Robinson
Land Development

3095 Palladium Drive Commercial Development Servicing and Stormwater Management Report

Prepared For:

3095 Palladium GP Inc.

Prepared By:

Robinson Land Development

Project No. 23021
June 2023
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LEGAL NOTIFICATION

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1.0 INTRODUCTION

Robinson Land Development have been retained by 3095 Palladium GP Inc. to prepare servicing and stormwater management designs for a proposed commercial development located at 3095 Palladium Drive within the Kanata West Retail Centre (KWRC), itself part of the Kanata West Business Park (KWBP). The subject site is proposed to be developed to include six commercial buildings, an automatic car wash, and associated parking lots. The property is located at the southwest corner of Palladium Drive and Campeau Drive (refer to **Figure 1 – Site Key Plan** and **Figure 2 – KWBP Key Plan** following page 1).

Detailed servicing and stormwater management designs were previously prepared (by IBI Group) and approved for the subject site as part of the overall KWRC development. This report is being prepared to demonstrate that the amended Site Plan for the subject site can be designed in keeping with the overarching report titled *Design Brief, Kanata West Retail Centre – 3015, 3075 and 3095 Palladium Drive*, prepared by IBI Group, dated September 2016 (herein referred to as the IBI Report). This report will detail the proposed means of servicing the site and provide details on how to meet the stormwater management requirements outlined in the overarching IBI Report.

Pre-consultation notes from the City of Ottawa have been provided in **Appendix A** for reference.

2.0 GUIDELINES, STUDIES AND REPORTS

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

- **Sewer Design Guidelines**, City of Ottawa, Second Edition, October 2012 (herein referred to as OSDG).
  - **Technical Bulletin ISD-2010-1,** City of Ottawa, September 28, 2010.
  - **Technical Bulletin PIEDTB-2016-01,** City of Ottawa, September 6, 2016.
  - **Technical Bulletin ISTB-2018-01**, City of Ottawa, March 21, 2018.
  - **Technical Bulletin ISTB-2018-03**, City of Ottawa, March 21, 2018.

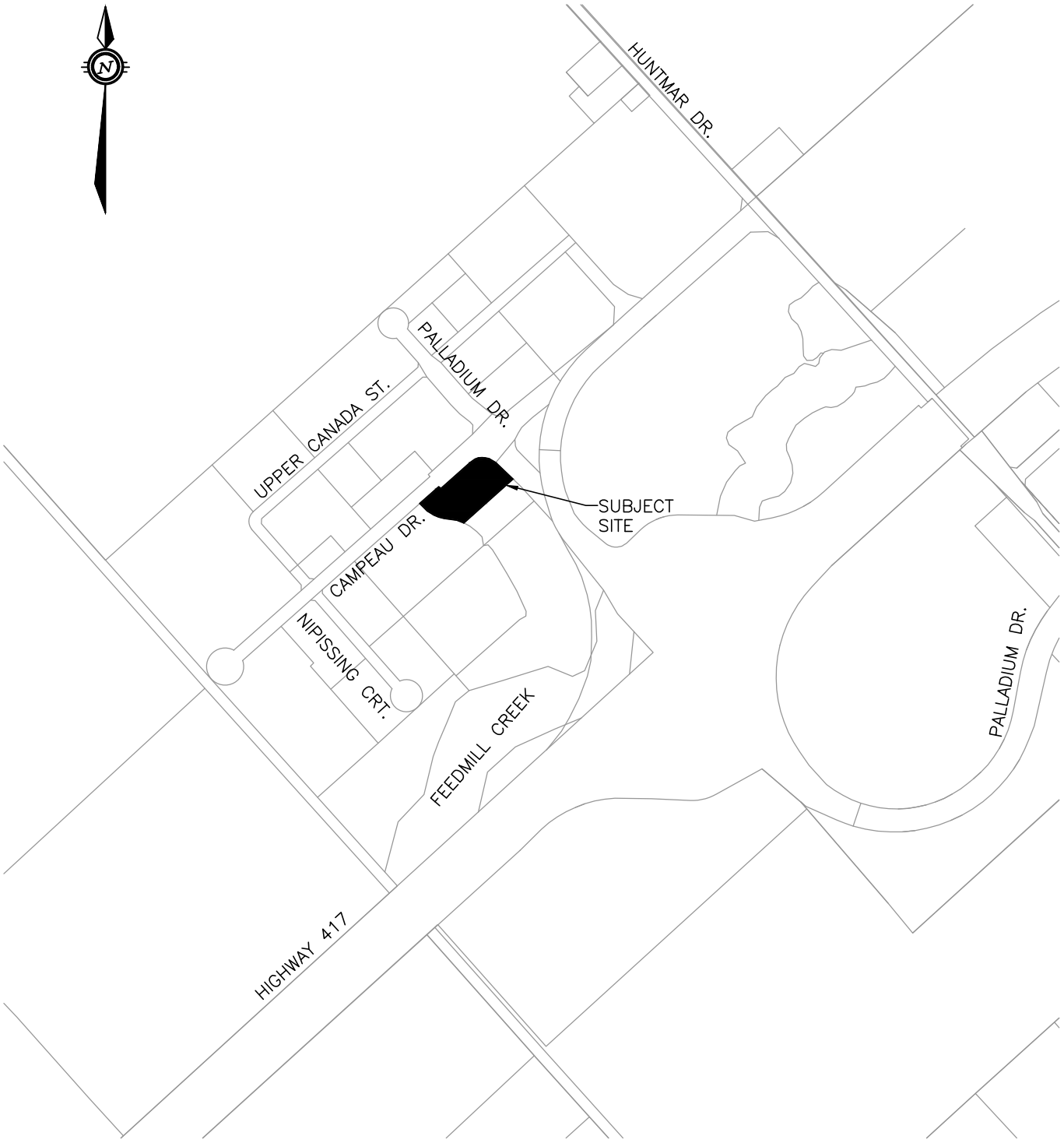
- **Ottawa Design Guidelines, Water Distribution**, City of Ottawa, First Edition, July 2010 (herein referred to as OWDG).
  - **Technical Bulletin ISD-2010-2**, City of Ottawa, December 15, 2010.
  - **Technical Bulletin ISDTB-2014-02**, City of Ottawa, May 27, 2014.
  - **Technical Bulletin ISTB-2018-02**, City of Ottawa, March 21, 2018.

- **Design Guidelines for Sewage Works**, Ministry of the Environment, 2008 (herein referred to as MECP Sewage Design Guidelines).

- **Design Guidelines for Drinking-Water Systems**, Ministry of the Environment, 2008 (herein referred to as MECP Water Design Guidelines).

- **Water Supply for Public Fire Protection**, Fire Underwriters Survey, 2020 (herein referred to as FUS Guidelines).

- **Geotechnical Investigation**, GEMTEC, June 2023.



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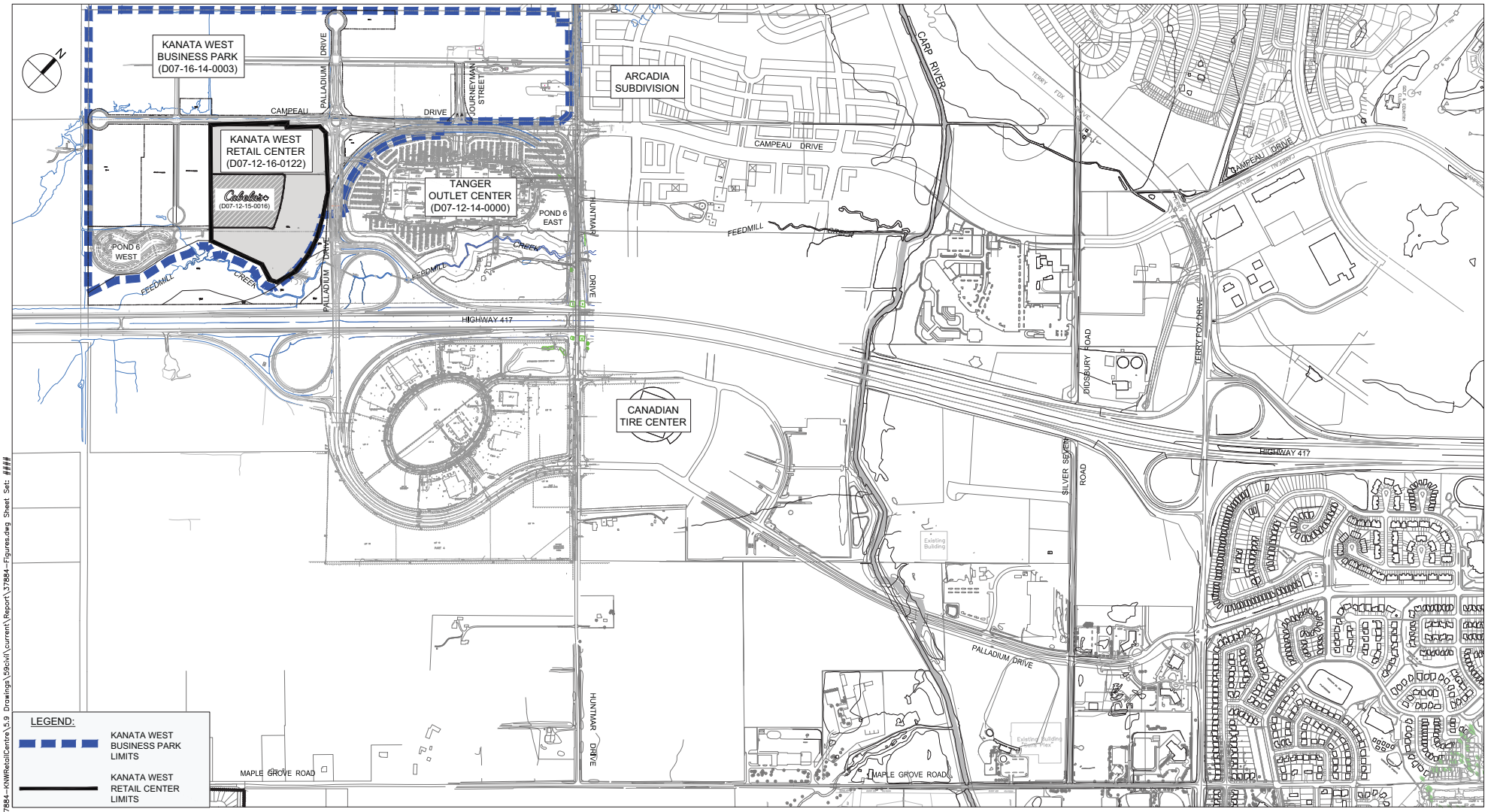

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Figure 2 - KWBP Key Plan

- **Design Brief, Kanata West Retail Centre – 3015, 3075 and 3095 Palladium Drive,** prepared by IBI Group, September 2016 (herein referred to as the IBI Report).

- **Runoff Volume Control Targets for Ontario Final Report**, Aquafor Beech Ltd. and Earthfx Inc., October 27, 2016 (herein referred to as the Aquafor Beech Report)

- **Low Impact Development Stormwater Management Planning and Design Guide**, Credit Valley Conservation and Toronto and Region Conservation, 2010 (herein referred to as the LID Manual)

3.0 EXISTING CONDITIONS

The 1.77 ha subject site is zoned General Mixed Use (GM[2167]) and is currently undeveloped. The site is bounded by municipal roads Palladium Drive to the east and Campeau Drive to the north. The site is also bounded by private roads Kanata West Centre Drive to the west and Cabela's Way to the south.

Private infrastructure has been installed within the private roadways to the west and south of the subject site, as follows:

- A 254 mm dia. watermain along Cabela's Way and a 203 mm dia. watermain along Kanata West Centre Drive.
- A 200 mm dia. sanitary sewer along Cabela's Way increasing to a 300mm dia. sanitary sewer along Kanata West Centre Drive before discharging to Campeau Drive.
- 450-825 mm dia. storm sewers along Cabela's Way and 375-450 mm dia. storm sewers along Kanata West Centre Drive, connecting at the roadway intersection and continuing south, ultimately discharging to Stormwater Management Pond 6 at the southwest corner of KWBP.
- Three sets of service stubs (200mm dia. sanitary, 250mm dia. storm, and 150mm dia. water) were installed to accommodate the previous Site Plan buildings (B1, B2, and B3) in the northwest, southeast, and southwest corners of the subject site.

Refer to drawing General Plan of Services and As-Built General Plan of Services, prepared by IBI Group, in **Appendix A** for more details.

4.0 DEVELOPMENT PROPOSAL

The Owner is proposing to develop the subject site to include six commercial buildings, an automatic car wash, and associated parking lots. The 1.77 ha block will include two areas to be developed: a 1.0 ha parcel for the six commercial buildings (herein referred to as the commercial building site) and a 0.54 ha parcel for the automatic car wash (herein referred to as the Halo site). The remaining land is comprised of private right-of-ways to the west and south of the property. The proposed design and development of the two parcels have been coordinated and summarized in this report. The six commercial buildings range from 355 m^2 to 892 m^2 in area and are accessed via an entrance connection to Kanata West Centre Drive. The automatic car wash building is approximately 518 m^2 in area and is also accessed via an entrance connection to Kanata West Centre Drive, further to the south. Refer to the Site Plan, prepared by Allan Stone Architect and the Site Development Plan, prepared by LRL Engineering, for more details.

The development of the subject site will require new water and sanitary services and new storm sewer systems to control the site's runoff to the design criteria outlined in the overarching

IBI Report as detailed in the sections below. Design drawings for the commercial site have been provided under **Appendix B** and design drawings for the Halo site (prepared by LRL Engineering) are provided under **Appendix F**.

5.0 WATER SERVICING

5.1 Design Criteria

The commercial building site will receive water supply via a 203 mm diameter watermain connection to the existing 203 mm diameter private watermain on Kanata West Centre Drive. Buildings B, C, D, E, and F will be provided with 102 mm diameter water service connections to the on-site 203 mm diameter watermain. Building A will receive water supply via an extension of the existing 152 mm diameter watermain stub off Kanata West Centre Drive. The Halo site will receive water supply via a 102 mm diameter watermain connection to the existing 254 mm diameter private watermain on Cabela's Way. In accordance with the IBI Report and the current OWDG, the following watermain design criteria have been utilized for the subject site:

- Minimum Pressure During Peak Hour — 276 kPa (40 psi)
- Minimum Pressure During Maximum Day Plus Fire — 140 kPa (20 psi)
- Maximum Pressure in Unoccupied Areas — 689 kPa (100 psi)
- Maximum Pressure in Occupied Areas — 552 kPa (80 psi)
- Fire Flow Rate — FUS calculations (Section 4.4)
- Average Day Demand (KWRC) — 2500 L / 1000m^2 / day
- Max. Daily Demand — 1.5 x Avg. Day
- Max. Hourly Demand — 1.8 x Max. Day

5.2 Boundary Conditions

The City of Ottawa provided boundary conditions for the subject site at the private connections from the KWRC to the municipal distribution system based on anticipated water demands and fire flows. The boundary conditions have been summarized in **Table 5.1** below:

Table 5.1: Boundary Conditions

Demand Scenario	Connection #1		Connection #2	
	Head (m)	Pressure (psi)	Head (m)	Pressure (psi)
Maximum HGL	161.3	84.0	161.3	85.6
Peak Hour	156.4	77.1	156.4	78.7
Max Day Plus Fire Flow	133.0	43.8	153.4	74.4

Notes:
1. BC#1 is located at the intersection of Campeau Drive and Kanata West Centre Drive.
2. BC#2 is located at the intersection of Campeau Drive and Palladium Drive.

Refer to the boundary conditions provided in **Appendix C** for more details.

5.3 Water Demands

For the commercial building site, water demands have been calculated based on an average day demand of 2,500 L/m^2 of floor area/day in keeping with the overarching IBI Report and the

OWDG Table 4.2. Water demands for the Halo site have been calculated based on an average day demand of 35,000 L/ha/day in accordance with the OWDG Table 4.2. The anticipated water demands have been summarized in **Table 5.2** below.

Table 5.2: Water Demands

Demand Scenario	Connection #1	Connection #2	Total
	Demand (L/s)	Demand (L/s)	Demand (L/s)
Average Day	0.10	0.22	0.32
Max. Daily	0.15	0.33	0.48
Max. Hourly	0.26	0.59	0.85

Notes:
1. Connection #1 is for the commercial building site.
2. Connection #2 is for the Halo site.

For the Halo site, water demands have also been calculated based on water volume per car wash data. Halo has anticipated 1000 car washes per day at a rate of 170 L per wash. The results of these demands have been summarized in **Table 5.3** below.

Table 5.3: Water Demands with Car Wash Data

Demand Scenario	Connection #1	Connection #2	Total
	Demand (L/s)	Demand (L/s)	Demand (L/s)
Average Day	0.10	1.30	1.40
Max. Daily	0.15	2.29	2.44
Max. Hourly	0.26	6.72	6.98

Notes:
1. Connection #1 is for the commercial building site.
2. Connection #2 is for the Halo site.

Refer to the watermain design sheet in **Appendix C** and the Halo site design correspondence (prepared by LRL Engineering) in **Appendix F** for more details.

5.4 Fire Flows

Existing private hydrants are located along Kanata West Centre Drive and Cabela's Way to service the subject site for fire protection. Since the distance from the existing hydrant on Kanata West Centre Drive to the front entrances of commercial buildings C, D, and E exceeds 90 metres, on-site private hydrants will be required for hydrant coverage. The proposed hydrants will be located within the landscaped island in the parking lot.

The total required fire flow for each building has been calculated in accordance with the current 2020 Water Supply for Public Fire Protection, Fire Underwriters Survey (herein referred to as the FUS Guidelines). The following input parameters were assumed in the FUS calculations:

Commercial Buildings:

- Type of Construction: Wood Frame
- Effective Floor Area: Building footprints as per Site Plan (1-storey)
- Occupancy Class: Combustible
- Sprinkler Protection: None

- Exposure Distances: Building separations as per Site Plan

Car Wash Building:

- Type of Construction: Non-Combustible Construction
- Ground Floor Area: Building footprint as per Site Plan
- Occupancy Class: Combustible
- Sprinkler Protection: None
- Exposure Distances: Building separations as per Site Plan

The total required fire flow for each building has been summarized in **Table 5.4** below.

Table 5.4: Total Required Fire Flow

Building	Total Required Fire Flow (L/min)
A	8,000
B	13,000
C	8,000
D	8,000
E	10,000
F	10,000
Car Wash	5,100

As detailed in **Table 5.4** above, the total required fire flow for the proposed commercial buildings (A to F) will range from 8,000 to 13,000 L/min. Refer to complete FUS calculations provided in **Appendix C** for more details.

5.5 Hydrant Coverage

Pressure losses (due to friction) in firehoses are proportional to the firehose length. Therefore, the actual fire flow delivered by the nozzle at the end of a long firehose will be less compared to a shorter firehose connected to the same hydrant. In accordance with OSDG ISTB-2018-02, the aggregate fire flow capacity of all contributing fire hydrants within 150 m of a building shall not be less than the required fire flow. In some instances, involving dead-end watermains, standard spacing requirements may not be sufficient to meet the required fire flow. The contribution to the required fire flow is dependent on the distance from the hydrant to building being considered. A flow of 5,700 L/min should be assigned to all hydrants with a distance of less than or equal to 75 m from the building being considered and 3,800 L/min to all hydrants with a distance between 75 m and 150 m from the building being considered (as per *Table 1* from ISTB-2018-02 for AA rated hydrants). Coverage for the on-site buildings will be provided by the existing hydrant on Kanata West Centre Drive (EX HYD-1), the existing hydrant on Cabela's Way (EX HYD-2) and by the proposed hydrants located on the commercial building site (HYD-1 and HYD-2). The maximum contributing fire flows based on hydrant coverage from the adjacent hydrants have been summarized in **Table 5.5** below.

Table 5.5: Hydrant Coverage

Building	HYD-1 Contrib. (L/min)	HYD-2 Contrib. (L/min)	EX HYD-1 Contrib. (L/min)	EX HYD-2 Contrib. (L/min)	Total Fire Flow Contrib. (L/min)
A	5,700	3,800	5,700		15,200
B	5,700	5,700	5,700		17,100
C	5,700	5,700	3,800		15,200
D	3,800	5,700	3,800		13,300
E	5,700	5,700	3,800		15,200
F	5,700	5,700	5,700		17,100
Car Wash			3,800	5,700	9,500

As demonstrated in **Table 5.5** above, the maximum contributing fire flows from the adjacent hydrants based on hydrant coverage exceeds the total required fire flows noted in **Table 5.4** and therefore is in accordance with ISTB-2018-02. Refer to the Hydrant Coverage Plan provided in **Appendix C**.

5.6 Hydraulic Model

A water distribution hydraulic model was created using EPANET software for the subject site. The hydraulic model incorporated the proposed watermain layouts, hydrant locations, boundary conditions, and typical “C” factors in accordance with the current OWDG. Refer to the developed hydraulic model figure provided in **Appendix C**. The hydraulic model outputs for Peak Hour (minimum pressure check) and Maximum HGL (high pressure check) simulations been summarized in **Table 5.6** below.

Table 5.6: Hydraulic Model Outputs

Model Junction	Peak Hour (psi)	Maximum Pressure (psi)
Building A	76.36	83.33
Building B	76.15	83.13
Building C	76.46	83.44
Building D	76.32	83.30
Building E	76.22	83.20
Building F	76.22	83.20
Car Wash	74.84	83.06

As demonstrated in **Table 5.6** above, the expected pressure at each building junction exceeds the minimum allowable pressure of 40 psi during the Peak Hour simulation. During the Maximum HGL simulation, the maximum pressure at each building junction exceeds the maximum allowable pressure of 80 psi and therefore pressure reducing valves (PRVs) will be required.

A Max. Day + Fire Flow simulation was run for the commercial building site using the boundary conditions for connection #1 and the highest required fire flow of 13,000 L/min for Building B. The required fire flow demand was split between the two proposed on-site hydrants and the existing hydrant on Kanata West Centre Drive while not exceeding the hydrant coverage flows provided in **Table 5.5**. The hydraulic model outputs demonstrate the distribution system can meet the required fire flows without any nodes in the system dropping below 20 psi.

A Max. Day + Fire Flow simulation was also run for the Halo site using the boundary conditions for connection #2 and the required fire flow of 5,100 L/min for the car wash. The required fire flow demand taken from the existing hydrant on Cabela's Way while not exceeding the hydrant coverage flows provided in **Table 5.5**. The hydraulic model outputs demonstrate the distribution system can meet the required fire flow without any nodes in the system dropping below 20 psi. Therefore, the proposed watermain systems have been adequately designed for domestic demand and fire protection in accordance with the OWDG and the IBI Report. Refer to the hydraulic model outputs provided in **Appendix C**.

6.0 SANITARY SERVICING

6.1 Existing System

As noted in the IBI Report, the KWRC lands have been designed to outlet to the existing 300 mm diameter sanitary sewer on Campeau Drive at the intersection with Kanata West Centre Drive (EX MH 105A). Sanitary flows from the KWRC (and overall KWBP) are conveyed east via the Campeau Drive sanitary sewer system before ultimately being conveyed to the Signature Ridge Pump Station (SRPS) north of Highway 417.

Existing 200 mm diameter sanitary sewers are available along Cabela's Way. Existing sanitary sewers ranging from 200 mm to 300 mm in diameter are available along Kanata West Centre Drive. The existing sanitary sewers between MH12A and MH105A are noted as 300 mm diameter on the As-Built General Plan of Services (prepared by IBI Group, **Appendix A**), however, the sewers are noted as 200-250 mm diameter on the *KWRC Sanitary Sewer Design Sheet* provided in the IBI Report.

Sanitary flows from the lands which are comprised of the subject site have been allocated within the existing private sanitary sewers along Kanata West Centre Drive and Cabela's Way. Drainage area A14 (which included 0.71 ha from the subject site) was allocated upstream of MH14A on Cabela's Way. Drainage area A15 (which included 0.13 ha from the subject site) was allocated upstream of MH13A on Kanata West Centre Drive. Drainage area A16 (which included 0.08 ha from the subject site) was allocated upstream of MH12A on Kanata West Centre Drive. Drainage area A17 (which included 0.18 ha from the subject site) was allocated upstream of MH11A on Kanata West Centre Drive. Drainage area A19 (which included 0.44 ha from the subject site) was allocated upstream of MH105A on Kanata West Centre Drive. A 200 mm diameter sanitary service stub was previously installed for each building in keeping with the previous Site Plan used in the IBI design (refer to As-Built General Plan of Services in **Appendix A**). Refer to the *KWRC Sanitary Drainage Area Plan*, *KWRC Sanitary Sewer Design Sheet*, and Site Contribution Sanitary Area Plan provided in **Appendix D** for more details.

6.2 Design Criteria

The private sanitary sewer system for KWRC has been designed (by IBI Group) based on recommendations from the following reports:

- Kanata West Master Servicing Study (KWMSS), 2006

- City of Ottawa Sewer Design Guidelines, 2012
- Ministry of the Environment Design Guidelines for Sewage Works, 2008
- City of Ottawa Technical Bulletin ISTB-2018-01

The KWRC is considered an extensive employment area as outlined in *Section 3.3* of the IBI Report. In keeping with the IBI Report, the following design parameters have been implemented for the subject site:

- Extensive Employment Area 50,000 L/ha/day
- Peaking Factor 1.5
- Infiltration Allowance 0.28 L/s/ha
- Minimum Velocity 0.60 m/s
- Maximum Velocity 3.0 m/s

Using the design criteria above, the IBI design allocated a peak design flow of 1.77 L/s from the lands (1.54 ha) which are comprised of the subject site. Refer to the *KWRC Sanitary Drainage Area Plan* and *KWRC Sanitary Sewer Design Sheet* provided in **Appendix D** for more details.

6.3 Proposed Sanitary Servicing

New private sanitary sewers will be required to service the subject site. Sanitary flows from commercial Buildings B, C, D, E, and F will be conveyed by new 150 mm diameter services to a proposed 200 mm diameter sanitary sewer system located within the parking lot. The proposed 200 mm diameter sanitary sewer system will outlet to the existing 300 mm sanitary sewer on Kanata West Centre Drive, upstream of MH11A. Sanitary flows from commercial Building A will be conveyed by an extension of the existing 200 mm diameter service stub to the existing 300 mm diameter sanitary sewer on Kanata West Centre Drive, upstream of MH10A. Sanitary flows from the car wash building will be conveyed by a proposed 150 mm diameter service to the existing 200 mm diameter sanitary sewer on Cabela's Way, upstream of MH14A. The existing sanitary service stubs for former Buildings B2 and B3 shall be abandoned in accordance with current City standards.

Using the design criteria noted in **Section 6.2** above, the peak sanitary design flow from the commercial site has been calculated to be 1.17 L/s. The peak sanitary design flow from the Halo site has been calculated to be 6.32 L/s. The peak design flow from the Halo site was established using estimated flow data per car wash and anticipated flows generated from employees. Therefore, the total peak sanitary design flow from the subject site tributary to the existing system on Campeau Drive is 7.49 L/s which exceeds the allocated flow of 1.77 L/s from the IBI design by 5.72 L/s. The existing sanitary sewers between MH14A and MH105A are noted as having 8.58 L/s to 25.67 L/s of available capacity on the *KWRC Sanitary Sewer Design Sheet* prepared by IBI Group (which do not account for increased pipe diameters of 300 mm as discussed above). Provided that the other contributing areas do not exceed their allocated flows, there should be adequate capacity within the existing private system to accommodate the additional flows from the subject site.

All proposed sanitary sewers have been designed to have the capacity to convey the peak design flows and meet the acceptable full flow velocity range. Refer to the Sanitary Drainage Area Plan (DWG. 23021-SAN1) and the sanitary sewer design sheets in **Appendix D**. Design details for the Halo site (prepared by LRL Engineering) are provided under **Appendix F**.

7.0 STORM SERVICING

7.1 Existing System

Existing storm sewers ranging from 300 mm to 450 mm in diameter are available along Kanata West Centre Drive. Existing storm sewers ranging from 450 mm to 825 mm in diameter are available along Cabela's Way. The existing storm sewer system for the KWRC conveys stormwater south to the existing Pond 6 West Facility and ultimately discharges into Feedmill Creek.

Minor system flows from the subject site have been allocated for within the existing storm sewer systems located on the adjacent private roads within the KWRC. The majority of subject site is comprised of drainage areas P27, R27A, and R27B on the *Storm Drainage Area Plan* prepared by IBI Group. The limits of subject site also forms part of drainage areas D11, D13, D25 and D26, however, portions of these boundaries include off-site area (refer to additional discussion under **Section 8.2**). The IBI design has allocated a 5-year peak flow of 299.79 L/s from the subject site within pipe run MH27 to MH26 on Cabela's Way (refer to *KWRC Storm Sewer Design Sheet).* Therefore, the minor system outlet for the subject site shall be located downstream of MH27. Refer to the *KWRC Storm Drainage Area Plan* and the *KWRC Storm Sewer Design Sheet* provided in **Appendix E** for more details.

7.2 Design Criteria

In keeping with the overarching IBI Report, the proposed storm sewer system has been designed using the following parameters:

Design Level of Service	5-Year event
Inlet Time of Concentration	10 minutes
Rainfall Intensity	City of Ottawa IDF curve equations
Manning's Roughness Coefficient	0.013
Minimum Full Flow Velocity	0.80 m/s
Maximum Full Flow Velocity	3.0 m/s
Minimum Pipe Diameter	250 mm
Runoff Coefficients	0.90 for impervious areas (hard surface area and roofs) 0.80 for gravel surfaces 0.20 for pervious areas

7.3 Proposed Storm Servicing

Stormwater runoff from the commercial building site will be captured by a proposed storm sewer system and conveyed to EXMH 33 at the intersection of Kanata West Centre Drive and Cabela's Way. Stormwater runoff from the Halo site will be captured by an independent storm sewer system and conveyed to the existing 825 mm diameter storm sewer on Cabela's Way, upstream of EXMH 33. Using the Rational Method, the full 5-year peak minor system flow from the commercial building site to EXMH 33 is 162.22 L/s (refer to storm sewer design sheet). The full 5-year peak minor system flow from the Halo site to EXMH 33 is 81.40 L/s. Therefore, the total 5-year peak flow is 243.62 L/s which is below the allocated flow of 299.79 L/s from the IBI design.

As per *Section 6.8.1* of the Geotechnical Investigation, perimeter foundation drainage is not considered necessary for slab-on-grade structures provided that the floor slab level is above the finished exterior ground surface level. Since all the commercial buildings will be slab-on-grade no storm services to collect foundation drainage will be required.

Runoff from the commercial building roofs will be collected by trough systems (designed by the Mechanical Engineer) and conveyed internally through the buildings to the proposed building storm services. Commercial Buildings C, D, and E will each be provided with a 250 mm diameter storm service to convey roof flows. The proposed storm sewer system has been designed to have capacity to convey the full 100-year peak flow from the roof areas.

Commercial Buildings B and F will each be provided with a 250 mm diameter storm service to convey roof flows to infiltration galleries located within the parking lot. Although infiltration is expected to occur, the proposed storm sewer system has been designed to have capacity to convey the full 100-year peak flow from the roof areas.

Building A will be serviced for roof flows via an extension of the existing 250 mm diameter stub which outlets to EXMH 11 on Kanata West Centre Drive.

The proposed on-site storm sewers range from 250 mm to 525 mm in diameter. The sewers have been designed to have capacity to convey the full 5-year peak design flow and be within the acceptable full flow velocity range as per the OSDG. The capacity of the proposed storm sewer system has also been assessed for the 100-year design event using restricted flows to demonstrate that the system will not be surcharged for up to and including the 100-year event. Refer to the storm sewer design sheet, Storm Drainage Area Plan (DWG. 23021-STM1), and runoff coefficient calculations provided in **Appendix E** for more details. Design details for the Halo site (prepared by LRL Engineering) are provided under **Appendix F**.

8.0 STORMWATER MANAGEMENT DESIGN

8.1 Design Criteria

The IBI Report provides updated stormwater management design criteria for the KWRC portion of the KWBP. The design criteria were prepared in accordance with the following overarching reports for the KWBP:

- Kanata West Master Servicing Study (KWMSS), prepared by Stantec and CCI/IBI Group, dated 2006.
- Kanata West Business Park Stormwater Management Report and Pond 6 West Design Brief, prepared by IBI Group, dated November 2015.
- Addendum Report: Kanata West Business Park Stormwater Management Report and Pond 6 East Design Brief, prepared by IBI Group, dated November 2015.

In keeping with the IBI Report, the following stormwater management design criteria have been implemented for the subject site:

- A dual drainage design (minor and major system).
- Peak runoff must be controlled to the modelled rates for the 5-year and 100-year events in accordance with the IBI Report.
- Provide on-site quantity storage in excess of the allowable release rates for up to and including the 100-year design event.
- Quality control is provided by the existing Pond 6 West Stormwater Management Facility.

8.2 Allocated Flows

The overall stormwater management design for the KWRC was modelled by IBI Group using SWMHYMO. *Table 4.2* (provided in **Appendix E**) from the IBI Report provides modelled peak runoff and capture rates for each drainage area within the KWRC for the 5-year and 100-year

design storm events. The boundaries for drainage areas P27, R27A, and R27B are fully contained within the limits of the subject site. These drainage areas have been allocated for within the existing storm sewer system on Cabela's Way within pipe run MH27 to MH26. The cumulative capture rate for these areas is 289 L/s and 353 L/s for the 5-year and 100-year design events respectively. Since runoff from these areas was assumed (in the IBI design) to be controlled on-site, any flows in excess of these capture rates needs to be stored on-site. The boundary for drainage area R13 is also fully contained within the limits of the subject site. Area R13 has been allocated for within the existing storm sewer system on the Kanata West Centre Drive within pipe run MH13 to MH14.

The limits of subject site also forms part of drainage areas D11, D13, D25 and D26, however, portions of these boundaries include off-site area (i.e. private road right-of-ways already constructed and adjacent blocks to be developed). To account for off-site areas, the modelled peak runoffs must be pro-rated by the area contained within the limits of the subject site.

Drainage area D11 has been allocated for within pipe run MH11 to MH12 on Kanata West Centre Drive via the existing curb inlet catch basins. *Table 4.2* from the IBI Report notes that drainage area D11 has a modelled peak runoff of 61 L/s and 112 L/s for the 5-year and 100-year design events respectively. The capture rate is noted as 61 L/s and 68 L/s for the 5-year and 100-year design events respectively. This indicates that runoff will be fully captured during the 5-year event and that surface storage within the existing road sags will be provided during the 100-year event. The D11 drainage boundary has a total area of 0.25 ha, however, the subject site contribution is 0.13 ha. Therefore, the peak runoff from the subject site tributary to pipe run MH11 to MH12 must be controlled to pro-rated rates of 31.7 L/s and 58.2 L/s for the 5-year and 100-year events respectively.

Drainage area D13 has been allocated for within pipe run MH13 to MH14 on Kanata West Centre Drive via the existing curb inlet catch basins. *Table 4.2* from the IBI Report notes that drainage area D13 has a modelled peak runoff of 28 L/s and 49 L/s for the 5-year and 100-year design events respectively. The capture rate is noted as 26 L/s and 28 L/s for the 5-year and 100-year design events respectively. This indicates that runoff will be close to fully captured during the 5-year event and that surface storage within the existing road sags will be provided during the 100-year event. The D13 drainage boundary has a total area of 0.10 ha, however, the subject site contribution is 0.03 ha. Therefore, the peak runoff from the subject site tributary to pipe run MH13 to MH14 must be controlled to pro-rated rates of 8.4 L/s and 14.7 L/s for the 5-year and 100-year events respectively.

Drainage area D25 has been allocated for within pipe run MH25 to MH26 on Cabela's Way via the existing curb inlet catch basins. *Table 4.2* from the IBI Report notes that drainage area D25 has a modelled peak runoff of 19 L/s and 34 L/s for the 5-year and 100-year design events respectively. The capture rate is noted as 18 L/s and 19 L/s for the 5-year and 100-year design events respectively. This indicates that runoff will be fully captured during the 5-year event and that surface storage within the existing road sags will be provided during the 100-year event. The D25 drainage boundary has a total area of 0.16 ha, however, the subject site contribution is 0.03 ha. Therefore, the peak runoff from the subject site tributary to pipe run MH25 to MH26 must be controlled to pro-rated rates of 3.6 L/s and 6.4 L/s for the 5-year and 100-year events respectively.

Drainage area D26 has been allocated for within pipe run MH26 to MH33 on Cabela's Way via the existing curb inlet catch basins. *Table 4.2* from the IBI Report notes that drainage area D26 has a modelled peak runoff of 22 L/s and 39 L/s for the 5-year and 100-year design events respectively. The capture rate is noted as 21 L/s and 22 L/s for the 5-year and 100-year design events respectively. This indicates that runoff will be close to fully captured during the 5-year event and that surface storage within the existing road sags will be provided during the 100-year event. The D26 drainage boundary has a total area of 0.08 ha, however, the subject site

contribution is 0.03 ha. Therefore, the peak runoff from the subject site tributary to pipe run MH26 to MH33 must be controlled to pro-rated rates of 8.3 L/s and 14.6 L/s for the 5-year and 100-year events respectively.

The IBI Report for the KWRC does not discuss uncontrolled free flow areas to the Campeau Drive and Palladium Drive storm sewer systems. However, interpolation of the *KWRC Storm Drainage Area Plan* indicates that approximately 0.11 ha of perimeter area was designed to be uncontrolled. Using the Rational Method, the allocated free flow has been calculated to be 16.4 L/s and 35.0 L/s for the 5-year and 100-year design events respectively.

The pro-rated allocated flows have been summarized in **Table E1** provided in **Appendix E**. Refer also to **Figure 3 – Site Contribution Area Plan** provided in **Appendix E**.

8.3 Outflows

For the commercial building site, runoff from the parking lot area will be captured by surface inlet catch basins and conveyed to the on-site storm sewer system. The catch basins located within the parking areas (drainage areas STM1, STM2 and STM3) will be equipped with inlet control devices (ICDs) to restrict flows to the minor system during larger storm events (refer to **Section 8.4** below). The catch basins located within landscape areas (drainage areas STM4, STM5 and STM6) will be uncontrolled to eliminate surface ponding for up to and including the 100-year design event.

For the Halo site, runoff will be captured by surface inlet catch basins and catch basin manholes and conveyed to the independent on-site storm sewer system. Runoff from the Halo site will be controlled by an inline orifice located within CBMH06 (refer to LRL design drawings in **Appendix F**).

Runoff from the building roofs (drainage areas R1-R6) will be conveyed to the on-site storm sewer system via the building service connections. The buildings have not been designed to provide roof storage and therefore the roof areas are assumed to be uncontrolled.

The perimeter of the subject site adjacent to Kanata West Centre Drive (drainage area FF2) will be conveyed uncontrolled to the private roadway where it will be captured by existing curb inlet catch basins and conveyed to the existing storm sewer system within pipe run MH11 to MH12. The runoff will be controlled to the capture rates of the IBI design by the existing storm system controls.

The perimeter of the subject site adjacent to Kanata West Centre Drive (drainage area WS-07) will be conveyed uncontrolled to the private roadway where it will be captured by existing curb inlet catch basins and conveyed to the existing storm sewer system within pipe run MH12 to MH33 (refer to LRL design drawings in **Appendix F**). The runoff will be controlled to the capture rates of the IBI design by the existing storm system controls.

The perimeter of the subject site adjacent to Cabela's Way (drainage area WS-09) will be conveyed uncontrolled to the private roadway where it will be captured by existing curb inlet catch basins and conveyed to the existing storm sewer system within pipe run MH25 to MH26 (refer to LRL design drawings in **Appendix F**). The runoff will be controlled to the capture rates of the IBI design by the existing storm system controls.

The perimeter of the subject site adjacent to Cabela's Way (drainage area WS-08) will be conveyed uncontrolled to the private roadway where it will be captured by existing curb inlet catch basins and conveyed to the existing storm sewer system within pipe run MH26 to MH33 (refer to LRL design drawings in **Appendix F**). The runoff will be controlled to the capture rates of the IBI design by the existing storm system controls.

The perimeter of the subject site adjacent to Campeau Drive and Palladium Drive (drainage area FF1 and WS-10) will be conveyed uncontrolled to the municipal roadways where it will be captured by existing curb inlet catch basins and conveyed to the existing storm sewer systems. The runoff will be controlled to the capture rates of the overall IBI KWBP design by the existing storm system controls.

The outflows from the subject site have been summarized in **Table 8.1** below. A more detailed summary which demonstrates the pro-rated values from the IBI design is shown in **Table E1** provided in **Appendix E**.

Table 8.1: Outflow Summary

Drainage Area ID	5-YR Outflow (L/s)	100-YR Outflow (L/s)	Drainage Area Restriction
STM1	20.6	21.0	Controlled via ICD
STM2	29.0	30.0	Controlled via ICD
STM3	29.1	30.0	Controlled via ICD
WS-01 to WS-06	78.51	78.51	Controlled via Inline Orifice[*1]
Sub-Total	**157.2**	**159.5**	**Controlled Flows**
STM4	1.0	2.1	Uncontrolled
STM5	0.9	2.0	Uncontrolled
STM6	1.6	3.4	Uncontrolled
R1	11.4	21.8	Uncontrolled
R2	23.3	44.3	Uncontrolled
R3	9.7	18.5	Uncontrolled
R4	12.6	17.6	Uncontrolled
R5	15.6	29.7	Uncontrolled
R6	18.7	35.7	Uncontrolled
FF1	18.0	38.7	Uncontrolled[*2]
FF2	13.6	29.2	Uncontrolled[*2]
WS-07	4.1	8.9	Uncontrolled[*1,2]
WS-08	2.2	4.7	Uncontrolled[*1,2]
WS-09	5.1	11.0	Uncontrolled[*1,2]
WS-10	1.1	2.3	Uncontrolled[*1,2]
Sub-Total	**139.0**	**269.8**	**Uncontrolled Flows**
Total	**296.2[3]**	**429.3[*3]**	
Allowable	**373.3[*4]**	**498.0[*4]**	

Notes:

1. Refer to Halo design details in **Appendix F**.
2. Drainage areas free flow from site boundary but are controlled by existing ICDs within the access roads as per approved IBI design.
3. Total flow values are calculated using unrounded numbers. Small discrepancies may occur using manual computations from table.
4. Allowable flows as per approved IBI design. Refer to *Table 4.2* from KWRC Design Brief (2016).

