.20
105	43.80	0.65	0.33	2.05
120	39.47	0.58	0.26	1.88

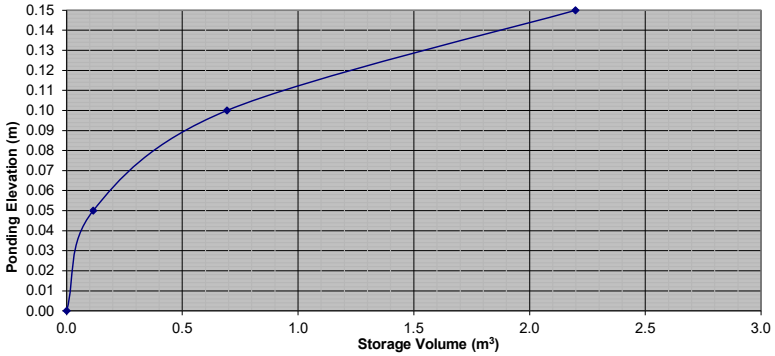
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.32	0.32	8	0.4	
1:5 Year	0.32	0.32	10	0.7	2.2
1:100 Year	0.32	0.32	15	1.9	

Roof Drain Storage Table for Area RD 6

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.6	0.1
0.10	18.5	0.7
0.15	41.7	2.2

Stage Storage Curve: Area A-6
Controlled Roof Drain #6



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Roof Drain #7

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	2.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	5.73	5.02	1.51
10	76.81	4.25	3.54	2.12
15	61.77	3.42	2.71	2.43
20	52.03	2.88	2.17	2.60
25	45.17	2.50	1.79	2.68
30	40.04	2.21	1.50	2.71
35	36.06	1.99	1.28	2.70
40	32.86	1.82	1.11	2.66
45	30.24	1.67	0.96	2.60
50	28.04	1.55	0.84	2.52
55	26.17	1.45	0.74	2.43
60	24.56	1.36	0.65	2.33
65	23.15	1.28	0.57	2.22
70	21.91	1.21	0.50	2.11
75	20.81	1.15	0.44	1.98
90	18.14	1.00	0.29	1.58
105	16.13	0.89	0.18	1.15
120	14.56	0.81	0.10	0.69

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Roof Drain #7

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	4.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	7.81	7.02	2.10
10	104.19	5.76	4.97	2.98
15	83.56	4.62	3.83	3.45
20	70.25	3.88	3.09	3.71
25	60.90	3.37	2.58	3.87
30	53.93	2.98	2.19	3.95
35	48.52	2.68	1.89	3.97
40	44.18	2.44	1.65	3.97
45	40.63	2.25	1.46	3.93
50	37.65	2.08	1.29	3.88
55	35.12	1.94	1.15	3.80
60	32.94	1.82	1.03	3.71
65	31.04	1.72	0.93	3.61
70	29.37	1.62	0.83	3.50
75	27.89	1.54	0.75	3.38
90	24.29	1.34	0.55	2.99
105	21.58	1.19	0.40	2.54
120	19.47	1.08	0.29	2.06

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Roof Drain #7

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	9.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	14.91	13.96	4.19
10	178.56	10.97	10.02	6.01
15	142.89	8.78	7.83	7.05
20	119.95	7.37	6.42	7.70
25	103.85	6.38	5.43	8.15
30	91.87	5.64	4.69	8.45
35	82.58	5.07	4.12	8.66
40	75.15	4.62	3.67	8.80
45	69.05	4.24	3.29	8.89
50	63.95	3.93	2.98	8.94
55	59.62	3.66	2.71	8.95
60	55.89	3.43	2.48	8.94
80	44.99	2.76	1.81	8.71
100	37.90	2.33	1.38	8.27
120	32.89	2.02	1.07	7.71
140	29.15	1.79	0.84	7.06
160	26.24	1.61	0.66	6.36
180	23.90	1.47	0.52	5.60

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-6 Controlled Roof Drain #7

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	11.4	m3

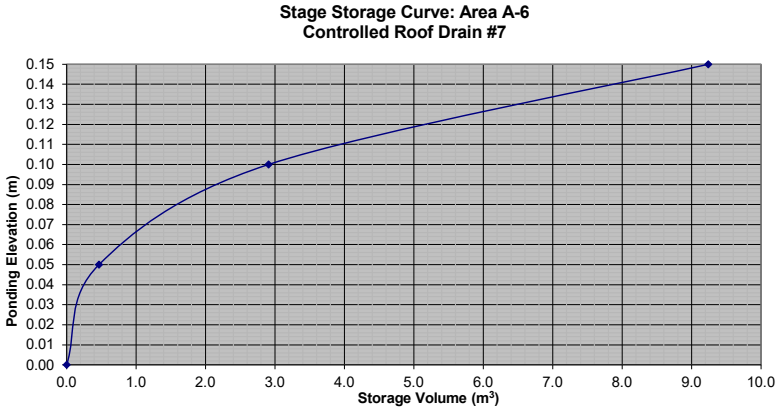
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	17.89	16.94	5.08
10	214.27	13.16	12.21	7.33
15	171.47	10.53	9.58	8.63
20	143.94	8.84	7.89	9.47
25	124.62	7.66	6.71	10.06
30	110.24	6.77	5.82	10.48
35	99.09	6.09	5.14	10.79
40	90.17	5.54	4.59	11.02
45	82.86	5.09	4.14	11.18
50	76.74	4.72	3.77	11.30
55	71.55	4.40	3.45	11.37
60	67.07	4.12	3.17	11.42
65	63.18	3.88	2.93	11.43
70	59.75	3.67	2.72	11.43
75	56.71	3.48	2.53	11.40
90	49.33	3.03	2.08	11.24
105	43.80	2.69	1.74	10.97
120	39.47	2.43	1.48	10.62

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	2.7	
1:5 Year	0.79	0.79	10	4.0	9.2
1:100 Year	0.95	0.95	15	9.0	

Roof Drain Storage Table for Area RD 7

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	18.6	0.5
0.10	79.1	2.9
0.15	174.2	9.2



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Roof Drain #8

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	2.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	5.70	4.99	1.50
10	76.81	4.23	3.52	2.11
15	61.77	3.40	2.69	2.42
20	52.03	2.86	2.15	2.58
25	45.17	2.49	1.78	2.66
30	40.04	2.20	1.49	2.69
35	36.06	1.98	1.27	2.68
40	32.86	1.81	1.10	2.64
45	30.24	1.66	0.95	2.58
50	28.04	1.54	0.83	2.50
55	26.17	1.44	0.73	2.41
60	24.56	1.35	0.64	2.31
65	23.15	1.27	0.56	2.20
70	21.91	1.21	0.50	2.08
75	20.81	1.15	0.44	1.96
90	18.14	1.00	0.29	1.56
105	16.13	0.89	0.18	1.12
120	14.56	0.80	0.09	0.66

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Roof Drain #8

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	7.77	6.98	2.09
10	104.19	5.74	4.95	2.97
15	83.56	4.60	3.81	3.43
20	70.25	3.87	3.08	3.69
25	60.90	3.35	2.56	3.84
30	53.93	2.97	2.18	3.92
35	48.52	2.67	1.88	3.95
40	44.18	2.43	1.64	3.94
45	40.63	2.24	1.45	3.91
50	37.65	2.07	1.28	3.85
55	35.12	1.93	1.14	3.77
60	32.94	1.81	1.02	3.68
65	31.04	1.71	0.92	3.58
70	29.37	1.62	0.83	3.47
75	27.89	1.54	0.75	3.35
90	24.29	1.34	0.55	2.95
105	21.58	1.19	0.40	2.51
120	19.47	1.07	0.28	2.03

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Roof Drain #8

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	8.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	14.84	13.89	4.17
10	178.56	10.92	9.97	5.98
15	142.89	8.74	7.79	7.01
20	119.95	7.34	6.39	7.66
25	103.85	6.35	5.40	8.10
30	91.87	5.62	4.67	8.40
35	82.58	5.05	4.10	8.61
40	75.15	4.60	3.65	8.75
45	69.05	4.22	3.27	8.84
50	63.95	3.91	2.96	8.88
55	59.62	3.65	2.70	8.90
60	55.89	3.42	2.47	8.89
80	44.99	2.75	1.80	8.65
100	37.90	2.32	1.37	8.21
120	32.89	2.01	1.06	7.65
140	29.15	1.78	0.83	7.00
160	26.24	1.60	0.65	6.29
180	23.90	1.46	0.51	5.53

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-6 Controlled Roof Drain #8

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	11.4	m3

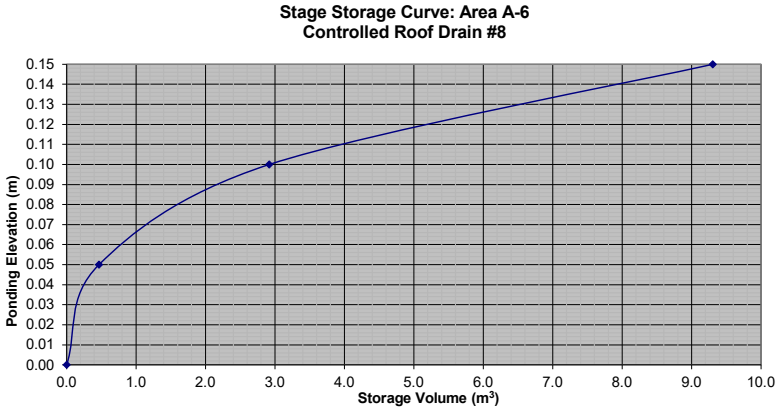
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	17.81	16.86	5.06
10	214.27	13.10	12.15	7.29
15	171.47	10.49	9.54	8.58
20	143.94	8.80	7.85	9.42
25	124.62	7.62	6.67	10.01
30	110.24	6.74	5.79	10.43
35	99.09	6.06	5.11	10.73
40	90.17	5.52	4.57	10.96
45	82.86	5.07	4.12	11.12
50	76.74	4.69	3.74	11.23
55	71.55	4.38	3.43	11.31
60	67.07	4.10	3.15	11.35
65	63.18	3.86	2.91	11.36
70	59.75	3.65	2.70	11.36
75	56.71	3.47	2.52	11.33
90	49.33	3.02	2.07	11.16
105	43.80	2.68	1.73	10.89
120	39.47	2.41	1.46	10.54

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 open

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	8	2.7	
1:5 Year	0.79	0.79	10	3.9	9.3
1:100 Year	0.95	0.95	15	8.9	

Roof Drain Storage Table for Area RD 8

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	18.7	0.5
0.10	79.3	2.9
0.15	176.1	9.3



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:2 YEAR EVENT
AREA B-0a Un-Controlled Runoff - Legget Drive

OTTAWA IDF CURVE

Area = 0.038 ha Qallow = 2.0 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	2.72	0.70	0.21
10	76.81	2.02	0.00	0.00
15	61.77	1.62	-0.39	-0.36
20	52.03	1.37	-0.65	-0.78
25	45.17	1.19	-0.83	-1.25
30	40.04	1.05	-0.96	-1.74
35	36.06	0.95	-1.07	-2.25
40	32.86	0.86	-1.15	-2.77
45	30.24	0.79	-1.22	-3.30
50	28.04	0.74	-1.28	-3.84
55	26.17	0.69	-1.33	-4.39
60	24.56	0.64	-1.37	-4.94
65	23.15	0.61	-1.41	-5.49
70	21.91	0.58	-1.44	-6.05
75	20.81	0.55	-1.47	-6.61
90	18.14	0.48	-1.54	-8.31
105	16.13	0.42	-1.59	-10.03
120	14.56	0.38	-1.63	-11.76
135	13.30	0.35	-1.67	-13.50
150	12.25	0.32	-1.69	-15.25

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:5 YEAR EVENT
AREA B-0a Un-Controlled Runoff - Legget Drive

OTTAWA IDF CURVE

Area = 0.038 ha Qallow = 2.7 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.71	0.97	0.29
10	104.19	2.73	0.00	0.00
15	83.56	2.19	-0.54	-0.49
20	70.25	1.84	-0.89	-1.07
25	60.90	1.60	-1.14	-1.70
30	53.93	1.42	-1.32	-2.37
35	48.52	1.27	-1.46	-3.07
40	44.18	1.16	-1.58	-3.78
45	40.63	1.07	-1.67	-4.50
50	37.65	0.99	-1.75	-5.24
55	35.12	0.92	-1.81	-5.98
60	32.94	0.86	-1.87	-6.73
65	31.04	0.81	-1.92	-7.49
70	29.37	0.77	-1.96	-8.25
75	27.89	0.73	-2.00	-9.01
90	24.29	0.64	-2.10	-11.33
105	21.58	0.57	-2.17	-13.66
120	19.47	0.51	-2.22	-16.01
135	17.76	0.47	-2.27	-18.37
150	16.36	0.43	-2.31	-20.75

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YEAR EVENT
AREA B-0a Un-Controlled Runoff - Legget Drive

OTTAWA IDF CURVE

Area = 0.038 ha Qallow = 5.7 L/s
C = 0.30 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	7.75	2.05	0.61
10	178.56	5.70	0.00	0.00
15	142.89	4.56	-1.14	-1.03
20	119.95	3.83	-1.87	-2.25
25	103.85	3.32	-2.39	-3.58
30	91.87	2.93	-2.77	-4.98
35	82.58	2.64	-3.07	-6.44
40	75.15	2.40	-3.30	-7.93
45	69.05	2.21	-3.50	-9.44
50	63.95	2.04	-3.66	-10.98
55	59.62	1.90	-3.80	-12.54
60	55.89	1.79	-3.92	-14.10
65	52.65	1.68	-4.02	-15.68
70	49.79	1.59	-4.11	-17.27
75	47.26	1.51	-4.19	-18.87
90	41.11	1.31	-4.39	-23.71
105	36.50	1.17	-4.54	-28.59
120	32.89	1.05	-4.65	-33.50
135	30.00	0.96	-4.75	-38.43
150	27.61	0.88	-4.82	-43.39

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YR + 20% IDF Increase
AREA B-0a Un-Controlled Runoff - Legget Drive

OTTAWA IDF CURVE

Area = 0.038 ha Qallow = 6.8 L/s
C = 0.30 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	9.30	2.46	0.74
10	214.27	6.84	0.00	0.00
15	171.47	5.48	-1.37	-1.23
20	143.94	4.60	-2.25	-2.70
25	124.62	3.98	-2.86	-4.30
30	110.24	3.52	-3.32	-5.98
35	99.09	3.17	-3.68	-7.73
40	90.17	2.88	-3.96	-9.51
45	82.86	2.65	-4.20	-11.33
50	76.74	2.45	-4.39	-13.18
55	71.55	2.29	-4.56	-15.04
60	67.07	2.14	-4.70	-16.93
65	63.18	2.02	-4.83	-18.82
70	59.75	1.91	-4.94	-20.73
75	56.71	1.81	-5.03	-22.65
90	49.33	1.58	-5.27	-28.45
105	43.80	1.40	-5.44	-34.30
120	39.47	1.26	-5.58	-40.20
135	36.00	1.15	-5.69	-46.12
150	33.13	1.06	-5.79	-52.07

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:2 YEAR EVENT
AREA B-0b Un-Controlled Runoff - Access Route

OTTAWA IDF CURVE

Area = 0.071 ha Qallow = 3.0 L/s
C = 0.20 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	4.09	1.06	0.32
10	76.81	3.03	0.00	0.00
15	61.77	2.44	-0.59	-0.53
20	52.03	2.05	-0.98	-1.17
25	45.17	1.78	-1.25	-1.87
30	40.04	1.58	-1.45	-2.61
35	36.06	1.42	-1.61	-3.38
40	32.86	1.30	-1.73	-4.16
45	30.24	1.19	-1.84	-4.96
50	28.04	1.11	-1.93	-5.78
55	26.17	1.03	-2.00	-6.60
60	24.56	0.97	-2.06	-7.43
65	23.15	0.91	-2.12	-8.26
70	21.91	0.87	-2.17	-9.10
75	20.81	0.82	-2.21	-9.95
90	18.14	0.72	-2.32	-12.51
105	16.13	0.64	-2.40	-15.09
120	14.56	0.57	-2.46	-17.69
135	13.30	0.52	-2.51	-20.31
150	12.25	0.48	-2.55	-22.93

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:5 YEAR EVENT
AREA B-0b Un-Controlled Runoff - Access Route

OTTAWA IDF CURVE

Area = 0.071 ha Qallow = 4.1 L/s
C = 0.20 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	5.57	1.46	0.44
10	104.19	4.11	0.00	0.00
15	83.56	3.30	-0.81	-0.73
20	70.25	2.77	-1.34	-1.61
25	60.90	2.40	-1.71	-2.56
30	53.93	2.13	-1.98	-3.57
35	48.52	1.92	-2.20	-4.62
40	44.18	1.74	-2.37	-5.69
45	40.63	1.60	-2.51	-6.78
50	37.65	1.49	-2.63	-7.88
55	35.12	1.39	-2.73	-9.00
60	32.94	1.30	-2.81	-10.13
65	31.04	1.23	-2.89	-11.26
70	29.37	1.16	-2.95	-12.41
75	27.89	1.10	-3.01	-13.55
90	24.29	0.96	-3.15	-17.03
105	21.58	0.85	-3.26	-20.55
120	19.47	0.77	-3.34	-24.08
135	17.76	0.70	-3.41	-27.64
150	16.36	0.65	-3.47	-31.20

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YEAR EVENT
AREA B-0b Un-Controlled Runoff - Access Route

OTTAWA IDF CURVE

Area = 0.071 ha Qallow = 8.8 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	11.98	3.17	0.95
10	178.56	8.81	0.00	0.00
15	142.89	7.05	-1.76	-1.58
20	119.95	5.92	-2.89	-3.47
25	103.85	5.12	-3.69	-5.53
30	91.87	4.53	-4.28	-7.70
35	82.58	4.07	-4.74	-9.95
40	75.15	3.71	-5.10	-12.25
45	69.05	3.41	-5.40	-14.59
50	63.95	3.16	-5.66	-16.97
55	59.62	2.94	-5.87	-19.37
60	55.89	2.76	-6.05	-21.79
65	52.65	2.60	-6.21	-24.23
70	49.79	2.46	-6.35	-26.69
75	47.26	2.33	-6.48	-29.16
90	41.11	2.03	-6.78	-36.62
105	36.50	1.80	-7.01	-44.16
120	32.89	1.62	-7.19	-51.75
135	30.00	1.48	-7.33	-59.38
150	27.61	1.36	-7.45	-67.04

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YR + 20% IDF Increase
AREA B-0b Un-Controlled Runoff - Access Route

OTTAWA IDF CURVE

Area = 0.071 ha Qallow = 10.6 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	14.37	3.80	1.14
10	214.27	10.57	0.00	0.00
15	171.47	8.46	-2.11	-1.90
20	143.94	7.10	-3.47	-4.16
25	124.62	6.15	-4.42	-6.64
30	110.24	5.44	-5.13	-9.24
35	99.09	4.89	-5.68	-11.94
40	90.17	4.45	-6.12	-14.70
45	82.86	4.09	-6.48	-17.51
50	76.74	3.79	-6.79	-20.36
55	71.55	3.53	-7.04	-23.24
60	67.07	3.31	-7.26	-26.15
65	63.18	3.12	-7.46	-29.08
70	59.75	2.95	-7.62	-32.02
75	56.71	2.80	-7.78	-34.99
90	49.33	2.43	-8.14	-43.95
105	43.80	2.16	-8.41	-53.00
120	39.47	1.95	-8.63	-62.10
135	36.00	1.78	-8.80	-71.26
150	33.13	1.63	-8.94	-80.44

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA B-1 Controlled Site Flows (R&D Lab Internal SWM Tank)

OTTAWA IDF CURVE — Qpeak = 21.9 L/s
Area = 0.795 ha — Qavg = 11.0 L/s
C = 0.90 — Vol(max) = 137.1 m3
(Vol calculated for Qallow-avg)

Time (min)	Tributary Ar (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	206.02	195.07	58.52
10	76.81	152.78	141.83	85.10
15	61.77	122.86	111.91	100.72
20	52.03	103.50	92.55	111.06
25	45.17	89.84	78.89	118.34
30	40.04	79.65	68.70	123.66
35	36.06	71.73	60.78	127.63
40	32.86	65.37	54.42	130.61
45	30.24	60.15	49.20	132.84
50	28.04	55.78	44.83	134.48
55	26.17	52.06	41.11	135.65
60	24.56	48.85	37.90	136.44
65	23.15	46.05	35.10	136.89
70	21.91	43.59	32.64	137.08
75	20.81	41.40	30.45	137.03
90	18.14	36.09	25.14	135.75
105	16.13	32.09	21.14	133.20
120	14.56	28.97	18.02	129.71
135	13.30	26.45	15.50	125.53
150	12.25	24.37	13.42	120.78

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA B-1 Controlled Site Flows (R&D Lab Internal SWM Tank)

OTTAWA IDF CURVE — Qpeak = 27.0 L/s
Area = 0.795 ha — Qavg = 13.5 L/s
C = 0.90 — Vol(max) = 188.9 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	280.83	267.33	80.20
10	104.19	207.26	193.76	116.25
15	83.56	166.21	152.71	137.44
20	70.25	139.74	126.24	151.49
25	60.90	121.13	107.63	161.45
30	53.93	107.27	93.77	168.79
35	48.52	96.51	83.01	174.32
40	44.18	87.89	74.39	178.53
45	40.63	80.82	67.32	181.75
50	37.65	74.90	61.40	184.19
55	35.12	69.87	56.37	186.01
60	32.94	65.53	52.03	187.31
65	31.04	61.75	48.25	188.18
70	29.37	58.43	44.93	188.69
75	27.89	55.47	41.97	188.88
90	24.29	48.31	34.81	187.99
105	21.58	42.93	29.43	185.41
120	19.47	38.72	25.22	181.61
135	17.76	35.34	21.84	176.88
150	16.36	32.55	19.05	171.42

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA B-1 Controlled Site Flows (R&D Lab Internal SWM Tank)

OTTAWA IDF CURVE — Qpeak = 41.0 L/s
Area = 0.795 ha — Qavg = 20.5 L/s
C = 1.00 — Vol(max) = 380.0 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	536.42	515.92	154.77
10	178.56	394.65	374.15	224.49
15	142.89	315.82	295.32	265.79
20	119.95	265.11	244.61	293.53
25	103.85	229.52	209.02	313.53
30	91.87	203.04	182.54	328.58
35	82.58	182.51	162.01	340.23
40	75.15	166.08	145.58	349.40
45	69.05	152.61	132.11	356.71
50	63.95	141.35	120.85	362.55
55	59.62	131.78	111.28	367.22
60	55.89	123.54	103.04	370.93
65	52.65	116.36	95.86	373.84
70	49.79	110.04	89.54	376.08
75	47.26	104.44	83.94	377.74
90	41.11	90.86	70.36	379.96
105	36.50	80.67	60.17	379.04
120	32.89	72.70	52.20	375.86
135	30.00	66.30	45.80	370.97
150	27.61	61.02	40.52	364.72

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA B-1 Controlled Site Flows (R&D Lab Internal SWM Tank)

OTTAWA IDF CURVE — Qpeak = 41.0 L/s
Area = 0.795 ha — Qavg = 20.5 L/s
C = 1.00 — Vol(max) = 480.7 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	643.70	623.20	186.96
10	214.27	473.57	453.07	271.84
15	171.47	378.98	358.48	322.64
20	143.94	318.13	297.63	357.16
25	124.62	275.42	254.92	382.38
30	110.24	243.65	223.15	401.68
35	99.09	219.01	198.51	416.88
40	90.17	199.30	178.80	429.12
45	82.86	183.14	162.64	439.12
50	76.74	169.62	149.12	447.36
55	71.55	158.13	137.63	454.19
60	67.07	148.24	127.74	459.88
65	63.18	139.63	119.13	464.60
70	59.75	132.05	111.55	468.52
75	56.71	125.33	104.83	471.74
90	49.33	109.03	88.53	478.09
105	43.80	96.80	76.30	480.68
120	39.47	87.24	66.74	480.56
135	36.00	79.56	59.06	478.37
150	33.13	73.23	52.73	474.56

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
SWM TANK	-	206.00	N/A		77.91
-	-	-	-	-	-
-	-	-	-	-	-

PI = 3.141592654
PIPE I.D.= 381 PVC
U/G Storage Pipe Volume
End Area 0.114 (m^2)
Total Length 0.0 (m)
Pipe Volume 0.0 (m^3)

Area B-1: Storage Table

Elevation (m)	System Depth (m)	SWM TANK Volume (m^3)	- -	- -	Underground Storage: Combined Volume (m^3)	Surface Storage: SWM TANK Area (m^2)	SWM TANK Volume (m^3)	- Area (m^2)	- Volume (m^3)	- Area (m^2)	- Volume (m^3)	Total Storage: Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
77.91	0.00	0.00			0.00	-	-	-	-	-	-	-	**0**	-
78.58	0.67	138.02			138.02	-	-	-	-	-	-	-	**138.0**	0.48
78.83	0.92	189.52			189.52	-	-	-	-	-	-	-	**189.5**	0.73
79.76	1.85	381.10			381.10	-	-	-	-	-	-	-	**381.1**	1.66
79.78	1.87	385.22			385.22	-	-	-	-	-	-	-	**385.2**	1.68
79.80	1.89	389.34			389.34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**389.3**	1.70
79.85						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**389.3**	1.75
79.90						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**389.3**	1.80
79.95						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**389.3**	1.85

Tempest HF Type C ICD

1:100 Yr
Flow (L/s) = 41.0
Head (m) = 1.66
Elevation (m) = **79.76**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 380.0

1:5 Yr
Flow (L/s) = 27.0
Head (m) = 0.73
Elevation (m) = **78.83**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 188.9

1:2 Yr
Flow (L/s) = 21.9
Head (m) = 0.48
Elevation (m) = **78.58**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 137.1

Orifice Size - 1:100 yr Flow Check
Q=0.62xAx(2gh)^0.5

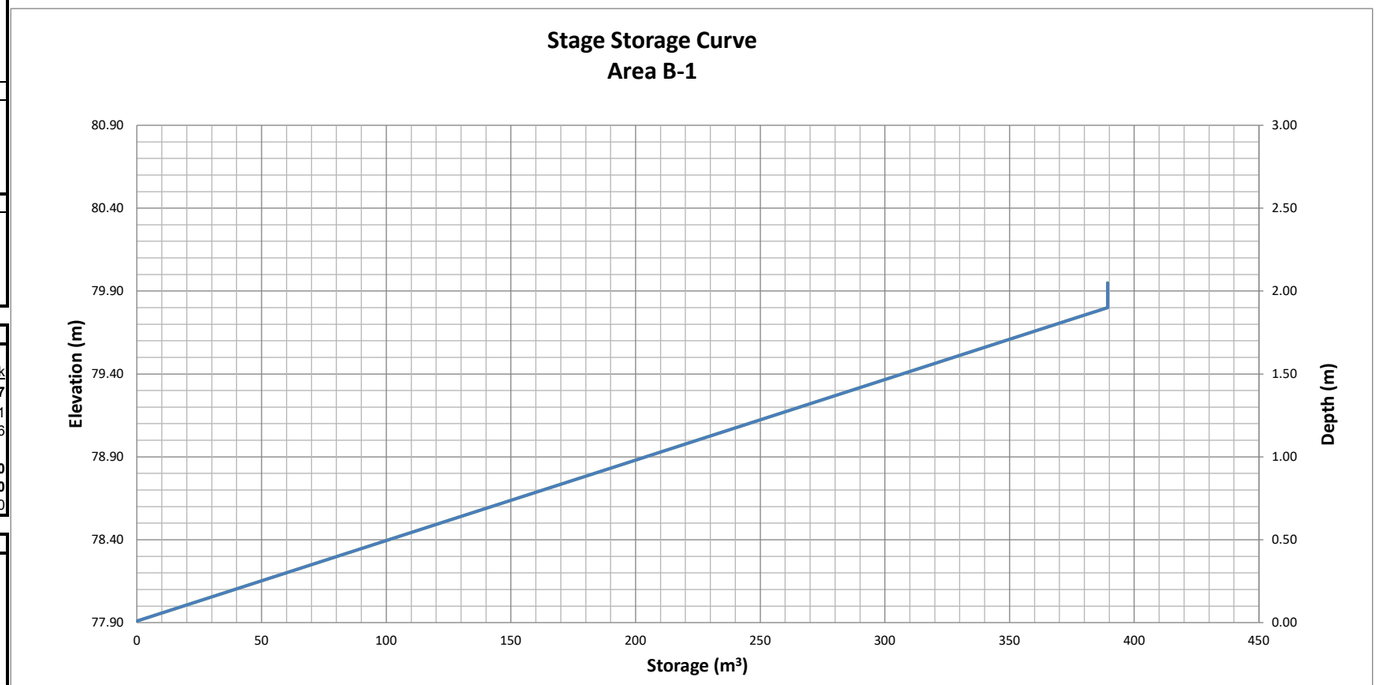
	1:100 yr	Flow Check
Q (m^3/s) =	0.0410	**0.0407**
g (m/s^2) =	9.81	9.81
h (m) =	**1.66**	1.66
A (m^2) =	**0.011589215**	**0.01150**
D (m) =	**0.121473649**	**0.12100**
D (mm) =	**121**	121.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0270
g (m/s^2) =	9.81
h (m) =	**0.73**
A (m^2) =	**0.01150**
D (m) =	**0.121**
D (mm) =	**121**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0219
g (m/s^2) =	9.81
h (m) =	**0.48**
A (m^2) =	**0.01150**
D (m) =	**0.121**
D (mm) =	**121**



Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA B-2 Controlled Site Flows (Plaza & Entrance Dropoff)

OTTAWA IDF CURVE — Qpeak = 19.0 L/s
Area = 0.550 ha — Qavg = 9.5 L/s
C = 0.64 — Vol(max) = 53.9 m3
(Vol calculated for Qallow-avg)

Time (min)	Tributary Ar (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	100.69	91.19	27.36
10	76.81	74.67	65.17	39.10
15	61.77	60.05	50.55	45.49
20	52.03	50.58	41.08	49.30
25	45.17	43.91	34.41	51.62
30	40.04	38.93	29.43	52.97
35	36.06	35.06	25.56	53.67
40	32.86	31.95	22.45	53.88
45	30.24	29.40	19.90	53.73
50	28.04	27.26	17.76	53.28
55	26.17	25.44	15.94	52.61
60	24.56	23.87	14.37	51.75
65	23.15	22.51	13.01	50.73
70	21.91	21.30	11.80	49.57
75	20.81	20.23	10.73	48.31
90	18.14	17.64	8.14	43.95
105	16.13	15.69	6.19	38.97
120	14.56	14.16	4.66	33.53
135	13.30	12.93	3.43	27.75
150	12.25	11.91	2.41	21.70

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA B-2 Controlled Site Flows (Plaza & Entrance Dropoff)

OTTAWA IDF CURVE — Qpeak = 21.0 L/s
Area = 0.550 ha — Qavg = 10.5 L/s
C = 0.64 — Vol(max) = 78.3 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	137.25	126.75	38.03
10	104.19	101.30	90.80	54.48
15	83.56	81.23	70.73	63.66
20	70.25	68.30	57.80	69.36
25	60.90	59.20	48.70	73.05
30	53.93	52.43	41.93	75.47
35	48.52	47.17	36.67	77.00
40	44.18	42.96	32.46	77.89
45	40.63	39.50	29.00	78.30
50	37.65	36.61	26.11	78.32
55	35.12	34.15	23.65	78.03
60	32.94	32.03	21.53	77.50
65	31.04	30.18	19.68	76.75
70	29.37	28.56	18.06	75.83
75	27.89	27.11	16.61	74.76
90	24.29	23.61	13.11	70.81
105	21.58	20.98	10.48	66.04
120	19.47	18.93	8.43	60.67
135	17.76	17.27	6.77	54.84
150	16.36	15.91	5.41	48.66

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA B-2 Controlled Site Flows (Plaza & Entrance Dropoff)

OTTAWA IDF CURVE — Qpeak = 30.0 L/s
Area = 0.550 ha — Qavg = 15.0 L/s
C = 0.72 — Vol(max) = 167.0 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	266.52	251.52	75.45
10	178.56	196.08	181.08	108.65
15	142.89	156.91	141.91	127.72
20	119.95	131.72	116.72	140.06
25	103.85	114.04	99.04	148.55
30	91.87	100.88	85.88	154.59
35	82.58	90.68	75.68	158.93
40	75.15	82.52	67.52	162.04
45	69.05	75.83	60.83	164.23
50	63.95	70.23	55.23	165.69
55	59.62	65.47	50.47	166.56
60	55.89	61.38	46.38	166.96
65	52.65	57.81	42.81	166.97
70	49.79	54.67	39.67	166.63
75	47.26	51.89	36.89	166.01
90	41.11	45.14	30.14	162.78
105	36.50	40.08	25.08	157.99
120	32.89	36.12	21.12	152.08
135	30.00	32.94	17.94	145.31
150	27.61	30.32	15.32	137.88

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA B-2 Controlled Site Flows (Plaza & Entrance Dropoff)

OTTAWA IDF CURVE — Qpeak = 30.0 L/s
Area = 0.550 ha — Qavg = 15.0 L/s
C = 0.72 — Vol(max) = 212.7 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	319.82	304.82	91.45
10	214.27	235.29	220.29	132.18
15	171.47	188.30	173.30	155.97
20	143.94	158.06	143.06	171.68
25	124.62	136.84	121.84	182.76
30	110.24	121.06	106.06	190.90
35	99.09	108.82	93.82	197.02
40	90.17	99.02	84.02	201.65
45	82.86	90.99	75.99	205.17
50	76.74	84.27	69.27	207.82
55	71.55	78.57	63.57	209.78
60	67.07	73.65	58.65	211.16
65	63.18	69.37	54.37	212.06
70	59.75	65.61	50.61	212.56
75	56.71	62.27	47.27	212.72
90	49.33	54.17	39.17	211.54
105	43.80	48.09	33.09	208.49
120	39.47	43.35	28.35	204.10
135	36.00	39.53	24.53	198.68
150	33.13	36.38	21.38	192.45

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
UG STORAGE	1144	112.10	VARIES		79.57
STMMH/CBMH	1200	9.05	VARIES	79.57	79.05
CBMH 260	1200	1.13	81.30	78.83	78.80

PI = 3.141592654
PIPE I.D.= 304.8 PVC
U/G Storage Pipe Volume
End Area 0.073 (m^2)
Total Length 77.3 (m)
Pipe Volume 5.6 (m^3)

PI = 3.14159
PIPE I.D.= 381 PVC
U/G Storage Pipe Volume
End Area 0.114 (m^2)
Total Length 107.0 (m)
Pipe Volume 12.2 (m^3)

Area B-2: Storage Table

Elevation (m)	System Depth (m)	UG STORAGE Volume (m^3)	STMMH/CBMH Volume (m^3)	CBMH 260 Volume (m^3)	Underground Storage Combined Volume (m^3)	Surface Storage: UG STORAGE Area (m^2)	UG STORAGE Volume (m^3)	STMMH/CBMH Area (m^2)	STMMH/CBMH Volume (m^3)	CBMH 260 Area (m^2)	CBMH 260 Volume (m^3)	Total Storage: Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
78.80	0.00	0.00	0.00	0.00	17.84	-	-	-	-	-	-	-	**0**	-
79.83	1.03	29.15	7.06	1.16	55.21	-	-	-	-	-	-	-	**55.2**	0.84
80.02	1.22	50.45	8.78	1.38	78.44	-	-	-	-	-	-	-	**78.4**	1.03
80.71	1.91	127.80	15.02	2.16	162.82	-	-	-	-	-	-	-	**162.8**	1.72
81.13	2.33	127.80	18.82	2.64	167.09	-	-	-	-	-	-	-	**167.1**	2.14
81.30	2.50	127.80	20.36	2.83	168.82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**168.8**	2.31
81.35						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**168.8**	2.36
81.40						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**168.8**	2.41
81.45						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**168.8**	2.46

Tempest HF Type B ICD

1:100 Yr
Flow (L/s) = 30.0
Head (m) = 2.14
Elevation (m) = **81.13**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 167.0

1:5 Yr
Flow (L/s) = 21.0
Head (m) = 1.03
Elevation (m) = **80.02**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 78.3

1:2 Yr
Flow (L/s) = 19.0
Head (m) = 0.84
Elevation (m) = **79.83**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 53.9

Orifice Size - 1:100 yr Flow Check
Q=0.62xAx(2gh)^0.5

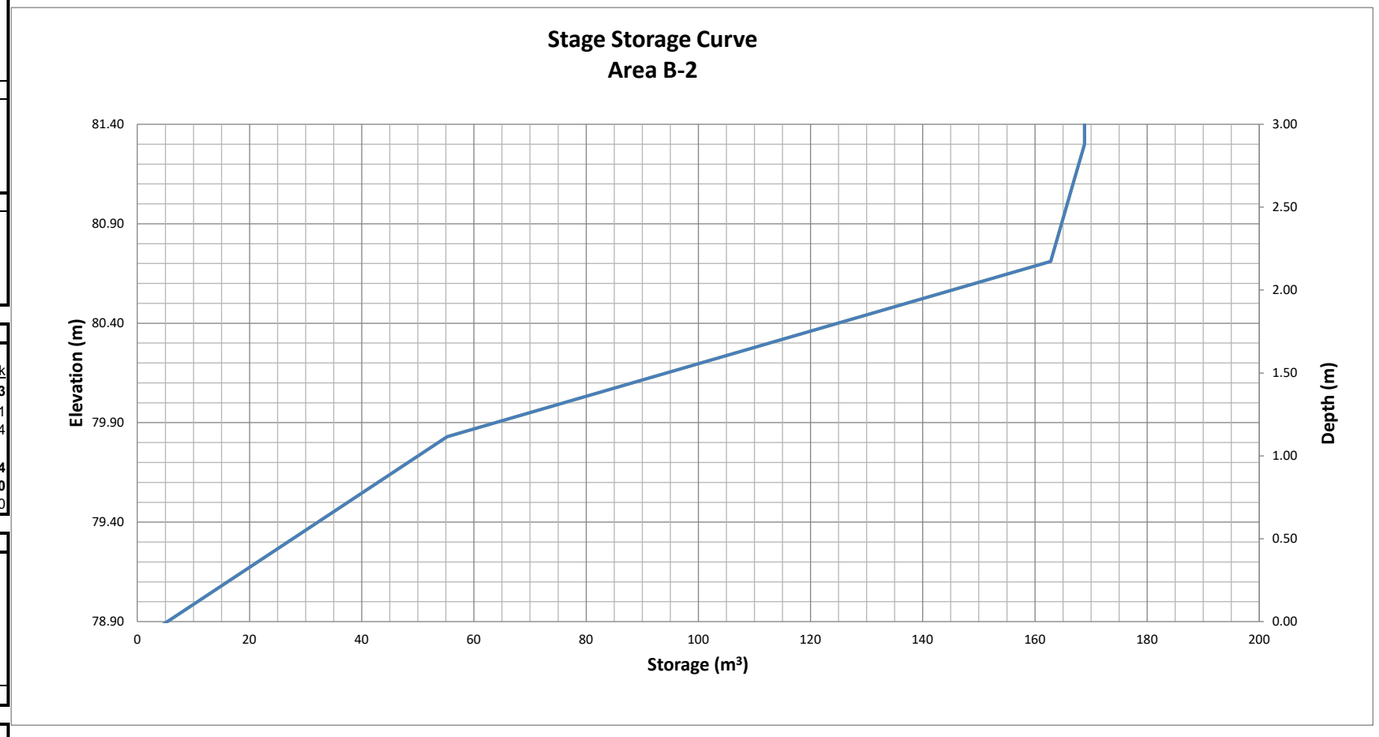
	1:100 yr	Flow Check
Q (m^3/s) =	0.0300	**0.0303**
g (m/s^2) =	9.81	9.81
h (m) =	**2.14**	2.14
A (m^2) =	**0.007468337**	**0.00754**
D (m) =	**0.097514011**	**0.09800**
D (mm) =	**98**	98.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0210
g (m/s^2) =	9.81
h (m) =	**1.03**
A (m^2) =	**0.00754**
D (m) =	**0.098**
D (mm) =	**98**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0190
g (m/s^2) =	9.81
h (m) =	**0.84**
A (m^2) =	**0.00754**
D (m) =	**0.098**
D (mm) =	**98**



Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA B-3 Controlled Site Flows (Surface Parking)

OTTAWA IDF CURVE
Area = 1.127 ha
C = 0.82

Qpeak = 23.7 L/s
Qavg = 11.9 L/s
Vol(max) = 186.4 m3
(Vol calculated for Qallow-avg)

Time (min)	Tributary Ar (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	264.73	252.88	75.86
10	76.81	196.32	184.47	110.68
15	61.77	157.88	146.03	131.43
20	52.03	132.99	121.14	145.37
25	45.17	115.45	103.60	155.40
30	40.04	102.35	90.50	162.90
35	36.06	92.17	80.32	168.67
40	32.86	84.00	72.15	173.17
45	30.24	77.29	65.44	176.70
50	28.04	71.67	59.82	179.47
55	26.17	66.89	55.04	181.64
60	24.56	62.77	50.92	183.31
65	23.15	59.18	47.33	184.57
70	21.91	56.01	44.16	185.47
75	20.81	53.20	41.35	186.07
90	18.14	46.37	34.52	186.43
105	16.13	41.24	29.39	185.15
120	14.56	37.22	25.37	182.67
135	13.30	33.98	22.13	179.29
150	12.25	31.32	19.47	175.19

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA B-3 Controlled Site Flows (Surface Parking)

OTTAWA IDF CURVE
Area = 1.127 ha
C = 0.82

Qpeak = 29.8 L/s
Qavg = 14.9 L/s
Vol(max) = 254.8 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	360.86	345.96	103.79
10	104.19	266.32	251.42	150.85
15	83.56	213.58	198.68	178.81
20	70.25	179.56	164.66	197.60
25	60.90	155.65	140.75	211.13
30	53.93	137.84	122.94	221.29
35	48.52	124.01	109.11	229.14
40	44.18	112.94	98.04	235.29
45	40.63	103.85	88.95	240.16
50	37.65	96.24	81.34	244.03
55	35.12	89.78	74.88	247.09
60	32.94	84.20	69.30	249.50
65	31.04	79.35	64.45	251.35
70	29.37	75.08	60.18	252.74
75	27.89	71.28	56.38	253.73
90	24.29	62.08	47.18	254.78
105	21.58	55.17	40.27	253.67
120	19.47	49.76	34.86	250.99
135	17.76	45.41	30.51	247.11
150	16.36	41.82	26.92	242.30

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA B-3 Controlled Site Flows (Surface Parking)

OTTAWA IDF CURVE
Area = 1.127 ha
C = 0.91

Qpeak = 46.0 L/s
Qavg = 23.0 L/s
Vol(max) = 510.5 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	691.82	668.82	200.65
10	178.56	508.98	485.98	291.59
15	142.89	407.32	384.32	345.88
20	119.95	341.92	318.92	382.70
25	103.85	296.01	273.01	409.52
30	91.87	261.87	238.87	429.96
35	82.58	235.39	212.39	446.01
40	75.15	214.20	191.20	458.88
45	69.05	196.83	173.83	469.33
50	63.95	182.30	159.30	477.90
55	59.62	169.96	146.96	484.95
60	55.89	159.33	136.33	490.77
65	52.65	150.07	127.07	495.56
70	49.79	141.92	118.92	499.48
75	47.26	134.70	111.70	502.65
90	41.11	117.19	94.19	508.60
105	36.50	104.03	81.03	510.52
120	32.89	93.77	70.77	509.51
135	30.00	85.51	62.51	506.29
150	27.61	78.70	55.70	501.33
165	25.61	73.00	50.00	494.97

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA B-3 Controlled Site Flows (Surface Parking)

OTTAWA IDF CURVE
Area = 1.127 ha
C = 0.91

Qpeak = 46.0 L/s
Qavg = 23.0 L/s
Vol(max) = 644.8 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	830.18	807.18	242.16
10	214.27	610.77	587.77	352.66
15	171.47	488.78	465.78	419.20
20	143.94	410.30	387.30	464.76
25	124.62	355.22	332.22	498.32
30	110.24	314.24	291.24	524.23
35	99.09	282.47	259.47	544.88
40	90.17	257.04	234.04	561.70
45	82.86	236.19	213.19	575.62
50	76.74	218.76	195.76	587.28
55	71.55	203.95	180.95	597.13
60	67.07	191.19	168.19	605.49
65	63.18	180.08	157.08	612.62
70	59.75	170.31	147.31	618.70
75	56.71	161.64	138.64	623.88
90	49.33	140.62	117.62	635.16
105	43.80	124.84	101.84	641.60
120	39.47	112.52	89.52	644.54
135	36.00	102.61	79.61	644.81
150	33.13	94.44	71.44	643.00

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
CBMH 275-278	1200	4.52	VARIES	78.96	78.48
UG STORAGE	1144	526.11	VARIES	78.36	78.21
CBMH 279	1200	1.13	80.35	78.17	78.14

PI = 3.141592654
PIPE I.D.= 381 PVC
U/G Storage Pipe Volume
End Area 0.114 (m^2)
Total Length 19.4 (m)
Pipe Volume 2.2 (m^3)

PI = 3.14159
PIPE I.D.= 457.2 PVC
U/G Storage Pipe Volume
End Area 0.164 (m^2)
Total Length 53.4 (m)
Pipe Volume 8.8 (m^3)

Area B-3: Storage Table

Elevation (m)	System Depth (m)	CBMH 275-278 Volume (m^3)	UG STORAGE Volume (m^3)	CBMH 279 Volume (m^3)	Underground Storage Combined Volume (m^3)	Surface Storage CBMH 275-278 Area (m^2)	CBMH 275-278 Volume (m^3)	UG STORAGE Area (m^2)	UG STORAGE Volume (m^3)	CBMH 279 Area (m^2)	CBMH 279 Volume (m^3)	Total Storage Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
78.14	0.00	0.00	0.00	0.00	10.98	-	-	-	-	-	-	-	**0**	-
78.55	0.41	0.32	178.88	0.46	190.64	-	-	-	-	-	-	-	**190.6**	0.22
78.68	0.54	0.90	247.27	0.61	259.77	-	-	-	-	-	-	-	**259.8**	0.35
79.16	1.02	3.08	499.80	1.15	515.01	-	-	-	-	-	-	-	**515.0**	0.83
79.35	1.21	3.08	599.77	1.37	615.19	-	-	-	-	-	-	-	**615.2**	1.02
80.35	2.21	3.08	599.77	2.50	616.32	0.0	0.00	0.00	0.00	0.00	0.00	0.0	**616.3**	2.02
80.40						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**616.3**	2.07
80.45						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**616.3**	2.12
80.50						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**616.3**	2.17

Tempest HF Type E ICD

1:100 Yr
Flow (L/s) = 46.0
Head (m) = 0.83
Elevation (m) = **79.16**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 510.5

1:5 Yr
Flow (L/s) = 29.8
Head (m) = 0.35
Elevation (m) = **78.68**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 254.8

1:2 Yr
Flow (L/s) = 23.7
Head (m) = 0.22
Elevation (m) = **78.55**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 186.4

Orifice Size - 1:100 yr Flow Check

Q=0.62xAx(2gh)^0.5

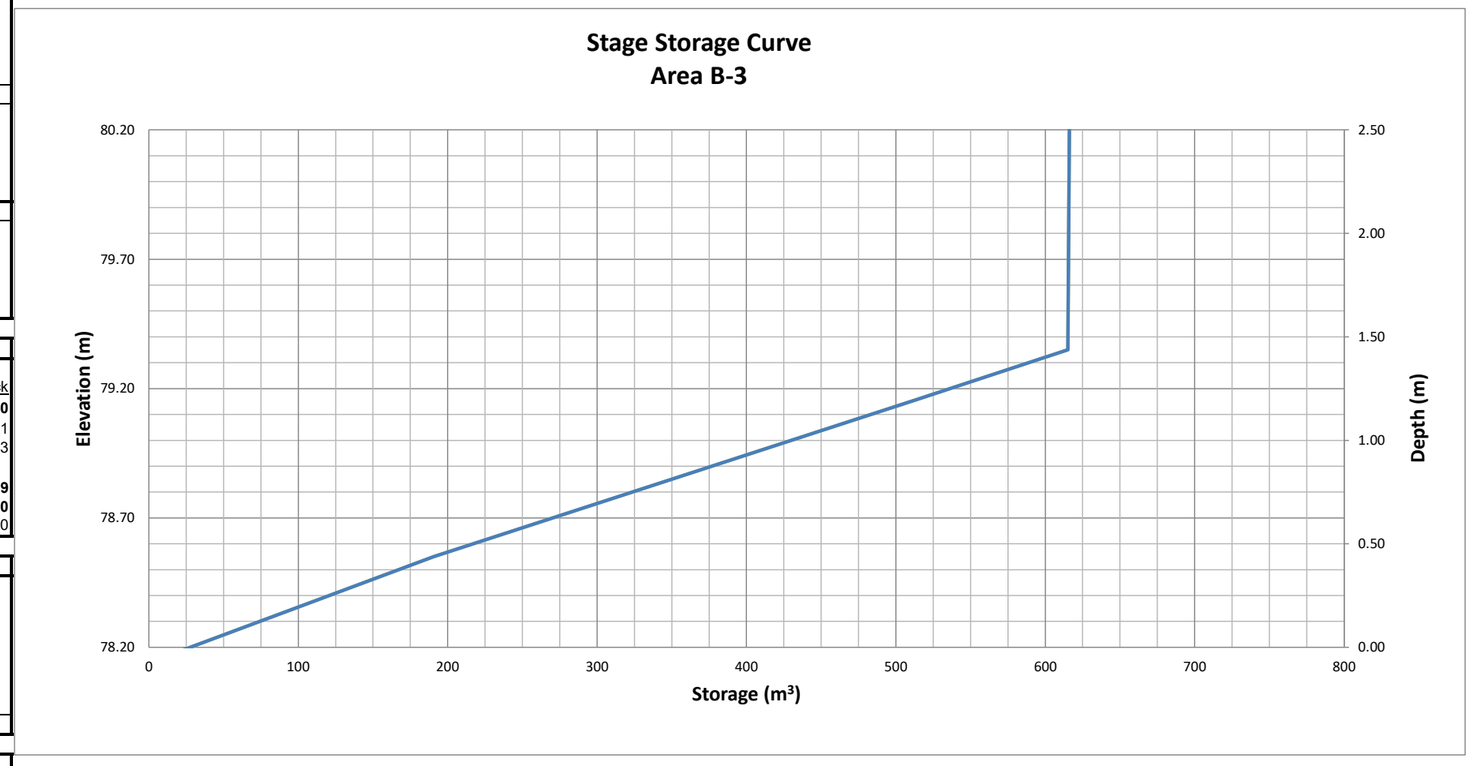
	1:100 yr	Flow Check
Q (m^3/s) =	0.0460	**0.0460**
g (m/s^2) =	9.81	9.81
h (m) =	**0.83**	0.83
A (m^2) =	**0.018391131**	**0.01839**
D (m) =	**0.153023906**	**0.15300**
D (mm) =	**153**	153.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0298
g (m/s^2) =	9.81
h (m) =	**0.35**
A (m^2) =	**0.01839**
D (m) =	**0.153**
D (mm) =	**153**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0237
g (m/s^2) =	9.81
h (m) =	**0.22**
A (m^2) =	**0.01839**
D (m) =	**0.153**
D (mm) =	**153**



Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA B-4 Controlled Site Flows (Access Route)

OTTAWA IDF CURVE — Qpeak = 29.4 L/s
Area = 0.800 ha — Qavg = 14.7 L/s
C = 0.79 — Vol(max) = 103.2 m3
(Vol calculated for Qallow-avg)

Time (min)	Tributary Ar (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	181.28	166.58	49.97
10	76.81	134.43	119.73	71.84
15	61.77	108.11	93.41	84.07
20	52.03	91.07	76.37	91.65
25	45.17	79.06	64.36	96.53
30	40.04	70.09	55.39	99.70
35	36.06	63.12	48.42	101.67
40	32.86	57.52	42.82	102.77
45	30.24	52.93	38.23	103.22
50	28.04	49.08	34.38	103.14
55	26.17	45.81	31.11	102.65
60	24.56	42.98	28.28	101.82
65	23.15	40.52	25.82	100.70
70	21.91	38.35	23.65	99.35
75	20.81	36.43	21.73	97.78
90	18.14	31.76	17.06	92.10
105	16.13	28.24	13.54	85.30
120	14.56	25.49	10.79	77.67
135	13.30	23.27	8.57	69.43
150	12.25	21.44	6.74	60.70

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA B-4 Controlled Site Flows (Access Route)

OTTAWA IDF CURVE — Qpeak = 35.7 L/s
Area = 0.800 ha — Qavg = 17.9 L/s
C = 0.79 — Vol(max) = 144.2 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	247.11	229.26	68.78
10	104.19	182.37	164.52	98.71
15	83.56	146.25	128.40	115.56
20	70.25	122.96	105.11	126.13
25	60.90	106.59	88.74	133.11
30	53.93	94.39	76.54	137.77
35	48.52	84.92	67.07	140.85
40	44.18	77.34	59.49	142.77
45	40.63	71.11	53.26	143.81
50	37.65	65.91	48.06	144.17
55	35.12	61.48	43.63	143.97
60	32.94	57.66	39.81	143.32
65	31.04	54.34	36.49	142.30
70	29.37	51.41	33.56	140.95
75	27.89	48.81	30.96	139.34
90	24.29	42.51	24.66	133.18
105	21.58	37.78	19.93	125.53
120	19.47	34.07	16.22	116.82
135	17.76	31.09	13.24	107.28
150	16.36	28.64	10.79	97.10

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA B-4 Controlled Site Flows (Access Route)

OTTAWA IDF CURVE — Qpeak = 53.0 L/s
Area = 0.800 ha — Qavg = 26.5 L/s
C = 0.89 — Vol(max) = 303.1 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	480.45	453.95	136.18
10	178.56	353.47	326.97	196.18
15	142.89	282.87	256.37	230.73
20	119.95	237.45	210.95	253.14
25	103.85	205.57	179.07	268.61
30	91.87	181.86	155.36	279.65
35	82.58	163.47	136.97	287.64
40	75.15	148.76	122.26	293.41
45	69.05	136.69	110.19	297.51
50	63.95	126.60	100.10	300.30
55	59.62	118.03	91.53	302.05
60	55.89	110.65	84.15	302.93
65	52.65	104.22	77.72	303.10
70	49.79	98.56	72.06	302.66
75	47.26	93.55	67.05	301.70
90	41.11	81.38	54.88	296.36
105	36.50	72.25	45.75	288.22
120	32.89	65.12	38.62	278.05
135	30.00	59.38	32.88	266.34
150	27.61	54.66	28.16	253.42

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA B-4 Controlled Site Flows (Access Route)

OTTAWA IDF CURVE — Qpeak = 53.0 L/s
Area = 0.800 ha — Qavg = 26.5 L/s
C = 0.89 — Vol(max) = 385.9 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	576.54	550.04	165.01
10	214.27	424.16	397.66	238.60
15	171.47	339.44	312.94	281.65
20	143.94	284.94	258.44	310.13
25	124.62	246.69	220.19	330.28
30	110.24	218.23	191.73	345.12
35	99.09	196.16	169.66	356.29
40	90.17	178.51	152.01	364.82
45	82.86	164.03	137.53	371.33
50	76.74	151.92	125.42	376.27
55	71.55	141.64	115.14	379.95
60	67.07	132.78	106.28	382.60
65	63.18	125.06	98.56	384.39
70	59.75	118.27	91.77	385.45
75	56.71	112.25	85.75	385.90
90	49.33	97.66	71.16	384.25
105	43.80	86.70	60.20	379.25
120	39.47	78.14	51.64	371.82
135	36.00	71.26	44.76	362.53
150	33.13	65.59	39.09	351.80

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
UG STORAGE	1144	259.97	VARIES		77.81
CBMH262-264	1200	3.39	79.91	77.80	77.73
CBMH 265	1200	1.13	79.25	77.69	77.65

PI = 3.141592654
PIPE I.D.= 381 PVC
U/G Storage Pipe Volume
End Area 0.114 (m^2)
Total Length 28.7 (m)
Pipe Volume 3.3 (m^3)

PI = 3.14159
PIPE I.D.= 457.2 PVC
U/G Storage Pipe Volume
End Area 0.164 (m^2)
Total Length 29.4 (m)
Pipe Volume 4.8 (m^3)

Area B-4: Storage Table

Elevation (m)	System Depth (m)	UG STORAGE Volume (m^3)	CBMH262-264 Volume (m^3)	CBMH 265 Volume (m^3)	Underground Storage Combined Volume (m^3)	Surface Storage: UG STORAGE Area (m^2)	UG STORAGE Volume (m^3)	CBMH262-264 Area (m^2)	CBMH262-264 Volume (m^3)	CBMH 265 Area (m^2)	CBMH 265 Volume (m^3)	Total Storage: Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
77.65	0.00	0.00	0.00	0.00	8.10	-	-	-	-	-	-	-	**0**	-
78.18	0.53	96.19	1.53	0.60	106.41	-	-	-	-	-	-	-	**106.4**	0.34
78.34	0.69	137.78	2.07	0.78	148.73	-	-	-	-	-	-	-	**148.7**	0.50
78.93	1.28	291.16	4.07	1.45	304.78	-	-	-	-	-	-	-	**304.8**	1.09
78.95	1.30	296.36	4.14	1.47	310.07	-	-	-	-	-	-	-	**310.1**	1.11
79.25	1.60	296.36	5.16	1.81	311.43	0.0	0.00	0.00	0.00	0.00	0.00	0.0	**311.4**	1.41
79.30						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**311.4**	1.46
79.35						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**311.4**	1.51
79.40						0.00	0.00	0.00	0.00	0.00	0.00	0.0	**311.4**	1.56

Tempest HF Type E ICD

1:100 Yr
Flow (L/s) = 53.0
Head (m) = 1.09
Elevation (m) = **78.93**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 303.1

1:5 Yr
Flow (L/s) = 35.7
Head (m) = 0.50
Elevation (m) = **78.34**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 144.2

1:2 Yr
Flow (L/s) = 29.4
Head (m) = 0.34
Elevation (m) = **78.18**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 103.2

Orifice Size - 1:100 yr Flow Check
Q=0.62xAx(2gh)^0.5

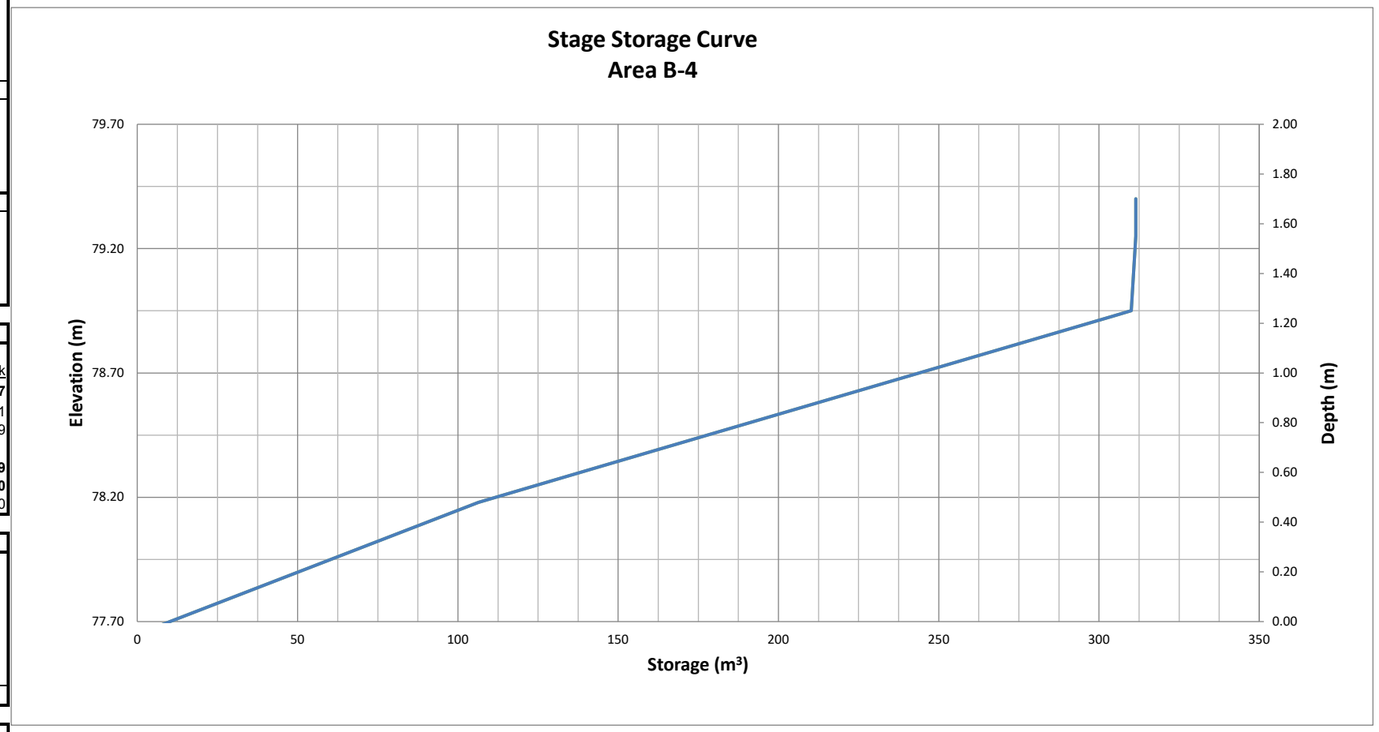
	1:100 yr	Flow Check
Q (m^3/s) =	0.0530	**0.0527**
g (m/s^2) =	9.81	9.81
h (m) =	**1.09**	1.09
A (m^2) =	**0.018489325**	**0.01839**
D (m) =	**0.153431874**	**0.15300**
D (mm) =	**153**	153.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0357
g (m/s^2) =	9.81
h (m) =	**0.50**
A (m^2) =	**0.01839**
D (m) =	**0.153**
D (mm) =	**153**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0294
g (m/s^2) =	9.81
h (m) =	**0.34**
A (m^2) =	**0.01839**
D (m) =	**0.153**
D (mm) =	**153**



Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:2 YEAR EVENT
AREA C-0 Un-Controlled Runoff - Retained Lands

OTTAWA IDF CURVE

Area = 0.064 ha Qallow = 2.7 L/s
C = 0.20 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	3.68	0.95	0.28
10	76.81	2.73	0.00	0.00
15	61.77	2.19	-0.53	-0.48
20	52.03	1.85	-0.88	-1.06
25	45.17	1.60	-1.12	-1.68
30	40.04	1.42	-1.30	-2.35
35	36.06	1.28	-1.45	-3.04
40	32.86	1.17	-1.56	-3.74
45	30.24	1.07	-1.65	-4.46
50	28.04	1.00	-1.73	-5.19
55	26.17	0.93	-1.80	-5.93
60	24.56	0.87	-1.85	-6.68
65	23.15	0.82	-1.90	-7.43
70	21.91	0.78	-1.95	-8.18
75	20.81	0.74	-1.99	-8.94
90	18.14	0.64	-2.08	-11.24
105	16.13	0.57	-2.15	-13.57
120	14.56	0.52	-2.21	-15.91
135	13.30	0.47	-2.25	-18.26
150	12.25	0.43	-2.29	-20.62

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:5 YEAR EVENT
AREA C-0 Un-Controlled Runoff - Retained Lands

OTTAWA IDF CURVE

Area = 0.064 ha Qallow = 3.7 L/s
C = 0.20 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	5.01	1.31	0.39
10	104.19	3.70	0.00	0.00
15	83.56	2.97	-0.73	-0.66
20	70.25	2.49	-1.20	-1.45
25	60.90	2.16	-1.54	-2.30
30	53.93	1.91	-1.78	-3.21
35	48.52	1.72	-1.98	-4.15
40	44.18	1.57	-2.13	-5.11
45	40.63	1.44	-2.26	-6.09
50	37.65	1.34	-2.36	-7.08
55	35.12	1.25	-2.45	-8.09
60	32.94	1.17	-2.53	-9.10
65	31.04	1.10	-2.60	-10.12
70	29.37	1.04	-2.66	-11.15
75	27.89	0.99	-2.71	-12.19
90	24.29	0.86	-2.84	-15.31
105	21.58	0.77	-2.93	-18.47
120	19.47	0.69	-3.01	-21.65
135	17.76	0.63	-3.07	-24.85
150	16.36	0.58	-3.12	-28.05

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YEAR EVENT
AREA C-0 Un-Controlled Runoff - Retained Lands

OTTAWA IDF CURVE

Area = 0.064 ha Qallow = 7.9 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	10.77	2.85	0.85
10	178.56	7.92	0.00	0.00
15	142.89	6.34	-1.58	-1.42
20	119.95	5.32	-2.60	-3.12
25	103.85	4.61	-3.32	-4.97
30	91.87	4.08	-3.85	-6.92
35	82.58	3.66	-4.26	-8.94
40	75.15	3.33	-4.59	-11.01
45	69.05	3.06	-4.86	-13.12
50	63.95	2.84	-5.09	-15.26
55	59.62	2.65	-5.28	-17.42
60	55.89	2.48	-5.44	-19.60
65	52.65	2.34	-5.59	-21.79
70	49.79	2.21	-5.71	-24.00
75	47.26	2.10	-5.83	-26.22
90	41.11	1.82	-6.10	-32.94
105	36.50	1.62	-6.30	-39.72
120	32.89	1.46	-6.46	-46.54
135	30.00	1.33	-6.59	-53.40
150	27.61	1.23	-6.70	-60.29

Proposed Nokia Ottawa Innovation Campus
Novatech Project No. 123043
Uncontrolled Runoff - 1:100 YR + 20% IDF Increase
AREA C-0 Un-Controlled Runoff - Retained Lands

OTTAWA IDF CURVE

Area = 0.064 ha Qallow = 9.5 L/s
C = 0.25 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	12.92	3.42	1.02
10	214.27	9.51	0.00	0.00
15	171.47	7.61	-1.90	-1.71
20	143.94	6.39	-3.12	-3.75
25	124.62	5.53	-3.98	-5.97
30	110.24	4.89	-4.62	-8.31
35	99.09	4.40	-5.11	-10.73
40	90.17	4.00	-5.51	-13.22
45	82.86	3.68	-5.83	-15.74
50	76.74	3.41	-6.10	-18.31
55	71.55	3.18	-6.33	-20.90
60	67.07	2.98	-6.53	-23.52
65	63.18	2.80	-6.70	-26.15
70	59.75	2.65	-6.86	-28.80
75	56.71	2.52	-6.99	-31.46
90	49.33	2.19	-7.32	-39.52
105	43.80	1.94	-7.56	-47.66
120	39.47	1.75	-7.76	-55.85
135	36.00	1.60	-7.91	-64.08
150	33.13	1.47	-8.04	-72.34

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA C-1 Controlled Site Flows (Retained Lands Parking)

OTTAWA IDF CURVE — Qpeak = 11.0 L/s
Area = 0.624 ha — Qavg = 5.5 L/s
C = 0.77 — Vol(max) = 100.9 m3
(Vol calculated for Qallow-avg)

Time (min)	Tributary Ar (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	138.09	132.59	39.78
10	76.81	102.40	96.90	58.14
15	61.77	82.35	76.85	69.17
20	52.03	69.37	63.87	76.65
25	45.17	60.22	54.72	82.08
30	40.04	53.39	47.89	86.20
35	36.06	48.08	42.58	89.41
40	32.86	43.82	38.32	91.96
45	30.24	40.32	34.82	94.01
50	28.04	37.39	31.89	95.66
55	26.17	34.89	29.39	97.00
60	24.56	32.74	27.24	98.07
65	23.15	30.87	25.37	98.93
70	21.91	29.22	23.72	99.61
75	20.81	27.75	22.25	100.12
90	18.14	24.19	18.69	100.92
105	16.13	21.51	16.01	100.87
120	14.56	19.42	13.92	100.19
135	13.30	17.73	12.23	99.04
150	12.25	16.34	10.84	97.52

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA C-1 Controlled Site Flows (Retained Lands Parking)

OTTAWA IDF CURVE — Qpeak = 13.6 L/s
Area = 0.624 ha — Qavg = 6.8 L/s
C = 0.77 — Vol(max) = 138.4 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	188.23	181.43	54.43
10	104.19	138.92	132.12	79.27
15	83.56	111.41	104.61	94.15
20	70.25	93.66	86.86	104.24
25	60.90	81.19	74.39	111.59
30	53.93	71.90	65.10	117.18
35	48.52	64.69	57.89	121.56
40	44.18	58.91	52.11	125.07
45	40.63	54.17	47.37	127.90
50	37.65	50.20	43.40	130.21
55	35.12	46.83	40.03	132.10
60	32.94	43.92	37.12	133.64
65	31.04	41.39	34.59	134.90
70	29.37	39.16	32.36	135.92
75	27.89	37.18	30.38	136.72
90	24.29	32.38	25.58	138.15
105	21.58	28.78	21.98	138.45
120	19.47	25.96	19.16	137.92
135	17.76	23.69	16.89	136.78
150	16.36	21.82	15.02	135.14

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA C-1 Controlled Site Flows (Retained Lands Parking)

OTTAWA IDF CURVE — Qpeak = 27.0 L/s
Area = 0.624 ha — Qavg = 13.5 L/s
C = 0.86 — Vol(max) = 258.0 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	361.73	348.23	104.47
10	178.56	266.13	252.63	151.58
15	142.89	212.97	199.47	179.53
20	119.95	178.78	165.28	198.33
25	103.85	154.78	141.28	211.91
30	91.87	136.92	123.42	222.16
35	82.58	123.08	109.58	230.11
40	75.15	112.00	98.50	236.40
45	69.05	102.91	89.41	241.42
50	63.95	95.32	81.82	245.46
55	59.62	88.86	75.36	248.70
60	55.89	83.31	69.81	251.30
65	52.65	78.47	64.97	253.37
70	49.79	74.21	60.71	254.97
75	47.26	70.43	56.93	256.19
90	41.11	61.27	47.77	257.97
105	36.50	54.40	40.90	257.65
120	32.89	49.03	35.53	255.80
135	30.00	44.71	31.21	252.79
150	27.61	41.15	27.65	248.87