5. Refer to **Table E1** in **Appendix E**.

The uncontrolled outflow from drainage area WS-09 to the existing pipe run upstream of MH26 marginally exceeds the allocated rates from the IBI design (increase of 4.6 L/s during the 100-year event). However, the pipe run is noted as having 78.27 L/s (58.8%) available capacity and therefore can accommodate the marginal increase in flows. Overall, the total outflows from the subject site do not exceed the allocated flows from the IBI design during the 5-year and 100-year design events and therefore have been designed in keeping with the overarching IBI Report. Refer to supporting flow calculations provided under **Appendix E** for more details. Design details for the Halo site (prepared by LRL Engineering) are provided under **Appendix F**.

8.4 Inlet Control Devices (ICDs)

For the commercial building site, the catch basins located within the parking areas (CB 1, CB 2, and CB 3) will be equipped with inlet control devices (ICDs) to restrict flows to the minor system during larger storm events. The catch basins located within landscape areas (CB 4, CB 5, and CB 6) will be uncontrolled to eliminate surface ponding for up to and including the 100-year design event. For the Halo site, runoff will be controlled by an inline orifice located within CBMH06. Using allocated release rates for the 100-year event and available heads, the ICDs have been sized using the orifice equation (OSDG Section 8.3.8.1). ICD details have been summarized in **Table 8.2** below.

Table 8.2: ICD Details

Structure	2-YR Outflow (L/s)	5-YR Outflow (L/s)	100-YR Outflow (L/s)	Orifice Diameter (mm)
CB 1	19.8	20.6	21.0	88.7
CB 2	27.8	29.0	30.0	106.5
CB 3	27.8	29.1	30.0	105.2
CBMH06[*1]	78.51	78.51	78.51	250VHV-2

Notes:
1. Design by LRL Engineering. Refer to **Appendix F**.

Refer to the ICD calculations provided in **Appendix E** for more details. Design details for the Halo site (prepared by LRL Engineering) are provided under **Appendix F**.

8.5 Quantity Storage

To restrict the site's runoff to the outflows noted in **Section 8.3** above, on-site quantity storage will be required. Quantity storage will be provided as surface storage at the catch basin locations. Using the Modified Rational Method, required storage volumes have been calculated for controlled drainage areas (STM1, STM2, and STM3). For the Halo site, all drainage areas upstream of CBMH06 will be controlled by the inline orifice. Required and provided storage volume details have been summarized in **Table 8.3** below.

Table 8.3: Quantity Storage Details

Drainage Area	5-YR Required (m^3)	5-YR Provided (m^3)	100-YR Required (m^3)	100-YR Provided (m^3)
STM1	3.0	5.8	16.9	17.7
STM2	4.1	5.8	28.3	29.4
STM3	5.8	6.6	28.6	34.0
Halo Site[*2]	6.28	8.21	67.25	74.97

Notes:
1. Provided storage volumes calculated using AutoCAD Civil 3D by Autodesk.
2. Design by LRL Engineering. Refer to **Appendix F**.

As demonstrated in **Table 8.3** above, adequate on-site storage has been provided for all design events up to and including the 100-year event. Refer to the storage volume calculations provided in **Appendix E** for more details. Design details for the Halo site (prepared by LRL Engineering) are provided under **Appendix F**.

As discussed under **Section 8.3**, the saw-tooth construction of the adjacent private roads have been designed (by IBI Group) to provide quantity storage for their respective drainage areas (which includes uncontrolled portions of the subject site).

8.6 Surface Ponding

To provide quantity storage within the parking lot areas, surface ponding will be required. Surface ponding details for the on-site catch basins have been summarized in **Table 8.4** below.

Table 8.4: Surface Ponding Details

Structure	2-YR Ponding Depth (m)	5-YR Ponding Depth (m)	100-YR Ponding Depth (m)
CB 1	0.0	0.12	0.18
CB 2	0.0	0.12	0.22
CB 3	0.0	0.13	0.23
CB 4	0.0	0.0	0.0
CB 5	0.0	0.0	0.0
CB 6	0.0	0.0	0.0
CB03	0.0	0.0	0.0
CB01[*2]	0.0	0.0	0.0
CBMH02[*2]	0.0	0.0	0.0
CBMH03[*2]	0.0	0.0	0.15
CB04[*2]	0.0	0.06	0.25
CBMH05[*2]	0.0	0.11	0.30
CBMH06[*2]	0.0	0.0	0.10

Notes:
1. Ponding depths are measured from the ponding elevation to the top of grate elevation.
2. Design by LRL Engineering. Refer to **Appendix F**.

As demonstrated in **Table 8.4** above, no surface ponding will occur during the 2-year design event in accordance with the current OSDG. The maximum ponding depths during the 100-year event are less than 0.30 m, also in accordance with the OSDG.

8.7 Major System

Cascading overland flow from the majority of the KWRC is conveyed from the northwest to the southeast, discharging to Feedmill Creek. Refer to *Figure 2 – Post-Development SWM Boundaries*, prepared by IBI Group for the KWBP in **Appendix E**. For the commercial building site, major system flows from the parking lot (drainage areas STM1, STM2, STM3 and STM4) will be conveyed to Kanata West Centre Drive via the proposed entrance connection. For the Halo site, major system flows from the parking lot will also be conveyed to Kanata West Centre Drive via the proposed entrance connection. Major system flows for the landscape area between the two sites (drainage areas STM5 and STM6) will also be conveyed to Kanata West Centre Drive. Since adequate on-site storage will be provided (refer to **Section 8.5**), no major system flows from controlled drainage areas shall occur for up to and including the 100-year design event. A minimum freeboard of 0.30 metres has been provided between the spillover elevations and the adjacent building finished floor elevations.

8.8 Infiltration

The Carp River Watershed/Subwatershed Study (CRWS) provided water balance calculations and outlined infiltration targets within the subwatershed area from the stormwater management perspective, based on soil characteristics. Following the CRWS, infiltration targets for the Kanata West development were established within the KWMSS. That study indicated that a range of 50 to 70 mm/year of runoff be infiltrated from the eastern portion of the KWBP site. The KWMSS also indicated that post development infiltration rates are to be increased by 25% above these pre-development rates to compensate for areas (i.e. roadway corridors) that cannot provide infiltration. For the KWRC the infiltration target is 75 mm/year as noted in *Section 4.3.4* of the IBI Report. In keeping with the IBI design, infiltration galleries fed by roof drains will be provided to achieve the required infiltration rates for the subject site.

Runoff from the Building B and Building F roofs will be conveyed to proposed infiltration galleries located within the parking lot. The proposed infiltration galleries have been designed using guidelines from the Low Impact Development Stormwater Management Planning and Design Guide (herein referred to as the LID Manual). The proposed infiltration galleries have also been sized to have capacity to detain roof drainage for the 90th percentile storm event for the Ottawa area. Rainfall data has been referenced from the report titled Runoff Volume Control Targets for Ontario Final Report, prepared by Aquafor Beech Ltd. and Earthfx Inc. (herein referred to as the Aquafor Beech Report).

<u>Infiltration Gallery #1 (Building B Roof)</u>

Required Storage Volume:

90th Percentile Daily Volume = 0.0216 m (*Aquafor Beech Report Table 3.16, **Appendix E***)

Roof Area = 892 m^2

Required Storage Volume = (0.0216 m) x (892 m^2) = **19.3 m^3**

Provided Storage Volume:

Infiltration Gallery Bottom Area = 96.0 m^2 (16.0 m length x 6.0 m width)

Infiltration Gallery Depth = 0.60 m (measured from pipe inverts to gallery bottom)

Infiltration Gallery Storage Media Porosity = 0.40 (50 mm diameter clear stone)

Provided Storage Volume = (96.0 m^2) x (0.60 m) x (0.40) = **23.0 m^3**

Infiltration Gallery #2 (Building F Roof)

Required Storage Volume:

90th Percentile Daily Volume = 0.0216 m (*Aquafor Beech Report Table 3.16,* ***Appendix E***)

Roof Area = 694 m^2

Required Storage Volume = (0.0216 m) x (694 m^2) = **15.0 m^3**

Provided Storage Volume:

Infiltration Gallery Bottom Area = 66.0 m^2 (11.0 m length x 6.0 m width)

Infiltration Gallery Depth = 0.60 m (measured from pipe inverts to gallery bottom)

Infiltration Gallery Storage Media Porosity = 0.40 (50 mm diameter clear stone)

Provided Storage Volume = (66.0 m^2) x (0.60 m) x (0.40) = **15.8 m^3**

As calculated above, the proposed infiltration galleries have been designed to provide storage volumes greater than the 90th percentile daily rainfall volume taken over their respective roof areas. Therefore, the infiltration galleries have capacity to detain up to 90 percent of storm events each year.

Infiltration Target:

Target Infiltration Rate = 75 mm/year
Average Annual Precipitation = 0.925 m (*Aquafor Beech Report Figure 3.41,* ***Appendix E***)
Total Roof Area = 1,586 m^2 (Building B plus Building F)
Total Site Area = 15,481 m^2 (includes commercial building site and Halo site)

Average Annual Precipitation = (0.925 m) x (1,586 m^2) = 1,467 m^3

Average Site Infiltration Rate = (1,467 m^3) / (15,481 m^2) x 1000 = 94.76 mm/yr

Effective Site Infiltration Rate = (94.76 mm/yr) x (0.90) = **85.29 mm/yr**

Using precipitation data from the Aquafor Beech Report and site parameters, the effective site infiltration rate from the Building B and Building F roof areas has been calculated to be 85.29 mm/year which exceeds the target infiltration rate of 75 mm/year. Therefore, the subject site has been designed to meet infiltration targets in accordance with the IBI Report and overarching reports for the subwatershed area.

Section 4.4 of the LID Manual states that the maximum allowable depth of a stone reservoir can be calculated using the following equation:

$d_{max} = i * t / V_r$

where:

d_{max} = maximum stone reservoir depth (mm)
i = infiltration rate for native soils (mm/hr)
V_r = void ratio (0.4 for clear stone)
t = time to drain (48 hrs recommended)

Section 6.5 of the Geotechnical Investigation indicates that the site is underlain by relatively low permeability silty clay soils with infiltration rates of 14 mm/hr. Higher permeability silt and silty sand to sandy silt was encountered at depths ranging from 1.8 m to 4.0 m below original ground surface. It is recommended that the bottom of the infiltration galleries extend below the silty clay layer or that the silty clay is excavated and backfilled with higher permeability soils. During construction, a Geotechnical Consultant should review the native material at the bottom of the proposed infiltration gallery and advise if additional excavation is required. To be conservative, the infiltration rate of the low permeability soils of 14 mm/hr with a factor of safety of 2.5 has been applied to the calculation below.

I_{design} = 14 mm/hr / 2.5 = 5.6 mm/hr

d_{max} = (5.6 mm/hr) x (48 hrs) / 0.40 = 672 mm = **0.67 m**

The proposed infiltration gallery depths of 0.6 m (active depth below perforated pipe invert) are less than the maximum allowable depth of 0.67 m calculated using the equation from the LID Manual for a recommended 48 hour drawdown time.

Section 4.4 of the LID Manual also states that the required footprint surface area of a stone reservoir can be calculated using the following equation:

$A_f = WQV / (d * V_r)$

where:

A_f = footprint surface area (m^2)
WQV = water quality volume (m^3)
d = stone reservoir depth (m)
V_r = void ratio (0.40 for clear stone)

$A_{GALLERY1}$ = (19.3 m^3) / (0.6 m x 0.40) = **80.3 m^2**

$A_{GALLERY2}$ = (15.0 m^3) / (0.6 m x 0.40) = **62.5 m^2**

The proposed infiltration gallery footprint areas exceed the minimum required areas calculated using the equation from the LID Manual. Based on the calculations above, it has been demonstrated that the infiltration galleries have been designed in accordance with the LID Manual for depth and footprint area.

Groundwater

Typically, infiltration-based LID options require an offset between the bottom of the facility invert and the seasonally high groundwater table for optimal performance (typically 1.0 m desired). Site specific investigations are required to assess whether high groundwater conditions are present. As detailed in the Geotechnical Investigation, GEMTEC installed monitoring wells in borehole 23-02 and 23-04 to measure stabilized groundwater conditions

for the subject site. Based on readings taken in May 2023, the groundwater elevation was observed to be between 101.50 m and 101.60 m.

The bottom of the proposed infiltration gallery ranges from an elevation of 102.37 m to 102.48 m for gallery #1 and 102.62 m to 102.72 m for gallery #2. The minimum separations from the measured groundwater level are 0.77 m and 1.02 m for the two galleries respectively. It should be noted that long-term static groundwater levels are often lower under post-development conditions, and therefore sufficient separation has been provided. The function of an infiltration gallery may be limited during seasonal high groundwater conditions, however, the infiltration practice is still feasible during the remainder of the year when groundwater levels are lower.

Overflow/ Bypass

In the event that infiltration into the surrounding soil is not being achieved (i.e. fine sediment accumulation or high groundwater table), stormwater would bypass through the infiltration galleries via the perforated storm pipes and outlet to the storm sewer system downstream. In the event of a blockage within the infiltration galleries, 250 mm diameter overflow/ bypass pipes have been provided between the upstream and downstream manholes. The overflow/ bypass pipes have been designed to have capacity to convey the peak 100-year design event from the tributary roof areas.

8.9 Hydraulic Grade Line (HGL) Analysis

As noted in *Section 4.6* of the IBI Report, the hydraulic grade line (HGL) within the storm sewers of the KWBP is dictated by water levels in Feedmill Creek and water levels in the Pond 6 West and Pond 6 East facilities. Due to the permanent water level within the Pond 6 West and Pond 6 East Facilities, some of the storm sewers within the KWBP will be partially submerged. A summary of the 100-year HGL analysis for the KWBP has been provided in *Table 4.8* of the IBI Report (refer to **Appendix E**).

An HGL analysis has been prepared for the proposed on-site storm sewer system based on a downstream 100-year HGL elevation of 103.48 m at MH14 (modelled by IBI Group using 100-year 12 hour SCS storm event). A HGL elevation was not provided for MH33 (i.e. site outlet), therefore, the closest HGL elevation was used for the analysis. It should be noted that the modelled 100-year HGL using the 100-year 3 hour Chicago storm event is lower at an elevation of 102.96 m. The HGL analysis has determined that the 100-year HGL will remain below the top of grate/cover elevations of the on-site storm manholes/catch basins and remain below the proposed building finished floor elevations. Refer to the HGL calculations provided in **Appendix E** for more details.

8.10 Quality Control

The Pond 6 West Facility is located at the western edge of the KWBP, north of Feedmill Creek. The facility provides water quality (and quantity) control for the development west of Palladium Drive (refer to *Figure 2 – Post-Development SWM Drainage Boundaries Overall Site*, prepared by IBI Group, in **Appendix E**). The facility discharges to Feedmill Creek in accordance with the *Kanata West Business Park Stormwater Management Report and Pond 6 West Design Brief*, prepared by IBI Group. Additional on-site quality control is not required for the subject site as the minor storm system is tributary to the Pond 6 West Facility.

8.11 Low Impact Development (LID)

Low Impact Development (LID) is a stormwater management strategy that seeks to mitigate the impacts of increased runoff and stormwater pollution by managing runoff as close to its source as possible. LID comprises a set of site design strategies that minimize runoff through

distributed, small scale structural practices that mimic natural or predevelopment hydrology through the processes of infiltration, evapotranspiration, harvesting, filtration and detention of stormwater. These practices can effectively remove nutrients, pathogens and metals from runoff, and they reduce the volume and intensity of stormwater flows. For the subject site, LID measures will be achieved via the use of infiltration galleries fed by runoff from the roofs of Buildings B and F. Refer to **Section 8.8** for more details.

9.0 EROSION AND SEDIMENT CONTROL

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

- Limiting the extent of exposed soils at any given time.
- Erosion and sediment control measures shall be maintained until vegetation has been re-established in all disturbed areas. Re-vegetate disturbed areas in accordance with approved Landscape Plan as soon as possible.
- Stockpile soil away (15 metres or greater) from watercourses, drainage features and top of steep slopes.
- Installation of silt sacks between frame and cover on all proposed and existing catch basins and open cover storm manholes until construction is completed.
- Silt fence to be installed and maintained along the property boundaries.
- Install mud mats at all construction entrances.
- During active construction periods, visual inspections shall be undertaken on a weekly basis and after major storm events (>25mm of rain in 24 hour period) on ESC and any damage repaired immediately.
- ESC shall also be assessed (and repaired as required) following significant snowmelt events.
- Visual inspections shall also be undertaken in anticipation of large storm events (or a series of rainfall and/or snowmelt days) that could potentially yield significant runoff volumes.
- Care shall be taken to prevent damage to ESC during construction operations.
- In some cases, barriers may be removed temporarily to accommodate construction operations. The affected barriers shall be reinstated immediately after construction operations are completed.
- ESC should be adjusted during construction to adapt to site features as the site becomes developed.
- ESC shall be cleaned of accumulated sedimentation as required and replaced as necessary.
- During the course of construction, if the Engineer believes that additional prevention methods are required to control erosion and sedimentation, the Contractor shall implement additional measures, as required, to the satisfaction of the Engineer.
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) 805.

Refer to the Erosion and Sediment Control Plan (DWG. 23021-ESC1) provided in **Appendix B** for more details.

10.0 CONCLUSIONS

This servicing and stormwater management report has been prepared to support the Site Plan Application for the development of the property located at 3095 Palladium Drive, within the KWRC. The report has detailed the proposed means of servicing the site and provided details on how to meet the stormwater management requirements in accordance with City of Ottawa guidelines and the overarching IBI Report prepared for the KWRC. The proposed servicing and stormwater management designs will be achieved by implementing the following key features:

- Domestic water supply will be provided by a new watermain connections to the existing private watermains on Kanata West Centre Drive and Cabela's Way.
- Water supply for fire protection will be provided by new on-site hydrants and the existing private hydrants adjacent to the site.
- Sanitary flows will be conveyed to the existing private sanitary sewer systems on Kanata West Centre Drive and Cabela's Way.
- Proposed storm sewer (minor) systems will be conveyed to the existing storm sewer system on Cabela's Way, upstream of MH33.
- Stormwater outflows for all storm events up to and including the 100-year design storm will be controlled in accordance with the IBI Report.
- On-site storage will be provided for all storm events up to and including the 100-year design storm event.
- Major overland flows will be conveyed to Kanata West Centre Drive.
- Two infiltration galleries, fed by roof drains, will be utilized to meet the infiltration targets for the site.
- Quality control will be provided by the existing Pond 6 West Facility.
- Erosion and sediment control measures will be implemented prior to construction and maintained until vegetation has been re-established in disturbed areas.

Report Prepared By:

Brandon MacKechnie, P.Eng.
Project Engineer

Report Reviewed By:

Chris Collins
Manager Land Development

Appendix A

Pre-Consultation Notes

General Plan of Services
(prepared by IBI Group)

As-Built General Plan of Services
(prepared by IBI Group)

Pre-Application Consultation Meeting Notes

Property Address: 3095 Palladium Drive
PC2023-0026
February 9, 2023 – Teams Meeting

Attendees:

Dave Melkie, Quaestus
Barry Godfrey, Quaestus
Tim Eisner, JFSA
Jocelyn Chandler, JFSA
Allan Stone, Architect
Andrew Harte, CGH Transportation
Derek Howe, Taggart
Dave Meikle, DBM Consulting
Chris Collins, EXP Engineering
Molly Smith, Planner II
Alex Gatien, Planner I
Selma Hassan, Urban Design
Laura Hagerman, Parks Planning
Kimberley Baldwin, Parks Planning
Mark Elliot, Environmental Planning
Shika Rathnasooriya, Infrastructure Project Manager
Josiane Gervais, Transportation Project Manager

Regrets: Nancy Young, Forestry

Subject: 3095 Palladium Retail Development.

Meeting notes:

Overview of Proposal

- The proposal is for a multi-tenant shopping centre on roughly the northern two thirds of the site with a car wash on the southern portion of the site. The site is located at the southwest corner of the intersection of Palladium Drive and Campeau Drive.

- The development will require a site plan control application and plan of condominium. Zoning By-law Amendment to permit a car wash is being contemplated.

- The intention is to apply for an ZBA and SPC concurrently. Current OP policies may make the introduction of a car wash difficult to support.

- The intention is to apply for SPC for the neighbouring site to the west (3075 Palladium) at roughly the same time. The neighbouring site is under different ownership but same consulting team.

- Site is part of a previous plan of subdivision and site plan control application (D07-12-15-0016 and D07-12-16-0122). Conditions on page 40 of the subdivision agreement relate to the left turning lane on Palladium Drive, relevant to the application.

Preliminary comments and questions from staff and agencies, including follow-up actions:

- **Planning**

  - The site is designated as Neighbourhood in the Suburban West Transect of the Official Plan.
  - The language in the official plan requires applications to meet the full intention and policies of Section 6.3 – Neighbourhoods. This designation has strict requirements for what kind of non-residential uses are permitted and the design. <u>All policies</u> that speak to non-residential uses must be met due to the language of 'shall' instead of 'should'
    - Specifically policies for non-residential uses:
      - 6.3.1
      - 6.3.2
      - 6.3.3
    - The applicant is encouraged to discuss with staff if the car wash is viable after a redesign to address OP policies. The current design of the car wash would not be supported.
  - With the current concept plan, can't comments on any zoning deficiencies. Please include a full zoning statistics table on the site plan upon submission.
  - Ensure sidewalk connections exist, especially to nearby transit stops.
  - Maximize tree planting and landscaping. Ensure that there is adequate tree planting space, especially along the perimeter of the site and within parking lot islands.
  - Please keep in mind that once Bill 109 is enacted (July 1st 2023), multiple planning applications cannot be filed at the same time. Ex. Rezoning and Site Plan Control – a rezoning would need to complete the appeal period before a site plan application can be filed.

- **Urban Design**

  - A Design Brief is required. A Terms of Reference for the Brief is attached. All elements highlighted in yellow must be addressed in written and graphic format.
  - The City's Urban Design Guidelines for Large Format Retail apply to this site. The Design Brief is to address these guidelines and, in particular, focus on a response to the guidelines related to building orientation and interface with the public realm, treatment of blank walls and service areas, and landscaping. Please note that the quoted recommended soil volume for trees may be out of date and Forestry's current standards are to apply.
  - As noted in the guidelines, such plazas are to address the street as much as possible through:
    - Entrances on the street
    - Real windows on the street
    - Corner units with glazing that wraps the unit and faces the street
    - Use of architectural elements and colour to animate the street
    - Landscaping

    These elements are to be addressed in the submitted drawings and Design Brief.

  - Should the applicant pursue the carwash, the City's Urban Design Guidelines for Drive-throughs must also be addressed in the Design Brief.

- Older retail plazas in the City are undergoing redevelopment and intensification. All new plazas are to be designed considering the logical evolution of the site (as note in the Design Guidelines). If the applicant does not pursue the car wash and the entire site develops as a large format retail, the applicant is asked to provide alternate layouts that considers the site as a whole, shows how the two parcels would work together now and with future redevelopment / intensification.
- The submitted Site and Landscape Plans are to clearly show the location and width of pedestrian walkways within the site, as well as walkway connections to the public sidewalks around the site.
- The submitted Site and Landscape Plan are to show the locations of all primary and exit doors.
- Site landscaping will be important. The applicant's landscape architect is to include robust tree planting within and surrounding the site. The submitted drawings must indicate the soil volumes provided and show planting details for hard and soft surface conditions. The selected species must be successful in urban conditions (salt, drought, compaction).
- If the car wash is pursued, the applicant is asked to provide alternate layouts that would internalize the cueing lanes and provide built form parallel and adjacent to the ROW.

- **Engineering**

  - The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications

  - Servicing and site works shall be in accordance with the following documents:
    - Ottawa Sewer Design Guidelines (October 2012)
    - Ottawa Design Guidelines – Water Distribution (2010)
    - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
    - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
    - City of Ottawa Environmental Noise Control Guidelines (January 2016)
    - City of Ottawa Park and Pathway Development Manual (2012)
    - City of Ottawa Accessibility Design Standards (2012)
    - Ottawa Standard Tender Documents (latest version)
    - Ontario Provincial Standards for Roads & Public Works (2013)

  - Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

  - Watermain Infrastructure:
    a) There are available 200mm and 250mm diameter private PVC watermains located the subdivision. A water boundary condition request is needed for the proposed water connection to the City main.

    b) 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.

    c) Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide an email to Shika Rathnasooriya (Thakshika.Rathnasooriya@ottawa.ca) with the following information:

i. Location of service
ii. Type of development and the amount of fire flow required (as per FUS, 1999 – See technical bulletin ISTB 2021-03).
iii. Average daily demand: ___ l/s.
iv. Maximum daily demand: ___l/s.
v. Maximum hourly daily demand: ___ l/s.

- Sanitary / Storm Infrastructure:
  a) There are available 200mm and 300mm diameter PVC and concrete sanitary sewers located southeast and southwest of the proposed site.
  b) All services (STM, SAN, WTR) should be grouped in a common trench to minimize the number of road cuts.
  c) Sewer connections to be made above the springline of the sewermain as per:
     i. Std Dwg S11.1 for flexible main sewers.
     ii. Std Dwg S11 (For rigid main sewers).
     iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method).
     iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.
- The Stormwater Management Criteria, for the subject site, is to be based on the following:
  a) The 5-yr and 100-yr post development peak flows for the development area are to be controlled to a release rate identified in the 'Design Brief , Kanata West Retail Centre 3015, 3075 and 3095 Palladium Drive' dated 2016. Onsite storage is to be provided for storm events up to and including the 100-yr storm event.
  b) There should be no stormwater ponding in parking areas or drive aisles during the 2-year storm event.
  c) Quality control to be provided by Pond 6 West.
  d) Infiltration targets maybe required for the site.
  e) The design of the storm sewers in the area are based on a 5-yr storm. If discharging to a storm sewer, the SWM criteria is to be based on the following for the development area:
     i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
     ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less.
     iii. A calculated time of concentration (Cannot be less than 10 minutes).
     iv. Flows to the storm sewer in excess of the 5-yr storm release rate, up to and including the 100-year storm event, must be detained on site.
- MECP ECA Requirements:

An MECP Environmental Compliance Approval (Private Sewage Works) will be required for the proposed development due to the proposed car wash.

- Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

- **Transportation**

  - Follow Transportation Impact Assessment Guidelines:
    - A TIA is required. Please submit the Scoping report to Josiane.gervais@ottawa.ca at your earliest convenience.
    - Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
    - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
    - As discussed, please ensure the TIA addresses the operations at the NB-LT lane on Palladium and how the operations relate to the subdivision condition to close the left-turn lane.
    - A joint TIA study for both 3095 and 3075 Palladium could be considered by the City provided that the timelines of both applications align. Separate title pages/introductions would be required for the individual applications. The iterative steps of the TIA must be followed. Any costs/delays resulting from providing both studies together would be the applicant's responsibility.
  - TMP shows future LRT station at Huntmar Drive (Ultimate Concept).
  - As the proposed site is commercial and for general public use, AODA legislation applies.
    - Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.
    - Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).
    - Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements. https://ottawa.ca/en/city-hall/creating-equal-inclusive-and-diverse-city/accessibility-services/accessibility-design-standards-features#accessibility-design-standards
  - On site plan:
    - Ensure site access meets the City's Private Approach Bylaw.
    - Show all details of the roads abutting the site; include such items as pavement markings, accesses and/or sidewalks.
    - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
    - Turning movement diagrams required for internal movements (loading areas, garbage).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and fall within TAC guidelines (Figure 8.5.1).
    - Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)
    - Parking stalls at the end of dead-end parking aisles require adequate turning around space

- **Environmental**

  - Already had a comprehensive environmental review for the subdivision. Should include a note that they will be followed.
  - Bird-Safe Design Guidelines should be incorporated into the design of the buildings to help reduce bird mortality in the presence of what will likely be substantial amounts of window coverage.
  - Urban Heat Island
    - There is a lot of impermeable surface on the proposed plans, which would contribute to the urban heat island effect and extreme heat events. Please add features that reduce the urban heat island effect (see OP 10.3.3) produced by the parking lot and a building footprint. For example, this impact can be reduced by adding large canopy trees, green roofs or vegetation walls, or constructing the parking lot or building differently.
  - Within the Carp river watershed, so there are runoff controls. Infrastructure comments address controls.
  - ESA will need to be updated. Must be within 18 months of submission.

- **Forestry**

  - A Tree Conservation Report and Landscape Plan are required, in accordance with the requirements below.
  - There are trees planted around the perimeter of the property which must be retained and protected through the planning and development of the site. Appropriate setbacks and tree protection fencing locations must be shown on the TCR.
  - The Landscape Plan must show where replacement and additional trees will be planted, with a priority of planting large-growing native species, to work towards 40% canopy cover.

  <u>Tree Conservation Report requirements:</u>

  1. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
     a. an approved TCR is a requirement of Site Plan approval.
     b. The TCR may be combined with the LP provided all information is supplied
  2. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
  3. Compensation may be required for the removal of city owned trees.
  4. The TCR must contain 2 separate plans:
     a. Plan/Map 1 - show existing conditions with tree cover information
     b. Plan/Map 2 - show proposed development with tree cover information
     c. Please ensure retained trees are shown on the landscape plan
  5. The TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, with information on the species, diameter and health condition
  6. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
  7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
  8. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at <u>Tree Protection Specification</u> or by searching Ottawa.ca
     a. the location of tree protection fencing must be shown on the plan

b. show the critical root zone of the retained trees

9. The new Official Plan places a strong priority on retention of existing trees. All opportunities to retain protected trees must be considered in the design of plans to maintain and improve the existing canopy cover of the site.
10. For more information on the process or help with tree retention options, contact Nancy Young nancy.young@ottawa.ca or on City of Ottawa

Tree planting requirements:

The Official Plan requires that "On urban properties subject to site plan control or community planning permits, development shall create tree planting areas within the site and in the adjacent boulevard, as applicable, that meet the soil volume requirements in any applicable City standards or best management practices or in accordance with the recommendation of a Landscape Architect;"

The Landscape Plan (LP) must account for the following:

Minimum Setbacks

- 1.5m from sidewalks, MUP/cycle tracks, and water service laterals
- 2.5m from curb
- Conifers: 4.5m setback from curb, sidewalk or MUP/cycle track/pathway
- Street Trees: 7.5m between large growing trees, 4m between small growing trees

- Park or open space planting: 10m spacing between trees, except where otherwise approved in naturalization / afforestation areas
- Adhere to the relevant Hydro Ottawa or Hydro One planting guidelines (species and setbacks) in proximity to above and below-ground hydro

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification and will include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant a diversity of native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

- **Parks**

  - CIL at the rate of 2% will be required unless proof of CIL payment during the subdivision registration is provided.

- **City Surveyor**
  - The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.) needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.
  - Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.

  Questions regarding the above requirements can be directed to the City's Surveyor, Bill Harper, at Bill.Harper@ottawa.ca

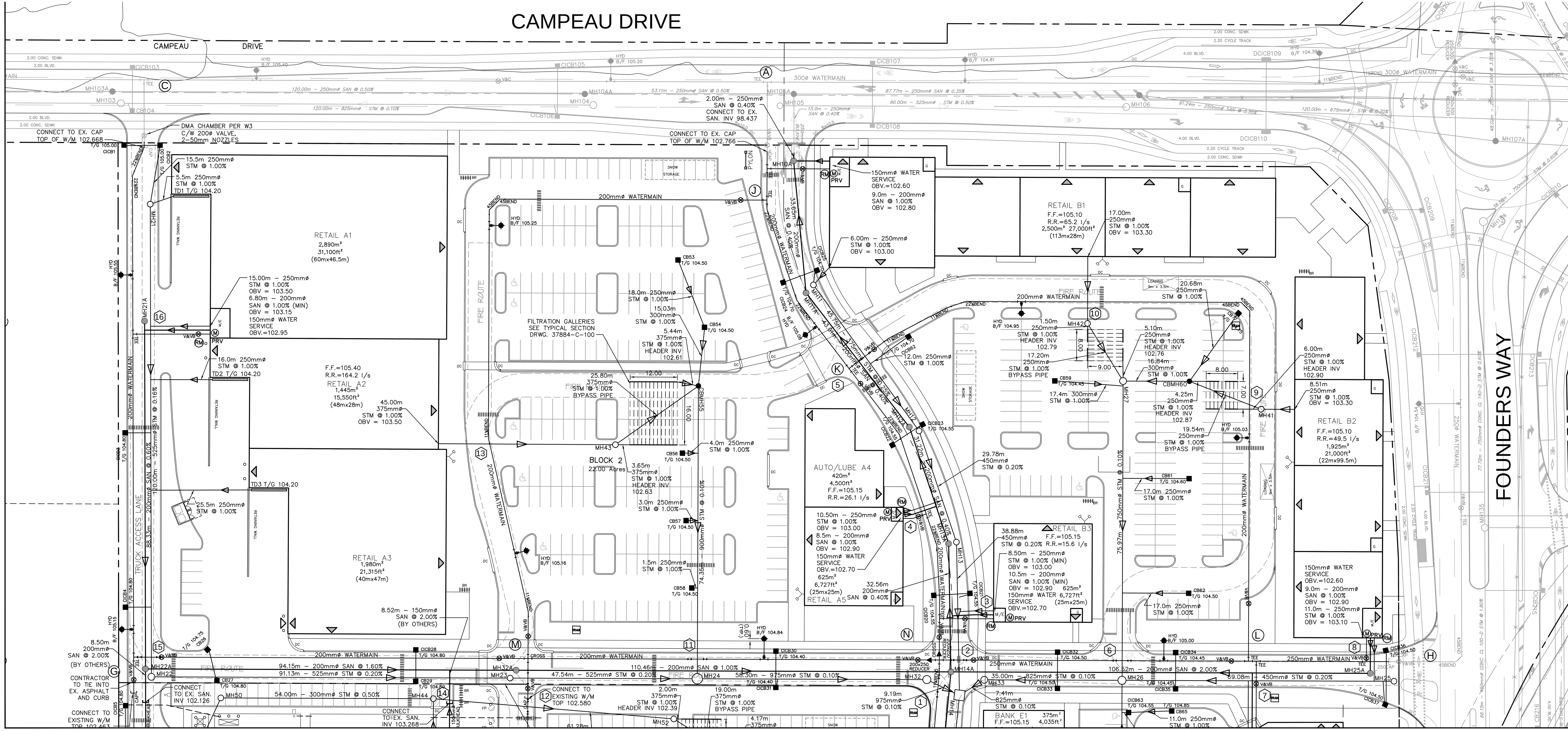
Submission requirements and fees

- Additional information regarding fees related to planning applications can be found here.
- Plans are to be standard A1 size (594 mm x 841 mm) or Arch D size (609.6 mm x 914.4 mm) sheets, dimensioned in metric and utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400 or 1:500).
- All PDF submitted documents are to be unlocked and flattened.

Next steps

- Please reach out to Councillor Curry to discuss the proposal when ready.
- It is anticipated that, as a result of the *More Homes for Everyone Act, 2022*, for applications for site plan approval and zoning by-law amendments, new processes in respect of pre-application consultation will be in place as of January 1, 2023. The new processes are anticipated to require a multiple phase pre-application consultation approach before an application will be deemed complete. Applicants who have not filed a complete application by the effective date may be required to undertake further pre-application consultation(s) consistent with the provincial changes. The by-laws to be amended include By-law 2009-320, the Pre-Consultation By-law, By-law 2022-239, the planning fees by-law and By-law 2022-254, the Information and Materials for Planning Application By-law. The revisions are

anticipated to be before Council in the period after the new Council takes office and the end of the year.