Proposed Nokia Development — Storage Calculations Using Average
Novatech Project No. 123043 — Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA C-1 Controlled Site Flows (Retained Lands Parking)

OTTAWA IDF CURVE — Qpeak = 27.0 L/s
Area = 0.624 ha — Qavg = 13.5 L/s
C = 0.86 — Vol(max) = 326.4 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	434.08	420.58	126.17
10	214.27	319.36	305.86	183.51
15	171.47	255.57	242.07	217.86
20	143.94	214.53	201.03	241.24
25	124.62	185.73	172.23	258.35
30	110.24	164.31	150.81	271.45
35	99.09	147.69	134.19	281.80
40	90.17	134.40	120.90	290.16
45	82.86	123.50	110.00	296.99
50	76.74	114.38	100.88	302.65
55	71.55	106.64	93.14	307.36
60	67.07	99.97	86.47	311.29
65	63.18	94.16	80.66	314.57
70	59.75	89.05	75.55	317.31
75	56.71	84.52	71.02	319.58
90	49.33	73.53	60.03	324.15
105	43.80	65.28	51.78	326.19
120	39.47	58.83	45.33	326.40
135	36.00	53.65	40.15	325.21
150	33.13	49.38	35.88	322.94

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/26/2025

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
CBMH 271	1200	1.13	80.45	78.60	78.52
SWM TANK	1144	206.33	VARIES	78.51	78.36
CBMH 274	1200	1.13	80.50	78.46	78.43
CBMH 272	1200	1.13	80.45	78.34	78.31

PI = 3.141592654
PIPE I.D.= 304.8 PVC
U/G Storage Pipe Volume
End Area 0.073 (m^2)
Total Length 58.8 (m)
Pipe Volume 4.3 (m^3)

PI = 3.141593
PIPE I.D.= 381 PVC
U/G Storage Pipe Volume
End Area 0.114 (m^2)
Total Lengt 32.4 (m)
Pipe Volum 3.7 (m^3)

Area C-1: Storage Table

Elevation (m)	System Depth (m)	CBMH 271 Volume (m^3)	SWM TANK Volume (m^3)	CBMH 274 Volume (m^3)	CBMH 272 Volume (m^3)	Underground Storage: Combined Volume (m^3)	Surface Storage: CBMH 271 Area (m^2)	CBMH 271 Volume (m^3)	CBMH 274 Area (m^2)	CBMH 274 Volume (m^3)	CBMH 272 Area (m^2)	CBMH 272 Volume (m^3)	Total Storage: Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
78.31	0.00	0.00	0.00	0.00	0.00	4.29	-	-	-	-	-	-	-	**0**	-
78.81	0.50	0.33	92.85	0.43	0.57	102.16	-	-	-	-	-	-	-	**102.2**	0.14
78.99	0.68	0.53	129.99	0.63	0.77	139.90	-	-	-	-	-	-	-	**139.9**	0.32
79.50	1.19	1.11	235.21	1.21	1.35	246.86	-	-	-	-	-	-	-	**246.9**	0.83
79.80	1.49	1.45	235.21	1.55	1.69	247.88	-	-	-	-	-	-	-	**247.9**	1.13
80.45	2.14	2.18	235.21	2.28	2.42	250.09	0.0	0.00	0.0	0.00	0.0	0.00	0.0	**250.1**	1.78
80.54							54.36	2.45	19.15	0.86	103.03	4.64	7.9	**258.0**	1.87
80.65							211.48	17.07	203.85	13.13	248.78	23.99	54.2	**304.3**	1.98

Tempest HF Type B ICD

1:100 Yr
Flow (L/s) = 27.0
Head (m) = 2.08
Elevation (m) = **80.54**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 258.0

1:5 Yr
Flow (L/s) = 13.6
Head (m) = 0.53
Elevation (m) = **78.99**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 138.4

1:2 Yr
Flow (L/s) = 11.0
Head (m) = 0.35
Elevation (m) = **78.81**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 100.9

Orifice Size - 1:100 yr Flow Check
Q=0.62xAx(2gh)^0.5

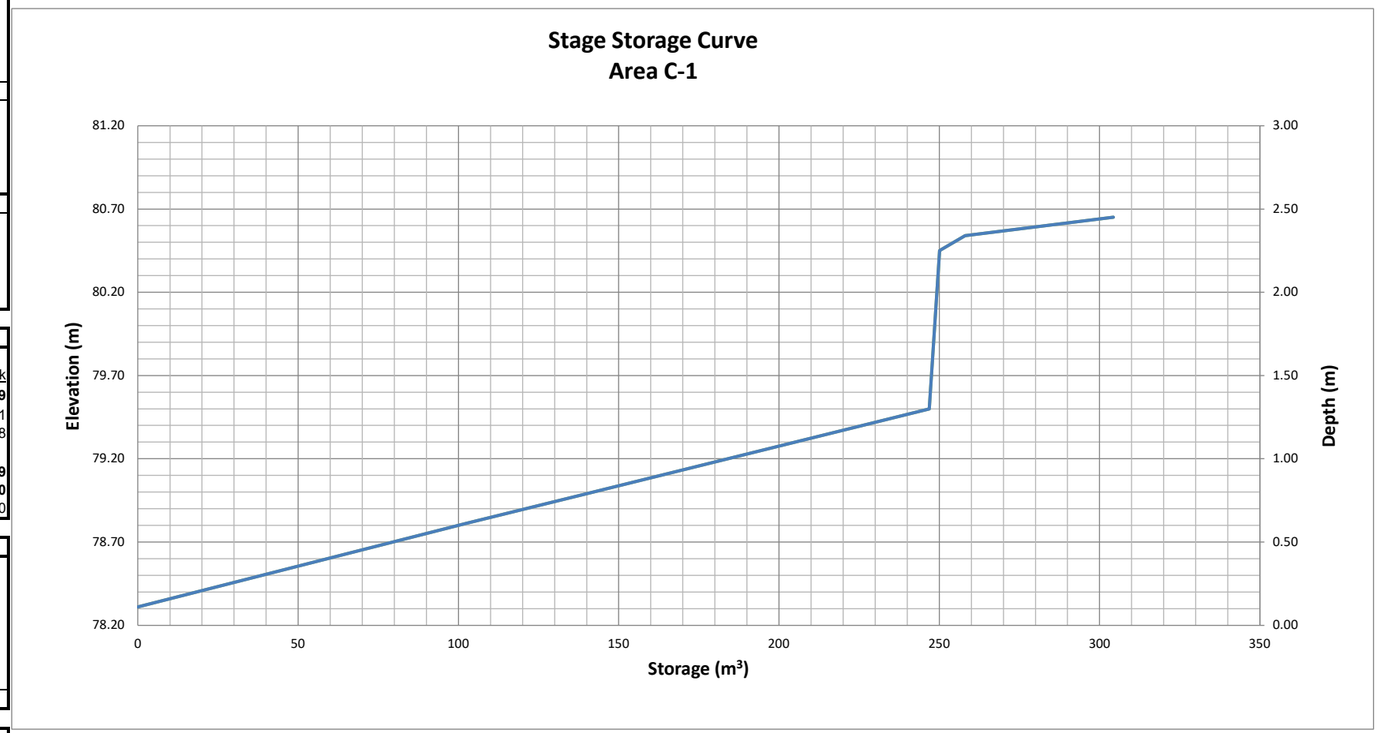
	1:100 yr	Flow Check
Q (m^3/s) =	0.0270	**0.0269**
g (m/s^2) =	9.81	9.81
h (m) =	**2.08**	2.08
A (m^2) =	**0.006820899**	**0.00679**
D (m) =	**0.093191405**	**0.09300**
D (mm) =	**93**	93.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0136
g (m/s^2) =	9.81
h (m) =	**0.53**
A (m^2) =	**0.00679**
D (m) =	**0.093**
D (mm) =	**93**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0110
g (m/s^2) =	9.81
h (m) =	**0.35**
A (m^2) =	**0.00679**
D (m) =	**0.093**
D (mm) =	**93**



Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA C-2 Controlled Site Flows (Retained Lands - ROW)

OTTAWA IDF CURVE — Qpeak = 7.8 L/s
Area = 0.124 ha — Qavg = 3.9 L/s
C = 0.80 — Vol(max) = 12.9 m3
(Vol calculated for Qallow-avg)

Time (min)	Tributary Ar (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	28.57	24.67	7.40
10	76.81	21.18	17.28	10.37
15	61.77	17.04	13.14	11.82
20	52.03	14.35	10.45	12.54
25	45.17	12.46	8.56	12.84
30	40.04	11.04	7.14	12.86
35	36.06	9.95	6.05	12.70
40	32.86	9.06	5.16	12.39
45	30.24	8.34	4.44	11.99
50	28.04	7.73	3.83	11.50
55	26.17	7.22	3.32	10.95
60	24.56	6.77	2.87	10.34
65	23.15	6.39	2.49	9.69
70	21.91	6.04	2.14	9.00
75	20.81	5.74	1.84	8.28
90	18.14	5.00	1.10	5.96
105	16.13	4.45	0.55	3.46
120	14.56	4.02	0.12	0.84
135	13.30	3.67	-0.23	-1.89
150	12.25	3.38	-0.52	-4.69

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA C-2 Controlled Site Flows (Retained Lands - ROW)

OTTAWA IDF CURVE — Qpeak = 9.7 L/s
Area = 0.124 ha — Qavg = 4.9 L/s
C = 0.80 — Vol(max) = 18.0 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	38.94	34.09	10.23
10	104.19	28.74	23.89	14.33
15	83.56	23.05	18.20	16.38
20	70.25	19.38	14.53	17.43
25	60.90	16.80	11.95	17.92
30	53.93	14.87	10.02	18.04
35	48.52	13.38	8.53	17.92
40	44.18	12.19	7.34	17.61
45	40.63	11.21	6.36	17.16
50	37.65	10.38	5.53	16.60
55	35.12	9.69	4.84	15.96
60	32.94	9.09	4.24	15.25
65	31.04	8.56	3.71	14.48
70	29.37	8.10	3.25	13.65
75	27.89	7.69	2.84	12.79
90	24.29	6.70	1.85	9.98
105	21.58	5.95	1.10	6.95
120	19.47	5.37	0.52	3.74
135	17.76	4.90	0.05	0.40
150	16.36	4.51	-0.34	-3.04

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA C-2 Controlled Site Flows (Retained Lands - ROW)

OTTAWA IDF CURVE — Qpeak = 15.0 L/s
Area = 0.124 ha — Qavg = 7.5 L/s
C = 0.89 — Vol(max) = 37.6 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	74.71	67.21	20.16
10	178.56	54.96	47.46	28.48
15	142.89	43.99	36.49	32.84
20	119.95	36.92	29.42	35.31
25	103.85	31.97	24.47	36.70
30	91.87	28.28	20.78	37.40
35	82.58	25.42	17.92	37.63
40	75.15	23.13	15.63	37.51
45	69.05	21.25	13.75	37.14
50	63.95	19.69	12.19	36.56
55	59.62	18.35	10.85	35.82
60	55.89	17.21	9.71	34.94
65	52.65	16.21	8.71	33.95
70	49.79	15.33	7.83	32.87
75	47.26	14.55	7.05	31.71
90	41.11	12.65	5.15	27.83
105	36.50	11.23	3.73	23.53
120	32.89	10.13	2.63	18.90
135	30.00	9.23	1.73	14.04
150	27.61	8.50	1.00	8.99

Proposed Nokia Development Storage Calculations Using Average
Novatech Project No. 123043 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA C-2 Controlled Site Flows (Retained Lands - ROW)

OTTAWA IDF CURVE — Qpeak = 15.0 L/s
Area = 0.124 ha — Qavg = 7.5 L/s
C = 0.89 — Vol(max) = 48.6 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	89.65	82.15	24.64
10	214.27	65.96	58.46	35.07
15	171.47	52.78	45.28	40.75
20	143.94	44.31	36.81	44.17
25	124.62	38.36	30.86	46.29
30	110.24	33.93	26.43	47.58
35	99.09	30.50	23.00	48.31
40	90.17	27.76	20.26	48.62
45	82.86	25.51	18.01	48.62
50	76.74	23.62	16.12	48.37
55	71.55	22.02	14.52	47.93
60	67.07	20.65	13.15	47.33
65	63.18	19.45	11.95	46.59
70	59.75	18.39	10.89	45.74
75	56.71	17.46	9.96	44.80
90	49.33	15.19	7.69	41.50
105	43.80	13.48	5.98	37.68
120	39.47	12.15	4.65	33.48
135	36.00	11.08	3.58	29.00
150	33.13	10.20	2.70	24.29

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
UG STORAGE	1144	33.70	VARIES		78.20
CBMH 261	1200	1.13	80.13	78.18	78.15
-	-	-	-	-	-

PI = 3.141592654
PIPE I.D.= 304.8 PVC
U/G Storage Pipe Volume
End Area 0.073 (m^2)
Total Length 6.0 (m)
Pipe Volume 0.4 (m^3)

Area C-2: Storage Table

Elevation (m)	System Depth (m)	UG STORAGE Volume (m^3)	CBMH 261 Volume (m^3)	- Volume (m^3)	Underground Storage: Combined Volume (m^3)	Surface Storage: UG STORAGE Area (m^2)	UG STORAGE Volume (m^3)	CBMH 261 Area (m^2)	CBMH 261 Volume (m^3)	- Area (m^2)	- Volume (m^3)	Total Storage: Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
78.15	0.00	0.00	0.00	0.00	0.44	-	-	-	-	-	-	-	**0**	-
78.55	0.40	11.80	0.45	0.45	13.14	-	-	-	-	-	-	-	**13.1**	0.25
78.69	0.54	16.51	0.61	0.61	18.17	-	-	-	-	-	-	-	**18.2**	0.39
79.24	1.09	35.05	1.23	1.23	37.95	-	-	-	-	-	-	-	**38.0**	0.94
79.34	1.19	38.42	1.35	1.35	41.55	-	-	-	-	-	-	-	**41.5**	1.04
80.13	1.98	38.42	2.24	2.24	43.34	0.0	0.00	0.00	0.00	-	-	0.0	**43.3**	1.83
80.16						0.00	0.00	3.61	0.05	-	-	0.1	**43.4**	1.86
80.19						0.00	0.00	10.31	0.26	-	-	0.3	**43.6**	1.89
80.23						0.00	0.00	19.55	0.86	-	-	0.9	**44.2**	1.93

Tempest MHF Type A ICD

1:100 Yr
Flow (L/s) = 15.0
Head (m) = 0.94
Elevation (m) = **79.24**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 37.6

1:5 Yr
Flow (L/s) = 9.7
Head (m) = 0.39
Elevation (m) = **78.69**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 18.0

1:2 Yr
Flow (L/s) = 7.8
Head (m) = 0.25
Elevation (m) = **78.55**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 12.9

Orifice Size - 1:100 yr Flow Check

Q=0.62xAx(2gh)^0.5

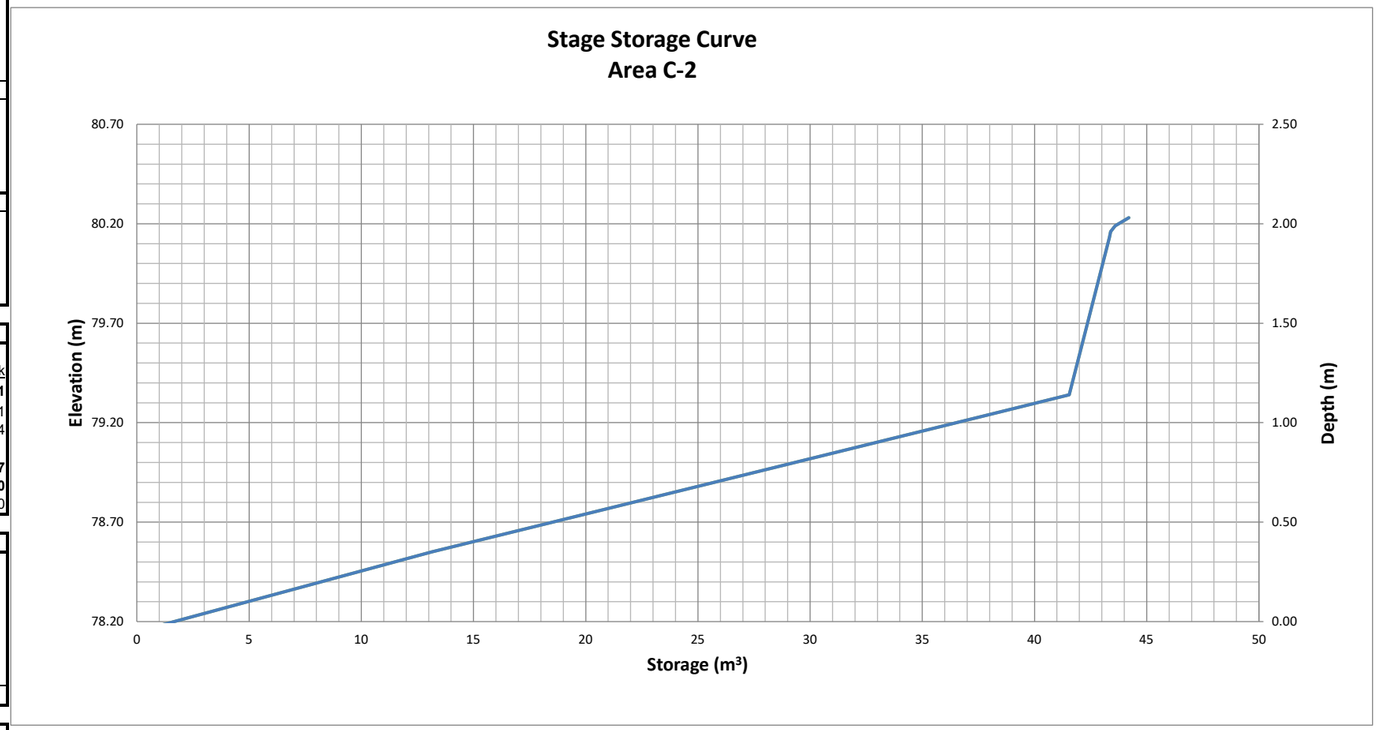
	1:100 yr	Flow Check
Q (m^3/s) =	0.0150	**0.0151**
g (m/s^2) =	9.81	9.81
h (m) =	**0.94**	0.94
A (m^2) =	**0.005640807**	**0.00567**
D (m) =	**0.084747265**	**0.08500**
D (mm) =	**85**	85.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0097
g (m/s^2) =	9.81
h (m) =	**0.39**
A (m^2) =	**0.00567**
D (m) =	**0.085**
D (mm) =	**85**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0078
g (m/s^2) =	9.81
h (m) =	**0.25**
A (m^2) =	**0.00567**
D (m) =	**0.085**
D (mm) =	**85**



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Engineers, Planners & Landscape Architects

Novatech Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Date: 10/22/2025
Input By: KD
Reviewed By: FST
Drawing Reference: C500

Storm Design Event = 5 Year

520 & 570 March Road - Nokia Ottawa Innovation Campus
Northern Outlet through KRP Lands
1:5 Year Storm Event

Legend:
- Design Input by User
- As-Built Input by User
- Cumulative Cell
- Calculated Design Cell Output
- Calculated Uncontrolled Peak Flow Cell Output
- Design Input Restricted Peak Flow Cell

Reference: City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

Location				Flow								Design Capacity / Proposed Sewer Pipe Sizing / Design								
Location	Area ID	From MH	To MH	Area A (ha.)	Runoff Coefficient C	Indivi. 2.78 AC	Accum. 2.78 AC	Time of Conc. Tc (min.)	Rain Intensity I (mm/hr)	Total Uncontrolled Peak Flow Q (L/s)	Total Restricted Peak Flow (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q / Qfull
Lifestyle Street	A-1	CBMH 266	CBMH 267	0.08	0.89	0.20	0.20	10.00	104.19	21.2		34.1	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.69	35.5%
Lifestyle Street	A-1	CBMH 267	STMMH 102	0.10	0.89	0.25	0.25	0.00	230.48	79.1		15.1	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.18	78.4%
Lifestyle Street	A-1	STMMH 102	STMMH 103	0.00	-	0.00	0.00	10.69	100.66	Flows controlled by ICD	**17.0**	43.8	300 PVC	0.3048	0.013	2.00	142.7	1.96	0.37	11.9%
570 March Road	A-3, A-5	Retail West/Office	STMMH 122	0.39	0.90	0.97	0.97	10.00	104.19	Controlled by 20 RDs	**14.9**	2.1	375 PVC	0.381	0.013	2.00	258.7	2.27	0.02	5.8%
570 March Road	A-3, A-5	STMMH 122	STMMH 103	0.00	-	0.00	0.00	10.02	104.11		**14.9**	24.1	375 PVC	0.381	0.013	2.00	258.7	2.27	0.18	5.8%
Lifestyle Street	A-1, A-3, A-5	STMMH 103	STMMH 104	0.00	-	0.00	0.00	11.07	98.87		**31.9**	19.0	375 PVC	0.381	0.013	2.00	258.7	2.27	0.14	12.3%
570 March Road	A-4, A-6	Retail East/Link	STMMH 104	0.19	0.90	0.48	0.48	10.00	104.19	Controlled by 10 RDs	**8.3**	14.3	300 PVC	0.3048	0.013	1.00	100.9	1.38	0.17	8.2%
Lifestyle Street	A-1, A3-A6	STMMH 104	STMMH 105	0.00	-	0.00	0.00	11.21	98.22		**40.2**	27.3	375 PVC	0.381	0.013	2.00	258.7	2.27	0.20	15.5%
Lifestyle Street	A-2	CBMH 249	CBMH 250	0.05	0.86	0.12	0.12	10.00	104.19	12.1		13.3	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.27	20.3%
Lifestyle Street	A-2	CBMH 250	CBMH 251	0.17	0.86	0.40	0.52	10.27	102.78	53.4		6.1	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.12	89.4%
Lifestyle Street	A-2	CBMH 251	STMMH 105	0.08	0.86	0.19	0.71	10.40	102.15	Flows controlled by ICD	**17.0**	3.3	300 PVC	0.3048	0.013	1.80	135.3	1.85	0.03	12.6%
Lifestyle Street	A1-A6	STMMH 105	EFO5	0.00	-	0.00	0.00	11.41	97.30		**57.2**	8.1	375 PVC	0.381	0.013	0.35	108.2	0.95	0.14	52.9%
Legget Drive	A1-A6	EFO5	EX CBMH "A"	0.00	-	0.00	0.00	11.55	96.66		**57.2**	70.1	375 PVC	0.381	0.013	0.40	115.7	1.01	1.15	49.4%
555 Legget Drive (KRP)	A1-A6, E-09	EX CBMH "A"	EX CBMH "B"	0.22	0.74	0.45	0.45	12.70	91.80	41.5	**57.2**	46.0	375 PVC	0.381	0.013	1.62	232.8	2.04	0.38	42.4%
555 Legget Drive (KRP)	E-07, E-08	EX CBMH	EX CBMH "B"	0.63	0.85	1.49	1.49	10.00	104.19	155.1		59.7	375 PVC	0.381	0.013	0.60	141.7	1.24	0.80	109.5%
535 Legget Drive (KRP)	A1-A6, E07-E10	EX CBMH "B"	EX CBMH "C"	0.22	0.76	0.46	2.41	13.08	90.33	217.3	**57.2**	34.9	450 PVC	0.4572	0.013	0.67	243.5	1.48	0.39	112.8%
535 Legget Drive (KRP)	E-11	Building	EX CBMH "C"	0.11	0.90	0.28	0.28	10.00	104.19	28.7		28.0	300 PVC	0.3048	0.013	0.50	71.3	0.98	0.48	40.2%
535 Legget Drive (KRP)	A1-A6, E07-E12	EX CBMH "C"	EX STMMH "D"	0.09	0.90	0.23	2.91	13.47	88.85	258.2	**57.2**	37.2	450 PVC	0.4572	0.013	2.40	460.8	2.81	0.22	68.5%
359 Terry Fox Drive (KRP)	E-13, E-15	EX CBMH	EX STMMH "D"	0.31	0.74	0.64	0.64	10.00	104.19	66.6		52.5	250 PVC	0.254	0.013	0.43	40.7	0.80	1.09	163.6%
535 Legget Drive (KRP)	A1-A6, E07-E15	EX STMMH "D"	EX CBMH "E"	0.35	0.75	0.73	4.28	13.69	88.04	376.4	**57.2**	24.0	450 PVC	0.4572	0.013	2.66	485.1	2.95	0.14	89.4%
525 Legget Drive (KRP)	A1-A6, E07-E17	EX CBMH "E"	EX CBMH "F"	0.19	0.90	0.48	4.75	13.83	87.55	415.9	**57.2**	65.0	900 CONC	0.9144	0.013	0.46	1280.9	1.95	0.56	36.9%
359 Terry Fox Drive (KRP)	E-18, E-19	EX CBMH	EX CBMH "F"	0.27	0.90	0.68	0.68	10.00	104.19	70.4		16.6	250 PVC	0.254	0.013	1.00	62.0	1.22	0.23	113.5%
525 Legget Drive (KRP)	A1-A6, E07-E20	EX CBMH "F"	EX CBMH "G"	0.10	0.90	0.25	5.68	14.38	85.61	485.9	**57.2**	24.4	900 CONC	0.9144	0.013	0.57	1425.9	2.17	0.19	38.1%
525 Legget Drive (KRP)	A1-A6, E07-E21	EX CBMH "G"	EX STMMH "H"	0.03	0.68	0.06	5.73	14.57	84.98	487.2	**57.2**	7.4	900 CONC	0.9144	0.013	0.36	1133.2	1.73	0.07	48.0%

STORM SEWER DESIGN SHEET

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Location				Flow								Design Capacity: Proposed Sewer Pipe Sizing / Design							
Location	Area ID	From MH	To MH	Area A (ha.)	Runoff Coefficient C	Indivi. 2.78 AC	Accum. 2.78 AC	Time of Conc. Tc (min.)	Rain Intensity I (mm/hr)	Total Uncontrolled Peak Flow Q (L/s)	Total Restricted Peak Flow (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q / Qfull
525 Legget Drive (KRP)	E-23	Building	EX CBMH	0.17	0.90	0.43	0.43	10.00	104.19	44.3		3.3	250 PVC	0.254	0.013	1.00	62.0	1.22	0.04	71.4%
525 Legget Drive (KRP)	E-23, E-24	EX CBMH	EX STMMH 109	0.13	0.90	0.33	0.75	10.04	103.96	78.0		32.7	375 PVC	0.381	0.013	2.54	291.5	2.56	0.21	26.8%
525 Legget Drive (KRP)	E-23, E-24	EX STMMH 109	EX CBMH 108	0.00	-	0.00	0.75	10.26	102.85	77.2		7.9	375 PVC	0.381	0.013	0.50	129.3	1.13	0.12	59.7%
525 Legget Drive (KRP)	E-23, E-24, F-4	EX CBMH 108	EX LS4	0.02	0.90	0.05	0.80	10.37	102.26	81.9		28.9	375 PVC	0.381	0.013	0.50	129.3	1.13	0.42	63.3%
525 Legget Drive (KRP)	E-23, E-24, F-4	EX LS4	EX CBMH 106	0.00	-	0.00	0.80	10.80	100.16	80.2		6.0	375 PVC	0.381	0.013	0.50	129.3	1.13	0.09	62.0%
525 Legget Drive (KRP)	E-23, E-24, F-4, F-5	EX CBMH 106	EX STMMH 105	0.02	0.90	0.05	0.85	10.89	99.73	84.8		9.8	450 PVC	0.4572	0.013	0.25	148.7	0.91	0.18	57.0%
525 Legget Drive (KRP)	E-22	Building	EX STMMH 105	0.54	0.90	1.35	1.35	10.00	104.19	140.8		4.2	300 PVC	0.3048	0.013	0.50	71.3	0.98	0.07	197.3%
525 Legget Drive (KRP)	E-22-E24, F-4, F-5	EX STMMH 105	EX STMMH 105B	0.00	-	0.00	2.20	11.07	98.87	217.7		9.7	525 PVC	0.5334	0.013	0.20	200.6	0.90	0.18	108.5%
525 Legget Drive (KRP)	F-1, F-2. F-3	CAP	EX STMMH 105B	0.16	0.90	0.40	0.40	10.00	104.19	41.7		3.0	450 PVC	0.4572	0.013	1.00	297.4	1.81	0.03	14.0%
525 Legget Drive (KRP)	E-22-E-24, F1-5	EX STMMH 105B	EX STMMH "H"	0.00	-	0.00	2.60	11.25	98.04	255.1		46.8	525 PVC	0.5334	0.013	0.20	200.6	0.90	0.87	127.1%
525 Legget Drive (KRP)	A1-A6, E07-E24, F1-F6	EX STMMH "H"	EX STMMH "I"	0.02	0.90	0.05	8.39	14.64	84.74	710.5	**57.2**	35.9	975 CONC	0.9906	0.013	0.24	1145.4	1.49	0.40	67.0%
525 Legget Drive (KRP)	A1-A6, E07-E24, F1-F8	EX STMMH "I"	EX STMMH "J"	0.23	0.83	0.53	8.92	15.04	83.42	743.7	**57.2**	22.1	975 CONC	0.9906	0.013	0.24	1145.4	1.49	0.25	69.9%
525 Legget Drive (KRP)	A1-A6, E07-E24, F1-F8	EX STMMH "J"	EX STMMH "K"	0.00	-	0.00	8.92	15.29	82.63	743.7	**57.2**	24.7	975 CONC	0.9906	0.013	0.24	1145.4	1.49	0.28	69.9%
525 Legget Drive (KRP)	A1-A6, E07-E24, F1-F8	EX STMMH "K"	SWM POND #1	0.00	-	0.00	8.92	15.57	81.77	743.7	**57.2**	7.7	975 CONC	0.9906	0.013	0.24	1145.4	1.49	0.09	69.9%
Totals				**4.87**								**919.1**								

Demand Equation / Parameters

1. Q = 2.78 ACI

Definitions

Q = Peak flow in litres per second (L/s)
A = Area in hectares (ha)
C = Weighted runoff coefficient (increased by 25% for 100-year)
I = Rainfall intensity in millimeters per hour (mm/hr)

Rainfall intensity is based on City of Ottawa IDF data presented in the City of Ottawa - Sewer Design Guidelines

Capacity Equation

Q full = $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p = Pipe flow area (m^2)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

Notes

1) Refer to the Novatech Report "Development Servicing Study and Stormwater Management Report - Nokia Ottawa Innovation Campus" (R-2023-082) for on-site storm drainage and stormwater details.
2) Refer to the Novatech Report "Sanitary and Storm Trunk Sewer Design Brief - Nokia Ottawa Innovation Campus" (R-2024-130) for off-site storm drainage and stormwater details.
3) Refer to Novatech Drawings C100 and C500 for the storm structure designations, storm pipe details and control structure tables.
4) Refer to Novatech Drawing C501 and associated storm sewer design sheet for STM drainage areas that contribute to southern STM Sewer on KRP Lands.
5) Stormwater flows from drainage areas A-0a and A-0b do not enter the storm sewer in Lifestyle Street, hence are not tributary to the northern STM Sewer on KRP Lands and have therefore been excluded from this design sheet.
6) Stormwater flows from drainage area A-1 include minor contributing off-site flows from drainage area OS-1, as further detailed in Appendix E of the report.

STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Date: 9/26/2025
Input By: KD
Reviewed By: FST
Drawing Reference: C501

Storm Design Event = 5 Year

520 & 570 March Road - Nokia Ottawa Innovation Campus
Southern Outlet through KRP Lands
1:5 Year Storm Event

Legend:
- Design Input by User
- As-Built Input by User
- Cumulative Cell
- Calculated Design Cell Output
- Calculated Uncontrolled Peak Flow Cell Output
- Design Input Restricted Peak Flow Cell

Reference: City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

Location				Flow								Design Capacity / Proposed Sewer Pipe Sizing / Design								
Location	Area ID	From MH	To MH	Area A (ha.)	Runoff Coefficient C	Indivi. 2.78 AC	Accum. 2.78 AC	Time of Conc. Tc (min.)	Rain Intensity I (mm/hr)	Total Uncontrolled Peak Flow Q (L/s)	Total Restricted Peak Flow (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q / Qfull
Legget Drive	B-1	Lab Building	STMMH 118	0.80	0.90	1.99	1.99	10.00	104.19	Flows controlled by ICD	**41.0**	1.2	375 PVC	0.381	0.013	1.00	182.9	1.60	0.01	22.4%
Legget Drive	B-1	STMMH 118	EX STMMH L1	0.00	0.90	0.00	0.00	10.01	104.13		**41.0**	11.9	375 PVC	0.381	0.013	0.35	108.2	0.95	0.21	37.9%
Legget Drive	B-0a, B-1, L-1	EX STMMH L1	EX STMMH L2	0.39	0.52	0.56	0.56	10.22	103.04	58.1	**41.0**	65.6	525 CONC	0.5334	0.013	0.18	190.3	0.85	1.28	52.1%
Legget Drive	B-0a, B1, L1-2	EX STMMH L2	EX STMMH L3	0.21	0.55	0.32	0.88	11.50	96.86	85.7	**41.0**	72.4	525 CONC	0.5334	0.013	0.17	185.0	0.83	1.46	68.5%
570 March Road	B-2	CB 201	STMMH 120	0.07	0.85	0.16	0.16	10.00	104.19	16.4		13.4	250 PVC	0.254	0.013	0.50	43.9	0.87	0.26	37.3%
570 March Road	B-2	CB 212	STMMH 120	0.03	0.79	0.07	0.07	10.00	104.19	7.3		2.6	250 PVC	0.254	0.013	0.50	43.9	0.87	0.05	16.6%
570 March Road	B-2	STMMH 120	SWM TANK	0.00	-	0.00	0.16	10.26	102.85	23.6		0.9	250 PVC	0.254	0.013	0.50	43.9	0.87	0.02	53.9%
570 March Road	B-2	SWM TANK	STMMH 121	0.00	-	0.00	0.00	10.28	102.76	23.6		0.9	250 PVC	0.254	0.013	0.50	43.9	0.87	0.02	53.9%
570 March Road	B-2	CB 213	STMMH 121	0.05	0.79	0.11	0.11	10.00	104.19	11.1		2.6	250 PVC	0.254	0.013	0.50	43.9	0.87	0.05	25.2%
570 March Road	B-2	STMMH 121	CBMH 257	0.00	-	0.00	0.00	10.29	102.67	34.7		27.0	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.55	58.1%
570 March Road	B-2	CBMH 257	CBMH 258	0.10	0.63	0.17	0.17	10.84	99.94	51.3		32.9	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.67	86.0%
570 March Road	B-2	LD 1	CBMH 255	0.03	0.63	0.05	0.05	10.00	104.19	5.5		24.7	250 PVC	0.254	0.013	0.50	43.9	0.87	0.48	12.5%
570 March Road	B-2	CBMH 255	CBMH 256	0.03	0.63	0.05	0.11	10.48	101.75	10.8		24.0	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.49	18.1%
570 March Road	B-2	CB 207	CBMH 256	0.04	0.63	0.07	0.07	10.00	104.19	7.3		17.8	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.36	12.2%
570 March Road	B-2	CBMH 256	CBMH 268	0.03	0.63	0.05	0.23	10.96	99.36	23.3		24.6	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.50	39.1%
570 March Road	B-2	CBMH 268	CBMH 258	0.03	0.63	0.05	0.28	11.47	97.04	28.4		23.0	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.47	47.7%
570 March Road	B-2	CBMH 258	CBMH 259	0.05	0.63	0.09	0.53	11.93	94.98	87.9		10.6	375 PVC	0.381	0.013	0.35	108.2	0.95	0.19	81.2%
570 March Road	B-2	CBMH 259	CBMH 260	0.01	0.63	0.01	0.54	12.12	94.18	88.7		63.5	375 PVC	0.381	0.013	0.35	108.2	0.95	1.12	82.0%
570 March Road	B-2	CBMH 260	STMMH 107	0.09	0.63	0.15	0.69	13.24	89.73	Flows controlled by ICD	**30.0**	7.2	375 PVC	0.381	0.013	0.30	100.2	0.88	0.14	29.9%
570 & 520 March Road	B-2	STMMH 107	STMMH 108	0.00	-	0.00	0.69	13.37	89.21		**30.0**	100.3	375 PVC	0.381	0.013	0.30	100.2	0.88	1.90	29.9%
Access Route	B-2	STMMH 108	STMMH 109	0.00	-	0.00	0.69	15.27	82.68		**30.0**	72.0	375 PVC	0.381	0.013	0.30	100.2	0.88	1.37	29.9%
520 March Road	C-1	CB 209	CBMH 269	0.08	0.74	0.16	0.16	10.00	104.19	16.7		20.0	250 PVC	0.254	0.013	0.50	43.9	0.87	0.39	38.2%
520 March Road	C-1	CBMH 269	CBMH 270	0.07	0.80	0.16	0.32	10.39	102.20	32.9		19.4	300 PVC	0.3048	0.013	0.30	55.3	0.76	0.43	59.5%
520 March Road	C-1	CBMH 270	CBMH 271	0.07	0.80	0.15	0.47	10.81	100.09	47.9		20.5	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.42	80.3%
520 March Road	C-1	CBMH 271	SWM TANK	0.08	0.79	0.17	0.64	11.23	98.12	64.4		4.0	375 PVC	0.381	0.013	0.30	100.2	0.88	0.08	64.3%
520 March Road	C-1	SWM TANK	CBMH 272	0.00	-	0.00	0.64	11.31	97.77	64.4		7.9	375 PVC	0.381	0.013	0.30	100.2	0.88	0.15	64.3%
520 March Road	C-1	CB 208	CBMH 273	0.11	0.60	0.18	0.18	10.00	104.19	18.7		19.9	250 PVC	0.254	0.013	0.50	43.9	0.87	0.38	42.6%
520 March Road	C-1	CBMH 273	CBMH 274	0.08	0.75	0.16	0.34	10.38	102.21	34.8		19.4	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.40	58.3%
520 March Road	C-1	CBMH 274	CBMH 272	0.07	0.86	0.17	0.51	10.78	100.25	52.2		20.0	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.41	87.5%
520 March Road	C-1	CBMH 272	STMMH 109	0.07	0.80	0.16	1.31	11.46	97.09	Flow controlled by ICD	**27.0**	22.6	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.46	45.2%
Access Route	B-2, C-1	STMMH 109	STMMH 111	0.00	-	0.00	2.00	16.64	78.61		**57.0**	16.6	450 PVC	0.4572	0.013	0.30	162.9	0.99	0.28	35.0%

STORM SEWER DESIGN SHEET

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Location				Flow								Design Capacity								
												Proposed Sewer Pipe Sizing / Design								
Location	Area ID	From MH	To MH	Area A (ha.)	Runoff Coefficient C	Indivi. 2.78 AC	Accum. 2.78 AC	Time of Conc. Tc (min.)	Rain Intensity I (mm/hr)	Total Uncontrolled Peak Flow Q (L/s)	Total Restricted Peak Flow (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q / Qfull
570 March Road	B-3	CB 210	CBMH 275	0.18	0.76	0.39	0.39	10.00	104.19	40.1		19.9	250 PVC	0.254	0.013	0.50	87.7	0.87	0.38	45.7%
570 March Road	B-3	CBMH 275	CBMH 276	0.19	0.79	0.41	0.79	10.38	102.21	81.8		19.4	375 PVC	0.381	0.013	0.30	100.2	0.88	0.37	81.7%
570 March Road	B-3	CBMH 276	CBMH 277	0.19	0.88	0.46	1.25	10.75	100.39	128.2		20.4	450 PVC	0.4572	0.013	0.30	162.9	0.99	0.34	78.7%
570 March Road	B-3	CBMH 277	CBMH 278	0.20	0.79	0.43	1.69	11.09	98.75	171.0		17.1	450 PVC	0.4572	0.013	0.45	199.5	1.22	0.23	85.7%
570 March Road	B-3	CBMH 278	SWM TANK	0.28	0.79	0.62	2.31	11.33	97.66	231.8		12.1	450 PVC	0.4572	0.013	1.00	297.4	1.81	0.11	77.9%
570 March Road	B-3	SWM TANK	CBMH 279	0.00	-	0.00	2.31	11.44	97.16	231.8		3.8	450 PVC	0.4572	0.013	1.00	297.4	1.81	0.03	77.9%
570 March Road	B-3	CBMH 279	STMMH 111	0.09	0.88	0.21	2.52	11.47	97.00	Flow controlled by ICD	**46.0**	26.4	375 PVC	0.381	0.013	0.30	100.2	0.88	0.50	45.9%
Access Route	B2-B3, C-1	STMMH 111	STMMH 112	0.00	-	0.00	0.00	16.92	77.83		**103.0**	4.1	450 PVC	0.4572	0.013	0.30	162.9	0.99	0.07	63.2%
Access Route	C-2	CBMH 261	STMMH 112	0.12	0.80	0.28	0.28	10.00	104.19	Flows controlled by ICD	**15.0**	23.2	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.47	25.1%
Access Route	B2-B3, C1-C2	STMMH 112	STMMH 113	0.00	-	0.00	0.28	16.99	77.64		**118.0**	70.0	450 PVC	0.4572	0.013	0.35	176.0	1.07	1.09	67.1%
Access Route	B2-B3, C1-C2	STMMH 113	EFO8	0.00	-	0.00	0.28	18.08	74.78		**118.0**	7.4	450 PVC	0.4572	0.013	0.35	176.0	1.07	0.12	67.1%
Access Route	B-4	CB 211	CBMH 262	0.18	0.79	0.40	0.40	10.00	104.19	41.2		16.0	300 PVC	0.3048	0.013	0.35	59.7	0.82	0.33	69.0%
Access Route	B-4	CB 214	CBMH 262	0.20	0.79	0.44	0.44	10.00	104.19	45.8		18.5	300 PVC	0.3048	0.013	0.50	71.3	0.98	0.32	64.2%
Access Route	B-4	CBMH 262	CBMH 263	0.16	0.79	0.35	1.19	10.33	102.50	123.0		21.5	450 PVC	0.4572	0.013	0.35	176.0	1.07	0.33	69.9%
Access Route	B-4	CBMH 263	CBMH 265	0.18	0.79	0.40	1.59	10.66	100.83	163.3		7.9	450 PVC	0.4572	0.013	0.50	210.3	1.28	0.10	77.6%
Access Route	B-4	CBMH 264	CBMH 265	0.08	0.79	0.17	0.17	10.00	104.19	17.4		26.7	375 PVC	0.381	0.013	0.30	100.2	0.88	0.51	17.4%
Access Route	B-4	CBMH 265	EFO8	0.00	-	0.00	1.75	10.76	100.33	Flows controlled by ICD	**53.0**	3.7	375 PVC	0.381	0.013	0.30	100.2	0.88	0.07	52.9%
Access Route	B2-B4, C1-C2	EFO8	STMMH 117	0.00	-	0.00	0.00	18.19	74.49		**171.0**	9.5	450 PVC	0.4572	0.013	0.50	210.3	1.28	0.12	81.3%
Access Route/Legget Drive	B2-B4, C1-C2	STMMH 117	EX. STMMH L4	0.00	-	0.00	2.03	18.31	74.18		**171.0**	13.0	450 PVC	0.4572	0.013	0.50	210.3	1.28	0.17	81.3%
500 March Road	B-0b, C-0, S-1	EX. STMMH	EX. STMMH L4	2.14	0.72	4.25	4.25	13.11	90.21	Flows controlled by ICD	**167.7**	26.2	600 CONC	0.6096	0.013	0.46	434.4	1.49	0.29	38.6%
500 March Road	B-0b, B2-B4, C0-C2, S-1	EX. STMMH L4	EX. STMMH L3	0.00	-	0.00	0.00	18.48	73.76		**338.7**	18.3	600 CONC	0.6096	0.013	0.33	368.0	1.26	0.24	92.0%
Legget Drive	B0-4, C0-4, L1-2, S-1	EX. STMMH L3	EX. STMMH "A"	0.00	-	0.00	0.00	18.73	73.18	85.7	**379.7**	30.0	825 CONC	0.8382	0.013	0.50	1058.9	1.92	0.26	44.0%
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S-1	EX. STMMH "A"	EX. STMMH "B"	0.00	-	0.00	0.00	18.99	72.56	85.7	**379.7**	50.1	825 CONC	0.8382	0.013	0.50	1058.9	1.92	0.44	44.0%
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S-1	EX. STMMH "B"	EX. STMMH "C"	0.00	-	0.00	0.00	19.42	71.55	85.7	**379.7**	46.8	825 CONC	0.8382	0.013	0.50	1058.9	1.92	0.41	44.0%
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S-1	EX. STMMH "C"	EX. STMMH "D"	0.00	-	0.00	0.00	19.83	70.63	85.7	**379.7**	12.8	825 CONC	0.8382	0.013	1.00	1497.5	2.71	0.08	31.1%
525 Legget Drive (KRP)	TC1-TC5	EX. CBMH	EX. STMMH "D"	1.31	0.82	2.99	2.99	10.00	104.19	311.9		53.9	600 PVC	0.7096	0.013	0.17	396.0	1.00	0.90	78.8%
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S-1, TC1-5	EX. STMMH "D"	EX. STMMH "E"	0.00	-	0.00	2.99	19.91	70.46	397.6	**379.7**	15.3	900 CONC	0.9144	0.013	0.27	981.3	1.49	0.17	79.2%
525 Legget Drive (KRP)	TD-1	EX. CBMH	EX. STMMH "E"	0.84	0.75	1.75	1.75	10.00	104.19	182.5		49.0	300 PVC	0.3048	0.013	1.60	127.6	1.75	0.47	143.0%
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S1, TC1-5, TD-1	EX. STMMH "E"	EX. STMMH "F"	0.00	-	0.00	4.75	20.08	70.08	332.6	**379.7**	37.5	900 CONC	0.9144	0.013	0.20	844.6	1.29	0.49	84.3%
515 Legget Drive (KRP)	TD-2	Building	EX. STMMH "F"	0.14	0.90	0.35	0.35	10.00	104.19	36.5		38.0	200 PVC	0.2032	0.013	0.30	18.7	0.58	1.10	194.7%
525 Legget Drive (KRP)	H-1	Hotel	EX. STMMH "F"	0.72	0.85	1.70	1.70	10.00	104.19	177.3		15.5	200 PVC	0.2032	0.013	0.71	28.8	0.89	0.29	614.9%
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S1, TC1-5, TD1-2	EX. STMMH "F"	EX. STMMH "G"	0.00	-	0.00	6.80	20.56	69.04	469.2	**379.7**	64.8	900 CONC	0.9144	0.013	0.48	1308.4	1.99	0.54	64.9%
515 Legget Drive (KRP)	TD-3, TD-4	EX. CBMH	EX. STMMH "G"	2.84	0.75	5.92	5.92	10.00	104.19	617.0		79.0	450 CONC	0.4572	0.013	0.50	210.3	1.28	1.03	293.4%

STORM SEWER DESIGN SHEET

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Location				Flow								Design Capacity								
												Proposed Sewer Pipe Sizing / Design								
Location	Area ID	From MH	To MH	Area A (ha.)	Runoff Coefficient C	Indivi. 2.78 AC	Accum. 2.78 AC	Time of Conc. Tc (min.)	Rain Intensity I (mm/hr)	Total Uncontrolled Peak Flow Q (L/s)	Total Restricted Peak Flow (L/s)	Pipe Length (m)	Pipe Size (mm) and Material	Pipe ID Actual (m)	Roughness n	Design Grade So (%)	Capacity Qfull (L/s)	Full Flow Velocity (m/s)	Time of Flow (min.)	Q / Qfull
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S1, TC1-5, TD1-4, H-1	EX. STMMH "G"	EX. STMMH "H"	0.00	-	0.00	12.72	21.11	67.91	863.8	**379.7**	22.5	975 CONC	0.9906	0.013	1.20	2561.1	3.32	0.11	48.6%
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S1, TC1-5, TD1-4, H-1	EX. STMMH "H"	EX. STMMH "I"	0.00	-	0.00	12.72	21.22	67.69	863.8	**379.7**	46.8	1050 CONC	1.0668	0.013	0.24	1395.6	1.56	0.50	89.1%
525 Legget Drive (KRP)	B0-4, C0-4, L1-2, S1, TC1-5, TD1-4, H-1	EX. STMMH "I"	SWM POND	0.00	-	0.00	12.72	21.72	66.69	863.8	**379.7**	42.9	1050 CONC	1.0668	0.013	0.44	1889.7	2.11	0.34	65.8%
Totals				**11.80**								**1758.2**								

Demand Equation / Parameters

1. Q = 2.78 ACI

Definitions

Q = Peak flow in litres per second (L/s)
A = Area in hectares (ha)
C = Weighted runoff coefficient (increased by 25% for 100-year)
I = Rainfall intensity in millimeters per hour (mm/hr)

Rainfall intensity is based on City of Ottawa IDF data presented in the City of Ottawa - Sewer Design Guidelines

Capacity Equation

Q full = $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

Definitions

Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A_p = Pipe flow area (m^2)
R = Hydraulic Radius of wetted area (dia./4 for full pipes)
So = Pipe slope/gradient

Notes

1) Refer to the Novatech Report "Development Servicing Study and Stormwater Management Report - Nokia Ottawa Innovation Campus" (R-2023-082) for on-site storm drainage and stormwater details.
2) Refer to the Novatech Report "Sanitary and Storm Trunk Sewer Design Brief - Nokia Ottawa Innovation Campus" (R-2024-130) for off-site storm drainage and stormwater details.
3) Refer to Novatech Drawings C100 and C501 for the storm structure designations, storm pipe details and control structure tables.
4) Refer to Novatech Drawing C500 and associated storm sewer design sheet for STM drainage areas that contribute to the northern STM Sewer on KRP Lands.
5) Stormwater flows from drainage area B-2 include minor contributing off-site flows from drainage area OS-2, as further detailed in the report.

APPENDIX F

Inlet Control Device (ICD) Information

IPEX Tempest™ Inlet Control Devices

Municipal Technical Manual Series

Vol. I, 2nd Edition

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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.

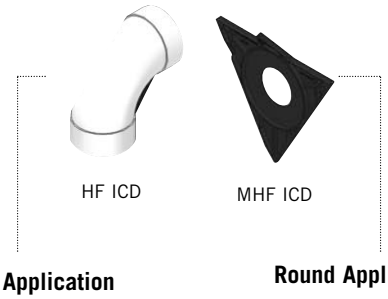
TEMPEST MHF (Medium to High Flow):
The MHF plate or plug is designed to control flow rates 9 L/s (143 gpm) or greater. It is not designed to prevent the propagation of odour and floatables.

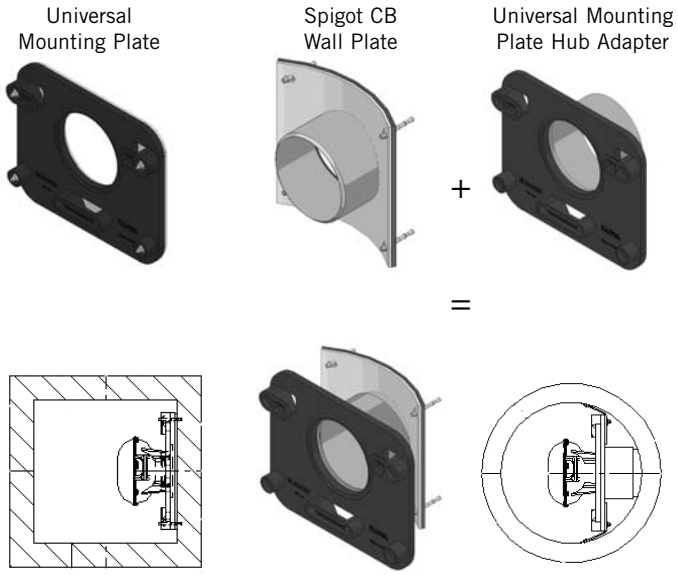
Product Construction

The HF, HF Sump and MHF ICDs are built to be light weight at a maximum weight of 6.8 Kg (14.6 lbs).

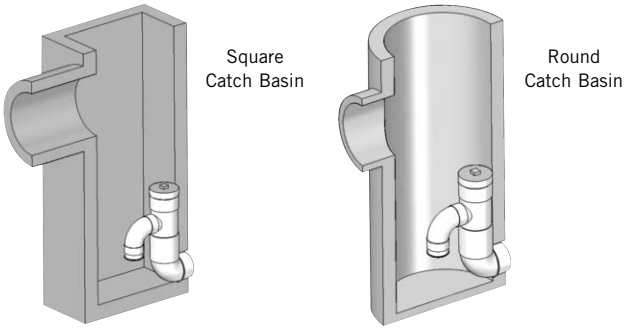
Product Applications

The HF and MHF ICD's are available to accommodate both square and round applications:



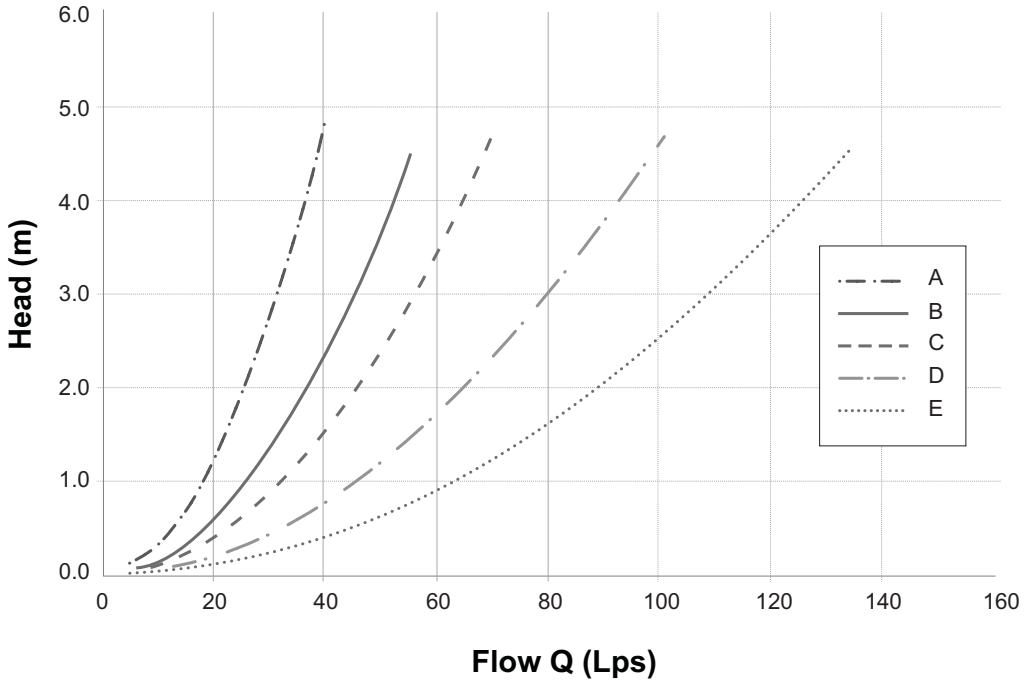


The HF Sump is available to accommodate low to no sump applications in both square and round catch basins:



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.

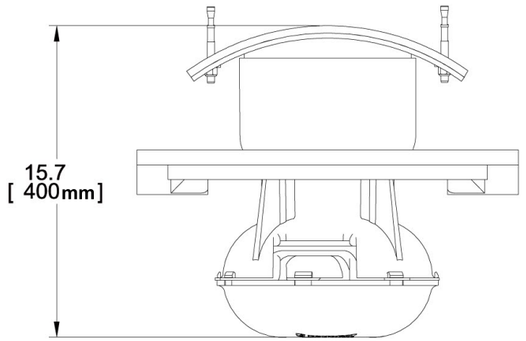
Dimensioning

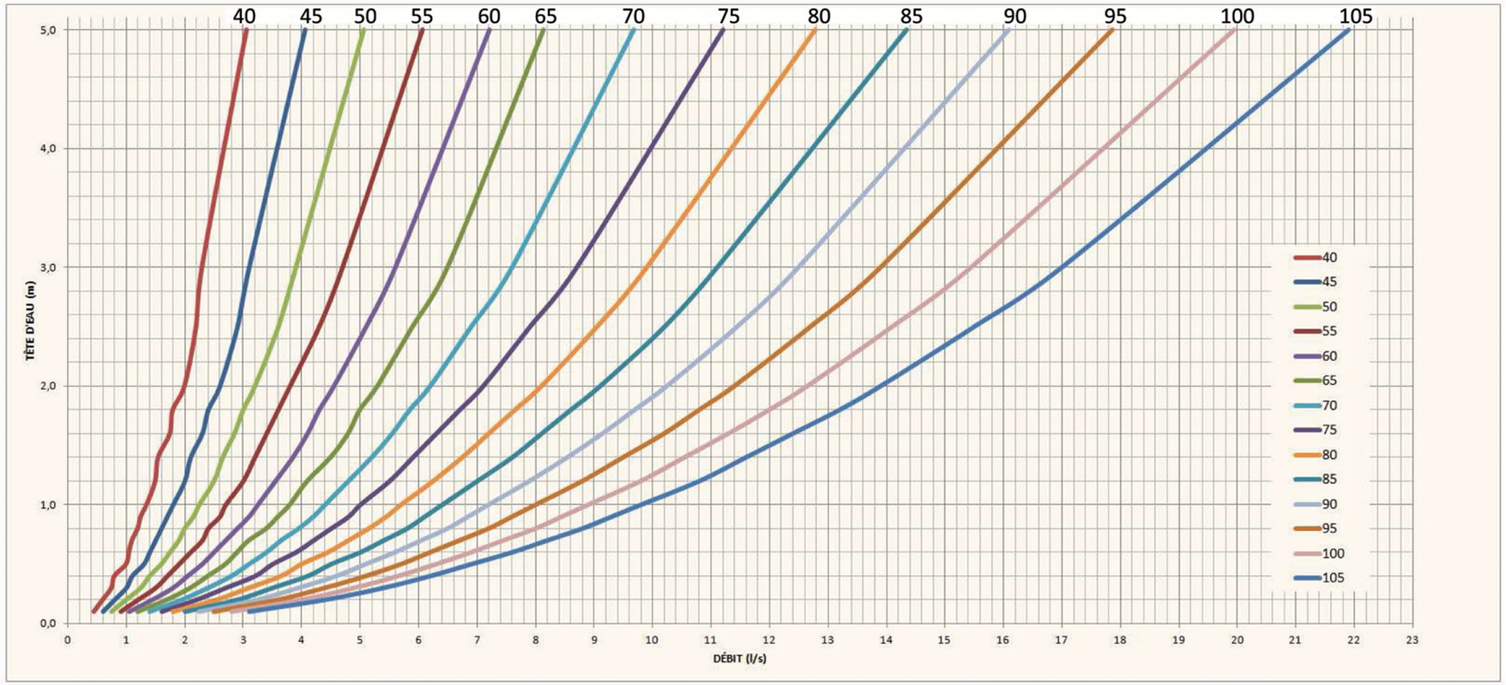
The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

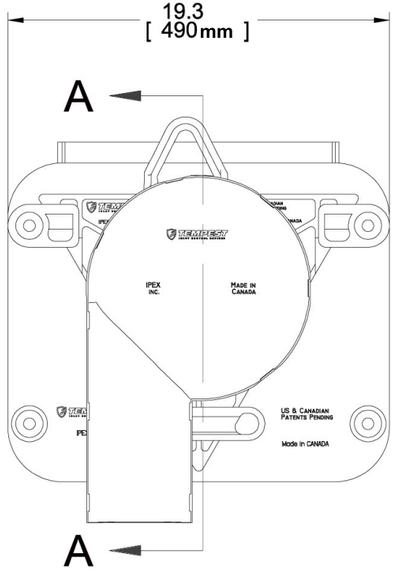
Installation

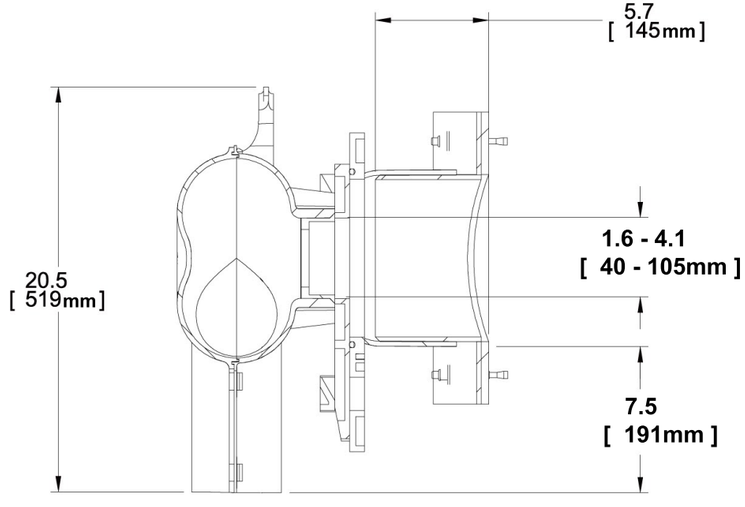
Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

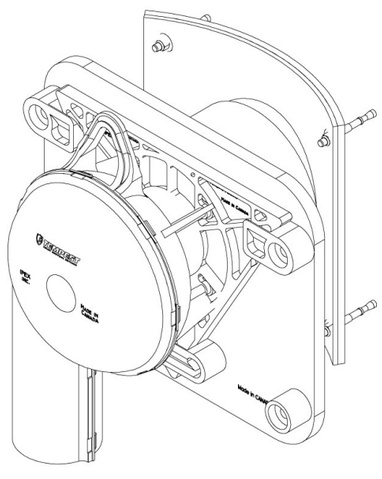








SECTION A-A



IPEX Product development engineering 3 Place du commerce, Suite 101 Île des Soeurs, Montréal, QC, H3E 1H7 Canada Tel 514 769 2200 www.ipexna.com			
PROJECTION	UNITS in [mm]	TITLE Tempest LMF round CB assembly [VORTEX]	SIZE B / SCALE(S) 1/8 / 1-2014

APPENDIX G

Control Flow Roof Drain Information

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

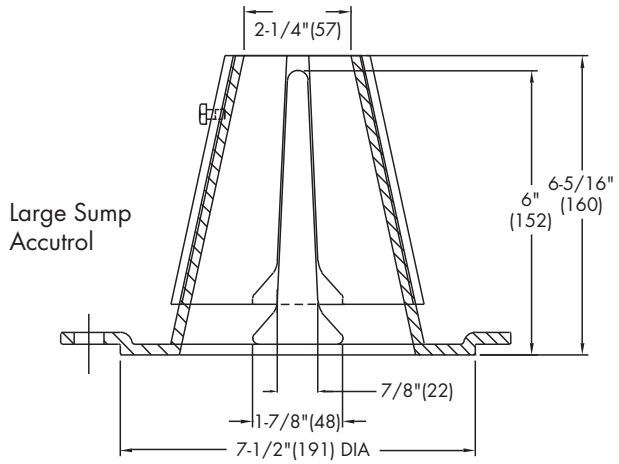
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

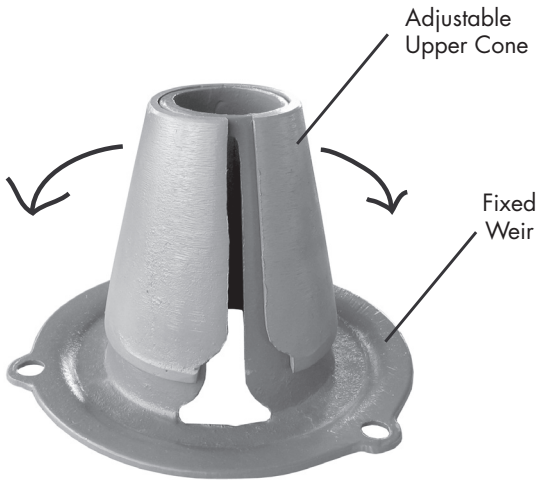
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the 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 _____

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

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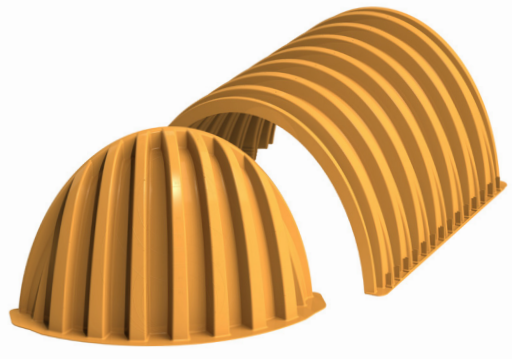
APPENDIX H

Underground Stormwater Storage Chamber Information

StormTech® MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



Nominal Chamber Specifications
(not to scale)

Size (L x W x H)
90” x 77” x 45”
2286 mm x 1956 mm x 1143 mm

Chamber Storage
109.9 ft³ (3.11 m³)

Min. Installed Storage*
175.0 ft³ (4.96 m³)

Weight
134 lbs (60.8 kg)

Shipping
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 6” (150 mm) of stone between chambers/ end caps and 40% stone porosity.

Nominal End Cap Specifications
(not to scale)

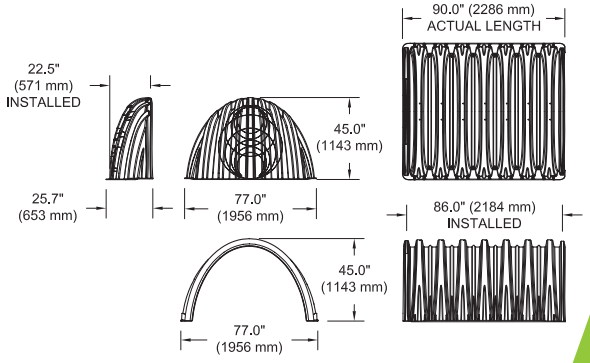
Size (L x W x H)
26.5” x 71” x 45.1”
673 mm x 1803 mm x 1145 mm

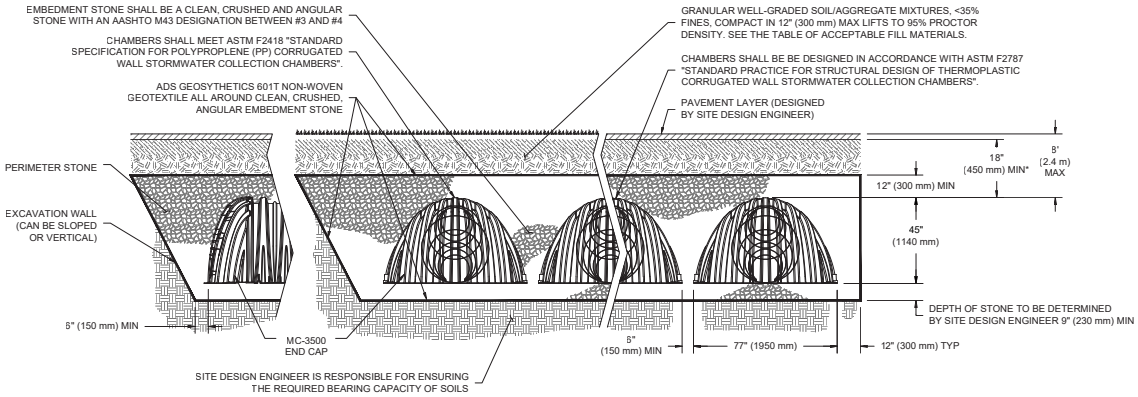
End Cap Storage
14.9 ft³ (0.42 m³)

Min. Installed Storage*
45.1 ft³ (1.28 m³)

Weight
49 lbs (22.2 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 6” (150 mm) of stone between chambers/ end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

ADS StormTech™

StormTech MC-3500 Specifications

Storage Volume Per Chamber

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9 in (230 mm)	12 in (300 mm)	15 in (375 mm)	18 in (450 mm)
Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

Amount of Stone Per Chamber

English Tons (yds³)	Stone Foundation Depth			
	9 in	12 in	15 in	18 in
Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
Metric Kilograms (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

Volume Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth			
	9 in (230 mm)	12 in (300 mm)	15 in (375mm)	18 in (450 mm)
Chamber	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.3)	4.3 (3.3)	4.4 (3.4)

Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS StormTech products, manufactured in accordance with ASTM F2418 or ASTMF2922, comply with all requirements in the Build America, Buy America (BABA) Act.

Working on a project?
Visit us at adspipe.com/stormtech and utilize the Design Tool

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800-821-6710

APPENDIX I

Stormwater Quality Control Treatment Unit Information

Kynan Dsa

From: Jessica Steffler <jessica.steffler@RinkerPipe.com>
Sent: Friday, August 1, 2025 11:42 AM
To: Kynan Dsa
Cc: Brandon O'Leary; Francois Thauvette
Subject: RE: [EXTERNAL] EFO Sizing Request - 570 March Road: Nokia Ottawa Innovation Campus (123043)
Attachments: Stormceptor EFO8-South Outlet-Nokia Ottawa Innovation Campus.pdf; Stormceptor EFO5-North outlet-Nokia Ottawa Innovation Campus.pdf; EFO5-DETAIL.pdf; EFO8-DETAIL.pdf; Stormceptor EF Owner's Manual_7-26-18 (1).pdf; Stormceptor EFO - Oil Grit Separator Specification (rev 12-23).pdf; QAP PROGRAM FOR STC Rinker Materials 080224 V3.png

Hi Kynan,

I have revised the sizing reports to reflect the changes provided below.

For the North unit, the stormceptor EFO5 is recommended. I have attached the sizing reports, and all related documents again for you. The budgetary price of the Stormceptor EFO5 is $31,045.

Stormceptor EFO5 Capacities
Maximum Treatment Flow Rate: 16.2 L/s
Maintenance Sediment Volume: 550 L
Maximum Sediment Capacity: 1,950 L
Maximum Hydrocarbon Storage Capacity: 420 L
Total Storage Volume: 3,150 L

For the south unit, the Stormceptor remains an EFO8 unit. The budgetary price of the Stormceptor EFO8 is now $54,186.

Again, the pricing includes the unit, delivery to the site, and the Quality Assurance Program (QAP).