	STATION	DESCRIPTION	FINISHED	TOP OF	AS-BUILT
A	0+017.74	EX.200Ø CAP	105.128	102.766	
	0+022.00	200Ø x 150Ø TEE DOMESTIC SERVICE	105.057	102.657	
J	0+029.97	200Ø x 200Ø TEE	104.930	102.530	
	0+032.25	200Ø – 11 1/4° BEND	104.903	102.503	
	0+040	--	104.860	102.460	
	0+056.24	200Ø – 11 1/4° BEND	104.779	102.379	
	0+064.50	HYDRANT TEE	104.919	102.519	
K	0+077.98	200Ø x 200Ø TEE	104.840	102.085	
	0+099.07	200Ø - 22 1/2° BEND	104.623	102.223	
	0+120.35	200Ø x 150Ø TEE DOMESTIC SERVICE	104.806	102.165	
	0+128.88	200Ø – 22 1/2° BEND	104.753	102.353	
	0+147.84	200Ø x 150Ø TEE DOMESTIC SERVICE	104.631	102.231	
	0+152.33	200Ø V&VB	104.689	102.289	
	0+156.42	200Ø x 250Ø REDUCER	104.784	102.384	
N	0+157.90	250Ø x 250Ø CROSS	104.809	102.409	
	0+161.00	250Ø – 11 1/4° BEND	104.856	102.456	
	0+161.19	250Ø 45° BEND VERTICAL BEND	104.852	102.452	
	0+162.58	250Ø 45° BEND VERTICAL BEND	104.82	101.170	
	0+166.10	250Ø 45° BEND VERTICAL BEND	104.765	101.170	
	0+167.38	250Ø 45° BEND VERTICAL BEND	104.738	102.338	
	0+177.98	HYDRANT TEE	104.621	102.221	
	0+187.06	250Ø x 150Ø TEE DOMESTIC SERVICE	104.549	102.149	
	0+200	--	104.508	102.108	
	0+213.41	250Ø V&VB	104.621	102.221	
F	0+219.24	250Ø x 200Ø TEE	104.675	102.275	
	0+228.56	250Ø – 11 1/4° BEND	104.625	102.225	
	0+240	--	104.485	102.085	
	0+260	--	104.403	102.003	
	0+280	--	104.616	102.216	
	0+300	--	104.461	102.061	
	0+320	250Ø 45° BEND VERTICAL BEND	104.614	102.214	
	0+322.42	250Ø 45° BEND VERTICAL BEND	104.645	99.860	
N	0+324.97	250Ø x 250Ø CROSS	104.673	99.860	
	0+326.93	200Ø x 250Ø REDUCER	104.628	99.860	
	0+329.92	200Ø 45° BEND VERTICAL BEND	104.602	99.886	
	0+332.29	200Ø 45° BEND VERTICAL BEND	104.575	102.175	
	0+332.74	200Ø V&VB	105.569	103.169	
	0+340	--	104.537	102.137	
	0+360	--	104.515	102.115	
	0+370.60	HYDRANT TEE	104.543	102.143	
	0+373	150Ø x 200Ø REDUCER	104.527	102.127	
	0+388.60	150Ø – 45° BEND	104.548	101.480	
	0+394.97	150Ø – 45° BEND	104.586	101.480	
	0+400.46	150Ø CS	104.689	102.289	
B	0+406.28	BUILDING - DOMESTIC SERVICE	104.977	102.550	
C	0+017.13	EX. 200Ø CAP REPLACE WITH 200Ø– 22 1/2° BEND	105.048	102.668	
	0+024.97	200Ø – 22 1/2° BEND	105.124	102.724	
	0+050.14	HYDRANT TEE	105.293	102.893	
	0+065.16	200Ø x 150Ø TEE DOMESTIC SERVICE	105.122	102.722	
	0+080	--	104.922	102.522	
	0+100	--	104.924	102.524	
	0+120	--	104.987	102.587	
	0+140.13	HYDRANT TEE	104.868	102.468	
G	0+147.15	200Ø x 200Ø TEE	104.938	102.538	
	0+152.87	200Ø V&VB	104.913	102.513	
	0+156.32	200Ø CAP	104.863	102.463	
	0+160	--	104.859	102.459	
	0+175	200Ø x 75Ø TEE DOMESTIC SERVICE	105.078	102.678	
	0+176	200Ø x 200Ø TEE DOMESTIC SERVICE	105.050	102.650	
	0+180	--	104.948	102.548	
	0+200	--	105.032	102.632	
	0+220	--	105.066	102.666	
	0+236.70	HYDRANT TEE	104.988	102.588	
	0+240	--	105.036	102.636	
	0+260	--	104.927	102.527	
	0+280	--	104.626	102.226	
	0+292.80	200Ø CAP	104.781	102.381	
	0+298.77	200Ø V&VB	104.836	102.436	
	0+300	--	104.85	102.450	
D	0+303.19	250Ø x 200Ø TEE	104.919	102.519	
E	0+000.00	250Ø CAP	105.450	103.050	
D	0+083.31	200Ø x 250Ø TEE	104.919	102.519	
	0+085.31	250Ø V&VB	104.941	102.541	
	0+085.93	250Ø 45° BEND VERTICAL BEND	104.948	102.548	
	0+86.52	250Ø 45° BEND VERTICAL BEND	104.955	101.970	
	0+089.10	250Ø 45° BEND VERTICAL BEND	104.985	101.970	
	0+089.71	250Ø 45° BEND VERTICAL BEND	104.992	102.592	
	0+093.94	HYDRANT TEE	104.963	102.563	
	0+100	--	104.910	102.510	
	0+120	--	104.727	102.327	
	0+121.40	--	104.712	102.270	
	0+123.54	--	104.692	102.270	
	0+140	--	104.630	102.230	
	0+147.48	250Ø 45° BEND VERTICAL BEND	104.694	102.294	
	0+148.17	250Ø 45° BEND VERTICAL BEND	104.700	101.620	
	0+150.57	250Ø 45° BEND VERTICAL BEND	104.720	101.620	
	0+151.27	250Ø 45° BEND VERTICAL BEND	104.726	102.326	
	0+160.46	250Ø x 150Ø TEE DOMESTIC SERVICE	104.804	102.404	
	0+176	--	104.862	102.360	
	0+178	--	104.831	102.360	
	0+180	--	104.831	102.360	
I	0+182.31	200Ø x 250Ø TEE	104.810	102.410	
	0+187.90	250Ø V&VB	104.761	102.361	
	0+200	--	104.654	102.254	
	0+220	--	104.459	102.059	
	0+233.26	250Ø 45° BEND VERTICAL BEND	104.348	101.948	
	0+234.21	250Ø 45° BEND VERTICAL BEND	104.357	101.030	
	0+236.82	250Ø – 22 1/2° BEND	104.381	101.030	
	0+237.37	250Ø 45° BEND VERTICAL BEND	104.390	101.030	
	0+238.33	250Ø 45° BEND VERTICAL BEND	104.406	102.006	
	0+245.71	250Ø V&VB	104.524	102.124	
	0+246.27	250Ø 45° BEND VERTICAL BEND	104.535	102.135	
	0+248.58	250Ø 45° BEND VERTICAL BEND	104.582	99.860	
N	0+255.00	250Ø x 250Ø CROSS	104.673	99.860	
	0+260.55	250Ø x 200Ø REDUCER	104.647	99.860	
	0+261.63	200Ø 45° BEND VERTICAL BEND	104.645	99.860	
	0+264.02	200Ø 45° BEND VERTICAL BEND	104.626	102.226	
	0+266.98	200Ø V&VB	104.617	102.217	
	0+280	--	104.644	102.244	
	0+300.88	HYDRANT TEE	104.693	102.293	
	0+324.36	200Ø – 45° BEND	104.707	102.307	
	0+326.90	200Ø – 45° BEND	104.677	102.277	
	0+333.29	200Ø – 11 1/4° BEND	104.586	102.186	
	0+340	--	104.543	102.143	
	0+360	--	104.480	102.080	
	0+371.06	HYDRANT TEE	104.585	102.185	
	0+375.08	200Ø x 150Ø TEE DOMESTIC SERVICE	104.615	102.215	
	0+375.25	200Ø 45° BEND VERTICAL BEND	104.615	102.215	
	0+376.97	200Ø 45° BEND VERTICAL BEND	104.624	100.750	
	0+380.87	200Ø 45° BEND VERTICAL BEND	104.647	100.750	
	0+382.16	200Ø 45° BEND VERTICAL BEND	104.676	102.276	
	0+396.20	200Ø V&VB	104.706	102.306	
	0+400	--	104.703	102.303	
	0+420	--	104.703	102.303	
	0+432.27	--	104.703	102.220	
	0+435.62	--	104.706	102.220	
	0+445.01	HYDRANT TEE	104.734	102.334	
	0+447.63	200Ø – 45° BEND	104.762	102.362	
	0+452.62	200Ø – 11 1/4° BEND	104.800	102.400	
	0+457.82	200Ø – 45° BEND	104.788	102.388	
	0+480	--	104.782	102.382	
	0+500	--	104.681	102.281	
	0+500.71	200Ø – 11 1/4° BEND	104.680	102.280	
	0+511	200Ø V&VB	104.723	102.323	
	0+514.04	200Ø 45° BEND VERTICAL BEND	104.679	102.279	
	0+515.64	200Ø 45° BEND VERTICAL BEND	104.651	100.700	
	0+519.18	200Ø 45° BEND VERTICAL BEND	104.691	100.700	
	0+520.80	200Ø 45° BEND VERTICAL BEND	104.731	102.331	
F	0+523.14	250Ø x 200Ø TEE	104.675	102.275	
G	0+000.00	200Ø x 200Ø TEE	104.939	102.539	
	0+000.72	200Ø 45° BEND VERTICAL BEND	104.944	102.544	
	0+001.89	200Ø 45° BEND VERTICAL BEND	104.950	101.380	
	0+005.86	200Ø 45° BEND VERTICAL BEND	104.984	101.380	
	0+007.00	200Ø 45° BEND VERTICAL BEND	105.000	102.600	
	0+007.11	200Ø V&VB	104.999	102.599	
	0+020	--	104.850	102.450	
	0+040	--	104.994	102.594	
	0+060	--	104.926	102.526	
	0+080	--	104.929	102.529	
	0+092.85	200Ø V&VB	104.994	102.594	
M	0+100.17	200Ø x 200Ø CROSS	104.897	102.497	
	0+120	--	104.734	102.334	
	0+140	--	104.596	102.196	
	0+140.79	200Ø 45° BEND VERTICAL BEND	104.59	102.190	
	0+141.64	200Ø 45° BEND VERTICAL BEND	104.584	101.350	
	0+144.78	200Ø 45° BEND VERTICAL BEND	104.563	101.350	
	0+145.60	200Ø 45° BEND VERTICAL BEND	104.557	102.157	
	0+160.13	HYDRANT TEE	104.458	102.058	
	0+180	--	104.584	102.184	
	0+199.20	200Ø V&VB	104.722	102.322	
	0+202.22	200Ø x 250Ø REDUCER	104.775	102.375	
N	0+205.28	250Ø x 250Ø CROSS	104.809	102.409	
	0+207.66	250Ø 45° BEND VERTICAL BEND	104.863	102.463	
	0+208.33	250Ø 45° BEND VERTICAL BEND	104.848	101.770	
	0+210.89	250Ø 45° BEND VERTICAL BEND	104.802	101.770	
	0+211.55	250Ø 45° BEND VERTICAL BEND	104.794	102.394	
	0+213.36	250Ø V&VB	104.767	102.367	
	0+220	--	104.696	102.296	
	0+240	--	104.589	102.189	
	0+248.81	250Ø 45° BEND VERTICAL BEND	104.679	102.279	
	0+249.61	250Ø 45° BEND VERTICAL BEND	104.687	101.490	
	0+252.57	250Ø 45° BEND VERTICAL BEND	104.649	101.490	
	0+253.33	250Ø 45° BEND VERTICAL BEND	104.639	102.239	
	0+261.68	HYDRANT TEE	104.527	102.127	
	0+278.85	250Ø V&VB	104.658	102.258	
	0+283.18	200Ø x 250Ø TEE	104.711	102.311	
L	0+285.18	250Ø x 150Ø TEE DOMESTIC SERVICE	104.734	102.334	
	0+300	--	104.734	102.334	
	0+313.14	250Ø x 150Ø TEE DOMESTIC SERVICE	104.593	102.115	
H	0+318.77	250Ø CAP	104.557	102.157	
I	0+000.00	200Ø x 250Ø TEE	104.810	102.410	
	0+001.52	200Ø V&VB	104.786	102.386	
	0+007.55	200Ø CAP	104.841	102.362	
	0+020	--	104.892	102.492	
	0+039.89	HYDRANT TEE	105.000	102.600	
	0+060	--	105.100	102.700	
	0+080	--	105.050	102.650	
	0+100	--	105.069	102.669	
	0+120	--	105.028	102.628	
	0+125.10	HYDRANT TEE	105.121	102.721	
	0+140	--	105.039	102.639	
	0+141.98	200Ø 45° BEND VERTICAL BEND	104.986	102.586	
	0+142.57	200Ø 45° BEND VERTICAL BEND	105.054	102.066	
	0+145.15	200Ø 45° BEND VERTICAL BEND	104.997	102.066	
	0+145.68	200Ø 45° BEND VERTICAL BEND	105.006	102.606	
	0+146	200Ø CAP	104.980	102.580	
	0+148.50	200Ø V&VB	104.900	102.500	
	0+149.12	200Ø 45° BEND VERTICAL BEND	104.876	102.476	
	0+149.73	200Ø 45° BEND VERTICAL BEND	104.864	101.840	
	0+152.44	200Ø 45° BEND VERTICAL BEND	104.932	101.840	
	0+153.14	200Ø 45° BEND VERTICAL BEND	104.949	102.549	
M	0+156.08	200Ø x 200Ø CROSS	104.897	102.497	
	0+161.73	200Ø V&VB	104.928	102.528	
	0+167.92	200Ø – 11 1/4° BEND	104.910	102.510	
	0+183.15	HYDRANT TEE	105.083	102.683	
	0+200	--	104.921	102.521	
	0+213.11	200Ø – 11 1/4° BEND	104.967	102.567	
	0+220	--	105.003	102.603	
	0+240	--	105.007	102.607	
	0+260	--	105.019	102.619	
	0+267.16	HYDRANT TEE	105.050	102.650	
	0+271.14	200Ø – 45° BEND	105.023	102.623	
	0+274.99	200Ø – 45° BEND	104.979	102.579	
	0+280	--	104.975	102.575	
	0+300	--	104.836	102.436	
	0+320	--	104.838	102.438	
	0+336.13	200Ø V&VB	104.907	102.507	
J	0+342.80	200Ø x 200Ø TEE	104.930	102.530	
K	0+000.00	200Ø x 200Ø TEE	104.840	102.440	
	0+003.41	200Ø 45° BEND VERTICAL BEND	104.885	102.485	
	0+003.86	200Ø 45° BEND VERTICAL BEND	104.874	102.030	
	0+006.39	200Ø 45° BEND VERTICAL BEND	104.809	102.030	
	0+006.76	200Ø 45° BEND VERTICAL BEND	104.803	102.403	
	0+008.05	200Ø V&VB	104.816	102.416	
	0+012.55	200Ø – 11 1/4° BEND	104.793	102.393	
	0+029.31	200Ø – 11 1/4° BEND	104.796	102.396	
	0+034.46	200Ø - 22 1/2° BEND	104.779	102.379	
	0+048.57	HYDRANT TEE	104.811	102.411	
	0+060	--	104.775	102.375	
	0+080	--	104.800	102.400	
	0+100	--	104.815	102.415	
	0+104.40	200Ø – 45° BEND	104.793	102.393	
	0+107.47	200Ø – 45° BEND	104.792	102.392	
	0+120	--	104.803	102.403	
	0+139.70	HYDRANT TEE	104.819	102.419	
	0+160	--	104.815	102.415	
	0+180	--	104.688	102.288	
	0+181.77	200Ø V&VB	104.875	102.475	
L	0+196.37	200Ø x 250Ø TEE	104.711	102.311	

J:\37884-KNWRetailCentre\5.9 Drawings\59civil\layouts\KWRC\C-100.dwg Layout Name: C-100 Plot Style: AIA STANDARD-FULL.CTB Plot Scale: 1:1 Plotted At: 4/27/2015 12:35 PM Last Saved By: dsiurna Last Saved At: Apr. 27, 15

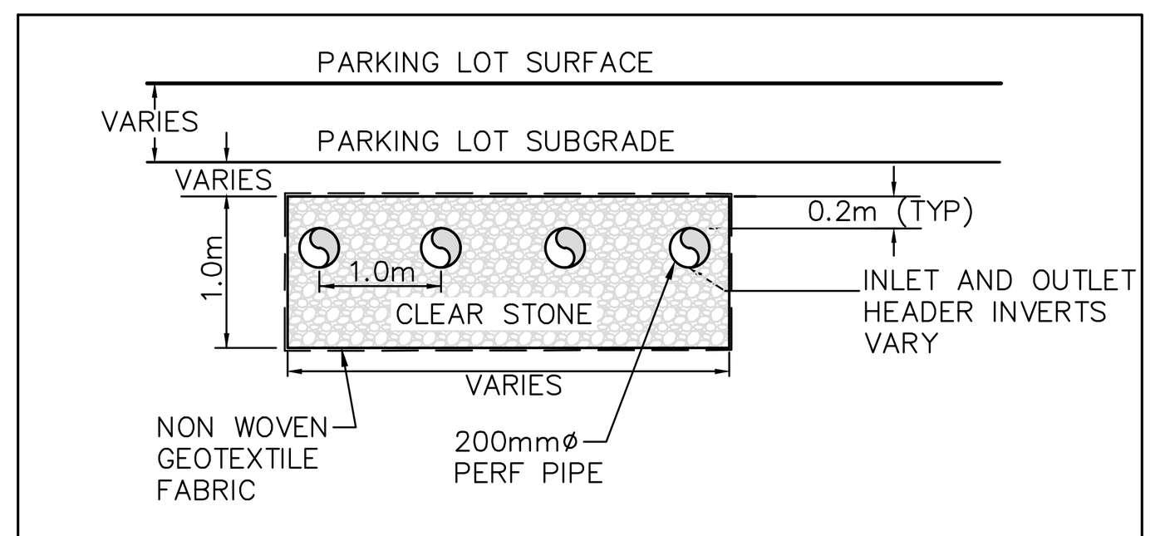
STORM SEWER STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT OUT	DESCRIPTION
CBMH 45	104.35	NW101.660	SE101.660	1500ø OPSD 701.011
CBMH34	104.45	NE102.167	NW101.867	1500ø OPSD 701.011
CBMH39	104.45	NE102.592 NE102.832	SE102.359	1200ø OPSD 701.010
CBMH46	104.50	N102.586	SW102.374	1200ø OPSD 701.010
CBMH47	104.55	NE102.348 N102.598	W102.203	1200ø OPSD 701.010
CBMH53	104.30	S102.380 E102.560 S102.636	NW102.156	1200ø OPSD 701.010
CBMH55	104.50	SW102.556 NW102.551 S102.792	SE102.038	1500ø OPSD 701.011
CBMH60	104.45	NE102.827 N102.817 E103.025	SW102.767	1200ø OPSD 701.010
MH11	104.78		E102.663	1200ø OPSD 701.010
MH12	104.57	W102.549	SE102.474	1200ø OPSD 701.010
MH13	104.74	NW102.414	SE102.394	1200ø OPSD 701.010
MH14	104.73	NW102.316 W101.791 N101.941	SE101.416	2438x2438 Rectangular Metric
MH15	104.65	NW101.360	SE101.360	2400ø OPSD 701.013
MH16	104.59	NW101.303 NE101.753	SE101.153	1829x2438 Rectangular Metric
MH17	104.64	NW101.103	W101.053	2438x2438 Rectangular Metric
MH18	104.42	E101.031 NW101.643	SW100.893	1289x2438 Rectangular Metric
MH18B	104.00	NE100.881 SE101.781	SW100.881	1829x2438 Rectangular Metric
MH19	104.75	NE100.806 NW102.025	SW100.806	1829x2438 Rectangular Metric
MH20	105.01	NE100.745 NW101.945 E101.945	SW100.745	1829x2438 Rectangular Metric
MH21	105.18		SE102.868	1200ø OPSD 701.010
MH22	104.98	NW102.676	NE102.616	1200ø OPSD 701.010
MH23	104.96	SW102.434	NE102.434	1200ø OPSD 701.010
MH24	104.57	SW102.339 NW101.964	NE101.889	2400ø OPSD 701.013
MH25	104.62		SW102.527	1200ø OPSD 701.010
MH26	104.67	NE102.389 NW102.089 SE102.389	SW102.014	1800ø OPSD 701.012
MH27	104.62	NW102.709 NE102.599 W102.868	SE102.165	1500ø OPSD 701.011
MH28	104.82		NW102.474	1200ø OPSD 701.010
MH29	105.23		SE102.259	1200ø OPSD 701.010
MH30	105.26	NW102.134	SE102.060	1200ø OPSD 701.010
MH31	104.49	SW102.328 W102.600	SE101.777	1800ø OPSD 701.012
MH32	104.22	SW101.831	E101.801	2400ø OPSD 701.013
MH33	104.20	NE101.979	S101.949	1800ø OPSD 701.012
MH34	104.45		SW102.281	1200ø OPSD 701.010
MH35	104.74	E102.115	W102.040	1200ø OPSD 701.010
MH36	104.77	NE102.520	SW102.510 S102.770	1200ø OPSD 701.010
MH37	104.55	S102.494	N102.483 N102.865	1200ø OPSD 701.010
MH38	104.60	NE102.249 NW102.261 SE102.110	SW101.799	1800ø OPSD 701.012
MH40	104.75	NE102.773	SW102.760 SW103.020	1200ø OPSD 701.010
MH41	104.85	NE102.965	SW102.960 W103.220	1200ø OPSD 701.010
MH42	104.64	NW102.880	SE102.805 E103.040	1200ø OPSD 701.010
MH43	104.68	SW102.675	NE102.666 N103.050	1200ø OPSD 701.010
MH44	104.97	SE103.287 SW102.860	NE102.788	1200ø OPSD 701.010
MH45	105.07	N103.179 SW102.491	SE102.416 S102.800	1200ø OPSD 701.010
MH45A	104.29	NW102.318 N102.608	SE102.263	1200ø OPSD 701.010
MH50	104.98	S103.425	NE103.130	1200ø OPSD 701.010
MH51	105.12	NW103.345	NE102.803	1200ø OPSD 701.010
MH52	104.74	SW102.420	NE102.410 E102.790	1200ø OPSD 701.010

SANITARY SEWER STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT OUT	DESCRIPTION	
MH10A	105.10	SE98.495	NW97.445	1200ø OPSD 701.010	SANITARY LANDING PER OPSD 404.02
MH11A	104.85	E98.650	NW98.630	1200ø OPSD 701.010	SANITARY LANDING PER OPSD 404.02
MH12A✳	104.64	SE98.842	W98.822	1200ø OPSD 701.010	SANITARY LANDING PER OPSD 404.02
MH13A	104.79	SE98.987	NW98.967	1200ø OPSD 701.010	SANITARY LANDING PER OPSD 404.02
MH14A	104.88	SW99.177 NE100.117 SE99.127	NW99.117	1200ø OPSD 701.010	200mm DROP PIPE PER OPSD 1003.010 SW AND NW SANITARY LANDING PER OPSD 404.02
MH15A	104.68	SE99.531	NW99.511	1200ø OPSD 701.010	SANITARY LANDING PER OPSD 404.02
MH16A	104.66	SE99.879 NE99.929	NW99.869	1200ø OPSD 701.010	
MH17A	104.64	S100.311 SW100.351	NW100.301	1200ø OPSD 701.010	
MH19A	104.80	SW101.166 NW102.836	NE101.156	1200ø OPSD 701.010	200mm DROP PIPE PER OPSD 1003.010 NW
MH20A✳	104.71	NW102.719	NE102.255	1200ø OPSD 701.010	
MH21A	105.19		SE102.388	1200ø OPSD 701.010	
MH22A✳	104.99	NW101.858 SE101.858	NE101.798	1200ø OPSD 701.010	
MH23A	105.15	SW103.273	SE103.173	1200ø OPSD 701.010	
MH25A	104.64		SW102.247	1200ø OPSD 701.010	
MH29A	105.19	NE103.380	NW102.881	1200ø OPSD 701.010	
MH32A	104.99	SW100.291	NE100.281	1200ø OPSD 701.010	
MH34A	104.54		N102.104	1200ø OPSD 701.010	
MH46A	104.78		SW101.841	1200ø OPSD 701.010	

✳ WATERTIGHT COVERS PER NOTE 2.7



FILTRATION GALLERY TYPICAL SECTION
N.T.S.

ROAD STRUCTURE ✽

CAR ONLY PARKING AREAS:

50mm WEAR COURSE12.5mm SUPERPAVE
150mm BASE GRANULAR "A"
300mm SUBBASE GRANULAR "B"

HEAVY TRUCK PARKING AREAS AND ACCESS LANES:

40mm WEAR COURSE 12.5mm SUPERPAVE
50mm BINDER COURSE 19.0mm SUPERPAVE
150mm BASE COURSE GRANULAR "A"
400mm SUBBASEGRANULAR "B"

✽ REFER TO NOTE 1.15

APPROVED ☐ REFUSED ☐

DATE ______________

Felice Petti, P.Eng., Manager, Development Review
Suburban Services
City of Ottawa

PIPE CROSSING TABLE

1.	200 mm dia. SAN	2.28 m	Clearance Under	975 mm dia. STM
	250 mm dia. WM	0.50 m (Min.)	Clearance Under	975 mm dia. STM
	200 mm dia. SAN	2.74 m	Clearance Under	250 mm dia. WM
2.	200 mm dia. SAN	1.88 m	Clearance Under	450 mm dia. STM
	250 mm dia. WM	0.50 m (Min.)	Clearance Under	450 mm dia. STM
	200 mm dia. SAN	2.16 m	Clearance Under	250 mm dia. WM
3.	200 mm dia. SAN	0.25 m (Min.)	Clearance Under	450 mm dia. STM
	150 mm dia. WM	0.50 m (Min.)	Clearance Under	450 mm dia. STM
4.	200 mm dia. SAN	3.76 m	Clearance Under	250 mm dia. STM
	200 mm dia. WM	0.50 m (Min.)	Clearance Under	250 mm dia. STM
5.	200 mm dia. SAN	2.92 m	Clearance Under	200 mm dia. WM
	200 mm dia. WM	0.50 m (Min.)	Clearance Under	375 mm dia. STM
6.	200 mm dia. SAN	0.77 m	Clearance Under	750 mm dia. STM
	250 mm dia. WM	0.50 m (Min.)	Clearance Under	750 mm dia. STM
7.	200 mm dia. SAN	0.25 m (Min.)	Clearance Under	450 mm dia. STM
	150 mm dia. WM	0.50 m (Min.)	Clearance Under	450 mm dia. STM
	150 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
8.	250 mm dia. WM	0.50 m (Min.)	Clearance Under	250 mm dia. STM
	250 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
9.	200 mm dia. WM	0.50 m (Min.)	Clearance Under	250 mm dia. STM
10.	200 mm dia. WM	0.50 m (Min.)	Clearance Under	250 mm dia. STM
11.	200 mm dia. SAN	1.80 m	Clearance Under	900 mm dia. STM
	200 mm dia. WM	0.50 m (Min.)	Clearance Under	900 mm dia. STM
12.	200 mm dia. WM	0.50 m (Min.)	Clearance Under	525 mm dia. STM
	200 mm dia. SAN	1.84 m	Clearance Under	200 mm dia. WM
	200 mm dia. WM	0.50 m (Min.)	Clearance Under	375 mm dia. STM
13.	200 mm dia. WM	0.50 m (Min.)	Clearance Under	375 mm dia. STM
14.	150 mm dia. SAN	0.23 m	Clearance Under	375 mm dia. STM
15.	200 mm dia. SAN	0.59 m	Clearance Under	525 mm dia. STM
	200 mm dia. WM	0.50 m (Min.)	Clearance Under	525 mm dia. STM
	200 mm dia. WM	1.21 m	Clearance Under	200 mm dia. SAN
16.	200 mm dia. SAN	0.11 m	Clearance Under	525 mm dia. STM
	150 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
	150 mm dia. WM	0.50 m (Min.)	Clearance Under	525 mm dia. STM
17.	375 mm dia. STM	0.75 m	Clearance Under	150 mm dia. SAN
18.	200 mm dia. SAN	0.25 m (Min.)	Clearance Under	1350 mm dia. STM
	150 mm dia. WM	0.50 m (Min.)	Clearance Under	1350 mm dia. STM
19.	200 mm dia. WM	0.50 m (Min.)	Clearance Under	1350 mm dia. STM
	200 mm dia. SAN	1.21 m	Clearance Under	200 mm dia. WM
20.	200 mm dia. SAN	0.79 m	Clearance Under	1500 mm dia. STM
21.	200 mm dia. SAN	0.21 m	Clearance Under	1500 mm dia. STM
	250 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
	250 mm dia. WM	1.02 m	Clearance Under	1500 mm dia. STM
22.	200 mm dia. SAN	0.12 m	Clearance Under	1500 mm dia. STM
	250 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
	250 mm dia. WM	1.00 m	Clearance Under	1500 mm dia. STM
23.	250 mm dia. WM	0.50 m (Min.)	Clearance Under	900 mm dia. STM
24.	200 mm dia. SAN	0.76 m	Clearance Under	750 mm dia. STM
25.	1650 mm dia. STM	0.13 m	Clearance Under	200 mm dia. SAN
	250 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
26.	150 mm dia. WM	0.50 m (Min.)	Clearance Under	1650 mm dia. STM
	150 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
27.	250 mm dia. WM	0.50 m (Min.)	Clearance Under	450 mm dia. STM
	200 mm dia. SAN	0.40 m	Clearance Under	250 mm dia. STM
28.	1650 mm dia. STM	0.10 m	Clearance Under	150 mm dia. SAN
	250 mm dia. WM	0.50 m (Min.)	Clearance Under	150 mm dia. SAN
29.	250 mm dia. WM	0.50 m (Min.)	Clearance Under	450 mm dia. STM
30.	150 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
31.	200 mm dia. WM	0.50 m (Min.)	Clearance Under	375 mm dia. STM
32.	200 mm dia. SAN	0.65 m	Clearance Under	600 mm dia. STM
33.	200 mm dia. WM	0.50 m (Min.)	Clearance Under	200 mm dia. SAN
	200 mm dia. WM	1.45 m	Clearance Under	450 mm dia. STM
34.	200 mm dia. SAN	0.12 m	Clearance Under	450 mm dia. STM
	150 mm dia. WM	0.50 m (Min.)	Clearance Under	450 mm dia. STM
35.	200 mm dia. WM	0.50 m (Min.)	Clearance Under	250 mm dia. STM

CATCH BASIN DATA TABLE

STRUCTURE ID	AREA ID	STRUCTURE	COVER	ELEVATION TOP OF GRATE	ELEVATION INVERT INLET	ELEVATION INVERT OUTLET	OUTLET PIPE DIAMETER (mm)	OUTLET PIPE TYPE	HEAD	FLOW	CUSTOM ICD TYPE	ORIFICE SIZE AREA	ORIFICE SIZE DIAMOND	ORIFICE SIZE CIRCULAR
CICB 1	D21	OPSD 705.010	S22 & S23	105.00		103.43	200	PVC DR-35						
CICB 2		OPSD 705.010	S22 & S23	105.00	103.33	103.23	250	PVC DR-35	1.64	13.0	Tempest LHF			
CICB 3	D21	OPSD 705.010	S22 & S23	104.80		103.23	250	PVC DR-35	1.44	23.5	Tempest HF			
CICB 4	D21	OPSD 705.010	S22 & S23	104.80		103.23	250	PVC DR-35	1.44	15.6	Tempest HF			
CICB 5	D29	OPSD 705.010	S22 & S23	104.80		103.23	200	PVC DR-35						
CICB 6		OPSD 705.010	S22 & S23	104.80	103.13	103.03	250	PVC DR-35	1.64	23.5	Tempest HF			
CB 9	D29	OPSD 705.010	S19	105.20		103.63	150	PVC DR-35	1.49	2.6	Tempest LHF			
CICB 7	D29	OPSD 705.010	S22 & S23	104.85		103.28	250	PVC DR-35	1.44	7.8	Tempest LHF			
CB 10	L29	OPSD 705.010	S19	104.15		102.58	250	PVC DR-35	1.44	13.4	Tempest LHF			
CICB 8	D30	OPSD 705.010	S22 & S23	104.60		103.03	250	PVC DR-35	1.44	46.9	Tempest HF			
CICB 9	P19	OPSD 705.010	S22 & S23	104.55		102.98	200	PVC DR-35						
CICB 10		OPSD 705.010	S22 & S23	104.55	102.88	102.78	250	PVC DR-35	1.64	28.7	Tempest HF			
CB 8	P19	OPSD 705.010	S19	104.55		102.98	250	PVC DR-35	1.44	10.4	Tempest LHF			
CB 11	P19	OPSD 705.010	S19	104.50		102.93	250	PVC DR-35	1.44	54.8	Tempest HF			
CICB 12	D18	OPSD 705.010	S22 & S23	104.30		102.73	200	PVC DR-35						
CICB 13		OPSD 705.010	S22 & S23	104.30	102.63	102.53	250	PVC DR-35	1.64	39.1	Tempest HF			
CICB 14	D16	OPSD 705.010	S22 & S23	104.35		102.78	200	PVC DR-35						
CICB 15		OPSD 705.010	S22 & S23	104.35	102.68	102.58	250	PVC DR-35	1.64	26.1	Tempest HF			
CICB 16	D15	OPSD 705.010	S22 & S23	104.30		102.73	200	PVC DR-35						
CICB 17		OPSD 705.010	S22 & S23	104.30	102.63	102.53	250	PVC DR-35	1.64	31.3	Tempest HF			
CICB 18	D14	OPSD 705.010	S22 & S23	104.45		102.88	200	PVC DR-35						
CICB 19		OPSD 705.010	S22 & S23	104.45	102.78	102.68	250	PVC DR-35	1.64	23.5	Tempest HF			
CICB 20	D13	OPSD 705.010	S22 & S23	104.55		102.98	200	PVC DR-35						
CICB 21		OPSD 705.010	S22 & S23	104.55	102.88	102.78	250	PVC DR-35	1.64	26.1	Tempest HF			
CICB 22	D11	OPSD 705.010	S22 & S23	104.55		102.98	200	PVC DR-35						
CICB 23		OPSD 705.010	S22 & S23	104.55	102.88	102.78	250	PVC DR-35	1.64	28.7	Tempest HF			
CICB 24	D11	OPSD 705.010	S22 & S23	104.70		103.13	200	PVC DR-35						
CICB 25		OPSD 705.010	S22 & S23	104.70	103.03	102.93	250	PVC DR-35	1.64	23.5	Tempest HF			
CICB 62	D11	OPSD 705.010	S19	104.55		102.98	250	PVC DR-35	1.44	13.0	Tempest LHF			
CICB 26	D22	OPSD 705.010	S22 & S23	104.75		103.18	200	PVC DR-35						
CICB 27		OPSD 705.010	S22 & S23	104.80	103.08	102.98	250	PVC DR-35	1.69	23.5	Tempest HF			
CICB 28	D22	OPSD 705.010	S22 & S23	104.80		103.23	200	PVC DR-35						
CICB 29		OPSD 705.010	S22 & S23	104.80	103.13	103.03	250	PVC DR-35	1.64	28.7	Tempest HF			
CICB 30	D24	OPSD 705.010	S22 & S23	104.40		102.83	200	PVC DR-35						
CICB 31		OPSD 705.010	S22 & S23	104.40	102.73	102.63	250	PVC DR-35	1.64	52.1	Tempest HF			
CICB 32	D26	OPSD 705.010	S22 & S23	104.50		102.93	200	PVC DR-35						
CICB 33		OPSD 705.010	S22 & S23	104.50	102.83	102.73	250	PVC DR-35	1.64	20.9	Tempest HF			
CICB 34	D25	OPSD 705.010	S22 & S23	104.45		102.88	200	PVC DR-35						
CICB 35		OPSD 705.010	S22 & S23	104.45	102.78	102.68	250	PVC DR-35	1.64	23.5	Tempest HF			
CICB 36	D25	OPSD 705.010	S22 & S23	104.50		102.93	200	PVC DR-35						
CICB 37		OPSD 705.010	S22 & S23	104.50	102.83	102.73	250	PVC DR-35	1.64	18.3	Tempest HF			
CB 38	P31	OPSD 705.010	S19	104.35		102.78	250	PVC DR-35						
CB 39		OPSD 705.010	S19	104.35		102.78	250	PVC DR-35						
CICB 40		OPSD 705.010	S22 & S23	104.30		102.73	250	PVC DR-35						
CICB 41		OPSD 705.010	S22 & S23	104.25	102.63	102.53	250	PVC DR-35						
CB 42		OPSD 705.010	S19	104.35		102.78	250	PVC DR-35						
CB 43		OPSD 705.010	S19	104.35		102.78	250	PVC DR-35						
CB 44		OPSD 705.010	S19	104.40		102.83	250	PVC DR-35						
CBMH 45		OPSD 701.010	S19	104.35	101.66	101.66	900	CONC CL 100-D	2.24	507.9		0.128		0.403
CB 46	P35	OPSD 705.010	S19	104.65		103.08	250	PVC DR-35	1.44	20.9	Tempest HF			
CBMH 47	P35	OPSD 701.010	S19	104.55	102.35	102.20	375	PVC DR-35	2.16	106.9		0.027		0.187
TD 6	L34	S15	S15	103.80		102.23	375	PVC DR-35						
TD 7		S15	S15	103.80		102.18	375	PVC DR-35						
CB 78		OPSD 705.010	S19	104.15		102.31	300	PVC DR-35						
CBMH 34		OPSD 701.010	S19	104.45	102.17	101.87	750	CONC CL 100-D	2.21	85.3		0.022		0.170
CB 23	P34	OPSD 705.010	S19	104.60		103.03	250	PVC DR-35	1.44	26.1	Tempest HF			
CB 24	P34	OPSD 705.010	S19	104.45		102.88	250	PVC DR-35	1.44	15.6	Tempest HF			
CB 49	P34	OPSD 705.010	S19	104.45		102.88	250	PVC DR-35						
CB 50		OPSD 705.010	S19	104.45	102.71	102.71	250	PVC DR-35	1.62	49.5	Tempest HF			
CB 51	P34	OPSD 705.010	S19	104.45		102.88	250	PVC DR-35	1.44	20.9	Tempest HF			
CB 53	P55	OPSD 705.010	S19	104.50		102.93	250	PVC DR-35						
CB 54		OPSD 705.010	S19	104.50	102.75	102.75	250	PVC DR-35						
CBMH 55		OPSD 701.010	S19	104.50	102.55	102.04	900	CONC CL 100-D	2.01	325.9		0.086		0.332
CB 56	P55	OPSD 705.010	S19	104.50		102.93	250	PVC DR-35	1.44	41.7	Tempest HF			
CB 57	P55	OPSD 705.010	S19	104.50		102.93	250	PVC DR-35	1.44	39.1	Tempest HF			
CB 58	P55	OPSD 705.010	S19	104.50		102.93	250	PVC DR-35	1.44	44.3	Tempest HF			
CB 77	P27	OPSD 705.010	S19	104.75		103.06	250	PVC DR-35						
CBMH 60		OPSD 701.010	S19	104.45	102.83	102.77	300	PVC DR-35	1.53	99.1		0.030		0.196
CB 59	P27	OPSD 705.010	S19	104.45		102.88	250	PVC DR-35	1.44	73.0	Tempest HF			
CB 61	P27	OPSD 705.010	S19	104.60		103.03	250	PVC DR-35	1.44	23.5	Tempest HF			
CB 62	P27	OPSD 705.010	S19	104.50		102.93	250	PVC DR-35	1.44	39.1	Tempest HF			
CB 65	P28	OPSD 705.010	S19	104.85		103.13	250	PVC DR-35						
CICB 63		OPSD 705.010	S22 & S23	104.55	103.02	103.02	250	PVC DR-35	1.41	28.7	Tempest HF			
CB 64	P28	OPSD 705.010	S19	104.60		103.03	250	PVC DR-35	1.44	20.9	Tempest HF			
CICB 75	P28	OPSD 705.010	S22 & S23	104.60		103.03	250	PVC DR-35	1.44	20.9	Tempest HF			
CICB 76	P28	OPSD 705.010	S22 & S23	104.60		103.03	250	PVC DR-35	1.44	31.3	Tempest HF			
CB 73	P46	OPSD 705.010	S19	104.50		102.93	250	PVC DR-35						
CBMH 46		OPSD 701.010	S19	104.50	102.58	102.37	450	CONC CL 100-D	1.90	60.0		0.016		0.144
CBMH 39	P38	OPSD 701.010	S19	104.45		102.36	450	CONC CL 100-D	1.87	91.2		0.025		0.179
CB 69	P38	OPSD 705.010	S19	104.45		102.88	250	PVC DR-35	1.44	33.9	Tempest HF			
CB 72	P38	OPSD 705.010	S19	104.30		102.73	300	PVC DR-35						
CBMH 53		OPSD 701.010	S19	104.30	102.56	102.16	600	CONC CL 100-D	1.84	255.5		0.071		0.300
CB 66	P38	OPSD 705.010	S19	104.40		102.83	250	PVC DR-35						
CB 68		OPSD 705.010	S19	104.40	102.61	102.61	250	PVC DR-35	1.67	46.9	Tempest HF			
CB 70	P38	OPSD 705.010	S19	104.30		102.73	250	PVC DR-35	1.44	36.5	Tempest HF			
TD 1	L21	S15	S15	104.20		103.05	250	PVC DR-35	1.03	22.3	Tempest HF			
TD 2	L21	S15	S15	104.20		103.05	250	PVC DR-35	1.03	31.3	Tempest HF			
TD 3	L21	S15	S15	104.20		103.05	250	PVC DR-35	1.03	31.3	Tempest HF			
TD 5	L19	S15	S15	103.90		102.75	250	PVC DR-35	1.03	13.4	Tempest LHF			

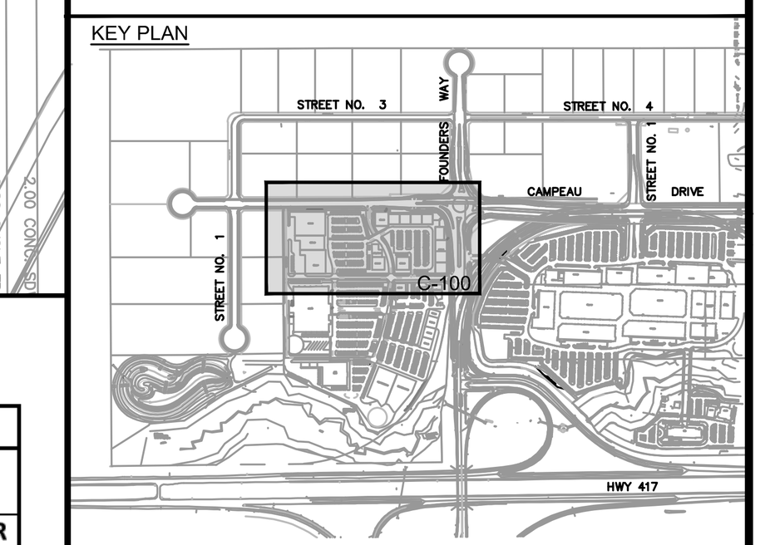
Bold font indicates CB's with ICD's

Signed ______________________
Date ______________________ 2015
Plan Number ______________________

LEGEND:

- MH2 PROPOSED STORM MANHOLE & NUMBER
- CBMH100 PROPOSED CATCHBASIN MANHOLE & NUMBER
- MH2A PROPOSED SANITARY MANHOLE & NUMBER
- PROPOSED STORM SEWER & FLOW DIRECTION
- PROPOSED SANITARY SEWER & FLOW DIRECTION
- HYD PROPOSED FIRE HYDRANT
- V&VB PROPOSED WATER VALVE BOX
- V&C PROPOSED WATER VALVE CHAMBER
- TVS TAPPING VALVE AND SLEEVE
- CB T/G 101.50 PROPOSED CATCHBASIN C/W TOP OFf GRATE ELEVATION
- 250mmØ SUBDRAIN
- TD1 T/G 101.50 TRENCH DRAIN C/W TOP OF GRATE
- CLAY DYKE
- SIAMESE CONNECTION (IF REQUIRED)
- M METER
- RM REMOTE METER
- PRV PRESSURE REDUCING VALVE
- A WATERMAIN IDENTIFICATION
- 9 PIPE CROSSING IDENTIFICATION
- R.R.=10.0 l/s CONTROLLED ROOF RELEASE RATE
- INLET CONTROL DEVICE LOCATION
- HEAVY DUTY ASPHALT / FIRE ROUTE
- PROPOSED CURB
- DC PROPOSED DEPRESSED CURB
- DC PROPOSED DEPRESSED CURB AND RAMP
- ×101.37 EXISTING GRADE
- 101.25 PROPOSED GRADE
- 101.25 PROPOSED GRADE
- PROPOSED BUILDING UPSTAND
- F.F.=89.25 PROPOSED BUILDING FINISHED FLOOR ELEVATION
- TCB T/G 98.25 PROPOSED TEE CB (ECB OR TCB) C/W TOP OF GRATE
- EMERGENCY FLOW ROUTE
- ROOF DRAINS
- CLAY DYKES PER S8

KEY PLAN



SCALE 0m 5 10 15 20 25 30m

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2	REVISED PER CITY COMMENTS	LME	15:04:27
1	ISSUED TO CITY FOR APPROVAL	LME	15:01:29

TAGGART REALTY MANAGEMENT

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

Project Title
KANATA WEST RETAIL CENTRE

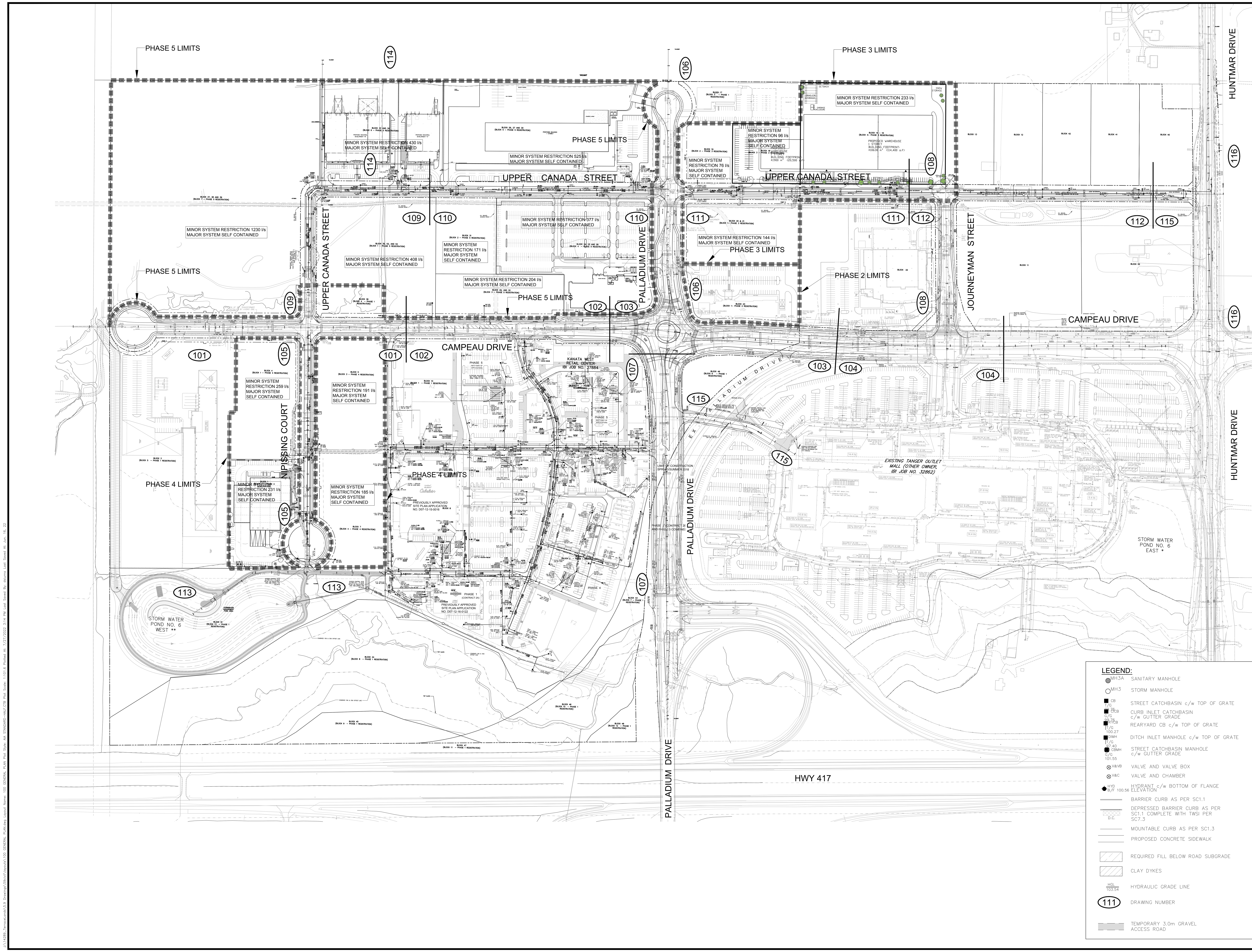
LICENSED PROFESSIONAL ENGINEER L. M. ERION 2015/04/27 PROVINCE OF ONTARIO

Drawing Title
GENERAL PLAN OF SERVICES

Scale 1:500

Design LME | Date JAN. 2015
Drawn DPS | Checked TRB
Project No. 37884 | Drawing No. C-100

D07-12-15-0016



NOTES:

* REFER TO KANATA WEST BUSINESS PARK STORMWATER MANAGEMENT REPORT AND POND 6 EAST DESIGN REPORT. 337 HUNTMAR DRIVE TANGER OUTLET CENTERS REPORT 32862.5.2.3 REVISION 4 NOVEMBER 2014.