Stormceptor EFO8 Capacities
Maximum Treatment Flow Rate: 41.6 L/s
Maintenance Sediment Volume: 1,810 L
Maximum Sediment Capacity: 8,780 L
Maximum Hydrocarbon Storage Capacity: 1,070 L
Total Storage Volume: 12,090 L

Please reach out if you have any questions.

Regards,

Jessica Steffler
Technical Resource Manager

O 519 622 7574 **C** 519 239 6958
2099 Roseville Rd N1R 5S3
Cambridge, ON
RinkerPipe.com

From: Kynan Dsa <k.dsa@novatech-eng.com>
Sent: Friday, August 1, 2025 9:36 AM
To: Jessica Steffler <jessica.steffler@RinkerPipe.com>
Cc: Brandon O'Leary <brandon.oleary@RinkerPipe.com>; Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: FW: [EXTERNAL] EFO Sizing Request - 570 March Road: Nokia Ottawa Innovation Campus (123043)

Hi Jessica,

As a result of recent changes to the site plan for the proposed development at 570 March Road (Nokia Ottawa Innovation Campus), we have revised our servicing and stormwater management design. The site plan changes have resulted in an increased tributary area for the north outlet and slightly increased imperviousness for the south outlet. The revised project details are as follows:

North Outlet (EFO6):

- Tributary Area = ~~1.014 ha.~~ 1.055 ha.
- Imperviousness: Cw = 0.90
- Time of concentration = 10min
- IDF Curve = City of Ottawa (104.19mm/hr for 5-year event, 178.56mm/hr for 100-year event)
- Anticipated (Controlled) Peak Flows = ~~57.6 L/s~~ 58.7 L/s
- No changes to previously provided servicing design

South Outlet (EFO8):

- Tributary Area: 3.235 ha.
- Imperviousness: Cw = ~~0.73~~ 0.77
- Time of concentration = 10min
- IDF Curve = City of Ottawa (104.19mm/hr for 5-year event, 178.56mm/hr for 100-year event)
- Anticipated (Controlled) Peak Flows = ~~165.0 L/s~~ 171.0 L/s
- No changes to previously provided servicing design

We want to confirm that the previously sized EFO units will be sufficient to provide the required 80% TSS removal; otherwise, we are requesting revised sizing reports and design details for submission to the City of Ottawa.

Please note that there is a bit of urgency to this request as the client is looking to submit documents to the City of Ottawa on August 5th.

Please let us know if you have any questions or require additional information.

Thanks,

Kynan D'sa, B.A.Sc. (Engineering) (He/Him)
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6
Tel: 613.254.9643 Ext. 276 | Cell: 705.821.2278
The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Jessica Steffler <jessica.steffler@RinkerPipe.com>
Sent: Sunday, October 27, 2024 8:58 AM
To: Kynan Dsa <k.dsa@novatech-eng.com>
Cc: Brandon O'Leary <brandon.oleary@RinkerPipe.com>
Subject: FW: [EXTERNAL] EFO Sizing Request - 570 March Road: Nokia Ottawa Innovation Campus (123043)

Kynan,

I have sized both units based on the parameters provided. The recommended unit for the south is the Stormceptor EFO8 and for the North is the Stormceptor EFO6 unit. I have attached both sizing reports for you to review. Also attached you will find the standard drawings for both units and specification, the owner's manual and information on the Quality Assurance Program. The budgetary price of each unit includes the unit itself, delivery to site and the Quality Assurance Program. See pricing below:

Stormceptor EFO6 $36,312
Stormceptor EFO8 $53,124.

Stormceptor EFO6 Capacities
Maximum Treatment Flow Rate: 23.4 L/s
Maintenance Sediment Volume: 760 L
Maximum Sediment Capacity: 3,470 L
Maximum Hydrocarbon Storage Capacity: 610 L
Total Storage Volume: 5,070 L

Stormceptor EFO8 Capacities
Maximum Treatment Flow Rate: 41.6 L/s
Maintenance Sediment Volume: 1,810 L
Maximum Sediment Capacity: 8,780 L
Maximum Hydrocarbon Storage Capacity: 1,070 L
Total Storage Volume: 12,090 L

Please reach out if you have any questions.

Jessica Steffler

From: Kynan Dsa <k.dsa@novatech-eng.com>
Sent: Tuesday, October 22, 2024 10:45 AM

To: Brandon O'Leary <Brandon.OLeary@forterrabp.com>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: [EXTERNAL] EFO Sizing Request - 570 March Road: Nokia Ottawa Innovation Campus (123043)

CAUTION: This email originated from outside of the organization. Exercise caution when opening attachments or clicking links, especially from *UNKNOWN* senders.

Hi Brandon,

I received your contact information from Steve Matthews (Novatech) and appreciate your time and consideration for this request.

We are currently working on a project that requires two (2) separate stormwater quality control units to treat water from the paved drive aisles on-site, some of the proposed buildings, and landscaped areas. The project proposes to develop an R&D lab, office building, parking garage, and at-grade commercial units as part of the new Nokia Ottawa Innovation Campus, located at 570 March Road in the City of Ottawa. Stormwater flows from the site will be directed to two separate outlets that both ultimately outlet to a stormwater management pond. Two separate stormwater quality control units will therefore be required.
The project details are as follows:

North Outlet:

- Tributary Area = 1.014 ha.
- Imperviousness: Cw = 0.90
- Time of concentration = 10min
- IDF Curve = City of Ottawa (104.19mm/hr for 5-year event, 178.56mm/hr for 100-year event)
- Anticipated (Controlled) Peak Flows = 57.6 L/s
- The proposed unit for the north outlet will be installed on an existing 375mm dia. PVC outlet pipe with one new 375 dia. PVC inlet pipe at 160 degrees of separation through the structure and approximately 2.25m of cover on both pipes.

South Outlet:

- Tributary Area: 3.235 ha.
- Imperviousness: Cw = 0.73
- Time of concentration = 10min
- IDF Curve = City of Ottawa (104.19mm/hr for 5-year event, 178.56mm/hr for 100-year event)
- Anticipated (Controlled) Peak Flows = 165.0 L/s
- The proposed unit for the south outlet will be installed on a new 450mm dia. PVC outlet pipe with the following inlet pipes:
    - One new 375mm dia. PVC inlet pipe at 180 degrees of separation through the structure and 90 degrees of separation from the other inlet pipe.
    - One new 450mm dia. PVC inlet pipe at 90 degrees of separation through the structure and 90 degrees of separation from the other inlet pipe.

We have a requirement to provide a water quality control of 80% TSS removal based on correspondence from the Mississippi Valley Conservation Authority. A standard particle distribution (Fines) should be

adequate for the design. Anticipated peak flows are based on a previously approved drainage plan for the stormwater management pond. On-site attenuation and detention will be provided through the use of ICDs within the storm structures and underground stormwater storage tanks. Please find attached a markup of the proposed site servicing plan for a sketch of the area and proposed water quality treatment unit locations (highlighted in yellow).

Can you please size two (2) separate EFO units for us and provide the design details as well as an approximate cost estimate.

We will also need the following information on each unit for our SWM Report:

- % of net annual TSS removal
- % of net annual treatment volume for the tributary area
- The treatment capacity in L/s
- The sediment storage capacity in m^3
- The oil storage capacity in L
- The total unit storage capacity in L

Thank you for your time and consideration in this matter. If there is any further information you require, please do not hesitate to call.

Thanks,

Kynan D'sa, B.A.Sc. (Engineering) (He/Him)
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6
Tel: 613.254.9643 Ext. 276 | Cell: 705.821.2278
The information contained in this email message is confidential and is for exclusive use of the addressee.

Stormceptor®

Rinker MATERIALS® A QUIKRETE® COMPANY

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

08/01/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	Nokia Ottawa Innovation Campus North Outlet

Drainage Area (ha):	1.055
Runoff Coefficient 'c':	0.90

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	30.65
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	58.70
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	1149
Estimated Average Annual Sediment Volume (L/yr):	934

Project Name:	570 March Rd.
Project Number:	-
Designer Name:	Jessica Steffler
Designer Company:	Forterra Pipe & Precast
Designer Email:	jessica.steffler@RinkerPipe.com
Designer Phone:	519-239-6958
EOR Name:	Kynan D'sa
EOR Company:	Novatech
EOR Email:	k.dsa@novatech-eng.com
EOR Phone:	613-254-9643

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	73
EFO5	80
EFO6	85
EFO8	91
EFO10	95
EFO12	97

Recommended Stormceptor EFO Model: EFO5

Estimated Net Annual Sediment (TSS) Load Reduction (%): 80

Water Quality Runoff Volume Capture (%): > 90

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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

Stormceptor®

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Stormceptor® EF Sizing Report

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	1.32	79.0	44.0	100	8.6	8.6
1.00	20.3	29.0	2.64	158.0	87.0	98	20.0	28.6
2.00	16.2	45.2	5.28	317.0	174.0	87	14.1	42.7
3.00	12.0	57.2	7.92	475.0	261.0	80	9.6	52.4
4.00	8.4	65.6	10.56	634.0	348.0	77	6.5	58.9
5.00	5.9	71.6	13.20	792.0	435.0	72	4.3	63.2
6.00	4.6	76.2	15.84	950.0	522.0	68	3.2	66.3
7.00	3.1	79.3	18.48	1109.0	609.0	65	2.0	68.3
8.00	2.7	82.0	21.12	1267.0	696.0	64	1.8	70.1
9.00	3.3	85.3	23.76	1425.0	783.0	63	2.1	72.2
10.00	2.3	87.6	26.40	1584.0	870.0	63	1.4	73.6
11.00	1.6	89.2	29.04	1742.0	957.0	62	1.0	74.6
12.00	1.3	90.5	31.68	1901.0	1044.0	61	0.8	75.4
13.00	1.7	92.2	34.31	2059.0	1131.0	59	1.0	76.4
14.00	1.2	93.5	36.95	2217.0	1218.0	57	0.7	77.1
15.00	1.2	94.6	39.59	2376.0	1305.0	55	0.6	77.7
16.00	0.7	95.3	42.23	2534.0	1392.0	53	0.4	78.1
17.00	0.7	96.1	44.87	2692.0	1479.0	49	0.4	78.4
18.00	0.4	96.5	47.51	2851.0	1566.0	47	0.2	78.6
19.00	0.4	96.9	50.15	3009.0	1653.0	44	0.2	78.8
20.00	0.2	97.1	52.79	3168.0	1740.0	42	0.1	78.9
21.00	0.5	97.5	55.43	3326.0	1827.0	40	0.2	79.1
22.00	0.2	97.8	58.07	3484.0	1914.0	38	0.1	79.2
23.00	1.0	98.8	60.71	3643.0	2001.0	37	0.4	79.5
24.00	0.3	99.1	63.35	3801.0	2088.0	35	0.1	79.6
25.00	0.0	99.1	65.99	3959.0	2176.0	34	0.0	79.6
30.00	0.9	100.0	79.19	4751.0	2611.0	28	0.3	79.9
35.00	0.0	100.0	92.39	5543.0	3046.0	24	0.0	79.9
40.00	0.0	100.0	105.58	6335.0	3481.0	22	0.0	79.9
45.00	0.0	100.0	118.78	7127.0	3916.0	19	0.0	79.9
						Estimated Net Annual Sediment (TSS) Load Reduction =		**80 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

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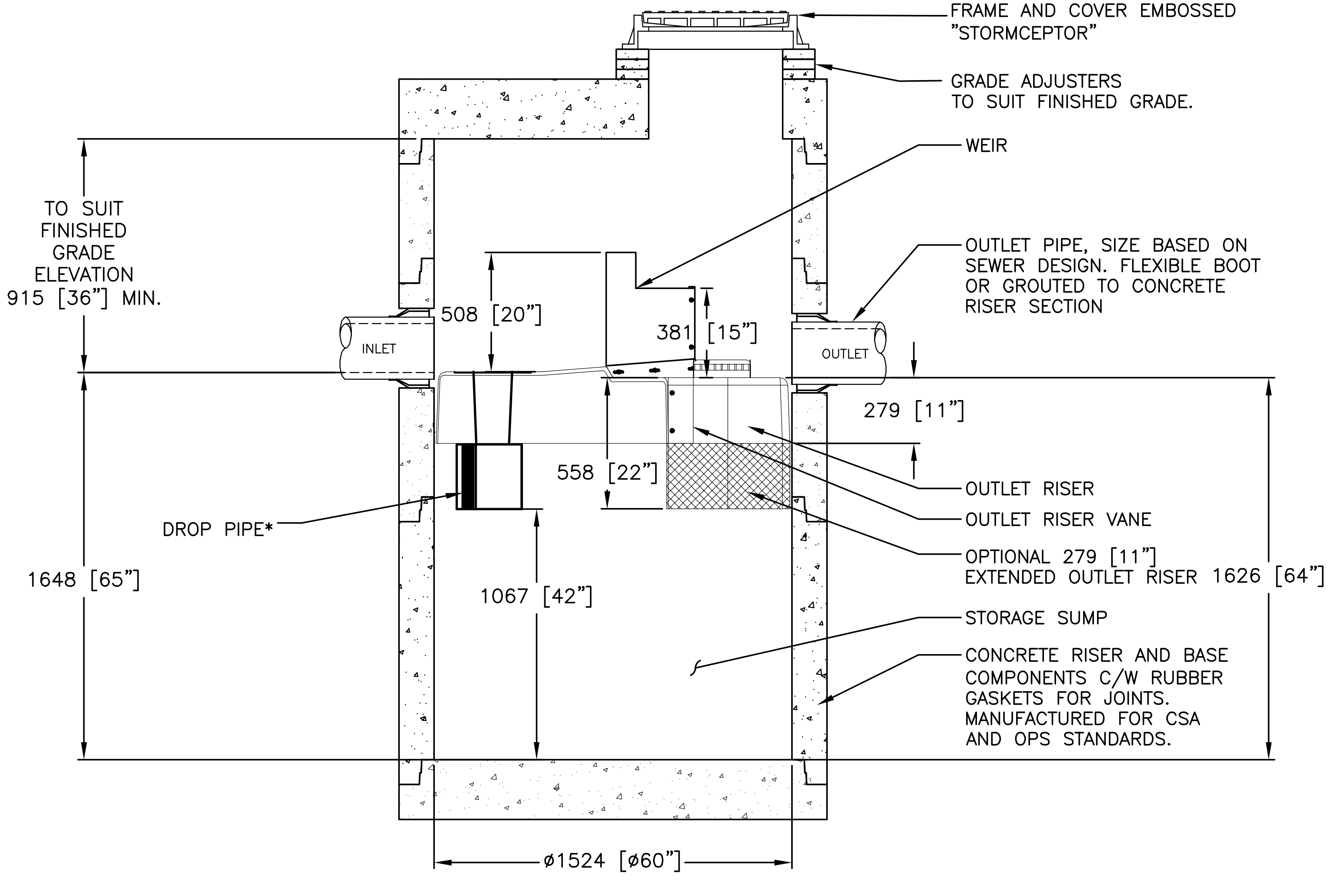
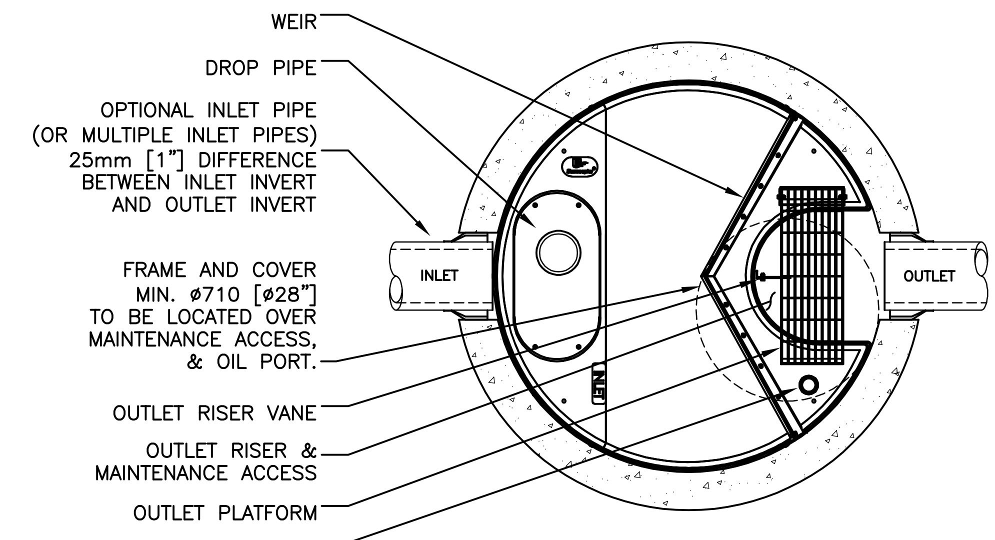
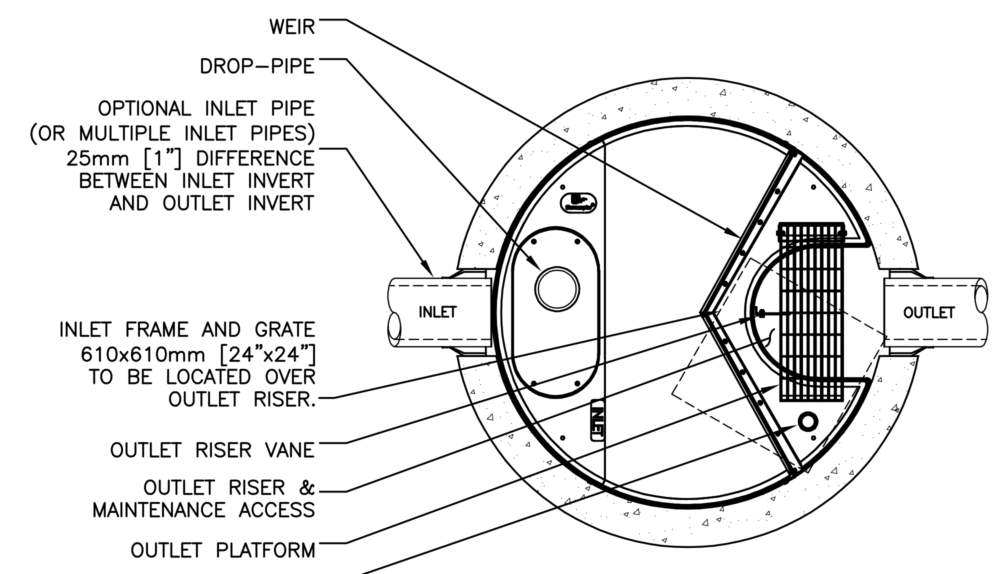
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

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 EF5 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO5 (OIL CAPTURE CONFIGURATION).

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.

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).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO5				
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

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If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be reported to Imbrium immediately for re-evaluation of the design. Imbrium accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

MARK	DATE	REVISION DESCRIPTION	BY
####	####	####	####
####	####	####	####
####	####	####	####
####	####	####	####
0	08/22/24	INITIAL RELEASE	EC

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9
TF 800-565-4801 CA 416-960-9900 INTL +1-416-960-9900

DATE: 8/22/2024	
DESIGNED: JSK	DRAWN: EC
CHECKED: BSF	APPROVED:
PROJECT No.: EFO5	SEQUENCE No.: *
SHEET: 1 OF 1	

C:\USERS\ERIC.CARMONA-EPP\ONEDRIVE - THE QUIKRETE COMPANIES\DESKTOP\EF5 EXTRA\EFO5-DETAIL.DWG 8/22/2024 4:30 PM

Stormceptor®

Rinker MATERIALS® A QUIKRETE® COMPANY

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

08/01/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	Nokia Ottawa Innovation Campus South Outlet

Drainage Area (ha):	3.235
Runoff Coefficient 'c':	0.77

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	80.40
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	171.00
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	2759
Estimated Average Annual Sediment Volume (L/yr):	2243

Project Name:	570 March Rd.
Project Number:	-
Designer Name:	Jessica Steffler
Designer Company:	Forterra Pipe & Precast
Designer Email:	jessica.steffler@RinkerPipe.com
Designer Phone:	519-239-6958
EOR Name:	Kynan D'sa
EOR Company:	Novatech
EOR Email:	k.dsa@novatech-eng.com
EOR Phone:	613-254-9643

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	54
EFO5	62
EFO6	70
EFO8	80
EFO10	85
EFO12	90

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 80

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

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PERFORMANCE

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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

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Stormceptor® EF Sizing Report

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	3.46	208.0	44.0	100	8.6	8.6
1.00	20.3	29.0	6.92	415.0	88.0	98	20.0	28.6
2.00	16.2	45.2	13.85	831.0	177.0	87	14.1	42.7
3.00	12.0	57.2	20.77	1246.0	265.0	80	9.6	52.4
4.00	8.4	65.6	27.70	1662.0	354.0	76	6.4	58.8
5.00	5.9	71.6	34.62	2077.0	442.0	72	4.3	63.1
6.00	4.6	76.2	41.55	2493.0	530.0	68	3.1	66.2
7.00	3.1	79.3	48.47	2908.0	619.0	65	2.0	68.2
8.00	2.7	82.0	55.40	3324.0	707.0	64	1.7	70.0
9.00	3.3	85.3	62.32	3739.0	796.0	63	2.1	72.1
10.00	2.3	87.6	69.25	4155.0	884.0	62	1.4	73.5
11.00	1.6	89.2	76.17	4570.0	972.0	62	1.0	74.5
12.00	1.3	90.5	83.10	4986.0	1061.0	60	0.8	75.3
13.00	1.7	92.2	90.02	5401.0	1149.0	58	1.0	76.3
14.00	1.2	93.5	96.95	5817.0	1238.0	56	0.7	77.0
15.00	1.2	94.6	103.87	6232.0	1326.0	54	0.6	77.6
16.00	0.7	95.3	110.80	6648.0	1414.0	52	0.4	77.9
17.00	0.7	96.1	117.72	7063.0	1503.0	49	0.4	78.3
18.00	0.4	96.5	124.65	7479.0	1591.0	46	0.2	78.5
19.00	0.4	96.9	131.57	7894.0	1680.0	44	0.2	78.7
20.00	0.2	97.1	138.50	8310.0	1768.0	42	0.1	78.8
21.00	0.5	97.5	145.42	8725.0	1856.0	40	0.2	78.9
22.00	0.2	97.8	152.35	9141.0	1945.0	38	0.1	79.0
23.00	1.0	98.8	159.27	9556.0	2033.0	36	0.4	79.4
24.00	0.3	99.1	166.20	9972.0	2122.0	35	0.1	79.5
25.00	0.0	99.1	173.12	10387.0	2210.0	33	0.0	79.5
30.00	0.9	100.0	207.75	12465.0	2652.0	28	0.3	79.7
35.00	0.0	100.0	242.37	14542.0	3094.0	24	0.0	79.7
40.00	0.0	100.0	276.99	16620.0	3536.0	21	0.0	79.7
45.00	0.0	100.0	311.62	18697.0	3978.0	19	0.0	79.7
						Estimated Net Annual Sediment (TSS) Load Reduction =		**80 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

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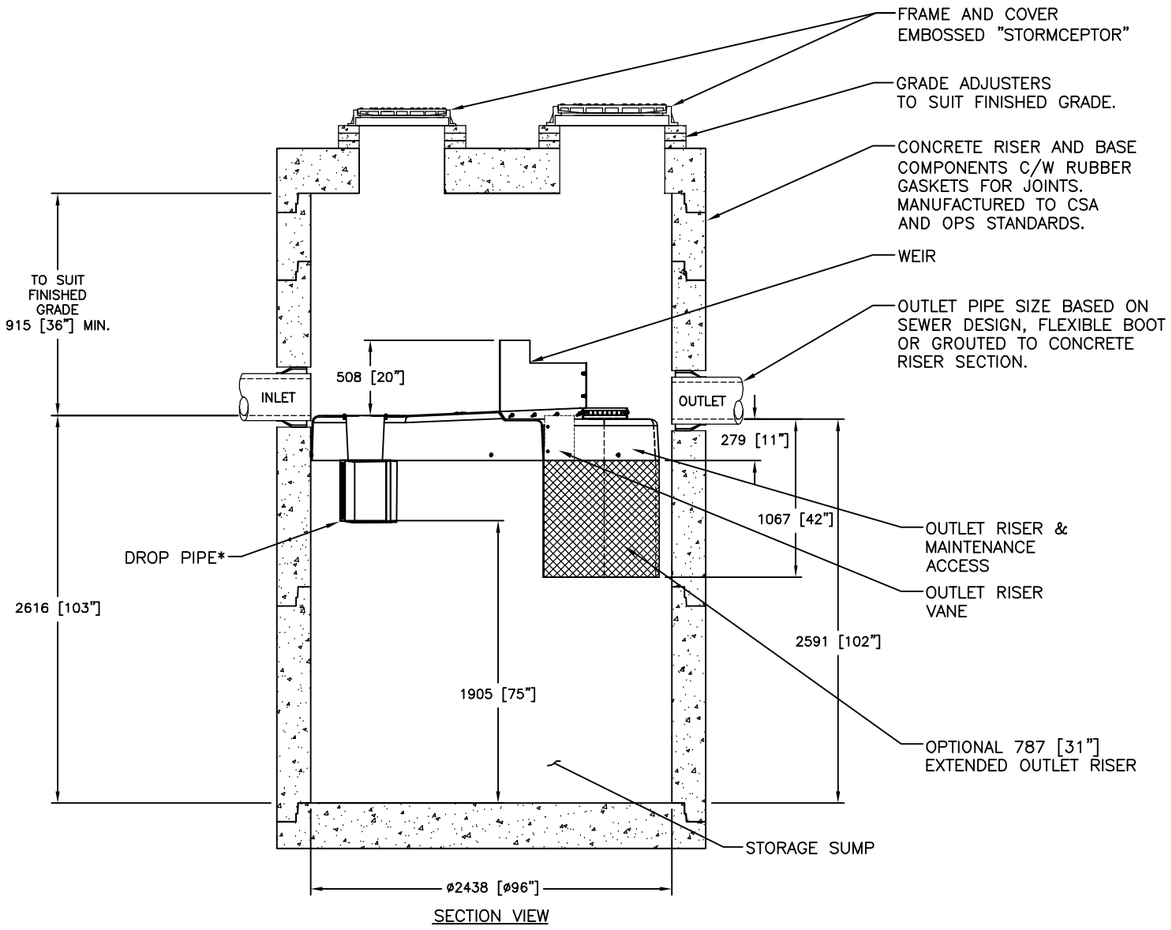
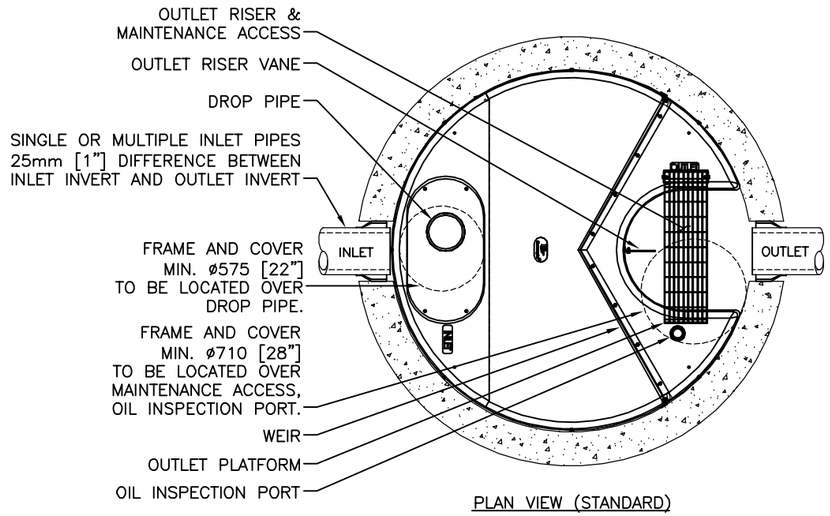
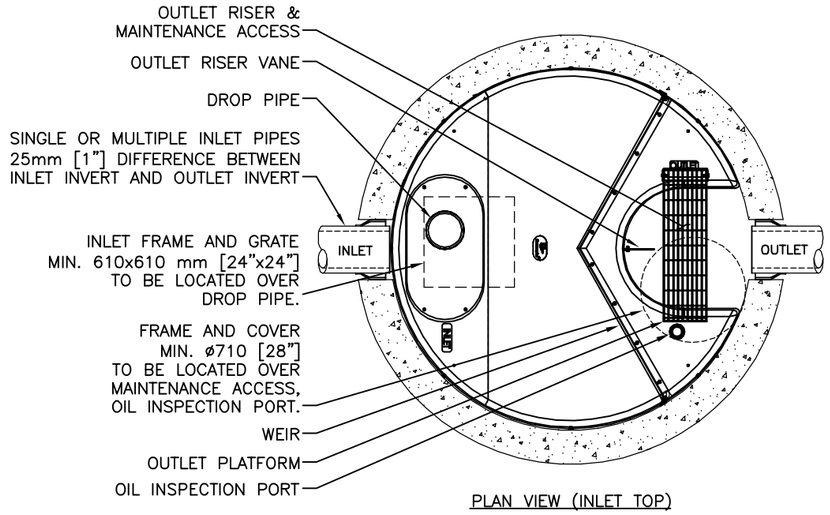
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

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 EF8 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO8 (OIL CAPTURE CONFIGURATION).

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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.

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).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO8				
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, please notify Imbrium immediately. Such discrepancies must be reported to Imbrium immediately for re-evaluation of the design. Imbrium accepts no responsibility for any deviations from this drawing or inaccurate information supplied by others.

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	OUTLET PLATFORM	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

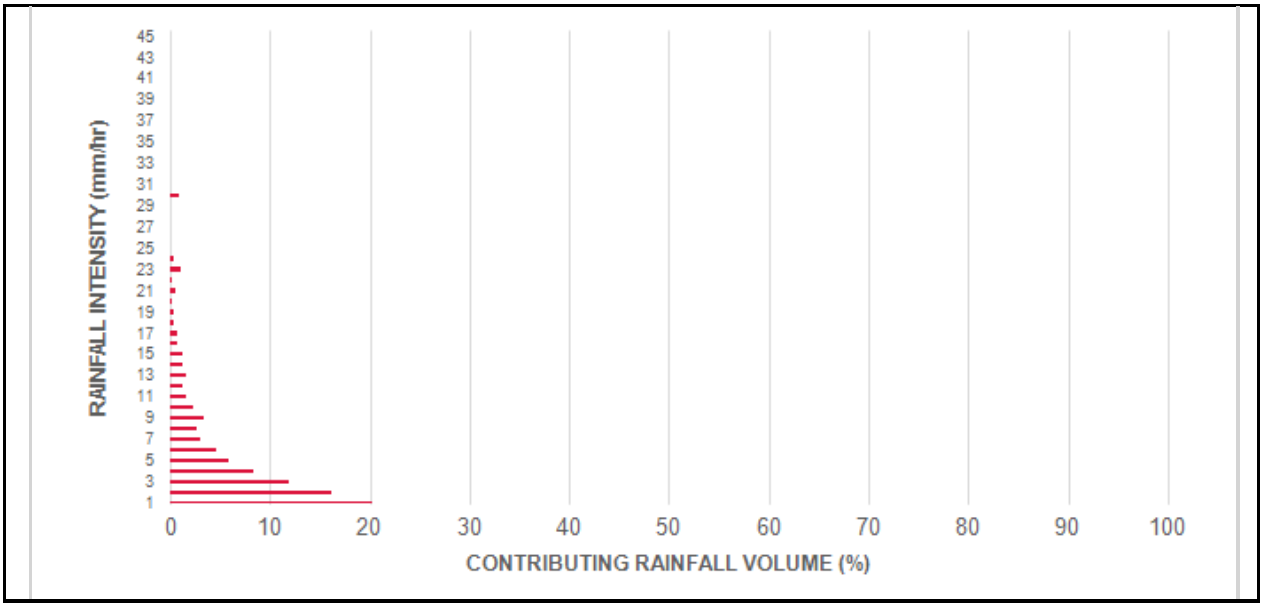
SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 9A9
TF 800-565-6801 CA 416-665-8600 INTL +1-416-665-8600

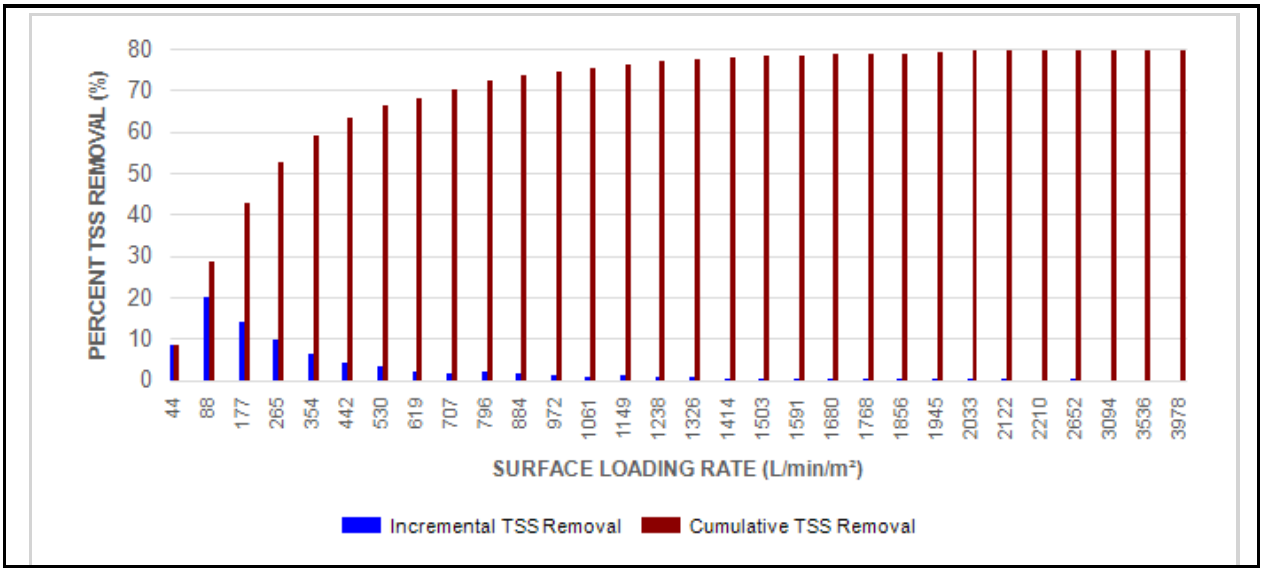
DATE:	10/13/2017
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: *
PROJECT No.: EFO8	SEQUENCE No.: *
SHEET:	1 OF 1

I:\IMBRIUM\PRODUCTS\STORMCEPTOR EF\40 DRAWINGS & DETAILS\STANDARD DETAILS\EFO8 STANDARD DETAILS\EFO8-DETAIL.DWG 4/12/2019 11:07 AM

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

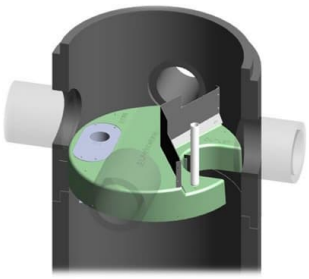
► **Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

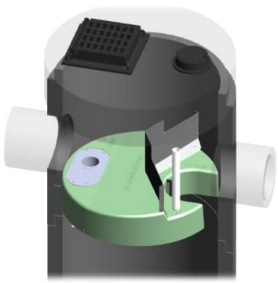
DESIGN FLEXIBILITY

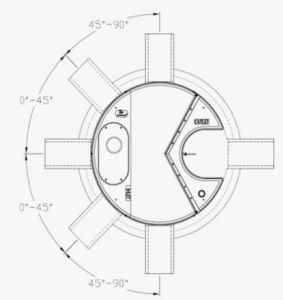
► **Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet 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

imbrium

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 Separators**

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.