** REFER TO KANATA WEST BUSINESS PARK STORMWATER MANAGEMENT REPORT AND POND 6 WEST DESIGN BRIEF REPORT 14289.5.2.3 SEPTEMBER 2015.

SITE BENCHMARK TO BE OBTAINED FROM LEGAL SURVEYOR STANTEC GEOMATICS

FOR EXTENT OF EXISTING CONSTRUCTION REFER TO DRAWING 14289-100A

No.	REVISIONS	By	Date
32	RECORD DRAWINGS	LME	22:07:27
31	ADD SERVICE CONNECTIONS FOR BLOCKS 5 AND 6	LME	20:06:17
30	ISSUED FOR CONSTRUCTION PHASE 4 AND 5	LME	20:05:27
29	ISSUED FOR TENDER PHASE 4 AND 5	LME	20:02:12
28	REVISED AS PER PHASE 5 COMMENTS	LME	19:10:25
27	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
26	ISSUED FOR PHASE 3 CONSTRUCTION	LME	19:08:15
25	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:25
24	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:22
23	REVISED AS PER PHASE 4 COMMENTS	LME	19:06:24
22	ISSUED FOR PHASE 4 REGISTRATION	LME	19:04:25
21	REVISED AS PER PHASE 3 COMMENTS	LME	19:03:08
20	REVISED AS PER PHASE 3 COMMENTS	LME	19:02:11
19	ISSUED FOR PHASE 3 TENDER	LME	19:01:11
18	REVISED AS PER PHASE 3 COMMENTS	LME	18:12:14
17	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
16	ADDED CITY FILE NUMBER	LME	18:05:30
15	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
14	REVISED DMA CHAMBER IN BLK 10 & RELOCATE HYD. BLK 35/36	LME	16:05:05
13	ISSUED AS PER REVISED CARPENTERS UNION	LME	16:04:25
12	REVISE HYDRANT ON UPPER CANADA ST. AT BLOCK 36 P/L	LME	16:04:20
11	REVISE ENTRANCE TO TANGER MALL FROM PALLADIUM DRIVE	LME	16:03:02
10	RE-ISSUED FOR CONSTRUCTION	LME	16:02:03
9	ISSUED FOR CONSTRUCTION	LME	16:01:19
8	ISSUED FOR MYLARS	LME	16:01:12
7	ISSUED TO TAGGART	LME	15:12:14
6	ISSUED TO TAGGART	LME	15:10:16
5	REVISED AS PER CITY COMMENTS	LME	15:10:15
4	REVISE WM, STM, AND SAN ON CAMPEAU AND UPPER CANADA	LME	15:08:19
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

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Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER L. M. ERION 13379508 22/07/27 PROVINCE OF ONTARIO

Drawing Title

GENERAL PLAN OF SERVICES

Scale 1:2000

Design	LME	Date	NOV. 2014
Drawn	DPS	Checked	TRB
Project No.	14289	Drawing No.	100

D07-16-14-0003_P5

#17661

Appendix B

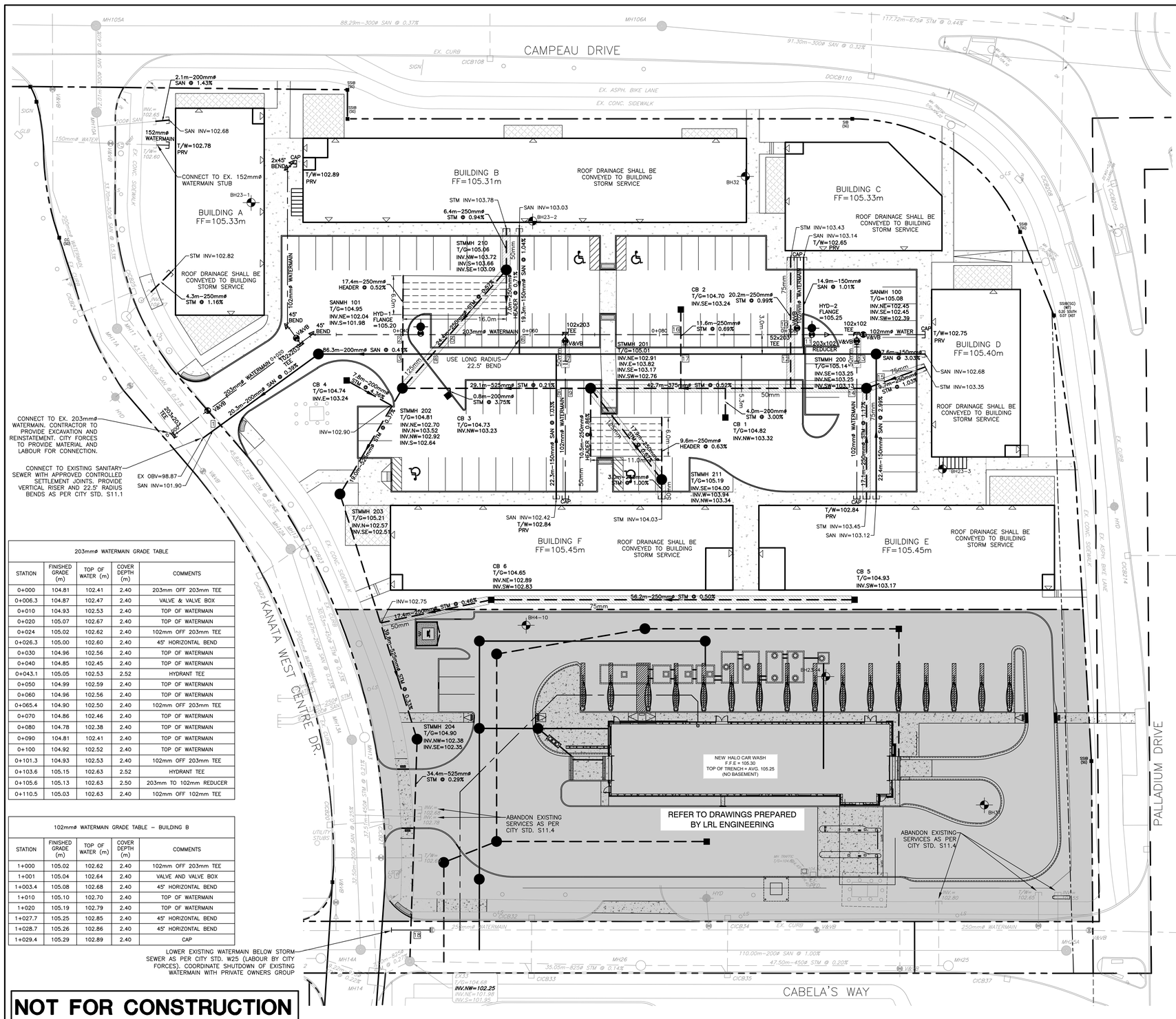
Servicing Plan
(DWG. 23021-S1)

Grading Plan
(DWG. 23021-GR1)

Erosion and Sediment Control Plan
(DWG. 23021-ESC1)

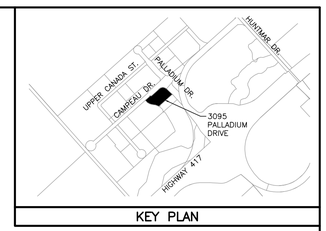
Notes & Details
(DWG. 23021-N1)

Existing Conditions and Removals Plan
(DWG. 23021-R1)



CROSSING TABLE			
CROSSING No.	SERVICE	INVERT/OBVERT	SEPARATION (m)
1	*EX STORM*	102.40	0.30
	SANITARY	102.10	
2	STORM	102.96	0.51
	WATER	102.45	
3	STORM	102.95	0.66
	SANITARY	102.29	
4	STORM	103.55	1.24
	SANITARY	102.31	
5	STORM	103.57	1.01
	WATER	102.56	
6	SANITARY	102.86	0.30
	WATER	102.56	
7	WATER	102.70	0.30
	SANITARY	102.40	
8	STORM	102.65	0.26
	SANITARY	102.39	
9	STORM	102.66	0.30
	WATER	102.36	
10	STORM	103.28	1.34
	WATER	101.94	
11	SANITARY	103.02	0.50
	WATER	102.52	
12	STORM	103.25	0.71
	SANITARY	102.54	
13	WATER	102.88	0.30
	SANITARY	102.58	
14	STORM	103.12	0.42
	WATER	102.70	
15	STORM	103.26	0.60
	SANITARY	102.66	
16	STORM	103.20	0.85
	WATER	102.35	
17	STORM	103.18	0.71
	SANITARY	102.47	
18	STORM	102.19	0.50
	WATER	101.69	

INLET CONTROL DEVICE (ICD) TABLE				
STRUCTURE	100–YR HEAD (m)	100–YR OUTFLOW (L/s)	ORIFICE DIAMETER (mm)	ORIFICE TYPE
CB 1	1.58	21.0	88.7	CIRCULAR, SLIDE
CB 2	1.55	30.0	106.5	CIRCULAR, SLIDE
CB 3	1.63	30.0	105.2	CIRCULAR, SLIDE



KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- ROAD WIDENING
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- EXISTING TREE
- HYDRANT
- WATERMAIN
- V&VB — VALVE & VALVE BOX
- SP — CURB STOP & SERVICE POST
- PRV — PRESSURE REDUCING VALVE
- CATCH BASIN
- SANITARY SEWER & MANHOLE (WATERTIGHT COVER)
- STORM SEWER & MANHOLE
- ENTRANCE
- CROSSING NUMBER
- 50mm — INSULATION AND THICKNESS AS PER S35
- BOREHOLE

203mmø WATERMAIN GRADE TABLE				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
0+000	104.81	102.41	2.40	203mm OFF 203mm TEE
0+006.3	104.87	102.47	2.40	VALVE & VALVE BOX
0+010	104.93	102.53	2.40	TOP OF WATERMAIN
0+020	105.07	102.67	2.40	TOP OF WATERMAIN
0+024	105.02	102.62	2.40	102mm OFF 203mm TEE
0+026.3	105.00	102.60	2.40	45° HORIZONTAL BEND
0+030	104.96	102.56	2.40	TOP OF WATERMAIN
0+040	104.85	102.45	2.40	TOP OF WATERMAIN
0+043.1	105.05	102.53	2.52	HYDRANT TEE
0+050	104.99	102.59	2.40	TOP OF WATERMAIN
0+060	104.96	102.56	2.40	TOP OF WATERMAIN
0+065.4	104.90	102.50	2.40	102mm OFF 203mm TEE
0+070	104.86	102.46	2.40	TOP OF WATERMAIN
0+080	104.78	102.38	2.40	TOP OF WATERMAIN
0+090	104.81	102.41	2.40	TOP OF WATERMAIN
0+100	104.92	102.52	2.40	TOP OF WATERMAIN
0+101.3	104.93	102.53	2.40	102mm OFF 203mm TEE
0+103.6	105.15	102.63	2.52	HYDRANT TEE
0+105.6	105.13	102.63	2.50	203mm TO 102mm REDUCER
0+110.5	105.03	102.63	2.40	102mm OFF 102mm TEE

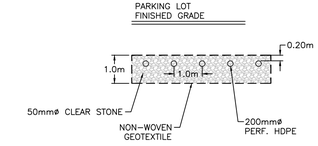
102mmø WATERMAIN GRADE TABLE – BUILDING B				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
1+000	105.02	102.62	2.40	102mm OFF 203mm TEE
1+001	105.04	102.64	2.40	VALVE AND VALVE BOX
1+003.4	105.08	102.68	2.40	45° HORIZONTAL BEND
1+010	105.10	102.70	2.40	TOP OF WATERMAIN
1+020	105.19	102.79	2.40	TOP OF WATERMAIN
1+027.7	105.25	102.85	2.40	45° HORIZONTAL BEND
1+028.7	105.26	102.86	2.40	45° HORIZONTAL BEND
1+029.4	105.29	102.89	2.40	CAP

102mmø WATERMAIN GRADE TABLE – BUILDING F				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
2+000	104.90	102.50	2.40	102mm OFF 203mm TEE
2+001	104.91	102.51	2.40	VALVE AND VALVE BOX
2+01.6	104.92	102.52	2.40	45° VERTICAL BEND
2+01.9	104.92	102.80	2.12	45° VERTICAL BEND
2+04.1	105.15	102.80	2.35	45° VERTICAL BEND
2+04.5	105.15	102.36	2.79	45° VERTICAL BEND
2+008	104.97	102.36	2.61	SEWER CROSSING
2+020	105.09	102.69	2.40	TOP OF WATERMAIN
2+025.4	105.24	102.84	2.40	CAP

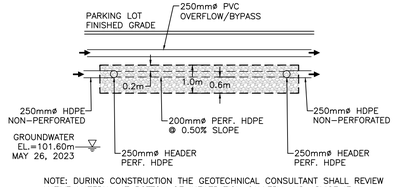
102mmø WATERMAIN GRADE TABLE – BUILDING E				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
3+000	105.03	102.63	2.40	102mm OFF 102mm TEE
3+001	105.03	102.63	2.40	VALVE AND VALVE BOX
3+001.6	105.03	102.63	2.40	45° VERTICAL BEND
3+001.9	105.03	102.98	2.05	45° VERTICAL BEND
3+004.1	105.07	102.98	2.09	45° VERTICAL BEND
3+004.4	105.07	102.70	2.37	45° VERTICAL BEND
3+008.3	105.14	102.70	2.44	SEWER CROSSING
3+020	105.11	102.71	2.40	TOP OF WATERMAIN
3+025.4	105.24	102.84	2.40	CAP

102mmø WATERMAIN GRADE TABLE – BUILDING D				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
4+000	105.03	102.63	2.40	102mm OFF 102mm TEE
4+001	105.03	102.63	2.40	VALVE & VALVE BOX
4+012.4	105.15	102.75	2.40	CAP

102mmø WATERMAIN GRADE TABLE – BUILDING C				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
5+000	104.93	102.53	2.40	102mm OFF 203mm TEE
5+001	104.93	102.53	2.40	VALVE & VALVE BOX
5+012	105.05	102.65	2.40	CAP



INFILTRATION GALLERY TYPICAL SECTION
N.T.S.



NOTE: DURING CONSTRUCTION THE GEOTECHNICAL CONSULTANT SHALL REVIEW NATIVE MATERIAL AT BOTTOM OF INFILTRATION GALLERY AND ADVISE IF ADDITIONAL EXCAVATION TO REMOVE LOW PERMEABILITY SOILS IS REQUIRED.

INFILTRATION GALLERY TYPICAL SECTION
N.T.S.

NOT FOR CONSTRUCTION

NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
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1	ISSUED FOR SITE PLAN APPLICATION	19/06/23	BLM

SCALE
0 3m 6m 12m
HORIZONTAL 1:300

LICENSED PROFESSIONAL ENGINEER
B. L. MACKECHNIE
100199554
Mar. 7/24
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	CC
DRAWN	BLM
CHECKED	CC
APPROVED	BLM

3095 PALLADIUM GP INC.

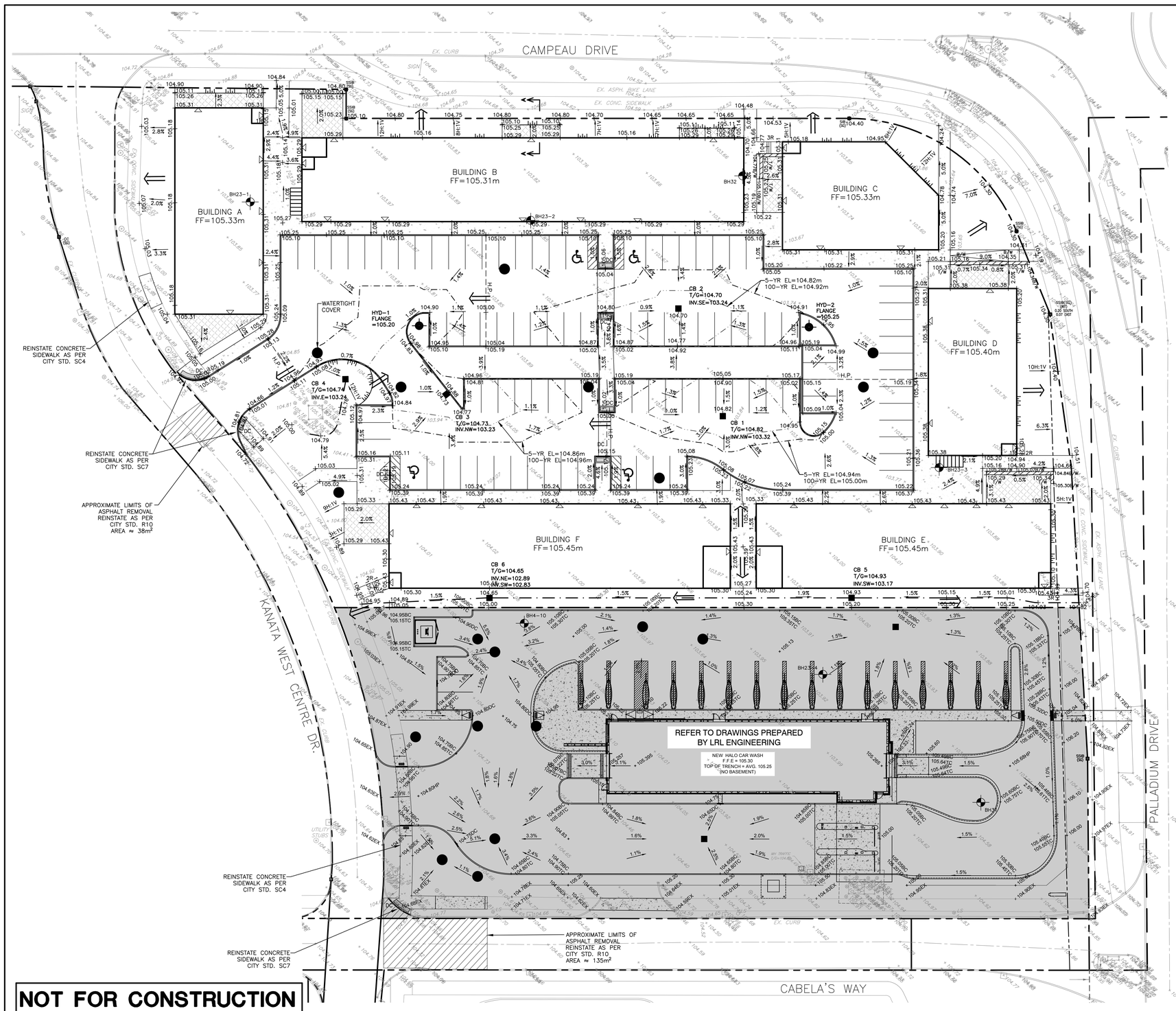
3095 PALLADIUM DRIVE
CITY OF OTTAWA

SERVICING PLAN

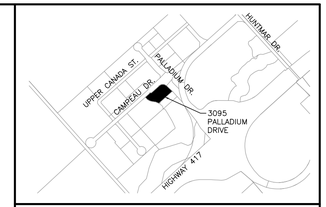
PROJECT No.	23021
SURVEY	STANTEC
DATED	MARCH 2024
DWG. No:	23021-S1

FILE No. D02-02-23-0058/D07-12-23-0092

PLAN No. 19021



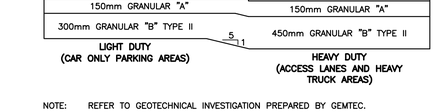
SECTION A–A
N.T.S.



KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- 100–YEAR PONDING LIMIT
- 5–YEAR PONDING LIMIT
- SWALE
- H.P. — HIGH POINT
- DC — DEPRESSED CURB WITH TWSI
- RETAINING WALL
- TERRACING (3H:1V MAX.)
- ×104.00 — EXISTING ELEVATION
- ×105.00 — PROPOSED GRADE
- 2.0% — DRAINAGE SLOPE & DIRECTION
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING TREE
- HYDRANT
- CATCH BASIN
- STORM/SANITARY MANHOLE
- ENTRANCE
- MAJOR OVERLAND FLOW ROUTE
- BOREHOLE



NOTE: REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY GEMTEC.

PAVEMENT STRUCTURE DETAIL
N.T.S.

SURFACE STORAGE VOLUME SUMMARY

STRUCTURE	2–YEAR			5–YEAR			100–YEAR		
	PROVIDED STORAGE VOLUME (m^3)	PONDING ELEVATION (m)	PONDING DEPTH (m)	PROVIDED STORAGE VOLUME (m^3)	PONDING ELEVATION (m)	PONDING DEPTH (m)	PROVIDED STORAGE VOLUME (m^3)	PONDING ELEVATION (m)	PONDING DEPTH (m)
CB 1	N/A	N/A	0.0	5.8	104.94	0.12	17.7	105.00	0.18
CB 2	N/A	N/A	0.0	5.8	104.82	0.12	29.4	104.92	0.22
CB 3	N/A	N/A	0.0	6.6	104.86	0.13	34.0	104.96	0.23
CB 4	N/A	N/A	0.0	N/A	N/A	0.0	N/A	N/A	0.0
CB 5	N/A	N/A	0.0	N/A	N/A	0.0	N/A	N/A	0.0
CB 6	N/A	N/A	0.0	N/A	N/A	0.0	N/A	N/A	0.0

NOTES:
1. N/A INDICATES THAT NO SURFACE PONDING WILL OCCUR.

NOT FOR CONSTRUCTION

NOTES

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3095 PALLADIUM GP INC.

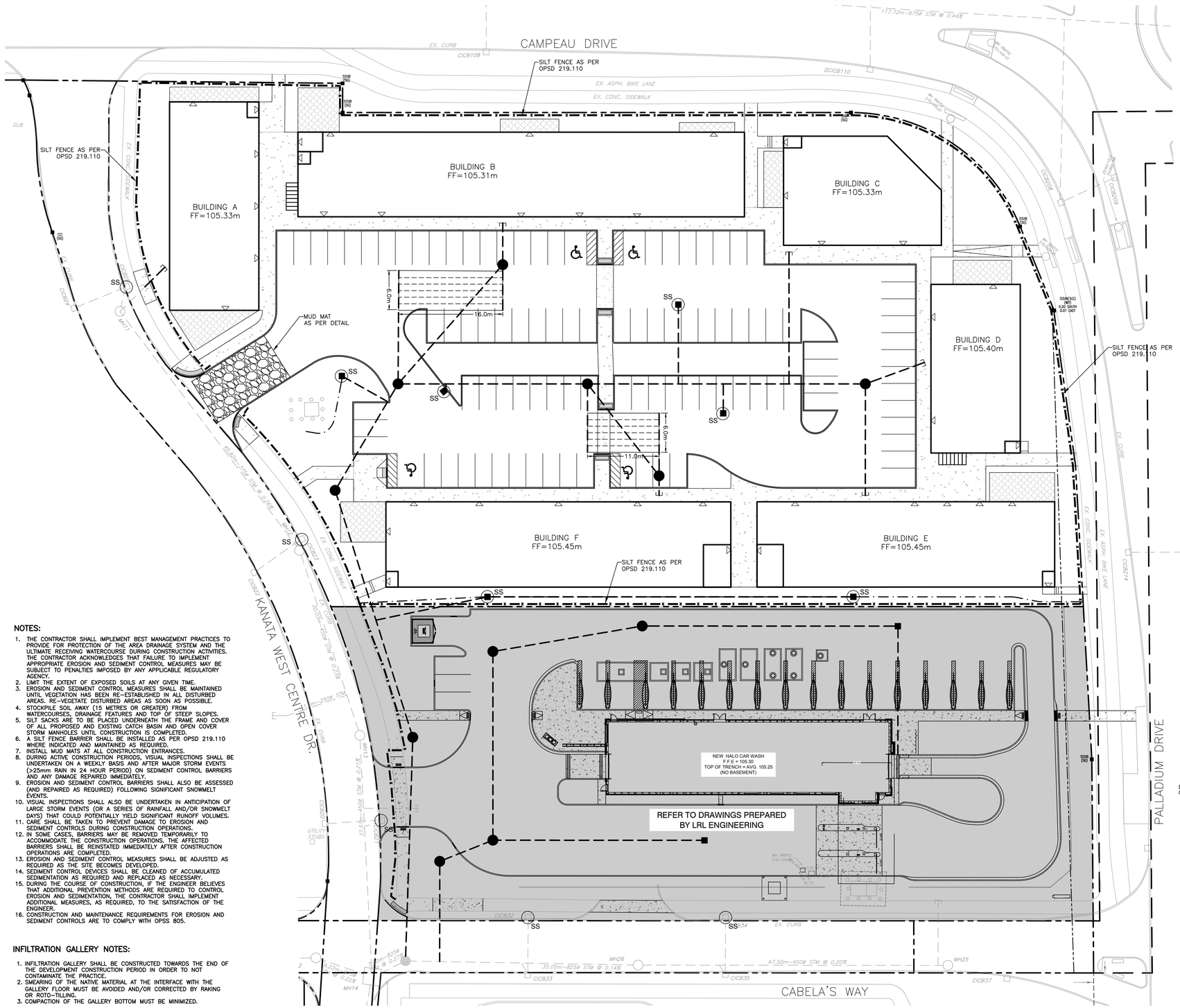
3095 PALLADIUM DRIVE
CITY OF OTTAWA

GRADING PLAN

PROJECT No.	23021
SURVEY	STANTEC
DATED	MARCH 2024
DWG. No:	23021-GR1

FILE No. D02-02-23-0058/D07-12-23-0092

PLAN No. 19021



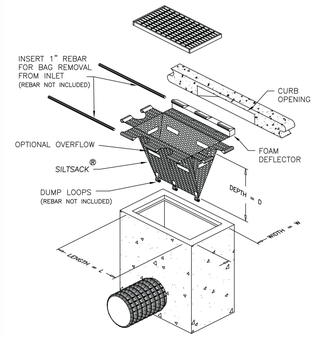
NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE ULTIMATE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. LIMIT THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL VEGETATION HAS BEEN RE-ESTABLISHED IN ALL DISTURBED AREAS. RE-VEGETATE DISTURBED AREAS AS SOON AS POSSIBLE.
4. STOCKPILE SOIL AWAY (15 METRES OR GREATER) FROM WATERCOURSES, DRAINAGE FEATURES AND TOP OF STEEP SLOPES.
5. SILT SACKS ARE TO BE PLACED UNDERNEATH THE FRAME AND COVER OF ALL PROPOSED AND EXISTING CATCH BASIN AND OPEN COVER STORM MANHOLES UNTIL CONSTRUCTION IS COMPLETED.
6. A SILT FENCE BARRIER SHALL BE INSTALLED AS PER OPSD 219.110 WHERE INDICATED AND MAINTAINED AS REQUIRED.
7. INSTALL MUD MATS AT ALL CONSTRUCTION ENTRANCES.
8. DURING ACTIVE CONSTRUCTION PERIODS, VISUAL INSPECTIONS SHALL BE UNDERTAKEN ON A WEEKLY BASIS AND AFTER MAJOR STORM EVENTS (>25mm RAIN IN 24 HOUR PERIOD) ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY.
9. EROSION AND SEDIMENT CONTROL BARRIERS SHALL ALSO BE ASSESSED (AND REPAIRED AS REQUIRED) FOLLOWING SIGNIFICANT SNOWMELT EVENTS.
10. VISUAL INSPECTIONS SHALL ALSO BE UNDERTAKEN IN ANTICIPATION OF LARGE STORM EVENTS (OR A SERIES OF RAINFALL AND/OR SNOWMELT DAYS) THAT COULD POTENTIALLY YIELD SIGNIFICANT RUNOFF VOLUMES.
11. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION OPERATIONS.
12. IN SOME CASES, BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS SHALL BE REINSTATED IMMEDIATELY AFTER CONSTRUCTION OPERATIONS ARE COMPLETED.
13. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED AS REQUIRED AS THE SITE BECOMES DEVELOPED.
14. SEDIMENT CONTROL DEVICES SHALL BE CLEANED OF ACCUMULATED SEDIMENTATION AS REQUIRED AND REPLACED AS NECESSARY.
15. DURING THE COURSE OF CONSTRUCTION, IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES, AS REQUIRED, TO THE SATISFACTION OF THE ENGINEER.
16. CONSTRUCTION AND MAINTENANCE REQUIREMENTS FOR EROSION AND SEDIMENT CONTROLS ARE TO COMPLY WITH OPSS 805.

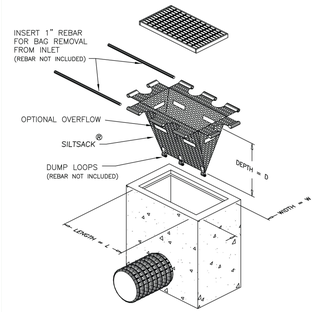
INFILTRATION GALLERY NOTES:

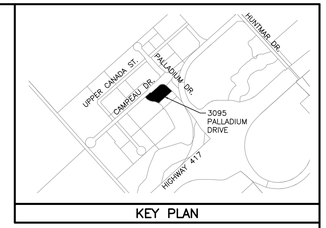
1. INFILTRATION GALLERY SHALL BE CONSTRUCTED TOWARDS THE END OF THE DEVELOPMENT CONSTRUCTION PERIOD IN ORDER TO NOT CONTAMINATE THE PRACTICE.
2. SMEARING OF THE NATIVE MATERIAL AT THE INTERFACE WITH THE GALLERY FLOOR MUST BE AVOIDED AND/OR CORRECTED BY RAKING OR ROTO-TILLING.
3. COMPACTION OF THE GALLERY BOTTOM MUST BE MINIMIZED.

Typical Siltsack® Construction - Type A



Typical Siltsack® Construction - Type B

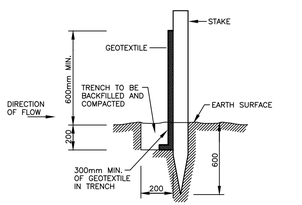




KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- CATCH BASIN
- STORM SEWER & MANHOLE
- SILT FENCE
- SS — SILT SACK (OR APPROVED EQUIVALENT)



SECTION X–X
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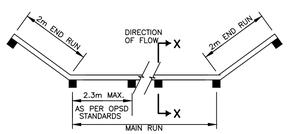
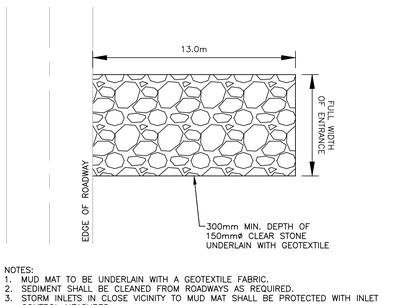


SILT FENCE BARRIER DETAIL
N.T.S.



NOTES:
1. MUD MAT TO BE UNDERLAIN WITH A GEOTEXTILE FABRIC.
2. SEDIMENT SHALL BE CLEANED FROM ROADWAYS AS REQUIRED.
3. STORM INLETS IN CLOSE VICINITY TO MUD MAT SHALL BE PROTECTED WITH INLET CONTROL MEASURES.

MUD MAT DETAIL
N.T.S.

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3095 PALLADIUM GP INC.

3095 PALLADIUM DRIVE
CITY OF OTTAWA

EROSION AND SEDIMENT CONTROL PLAN

PROJECT No.	23021
SURVEY	STANTEC
DATED	MARCH 2024
DWG. No:	23021-ESC1

FILE No. D02-02-23-0058/D07-12-23-0092

PLAN No. 19021

GENERAL NOTES:

1. ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), AS AMENDED BY THE CITY OF OTTAWA.
2. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS AND ELEVATIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
4. DESIGN ELEVATIONS GIVEN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY ROBINSON LAND DEVELOPMENT.
5. ANY AREAS BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE.
6. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
7. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
8. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST AMENDMENT).
9. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
10. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
11. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH, AS SPECIFIED BY OPSD, IS EXCEEDED.
12. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH THE CITY OF OTTAWA PRIOR TO AND TREE CUTTING.
13. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY GEMEC, DATED JUNE 2023.
14. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE FOR DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS AND TRENCHING AS WELL AS RELEASE OF ANY PUMPED GROUNDWATER IN A CONTROLLED AND APPROVED MANNER.
15. DO NOT CONSTRUCT USING DRAWINGS THAT ARE NOT MARKED "ISSUED FOR CONSTRUCTION".
16. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
17. CLAY SEALS SHALL BE INSTALLED WITHIN SEWER TRENCHES IN ACCORDANCE WITH CITY STANDARD S8.

STORM SEWERS:

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

SANITARY SEWERS:

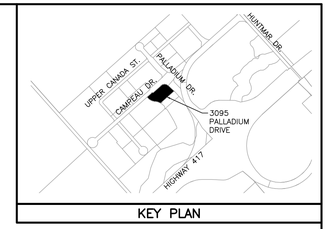
1. ALL SANITARY SEWERS SHALL BE PVC SDR 35, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
2. SANITARY SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF OTTAWA STD. S6 AND S7, CLASS 'B' BEDDING UNLESS OTHERWISE NOTED.
3. ALL SANITARY SERVICES ARE TO BE EQUIPPED WITH APPROVED BACKWATER VALVES.
4. SANITARY MANHOLE FRAME AND COVERS SHALL BE WATERTIGHT AS PER CITY OF OTTAWA STD. S24.
5. SANITARY SEWER MANHOLES SHALL BE BENCHED AS PER OPSD 701.021.
6. SANITARY PRE-CAST MANHOLE SHALL BE CONSTRUCTED WITH A HIGHER PERCENTAGE OF SILICA FUME IN THE CONCRETE TO MAKE IT MORE DENSE AND LESS SUSCEPTIBLE TO CORROSION OR PINHOLE LEAKS.
7. FOR SANITARY MANHOLES, DEPENDING ON THE ELEVATION OF THE GROUNDWATER TABLE, AND BASED ON THE RECOMMENDATION OF THE PROJECT GEOTECHNICAL CONSULTANT, CRETEX SEALS, OR A SIMILAR PRODUCT, SHALL BE INSTALLED IN THE PRE-CAST MANHOLE SECTION TO JUST BELOW THE MANHOLE FRAME TO PREVENT INFILTRATION.
8. CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSS 410 AND OPSS 407. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL STORM AND SANITARY SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
9. IN ACCORDANCE WITH CITY OF OTTAWA STANDARD S11, SANITARY SERVICE CONNECTION REQUIRES APPROVED CONTROLLED SETTLEMENT JOINT.

WATER SUPPLY:

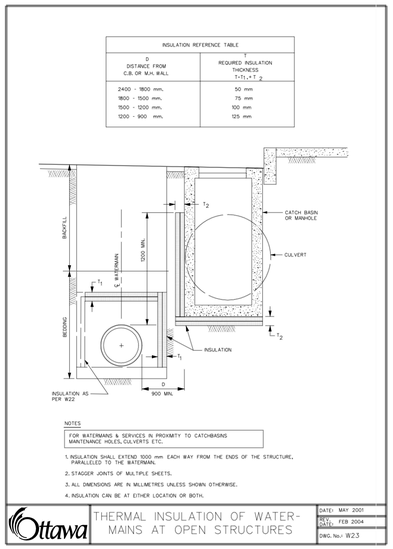
1. ALL PVC WATERMAINS SHALL BE EQUAL TO AWWA C-900 CLASS 150, SDR 18, OR APPROVED EQUAL.
2. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17, UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
3. ALL PVC WATERMAINS SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W36.
4. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS AS PER CITY OF OTTAWA STD. W40 AND W42.
5. CONTRACTOR TO SUPPLY HYDRANT EXTENSION TO ADJUST THE LENGTH OF HYDRANT BARREL IF REQUIRED.
6. FIRE HYDRANTS SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W19, AND LOCATED AS PER CITY STD. W18.
7. VALVE IN BOXES SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W24.
8. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS AS PER CITY OF OTTAWA STD. W25.5 AND W25.6.
9. THRUST BLOCKING OF WATERMAIN TO BE INSTALLED AS PER CITY OF OTTAWA STD. W25.3 AND W25.4.
10. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS AND BLOW-OFFS AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
11. INSULATION FOR WATERMAIN CROSSING OVER AND BELOW SEWER SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. W25.2 AND W25, RESPECTIVELY, WHERE WATERMAIN COVER IS LESS THAN 2.4m.
12. AS PER CITY GUIDELINE, THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER / UTILITY IS 0.25m FOR CROSSING OVER THE SEWER, AS PER CITY STD. W25.2. FOR CROSSING UNDER SEWER, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER AS PER CITY STD. W25.
13. CONNECTION TO EXISTING WATERMAIN TO BE PERFORMED BY CITY FORCES. CONTRACTOR TO PROVIDE LABOUR, EQUIPMENT AND MATERIAL REQUIRED FOR EXCAVATION, BEDDING AND REINSTATEMENT.
14. SWABBING, DISINFECTION, AND HYDROSTATIC TESTING TO BE CONDUCTED AS PER CITY OF OTTAWA STANDARDS IN THE PRESENCE OF A CITY INSPECTOR AND/OR CONSULTANT.

ROADWORK SPECIFICATIONS:

1. CONCRETE CURB SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC1.1 (BARRIER CURB). PROVISION SHALL BE MADE FOR CURB DEPRESSIONS AT SIDEWALKS AND DRIVEWAYS.
2. ALL BARRIER CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
3. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC1.4.
4. TWSIs SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF OTTAWA STD. SC7.3.
5. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. R10 AND OPSD 509.010, OPSS 310.
6. GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300mm AROUND ALL STRUCTURES WITHIN PAVEMENT AREA.
7. ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR DENSITY.
8. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS & NECESSARY REPAIRS HAVE BEEN CARRIED OUT TO THE SATISFACTION OF THE ENGINEER.
9. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300mm LIFTS.
10. PEDESTRIAN CURB RAMP WITH BOULEVARD SHALL BE ACCORDANCE WITH CITY OF OTTAWA STD. SC7.
11. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW-CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW ASPHALT.
12. PAVEMENT DESIGN AS PER GEOTECHNICAL RECOMMENDATIONS.



KEY PLAN

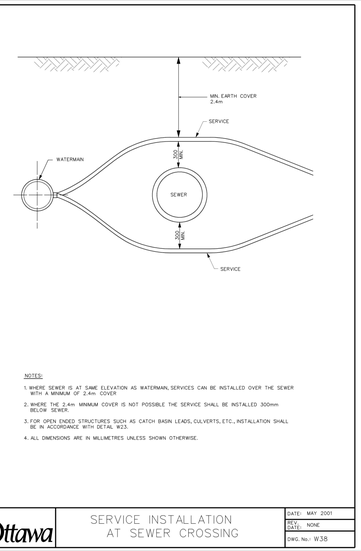


NOTES

FOR WATERMAINS & SERVICES IN PROXIMITY TO CATCHBASINS MAINTENANCE HOLES, CULVERTS ETC.

1. INSULATION SHALL EXTEND 1000 mm EACH WAY FROM THE ENDS OF THE STRUCTURE, PARALLELED TO THE WATERMAIN.
2. STAGGER JOINTS OF MULTIPLE SHEETS.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
4. INSULATION CAN BE AT EITHER LOCATION OR BOTH.

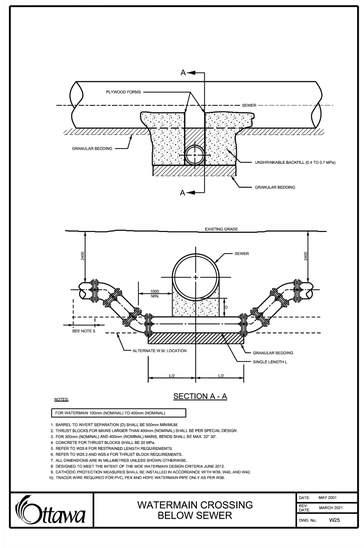
Ottawa	THERMAL INSULATION OF WATER-MAINS AT OPEN STRUCTURES	DATE: MAY 2001 REV. DATE: FEB 2004 DWG. No.: W23



NOTES:

1. WHERE SEWER IS AT SAME ELEVATION AS WATERMAIN, SERVICES CAN BE INSTALLED OVER THE SEWER WITH A MINIMUM OF 2.4m COVER
2. WHERE THE 2.4m MINIMUM COVER IS NOT POSSIBLE THE SERVICE SHALL BE INSTALLED 300mm BELOW SEWER.
3. FOR OPEN ENDED STRUCTURES SUCH AS CATCH BASIN LEADS, CULVERTS, ETC., INSTALLATION SHALL BE IN ACCORDANCE WITH DETAIL W23.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

Ottawa	SERVICE INSTALLATION AT SEWER CROSSING	DATE: MAY 2001 REV. DATE: NONE DWG. No.: W38



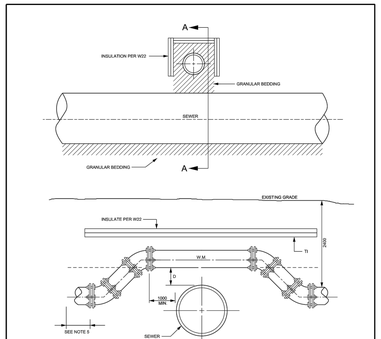
SECTION A - A

NOTES:

FOR WATERMAIN 150mm (NOMINAL) TO 400mm (NOMINAL)

1. BARREL TO INVERT SEPARATION (S) SHALL BE 500mm MINIMUM.
2. THRUST BLOCKS FOR MAINS LARGER THAN 400mm (NOMINAL) SHALL BE PER SPECIAL DESIGN.
3. FOR 300mm (NOMINAL) AND 400mm (NOMINAL) MAINS, BENDS SHALL BE MAX. 22° 30'.
4. CONCRETE FOR THRUST BLOCKS SHALL BE 20 MPa.
5. REFER TO W25.6 FOR RESTRAINED LENGTH REQUIREMENTS.
6. REFER TO W25.5 AND W25.4 FOR THRUST BLOCK REQUIREMENTS.
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
8. DESIGNED TO MEET THE INTENT OF THE MOE WATERMAIN DESIGN CRITERIA JUNE 2012.
9. CATHODIC PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH W25.1(A), W40, AND W42.
10. TRACER WIRE REQUIRED FOR PVC, PEA AND HDPE WATERMAIN PIPE ONLY AS PER W36.

Ottawa	WATERMAIN CROSSING BELOW SEWER	DATE: MAY 2001 REV. DATE: MARCH 2021 DWG. No.: W25



SECTION A - A

NOTES:

FOR WATERMAIN 150mm (NOMINAL) TO 400mm (NOMINAL)

1. BARREL TO BARREL SEPARATION (S) SHALL BE 500mm MINIMUM.
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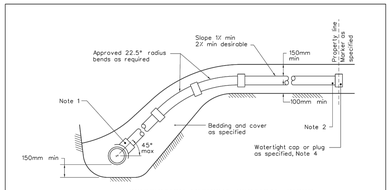
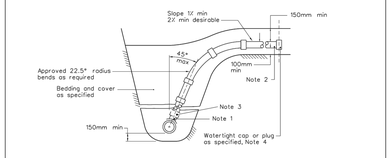
3. FOR 300mm (NOMINAL) AND 400mm (NOMINAL) MAINS, BENDS SHALL BE MAX. 22° 30'.
4. CONCRETE FOR THRUST BLOCKS SHALL BE 20 MPa.
5. REFER TO W25.6 FOR RESTRAINED LENGTH REQUIREMENTS.
6. REFER TO W25.5 AND W25.4 FOR THRUST BLOCK REQUIREMENTS.
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
8. DESIGNED TO MEET THE INTENT OF THE MOE WATERMAIN DESIGN CRITERIA JUNE 2012.

Ottawa	WATERMAIN CROSSING OVER SEWER	DATE: MAY 2001 REV. DATE: MARCH 2013 DWG. No.: W25.2



CONNECTION WITHOUT VERTICAL RISER

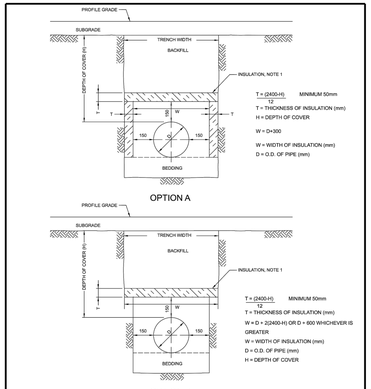


VERTICAL RISER

NOTES:

1. ALL DIAMETERS OF SERVICE CONNECTIONS TO FLEXIBLE MAIN SEWER SHALL BE MADE USING APPROVED TEE OR WYE FITTINGS.
2. SANITARY SERVICES TO BE 150mm AND STORM SERVICES TO BE 100mm FOR NEW RESIDENCES UNLESS SPECIFIED OTHERWISE. SERVICE PIPE AND RADIUS BENDS TO BE APPROVED CSA B182.2, SDR28 PRODUCTS UNLESS SPECIFIED OTHERWISE.
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 5m DEEP. WHERE APPROVED, CONNECTIONS TO SEWERS OVER 5m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS.
4. CAP OR PLUG AT THE PROPERTY LINE SHALL BE ADEQUATELY BRACED TO WITHSTAND TESTING PRESSURE.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

Ottawa	SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN SEWER PIPE (MODIFIED OPSD-1006.020)	DATE: MARCH 2006 REV. DATE: MARCH 2013 DWG. No.: S11.1

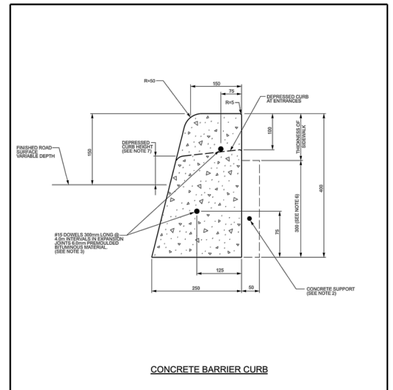


OPTION B
TYPICAL PIPE INSULATION DETAIL

NOTES:

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

Ottawa	INSULATION FOR SHALLOW SEWERS	DATE: MARCH 2003 REV. DATE: — DWG. No.: S35



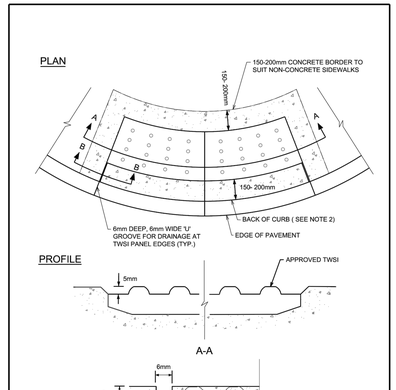
CONCRETE BARRIER CURB

NOTES:

1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE EXPANSION JOINTS/SOLID MATERIAL AND THE #10 DOWELS ARE TO BE PLACED AT THE END OF THE EXTRUSION.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. DUMMY JOINTS SHALL BE 25mm DEEP, FRONT, BACK AND TOP OF SECTION AT 4m SPACING OR MATCH JOINTING WHERE SIDEWALK IS ADJACENT.
6. FOR DEPRESSED CURB AT ENTRANCES USE 250.
7. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm.

N.T.S.

Ottawa	CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD-600.110)	DATE: JANUARY 2003 REV. DATE: MARCH 2021 DWG. No.: SC1.1



NOTES:

1. TOPS OF TWSI'S (TACTILE WALKING SURFACE INDICATOR) SHALL BE ALIGNED & LEVEL WITH THE ADJACENT CONCRETE SURFACE & INSTALLATION IN WET CONCRETE SHALL BE EFFECTIVE IN PERMANENTLY SECURING THE TWSI IN PLACE ONCE DRY.
2. FOR MONOLITHIC SIDEWALKS, TWSI SHALL BE 300 TO 350mm BACK FROM THE CURB FACE.

N.T.S.

Ottawa	TWSI DETAIL	DATE: MARCH 2018 REV. DATE: MARCH 2018 DWG. No.: SC7.3

NOT FOR CONSTRUCTION

NOTES

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

PROPERTY BOUNDARIES ARE DERIVED FROM PLAN OF SURVEY BLOCKS 1 AND 14 REGISTERED PLAN 4M-1566 CITY OF OTTAWA, STANTEC GEOMATICS LTD., ONTARIO LAND SURVEYORS. ELEVATIONS SHOWN ARE GEODETIC (GSVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=95.230.

NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	07/03/24	BLM
2	REVISED PER COMMENTS	16/11/23	BLM
1	ISSUED FOR SITE PLAN APPLICATION	19/06/23	BLM

SCALE

LICENSED PROFESSIONAL ENGINEER
B.L. MACKECHNIE
100199554
Mar 7/24
PROVINCE OF ONTARIO

Robinson Land Development

350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	CC
DRAWN	BLM
CHECKED	CC
APPROVED	BLM

3095 PALLADIUM GP INC.

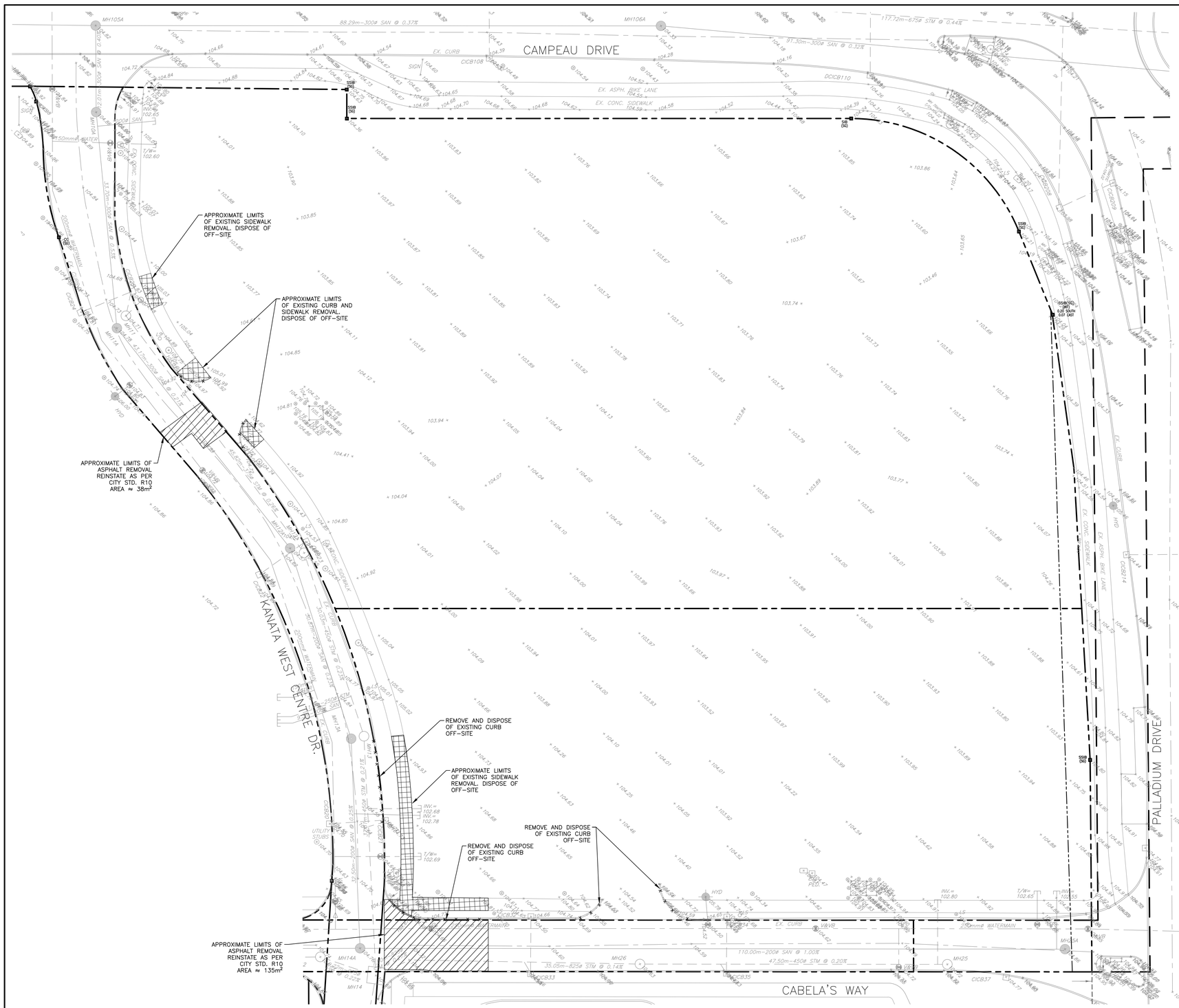
3095 PALLADIUM DRIVE
CITY OF OTTAWA

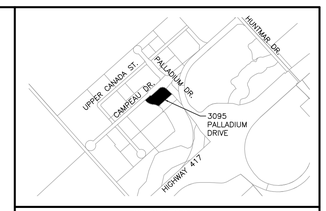
NOTES & DETAILS

PROJECT No.	23021
SURVEY	STANTEC
DATED	MARCH 2024
DWG. No:	23021-N1

FILE No. D02-02-23-0058/D07-12-23-0092

PLAN No. 19021





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- ×104.00 EXISTING ELEVATION
- EXISTING HYDRANT
- EXISTING CATCH BASIN
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- EXISTING TREE
- ASPHALT REMOVAL
- CONCRETE SIDEWALK REMOVAL
- CONCRETE CURB REMOVAL

NOT FOR CONSTRUCTION

NOTES

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

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NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	07/03/24	BLM
2	REVISED PER COMMENTS	16/11/23	BLM
1	ISSUED FOR SITE PLAN APPLICATION	19/06/23	BLM

SCALE
0 3m 6m 12m
HORIZONTAL 1:300

LICENSED PROFESSIONAL ENGINEER
B. L. MACKECHNIE
100199554
Mar. 7/24
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
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DESIGN	BLM
CHECKED	CC
DRAWN	BLM
CHECKED	CC
APPROVED	BLM

3095 PALLADIUM GP INC.

3095 PALLADIUM DRIVE
CITY OF OTTAWA

EXISTING CONDITIONS AND REMOVALS PLAN

PROJECT No.	23021
SURVEY	STANTEC
DATED	MARCH 2024
DWG. No:	23021-R1

FILE No. D02-02-23-0058/D07-12-23-0092

PLAN No. 19021

Appendix C

Boundary Conditions

Watermain Design Sheet

Hydraulic Model Figure

FUS Calculations

Hydrant Coverage Plan

Hydraulic Model Outputs

Boundary Conditions
3095 Palladium Drive

Provided Information

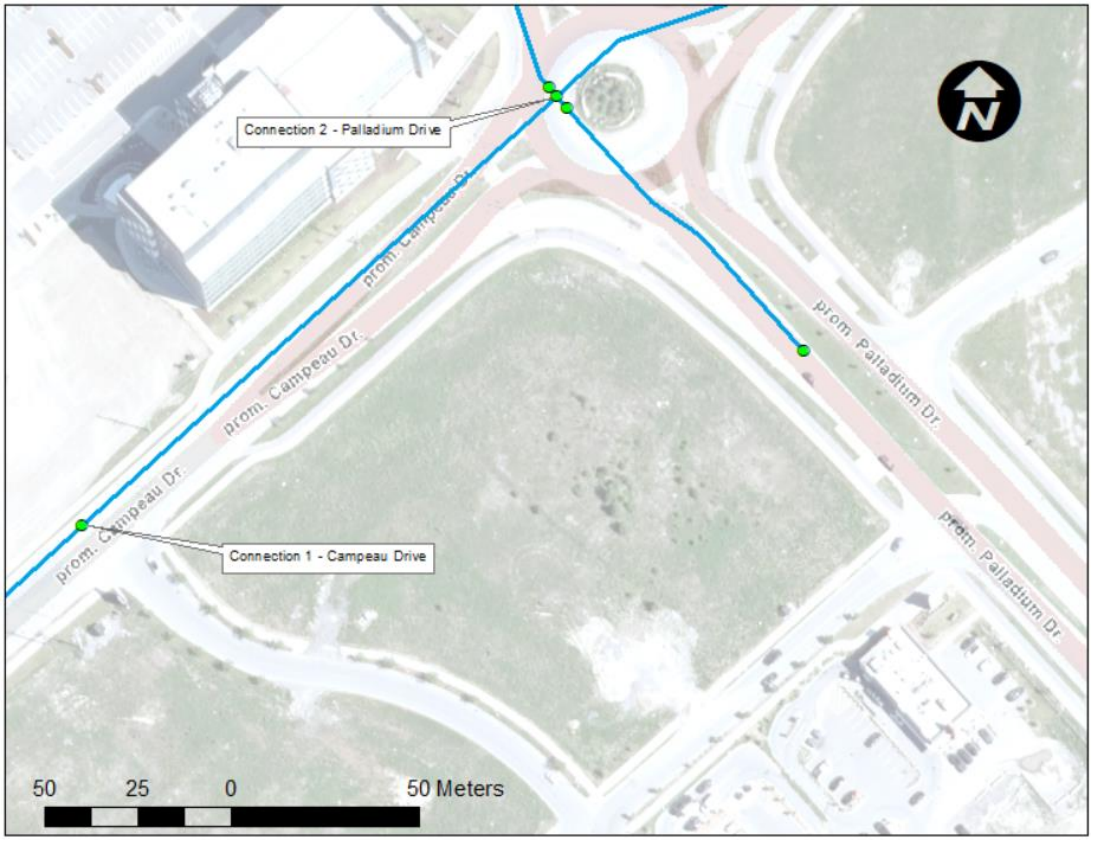
Connection 1 – Campeau Drive

Scenario	Demand	
	L/min	L/s
Average Daily Demand	6	0.10
Maximum Daily Demand	9	0.15
Peak Hour	16	0.26
Fire Flow Demand #1	13,000	216.67

Connection 2 – Palladium Drive

Scenario	Demand	
	L/min	L/s
Average Daily Demand	78	1.30
Maximum Daily Demand	137	2.29
Peak Hour	403	6.72
Fire Flow Demand #1	5,100	85.00

Location



Results

Connection 1 – KWC

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.3	84.0
Peak Hour	156.4	77.1
Max Day plus Fire Flow #1	133.0	43.8

[1] Ground Elevation = 102.2 m

Connection 2 – Car Wash

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.3	85.6
Peak Hour	156.4	78.7
Max Day plus Fire Flow #1	153.4	74.4

[1] Ground Elevation = 101.1 m

Notes

1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
    a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
    b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

2. Connections provided at existing public watermain locations. Connection 2 was provided at Campeau Drive & Palladium Drive intersection to avoid dead end modelling scenario along Palladium Drive. Existing private watermains within parcel must be modelled by consultant.

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.

WATERMAIN DESIGN SHEET

3095 PALLADIUM DRIVE
Project No. 23021

JUNCTION NODE	RESIDENTIAL POPULATION				COMMERCIAL AREA (ha)	COMMERCIAL FLOOR AREA (m^2)	INSTITUTIONAL AREA (ha)	AVG. DAY DEMAND (L/s)				MAX. DAILY DEMAND (L/s)				MAX. HOURLY DEMAND (L/s)				AVG. DAY DEMAND (m^3/day)
	UNIT COUNT			TOTAL POPULATION																
	SINGLE FAMILY	TOWNHOUSE	APARTMENTS					RES.	COMM.	INST.	TOTAL	RES.	COMM.	INST.	TOTAL	RES.	COMM.	INST.	TOTAL	
CONNECTION 1						3351			0.10		0.10		0.15		0.15		0.26		0.26	8.4
CONNECTION 2					0.54				0.22		0.22		0.33		0.33		0.59		0.59	18.9
Total					**0.54**	**3351**			**0.32**		**0.32**		**0.474**		**0.474**		**0.85**		**0.85**	**27.3**

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

Shopping Centres = 2500 L/ (1000 m^2/day) OWDG Table 4.2
Reference Table 1 IBI Report

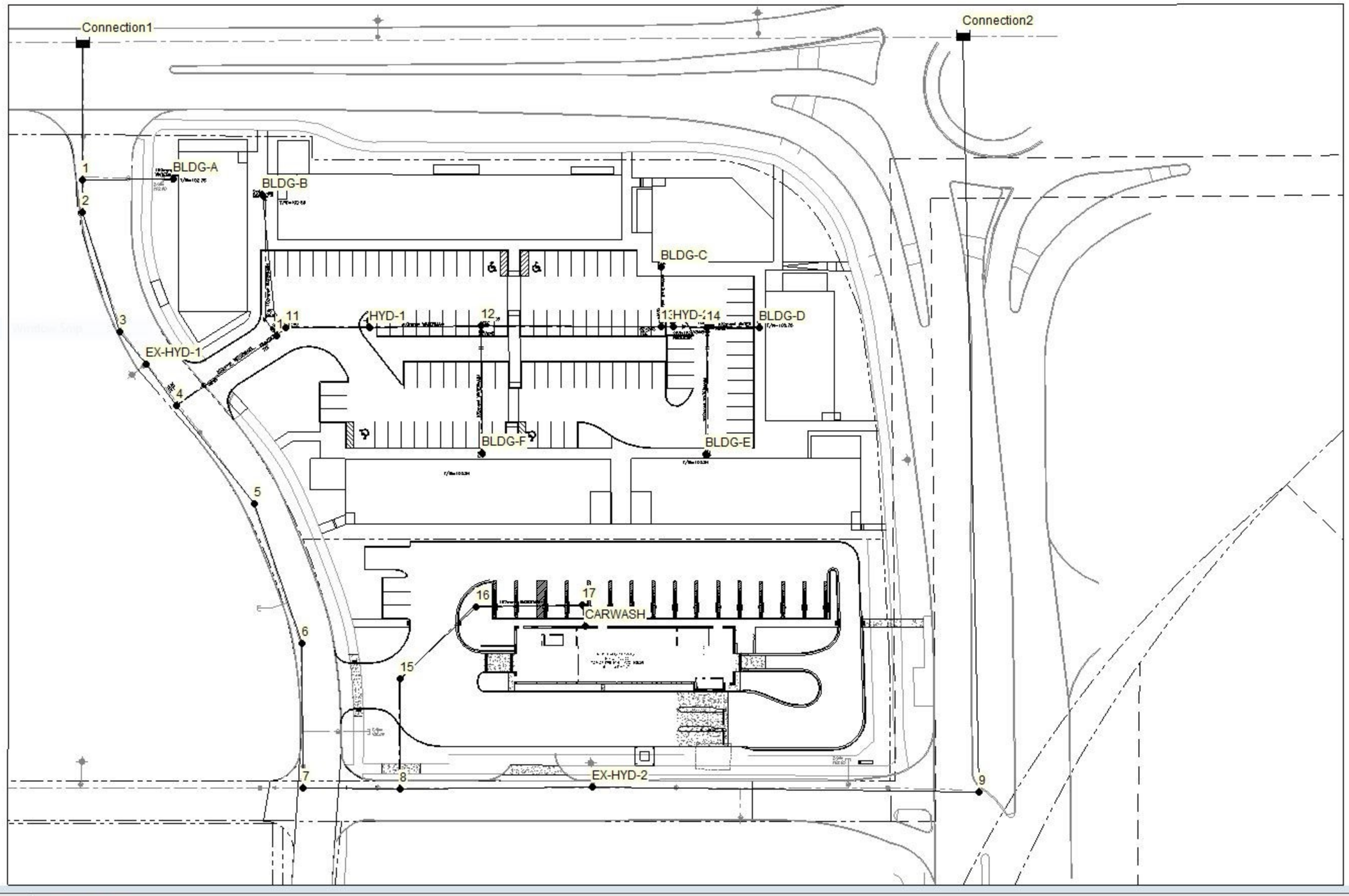
Per Unit Populations
Single Family = 3.4 persons/unit
Townhouses = 2.7 persons/unit
Apartments (2 bedroom) = 2.1 persons/unit

Avg. Day Demand:
Residential 280 L/person/day
Commercial 35000 L/ha/day
Institutional 28000 L/ha/day

Max. Daily Demand:
Residential 2.5 x Avg. Day
Commercial 1.5 x Avg. Day
Institutional 1.5 x Avg. Day

Max. Hourly Demand:
Residential 2.2 x Max. Day
Commercial 1.8 x Max. Day
Institutional 1.8 x Max. Day

t Report Window Help



152% X,Y: 899.010, 6251.751

Project Name:	3095 Palladium Drive Site Plan
Project Location:	3095 Palladium Drive
Project No:	23021
Date:	Oct. 06-23
Building Type:	Commercial Retail
Building Being Considered:	BLDG A

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**			
		Wood Frame (Type V)	1.5	Wood Frame (Type V)	1.5	
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				439.1	m^2
	Total Effective Floor Area				**439.1**	**m^2**
C	**Fire Flow**				**7,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15	Combustible	0	
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**0**	**L/min**
	Fire Flow				**7,000**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				0	m
	Exposed Wall No. of Storeys				0	
	Length-Height Factor of Exposed Wall				0	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	31	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				0	m
	Exposed Wall No. of Storeys				0	
	Length-Height Factor of Exposed Wall				0	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	31	m
	North Side Exposure Charge				**0.00**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				13	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				13	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				

	Separation Distance			6	m
	East Side Exposure Charge			**0.15**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			55	m
	Exposed Wall No. of Storeys			1	
	Length-Height Factor of Exposed Wall			55	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	36	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.15**	**< 0.75**
	Increase for Exposures			**1050**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

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

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

Project Name:	3095 Palladium Drive Site Plan
Project Location:	3095 Palladium Drive
Project No:	23021
Date:	Oct. 06-23
Building Type:	Commercial Retail
Building Being Considered:	BLDG B

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**			
		Wood Frame (Type V)	1.5	Wood Frame (Type V)	1.5	
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				892.0	m^2
	Total Effective Floor Area				**892.0**	**m^2**
C	**Fire Flow**				**10,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15	Combustible	0	
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**0**	**L/min**
	Fire Flow				**10,000**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				32	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				32	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				6	m
	West Side Exposure Charge				**0.16**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				0	m
	Exposed Wall No. of Storeys				0	
	Length-Height Factor of Exposed Wall				0	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	31	m
	North Side Exposure Charge				**0.00**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				16.8	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				16.8	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				

	Separation Distance			6	m
	East Side Exposure Charge			**0.15**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			55	m
	Exposed Wall No. of Storeys			1	
	Length-Height Factor of Exposed Wall			55	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	43.8	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.31**	**< 0.75**
	Increase for Exposures			**3100**	**L/min**
G	**Total Required Fire Flow**			**13,000**	**L/min**

Notes:

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

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

Project Name:	3095 Palladium Drive Site Plan
Project Location:	3095 Palladium Drive
Project No:	23021
Date:	Oct. 06-23
Building Type:	Commercial Retail
Building Being Considered:	BLDG C

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**			
		Wood Frame (Type V)	1.5	Wood Frame (Type V)	1.5	
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				372.0	m^2
	Total Effective Floor Area				**372.0**	**m^2**
C	**Fire Flow**				**6,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15	Combustible	0	
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**0**	**L/min**
	Fire Flow				**6,000**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				13	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				13	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				6	m
	West Side Exposure Charge				**0.15**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				0	m
	Exposed Wall No. of Storeys				0	
	Length-Height Factor of Exposed Wall				0	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	31	m
	North Side Exposure Charge				**0.00**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				13.7	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				13.7	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				

	Separation Distance			6	m
	East Side Exposure Charge			**0.15**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			45.7	m
	Exposed Wall No. of Storeys			1	
	Length-Height Factor of Exposed Wall			45.7	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	39.4	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.3**	**< 0.75**
	Increase for Exposures			**1800**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

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

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

Project Name:	3095 Palladium Drive Site Plan
Project Location:	3095 Palladium Drive
Project No:	23021
Date:	Oct. 06-23
Building Type:	Commercial Retail
Building Being Considered:	BLDG D

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**			
		Wood Frame (Type V)	1.5	Wood Frame (Type V)	1.5	
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				355.0	m^2
	Total Effective Floor Area				**355.0**	**m^2**
C	**Fire Flow**				**6,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15	Combustible	0	
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**0**	**L/min**
	Fire Flow				**6,000**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				32	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				32	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	103	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				24.3	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				24.3	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				6	m
	North Side Exposure Charge				**0.16**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				0	m
	Exposed Wall No. of Storeys				0	
	Length-Height Factor of Exposed Wall				0	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				

	Separation Distance			31	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			45.7	m
	Exposed Wall No. of Storeys			1	
	Length-Height Factor of Exposed Wall			45.7	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			7.5	m
	South Side Exposure Charge			**0.17**	
	Total Exposure Charage			**0.33**	**< 0.75**
	Increase for Exposures			**1980**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

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

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

Project Name:	3095 Palladium Drive Site Plan
Project Location:	3095 Palladium Drive
Project No:	23021
Date:	Nov. 15-23
Building Type:	Commercial Retail
Building Being Considered:	BLDG E

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	**Type of Construction**	**Options**	**C**			
		Wood Frame (Type V)	1.5	Wood Frame (Type V)	1.5	
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				599.0	m^2
	Total Effective Floor Area				**599.0**	**m^2**
C	**Fire Flow**				**8,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15	Combustible	0	
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**0**	**L/min**
	Fire Flow				**8,000**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				13.1	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				13.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				4	m
	West Side Exposure Charge				**0.15**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				13.7	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				13.7	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				7.5	m
	North Side Exposure Charge				**0.15**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				0	m
	Exposed Wall No. of Storeys				0	
	Length-Height Factor of Exposed Wall				0	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				

	Separation Distance			31	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			44.1	m
	Exposed Wall No. of Storeys			1	
	Length-Height Factor of Exposed Wall			44.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			20.2	m
	South Side Exposure Charge			**0.01**	
	Total Exposure Charage			**0.31**	**< 0.75**
	Increase for Exposures			**2480**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

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

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

Project Name:	3095 Palladium Drive Site Plan
Project Location:	3095 Palladium Drive
Project No:	23021
Date:	Nov. 15-23
Building Type:	Commercial Retail
Building Being Considered:	BLDG F

Robinson Land Development

Calculations for Total Required Fire Flow

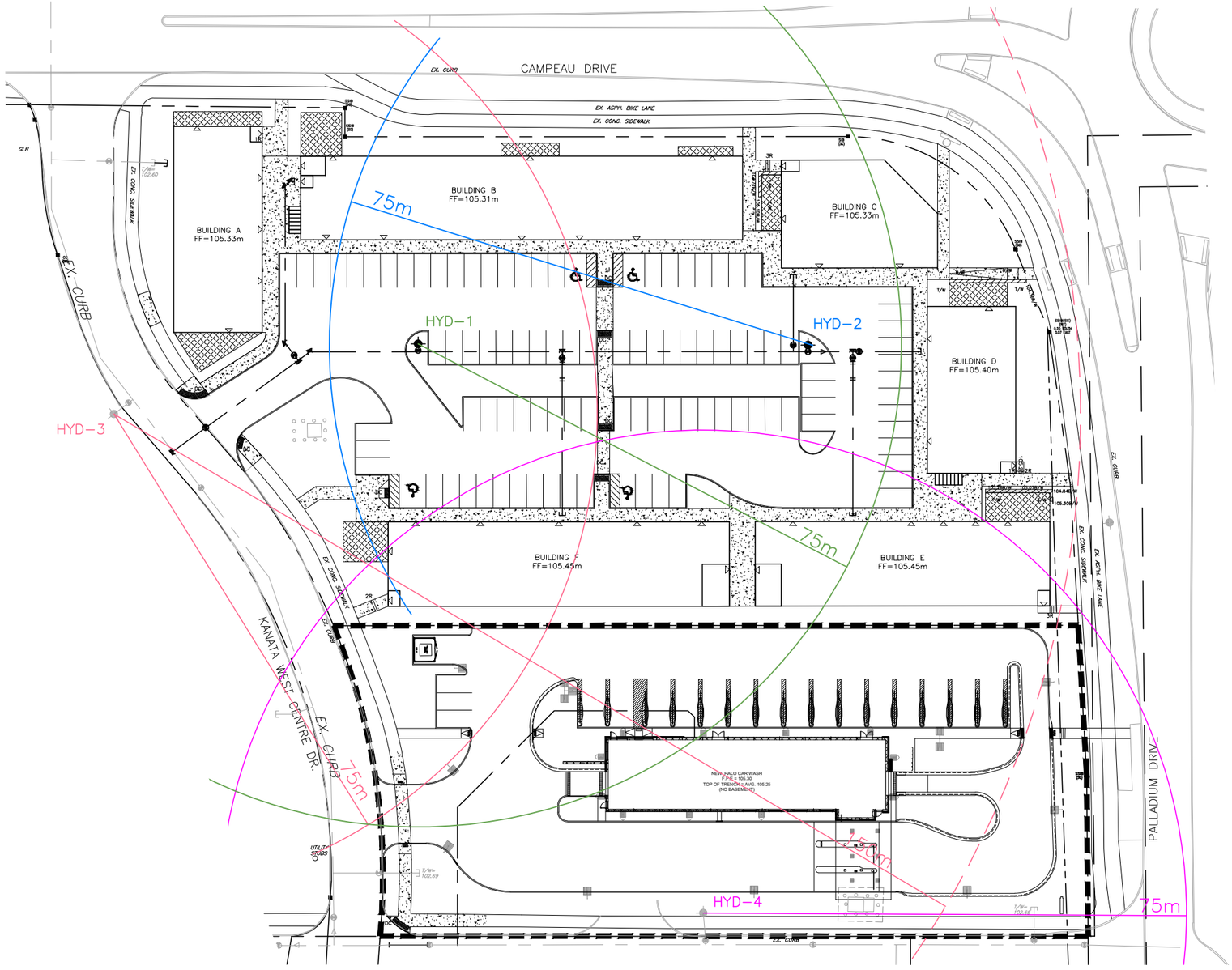
Step	Parameter				Value	
A	Type of Construction	**Options**	**C**			
		Wood Frame (Type V)	1.5	Wood Frame (Type V)	1.5	
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				694.0	m^2
	Total Effective Floor Area				**694.0**	**m^2**
C	**Fire Flow**				**9,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15	Combustible	0	
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**0**	**L/min**
	Fire Flow				**9,000**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinker System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				13.7	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				13.7	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	33	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				68.6	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				68.6	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	43.8	m
	North Side Exposure Charge				**0.00**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				13.1	m
	Exposed Wall No. of Storeys				1	
	Length-Height Factor of Exposed Wall				13.1	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				

	Separation Distance			4.0	m
	East Side Exposure Charge			**0.15**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			44.1	m
	Exposed Wall No. of Storeys			1	
	Length-Height Factor of Exposed Wall			44.1	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			20.2	m
	South Side Exposure Charge			**0.01**	
	Total Exposure Charage			**0.16**	**< 0.75**
	Increase for Exposures			**1440**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

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

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



Robinson
Land Development

scale 1:750	3095 PALLADIUM DRIVE	project no. 23021
date 20/02/24	HYDRANT COVERAGE PLAN	HYD
drawn by BLM		

```
*********************************************************************
*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                           Version 2.2                             *
*********************************************************************
```

Input File:
AVERAGE DAY DEMAND

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
3	8	7	19	254
4	7	6	29	203
5	6	5	30	203
6	5	4	25	203
8	3	2	25	203
9	2	1	8	203
10	1	Connection1	18	203
11	8	15	21	102
12	15	16	21	102
13	16	17	21	102
14	17	CARWASH	4	102
15	Connection2	9	149	254
16	9	EX-HYD-2	73	254
17	EX-HYD-2	8	39	254
18	4	10	24	203
19	10	BLDG-B	29	102
20	10	11	3	203
21	11	HYD-1	17	203
22	HYD-1	12	22	203
23	12	BLDG-F	26	102
24	12	13	36	203
25	13	BLDG-C	12	52
26	13	HYD-2	2	203
27	HYD-2	14	7	203
28	14	BLDG-E	26	102
29	14	BLDG-D	11	52
30	1	BLDG-A	18	152
31	3	EX-HYD-1	8	203
32	EX-HYD-1	4	10	203

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	161.30	58.64	0.00	
BLDG-A	0.01	161.30	58.60	0.00	
2	0.00	161.30	58.80	0.00	
3	0.00	161.30	58.92	0.00	
4	0.00	161.30	58.89	0.00	
5	0.00	161.30	59.08	0.00	
6	0.00	161.30	58.95	0.00	
7	0.00	161.30	58.89	0.00	
8	0.00	161.30	58.93	0.00	
9	0.00	161.30	59.14	0.00	
10	0.00	161.30	58.68	0.00	
11	0.00	161.30	58.70	0.00	
HYD-1	0.00	161.30	58.80	0.00	
12	0.00	161.30	58.80	0.00	
13	0.00	161.30	58.77	0.00	
HYD-2	0.00	161.30	58.74	0.00	
14	0.00	161.30	58.67	0.00	
BLDG-E	0.02	161.30	58.51	0.00	
BLDG-D	0.01	161.30	58.58	0.00	
BLDG-F	0.02	161.30	58.51	0.00	
BLDG-B	0.03	161.30	58.46	0.00	
15	0.00	161.29	59.24	0.00	
16	0.00	161.27	58.47	0.00	
17	0.00	161.26	58.46	0.00	
CARWASH	1.30	161.26	58.41	0.00	
EX-HYD-2	0.00	161.30	59.17	0.00	
BLDG-C	0.01	161.30	58.68	0.00	
EX-HYD-1	0.00	161.30	58.78	0.00	
Connection1	-0.62	161.30	0.00	0.00	Reservoir
Connection2	-0.78	161.30	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
3	-0.52	0.01	0.00	Open
4	-0.52	0.02	0.00	Open
5	-0.52	0.02	0.00	Open
6	-0.52	0.02	0.00	Open
8	-0.61	0.02	0.01	Open
9	-0.61	0.02	0.00	Open
10	-0.62	0.02	0.00	Open
11	1.30	0.16	0.64	Open
12	1.30	0.16	0.64	Open

13	1.30	0.16	0.64	Open
14	1.30	0.16	0.65	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
15	0.78	0.02	0.00	Open
16	0.78	0.02	0.00	Open
17	0.78	0.02	0.00	Open
18	0.08	0.00	0.00	Open
19	0.03	0.00	0.00	Open
20	0.06	0.00	0.00	Open
21	0.06	0.00	0.00	Open
22	0.06	0.00	0.00	Open
23	0.02	0.00	0.00	Open
24	0.04	0.00	0.00	Open
25	0.01	0.01	0.00	Open
26	0.03	0.00	0.00	Open
27	0.03	0.00	0.00	Open
28	0.02	0.00	0.00	Open
29	0.01	0.00	0.00	Open
30	0.01	0.00	0.00	Open
31	0.61	0.02	0.00	Open
32	0.61	0.02	0.00	Open

```
******************************************************************
*                            E P A N E T                         *
*                    Hydraulic and Water Quality                 *
*                    Analysis for Pipe Networks                  *
*                          Version 2.2                           *
******************************************************************
```

Input File:
PEAK HOUR DEMAND

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
3	8	7	19	254
4	7	6	29	203
5	6	5	30	203
6	5	4	25	203
8	3	2	25	203
9	2	1	8	203
10	1	Connection1	18	203
11	8	15	21	102
12	15	16	21	102
13	16	17	21	102
14	17	CARWASH	4	102
15	Connection2	9	149	254
16	9	EX-HYD-2	73	254
17	EX-HYD-2	8	39	254
18	4	10	24	203
19	10	BLDG-B	29	102
20	10	11	3	203
21	11	HYD-1	17	203
22	HYD-1	12	22	203
23	12	BLDG-F	26	102
24	12	13	36	203
25	13	BLDG-C	12	52
26	13	HYD-2	2	203
27	HYD-2	14	7	203
28	14	BLDG-E	26	102
29	14	BLDG-D	11	52
30	1	BLDG-A	18	152
31	3	EX-HYD-1	8	203
32	EX-HYD-1	4	10	203

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	156.40	53.74	0.00	
BLDG-A	0.04	156.40	53.70	0.00	
2	0.00	156.40	53.90	0.00	
3	0.00	156.40	54.02	0.00	
4	0.00	156.39	53.98	0.00	
5	0.00	156.39	54.17	0.00	
6	0.00	156.39	54.04	0.00	
7	0.00	156.39	53.98	0.00	
8	0.00	156.39	54.02	0.00	
9	0.00	156.39	54.23	0.00	
10	0.00	156.39	53.77	0.00	
11	0.00	156.39	53.79	0.00	
HYD-1	0.00	156.39	53.89	0.00	
12	0.00	156.39	53.89	0.00	
13	0.00	156.39	53.86	0.00	
HYD-2	0.00	156.39	53.83	0.00	
14	0.00	156.39	53.76	0.00	
BLDG-E	0.05	156.39	53.60	0.00	
BLDG-D	0.03	156.39	53.67	0.00	
BLDG-F	0.05	156.39	53.60	0.00	
BLDG-B	0.07	156.39	53.55	0.00	
15	0.00	156.10	54.05	0.00	
16	0.00	155.82	53.02	0.00	
17	0.00	155.54	52.74	0.00	
CARWASH	6.72	155.48	52.63	0.00	
EX-HYD-2	0.00	156.39	54.26	0.00	
BLDG-C	0.03	156.39	53.77	0.00	
EX-HYD-1	0.00	156.39	53.87	0.00	
Connection1	-3.03	156.40	0.00	0.00	Reservoir
Connection2	-3.96	156.40	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
3	-2.76	0.05	0.03	Open
4	-2.76	0.09	0.08	Open
5	-2.76	0.09	0.08	Open
6	-2.76	0.09	0.08	Open
8	-2.99	0.09	0.09	Open
9	-2.99	0.09	0.09	Open
10	-3.03	0.09	0.09	Open
11	6.72	0.82	13.47	Open
12	6.72	0.82	13.47	Open