APPENDIX J

KRP Stormwater Drainage Brief Excerpts

KANATA RESEARCH PARK
STORMWATER DRAINAGE
BRIEF

Prepared for:

CITY OF KANATA

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.

December 11, 2000

Development sites in Area 1 that drain to Pond 1 include:

- Towers A, B, C, and Link between B and C
- The Hotel, Tower D and Tower D – Hotel Link
- Alcatel parking lot and future development area, both southwest of Legget Drive
- By additional quality treatment, the 1.25 ha parking area adjacent to the Swansea Development

3.1 Tower A, B, C, And Link between B and C

As stated above, Towers 'A', 'B', 'C' and Link are located in Drainage Area 1 and SWM Pond 1 provides quantity and quality control for this development.

The storm sewer system that services these developments also services an Alcatel parking area and one future development area, both southwest of Legget Drive.
As shown on the attached drawing, the overland flow route for the parking areas servicing Towers A and B has been intercepted by the link between Towers B and C. It is now intended to pipe the 100 year flows under the link via a 600 mm storm pipe (replacing the proposed 450 mm pipe). Summarized below are the storm sewer calculations that show the anticipated 100 year flows along with system capacity.

Tower A, B, C and Link - Major Flow Conditions

From	To	Peak 100yr Flow(L/s)	Pipe Ø mm	Grade	Capacity	Q Q_{max}	Comments
Alcatel Parking	CBMH 5	63.8	375	0.55	135.7	47	Flow from Alcatel controlled to 63.8
CBMH 5	CBMH A	213.3	375	1.64	235	91	
CBMH A	CBMH B	210.0	600	0.3	350.8	60	
CB3	CBMH 4	104.0	300	0.5	71.33	146	No surcharging above T/G
CBMH 4	CBMH B	214.5	375	0.5	129.3	167	No surcharging above T/G
CBMH B	STMH A	425.1	600	1.0	640.6	66	New 600mm pipe under link
Tower B	STMH A	38.0	300	0.5	71.3	54	
STMH A	STMH 10	463.1	450	2.9	506.2	92	

As shown in the table above, very little pipe surcharging will occur and ponding in the parking area is not anticipated. As part of designing the link and adjacent parking area, the 600mm inlet will be graded to take all major system drainage from this area.

For CB3 above, ponding level is contingent on full flow control of the Alcatel parking lot to 62.8 L/s. A site inspection carried out December 8, 2000, by NECL staff verified that four of the six ICD devices were in place, however the ICD was missing on the last CBMH upstream of Leggett Drive. This lot is designed to cascade to this last catchbasin, so design quantity control, as identified in the SWM report for this site, has not been provided. Without this ICD, ponding of 0.32 m will occur at CBMH5 during the 100 year event.

SANITARY AND STORM TRUNK SEWER DESIGN BRIEF

KANATA RESEARCH PARK LANDS

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

August 8, 2014
Revised September 25, 2014
Issued to MOE November 12, 2014

Novatech File: 114060
Ref: R-2014-114

management facility (SWMF) No. 1 located on the KRP lands. This SWM pond was designed to accommodate flow from the drainage areas shown on the Storm Drainage Area Plan (98066-STM). An MOE Certificate of Approval (MOE C of A No. 8125-4MTJ36) was obtained for the SWMF. Refer to **Appendix A** for a copy of the MOE C of A.

Storm Sewer Design Sheets have been provided in **Appendix C** for the on-site storm sewer system and the trunk storm sewer system from Legget Drive to the existing Stormwater Management Facility No.1. The following list of sewers identifies the storm sewer reaches for which a new MOE ECA is required. Refer to the enclosed Storm Drainage Area Plan (114060-STM, C201) for details.

- From New STM MH 4 to New STM MH 3
- From New STM MH 3 to New STM MH 2
- From New STM MH 2 to New STM MH 1
- From New STM MH 1 to New STM MH 1A
- From New STM MH 1A to EX. STM MH 2
- From EX. STM MH 2 to EX. STM MH 3
- From EX. STM MH 3 to EX. STM MH D
- From EX. STM MH D to EX. STM MH 6
- From EX. STM MH 6 to EX. STM MH 4
- From EX. STM MH 4 to EX. SWMF No. 1

3.1 Storm Design Flows

Storm flows shown in the Storm Sewer Design Sheet were determined as described in the following section of the report. The properties on the west side of Legget Drive, including the subject site (500 March Road), require on-site detention as the developed sites exceed the allowable runoff coefficient of 0.75.

3.1.1 *Newbridge Parking Lot*

Stormwater runoff from the paved parking lot is currently being controlled by an inlet control device (ICD) installed in the outlet pipe of CBMH 4 to a maximum release rate of 152 L/s prior to being directed into the existing storm sewer in Legget Drive. Refer to **Appendix D** for details regarding this previously constructed site.

3.1.2 *Vacant Land (Future Parking south of Newbridge Parking Lot)*

Should the vacant land between the Newbridge Parking and the subject site (500 March Road) be developed in the future, flows will have to be controlled to a maximum release rate of 83.1 L/s prior to being discharged into the storm sewer in Legget Drive. Refer to **Appendix E** for detailed calculations.

3.1.3 *Sites on the East side of Legget Drive*

The tributary flows from areas on the east side of Legget Drive were designed with actual runoff coefficients and did not require on-site detention. Data for these areas is provided in the enclosed Storm Sewer Design Sheets. Refer to **Appendix C** for details.

APPENDIX K

Engineering Drawings

LEGEND

Symbol	Description
SANMH 1	PROPOSED SANITARY MANHOLE AND SEWER (WT) = WATERTIGHT FRAME AND COVER
CBMH 250	PROPOSED CATCHBASIN MANHOLE C/W RADIAL SUBDRAIN (PER GEOTECH)
STMMH 100	PROPOSED STORM MANHOLE AND SEWER
CB 200	PROPOSED CATCHBASIN C/W SUBDRAIN (PER GEOTECH)
LD 1	PROPOSED LANDSCAPE DRAIN
	THERMAL INSULATION FOR SHALLOW SEWERS
	PROPOSED WATERMAIN / WATER SERVICE
HYD	PROPOSED HYDRANT AND VALVE
M RM	PROPOSED WATER METER AND REMOTE METER
VB	PROPOSED VALVE BOX
RED	PROPOSED REDUCER
	PROPOSED SIAMESE CONNECTION
	PROPOSED BARRIER CURB (PER SC1.1)
DC	PROPOSED DEPRESSED CURB (PER SC1.1)
CC	PROPOSED CURB CUT
ICD	PROPOSED INLET CONTROL DEVICE
FFE	PROPOSED FINISHED FLOOR ELEVATION
USF	PROPOSED UNDERSIDE OF FOOTING ELEVATION
	PROPOSED TRENCH DRAIN
	PROPOSED BUILDING ENTRANCE
	EXISTING CONCRETE CURB
SANMH	EXISTING SANITARY MANHOLE
CBMH	EXISTING CATCHBASIN MANHOLE
STMMH	EXISTING STORM MANHOLE
CB	EXISTING CATCHBASIN
WV	EXISTING HYDRANT & VALVE
	EXISTING TREES / VEGETATION
EX UP	EXISTING UTILITY POLE C/W GUY WIRES
	EXISTING FENCE
	EXISTING LIGHT STANDARD
X	REMOVALS

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA AND ENGINEER.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL REPORT (No. 12667557-RPT-2, DATED OCTOBER 2, 2025), PREPARED BY GHD, FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
10. REFER TO DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT (R-2023-082) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.

WATERMAIN NOTES:

1. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS - ALL CURRENT VERSIONS AND 'AS AMENDED'. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR IN THE PRESENCE CITY OF OTTAWA FORCES.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
AUTOMATIC FLUSHING CHAMBER	W3.2	CITY OF OTTAWA
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
HYDRANT INSTALLATION	W19	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
INSULATION ADJACENT TO OPEN STRUCTURES	W23	CITY OF OTTAWA
VALVE BOX ASSEMBLY	W24	CITY OF OTTAWA
WATERMAIN	PVC DR 18	
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATERMAIN CROSSING ABOVE SEWER	W25.2	CITY OF OTTAWA

3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE, UNLESS OTHERWISE INDICATED.
4. PROVIDE MINIMUM 0.5m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS, UNLESS OTHERWISE INDICATED.
5. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED.
6. HYDRANTS SHALL BE ROTATED AT THE FLANGE TO FACE THE ROAD AND ALLOW FIRE SERVICES TO OPERATE THE NUTS.
7. ALL DUCTILE IRON PIPES AND FITTINGS SHALL BE PROTECTED AGAINST POTENTIAL CORROSION PER GEOTECHNICAL RECOMMENDATIONS DUE TO THE CORROSIVE NATURE OF THE SUBGRADE AND GROUNDWATER.
8. MODERATE SULPHATE RESISTANCE (MS) CEMENT SHALL BE USED FOR BELOW GRADE CONCRETE STRUCTURES PER GEOTECHNICAL RECOMMENDATIONS.

SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS - ALL CURRENT VERSIONS AND 'AS AMENDED'.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
STORM / SANITARY MANHOLE (1200mmØ)	701.010	OPSD
STORM MANHOLE (1500Ø)	701.011	OPSD
CB, FRAME & COVER	S19.1	CITY OF OTTAWA
SANITARY MH FRAME & COVER	S24	CITY OF OTTAWA
STORM / CBMH MANHOLE FRAME AND COVER	S24.1	CITY OF OTTAWA
WATERTIGHT MH FRAME AND COVER	401.030	OPSD
LANDSCAPE DRAIN (ELBOW, COVER & PIPE)	S29 / S31	CITY OF OTTAWA
SEWER TRENCH	S6	CITY OF OTTAWA
INSULATION FOR SHALLOW SEWERS	S35	CITY OF OTTAWA
STORM SEWER	PVC DR 35	
SANITARY SEWER	PVC DR 35	
CATCHBASIN LEAD	PVC DR 35	

3. ALL STORM AND SANITARY SERVICE LATERALS SHALL BE EQUIPPED WITH BACKFLOW PREVENTION DEVICES AS PER THE CITY OF OTTAWA STANDARD DETAILS S14 AND S14.1 OR S14.2.
4. INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 1.8m COVER WITH HI-40 INSULATION PER CITY OF OTTAWA STANDARD DETAIL S35. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.
5. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
6. ALL MANHOLES AND CATCHBASIN MANHOLES SHALL BE 1200mmØ UNLESS OTHERWISE SPECIFIED.
7. ALL SEWERS AND WATERMAINS LOCATED PARALLEL TO EACH OTHER ARE TO BE CONSTRUCTED IN SEPARATE TRENCHES MAINTAINING A CLEAR HORIZONTAL SEPARATION DISTANCE OF 2.5 METRES, AS PER MECP F-6-1 STANDARDS.
8. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
9. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
10. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
11. ALL STORM MANHOLES AND CATCHBASIN MANHOLES ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED. ALL CATCHBASINS ARE TO HAVE 600mm SUMPS.
12. ALL CATCHBASINS, MANHOLES AND/OR CATCHBASIN MANHOLES THAT ARE TO HAVE ICD'S INSTALLED WITHIN THEM ARE TO HAVE 600mm SUMPS.
13. ALL WEEPING TILE CONNECTIONS TO BE MADE TO THE PROPOSED STORM SEWER SYSTEM DOWNSTREAM OF ANY INLET CONTROL DEVICES.
14. UNDERGROUND STORMWATER STORAGE TANKS TO BE DESIGNED BY SUPPLIER AND SHALL INCLUDE APPROPRIATE COUNTER BUOYANCY MEASURES WHERE APPLICABLE.
15. ALL DUCTILE IRON PIPES AND FITTINGS SHALL BE PROTECTED AGAINST POTENTIAL CORROSION PER GEOTECHNICAL RECOMMENDATIONS DUE TO THE CORROSIVE NATURE OF THE SUBGRADE AND GROUNDWATER.
16. MODERATE SULPHATE RESISTANCE (MS) CEMENT SHALL BE USED FOR BELOW GRADE CONCRETE STRUCTURES PER GEOTECHNICAL RECOMMENDATIONS.
17. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.
18. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.

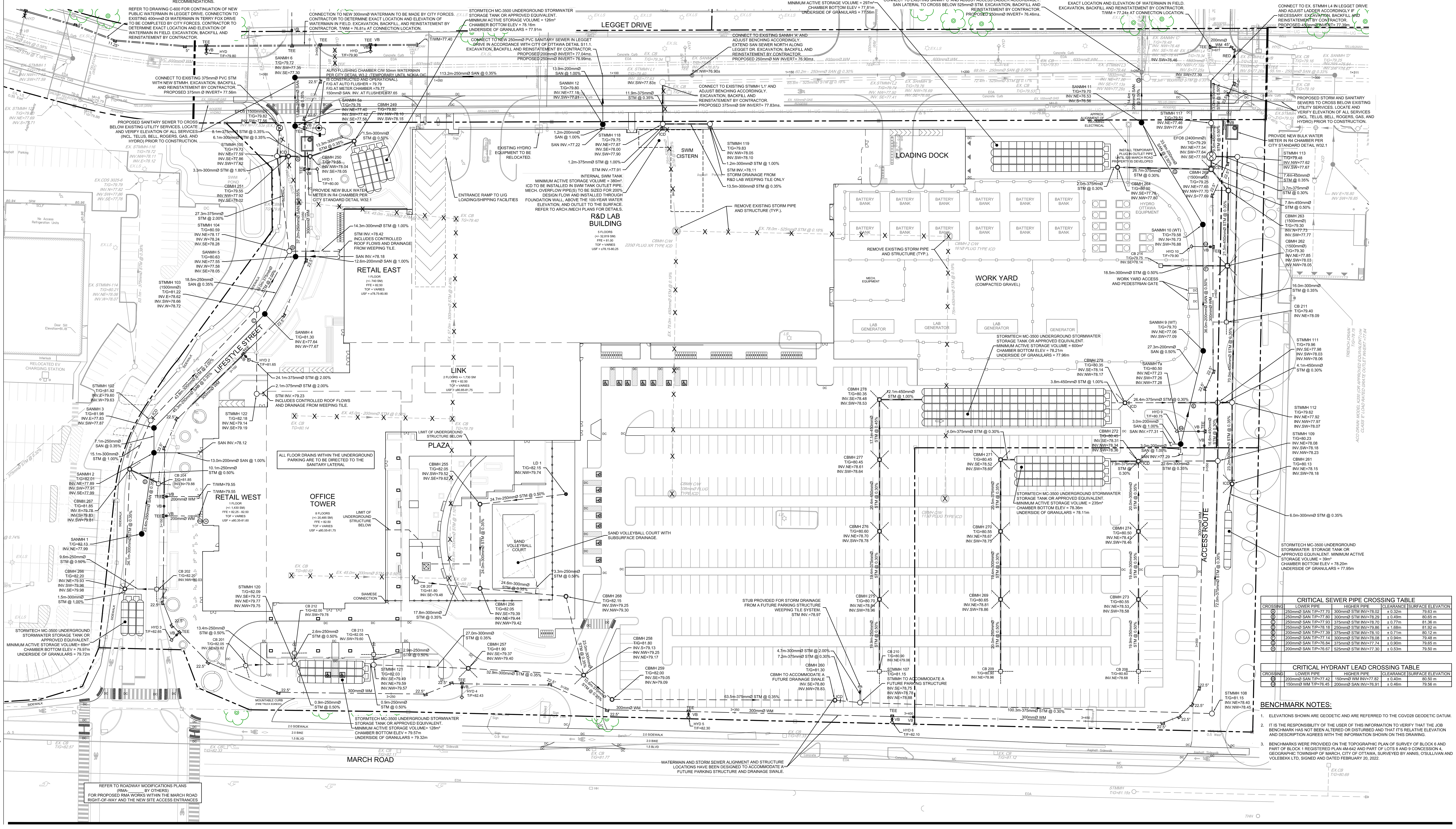
PROPOSED 300mmØ WATERMAIN TABLE - SITE LOOP

Station	F/G ELEVATION	TOP OF WATERMAIN	DESCRIPTION
3+000.00	79.57	76.60*	300mmØ WATERMAIN TEE CONNECTION TO NEW 300mmØ WATERMAIN
3+003.45	79.62	76.60	22.5° VERTICAL BEND
3+004.90	79.65	76.02	22.5° VERTICAL BEND
3+006.10	79.66	76.02***	CROSS UNDER EX. 600mmØ WATERMAIN. INV = 76.62±
3+007.10	79.68	76.02	22.5° VERTICAL BEND
3+008.90	79.73	76.75	22.5° VERTICAL BEND
3+009.10	79.73	76.75***	CROSS UNDER NEW 250mmØ SANITARY SEWER. INV = 77.29±
3+010.30	79.72	76.77	22.5° HORIZONTAL BEND
3+016.20	79.60	76.85	CROSS UNDER EX. 100mmØ GAS LINE
3+018.90	79.67	76.88	CROSS UNDER EX. ROGERS LINE
3+020.20	79.74	76.90	CROSS UNDER EX. HYDRO LINE
3+021.80	79.77	76.92	22.5° HORIZONTAL BEND
3+023.30	79.76	76.94	VALVE AT PROPERTY LINE
3+024.40	79.74	76.95	50mm AUTO FLUSHING CHAMBER TEE
3+024.90	79.73	76.96	CROSS UNDER TEMPORARY 150mmØ SANITARY SEWER FROM AUTO FLUSHING CHAMBER. INV = 77.61±
3+026.80	79.68	76.99	BULK WATER METER IN R4 CHAMBER
3+032.50	79.60	** 77.06***	CROSS UNDER NEW 300mmØ STORM SEWER. INV = 78.03±
3+036.10	79.77	77.11	150mmØ HYDRANT 1 TEE
3+059.50	80.50	77.38***	CROSS UNDER NEW 300mmØ STORM SERVICE LATERAL. INV = 78.32±
3+061.10	80.54	** 77.40***	CROSS UNDER NEW 200mmØ SANITARY SERVICE LATERAL. INV = 78.07±
3+062.20	80.56	** 77.41	22.5° HORIZONTAL BEND
3+066.00	80.72	77.47	11.25° VERTICAL BEND
3+070.00	80.84	78.27	11.25° VERTICAL VEND
3+078.15	81.28	78.32	22.5° HORIZONTAL BEND
3+089.70	81.30	78.32***	CROSS UNDER NEW 375mmØ STORM SERVICE LATERAL. INV = 78.84±
3+093.60	81.39	78.32	22.5° VERTICAL BEND
3+094.90	81.41	78.86	150mmØ HYDRANT 2 TEE
3+096.20	**81.43	79.40	22.5° VERTICAL BEND
3+121.40	81.90	79.46	22.5° HORIZONTAL BEND
3+130.40	82.01	79.46	22.5° HORIZONTAL BEND
3+131.70	81.99	79.46***	CROSS OVER NEW 200mmØ SANITARY SERVICE LATERAL. OBV = 78.23±
3+144.20	81.96	79.49	200mmØ WATER SERVICE TEE
3+145.40	81.97	79.49	VALVE & VALVE BOX
3+146.60	81.98	79.49	200mmØ WATER SERVICE TEE
3+174.50	82.31	79.84	22.5° HORIZONTAL BEND
3+181.40	82.47	79.84	22.5° HORIZONTAL BEND
3+184.20	82.45	79.84	150mmØ HYDRANT 3 TEE
3+196.10	82.33	79.84	22.5° HORIZONTAL BEND
3+217.90	82.31	79.84	22.5° HORIZONTAL BEND
3+250.00	82.28	79.61	-
3+259.70	82.27	79.57	22.5° HORIZONTAL BEND
3+267.80	82.17	79.57	22.5° HORIZONTAL BEND
3+270.80	82.03	79.55	150mmØ HYDRANT 4 TEE
3+295.80	81.95	79.51	22.5° HORIZONTAL BEND
3+313.60	82.12	79.51	22.5° HORIZONTAL BEND
3+325.00	82.08	79.50	-
3+336.80	82.00	79.45	150mmØ HYDRANT 5 TEE
3+350.00	82.10	79.42	-
3+375.00	81.80	79.38	-
3+394.90	81.90	79.33	150mmØ HYDRANT 6 TEE
3+400.90	81.78	79.32	VALVE AT PROPERTY LINE
3+425.00	82.05	79.28	-
3+450.00	81.95	79.23	-
3+454.90	81.60	79.21	11.25° VERTICAL BEND
3+457.50	81.50	78.69	11.25° VERTICAL BEND
3+472.00	81.30	78.69	22.5° HORIZONTAL BEND
3+477.00	81.31	77.96	22.5° HORIZONTAL BEND
3+478.60	82.30	77.96	CROSS UNDER NEW 375mmØ STORM SEWER. INV = 78.48±
3+482.00	81.30	77.96	22.5° HORIZONTAL BEND
3+487.00	81.07	77.96	22.5° HORIZONTAL BEND
3+500.00	80.98	78.30	-
3+525.00	80.65	78.20	-
3+551.80	80.28	77.86	CROSS UNDER NEW 300mmØ STORM SEWER. INV = 78.24±
3+556.20	80.29	77.85	VALVE & VALVE BOX AT PROPERTY LINE
3+560.30	80.24	77.85	150mmØ HYDRANT 9 TEE
3+568.50	80.00	** 77.60***	CROSS UNDER NEW 450mmØ STORM SEWER. INV = 78.07±
3+572.40	79.96	77.50	22.5° HORIZONTAL BEND
3+577.80	79.85	77.30	22.5° HORIZONTAL BEND
3+600.00	79.55	77.10	-
3+607.90	79.42	76.98	CROSS UNDER NEW 300mmØ STORM SEWER. INV = 78.07±
3+613.20	79.47	76.90	150mmØ HYDRANT 10 TEE
3+627.90	79.40	76.90	22.5° HORIZONTAL BEND
3+632.90	79.27	76.90***	CROSS UNDER NEW 450mmØ STORM SEWER. INV = 77.71±
3+637.90	79.40	76.90	22.5° HORIZONTAL BEND
3+639.90	79.29	** 76.89***	CROSS UNDER NEW 450mmØ STORM SEWER. INV = 77.61±
3+644.80	79.34	76.85	BULK WATER METER IN R4 CHAMBER
3+650.00	79.39	76.83	VALVE & VALVE BOX AT PROPERTY LINE
3+652.50	79.36	76.80	22.5° VERTICAL BEND
3+653.30	79.34	76.40	CROSS UNDER EX. BELL LINE
3+654.30	79.33	76.00	CROSS UNDER EX. ROGERS LINE
3+655.30	79.32	75.60	CROSS UNDER EX. TELUS LINE
3+656.30	79.31	75.20	CROSS UNDER EX. 100mmØ GAS LINE
3+657.20	79.28	74.82	22.5° VERTICAL BEND
3+657.70	79.28	74.82	22.5° HORIZONTAL BEND
3+659.00	79.28	74.82***	CROSS UNDER EX. 600mmØ STORM SEWER. INV = 77.28±
3+661.00	79.30	74.82	22.5° HORIZONTAL BEND
3+662.70	79.30	74.82***	CROSS UNDER EX. 750mmØ STORM SEWER. INV = 77.19±
3+663.90	79.32	74.82***	CROSS UNDER EX. 250mmØ SANITARY SEWER. INV = 76.54±
3+666.90	79.26	74.82***	CROSS UNDER EX. 600mmØ WATERMAIN. INV = 75.42±
3+668.40	79.32	74.82	REDUCER TO 200mmØ WATERMAIN
3+670.40	79.31	74.82	45° HORIZONTAL BEND
3+671.70	79.31	74.82	45° HORIZONTAL BEND
3+674.00	79.32	74.82	45° VERTICAL BEND
3+676.50	79.33	** 77.32	45° VERTICAL BEND
3+677.50	79.33	** 77.32*	200mmØ WATERMAIN TEE CONNECTION TO EX. 200mmØ WATERMAIN

* CONNECTIONS TO NEW 300mmØ AND EXISTING 200mmØ WATERMAINS. EXACT ELEVATIONS TO BE FIELD DETERMINED.

** PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAILS W22 IN SHALLOW TRENCHES WHERE COVER IS LESS THAN 2.4m AND/OR W23 ADJACENT TO OPEN STRUCTURES.

*** PIPE CROSSINGS WITH WATERMAINS ARE TO BE IN ACCORDANCE WITH CITY STANDARDS W25 AND 25.2 TO AVOID CONFLICTS, WHERE POSSIBLE.



CRITICAL SEWER PIPE CROSSING TABLE

CROSSING	LOWER PIPE	HIGHER PIPE	CLEARANCE	SURFACE ELEVATION
A	250mmØ SAN T/P=77.70	300mmØ STM INV=78.02	± 0.32m	79.63 m
B	250mmØ SAN T/P=77.80	300mmØ STM INV=78.29	± 0.49m	80.65 m
C	250mmØ SAN T/P=77.93	375mmØ STM INV=78.70	± 0.77m	81.36 m
D	250mmØ SAN T/P=78.18	250mmØ STM INV=79.86	± 1.68m	81.92 m
E	200mmØ SAN T/P=77.39	375mmØ STM INV=78.10	± 0.71m	80.12 m
F	200mmØ SAN T/P=77.14	300mmØ STM INV=78.08	± 0.94m	79.48 m
G	200mmØ SAN T/P=76.84	375mmØ STM INV=77.74	± 0.90m	79.65 m
H	200mmØ SAN T/P=76.67	525mmØ STM INV=77.30	± 0.53m	79.50 m

CRITICAL HYDRANT LEAD CROSSING TABLE

CROSSING	LOWER PIPE	HIGHER PIPE	CLEARANCE	SURFACE ELEVATION
9A	200mmØ SAN T/P=77.42	150mmØ WM INV=77.82	± 0.40m	80.50 m
10A	150mmØ WM T/P=76.45	200mmØ SAN INV=76.91	± 0.46m	79.56 m

BENCHMARK NOTES:

1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARKS WERE PROVIDED ON THE TOPOGRAPHIC PLAN OF SURVEY OF BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4, GEOGRAPHIC TOWNSHIP OF MARCH, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLEBEKK LTD, SIGNED AND DATED FEBRUARY 20, 2022.

M:\2023\123043\CAD\Civil\123043-GP.dwg

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Stantec

Stantec
Traffic Consultant
300 – 1331 Clyde Avenue
Ottawa Ontario, K2C 3G5
Tel 613.722.4420

△ Date	Description
SEP 12/24	ISSUED FOR SITE PLAN CONTROL APPROVAL
NOV 15/24	REVISED PER CITY COMMENTS
FEB 07/25	REVISED PER CITY COMMENTS
JUN 25/25	ISSUED FOR INFORMATION P01
AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDED
OCT 02/25	REVISED PER CITY COMMENTS
OCT 02/25	ISSUED FOR PERMIT
OCT 24/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature

LICENSED PROFESSIONAL ENGINEER F.S. THAUVETTE 100041399 October 24, 2025 PROVINCE OF ONTARIO

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
GENERAL PLAN OF SERVICES

Scale
1 : 400

City Project no: D07-12-24-0149

C100

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Plan #19202

LEGEND

- 81.65 / 81.50 — PROPOSED ELEVATION / *EXISTING ELEVATION*
- × 81.50 — EXISTING ELEVATION
- 82.00DC — PROPOSED DEPRESSED CURB ELEVATION
- 81.65* — PROPOSED INTERNAL ELEVATION
- 88.00TW / 80.00BW — PROPOSED TOP OF WALL ELEVATION / PROPOSED LOW ELEVATION
- 82.50 (boxed) — PROPOSED FINISHED FLOOR ELEVATION
- 2.0% — GRADE AND DIRECTION
- MAXIMUM 3:1 SIDESLOPE
- H.P. — PROPOSED HIGH POINT
- EMERGENCY OVERLAND FLOW ROUTE
- SANMH 1 — PROPOSED SANITARY MANHOLE
- CBMH 250 — PROPOSED CATCHBASIN MANHOLE
- STMMH 101 — PROPOSED STORM MANHOLE
- CB 201 — PROPOSED CATCHBASIN
- LD 1 — PROPOSED LANDSCAPE DRAIN
- HYD / VB — PROPOSED HYDRANT AND VALVE
- APPROXIMATE LIMIT OF REINSTATEMENT AREA
- PROPOSED BARRIER CURB (PER SC1.1)
- DC — PROPOSED DEPRESSED CURB (PER SC1.1)
- CC — PROPOSED CURB CUT
- FFE — PROPOSED FINISHED FLOOR ELEVATION
- USF — PROPOSED UNDERSIDE OF FOOTING ELEVATION
- PROPOSED BUILDING ENTRANCE
- PROPOSED SIAMESE CONNECTION
- PROPOSED SILT FENCING (OPSD 219.110)
- PROPOSED TRENCH DRAIN
- M M — PROPOSED MUD MAT / CONSTRUCTION ENTRANCE
- PROPOSED FILTER BAG
- 1:5 YR / 1:100 YR — APPROXIMATE PONDING LIMITS
- *EXISTING CONCRETE CURB*
- SANMH — *EXISTING SANITARY MANHOLE*
- CBMH — *EXISTING CATCHBASIN MANHOLE*
- STMMH — *EXISTING STORM MANHOLE*
- CB — EXISTING CATCHBASIN
- HYD / WV — *EXISTING HYDRANT & VALVE*
- *EXISTING TREES / VEGETATION*
- EX UP — *EXISTING UTILITY POLE C/W GUY WIRES*
- *EXISTING FENCE*
- *EXISTING LIGHT STANDARD*
- X — REMOVALS
- FULL ASPHALT OVERLAY PER CITY STANDARD R10

PAVEMENT STRUCTURES:

HEAVY DUTY (LIFESTYLE STREET)	HEAVY DUTY (ACCESS ROADS AND LOADING DOCK)	LIGHT DUTY (SURFACE PARKING LOT)
100mm UNIT PAVERS 10mm COARSE SAND 150mm GRANULAR "A" 500mm GRANULAR "B" TYPE II	50mm HL1 70mm HL8 150mm GRANULAR "A" 650mm GRANULAR "B" TYPE II	50mm HL1 50mm HL8 150mm GRANULAR "A" 550mm GRANULAR "B" TYPE II

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS USING THE CURRENT GUIDELINES, BYLAWS AND STANDARDS INCLUDING MATERIALS OF CONSTRUCTION, DISINFECTION AND ALL RELEVANT REFERENCES TO OPSS, OPSD & AWWA GUIDELINES - ALL CURRENT VERSIONS AND AS AMENDED.
6. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA AND ENGINEER.
7. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
8. ALL ELEVATIONS ARE GEODETIC.
9. REFER TO GEOTECHNICAL REPORT (No. 12667557-RPT-2, DATED OCTOBER 02, 2025), PREPARED BY GHD, FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
10. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
11. REFER TO DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT (R-2023-082) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
12. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
13. PROVIDE LINE/PARKING PAINTING.

Erosion and Sediment Control Responsibilities:

	ESC Measure	Symbol	Specification	During Construction: Installation Responsibility	During Construction: Inspection/Maintenance Responsibility	During Construction: Inspection Frequency	After Construction Prior to Final Acceptance: Approval to Remove	After Construction Prior to Final Acceptance: Removal Responsibility	After Final Acceptance: Inspection/Maintenance Responsibility
Temporary Measures	Silt Fence	——	OPSD 219.110	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Filter Fabric	Location as Indicated in ESC Note #3	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Mud Mat	M M	Drawing Details	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Dust Control	Location as Required Around Site	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Stabilized Material Stockpiling	Location as Required by Contractor	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Sediment Basin (for flows being pumped out of excavations)	Location as Required by Contractor	---	Developer's Contractor	Developer's Contractor	After Every Rainstorm	Developer's Contractor	Developer's Contractor	N/A

GRADING NOTES:

1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
6. MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
7. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
8. ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1). MOUNTABLE CURBS ARE TO BE PER CITY OF OTTAWA STANDARD (SC1.3).
9. ALL RETAINING WALLS OF AT LEAST 0.6m IN HEIGHT SHALL HAVE FENCING/RAILING ALONG TOP SURFACE OF WALL PER OBC ARTICLE 9.8.8.1.
10. ALL BIO-SWALES SHALL BE CONSTRUCTED BASED ON THE SPECIFICATIONS PROVIDED ON THE APPROVED LANDSCAPED PLAN, WHICH ARE GENERALLY BASED ON THE CITY OF OTTAWA STANDARD L20.
11. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
12. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

BENCHMARK NOTES:

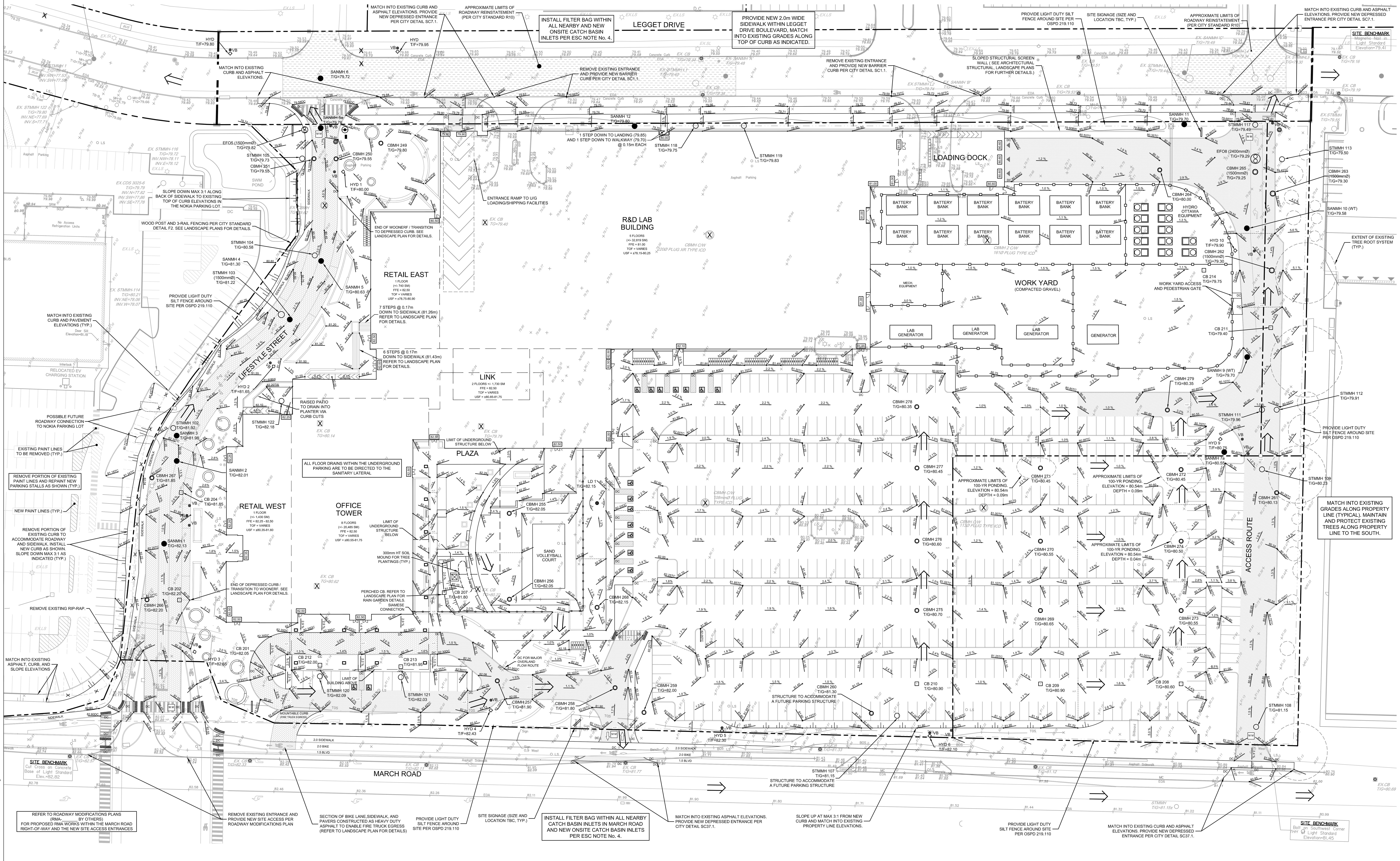
1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARKS WERE PROVIDED ON THE TOPOGRAPHIC PLAN OF SURVEY OF BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4, GEOGRAPHIC TOWNSHIP OF MARCH, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLEBEKK LTD, SIGNED AND DATED FEBRUARY 20, 2022.

EROSION AND SEDIMENT CONTROL NOTES :

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE 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. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA. THEY ARE TO BE APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.
3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED DURING CONSTRUCTION IN ACCORDANCE WITH THE "GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES" (GOVERNMENT OF ONTARIO, MAY 1987). THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MEETING ALL REGULATORY AGENCY REQUIREMENTS.
4. TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER CLOTH WILL BE PLACED UNDER GRATES OF NEARBY CATCHBASINS AND STRUCTURES. A LIGHT DUTY SILT FENCE BARRIER WILL ALSO BE INSTALLED AROUND THE CONSTRUCTION AREA (WHERE APPLICABLE). THESE CONTROL MEASURES WILL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
5. TO LIMIT EROSION: MINIMIZE THE AMOUNT OF EXPOSED SOILS AT ANY GIVEN TIME, RE-VEGETATE EXPOSED AREAS AND SLOPES AS SOON AS POSSIBLE AND PROTECT EXPOSED SLOPES WITH NATURAL OR SYNTHETIC MULCHES.
6. FOR MATERIAL STOCKPILING: MINIMIZE THE AMOUNT OF EXPOSED MATERIALS AT ANY GIVEN TIME; APPLY TEMPORARY SEEDING, TARPS, COMPACTION AND/OR SURFACE ROUGHENING AS REQUIRED TO STABILIZE STOCKPILED MATERIALS THAT WILL NOT BE USED WITHIN 14 DAYS.
7. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.
8. THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO ANY STORM SEWER SYSTEM. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.
9. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
10. ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE MUNICIPALITY.
11. THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER (AND IF REQUIRED, CALCIUM CHLORIDE) DURING DRY PERIODS. MONITOR DUST LEVELS DURING SITE PREPARATION/EXCAVATION, AND CONSTRUCTION ACTIVITIES, AND WHEN DUST LEVELS BECOME VISUALLY APPARENT SPRAY WATER TO MINIMIZE THE RELEASE OF DUST FROM GRAVEL, PAVED AREAS AND EXPOSED SOILS. USE CHEMICAL DUST SUPPRESSANTS ONLY WHERE NECESSARY ON PROBLEM AREAS.

LEGGET DRIVE REINSTATEMENT:

1. RESTORE ALL DISTURBED R.O.W. AREAS TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF MUNICIPAL AUTHORITIES. ASPHALT TO MEET PG 58-34 'TRAFFIC LEVEL B' STANDARDS FOR MINOR COLLECTOR ROADS AS PER CITY SPECIFICATION F-3106.
2. REINSTATE ALL DISTURBED ROADWAY AREAS AND SAW CUT & KEYGRIND ASPHALT AT ALL ROAD CUTS / ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARD R10.
3. REINSTATE LINE PAINTING AS REQUIRED TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.



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Tel 613.729.4536

Stantec
Traffic Consultant
300 – 1331 Clyde Avenue
Ottawa Ontario, K2C 3G5
Tel 613.722.4420

△ Date	Description
SEP 12/24	ISSUED FOR SITE PLAN CONTROL APPROVAL
NOV 15/24	REVISED PER CITY COMMENTS
FEB 07/25	REVISED PER CITY COMMENTS
JUN 25/25	ISSUED FOR INFORMATION P01
JUL 24/25	ISSUED FOR INFORMATION P02: PARKING
AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDITION
OCT 02/25	REVISED PER CITY COMMENTS
OCT 02/25	ISSUED FOR PERMIT
OCT 24/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature

LICENSED PROFESSIONAL ENGINEER F.S. THAUVETTE 100041399 October 24, 2025 PROVINCE OF ONTARIO

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
GRADING AND EROSION & SEDIMENT CONTROL PLAN

Scale
1 : 400

City Project no: D07-12-24-0149

C200

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Plan #19202

LEGEND

- DRAINAGE AREA LIMITS
- PRE — PRE-DEVELOPMENT AREA ID
- 0.600 — PRE-DEVELOPMENT DRAINAGE AREA (ha)
- 0.30 — 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- EXISTING CONCRETE CURB
- V&VB — EXISTING VALVE & VALVE BOX
- SP — EXISTING SERVICE POST
- HYD — EXISTING HYDRANT
- CBMH — EXISTING CATCHBASIN
- CB — EXISTING CATCHBASIN MH
- EX UP — EXISTING UTILITY POLE C/W GUY WIRES
- EXISTING DRAINAGE DIRECTION ARROWS
- EXISTING OVERLAND FLOW

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS USING THE CURRENT GUIDELINES, BYLAWS AND STANDARDS INCLUDING MATERIALS OF CONSTRUCTION, DISINFECTION AND ALL RELEVANT REFERENCES TO OPSS, OPSD & AWWA GUIDELINES - ALL CURRENT VERSIONS AND 'AS AMENDED.
6. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA AND ENGINEER.
7. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
8. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL REPORT (No. 12667557-RPT-2, DATED OCTOBER 02, 2025) FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
10. REFER TO THE DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT (R-2023-082) PREPARED BY NOVATECH.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.

BENCHMARK NOTES:

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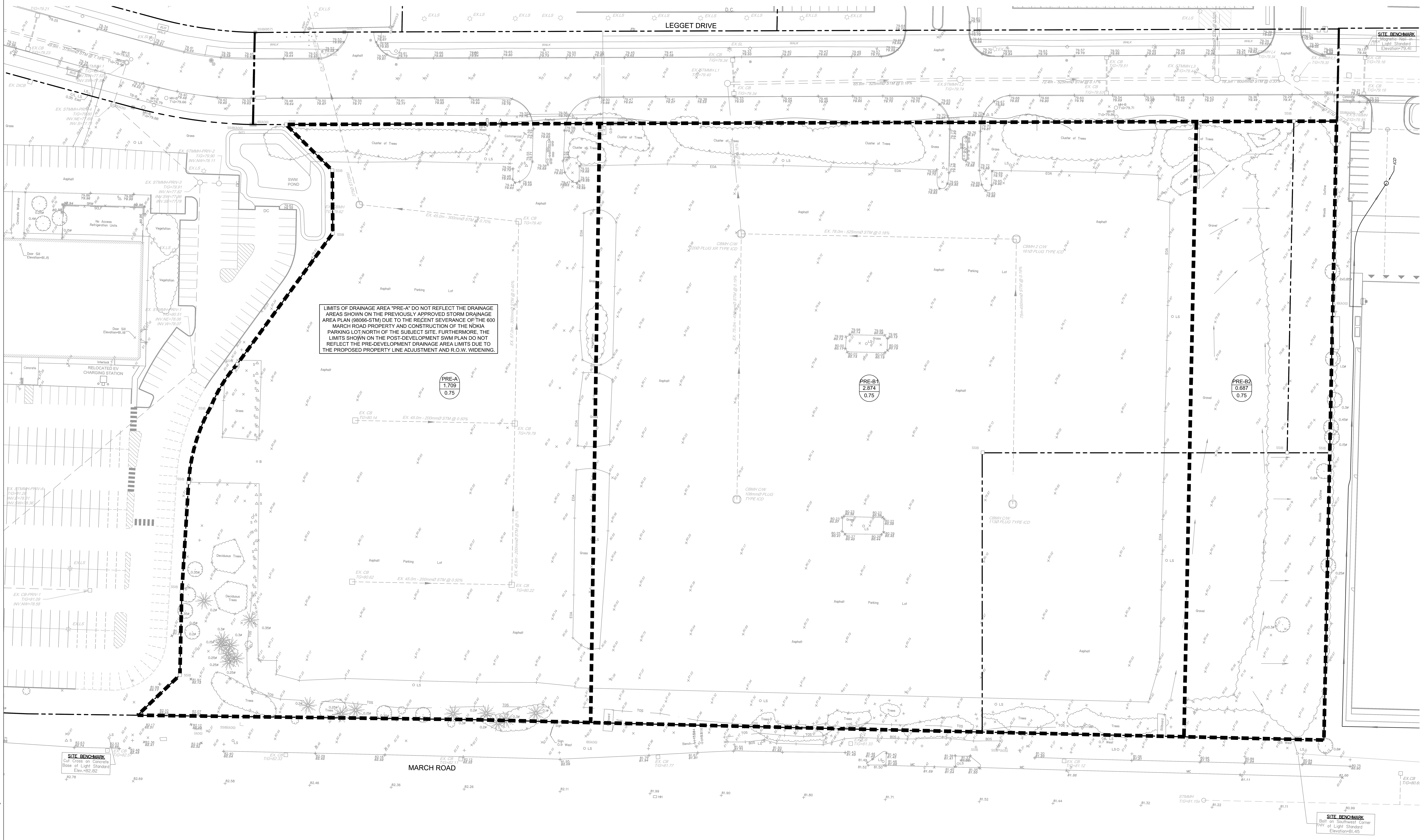

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Date	Description
NOV 15/24	ISSUED FOR SITE PLAN CONTROL APPROVAL
FEB 07/25	REVISED PER CITY COMMENTS
AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDED
OCT 02/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature

LICENSED PROFESSIONAL ENGINEER
F.S. THAUVETTE
100041399
October 2, 2025
PROVINCE OF ONTARIO

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
PRE-DEVELOPMENT STORM DRAINAGE PLAN

Scale
1 : 400

C300

City Project no: D07-12-24-0149

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Plan #19202

LEGEND

- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- CC — PROPOSED CURB CUT
- DRAINAGE AREA LIMITS
- 1:5 YR / 1:100 YR — APPROXIMATE ROOF PONDING LIMITS
- APPROXIMATE SURFACE PONDING LIMITS
- A-2 / 0.129 / 0.82 — POST-DEVELOPMENT AREA ID
- POST-DEVELOPMENT DRAINAGE AREA (ha)
- 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- STMMH — PROPOSED STORM MANHOLE
- CBMH — PROPOSED CATCHBASIN MANHOLE C/W RADIAL SUBDRAIN (PER GEOTECH)
- CB — PROPOSED CATCHBASIN C/W SUBDRAIN (PER GEOTECH)
- RD — CONTROLLED FLOW ROOF DRAIN
- LD — PROPOSED LANDSCAPE DRAIN
- PROPOSED STORM SEWER AND FLOW DIRECTION
- ICD — PROPOSED INLET CONTROL DEVICE
- EMERGENCY OVERLAND FLOW ROUTE
- PROPOSED TRENCH DRAIN
- PROPOSED BUILDING ENTRANCE / EXIT
- MAXIMUM 3:1 SIDESLOPE
- H.P. — PROPOSED HIGH POINT
- FFE — FINISHED FLOOR ELEVATION
- USF — UNDERSIDE OF FOOTING ELEVATION
- EXISTING STORM MH & SEWER
- CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- EXISTING CONCRETE CURB
- VALVE — EXISTING VALVE & VALVE BOX
- SIGN — EXISTING SERVICE POST
- HYD — EXISTING HYDRANT
- CBMH — EXISTING CATCHBASIN
- CB — EXISTING CATCHBASIN MH
- EX.UP — EXISTING UTILITY POLE C/W DOT WIRES

GENERAL NOTES:

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BENCHMARK NOTES:

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INLET CONTROL DEVICE DATA TABLE: AREA A-1

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	IPEX TEMPEST MHF TYPE A	STMMH 102 1200mmØ	300mmØ PVC	10.0	0.04	80.29	23.9	76.4 m^3
1:5 YR				12.5	0.71	80.46	34.5	
1:100 YR				17.0	1.34	81.09	74.1	

INLET CONTROL DEVICE DATA TABLE: AREA A-2

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	IPEX TEMPEST MHF TYPE A	CBMH 251 1200mmØ	300mmØ PVC	11.6	0.44	78.51	41.1	126.3 m^3
1:5 YR				13.5	0.60	78.67	58.4	
1:100 YR				18.5	1.16	79.23	122.3	

INLET CONTROL DEVICE DATA TABLE: AREA B-1

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	IPEX TEMPEST HF TYPE C	INTERNAL SWM TANK	375mmØ PVC	27.0	0.73	78.83	188.9	389.3 m^3
1:5 YR				41.0	1.66	79.76	380.0	

INLET CONTROL DEVICE DATA TABLE: AREA B-2

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	IPEX TEMPEST HF TYPE B	CBMH 260 1200mmØ	375mmØ PVC	19.0	0.84	79.83	53.9	168.8 m^3
1:5 YR				21.0	1.03	80.02	79.3	
1:100 YR				30.0	2.14	81.13	167.0	

INLET CONTROL DEVICE DATA TABLE: AREA B-3

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	IPEX TEMPEST HF TYPE E	CBMH 279 1200mmØ	375mmØ PVC	23.7	0.22	78.55	186.4	616.4 m^3
1:5 YR				29.8	0.35	78.68	254.8	
1:100 YR				46.0	0.83	79.16	510.5	

INLET CONTROL DEVICE DATA TABLE: AREA B-4

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	IPEX TEMPEST HF TYPE E	CBMH 265 1500mmØ	375mmØ PVC	20.4	0.34	78.18	103.2	311.4 m^3
1:5 YR				35.7	0.50	78.34	144.2	
1:100 YR				53.0	1.06	78.93	303.1	

INLET CONTROL DEVICE DATA TABLE: AREA C-1

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	IPEX TEMPEST HF TYPE E	CBMH 268 1200mmØ	300mmØ PVC	13.6	0.53	78.99	138.4	304.3 m^3
1:5 YR				27.0	2.08	80.54	256.0	

INLET CONTROL DEVICE DATA TABLE: AREA C-2

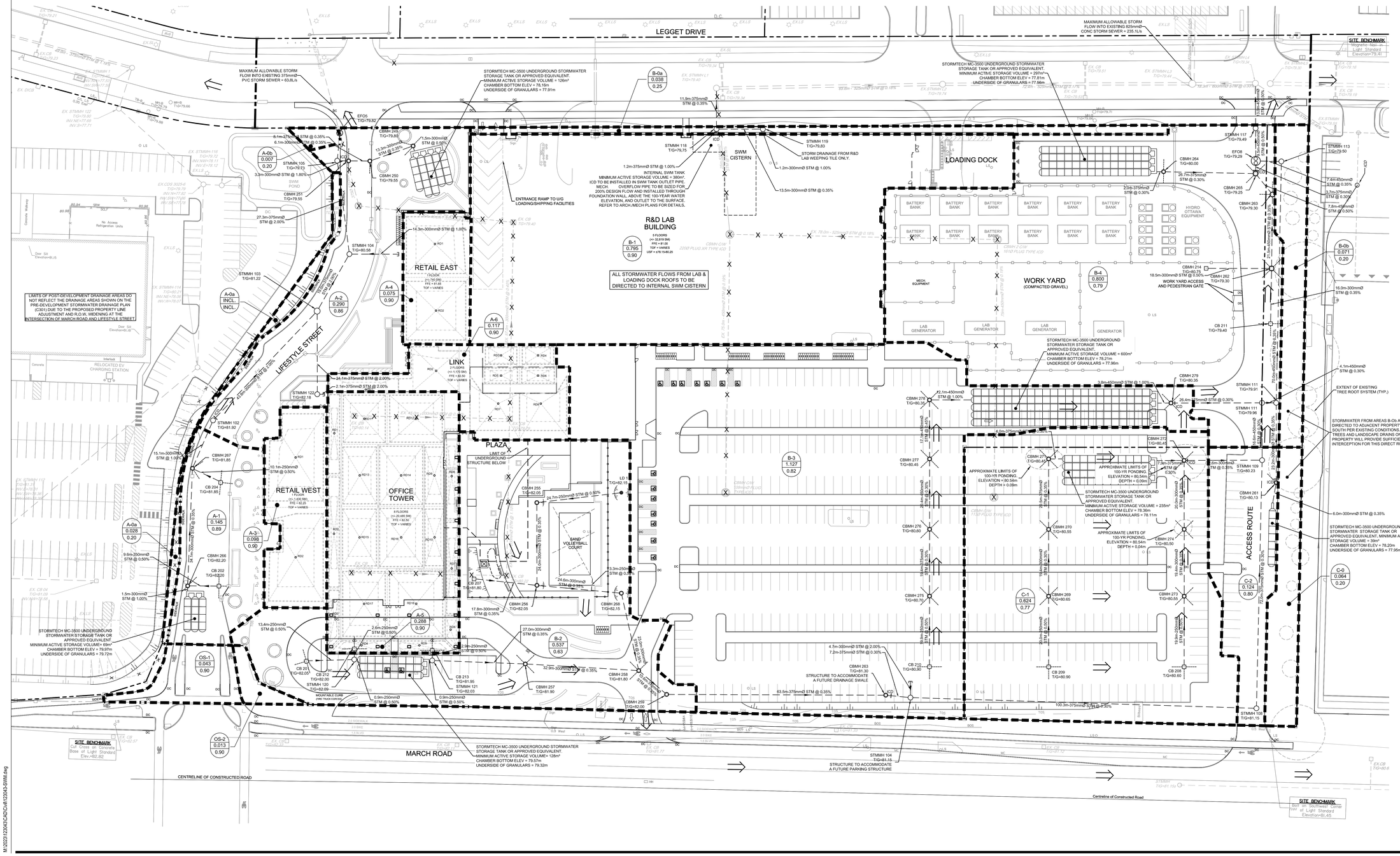
DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	IPEX TEMPEST MHF TYPE A	CBMH 261 1200mmØ	300mmØ PVC	7.8	0.25	78.55	12.9	44.2 m^3
1:5 YR				9.7	0.39	78.69	18.0	
1:100 YR				15.0	0.94	79.24	37.6	

ROOF DRAIN TABLE

AREA ID *	BUILDING	ROOF DRAIN No. (WATTS MODEL)**	ROOF DRAIN OPENING SETTING	2 YEAR RELEASE RATE	APPROX. 2-YR PONDING DEPTH	5-YEAR RELEASE RATE	APPROX. 5-YEAR PONDING DEPTH	100-YEAR RELEASE RATE	APPROX. 100-YR PONDING DEPTH
A-3	RETAIL WEST	RD 1 (RD-100-A-ADJ)	FULLY EXPOSED	0.95 L/s	8 cm	1.26 L/s	10 cm	1.89 L/s	15 cm
		RD 2 (RD-100-A-ADJ)	FULLY EXPOSED	0.95 L/s	8 cm	1.26 L/s	10 cm	1.89 L/s	15 cm
A-4	RETAIL EAST	RD 1 (RD-100-A-ADJ)	FULLY EXPOSED	0.95 L/s	8 cm	1.26 L/s	10 cm	1.89 L/s	15 cm
		RD 2 (RD-100-A-ADJ)	FULLY EXPOSED	0.95 L/s	8 cm	1.26 L/s	10 cm	1.89 L/s	15 cm
A-5	OFFICE TOWER	RD 1 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 2 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 3 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 4 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 5 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 6 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 7 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 8 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 9 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 10 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 11 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 12 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 13 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 14 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 15 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 16 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 17 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 18 (RD-100-A-ADJ)	1/2 OPEN	0.79 L/s	8 cm	0.95 L/s	10 cm	1.26 L/s	15 cm
A-6	LINK	RD 1 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 2 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 3 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 4 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 5 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 6 (RD-100-A-ADJ)	CLOSED	0.32 L/s	8 cm	0.32 L/s	10 cm	0.32 L/s	15 cm
		RD 7 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm
		RD 8 (RD-100-A-ADJ)	1/4 OPEN	0.71 L/s	8 cm	0.79 L/s	10 cm	0.95 L/s	15 cm

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2023-082) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.



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Stantec
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Traffic Consultant
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Tel 613.722.4420

△	Date	Description
	SEP 12/24	ISSUED FOR SITE PLAN CONTROL APPROVAL
	NOV 15/24	REVISED PER CITY COMMENTS
	FEB 07/25	REVISED PER CITY COMMENTS
	JUN 25/25	ISSUED FOR INFORMATION P01
	AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDED
	OCT 02/25	REVISED PER CITY COMMENTS
	OCT 24/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature

LICENSED PROFESSIONAL ENGINEER F.S. THAUVETTE 100041399 October 24, 2025 PROVINCE OF ONTARIO

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
POST-DEVELOPMENT STORMWATER MANAGEMENT PLAN

Scale
1 : 400

C301

City Project no: D07-12-24-0149

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Plan #19202

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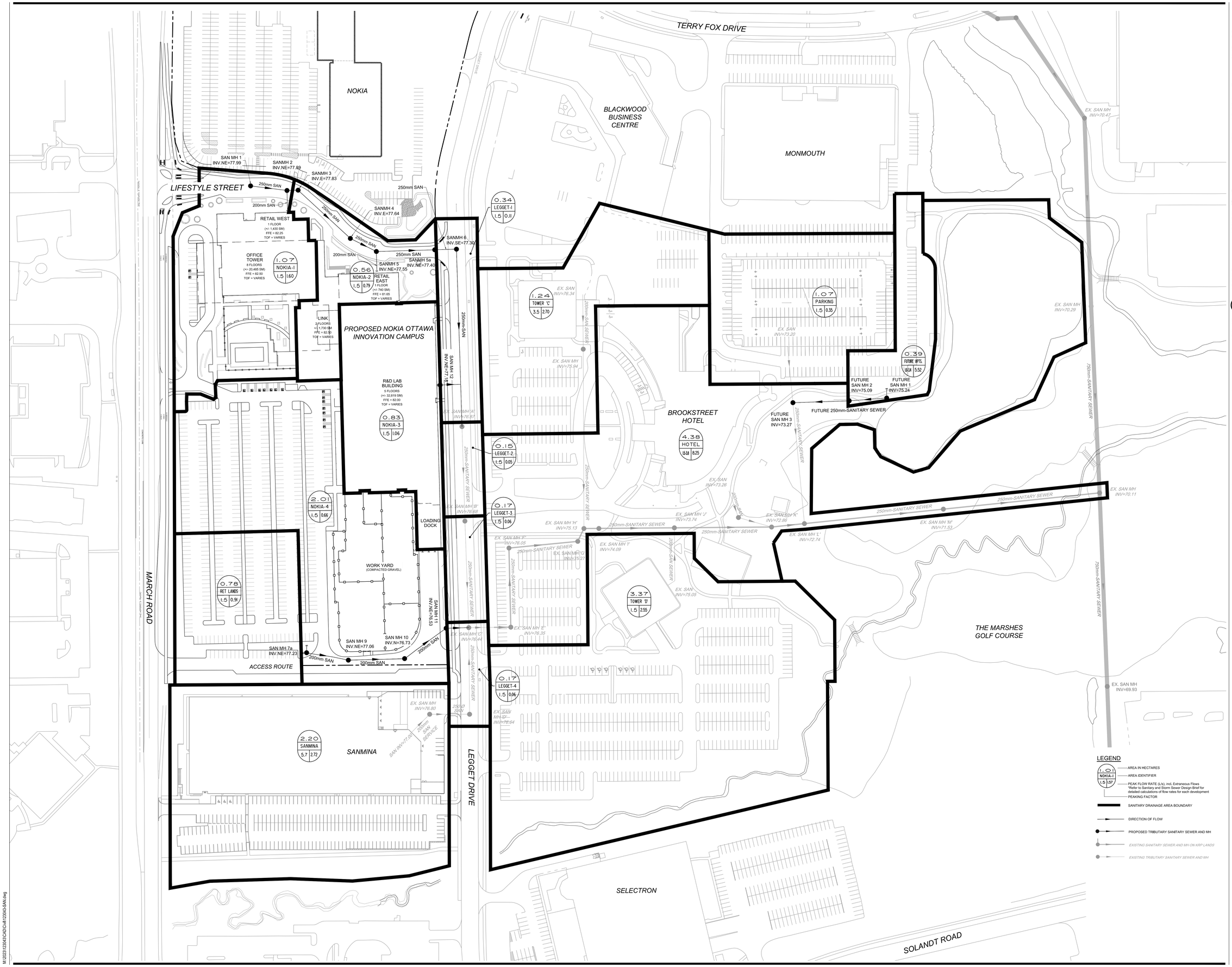

LEGEND

- 1.01 / NOKIA-1 / 1.5 | 1.57 — AREA IN HECTARES; AREA IDENTIFIER; PEAK FLOW RATE (L/s), incl. Extraneous Flows *Refer to Sanitary and Storm Sewer Design Brief for detailed calculations of flow rates for each development; PEAKING FACTOR
- SANITARY DRAINAGE AREA BOUNDARY
- DIRECTION OF FLOW
- PROPOSED TRIBUTARY SANITARY SEWER AND MH
- EXISTING SANITARY SEWER AND MH ON KRP LANDS
- EXISTING TRIBUTARY SANITARY SEWER AND MH

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△ Date	Description
NOV 15/24	ISSUED FOR SITE PLAN CONTROL APPROVAL
FEB 07/25	REVISED PER CITY COMMENTS
AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDED
OCT 02/25	REVISED PER CITY COMMENTS
OCT 24/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature

LICENSED PROFESSIONAL ENGINEER — F.S. THAUVETTE — 100041396 — October 24, 2025 — PROVINCE OF ONTARIO

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
SANITARY DRAINAGE AREA PLAN

Scale
1 : 750

C400

City Project no: D07-12-24-0149

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Plan #19202

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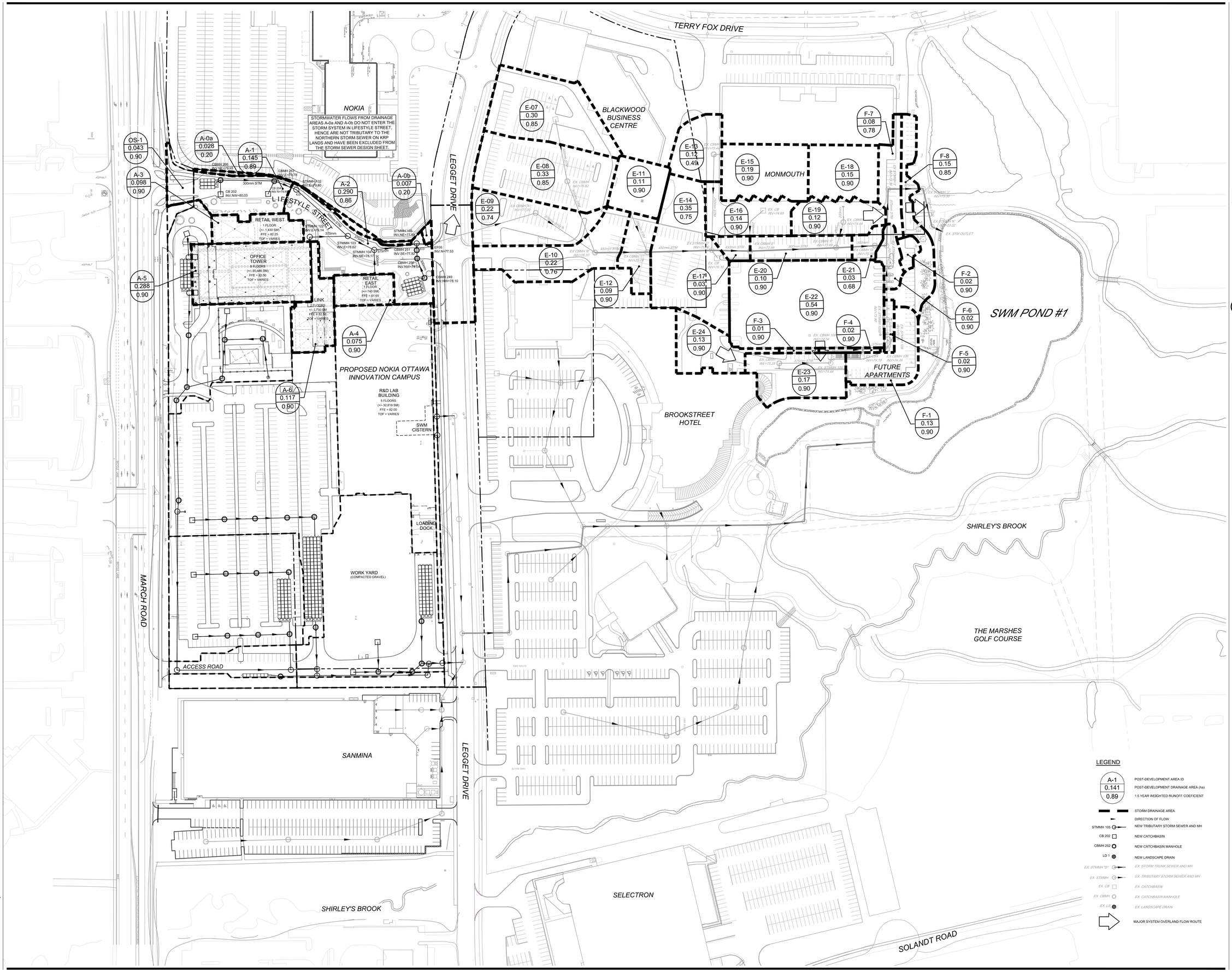

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△ Date	Description
NOV 15/24	ISSUED FOR SITE PLAN CONTROL APPROVAL
FEB 07/25	REVISED PER CITY COMMENTS
AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDED
OCT 02/25	REVISED PER CITY COMMENTS
OCT 24/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature

LICENSED PROFESSIONAL ENGINEER
F.S. THIBODETTE
100041259
October 24, 2025
PROVINCE OF ONTARIO

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
STORM DRAINAGE AREA PLAN - NORTH OUTLET

Scale
1 : 750

C500

City Project no: D07-12-24-0149

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Plan #19202

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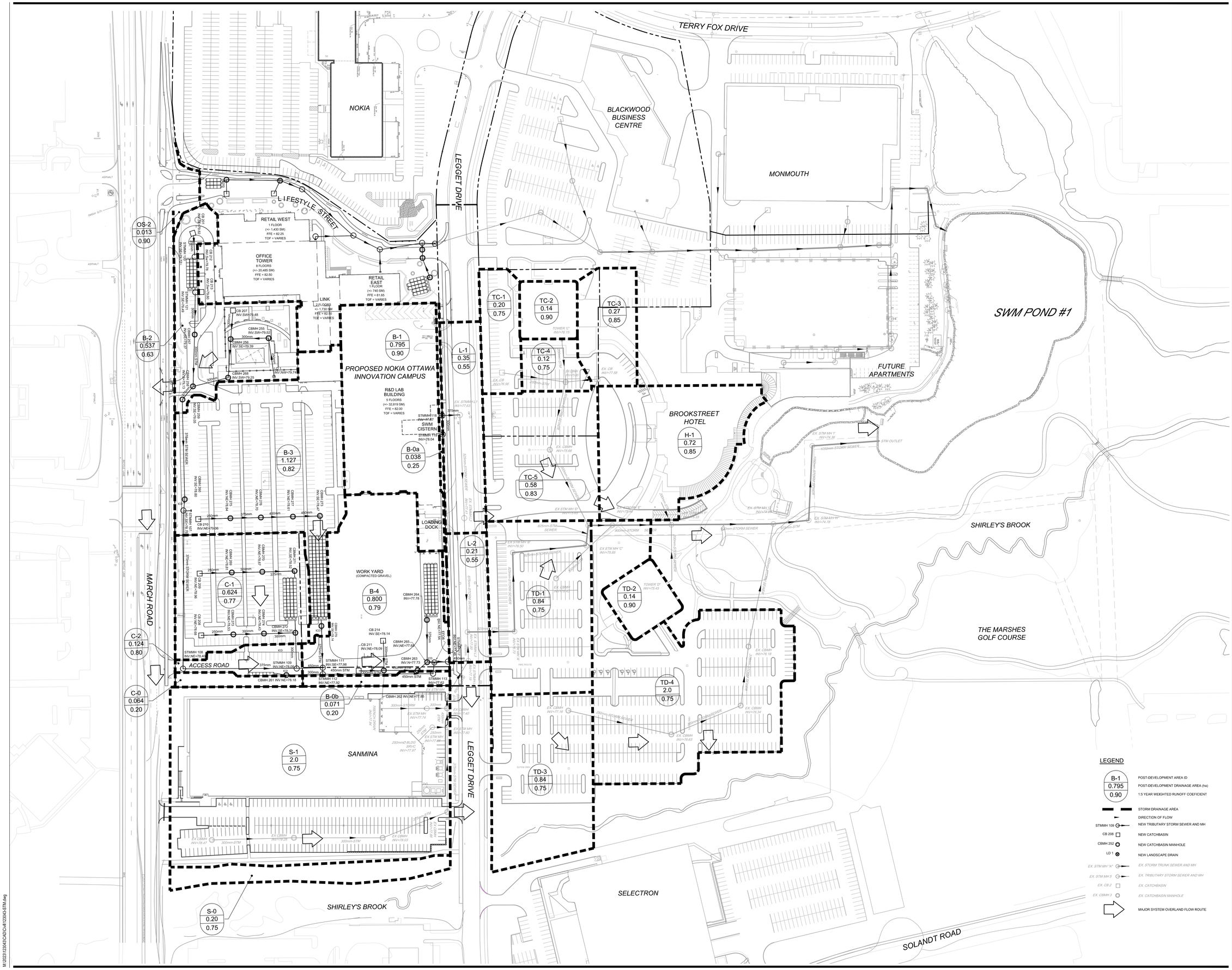

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△ Date	Description
NOV 15/24	ISSUED FOR SITE PLAN CONTROL APPROVAL
FEB 07/25	REVISED PER CITY COMMENTS
AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDED
OCT 02/25	REVISED PER CITY COMMENTS
OCT 24/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature

LICENSED PROFESSIONAL ENGINEER
F.S. THAUVETTE
100041299
October 24, 2025
PROVINCE OF ONTARIO

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
STORM DRAINAGE AREA PLAN - SOUTH OUTLET

Scale
1 : 750

C501

City Project no: D07-12-24-0149

Plan #19202

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LEGEND

SAN MH 1	PROPOSED SANITARY MANHOLE AND SEWER
CBMH 250	PROPOSED CATCHBASIN MANHOLE
STMMH 100	PROPOSED STORM MANHOLE AND SEWER
CB 200	PROPOSED CATCHBASIN
LD 1	PROPOSED LANDSCAPE DRAIN
	THERMAL INSULATION
	PROPOSED WATERMAIN / WATER SERVICE
HYD	PROPOSED HYDRANT AND VALVE
V&VB	PROPOSED VALVE BOX
RED	PROPOSED REDUCER
	PROPOSED BARRIER CURB (PER SC1.1)
DC	PROPOSED DEPRESSED CURB (PER SC1.1)
CC	PROPOSED CURB CUT
ICD	PROPOSED INLET CONTROL DEVICE
	PROPOSED BUILDING ENTRANCE
	EXISTING CONCRETE CURB
SAMH	*EXISTING SANITARY MANHOLE*
CBMH	*EXISTING CATCHBASIN MANHOLE*
STMMH	*EXISTING STORM MANHOLE*
CB	*EXISTING CATCHBASIN*
HYD / WV	*EXISTING HYDRANT & VALVE*
	EXISTING TREES / VEGETATION
EX UP	*EXISTING UTILITY POLE C/W GUY WIRES*
	EXISTING FENCE
	EXISTING LIGHT STANDARD
X	REMOVALS
	ASPHALT OVERLAY PER CITY STANDARD R10
	BOREHOLE LOCATION (REFER TO GEOTECH REPORTS (PROJECT: 103940.007 REV1, DATED SEPTEMBER 26, 2025), PREPARED BY GEMTEC, FOR DETAILS)

BENCHMARK NOTES:

1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARKS WERE PROVIDED ON THE TOPOGRAPHIC PLAN OF SURVEY OF BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4, GEOGRAPHIC TOWNSHIP OF MARCH, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLEBEKK LTD. SIGNED AND DATED FEBRUARY 20, 2022.