13	6.72	0.82	13.47	Open
14	6.72	0.82	13.47	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
15	3.96	0.08	0.05	Open
16	3.96	0.08	0.05	Open
17	3.96	0.08	0.05	Open
18	0.23	0.01	0.00	Open
19	0.07	0.01	0.00	Open
20	0.16	0.00	0.00	Open
21	0.16	0.00	0.00	Open
22	0.16	0.00	0.00	Open
23	0.05	0.01	0.00	Open
24	0.11	0.00	0.00	Open
25	0.03	0.01	0.02	Open
26	0.07	0.00	0.00	Open
27	0.07	0.00	0.00	Open
28	0.05	0.01	0.00	Open
29	0.03	0.01	0.01	Open
30	0.04	0.00	0.00	Open
31	2.99	0.09	0.09	Open
32	2.99	0.09	0.09	Open

```
*********************************************************************
*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                           Version 2.2                             *
*********************************************************************
```

Input File:
MAX DAY + FIRE

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
3	8	7	19	254
4	7	6	29	203
5	6	5	30	203
6	5	4	25	203
8	3	2	25	203
9	2	1	8	203
10	1	Connection1	18	203
11	8	15	21	102
12	15	16	21	102
13	16	17	21	102
14	17	CARWASH	4	102
15	Connection2	9	149	254
16	9	EX-HYD-2	73	254
17	EX-HYD-2	8	39	254
18	4	10	24	203
19	10	BLDG-B	29	102
20	10	11	3	203
21	11	HYD-1	17	203
22	HYD-1	12	22	203
23	12	BLDG-F	26	102
24	12	13	36	203
25	13	BLDG-C	12	52
26	13	HYD-2	2	203
27	HYD-2	14	7	203
28	14	BLDG-E	26	102
29	14	BLDG-D	11	52
30	1	BLDG-A	18	152
31	3	EX-HYD-1	8	203
32	EX-HYD-1	4	10	203

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	131.09	28.43	0.00	
BLDG-A	0.02	131.09	28.39	0.00	
2	0.00	130.24	27.74	0.00	
3	0.00	127.59	25.21	0.00	
4	0.00	126.04	23.63	0.00	
5	0.00	126.99	24.77	0.00	
6	0.00	128.13	25.78	0.00	
7	0.00	129.24	26.83	0.00	
8	0.00	129.48	27.11	0.00	
9	0.00	130.99	28.83	0.00	
10	0.00	121.41	18.79	0.00	
11	0.00	120.83	18.23	0.00	
HYD-1	95.00	117.55	15.05	0.00	
12	0.00	116.37	13.87	0.00	
13	0.00	114.45	11.92	0.00	
HYD-2	95.00	114.34	11.78	0.00	
14	0.00	114.34	11.71	0.00	
BLDG-E	0.03	114.34	11.55	0.00	
BLDG-D	0.01	114.34	11.62	0.00	
BLDG-F	0.03	116.37	13.58	0.00	
BLDG-B	0.04	121.41	18.57	0.00	
15	0.00	129.44	27.39	0.00	
16	0.00	129.40	26.60	0.00	
17	0.00	129.36	26.56	0.00	
CARWASH	2.29	129.36	26.51	0.00	
EX-HYD-2	0.00	130.01	27.88	0.00	
BLDG-C	0.02	114.45	11.83	0.00	
EX-HYD-1	26.67	126.75	24.23	0.00	
Connection1	-137.61	133.00	0.00	0.00	Reservoir
Connection2	-81.50	133.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
3	79.21	1.56	12.79	Open
4	79.21	2.45	38.11	Open
5	79.21	2.45	38.11	Open
6	79.21	2.45	38.11	Open
8	-137.59	4.25	105.98	Open
9	-137.59	4.25	105.98	Open
10	-137.61	4.25	106.01	Open
11	2.29	0.28	1.83	Open
12	2.29	0.28	1.83	Open

13	2.29	0.28	1.83	Open
14	2.29	0.28	1.83	Open

Link Results: (continued)

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
15	81.50	1.61	13.49	Open
16	81.50	1.61	13.49	Open
17	81.50	1.61	13.49	Open
18	190.13	5.87	192.91	Open
19	0.04	0.00	0.00	Open
20	190.09	5.87	192.83	Open
21	190.09	5.87	192.83	Open
22	95.09	2.94	53.46	Open
23	0.03	0.00	0.00	Open
24	95.06	2.94	53.43	Open
25	0.02	0.01	0.01	Open
26	95.04	2.94	53.42	Open
27	0.04	0.00	0.00	Open
28	0.03	0.00	0.00	Open
29	0.01	0.01	0.00	Open
30	0.02	0.00	0.00	Open
31	137.59	4.25	105.98	Open
32	110.92	3.43	71.11	Open

```
*********************************************************************
*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                          Version 2.2                              *
*********************************************************************
```

Input File:
MAX DAY + FIRE

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
3	8	7	19	254
4	7	6	29	203
5	6	5	30	203
6	5	4	25	203
8	3	2	25	203
9	2	1	8	203
10	1	Connection1	18	203
11	8	15	21	102
12	15	16	21	102
13	16	17	21	102
14	17	CARWASH	4	102
15	Connection2	9	149	254
16	9	EX-HYD-2	73	254
17	EX-HYD-2	8	39	254
18	4	10	24	203
19	10	BLDG-B	29	102
20	10	11	3	203
21	11	HYD-1	17	203
22	HYD-1	12	22	203
23	12	BLDG-F	26	102
24	12	13	36	203
25	13	BLDG-C	12	52
26	13	HYD-2	2	203
27	HYD-2	14	7	203
28	14	BLDG-E	26	102
29	14	BLDG-D	11	52
30	1	BLDG-A	18	152
31	3	EX-HYD-1	8	203
32	EX-HYD-1	4	10	203

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	153.26	50.60	0.00	
BLDG-A	0.02	153.26	50.56	0.00	
2	0.00	153.19	50.69	0.00	
3	0.00	152.99	50.61	0.00	
4	0.00	152.85	50.44	0.00	
5	0.00	152.65	50.43	0.00	
6	0.00	152.41	50.06	0.00	
7	0.00	152.18	49.77	0.00	
8	0.00	152.13	49.76	0.00	
9	0.00	152.48	50.32	0.00	
10	0.00	152.85	50.23	0.00	
11	0.00	152.85	50.25	0.00	
HYD-1	0.00	152.85	50.35	0.00	
12	0.00	152.85	50.35	0.00	
13	0.00	152.85	50.32	0.00	
HYD-2	0.00	152.85	50.29	0.00	
14	0.00	152.85	50.22	0.00	
BLDG-E	0.03	152.85	50.06	0.00	
BLDG-D	0.01	152.85	50.13	0.00	
BLDG-F	0.03	152.85	50.06	0.00	
BLDG-B	0.04	152.85	50.01	0.00	
15	0.00	152.09	50.04	0.00	
16	0.00	152.05	49.25	0.00	
17	0.00	152.01	49.21	0.00	
CARWASH	2.29	152.01	49.16	0.00	
EX-HYD-2	85.00	152.04	49.91	0.00	
BLDG-C	0.02	152.85	50.23	0.00	
EX-HYD-1	0.00	152.93	50.41	0.00	
Connection1	-34.14	153.40	0.00	0.00	Reservoir
Connection2	-53.30	153.40	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
3	-33.99	0.67	2.67	Open
4	-33.99	1.05	7.96	Open
5	-33.99	1.05	7.96	Open
6	-33.99	1.05	7.96	Open
8	-34.12	1.05	8.01	Open
9	-34.12	1.05	8.01	Open
10	-34.14	1.05	8.02	Open
11	2.29	0.28	1.83	Open
12	2.29	0.28	1.83	Open

13	2.29	0.28	1.83	Open
14	2.29	0.28	1.83	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
15	53.30	1.05	6.14	Open
16	53.30	1.05	6.14	Open
17	-31.70	0.63	2.35	Open
18	0.13	0.00	0.00	Open
19	0.04	0.00	0.00	Open
20	0.09	0.00	0.00	Open
21	0.09	0.00	0.00	Open
22	0.09	0.00	0.00	Open
23	0.03	0.00	0.00	Open
24	0.06	0.00	0.00	Open
25	0.02	0.01	0.01	Open
26	0.04	0.00	0.00	Open
27	0.04	0.00	0.00	Open
28	0.03	0.00	0.00	Open
29	0.01	0.01	0.01	Open
30	0.02	0.00	0.00	Open
31	34.12	1.05	8.01	Open
32	34.12	1.05	8.01	Open

Appendix D

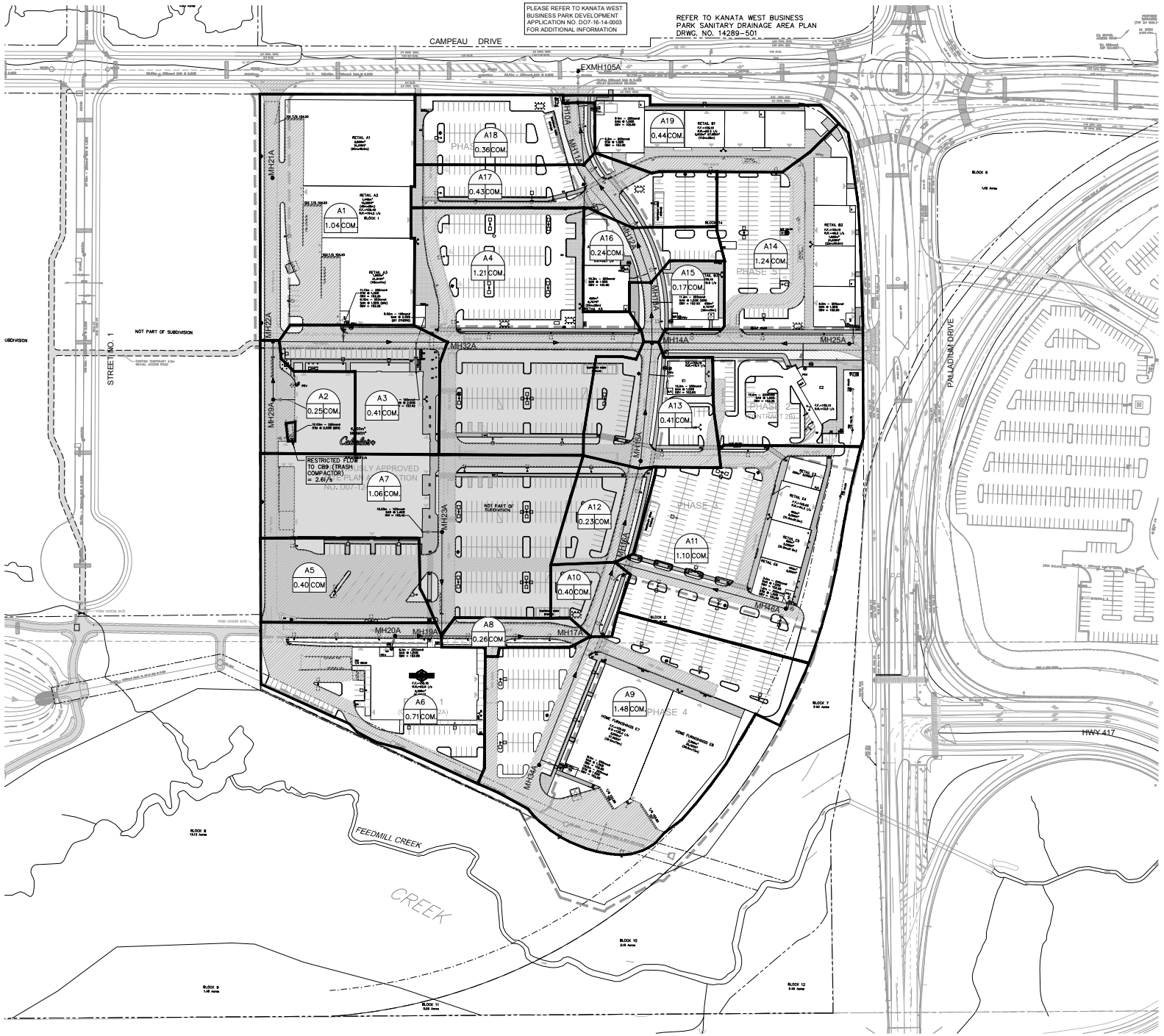
KWRC Sanitary Drainage Area Plan (prepared by IBI Group)

KWRC Sanitary Sewer Design Sheet (prepared by IBI Group)

Sanitary Drainage Area Plan (DWG. 23021-SAN1)

Sanitary Sewer Design Sheet

Figure 3 – Site Contribution SAN Area Plan



No.	Revised	By	Date
14			
13			
12			
11			
10			
9			
8	REVISED PER CITY COMMENTS	LME	16-08-31
7	ISSUED TO CITY FOR APPROVAL PHASE 2A	LME	16-08-04
6	RE-ISSUED FOR MYLARS	LME	15-11-26
5	RE-ISSUED FOR MYLARS	LME	15-11-03
4	ISSUED FOR MYLARS	LME	15-07-20
3	REVISED PER CITY COMMENTS AND NEW SITE PLAN	LME	15-06-19
2	REVISED PER CITY COMMENTS	LME	15-04-27
1	ISSUED TO CITY FOR APPROVAL	LME	15-01-29

TAGGART REALTY MANAGEMENT

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

Project Title: KANATA WEST RETAIL CENTRE
3015, 3075, & 3095 PALLADIUM DRIVE

Drawing Title: SANITARY DRAINAGE AREA PLAN

Scale: 1:750

Design	Date
LME	JAN. 2015
Drawn	Checked
DPS	TRB
Project No.	Drawing No.
37884	C-501

APPROVED ☐ REFUSED ☐
THIS ___ DAY OF _____, 20____
DERRICK MOODIE, ACTING MANAGER
DEVELOPMENT REVIEW, SUBURBAN SERVICES

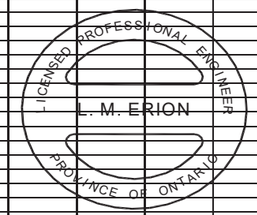
D07-12-16-0122

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

SANITARY SEWER DESIGN SHEET

Kanata West Retail Center
CITY OF OTTAWA
Taggart Realty Management

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW	TOTAL FLOW	PROPOSED SEWER DESIGN							
				AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)						PEAK FLOW (L/s)	AREA (Ha)		FLOW			CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full)	VELOCITY (actual)	AVAILABLE CAPACITY	
														INDUSTRIAL		COMMERCIAL		PRESTIGE BUISNESS PK															
STREET	AREA ID	FROM MH	TO MH		SF	SD	TH	APT		IND	CUM			IND	CUM	IND	CUM	IND	CUM		IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	(actual) (m/s)	L/s	(%)
	A1	MH21A	MH22A							0.0	0.0	4.00	0.00			1.04	1.04			0.90	1.04	1.04	0.29	0.00	1.19	26.50	88.33	200	0.60	0.82	0.40	25.31	95.50%
	A2	MH29A	MH22A							0.0	0.0	4.00	0.00			0.25	0.25			0.22	0.25	0.25	0.07	0.00	0.29	59.26	23.00	200	3.00	1.83	0.47	58.98	99.52%
	A3	MH22A	MH32A							0.0	0.0	4.00	0.00			0.41	1.70			1.48	0.41	1.70	0.48	0.00	1.95	43.28	94.15	200	1.60	1.33	0.66	41.33	95.49%
	A4	MH32A	MH14A							0.0	0.0	4.00	0.00			1.21	2.91			2.53	1.21	2.91	0.81	0.00	3.34	34.22	110.46	200	1.00	1.06	0.65	30.88	90.24%
	A5, A6	MH20A	MH19A							0.0	0.0	4.00	0.00			1.11	1.11			0.96	1.11	1.11	0.31	0.00	1.27	48.39	25.00	200	2.00	1.49	0.64	47.12	97.37%
	A7	MH23A	MH19A							0.0	0.0	4.00	0.00			1.06	1.06			0.92	1.06	1.06	0.30	0.00	1.22	26.50	44.08	200	0.60	0.82	0.40	25.29	95.41%
	A8	MH19A	MH17A							0.0	0.0	4.00	0.00			0.26	2.43			2.11	0.26	2.43	0.68	0.00	2.79	34.22	80.49	200	1.00	1.06	0.63	31.43	91.85%
	A9	MH34A	MH17A							0.0	0.0	4.00	0.00			1.48	1.48			1.28	1.40	1.40	0.39	0.00	1.68	53.01	74.68	200	2.40	1.63	0.70	51.33	96.84%
	A10	MH17A	MH16A							0.0	0.0	4.00	0.00			0.40	4.31			3.74	0.40	4.23	1.18	0.00	4.93	34.22	42.26	200	1.00	1.06	0.74	29.29	85.60%
	A11	MH46A	MH16A							0.0	0.0	4.00	0.00			1.10	1.10			0.95	1.10	1.10	0.31	0.00	1.26	48.39	95.58	200	2.00	1.49	0.64	47.13	97.39%
	A12	MH16A	MH15A							0.0	0.0	4.00	0.00			0.23	5.64			4.90	0.23	5.56	1.56	0.00	6.45	26.50	56.34	200	0.60	0.82	0.63	20.05	75.65%
	A13	MH15A	MH14A							0.0	0.0	4.00	0.00			0.41	6.05			5.25	0.41	5.97	1.67	0.00	6.92	26.50	64.00	200	0.60	0.82	0.63	19.58	73.88%
	A14	MH25A	MH14A							0.0	0.0	4.00	0.00			1.24	1.24			1.08	1.24	1.24	0.35	0.00	1.42	48.39	106.52	200	2.00	1.49	0.64	46.97	97.06%
	A15	MH14A	MH13A							0.0	0.0	4.00	0.00			0.17	10.37			9.00	0.17	10.29	2.88	0.00	11.88	21.64	32.56	200	0.40	0.67	0.67	9.76	45.09%
	A16	MH13A	MH12A							0.0	0.0	4.00	0.00			0.24	10.61			9.21	0.24	10.53	2.95	0.00	12.16	21.64	31.22	200	0.40	0.67	0.67	9.48	43.82%
	A17	MH12A	MH11A							0.0	0.0	4.00	0.00			0.43	11.04			9.58	0.43	10.96	3.07	0.00	12.65	21.64	43.01	200	0.40	0.67	0.67	8.99	41.53%
	A18	MH11A	MH10A							0.0	0.0	4.00	0.00			0.36	11.40			9.90	0.36	11.32	3.17	0.00	13.07	21.64	33.65	200	0.40	0.67	0.69	8.58	39.62%
	A19	MH10A	MH105A							0.0	0.0	4.00	0.00			0.44	11.84			10.28	0.44	11.76	3.29	0.00	13.57	39.24	17.00	250	0.40	0.77	0.70	25.67	65.41%



Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	P.B.P.	35,000	L/Ha/day	1.5
APT	1.8	p/p/u	COM	50,000	L/Ha/day	1.5
Other	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

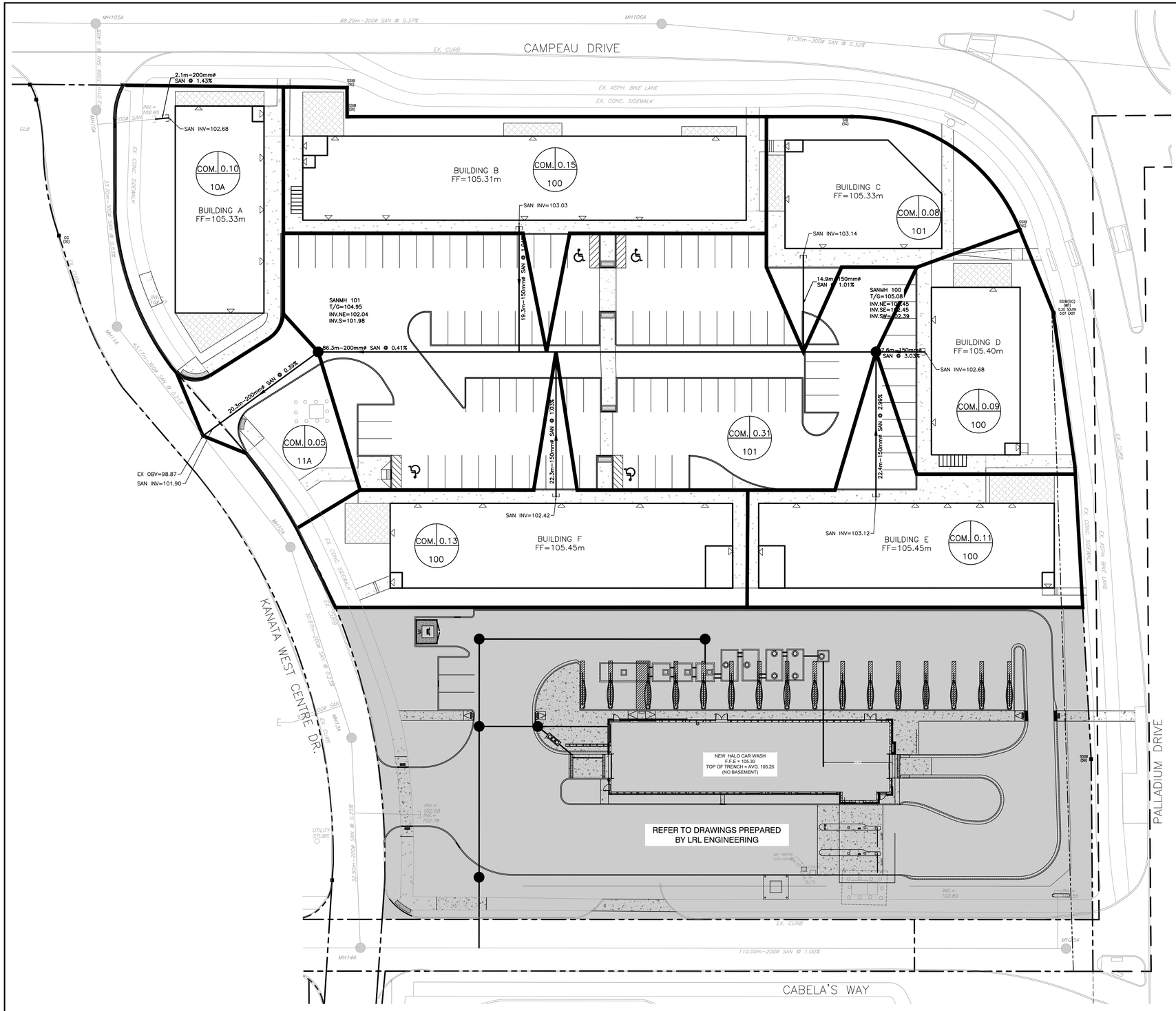
Designed: LME

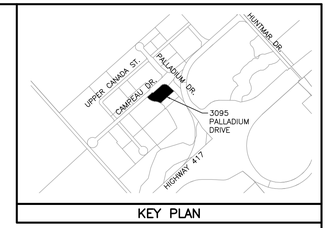
Checked:

Dwg. Reference: 37884-501

No.	Revision	Date
1.	City submission No. 1	1/29/2015
2.	City submission No. 2	4/24/2015
3.	City submission No. 3	6/19/2015
4.	City submission No. 4	10/16/2015
5.	City submission No. 5	10/27/2015
6	City submission No. 6	11/27/2015
7	City submission No. 7	8/3/2016

File Reference:	Date:	Sheet No:
37884.5.7.1	8/4/2016	1 of 1





KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EXISTING SANITARY SEWER & MANHOLE
- SANITARY SEWER & MANHOLE
- SANITARY DRAINAGE AREA BOUNDARY

EXTENSIVE EMPLOYMENT AREA
50,000 L/s/ha

COM. 0.91 — DRAINAGE AREA (ha)

104 — DOWNSTREAM MANHOLE

NOT FOR CONSTRUCTION

NOTES

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

PROPERTY BOUNDARIES ARE DERIVED FROM PLAN OF SURVEY BLOCKS 1 AND 14 REGISTERED PLAN 4M–1566 CITY OF OTTAWA, STANTEC GEOMATICS LTD., ONTARIO LAND SURVEYORS. ELEVATIONS SHOWN ARE GEODETIC (CGVD–1928:1978) AND ARE DERIVED FROM THE CAN–NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=95.230.

NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	07/03/24	BLM
2	REVISED PER COMMENTS	16/11/23	BLM
1	ISSUED FOR SITE PLAN APPLICATION	19/06/23	BLM

SCALE
0 3m 6m 12m
HORIZONTAL 1:300

LICENSED PROFESSIONAL ENGINEER
B. L. MACKECHNIE
100199554
Mar. 7/24
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	CC
DRAWN	BLM
CHECKED	CC
APPROVED	BLM

3095 PALLADIUM GP INC.

3095 PALLADIUM DRIVE
CITY OF OTTAWA

SANITARY DRAINAGE AREA PLAN

PROJECT No.	23021
SURVEY	STANTEC
DATED	MARCH 2024
DWG. No:	23021-SAN1

FILE No. D02-02-23-0058/D07-12-23-0092

PLAN No. 19021

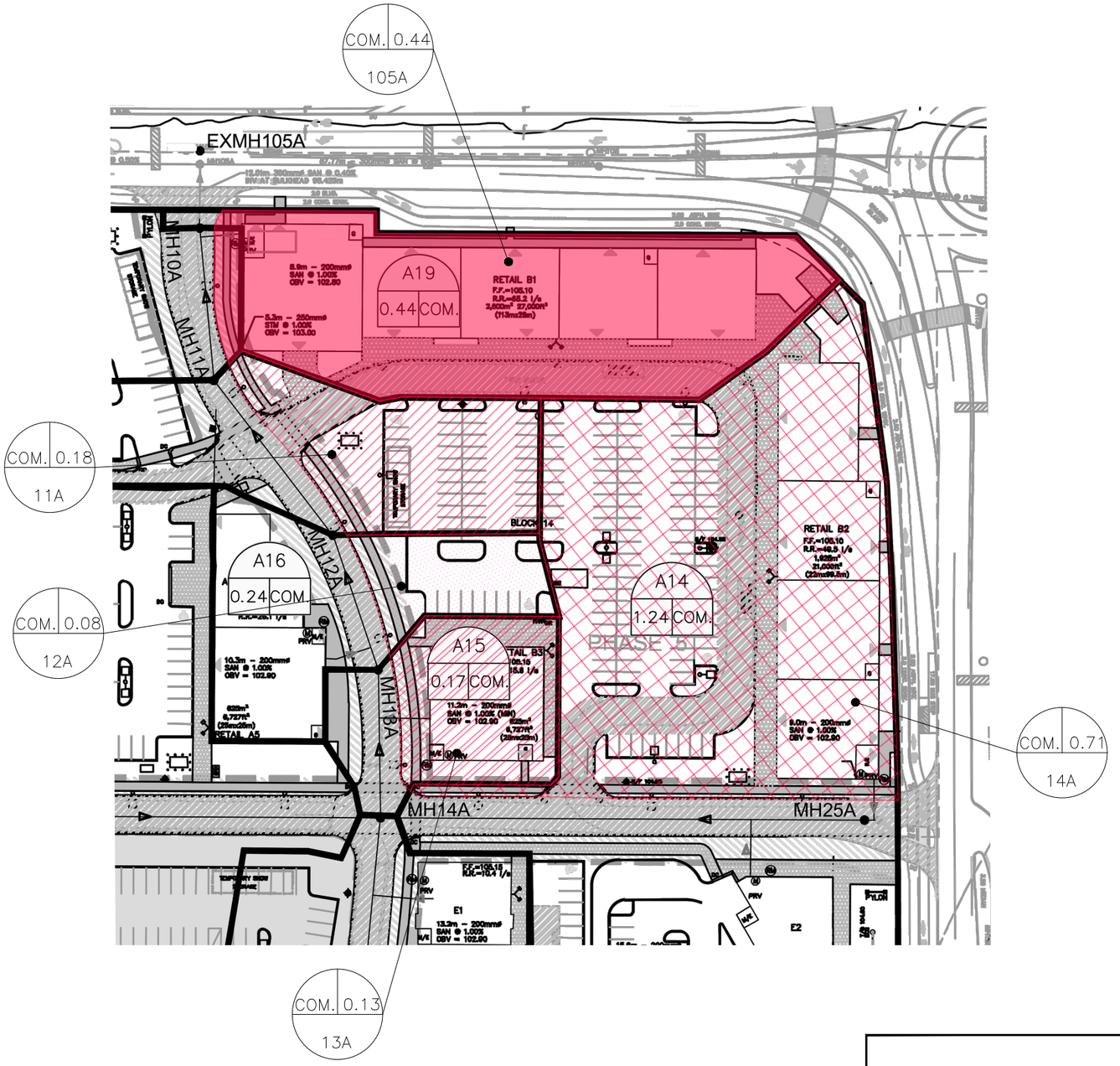
SANITARY SEWER DESIGN SHEET
3095 PALLADIUM DRIVE

LOCATION			AREA (ha)		COMMERCIAL FLOW				PIPE						
STREET	FROM MH	TO MH	INDIVIDUAL	CUMM.	PEAK FACTOR	PEAK FLOW (L/s)	EXTRAN. FLOW (L/s)	PEAK DESIGN FLOW (L/s)	LENGTH (m)	DIAMETER (mm)	SLOPE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	EXCESS CAPACITY (L/s)	PERCENT FULL
TO KANATA WEST CENTRE DRIVE U/S MH 11A															
PARKING LOT	BLDG D	100	0.09	0.09	1.50	0.08	0.03	0.10	7.6	148.01	3.03	25.61	1.49	25.50	0.40
PARKING LOT	BLDG E	100	0.11	0.11	1.50	0.10	0.03	0.13	22.4	148.01	2.99	25.44	1.48	25.31	0.50
PARKING LOT	BLDG C	MAIN	0.08	0.08	1.50	0.07	0.02	0.09	14.9	148.01	1.01	14.78	0.86	14.69	0.62
PARKING LOT	BLDG F	MAIN	0.13	0.13	1.50	0.11	0.04	0.15	22.3	148.01	1.03	14.93	0.87	14.78	1.00
PARKING LOT	BLDG B	MAIN	0.15	0.15	1.50	0.13	0.04	0.17	19.3	148.01	1.04	15.00	0.87	14.83	1.15
PARKING LOT	100	101	0.31	0.87	1.50	0.76	0.24	1.00	86.3	201.16	0.41	21.35	0.67	20.35	4.68
PARKING LOT	101	EX MAIN	0.05	0.92	1.50	0.80	0.26	1.06	20.3	201.16	0.39	20.82	0.66	19.77	5.07
TO KANATA WEST CENTRE DRIVE U/S MH 10A															
KANATA WEST CENTRE DR.	BLDG A	EX MAIN	0.10	0.10	1.50	0.09	0.03	0.11	11.1	201.16	1.43	39.87	1.25	39.76	0.29
								1.17							

DESIGN PARAMETERS

Average Daily Flow =		L/person/day
Extensive Employment Area =	50,000	L/s/ha
Light Industrial Flow =		L/ha/d
Maximum Residential Peak Factor =	4.0	
Harmon - Correction Factor (K) =	0.8	
Peaking Factor =	1.5	
Extraneous Flow =	0.28	L/s/ha
Minimum Full Flow Velocity =	0.60	m/s
Maximum Full Flow Velocity =	3.0	m/s
Manning's Coefficient (n) =	0.013	

Notes:
1. Sanitary sewer design parameters in accordance Design Brief Kanata West Retail Centre, September 2016, IBI Group.



IBI DESIGN
EXTENSIVE EMPLOYMENT AREA
50,000 L/s/ha

COM. 0.91
104

SITE CONTRIBUTION AREA (ha)

DOWNSTREAM MANHOLE

Robinson
Land Development

scale N.T.S.	3095 PALLADIUM DRIVE	project no. 23021
date 08/06/23		
drawn by BLM	SITE CONTRIBUTION SAN AREA PLAN	FIG 3

Appendix E

KWRC Storm Drainage Area Plan (prepared by IBI Group)

KWRC Storm Sewer Design Sheet (prepared by IBI Group)

Storm Sewer Design Sheet

Storm Drainage Area Plan
(DWG. 23021-STM1)

Runoff Coefficient Calculations

Table 4.2 SWMHYMO Modeling Results (prepared by IBI Group)

Figure 4 – Site Contribution Area Plan

Table E1 – Pro-Rated Release Rates vs Site Outflows

Flow Calculations

ICD Calculations

Storage Volume Calculations

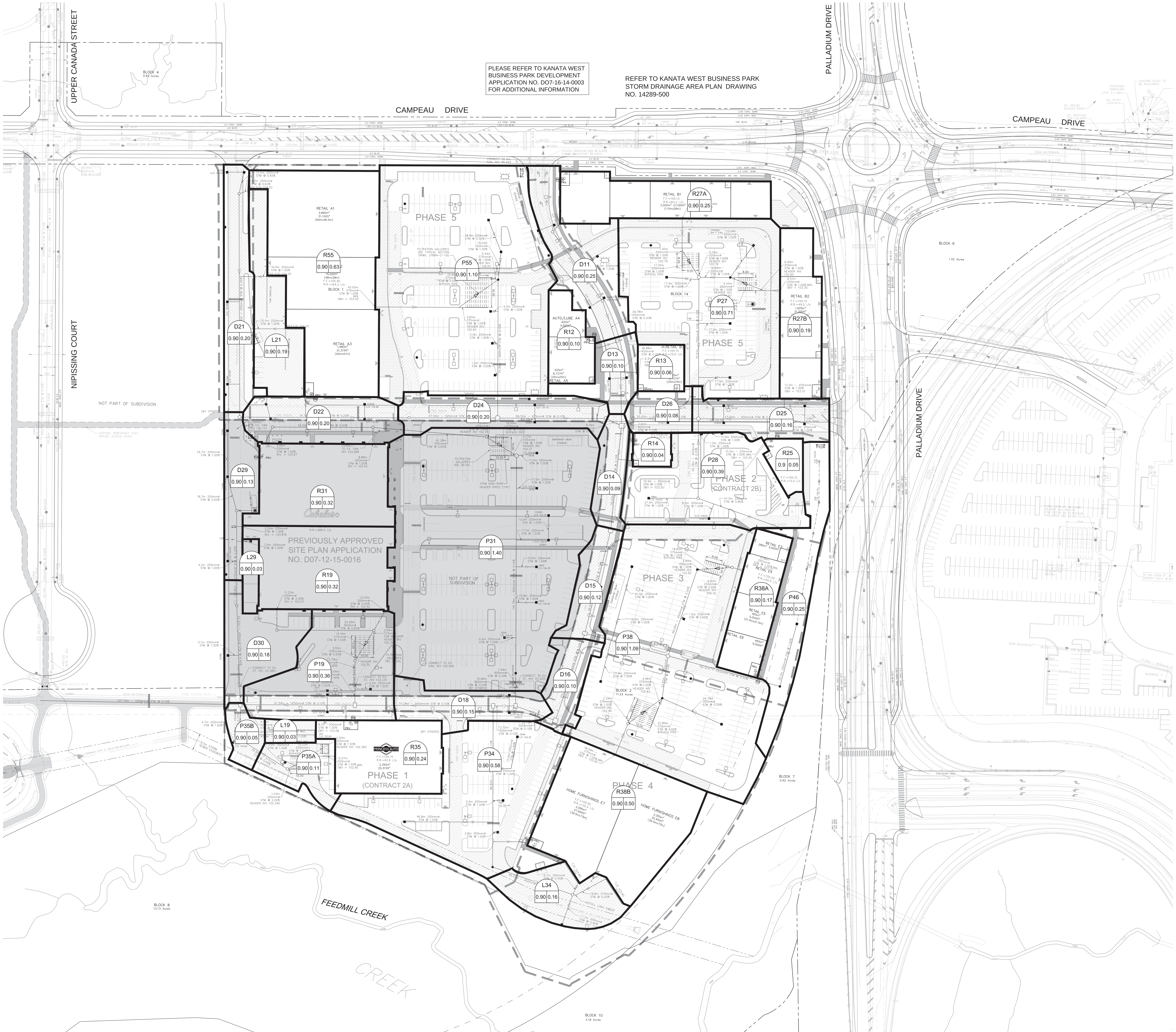
Figure 2 – Post-Development SWM Boundaries (prepared by IBI Group)

Table 3.16 – 90th Percentile Event Daily Rainfall Volumes (prepared by Aquafor Beech)

Figure 3.41 – Average Annual Precipitation (prepared by Aquafor Beech)

Table 4.8 – Summary of HGL (prepared by IBI Group)

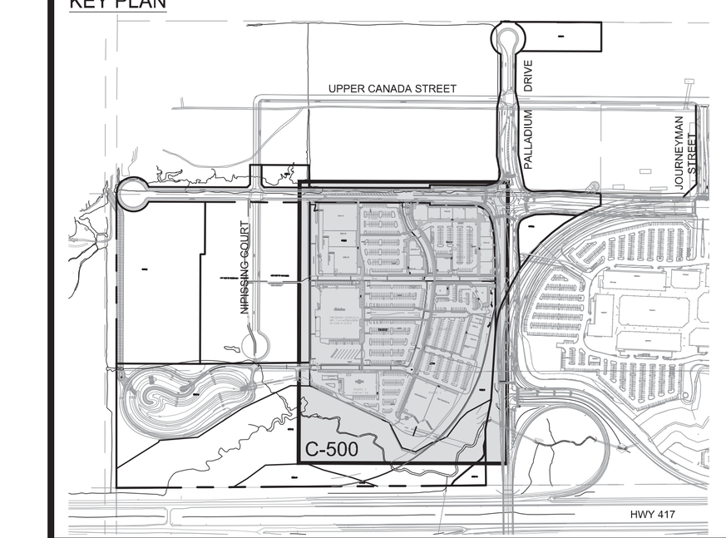
HGL Calculations


UPPER CANADA STREET
NIPISSING COURT
CAMPEAU DRIVE
PALLADIUM DRIVE
PLEASE REFER TO KANATA WEST BUSINESS PARK DEVELOPMENT APPLICATION NO. D07-16-14-0003 FOR ADDITIONAL INFORMATION
REFER TO KANATA WEST BUSINESS PARK STORM DRAINAGE AREA PLAN DRAWING NO. 14289-500
NOT PART OF SUBDIVISION
PHASE 5
PHASE 2 (CONTRACT 2B)
PHASE 3
PHASE 4
PHASE 1 (CONTRACT 2A)
PREVIOUSLY APPROVED SITE PLAN APPLICATION NO. D07-12-15-0016
FEEDMILL CREEK
CREEK
R55 0.90 0.63
P55 0.90 1.10
D21 0.90 0.20
L21 0.90 0.19
R12 0.90 0.10
D11 0.90 0.25
D13 0.90 0.10
R13 0.90 0.06
R27A 0.90 0.25
P27 0.90 0.71
R27B 0.90 0.19
D22 0.90 0.20
D24 0.90 0.20
D26 0.90 0.08
D25 0.90 0.16
R14 0.90 0.04
P28 0.90 0.39
R25 0.9 0.05
D14 0.90 0.09
D29 0.90 0.13
R31 0.90 0.32
P31 0.90 1.40
L29 0.90 0.03
R19 0.90 0.32
D15 0.90 0.12
R38A 0.90 0.17
P46 0.90 0.25
P38 0.90 1.09
D30 0.90 0.18
P19 0.90 0.36
D16 0.90 0.10
D18 0.90 0.15
P35B 0.90 0.05
L19 0.90 0.03
P35A 0.90 0.11
R35 0.90 0.24
P34 0.90 0.58
R38B 0.90 0.50
L34 0.90 0.16

LEGEND:

DRAINAGE AREA LIMITS
MH601 STORM MANHOLE & NUMBER
STORM SEWER & FLOW DIRECTION
R25 AREA ID
0.85 2.63 AREA IN HECTARES
RUNOFF COEFFICIENT
R31 ROOF AREA
D30 DRIVE LANES
P31 PARKING AREA
L34 LOADING AREA
EMERGENCY OVERLAND FLOW ROUTE
AREA CONSTRUCTED AS PART OF PLAN OF SUBDIVISION FILE NO. D07-16-14-0003

KEY PLAN



No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8	REVISED PER CITY COMMENTS	LME	16:08:31
7	ISSUED TO CITY FOR APPROVAL PHASE 2A	LME	16:08:04
6	RE-ISSUED FOR MYLARS	LME	15:11:26
5	RE-ISSUED FOR MYLARS	LME	15:11:03
4	ISSUED FOR MYLARS	LME	15:07:20
3	REVISED PER CITY COMMENTS AND NEW SITE PLAN	LME	15:06:19
2	REVISED PER CITY COMMENTS	LME	15:04:27
1	ISSUED TO CITY FOR APPROVAL	LME	15:01:29

TAGGART REALTY MANAGEMENT

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

Project Title

KANATA WEST BUSINESS PARK

KANATA WEST RETAIL CENTRE

3015, 3075, & 3095 PALLADIUM DRIVE

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
2016/08/31
PROVINCE OF ONTARIO

N

Drawing Title

STORM DRAINAGE AREA PLAN

Scale 1:750

APPROVED ☐ REFUSED ☐

THIS ____ DAY OF ____________ , 20 ______

DERRICK MOODIE, ACTING MANAGER
DEVELOPMENT REVIEW, SUBURBAN SERVICES

Design	Date
LME	JAN. 2015
Drawn	Checked
DPS	TRB
Project No.	Drawing No.
37884	C-500