GENERAL NOTES:

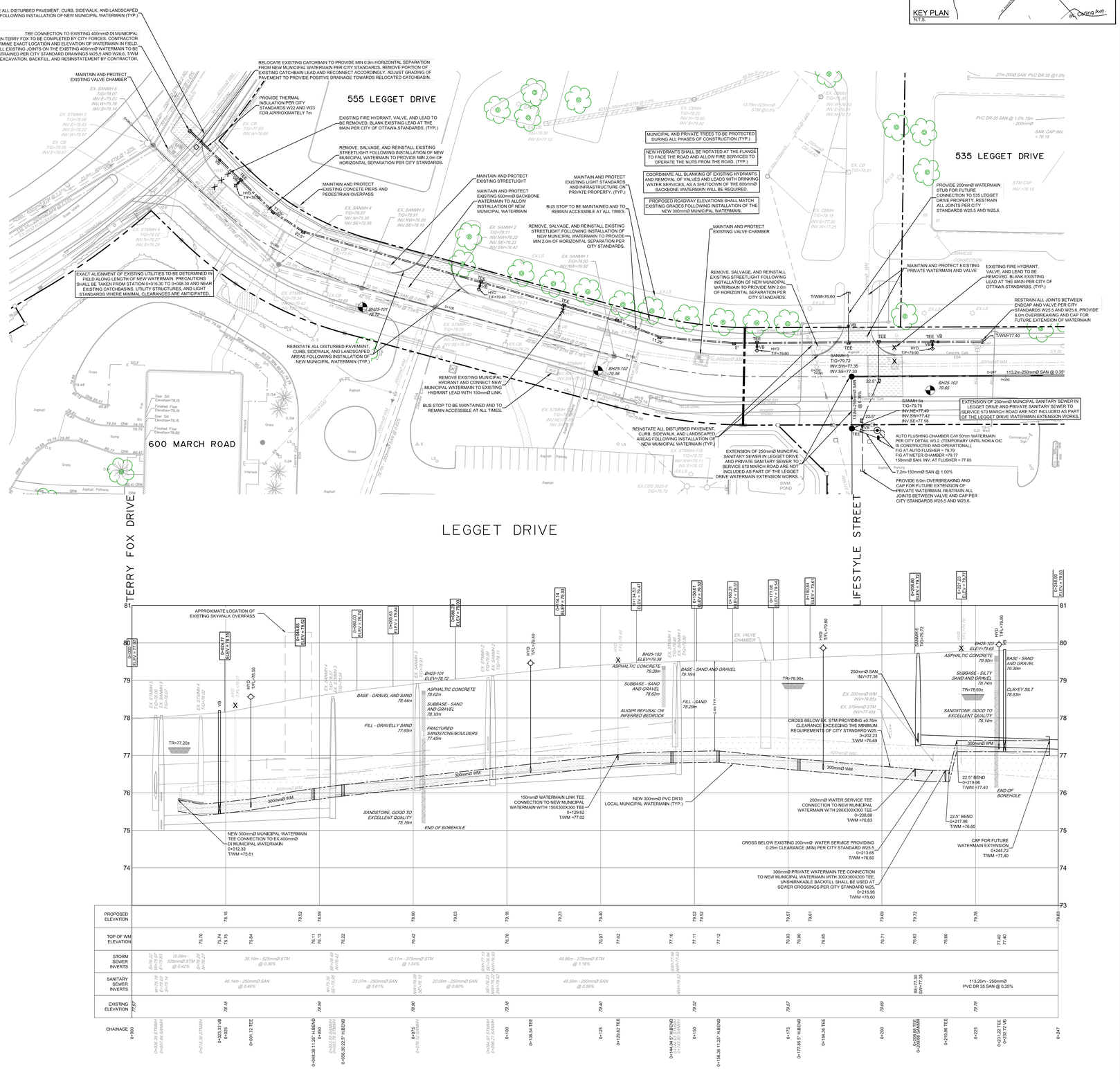
1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00, INSURANCE POLICY TO NAME OWNERS AND ENGINEERS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA AND ENGINEER.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO THE GEOTECHNICAL REPORT, SOIL QUALITY REPORT, AND SUBSURFACE INVESTIGATION REPORT (PROJECT: 103940.007 REV1, DATED SEPTEMBER 26, 2025), PREPARED BY GEMTEC, FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, EXCESS SOIL MANAGEMENT, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
10. PROVIDE LINE PAINTING.

WATERMAIN NOTES:

1. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS - ALL CURRENT VERSIONS AND 'AS AMENDED' EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR IN THE PRESENCE CITY OF OTTAWA FORCES. COORDINATE ALL BLANKING OF EXISTING HYDRANTS AND REMOVAL OF VALVES AND LEADS WITH DRINKING WATER SERVICES, AS A SHUTDOWN OF THE BACKBONE WATERMAIN WILL BE REQUIRED.
2. SPECIFICATIONS:

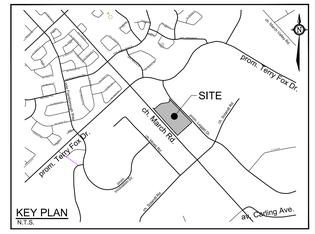
ITEM	SPEC. No.	REFERENCE
AUTOMATIC FLUSHING CHAMBER	W3.2	CITY OF OTTAWA
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
HYDRANT INSTALLATION	W19	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
INSULATION ADJACENT TO OPEN STRUCTURES	W23	CITY OF OTTAWA
VALVE BOX ASSEMBLY	W24	CITY OF OTTAWA
WATERMAIN	PVC DR 18	
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATERMAIN CROSSING ABOVE SEWER	W25.2	CITY OF OTTAWA
RESTRAINING AND RETAINING RINGS	W25.5	CITY OF OTTAWA
TABLES OF RESTRAINED LENGTHS	W25.6	CITY OF OTTAWA

3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE, UNLESS OTHERWISE INDICATED.
4. PROVIDE MINIMUM 0.5m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS, UNLESS OTHERWISE INDICATED.
5. HYDRANTS SHALL BE ROTATED AT THE FLANGE TO FACE THE ROAD AND ALLOW FIRE SERVICES TO OPERATE THE NUTS.
6. ALL DUCTILE IRON PIPES AND FITTINGS SHALL BE PROTECTED AGAINST POTENTIAL CORROSION PER GEOTECHNICAL RECOMMENDATIONS DUE TO THE CORROSIVE NATURE OF THE SUBGRADE AND GROUNDWATER.
7. MODERATE SULPHATE RESISTANCE (MS) CEMENT SHALL BE USED FOR BELOW GRADE CONCRETE STRUCTURES PER GEOTECHNICAL RECOMMENDATIONS.
8. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A PLAN AND PROFILE DRAWING INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.



KEY PLAN

N.T.S.



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△ Date	Description
JAN 24/25	PRELIMINARY WATERMAIN DESIGN ISSUED WITH CLASS C COST ESTIMATE
FEB 12/25	PRELIMINARY WATERMAIN DESIGN ISSUED WITH REVISED CLASS C COST ESTIMATE
MAY 28/25	REVISED WATERMAIN DESIGN ISSUED WITH REVISED CLASS C COST ESTIMATE
AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDED
OCT 02/25	REVISED PER CITY COMMENTS
OCT 02/25	ISSUED FOR PERMIT
OCT 24/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
PLAN AND PROFILE - LEGGET DRIVE
STATION 0+000 TO 0+247

Scale
1 : 400 HORIZONTAL
1 : 40 VERTICAL

C600

City Project no: D07-12-24-0149

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Plan #19202

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LEGEND

SAN MH 1	PROPOSED SANITARY MANHOLE AND SEWER
CBMH 250	PROPOSED CATCHBASIN MANHOLE
STMMH 100	PROPOSED STORM MANHOLE AND SEWER
CB 200	PROPOSED CATCHBASIN
LD 1	PROPOSED LANDSCAPE DRAIN
	THERMAL INSULATION FOR SHALLOW SEWERS
	PROPOSED WATERMAIN / WATER SERVICE
HYD	PROPOSED HYDRANT AND VALVE
V&VB	PROPOSED VALVE BOX
VC	PROPOSED VALVE CHAMBER
RED	PROPOSED REDUCER
	PROPOSED BARRIER CURB (PER SC1.1)
DC	PROPOSED DEPRESSED CURB (PER SC1.1)
CC	PROPOSED CURB CUT
ICD	PROPOSED INLET CONTROL DEVICE
	PROPOSED BUILDING ENTRANCE
	EXISTING CONCRETE CURB
SANMH	EXISTING SANITARY MANHOLE
CBMH	EXISTING CATCHBASIN MANHOLE
STMMH	EXISTING STORM MANHOLE
CB	EXISTING CATCHBASIN
HYD / WV	EXISTING HYDRANT & VALVE
	EXISTING TREES / VEGETATION
EX UP	EXISTING UTILITY POLE C/W GUY WIRES
	EXISTING FENCE
	EXISTING LIGHT STANDARD
X	REMOVALS
	FULL ASPHALT OVERLAY PER CITY STANDARD R10
	BOREHOLE LOCATION (REFER TO GEOTECH REPORT (PROJECT: 103940.009 REV1, DATED SEPTEMBER 26, 2025), PREPARED BY GEMTEC, FOR DETAILS)

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
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4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS AND ENGINEERS AS CO-INSURED.
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8. REFER TO THE SOIL QUALITY REPORT AND GEOTECHNICAL REPORT (PROJECT: 103940.009 REV1, DATED SEPTEMBER 26, 2025), PREPARED BY GEMTEC, FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, EXCESS SOIL MANAGEMENT, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
10. PROVIDE LINE PAINTING.

SEWER NOTES:

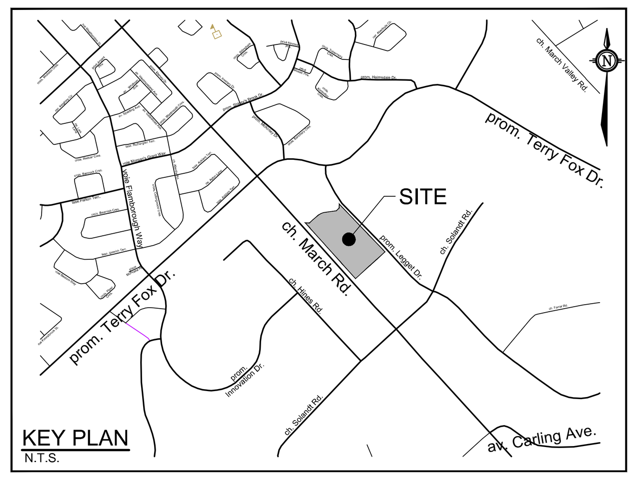
1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS - ALL CURRENT VERSIONS AND 'AS AMENDED'.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
SANITARY MANHOLE (1200mmØ)	701.010	OPSD
SANITARY MH FRAME & COVER	S24	CITY OF OTTAWA
INSULATION FOR SHALLOW SEWERS	S35	CITY OF OTTAWA
SANITARY SEWER	PVC DR 35	

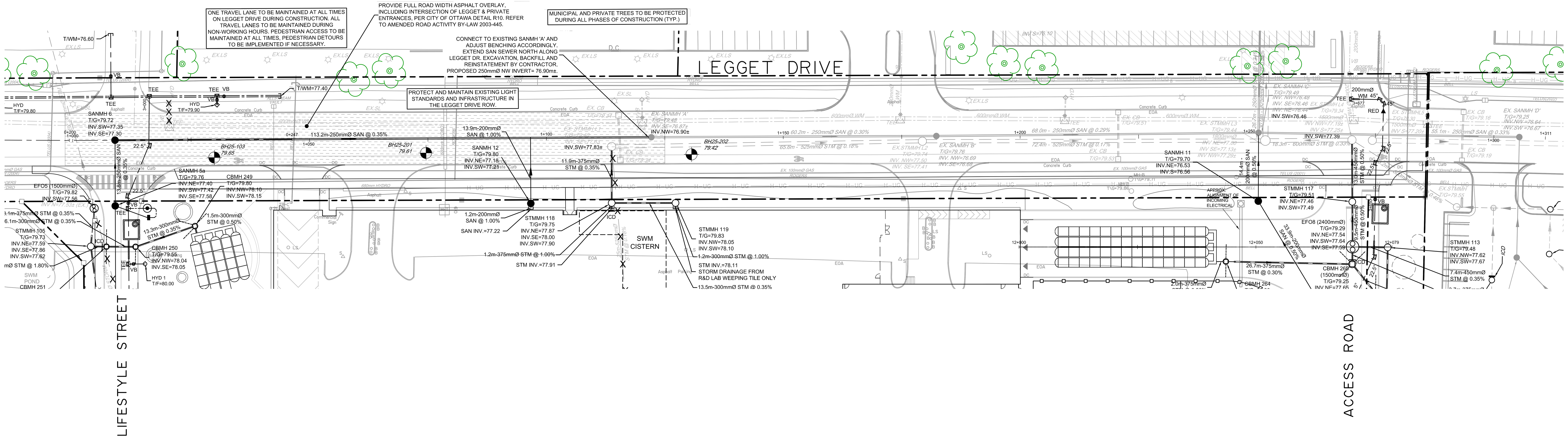
3. INSULATE ALL NEW PIPES THAT HAVE LESS THAN 1.8m COVER WITH HI-40 INSULATION PER CITY OF OTTAWA STANDARD DETAIL S35. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.
4. ALL MANHOLES SHALL BE 1200mmØ UNLESS OTHERWISE SPECIFIED.
5. ALL SEWERS AND WATERMAINS LOCATED PARALLEL TO EACH OTHER ARE TO BE CONSTRUCTED IN SEPARATE TRENCHES MAINTAINING A CLEAR HORIZONTAL SEPARATION DISTANCE OF 2.5 METRES, AS PER MECP F-6-1 STANDARDS.
6. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
7. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
8. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
9. ALL DUCTILE IRON PIPES AND FITTINGS SHALL BE PROTECTED AGAINST POTENTIAL CORROSION PER GEOTECHNICAL RECOMMENDATIONS DUE TO THE CORROSIVE NATURE OF THE SUBGRADE AND GROUNDWATER.
10. MODERATE SULPHATE RESISTANCE (MS) CEMENT SHALL BE USED FOR BELOW GRADE CONCRETE STRUCTURES PER GEOTECHNICAL RECOMMENDATIONS.
11. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.
12. CONTRACTOR TO PROVIDE THE CONSULTANT WITH AN A PLAN AND PROFILE DRAWING INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, AND ANY ALIGNMENT CHANGES, ETC.

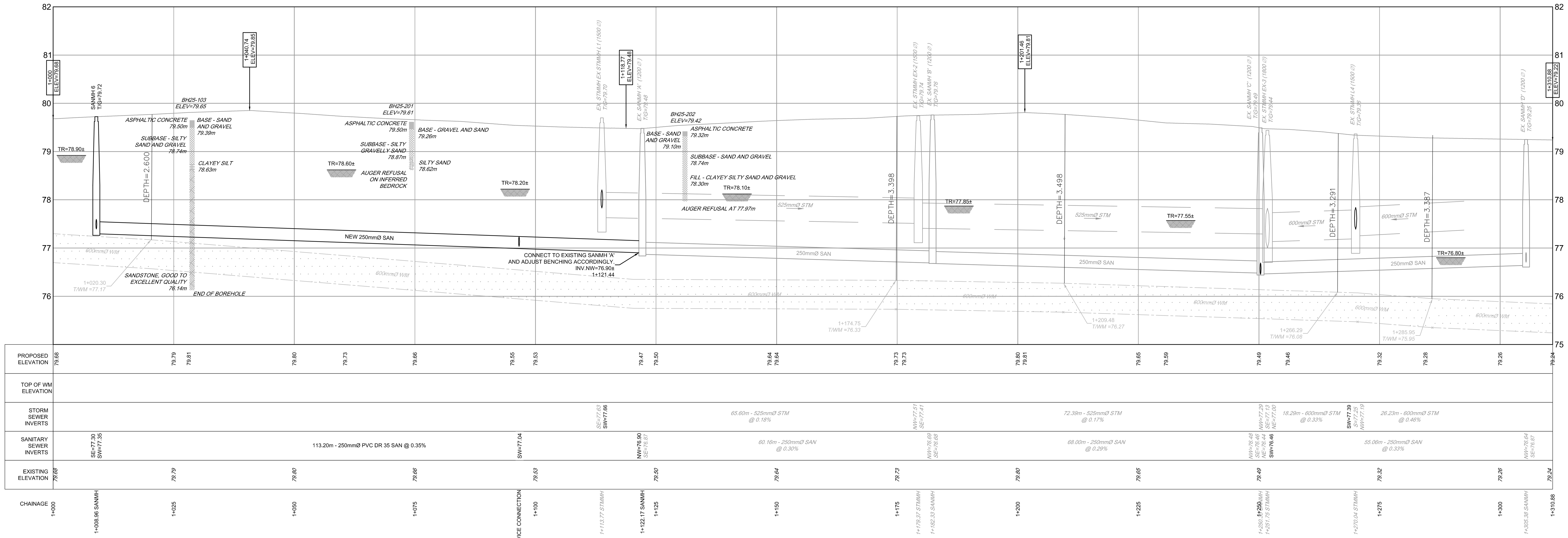
BENCHMARK NOTES:

1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARKS WERE PROVIDED ON THE TOPOGRAPHIC PLAN OF SURVEY OF BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4, GEOGRAPHIC TOWNSHIP OF MARCH, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLEBEKK LTD, SIGNED AND DATED FEBRUARY 20, 2022.



KEY PLAN
N.T.S.





REFER TO DRAWING C-100 FOR ADDITIONAL NOTES

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Ottawa, ON, K2K 2T6

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Tel 613.729.4536

Stantec
Traffic Consultant
300 – 1331 Clyde Avenue
Ottawa Ontario, K2C 3G5
Tel 613.722.4420

△ Date	Description
NOV 15/24	ISSUED FOR SITE PLAN CONTROL APPROVAL
FEB 07/25	REVISED PER CITY COMMENTS
AUG 06/25	REVISED PER CITY COMMENTS / SURFACE PARKING LOT ADDED
OCT 02/25	REVISED PER CITY COMMENTS
OCT 02/25	ISSUED FOR PERMIT
OCT 24/25	REVISED PER CITY COMMENTS

NOT FOR CONSTRUCTION

Seal / Signature
LICENSED PROFESSIONAL ENGINEER F.S. THAUVETTE 100041399 October 24, 2025 PROVINCE OF ONTARIO

Project Name
Nokia Ottawa Campus

Project Number
027.7946.000

Description
PLAN AND PROFILE - LEGGET DRIVE
STATION 1+000 TO 1+310

Scale
HORIZONTAL 1 : 400
VERTICAL 1 : 40

C601

City Project no: D07-12-24-0149

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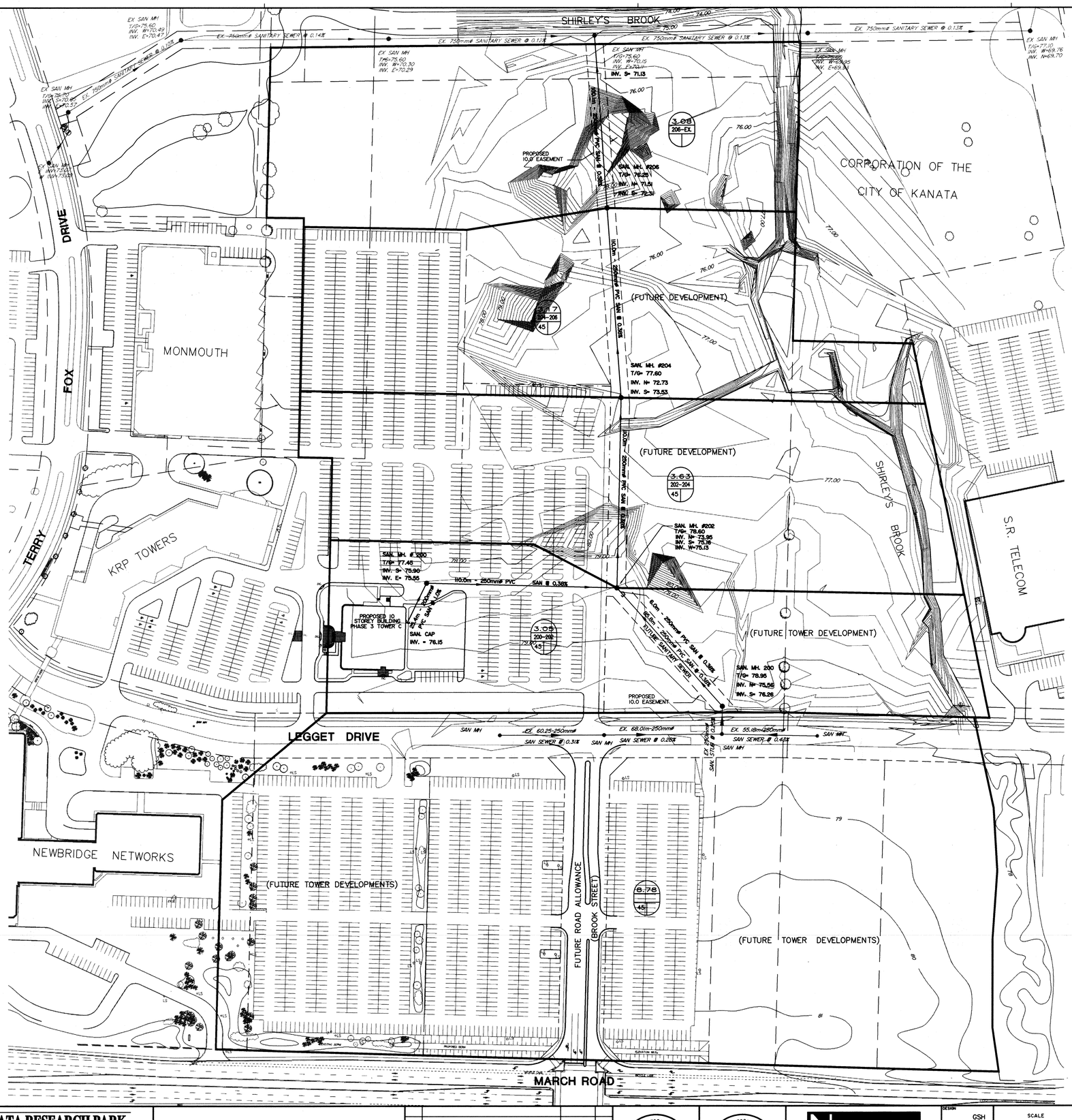
Plan #19202



NOTE:
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(613)591-4594

No.	REVISION	DATE	BY
1	ISSUED FOR COMMENTS	DEC. 11/98	GSH

LICENSED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO
LICENSED PROFESSIONAL ENGINEER — G. S. HOLOWACH — PROVINCE OF ONTARIO

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CONSULTING ENGINEERS & PLANNERS
Suite 17, 77 Auriga Drive
Nepean, Ontario
K2E 7Z7
Telephone (613)727-1658
Facsimile (613)727-6972

DESIGN	GSH
CHECKED	UB
DRAWN	DU
CHECKED	GSH
APPROVED	UB
SCALE	1:1000

CITY OF KANATA
KANATA RESEARCH PARK
TOWER 'C' PROJECT

SANITARY DRAINAGE AREA PLAN

PROJECT No. 98066
DATE SEPTEMBER 1998
DRAWING No. 98066-SAN

PLAN8.DWG - 1000mmX707mm

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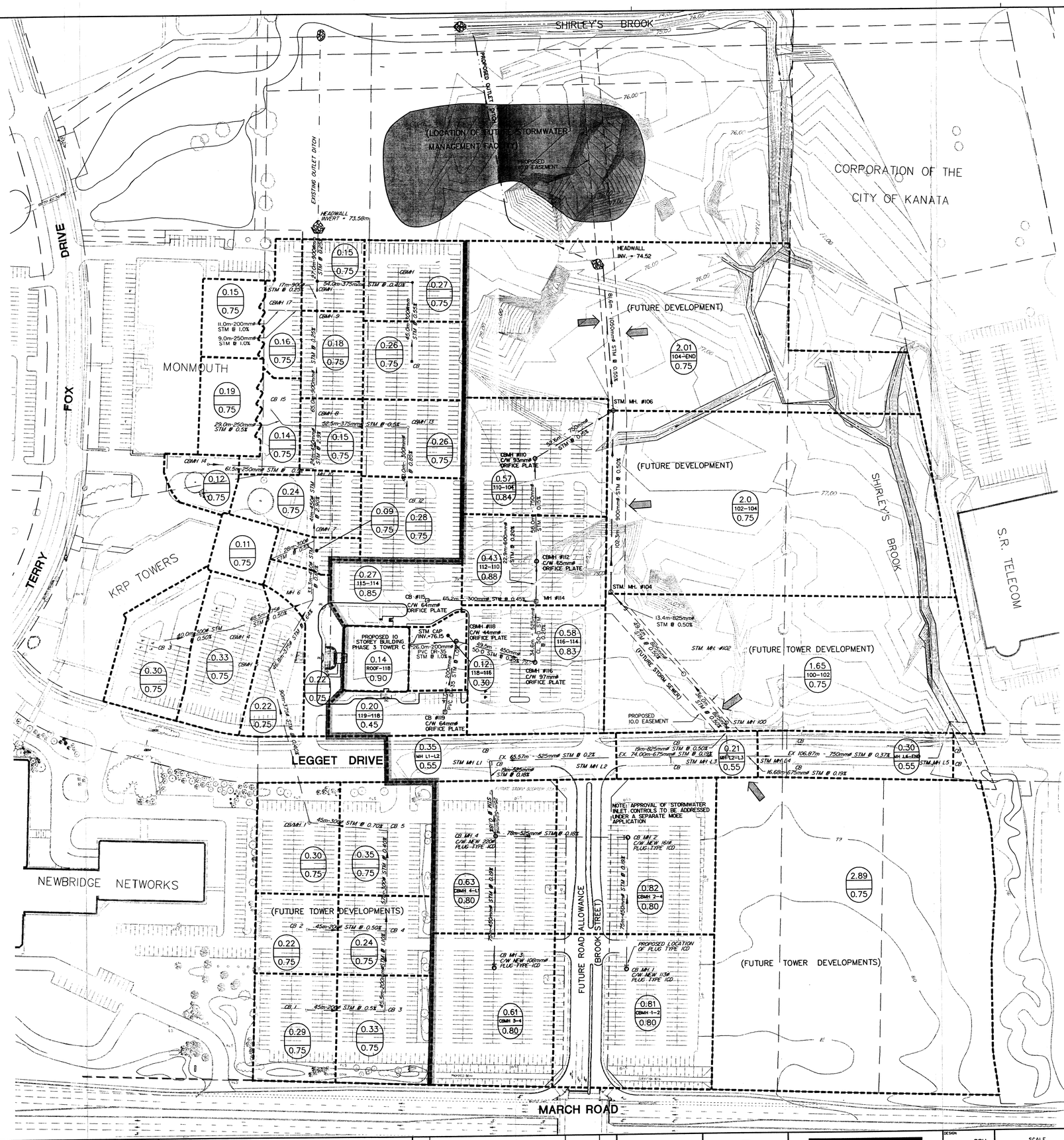

LEGEND

- 2.02 — DRAINAGE AREA (hectares)
- 100-102 — MANHOLE TO MANHOLE
- 0.6 — RUN-OFF COEFFICIENT
- STORM DRAINAGE AREA
- STORM DRAINAGE AREA BOUNDARY
- MH #100 — EXISTING STORM SEWER AND MANHOLE
- CBMH #116 — EXISTING CATCHBASIN MANHOLE
- CB #119 — EXISTING CATCHBASIN
- DIRECTION OF FLOW
- MINOR STORM SYSTEM FLOW ROUTING (UNDEVELOPED AREAS)

NOTE:

1. RUNOFF COEFFICIENTS FOR TOWER 'C' PHASE 3 DEVELOPMENT ARE AS OUTLINED IN *"KANATA RESEARCH PARK - TOWER 'C' STORMWATER MANAGEMENT REPORT"* (NECL, Dec 1998)
2. APPROVAL OF STORMWATER INLET CONTROLS FOR THE EXISTING NEWBRIDGE PARKING LOT (PLUG TYPE ICD'S) TO BE ADDRESSED UNDER A SEPARATE MOEE APPLICATION.

NOTE:
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No.	REVISION	DATE	BY
2	REVISED STORM SEWER PER R.M.O.C. COMMENTS	APR. 13/99	GSH
1	ISSUED FOR COMMENTS	DEC. 11/98	GSH

LICENSED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO

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DESIGN	GSH
CHECKED	UB
DRAWN	DU
CHECKED	GSH
APPROVED	UB

SCALE 1:1000

CITY OF KANATA
KANATA RESEARCH PARK
TOWER 'C' PROJECT

STORM DRAINAGE AREA PLAN

PROJECT No. 98066
DATE SEPTEMBER 1998
DRAWING No. 98066-STM

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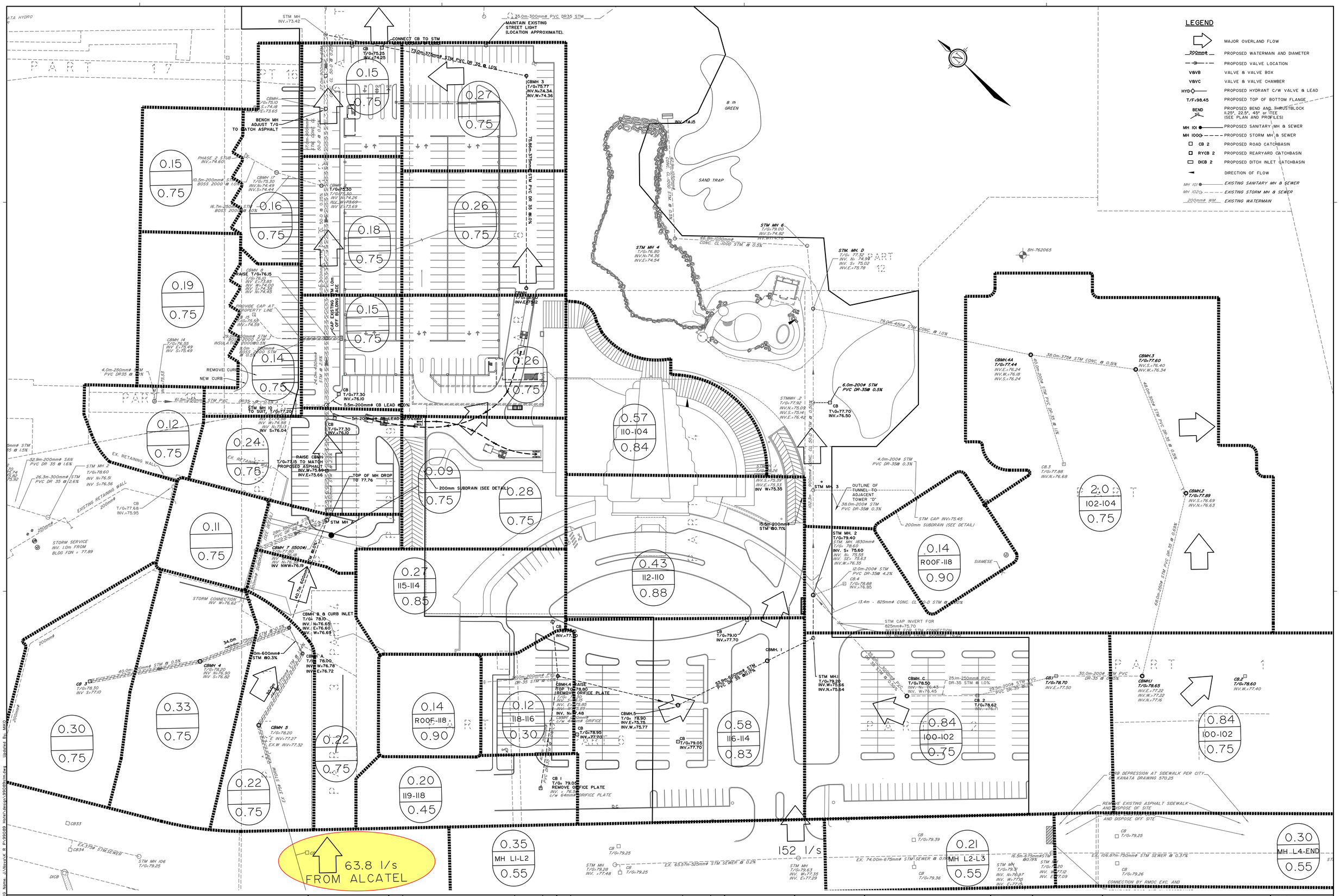

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No.	REVISION	DATE	BY
1.	DESIGN REVIEW/ MAJOR SYSTEM FLOW	NOV29/00	AS

REGISTERED PROFESSIONAL ENGINEER J.G. RIDDELL PROVINCE OF ONTARIO

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Email: novainfo@novatech-eng.com

DESIGN	RRJ
CHECKED	GM
DRAWN	MB
CHECKED	GM
APPROVED	RRJ

SCALE 1 : 500

CITY OF KANATA
KANATA RESEARCH PARK
K.R.P. HOTEL SITE
STORM PLAN

PROJECT No. 99089
DATE NOVEMBER 20/ 2000
DRAWING No. 99089-STM

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