D07-12-16-0122

#________

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

STORM SEWER DESIGN SHEET

Kanata West Retail Center
City of Ottawa
Taggart Realty Management

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW												SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.90	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
	D11	MH11	MH12									0.25		0.63	0.63	10.00	0.95	10.95	104.19	122.14	178.56	65.17				65.17	91.46	45.75	375			0.25	0.802	26.28	28.74%
	R12	MH12	MH13									0.10		0.25	0.88	10.95	0.61	11.56	99.43	116.53	170.31	87.07				87.07	133.02	29.78	450			0.20	0.810	45.95	34.54%
	D13, R13	MH13	MH14									0.16		0.40	1.28	11.56	0.80	12.36	96.60	113.20	165.43	123.27				123.27	133.02	38.88	450			0.20	0.810	9.75	7.33%
	D25, R25	MH25	MH26									0.21		0.53	0.53	10.00	1.42	11.42	104.19	122.14	178.56	54.75				54.75	133.02	69.08	450			0.20	0.810	78.27	58.84%
	P27, R27A, R27B	MH27	MH26									1.15		2.88	2.88	10.00	1.57	11.57	104.19	122.14	178.56	299.79				299.79	367.27	75.97	750			0.10	0.805	67.48	18.37%
	P28	MH28	MH26									0.39		0.98	0.98	10.00	0.88	10.88	104.19	122.14	178.56	101.67				101.67	133.02	42.76	450			0.20	0.810	31.35	23.57%
	D26	MH26	MH33									0.08		0.20	4.58	11.57	0.68	12.25	96.56	113.16	165.36	442.13				442.13	473.55	35.00	825			0.10	0.858	31.42	6.64%
		MH33	MH14											0.00	4.58	12.25	0.14	12.40	93.63	109.71	160.30	428.72				428.72	473.55	7.41	825			0.10	0.858	44.84	9.47%
	D21	MH21	MH22									0.20		0.50	0.50	10.00			104.19	122.14	178.56	52.14													
	L21												0.19	0.48	0.48	10.00	2.49	12.49	104.19	122.14	178.56			84.88		137.02	179.46	120.00	525			0.16	0.803	42.44	23.65%
	D22	MH22	MH23									0.20		0.50	1.00	12.49			92.65	108.55	158.60	92.73													
														0.00	0.48	12.49	1.69	14.18	92.65	108.55	158.60			75.40		168.12	200.65	91.13	525			0.20	0.898	32.52	16.21%
		MH23	MH24											0.00	1.00	14.18			86.30	101.07	147.62	86.37													
														0.00	0.48	14.18	0.88	15.06	86.30	101.07	147.62			70.18		156.54	200.65	47.54	525			0.20	0.898	44.10	21.98%
	P55, R55	CBMH55	MH24									1.73		4.33	4.33	10.00	1.36	11.36	104.19	122.14	178.56	451.00				451.00	597.22	74.35	900			0.10	0.909	146.23	24.48%
	D24	MH24	MH32									0.20		0.50	5.83	15.06			83.35	97.61	142.54	485.90													
														0.00	0.48	15.06	1.01	16.08	83.35	97.61	142.54			67.76		553.66	739.33	58.30	975			0.10	0.959	185.66	25.11%
		MH32	MH14											0.00	5.83	16.08			80.23	93.94	137.16	467.72													
														0.00	0.48	16.08	0.16	16.24	80.23	93.94	137.16			65.20		532.92	739.33	9.19	975			0.10	0.959	206.40	27.92%
	D14, R14	MH14	MH15									0.13		0.33	12.01	16.24			79.76	93.39	136.35	957.93													
														0.00	0.48	16.24	0.79	17.03	79.76	93.39	136.35			64.82		1,022.74	1,760.81	56.60	1350			0.10	1.192	738.07	41.92%
	D15	MH15	MH16									0.12		0.30	12.31	17.03			77.53	90.76	132.49	954.37													
														0.00	0.48	17.03	0.80	17.82	77.53	90.76	132.49			62.99		1,017.36	1,760.81	56.91	1350			0.10	1.192	743.45	42.22%
	P46	CBMH46	MH38									0.25		0.63	0.63	10.00	1.28	11.28	104.19	122.14	178.56	65.17				65.17	133.02	62.32	450			0.20	0.810	67.84	51.00%
	P38, R38A, R38B	MH38	MH16									1.76		4.40	5.03	11.28	0.85	12.13	97.88	114.70	167.63	492.22				492.22	597.22	46.30	900			0.10	0.909	105.00	17.58%
	D16	MH16	MH17									0.10		0.25	17.59	17.82			75.42	88.28	128.86	1,326.55													
														0.00	0.48	17.82	0.64	18.47	75.42	88.28	128.86			61.26		1,387.81	2,332.02	49.47	1500			0.10	1.278	944.22	40.49%
		MH17	MH18											0.00	17.59	18.47			73.80	86.38	126.07	1,298.08													
														0.00	0.48	18.47	0.30	18.77	73.80	86.38	126.07			59.93		1,358.01	2,332.02	22.78	1500			0.10	1.278	974.01	41.77%
	P31	MH31	CBMH 45									1.40		3.50	3.50	10.00			104.19	122.14	178.56	364.97													
	R31												0.32	0.80	0.80	10.00	2.14	12.14	104.19	122.14	178.56			142.96		507.93	597.22	116.78	900			0.10	0.909	89.29	14.95%
		CBMH 45	MH18											0.00	3.50	12.14			94.10	110.26	161.11	329.62													
														0.00	0.80	12.14	0.32	12.46	94.10	110.26	161.11			128.99		458.61	597.22	17.60	900			0.10	0.909	138.61	23.21%
	D18	MH18	MH18B									0.15		0.38	21.47	18.77			73.08	85.54	124.83	1,568.84													
														0.00	1.28	18.77	0.15	18.91	73.08	85.54	124.83			159.28		1,728.12	3,006.86	12.10	1650			0.10	1.362	1278.74	42.53%
		MH34	CBMH34											0.00	0.00	10.00			104.19	122.14	178.56	0.00													
	L34												0.16	0.40	0.40	10.00	0.84	10.84	104.19	122.14	178.56			71.48		71.48	148.72	45.57	450			0.25	0.906	77.24	51.93%
	P34	CBMH34	MH18B									0.58		1.45	1.45	10.84			99.96	117.16	171.24	145.06													
														0.00	0.40	10.84	1.79	12.63	99.96	117.16	171.24			68.55		213.61	367.27	86.60	750			0.10	0.805	153.66	41.84%
		MH18B	MH19											0.00	22.92	18.77			73.08	85.54	124.83	1,674.89													
														0.00	1.68	18.77	0.91	19.67	73.08	85.54	124.83			209.25		1,884.14	3,006.86	74.28	1650			0.10	1.362	1122.72	37.34%
	P19	MH19	MH20									0.36		0.90	23.82	19.67			70.97	83.06	121.19	1,690.50													
	R19												0.32	0.80	2.48	19.67	0.75	20.43	70.97	83.06	121.19			300.19		1,990.70	3,006.86	61.54	1650			0.10	1.362	1016.17	33.79%
	D29	MH29	MH30									0.13		0.33	0.33	10.00			104.19	122.14	178.56	33.89													
	L29												0.03	0.08	0.08	10.00	1.06	11.06	104.19	122.14	178.56			13.40		47.29	91.46	51.00	375			0.25	0.802	44.16	48.29%
	D30	MH30	MH20									0.18		0.45	0.78	11.06			98.91	115.92	169.42	76.72													
															0.08	11.06	0.63	11.69	98.91	115.92	169.42			12.72		89.43	188.11	43.23	450			0.40	1.146	98.68	52.46%
	R35, P35A	MH47	MH35									0.35		0.88	0.88	10.00	0.49	10.49	104.19	122.14	178.56	91.24				91.24	115.68	29.88	375			0.40	1.015	24.44	21.13%
	P35B	MH35	MH20									0.05		0.13	1.00	10.49	0.34	10.84	101.67	119.17	174.19	101.75				115.15	148.72	18.75	450			0.25	0.906	33.56	22.57%
	L19												0.03	0.08	0.08	10.00	0.55	10.55	104.19	122.14	178.56			13.40		13.40	62.04	40.50	250			1.00	1.224	48.64	78.40%
		MH20	MH123											0.00	25.60	20.43			69.33	81.12	118.36	1,774.42													
														0.00	2.63	20.43	1.32	21.75	69.33	81.12	118.36			310.93		2,085.36	3,006.86	107.79	1650			0.10	1.362	921.51	30.65%

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

Notes:
1. Mannings coefficient (n) = 0.013

Designed: LME/TRB

Checked: TRB

Dwg. Reference: 37884-500

No.	Revision	Date
1.	City submission No. 1	1/29/2015
2.	City submission No. 2	4/24/2015
3.	City submission No. 3	6/19/2015
4.	City submission No. 4	10/16/2015
5.	City submission No. 5	10/27/2015
6.	City submission No. 6	11/27/2015
7.	City Submission No. 7 (Revised for Princess Auto Block)	8/3/2016

File Reference: 37884.5.7.1
Date: 8/4/2016
Sheet No: 1 of 1

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STORM SEWER INLET DESIGN SHEET

Kanata West Retail Center
City of Ottawa
Taggart Realty Management

LOCATION					AREA (Ha)										RATIONAL DESIGN FLOW										
STREET	AREA ID	FROM	TO	STRUCTURE	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.90	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)
	D11	MH 11	MH 12	CIBC 25									0.09		0.23	0.23	10.00			104.19	122.14	178.56	23.46				23.46
	D11			CIBC 62									0.05		0.13	0.13	10.00			104.19	122.14	178.56	13.03				13.03
	D11			CIBC 23									0.11		0.28	0.28	10.00			104.19	122.14	178.56	28.68				28.68
				Sub Total																							**65.17**
	R12	MH 12	MH 13	Building A4, A5									0.10		0.25	0.25	10.00			104.19	122.14	178.56	26.07				26.07
	D13	MH 13	MH 14	CICB 21									0.10		0.25	0.25	10.00			104.19	122.14	178.56	26.07				26.07
	R13			Building B3									0.06		0.15	0.15	10.00			104.19	122.14	178.56	15.64				15.64
				Sub Total																							**41.71**
	D25	MH 25	MH 26	CICB 37									0.07		0.18	0.18	10.00			104.19	122.14	178.56	18.25				18.25
	D25			CICB 35									0.09		0.23	0.23	10.00			104.19	122.14	178.56	23.46				23.46
	R25			Building E2									0.05		0.13	0.13	10.00			104.19	122.14	178.56	13.03				13.03
				Sub Total																							**54.75**
	R27A	MH 27	MH 26	Building B1									0.25		0.63	0.63	10.00			104.19	122.14	178.56	65.17				65.17
	P27, R27B			Bldg. B2, CB 77, CBMH60									0.38		0.95	0.95	10.00			104.19	122.14	178.56	99.06				99.06
	P27			CB59									0.28		0.70	0.70	10.00			104.19	122.14	178.56	72.99				72.99
	P27			CB61									0.09		0.23	0.23	10.00			104.19	122.14	178.56	23.46				23.46
	P27			CB62									0.15		0.38	0.38	10.00			104.19	122.14	178.56	39.10				39.10
				Sub Total																							**299.79**
	P28	MH 28	MH 26	CICB 63									0.11		0.28	0.28	10.00			104.19	122.14	178.56	28.68				28.68
	P28			CB64									0.08		0.20	0.20	10.00			104.19	122.14	178.56	20.86				20.86
	P28			CB 75									0.08		0.20	0.20	10.00			104.19	122.14	178.56	20.86				20.86
	P28			CICB 76									0.12		0.30	0.30	10.00			104.19	122.14	178.56	31.28				31.28
				Sub Total																							**101.67**
	D26	MH 26	MH 14	CICB 33									0.08		0.20	0.20	10.00			104.19	122.14	178.56	20.86				20.86
	D21	MH 21	MH 22	CICB 2									0.05		0.13	0.13	10.00			104.19	122.14	178.56	13.03				13.03
	D21			CICB 3									0.09		0.23	0.23	10.00			104.19	122.14	178.56	23.46				23.46
	D21			CICB 4									0.06		0.15	0.15	10.00			104.19	122.14	178.56	15.64				15.64
	L21			TD 1										0.05	0.13	0.13	10.00			104.19	122.14	178.56			22.34		22.34
	L21			TD 2										0.07	0.18	0.18	10.00			104.19	122.14	178.56			31.27		31.27
	L21			TD 3										0.07	0.18	0.18	10.00			104.19	122.14	178.56			31.27		31.27
				Sub Total																							**137.02**
	D22	MH 22	MH 23	CICB 27									0.09		0.23	0.23	10.00			104.19	122.14	178.56	23.46				23.46
	D22			CICB 29									0.11		0.28	0.28	10.00			104.19	122.14	178.56	28.68				28.68
				Sub Total																							**52.14**
	R55, P55	CBMH 55	MH 24	Bldg. A1-3, CBMH 55									1.25		3.13	3.13	10.00			104.19	122.14	178.56	325.86				325.86
	P55			CB 56									0.16		0.40	0.40	10.00			104.19	122.14	178.56	41.71				41.71
	P55			CB 57									0.15		0.38	0.38	10.00			104.19	122.14	178.56	39.10				39.10
	P55			CB 58									0.17		0.43	0.43	10.00			104.19	122.14	178.56	44.32				44.32
				Sub Total																							**451.00**
	D24	MH 24	MH 14	CB 31									0.20		0.50	0.50	10.00			104.19	122.14	178.56	52.14				52.14
	D14	MH 14	MH 15	CICB 19									0.09		0.23	0.23	10.00			104.19	122.14	178.56	23.46				23.46
	R14			Building E1									0.04		0.10	0.10	10.00			104.19	122.14	178.56	10.43				10.43
				Sub Total																							**33.89**
	D15	MH 15	MH 16	CICB 17									0.12		0.30	0.30	10.00			104.19	122.14	178.56	31.28				31.28
	P46	CBMH 46	MH 38	CBMH 46									0.25		0.63	0.63	10.00			104.19	122.14	178.56	65.17				65.17
	P38, R38A	MH 38	MH 16	Bldg. E3-6, CBMH 39									0.33		0.83	0.83	10.00			104.19	122.14	178.56	86.03				86.03
	P38			CB 69									0.13		0.33	0.33	10.00			104.19	122.14	178.56	33.89				33.89
	P38, R38B			Bldg. E7-8, CBMH 53									0.98		2.45	2.45	10.00			104.19	122.14	178.56	255.48				255.48
	P38			CB 68									0.18		0.45	0.45	10.00			104.19	122.14	178.56	46.92				46.92
				CB 70									0.14		0.35	0.35	10.00			104.19	122.14	178.56	36.50				36.50
				Sub Total																							**458.82**
	D16	MH 16	MH 17	CICB 15									0.10		0.25	0.25	10.00			104.19	122.14	178.56	26.07				26.07
	P34	MH 34	MH 17	TD 6, 7 CB 78										0.15	0.38	0.38	10.00			104.19	122.14	178.56			67.01		
	L34			CBMH 34									0.07		0.18	0.18	10.00			104.19	122.14	178.56	18.25				85.26
	P34			CB 23									0.09		0.23	0.23	10.00			104.19	122.14	178.56	23.46				23.46
	P34			CB 24									0.07		0.18	0.18	10.00			104.19	122.14	178.56	18.25				18.25
	P34			CB 51									0.08		0.20	0.20	10.00			104.19	122.14	178.56	20.86				20.86
	P34			CB 48, CB50									0.19		0.48	0.48	10.00			104.19	122.14	178.56	49.53				49.53
				Sub Total																							**197.36**

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STORM SEWER INLET DESIGN SHEET

Kanata West Retail Center
City of Ottawa
Taggart Realty Management

LOCATION					AREA (Ha)										RATIONAL DESIGN FLOW										
STREET	AREA ID	FROM	TO	STRUCTURE	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.90	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)
	R31	MH 31	MH 45	Cabela's building										0.32	0.80	0.80	10.00			104.19	122.14	178.56			142.96		
	P31			CBMH 45									1.40		3.50	3.50	10.00			104.19	122.14	178.56	364.97				507.93
				Sub Total																							**507.93**
	D18	MH 18	MH 18A	CICB 13									0.15		0.38	0.38	10.00			104.19	122.14	178.56	39.10				39.10
	L19	MH 19	MH 20	TD 5										0.03	0.08	0.08	10.00			104.19	122.14	178.56			13.40		13.40
	R19			Cabela's building MH 45A										0.32	0.80	0.80	10.00			104.19	122.14	178.56			142.96		142.96
	P19			CB 8									0.05		0.13	0.13	10.00			104.19	122.14	178.56	13.43				13.43
	P19			CB 11									0.18		0.45	0.45	10.00			104.19	122.14	178.56	46.92				46.92
	P19			CICB 10									0.13		0.33	0.33	10.00			104.19	122.14	178.56	33.89				33.89
	L29	MH 29	MH 30	CB 10										0.03	0.08	0.08	10.00			104.19	122.14	178.56			13.40		13.40
	D29			CICB 6									0.10		0.25	0.25	10.00			104.19	122.14	178.56	26.07				26.07
				CB 9									0.01		0.01	0.01	10.00			104.19	122.14	178.56	1.49				1.49
	D29			CICB 7									0.03		0.08	0.08	10.00			104.19	122.14	178.56	7.82				7.82
				Sub Total																							**48.78**
	D30	MH 30	MH 20	CICB 8									0.18		0.45	0.45	10.00			104.19	122.14	178.56	46.92				46.92
	P35, R35	MH 35	MH 20	Bldg. AP, CBMH 47									0.41		1.03	1.03	10.00			104.19	122.14	178.56	106.88				106.88
	P35			CB 46									0.08		0.20	0.20	10.00			104.19	122.14	178.56	20.86				20.86
				Sub Total																							**127.74**

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

Notes:

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
PROVINCE OF ONTARIO

Designed: LME

Checked:

Dwg. Reference: 37884-500

No.	Revision
1.	City submission No. 1
2.	City submission No. 2
3.	City submission No. 3
4.	City submission No. 4

File Reference: 37884.5.7.1
Date: 10/16/2015

STORM SEWER DESIGN SHEET
3095 PALLADIUM DRIVE

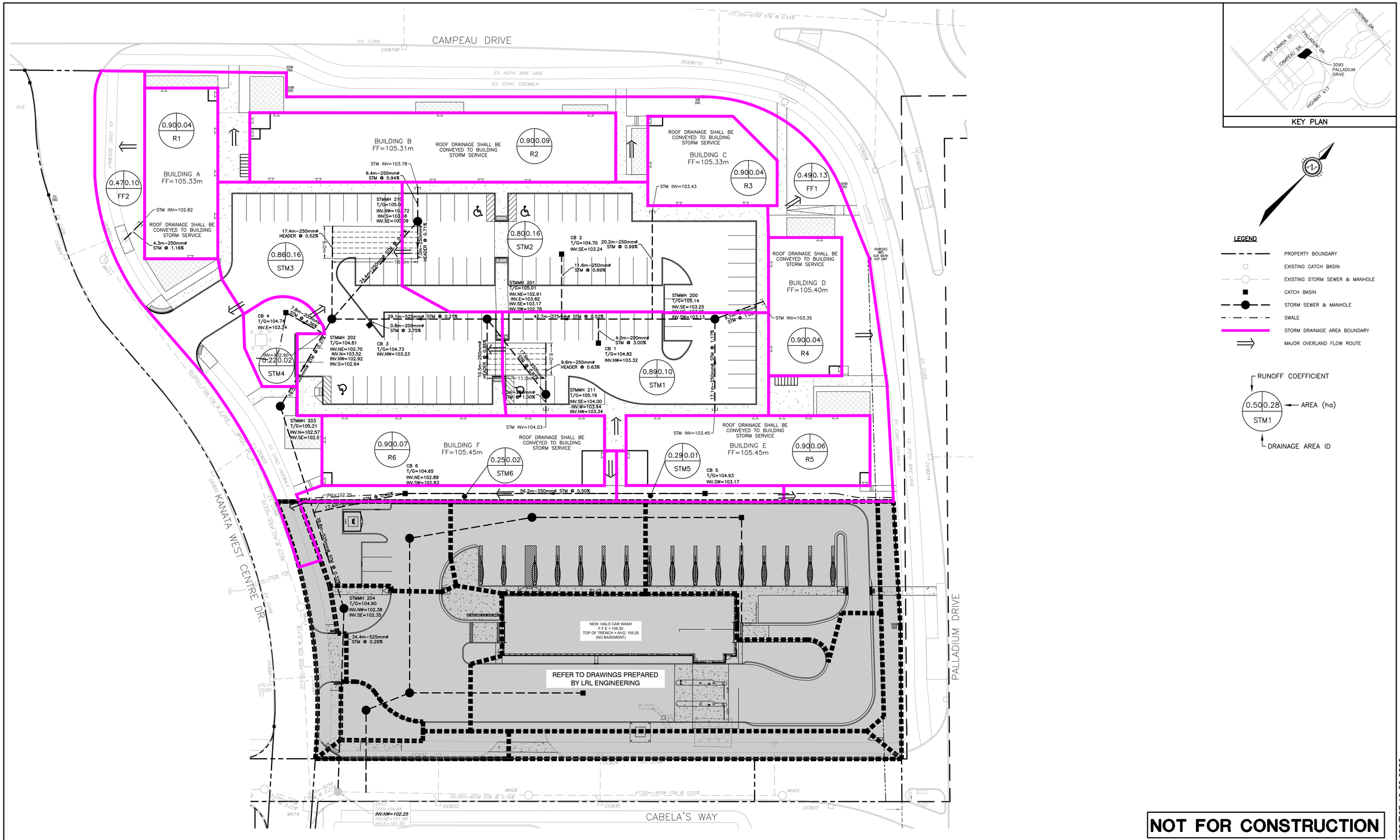
LOCATION			AREA (ha)	C	C (100 YR)	5 YR		100 YR		TIME OF CONC. (min)	5 YR RAINFALL INTENSITY (mm/hr)	5 YR PEAK FLOW (L/s)	100 YR RAINFALL INTENSITY (mm/hr)	100 YR PEAK FLOW (L/s)	RESTRICTED FLOW (L/s)	CUMULATIVE RESTRICTED FLOW (L/s)	PROPOSED SEWER							
DRAINAGE AREA	FROM MH	TO MH				INDIV. 2.78AC	ACCUM. 2.78AC	INDIV. 2.78AC	ACCUM. 2.78AC								PIPE DIA. (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	5 YR PERCENT FULL	100 PERCENT FULL WITH RESTRICTED CONTROLS
TO EX STMMH 33																								
R4	BLDG D	200	0.04	0.90	1.00	0.09	0.09	0.10	0.10	10.00	104.19	9.26	178.56	17.64	17.64	17.64	251.46	1.03	9.7	61.36	1.24	0.13	15%	29%
R5	BLDG E	200	0.06	0.90	1.00	0.15	0.15	0.17	0.17	10.00	104.19	15.62	178.56	29.74	29.74	29.74	251.46	1.17	17.1	65.40	1.32	0.22	24%	45%
R3	BLDG C	MAIN	0.04	0.90	1.00	0.09	0.09	0.10	0.10	10.00	104.19	9.70	178.56	18.47	18.47	18.47	251.46	0.99	20.2	60.16	1.21	0.28	16%	31%
STM1	CB 1	MAIN	0.10	0.89	1.00	0.25	0.25	0.28	0.28	10.00	104.19	25.57	178.56	49.22	21.00	21.00	201.16	3.00	4.0	57.75	1.82	0.04	44%	36%
STM2	CB 2	MAIN	0.16	0.80	1.00	0.34	0.34	0.43	0.43	10.00	104.19	35.87	178.56	76.84	30.00	30.00	251.46	0.69	11.6	50.22	1.01	0.19	71%	60%
	200	201	0.00	0.00	0.00	0.00	0.92	0.00	1.07	10.22	103.06	94.98	176.60	189.82	0.00	116.85	366.42	0.52	42.7	118.98	1.13	0.63	80%	98%
R6	BLDG F	211	0.07	0.90	1.00	0.18	0.18	0.20	0.20	10.00	104.19	18.75	178.56	35.70	35.70	35.70	251.46	1.00	3.0	60.46	1.22	0.04	31%	59%
	211	201	0.00	0.00	0.00	0.00	0.18	0.00	0.20	10.04	103.98	18.71	178.18	35.62	35.62	35.62	251.46	0.67	17.9	49.49	1.00	0.30	38%	72%
STM3	CB 3	MAIN	0.16	0.86	1.00	0.37	0.37	0.43	0.43	10.00	104.19	38.66	178.56	77.13	30.00	30.00	201.16	3.75	0.8	64.57	2.03	0.01	60%	46%
	201	202	0.00	0.00	0.00	0.00	1.47	0.00	1.71	10.85	99.92	147.14	171.17	292.13	0.00	182.47	533.00	0.21	29.1	205.40	0.92	0.53	72%	89%
R2	BLDG B	210	0.09	0.90	1.00	0.22	0.22	0.25	0.25	10.00	104.19	23.25	178.56	44.28	44.28	44.28	251.46	0.94	6.4	58.62	1.18	0.09	40%	76%
	210	202	0.00	0.00	0.00	0.00	0.22	0.00	0.25	10.09	103.72	23.15	177.74	44.07	44.07	44.07	251.46	0.57	24.4	45.65	0.92	0.44	51%	97%
STM4	CB 4	MAIN	0.02	0.22	0.28	0.01	0.01	0.01	0.01	10.00	104.19	0.97	178.56	2.07	2.07	2.07	201.16	4.36	7.8	69.62	2.19	0.06	1%	3%
	202	203	0.00	0.00	0.00	0.00	1.71	0.00	1.97	11.37	97.46	166.16	166.90	328.18	0.00	228.62	533.00	0.37	19.0	272.64	1.22	0.26	61%	84%
STM5	CB 5	CB 6	0.01	0.29	0.37	0.01	0.01	0.01	0.01	10.00	104.19	0.93	178.56	2.00	2.00	2.00	251.46	0.50	56.2	42.75	0.86	1.09	2%	5%
STM6	CB 6	MAIN	0.02	0.25	0.31	0.02	0.02	0.02	0.03	11.09	98.78	2.38	169.19	5.09	5.09	7.08	251.46	0.46	17.4	41.01	0.83	0.35	6%	17%
	203	204	0.00	0.00	0.00	0.00	1.73	0.00	2.00	11.63	96.29	166.50	164.89	329.18	0.00	235.70	533.00	0.33	39.8	257.48	1.15	0.57	65%	92%
	204	EX33	0.00	0.00	0.00	0.00	1.73	0.00	2.00	12.21	93.82	162.22	160.61	320.64	0.00	235.70	533.00	0.29	34.4	241.37	1.08	0.53	67%	98%
TO EX STMMH 11																								
R1	BLDG A	EX11	0.04	0.90	1.00	0.11	0.11	0.12	0.12	10.00	104.19	11.45	178.56	21.80	21.80	21.80	251.46	1.16	9.7	65.12	1.31	0.12	18%	33%

Design Parameters

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

IDF curve equations (Intensity in mm/hr)

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



KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- CATCH BASIN
- STORM SEWER & MANHOLE
- SWALE
- STORM DRAINAGE AREA BOUNDARY
- MAJOR OVERLAND FLOW ROUTE

RUNOFF COEFFICIENT
0.50 0.28 ← AREA (ha)
STM1
└ DRAINAGE AREA ID

NOT FOR CONSTRUCTION

NOTES

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

PROPERTY BOUNDARIES ARE DERIVED FROM PLAN OF SURVEY BLOCKS 1 AND 14 REGISTERED PLAN 4M-1566 CITY OF OTTAWA, STANTEC GEOMATICS LTD., ONTARIO LAND SURVEYORS. ELEVATIONS SHOWN ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=95.230.

NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	07/03/24	BLM
2	REVISED PER COMMENTS	16/11/23	BLM
1	ISSUED FOR SITE PLAN APPLICATION	19/06/23	BLM

SCALE
0 3m 6m 12m
HORIZONTAL 1:300

LICENSED PROFESSIONAL ENGINEER
B.L. MACKECHNIE
100199554
Mar. 7/24
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	CC
DRAWN	BLM
CHECKED	CC
APPROVED	BLM

3095 PALLADIUM GP INC.

3095 PALLADIUM DRIVE
CITY OF OTTAWA

STORM DRAINAGE AREA PLAN

PROJECT No.	23021
SURVEY	STANTEC
DATED	MARCH 2024
DWG. No:	23021-STM1

PLAN No. 19021

FILE No. D02-02-23-0058/D07-12-23-0092

Sub-Drainage Area Runoff Coefficient Calculations

Drainage Area ID	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)	Percent Impervious (%)
R1	0.04	0.00	0.00	0.04	0.90	1.00	100.0
R2	0.09	0.00	0.00	0.09	0.90	1.00	100.0
R3	0.04	0.00	0.00	0.04	0.90	1.00	100.0
R4	0.04	0.00	0.00	0.04	0.90	1.00	100.0
R5	0.06	0.00	0.00	0.06	0.90	1.00	100.0
R6	0.07	0.00	0.00	0.07	0.90	1.00	100.0
STM1	0.10	0.001	0.00	0.10	0.89	1.00	98.6
STM2	0.13	0.02	0.00	0.16	0.80	1.00	85.5
STM3	0.15	0.01	0.00	0.16	0.86	1.00	94.1
STM4	0.0005	0.01	0.00	0.02	0.22	0.28	3.1
STM5	0.001	0.01	0.00	0.01	0.29	0.37	13.5
STM6	0.001	0.02	0.00	0.02	0.25	0.31	6.7
FF1	0.05	0.08	0.00	0.13	0.49	0.61	40.7
FF2	0.04	0.06	0.00	0.10	0.47	0.59	39.0

Runoff Coefficients:

C impervious = 0.90

C pervious = 0.20

C gravel = 0.80

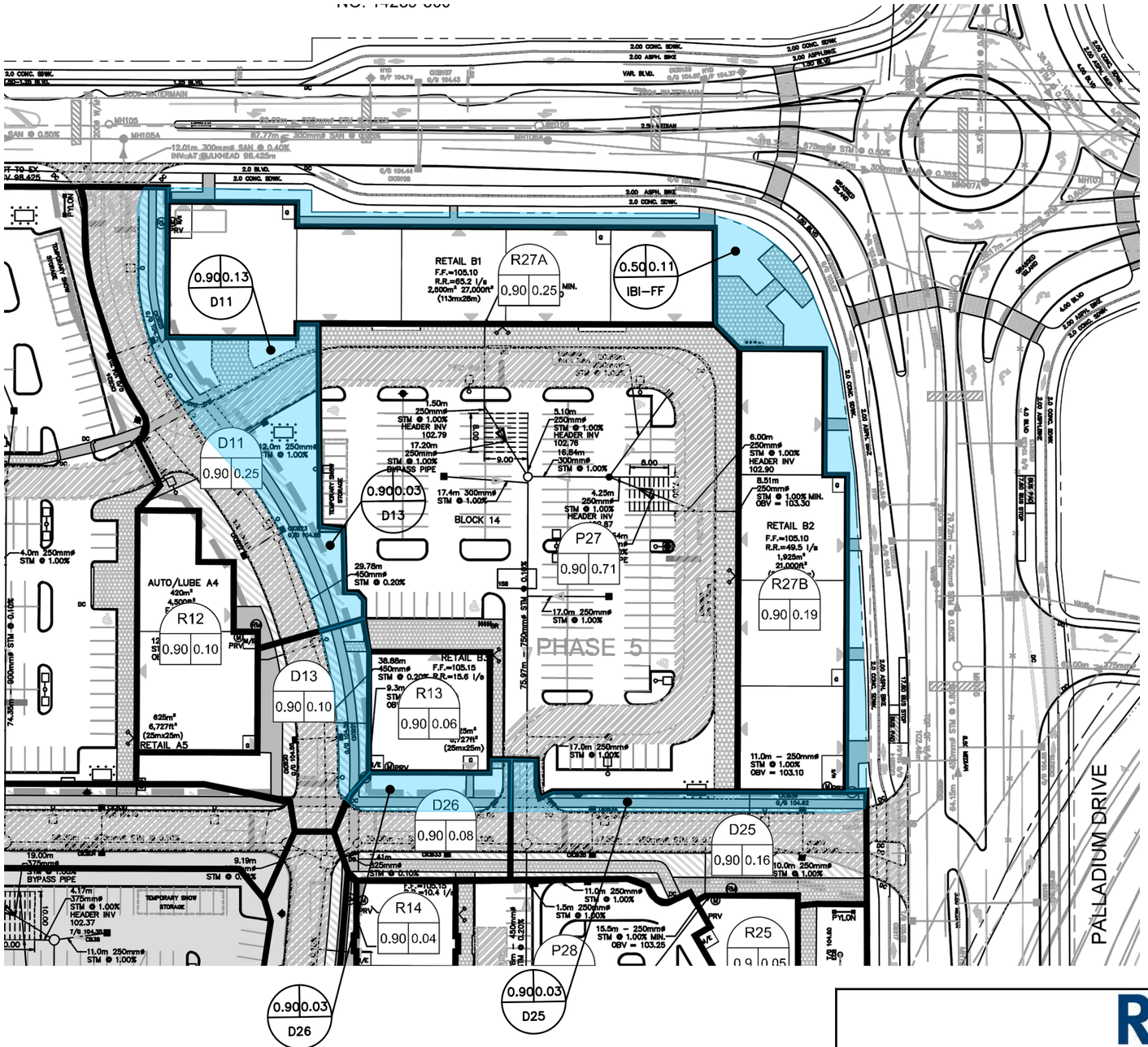
C_{100} = C * 1.25 (Max. 1.0)

flow on the streets. The 8m wide driveway was entered into the model with the appropriate longitudinal slopes to obtain the maximum normal depth and velocity of flow, based on the maximum major flow from the SWMHYMO model results. The SWMHYMO output file is provided within **Appendix C** for reference. The results of the evaluation are presented in the below tables.

Table 4.2 SWMHYMO Modeling Results: 5 Year and 100 Year Chicago Storm Events

AREA ID	PEAK RUNOFF (L/S)		CAPTURE (L/S)	
	5 yr CHI	100 yr chi	5 yr CHI	100 yr chi
D21i	11	20	11	13
D21ii	85	156	85	127
D22i	28	49	24	24
D29/L29	36	66	36	61
D30	47	85	47	49
P35/L19	73	132	73	132
R55	170	300	164	164
R12	29	49	26	26
P55	260	478	260	451
D11	61	112	61	68
D13	28	49	26	28
D22ii	28	49	28	29
D24	48	88	48	54
R27A	70	122	65	65
R27B	54	93	50	50
R13	17	30	16	16
P27	174	318	174	238
D25ii	19	34	18	19
D25i	23	42	23	24
D26	22	39	21	22
D14	24	43	24	26
R31	89	156	89	156
R19	89	156	89	156
P31	320	593	320	510
D15	32	57	31	33
R14	11	20	10	10
R25	14	25	13	13
P28	106	187	102	105
R38A	48	83	44	44
P46	59	108	59	65
R38B	136	240	130	130
P38	278	506	278	459
P19	92	167	92	97
D18	38	70	38	40
D16	27	48	26	27
R35	67	117	63	63
P34/L34	166	301	166	204

From a major system perspective, major flow from the majority of the development cascades to Feedmill Creek. A summary of the results of the modelling for the 5 year and 100 year Chicago design storm events are presented in the below **Tables 4.3 and 4.4**:



IBI DESIGN
RUNOFF COEFFICIENT

0.50 0.28
STM1

SITE CONTRIBUTION
AREA (ha)

IBI DESIGN
DRAINAGE AREA ID

Robinson
Land Development

scale N.T.S.	3095 PALLADIUM DRIVE	project no. 23021
date 08/06/23		
drawn by BLM	SITE CONTRIBUTION STM AREA PLAN	FIG 4

Table E1 - Pro-Rated Release Rates vs Site Outflows

Allowable Release Rates							Outflows			
Drainage Area	IBI Design			Site Contribution			Drainage Area	Subject Site		
	Area (ha)	Peak Runoff/ Capture Rate (L/s)		Area (ha)	Pro-Rated Allowable (L/s)			Area (ha)	Peak Runoff/ Controlled Flows (L/s)	
		5-Year	100-Year		5-Year	100-Year			5-Year	100-Year
To Campeau/Palladium										
FF1-IBI	0.11	16.4	35.0	0.11	16.4	35.0	FF1	0.13	18.0	38.7
							WS-10	0.017	1.1	2.3
Sub-Total	**0.11**	**16.4**	**35.0**	**0.11**	**16.4**	**35.0**	**Sub-Total**	**0.15**	**19.1**	**41.0**
To Kanata West Centre Drive U/S MH12										
D11	0.25	61.0	112.0	0.13	31.7	58.2	FF2	0.10	13.6	29.2
							R1	0.04	11.4	21.8
Sub-Total	**0.25**	**61.0**	**112.0**	**0.13**	**31.7**	**58.2**	**Sub-Total**	**0.14**	**25.1**	**51.0**
To Kanata West Centre Drive U/S MH14										
D13	0.10	28.0	49.0	0.03	8.4	14.7	WS-07	0.022	4.1	8.9
R13	0.06	16.0	16.0	0.06	16.0	16.0				
Sub-Total	**0.16**	**44.0**	**65.0**	**0.09**	**24.4**	**30.7**	**Sub-Total**	**0.02**	**4.1**	**8.9**
To Cabela's Way U/S MH26										
D25	0.16	19.0	34.0	0.03	3.6	6.4	WS-09	0.037	5.1	11.0
Sub-Total	**0.16**	**19.0**	**34.0**	**0.03**	**3.6**	**6.4**	**Sub-Total**	**0.04**	**5.1**	**11.0**
To Cabela's Way U/S MH33										
P27	0.71	174.0	238.0	0.71	174.0	238.0				
R27A	0.25	65.0	65.0	0.25	65.0	65.0	R2	0.09	23.3	44.3
R27B	0.19	50.0	50.0	0.19	50.0	50.0	R3	0.04	9.7	18.5
D26	0.08	22.0	39.0	0.03	8.3	14.6	R4	0.04	12.6	17.6
							R5	0.06	15.6	29.7
							R6	0.07	18.7	35.7
							STM1	0.10	20.6	21.0
							STM2	0.16	29.0	30.0
							STM3	0.16	29.1	30.0
							STM4	0.02	1.0	2.1
							STM5	0.01	0.9	2.0
							STM6	0.02	1.6	3.4
							WS-01	0.087	78.51	78.51
							WS-02	0.118		
							WS-03	0.039		
							WS-04	0.119		
							WS-05	0.064		
							WS-06	0.012		
							WS-08	0.015	2.2	4.7
Sub-Total	**1.23**	**311.0**	**392.0**	**1.18**	**297.3**	**367.6**	**Sub-Total**	**1.21**	**242.7**	**317.4**
Total	**1.91**	**451.4**	**638.0**	**1.54**	**373.3**	**498.0**	**Total**	**1.55**	**296.2**	**429.3**

Notes:

1. Drainage areas denoted as "WS" correspond to the design prepared by LRL Engineering for the Halo site.
2. IBI design values correspond to Table 4.2 from the KWRC Design Brief, 2016, IBI Group.
3. Site contribution values pro-rated by area of subject site within IBI drainage area. Refer to Figure 4 in Appendix E.
4. Allowable release rates for IBI areas D11, D13, D25, and D26 correspond to peak runoff values from IBI Table 4.2.
5. Allowable release rates for areas R13, R27A, R27B, and P27 correspond to capture rates from IBI Table 4.2.
6. Refer to Storm Drainage Area Plan (DWG. 23021-STM1) and KWRC Storm Drainage Area Plan in Appendix E.

Storage Volume Calculations - Area STM1 (CB 1)

Area ID = STM1
Area (ha) = 0.10
C = 0.89
C (100 YR) = 1.00

2-Year Release Rate (L/s) = 19.8
5-Year Release Rate (L/s) = 20.6
100-Year Release Rate (L/s) = 21.0

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	18.9	19.8	-0.9	-0.6
	15	61.8	15.2	19.8	-4.6	-4.1
	20	52.0	12.8	19.8	-7.0	-8.4
	25	45.2	11.1	19.8	-8.7	-13.0
	30	40.0	9.8	19.8	-9.9	-17.9
	35	36.1	8.9	19.8	-10.9	-22.9
5 Year	**10**	**104.2**	**25.6**	**20.6**	**5.0**	**3.0**
	15	83.6	20.5	20.6	-0.1	-0.1
	20	70.3	17.2	20.6	-3.4	-4.0
	25	60.9	14.9	20.6	-5.7	-8.5
	30	53.9	13.2	20.6	-7.4	-13.3
	35	48.5	11.9	20.6	-8.7	-18.2
100 Year	**10**	**178.6**	**49.2**	**21.0**	**28.2**	**16.9**
	15	142.9	39.4	21.0	18.4	16.6
	20	120.0	33.1	21.0	12.1	14.5
	25	103.8	28.6	21.0	7.6	11.4
	30	91.9	25.3	21.0	4.3	7.8
	35	82.6	22.8	21.0	1.8	3.7

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Storage Volume Calculations - Area STM3 (CB 3)

Area ID = STM3
Area (ha) = 0.16
C = 0.86
C (100 YR) = 1.00

2-Year Release Rate (L/s) = 27.8
5-Year Release Rate (L/s) = 29.1
100-Year Release Rate (L/s) = 30.0

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	28.5	27.8	0.7	0.4
	15	61.8	22.9	27.8	-4.9	-4.4
	20	52.0	19.3	27.8	-8.5	-10.2
	25	45.2	16.8	27.8	-11.0	-16.6
	30	40.0	14.9	27.8	-12.9	-23.3
	35	36.1	13.4	27.8	-14.4	-30.3
5 Year	**10**	**104.2**	**38.7**	**29.1**	**9.6**	**5.8**
	15	83.6	31.0	29.1	1.9	1.7
	20	70.3	26.1	29.1	-3.0	-3.6
	25	60.9	22.6	29.1	-6.5	-9.7
	30	53.9	20.0	29.1	-9.1	-16.3
	35	48.5	18.0	29.1	-11.1	-23.2
100 Year	10	178.6	77.1	30.0	47.1	28.3
	15	**142.9**	**61.7**	**30.0**	**31.7**	**28.6**
	20	120.0	51.8	30.0	21.8	26.2
	25	103.8	44.9	30.0	14.9	22.3
	30	91.9	39.7	30.0	9.7	17.4
	35	82.6	35.7	30.0	5.7	11.9

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Storage Volume Calculations - Area STM5 (CB 5)

Area ID = STM5
Area (ha) = 0.01
C = 0.29
C (100 YR) = 0.37

2-Year Release Rate (L/s) = UNCONTROLLED
5-Year Release Rate (L/s) = UNCONTROLLED
100-Year Release Rate (L/s) = UNCONTROLLED

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	0.7	0.7	0.0	0.0
	15	61.8	0.6	0.6	0.0	0.0
	20	52.0	0.5	0.5	0.0	0.0
	25	45.2	0.4	0.4	0.0	0.0
	30	40.0	0.4	0.4	0.0	0.0
	35	36.1	0.3	0.3	0.0	0.0
5 Year	10	104.2	0.9	0.9	0.0	0.0
	15	83.6	0.7	0.7	0.0	0.0
	20	70.3	0.6	0.6	0.0	0.0
	25	60.9	0.5	0.5	0.0	0.0
	30	53.9	0.5	0.5	0.0	0.0
	35	48.5	0.4	0.4	0.0	0.0
100 Year	10	178.6	2.0	2.0	0.0	0.0
	15	142.9	1.6	1.6	0.0	0.0
	20	120.0	1.3	1.3	0.0	0.0
	25	103.8	1.2	1.2	0.0	0.0
	30	91.9	1.0	1.0	0.0	0.0
	35	82.6	0.9	0.9	0.0	0.0

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Storage Volume Calculations - Area STM2 (CB 2)

Area ID = STM2
Area (ha) = 0.16
C = 0.80
C (100 YR) = 1.00

2-Year Release Rate (L/s) = 27.8
5-Year Release Rate (L/s) = 29.0
100-Year Release Rate (L/s) = 30.0

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	26.4	27.8	-1.4	-0.8
	15	61.8	21.3	27.8	-6.5	-5.9
	20	52.0	17.9	27.8	-9.9	-11.9
	25	45.2	15.5	27.8	-12.2	-18.4
	30	40.0	13.8	27.8	-14.0	-25.2
	35	36.1	12.4	27.8	-15.4	-32.3
5 Year	**10**	**104.2**	**35.9**	**29.0**	**6.9**	**4.1**
	15	83.6	28.8	29.0	-0.3	-0.2
	20	70.3	24.2	29.0	-4.8	-5.8
	25	60.9	21.0	29.0	-8.1	-12.1
	30	53.9	18.6	29.0	-10.5	-18.8
	35	48.5	16.7	29.0	-12.3	-25.9
100 Year	10	178.6	76.8	30.0	46.8	28.1
	15	**142.9**	**61.5**	**30.0**	**31.5**	**28.3**
	20	120.0	51.6	30.0	21.6	25.9
	25	103.8	44.7	30.0	14.7	22.0
	30	91.9	39.5	30.0	9.5	17.2
	35	82.6	35.5	30.0	5.5	11.6

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Storage Volume Calculations - Area STM4 (CB 4)

Area ID = STM4
Area (ha) = 0.02
C = 0.22
C (100 YR) = 0.28

2-Year Release Rate (L/s) = UNCONTROLLED
5-Year Release Rate (L/s) = UNCONTROLLED
100-Year Release Rate (L/s) = UNCONTROLLED

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	0.7	0.7	0.0	0.0
	15	61.8	0.6	0.6	0.0	0.0
	20	52.0	0.5	0.5	0.0	0.0
	25	45.2	0.4	0.4	0.0	0.0
	30	40.0	0.4	0.4	0.0	0.0
	35	36.1	0.3	0.3	0.0	0.0
5 Year	10	104.2	1.0	1.0	0.0	0.0
	15	83.6	0.8	0.8	0.0	0.0
	20	70.3	0.7	0.7	0.0	0.0
	25	60.9	0.6	0.6	0.0	0.0
	30	53.9	0.5	0.5	0.0	0.0
	35	48.5	0.5	0.5	0.0	0.0
100 Year	10	178.6	2.1	2.1	0.0	0.0
	15	142.9	1.7	1.7	0.0	0.0
	20	120.0	1.4	1.4	0.0	0.0
	25	103.8	1.2	1.2	0.0	0.0
	30	91.9	1.1	1.1	0.0	0.0
	35	82.6	1.0	1.0	0.0	0.0

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Storage Volume Calculations - Area STM6 (CB 6)

Area ID = STM6
Area (ha) = 0.02
C = 0.25
C (100 YR) = 0.31

2-Year Release Rate (L/s) = UNCONTROLLED
5-Year Release Rate (L/s) = UNCONTROLLED
100-Year Release Rate (L/s) = UNCONTROLLED

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	1.2	1.2	0.0	0.0
	15	61.8	0.9	0.9	0.0	0.0
	20	52.0	0.8	0.8	0.0	0.0
	25	45.2	0.7	0.7	0.0	0.0
	30	40.0	0.6	0.6	0.0	0.0
	35	36.1	0.5	0.5	0.0	0.0
5 Year	10	104.2	1.6	1.6	0.0	0.0
	15	83.6	1.3	1.3	0.0	0.0
	20	70.3	1.1	1.1	0.0	0.0
	25	60.9	0.9	0.9	0.0	0.0
	30	53.9	0.8	0.8	0.0	0.0
	35	48.5	0.7	0.7	0.0	0.0
100 Year	10	178.6	3.4	3.4	0.0	0.0
	15	142.9	2.7	2.7	0.0	0.0
	20	120.0	2.3	2.3	0.0	0.0
	25	103.8	2.0	2.0	0.0	0.0
	30	91.9	1.7	1.7	0.0	0.0
	35	82.6	1.6	1.6	0.0	0.0

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided storage volumes have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Flow Calculations - Area R1

Area ID = R1
Area (ha) = 0.04
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**8.4**
	15	61.8	6.8
	20	52.0	5.7
	25	45.2	5.0
	30	40.0	4.4
	35	36.1	4.0
5 Year	**10**	**104.2**	**11.4**
	15	83.6	9.2
	20	70.3	7.7
	25	60.9	6.7
	30	53.9	5.9
	35	48.5	5.3
100 Year	**10**	**178.6**	**21.8**
	15	142.9	17.4
	20	120.0	14.6
	25	103.8	12.7
	30	91.9	11.2
	35	82.6	10.1

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.

3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Flow Calculations - Area R3

Area ID = R3
Area (ha) = 0.04
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**7.1**
	15	61.8	5.7
	20	52.0	4.8
	25	45.2	4.2
	30	40.0	3.7
	35	36.1	3.4
5 Year	**10**	**104.2**	**9.7**
	15	83.6	7.8
	20	70.3	6.5
	25	60.9	5.7
	30	53.9	5.0
	35	48.5	4.5
100 Year	**10**	**178.6**	**18.5**
	15	142.9	14.8
	20	120.0	12.4
	25	103.8	10.7
	30	91.9	9.5
	35	82.6	8.5

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.

3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Flow Calculations - Area R5

Area ID = R5
Area (ha) = 0.06
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**11.5**
	15	61.8	9.3
	20	52.0	7.8
	25	45.2	6.8
	30	40.0	6.0
	35	36.1	5.4
5 Year	**10**	**104.2**	**15.6**
	15	83.6	12.5
	20	70.3	10.5
	25	60.9	9.1
	30	53.9	8.1
	35	48.5	7.3
100 Year	**10**	**178.6**	**29.7**
	15	142.9	23.8
	20	120.0	20.0
	25	103.8	17.3
	30	91.9	15.3
	35	82.6	13.8

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.

3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)

Flow Calculations - Area R2

Area ID = R2
Area (ha) = 0.09
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**17.1**
	15	61.8	13.8
	20	52.0	11.6
	25	45.2	10.1
	30	40.0	8.9
	35	36.1	8.0
5 Year	**10**	**104.2**	**23.3**
	15	83.6	18.6
	20	70.3	15.7
	25	60.9	13.6
	30	53.9	12.0
	35	48.5	10.8
100 Year	**10**	**178.6**	**44.3**
	15	142.9	35.4
	20	120.0	29.7
	25	103.8	25.8
	30	91.9	22.8
	35	82.6	20.5

Flow Calculations - Area R4

Area ID = R4
Area (ha) = 0.04
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**5**	**103.6**	**9.2**
	10	76.8	6.8
	15	61.8	5.5
	20	52.0	4.6
	25	45.2	4.0
	30	40.0	3.6
5 Year	**5**	**141.2**	**12.6**
	10	104.2	9.3
	15	83.6	7.4
	20	70.3	6.2
	25	60.9	5.4
	30	53.9	4.8
100 Year	**10**	**178.6**	**17.6**
	15	142.9	14.1
	20	120.0	11.9
	25	103.8	10.3
	30	91.9	9.1
	35	82.6	8.2

Flow Calculations - Area R6

Area ID = R6
Area (ha) = 0.07
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**13.8**
	15	61.8	11.1
	20	52.0	9.4
	25	45.2	8.1
	30	40.0	7.2
	35	36.1	6.5
5 Year	**10**	**104.2**	**18.7**
	15	83.6	15.0
	20	70.3	12.6
	25	60.9	11.0
	30	53.9	9.7
	35	48.5	8.7
100 Year	**10**	**178.6**	**35.7**
	15	142.9	28.6
	20	120.0	24.0
	25	103.8	20.8
	30	91.9	18.4
	35	82.6	16.5

Free Flow Calculations - Area FF1 (to Campeau/Palladium)

Area ID = FF1
Area (ha) = 0.13
C = 0.49
C (100 YR) = 0.61

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**13.3**
	15	61.8	10.7
	20	52.0	9.0
	25	45.2	7.8
	30	40.0	6.9
	35	36.1	6.2
5 Year	**10**	**104.2**	**18.0**
	15	83.6	14.5
	20	70.3	12.2
	25	60.9	10.5
	30	53.9	9.3
	35	48.5	8.4
100 Year	**10**	**178.6**	**38.7**
	15	142.9	30.9
	20	120.0	26.0
	25	103.8	22.5
	30	91.9	19.9
	35	82.6	17.9

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

Free Flow Calculations - Area WS-07 (to Kanata West Centre Drive U/S MH14)

Area ID = WS-07 (REFER TO LRL ENGINEERING DESIGN)
Area (ha) = 0.022
C = 0.65
C (100 YR) = 0.81

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**3.1**
	15	61.8	2.5
	20	52.0	2.1
	25	45.2	1.8
	30	40.0	1.6
	35	36.1	1.4
5 Year	**10**	**104.2**	**4.1**
	15	83.6	3.3
	20	70.3	2.8
	25	60.9	2.4
	30	53.9	2.1
	35	48.5	1.9
100 Year	**10**	**178.6**	**8.9**
	15	142.9	7.1
	20	120.0	6.0
	25	103.8	5.2
	30	91.9	4.6
	35	82.6	4.1

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

Free Flow Calculations - Area WS-10 (to Campeau/Palladium)

Area ID = WS-10 (REFER TO LRL ENGINEERING DESIGN)
Area (ha) = 0.017
C = 0.22
C (100 YR) = 0.28

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**0.8**
	15	61.8	0.6
	20	52.0	0.5
	25	45.2	0.5
	30	40.0	0.4
	35	36.1	0.4
5 Year	**10**	**104.2**	**1.1**
	15	83.6	0.9
	20	70.3	0.7
	25	60.9	0.6
	30	53.9	0.6
	35	48.5	0.5
100 Year	**10**	**178.6**	**2.3**
	15	142.9	1.9
	20	120.0	1.6
	25	103.8	1.3
	30	91.9	1.2
	35	82.6	1.1

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

Free Flow Calculations - Area FF2 (to Kanata West Centre Drive U/S MH12)

Area ID = FF2
Area (ha) = 0.10
C = 0.47
C (100 YR) = 0.59

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**10.1**
	15	61.8	8.1
	20	52.0	6.8
	25	45.2	5.9
	30	40.0	5.2
	35	36.1	4.7
5 Year	**10**	**104.2**	**13.6**
	15	83.6	10.9
	20	70.3	9.2
	25	60.9	8.0
	30	53.9	7.1
	35	48.5	6.3
100 Year	**10**	**178.6**	**29.2**
	15	142.9	23.4
	20	120.0	19.6
	25	103.8	17.0
	30	91.9	15.0
	35	82.6	13.5

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

Free Flow Calculations - Area WS-08 (to Cabela's Way U/S MH33)

Area ID = WS-08 (REFER TO LRL ENGINEERING DESIGN)
Area (ha) = 0.015
C = 0.50
C (100 YR) = 0.63

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**1.6**
	15	61.8	1.3
	20	52.0	1.1
	25	45.2	0.9
	30	40.0	0.8
	35	36.1	0.8
5 Year	**10**	**104.2**	**2.2**
	15	83.6	1.7
	20	70.3	1.5
	25	60.9	1.3
	30	53.9	1.1
	35	48.5	1.0
100 Year	**10**	**178.6**	**4.7**
	15	142.9	3.7
	20	120.0	3.1
	25	103.8	2.7
	30	91.9	2.4
	35	82.6	2.2

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

Free Flow Calculations - Area WS-09 (to Cabela's Way U/S MH26)

Area ID = WS-09 (REFER TO LRL ENGINEERING DESIGN)
Area (ha) = 0.037
C = 0.48
C (100 YR) = 0.60

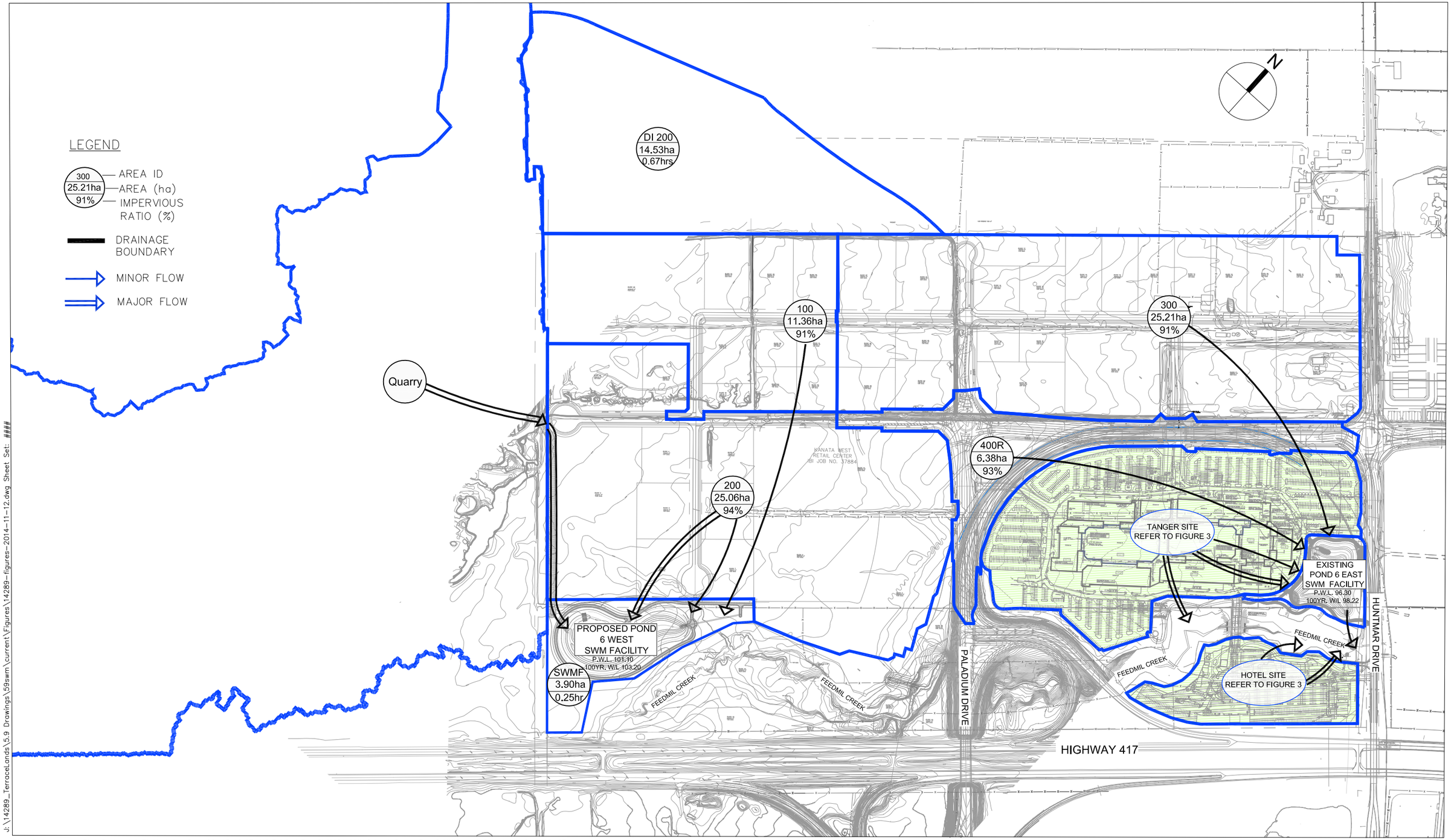
Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
2 Year	**10**	**76.8**	**3.8**
	15	61.8	3.0
	20	52.0	2.6
	25	45.2	2.2
	30	40.0	2.0
	35	36.1	1.8
5 Year	**10**	**104.2**	**5.1**
	15	83.6	4.1
	20	70.3	3.5
	25	60.9	3.0
	30	53.9	2.7
	35	48.5	2.4
100 Year	**10**	**178.6**	**11.0**
	15	142.9	8.8
	20	120.0	7.4
	25	103.8	6.4
	30	91.9	5.7
	35	82.6	5.1

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

Ponding and Inlet Control Device Calculations

Structure	Drainage Area	Outlet Pipe Inv. Elev. (m)	Outlet Pipe Diam. (m)	C/L Orifice Elev. (m)	T/G Elev. (m)	2-YR Ponding Depth (m)	2-YR Ponding Elev. (m)	2-YR Head (m)	5-YR Ponding Depth (m)	5-YR Ponding Elev. (m)	5-YR Head (m)	100-YR Ponding Depth (m)	100-YR Ponding Elev. (m)	100-YR Head (m)	2-YR Outflow (L/s)	5-YR Outflow (L/s)	100-YR Outflow (L/s)	Orifice Area (m^2)	Orifice Diameter (mm)	Orifice Type
CB 1	STM1	103.32	0.201	103.42	104.82	0.00	104.82	1.40	0.12	104.94	1.52	0.18	105.00	1.58	19.8	20.6	21.0	0.006	88.7	Circular, slide
CB 2	STM2	103.24	0.251	103.37	104.70	0.00	104.70	1.33	0.12	104.82	1.45	0.22	104.92	1.55	27.8	29.0	30.0	0.009	106.5	Circular, slide
CB 3	STM3	103.23	0.201	103.33	104.73	0.00	104.73	1.40	0.13	104.86	1.53	0.23	104.96	1.63	27.8	29.1	30.0	0.009	105.2	Circular, slide
CB 4	STM4	103.24	0.201	103.34	104.74	0.00	104.74	1.40	0.00	104.74	1.40	0.00	104.74	1.40	0.7	1.0	2.1			No ICD
CB 5	STM5	103.17	0.251	103.30	104.93	0.00	104.93	1.63	0.00	104.93	1.63	0.00	104.93	1.63	0.7	0.9	2.0			No ICD
CB 6	STM6	102.83	0.251	102.96	104.65	0.00	104.65	1.69	0.00	104.65	1.69	0.00	104.65	1.69	1.2	1.6	3.4			No ICD

Notes:
1. Ponding depths are measured from the ponding elevation to the T/G elevation.
2. Heads are measured from the ponding elevation to the centreline of orifice elevation.
3. Orifice Area = (Q/1000) / 0.61(2*9.81*H_{100})^0.5 (OSDG Section 8.3.8.1)
4. Orifice areas are calculated using 100 year head and outflow values.



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IBI GROUP

Scale

N.T.S.

Project Title

TANGER OUTLETS CENTRE STORMWATER MANAGEMENT FACILITY

Drawing Title

POST-DEVELOPMENT SWM DRAINAGE BOUNDARIES OVERALL SITE

Sheet No.

FIGURE 2

Table 3.16 - 90th and 95th Percentile event daily rainfall volumes from daily climate data collected proximal to the City of Ottawa.

Station Name	Annual Average		Number of Years in Analysis	90th Percentile Daily Volume (mm)				95th Percentile Daily Volume (mm)			
				All Rainfall Events		Apr. 1st - Oct. 31st		All Rainfall Events		Apr. 1st - Oct. 31st	
	Precipitation* (mm)	Oct. to Apr. Rainfall) (mm)		2 mm Cut-off	5 mm Cut-off	2 mm Cut-off	5 mm Cut-off	2 mm Cut-off	5 mm Cut-off	2 mm Cut-off	5 mm Cut-off
OTTAWA CDA	910	583	36	21.2	25.8	21.8	25.8	27.2	31.4	27.4	31.8
OTTAWA MACDONALD-CARTIER INT'L A	935	580	36	22.0	26.6	22.6	26.8	28.6	34.4	29.0	35.0
Average	922	581	36	21.6	26.2	22.2	26.3	27.9	32.9	28.2	33.4

3.7.3.3 Windsor

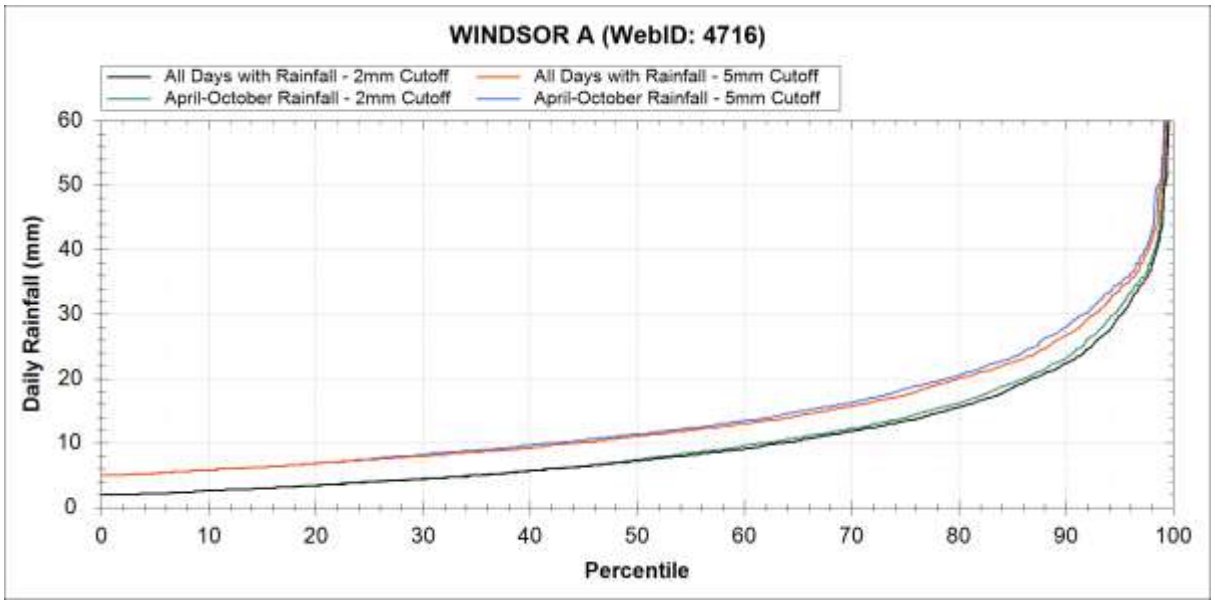

Figure 3.59 - Daily rainfall frequency curves derived from daily rainfall data at ECCC climate station WINDSOR A.

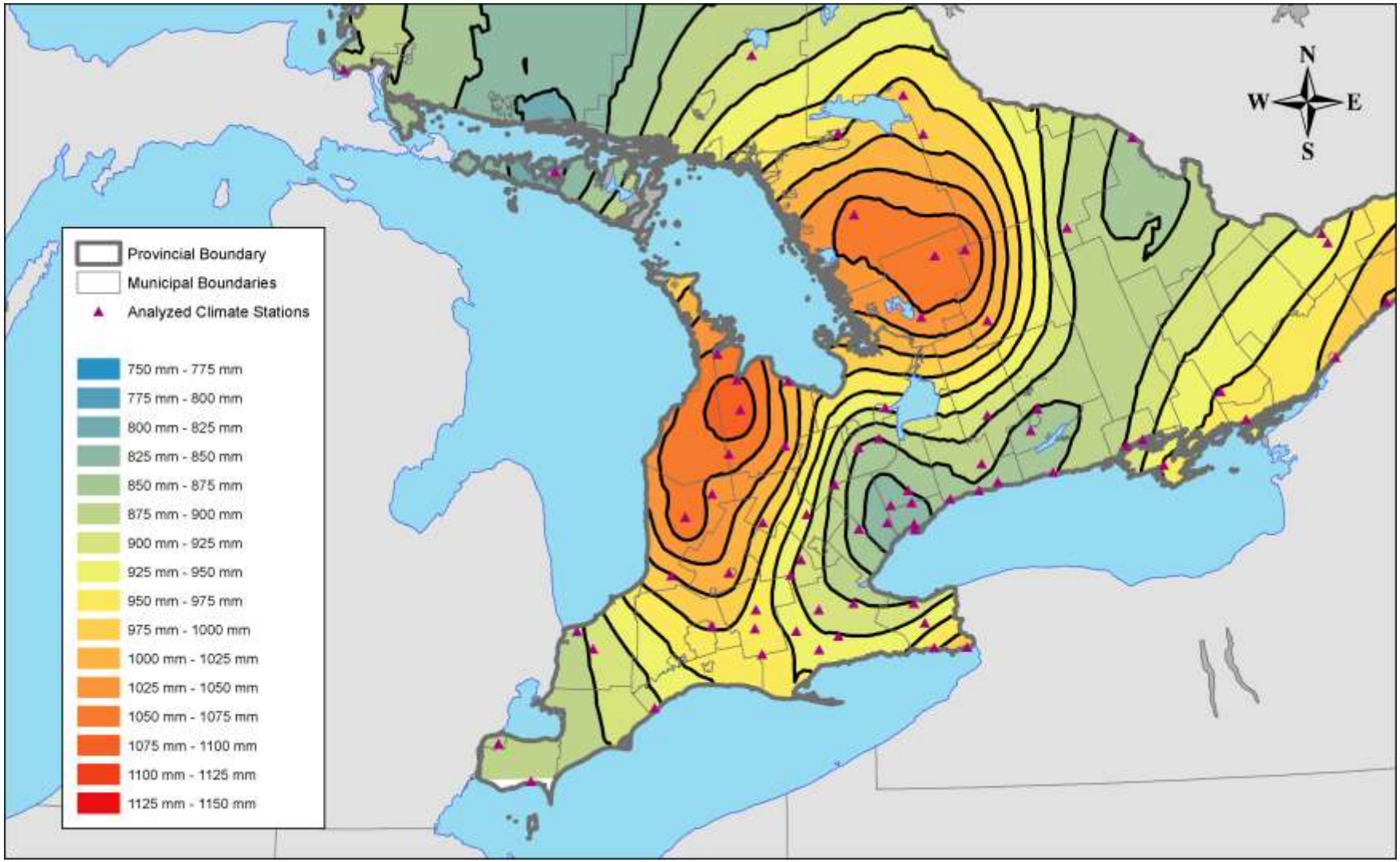

Figure 3.41 - Average annual precipitation in southern Ontario (1970-2005).

4.6 Hydraulic Evaluation

4.6.1 PCSWMM Model of Feedmill Creek

The City of Ottawa has provided IBI with a PCSWMM Model of Feedmill Creek (100 year, 12 hour SCS design storm) for use in confirming the water levels in the creek at the SWMF outfall locations for the KWBP. The outflow hydrographs from the XPSWMM model of the Pond 6 West and Pond 6 East SWMFs have been uploaded to the PCSWMM model to confirm water levels in the creek and to generate tailwater curves to be used in the XPSWMM models. An electronic copy of the updated PCSWMM model is provided on CD within **Appendix C**. The results of the updated PCSWMM model with the outflow hydrographs from XPSWMM indicate water levels as follows:

Table 4.7 Summary of Updated PCSWMM Model Results during the 100 year 12 hour SCS design storm (Model File: CarpInterim2_100ySCS_FinalDraft_IBI2015-09-17.out)

LOCATION	PCSWMM NODE ID	MAX WATER LEVEL (M)
Pond 6 West Outfall	FJ038	101.32
Pond 6 East Outfall	FJ032	97.87

For modelling purposes for the other design storm events, the maximum water level in Feedmill Creek during the 100 year, 12 hour SCS design storm event (as indicated within the above table) was used to generate tailwater curves based on the outflow hydrograph from XPSWMM.

4.6.2 XPSWMM Model of Kanata West Retail Centre

The proposed storm sewers within the subject site have been analyzed using fully dynamic XPSWMM model of the proposed trunk storm sewer and Pond 6 West SWMF. The HGL is dictated by water levels in Feedmill Creek as well as the 1:100 year water level in the proposed Pond 6 West SWMF.

For modelling purposes, manhole storage equivalent to the area of the manhole has been incorporated in the XPSWMM model to help stabalize the HGL results. A summary of the manhole sizes and calculated areas is provided within **Appendix C**.

The following table presents a summary of the HGL for the 100 year 12 hour SCS design storm and the 100 year 3 hour Chicago design storm, finished floor elevations and associated freeboard at each manhole location. XPSWMM output files (32862-100YRSCS-2015-11-02.out and 14289-100YRSCS-2015-11-02.out) and model schematic are provided within **Appendix C**

Table 4.8 Summary of Hydraulic Grade Line during the 100 year 12 hour SCS Storm and 100 year 3 hour Chicago Storm

(Model Files: 14289-100YRSCS-2015-11-02.out, 14289-100YRCHI-2015-11-02.out)

LOCATION	MH	FINISHED FLOOR ELEVATION (M)	100 YEAR 12 HOUR SCS		100 YEAR 3 HOUR CHICAGO	
			HGL (M)	FB (M)	HGL (M)	FB (M)
Nipissing Court	P6WEST	N/A	103.26	**N/A**	102.94	**N/A**
	MH123	106.20	103.29	2.08	102.95	2.42
	MH122	106.20	103.40	2.80	102.98	3.22
	MH121	106.30	103.57	2.63	103.11	3.09
	MH120	105.51	103.71	2.59	103.23	3.07
Upper Canada St	MH150	106.00	103.79	2.51	103.30	3.00
	MH151	106.30	103.90	3.00	103.41	3.49
	MH152	106.90	103.95	2.95	103.45	3.45

LOCATION	MH	FINISHED FLOOR ELEVATION (M)	100 YEAR 12 HOUR SCS		100 YEAR 3 HOUR CHICAGO	
			HGL (M)	FB (M)	HGL (M)	FB (M)
	MH153	105.90	104.07	1.83	103.55	2.35
	MH154	105.70	104.19	1.51	103.77	1.93
Campeau Dr.	MH99	106.70	104.20	2.50	103.72	2.98
	MH100	106.75	103.94	2.76	103.47	3.23
	MH101	106.60	103.78	2.52	103.30	3.00
	MH102	106.00	103.73	2.27	103.25	2.75
	MH103	105.85	103.79	2.06	103.31	2.54
	MH104	105.75	103.96	1.79	103.48	2.27
KANATA WEST RETAIL CENTRE	CBMH46	104.50	103.47	1.58	103.10	1.95
	CBMH55	104.50	103.69	1.71	103.00	2.40
	11	104.82	103.68	1.42	102.98	2.12
	12	104.59	103.61	1.54	102.97	2.18
	13	104.74	103.57	1.58	102.97	2.18
	14	104.79	103.48	1.67	102.96	2.19
	15	104.59	103.41	1.64	102.97	2.08
	16	104.59	103.36	1.69	102.98	2.07
	17	104.57	103.28	1.72	102.98	2.02
	18	104.42	103.28	1.72	102.98	2.02
	19	104.78	103.29	1.81	102.97	2.13
	20	105.01	103.29	2.11	102.97	2.43
	21	105.21	104.15	1.25	103.27	2.13
	22	104.97	104.07	1.33	103.13	2.27
	23	104.96	103.72	1.68	102.99	2.41
	24	104.57	103.62	1.78	102.96	2.44
	25	104.62	103.63	1.47	103.04	2.06
	26	104.67	103.60	1.55	102.99	2.16
	27	104.62	103.70	1.40	103.05	2.05
	28	104.73	103.67	1.43	103.01	2.09
	29	105.14	103.32	2.08	103.00	2.40
	30	105.00	103.31	2.09	102.98	2.42
	31	104.44	103.36	2.04	103.52	1.88
	35	104.80	103.33	1.77	102.99	2.11
	38	104.60	103.43	1.57	102.99	2.01

The above results indicate that the hydraulic grade line will be at least 1.25 m below the finished floor elevation within the Kanata West Retail Centre. XPSWMM Profile plots from the 100 year Chicago and 100 year SCS design storm event are provided within Appendix C for reference.

HYDRAULIC GRADE LINE COMPUTATION FORM

From Manhole	To Manhole	U/S Invert	D/S Invert	U/S Obvert	D/S Obvert	Slope	TW	Diameter D_o	Area	Hydraulic Radius	100-Year Peak Flow Q_o	Length L_o	Velocity V_o	Velocity Head $V_o^2/2g$	Friction Slope Sf_o	Friction Loss H_f	Angle of Deflection at U/S MH	Sewer Bend Loss Coefficient[*1]	Hydraulic Loss at MH	EGL_o	EGL_i	HGL_o	HGL_i	Ground Elev.	Surcharge Depth	Free Board
		m	m	m	m	m/m	m	m	m^2	m	m^3/s	m	m/s	m	m/m	m	degrees	K_b	m	m	m	m	m	m	m	m
MH33	204	102.35	102.25	102.88	102.78	0.0029	103.48	0.533	0.22	0.13	0.236	34.4	1.06	0.06	0.0028	0.095	20	0.12	0.0068	103.54	103.64	103.48	103.58	104.90	0.70	1.32
204	203	102.51	102.38	103.04	102.91	0.0033	103.58	0.533	0.22	0.13	0.236	39.8	1.06	0.06	0.0028	0.110	50	0.46	0.0262	103.64	103.78	103.58	103.72	105.22	0.68	1.50
203	202	102.64	102.57	103.17	103.10	0.0037	103.72	0.533	0.22	0.13	0.229	19.0	1.02	0.05	0.0026	0.050	60	0.64	0.0343	103.77	103.86	103.72	103.80	104.79	0.63	0.99
202	201	102.76	102.70	103.29	103.23	0.0021	103.80	0.533	0.22	0.13	0.182	29.1	0.82	0.03	0.0017	0.048	0	0.02	0.0007	103.84	103.89	103.80	103.85	105.01	0.56	1.16
201	200	103.13	102.91	103.50	103.28	0.0052	103.85	0.366	0.11	0.09	0.117	42.7	1.11	0.06	0.0050	0.215	20	0.12	0.0075	103.91	104.14	103.85	104.07	105.14	0.58	1.07
200	BLDG D	103.25	103.35	103.50	103.60	-0.0103	104.07	0.251	0.05	0.06	0.018	9.7	0.36	0.01	0.0009	0.008	0	0.02	0.0001	104.08	104.09	104.07	104.08	105.40	0.58	1.32
MH33	204	102.35	102.25	102.88	102.78	0.0029	103.48	0.533	0.22	0.13	0.236	34.4	1.06	0.06	0.0028	0.095	20	0.12	0.0068	103.54	103.64	103.48	103.58	104.90	0.70	1.32
204	203	102.51	102.38	103.04	102.91	0.0033	103.58	0.533	0.22	0.13	0.236	39.8	1.06	0.06	0.0028	0.110	50	0.46	0.0262	103.64	103.78	103.58	103.72	105.22	0.68	1.50
203	202	102.64	102.57	103.17	103.10	0.0037	103.72	0.533	0.22	0.13	0.229	19.0	1.02	0.05	0.0026	0.050	60	0.64	0.0343	103.77	103.86	103.72	103.80	104.79	0.63	0.99
202	201	102.76	102.70	103.29	103.23	0.0021	103.80	0.533	0.22	0.13	0.182	29.1	0.82	0.03	0.0017	0.048	0	0.02	0.0007	103.84	103.89	103.80	103.85	105.01	0.56	1.16
201	200	103.13	102.91	103.50	103.28	0.0052	103.85	0.366	0.11	0.09	0.117	42.7	1.11	0.06	0.0050	0.215	90	1.32	0.0826	103.91	104.21	103.85	104.15	105.14	0.65	0.99
200	BLDG E	103.45	103.25	103.70	103.50	0.0117	104.15	0.251	0.05	0.06	0.030	17.1	0.60	0.02	0.0024	0.041	0	0.02	0.0004	104.17	104.21	104.15	104.19	105.45	0.49	1.26
MH33	204	102.35	102.25	102.88	102.78	0.0029	103.48	0.533	0.22	0.13	0.236	34.4	1.06	0.06	0.0028	0.095	20	0.12	0.0068	103.54	103.64	103.48	103.58	104.90	0.70	1.32
204	203	102.51	102.38	103.04	102.91	0.0033	103.58	0.533	0.22	0.13	0.236	39.8	1.06	0.06	0.0028	0.110	50	0.46	0.0262	103.64	103.78	103.58	103.72	105.22	0.68	1.50
203	202	102.64	102.57	103.17	103.10	0.0037	103.72	0.533	0.22	0.13	0.229	19.0	1.02	0.05	0.0026	0.050	60	0.64	0.0343	103.77	103.86	103.72	103.80	104.79	0.63	0.99
202	201	102.76	102.70	103.29	103.23	0.0021	103.80	0.533	0.22	0.13	0.182	29.1	0.82	0.03	0.0017	0.048	0	0.02	0.0007	103.84	103.89	103.80	103.85	105.01	0.56	1.16
201	200	103.13	102.91	103.50	103.28	0.0052	103.85	0.366	0.11	0.09	0.117	42.7	1.11	0.06	0.0050	0.215	90	1.32	0.0826	103.91	104.21	103.85	104.15	105.14	0.65	0.99
200	BLDG C	103.40	103.23	103.65	103.48	0.0084	104.15	0.251	0.05	0.06	0.018	20.2	0.37	0.01	0.0009	0.019	0	0.02	0.0001	104.16	104.17	104.15	104.17	105.33	0.52	1.16
MH33	204	102.35	102.25	102.88	102.78	0.0029	103.48	0.533	0.22	0.13	0.236	34.4	1.06	0.06	0.0028	0.095	20	0.12	0.0068	103.54	103.64	103.48	103.58	104.90	0.70	1.32
204	203	102.51	102.38	103.04	102.91	0.0033	103.58	0.533	0.22	0.13	0.236	39.8	1.06	0.06	0.0028	0.110	50	0.46	0.0262	103.64	103.78	103.58	103.72	105.22	0.68	1.50
203	202	102.64	102.57	103.17	103.10	0.0037	103.72	0.533	0.22	0.13	0.229	19.0	1.02	0.05	0.0026	0.050	60	0.64	0.0343	103.77	103.86	103.72	103.80	104.79	0.63	0.99
202	201	102.76	102.70	103.29	103.23	0.0021	103.80	0.533	0.22	0.13	0.182	29.1	0.82	0.03	0.0017	0.048	90	1.32	0.0450	103.84	103.93	103.80	103.90	105.01	0.60	1.11
201	211	103.94	103.82	104.19	104.07	0.0067	103.90	0.251	0.05	0.06	0.036	17.9	0.72	0.03	0.0035	0.062	40	0.32	0.0084	103.92	103.99	103.90	103.97	105.19	-0.23	1.22
MH33	204	102.35	102.25	102.88	102.78	0.0029	103.48	0.533	0.22	0.13	0.236	34.4	1.06	0.06	0.0028	0.095	20	0.12	0.0068	103.54	103.64	103.48	103.58	104.90	0.70	1.32
204	203	102.51	102.38	103.04	102.91	0.0033	103.58	0.533	0.22	0.13	0.236	39.8	1.06	0.06	0.0028	0.110	50	0.46	0.0262	103.64	103.78	103.58	103.72	105.22	0.68	1.50
203	202	102.64	102.57	103.17	103.10	0.0037	103.72	0.533	0.22	0.13	0.229	19.0	1.02	0.05	0.0026	0.050	60	0.64	0.0343	103.77	103.86	103.72	103.80	104.79	0.63	0.99
202	210	103.66	103.52	103.91	103.77	0.0057	103.80	0.251	0.05	0.06	0.044	24.4	0.89	0.04	0.0053	0.130	40	0.32	0.0129	103.84	103.99	103.80	103.95	105.06	0.03	1.11
210	BLDG B	103.78	103.72	104.03	103.97	0.0094	103.95	0.251	0.05	0.06	0.044	6.4	0.89	0.04	0.0054	0.034	0	0.02	0.0008	103.99	104.02	103.95	103.98	105.31	-0.05	1.33

Notes:
1. From "Sewer Bend Loss Coefficient Design Chart", Appendix 6-B, City of Ottawa Sewer Design Guidelines, 2004
2. 100-year peak flows correspond to cummulative 100-year restricted flow rates.

Designed: BLM
Checked:
Dwg. Reference:
Project: 3095 Palladium Drive
Location: 3095 Palladium Drive
Project No.: 23021
Date:
Page 1 of 1

Deflection Angle	Bend Loss Coefficient
0	0.02
5	0.02
10	0.05
15	0.08
20	0.12
25	0.16
30	0.22
35	0.27
40	0.32
45	0.39
50	0.46
55	0.54
60	0.64
65	0.73
70	0.84
75	0.95
80	1.07
85	1.20
90	1.32

From "Sewer Bend Loss Coefficient Design Chart", Appendix 6-B, City of Ottawa Sewer Design Guidelines, 2012

Appendix F

Halo Site Technical Memorandum
(prepared by LRL Engineering,
under separate cover)