SERVICING & STORMWATER MANAGEMENT REPORT
100 TERENCE MATTHEWS

Project No.: CCO-23-0422

City File No.: D07-12-XX-XXXX

Prepared for:

DS Studio
95 Pelham Avenue
Toronto, ON
M6N 1A5

Prepared by:

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115 Walgreen Road
Carp, ON K0A 1L0

October 7th, 2022

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by DS Studio Inc to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed development located at 100 Terence Matthews Crescent within the City of Ottawa.

The main purpose of this report is to present a servicing and stormwater management design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Rideau Valley Conservation Authority (RVCA), and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary and storm sewer servicing for the development, ensuring that existing and available services will adequately service the proposed development.

This report should be read in conjunction with the following drawings:

- CCO-23-0422, C101 – Site Grading, Drainage, Erosion and Sediment Control Plan
- CCO-23-0422, C102 – Site Servicing Plan
- CCO-23-0422, PRE – Pre-Development Drainage Plan (*Appendix E*)
- CCO-23-0422, POST – Post-Development Drainage Plan (*Appendix F*)

1.2 Site Description

Figure 1: Site Map

The subject property, herein referred to as the site, is located 100 Terence Matthews Crescent within the Kanata South ward. The site covers approximately *0.54 ha* and is located along Terence Matthews Crescent. The site is zoned for Business Park Industrial Zone use (IP4). See Site Location Plan in *Appendix 'A'* for more details.

1.3 Proposed Development and Statistics

The proposed development consists of a *958 m²* addition to the existing office building. Refer to *Site Plan* prepared by DS Studio and included in *Appendix B* for further details. Parking and drive aisles will be provided by the existing parking lot with access from Terence Matthews.

1.4 Existing Conditions and Infrastructures

The site is currently developed containing an existing 1-storey metal siding office building with asphalt parking areas. The existing building is serviced via a 50-150 mm diameter water service, 200-300mm diameter storm service, and a 150 mm diameter sanitary service connected to the municipal infrastructure within Terence Matthews Crescent.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal rights-of-way(s):

- Terence Matthews Crescent
  - 305 mm diameter DI watermain, a
  - 250 mm diameter PVC sanitary sewer tributary to the Glen Cairn Trunk via the Hazeldean Pump Station, and a
  - 450 mm diameter concrete storm sewer

1.5 Approvals

The proposed development is subject to the City of Ottawa site plan control approval process. Site plan control requires the City to review, provided concurrence and approve the engineering design package. Permits to construct can be requested once the City has issued a site plan agreement.

An Environmental Compliance Approval (*ECA*) through the Ministry of Environment, Conservation and Parks (*MECP*) is not anticipated to be required since the proposed sanitary and storm sewer system services one parcel of land and the development does not propose industrial use.

2.0 BACKROUND STUDIES, STANDARDS, AND REFERENCES

2.1 Background Reports / Reference Information

As-built drawings of existing services, provided by the City of Ottawa Information centre, within the vicinity of the proposed site were reviewed in order to identify infrastructure available to service the proposed development.

A topographic survey of the site was completed by Fairhall Moffat & Woodland and dated August 27th, 2022. The Site Plan (A0.01) was prepared by DS Studio and dated June 28th, 2022. A geotechnical report was completed by Gemtec and dated August 31st, 2022.

2.2 Applicable Guidelines and Standards

City of Ottawa:

- Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (*Ottawa Sewer Guidelines*)
  - Technical Bulletin ISTB-2014-01 City of Ottawa, February 2014*. (ISTB-2014-01)*
  - Technical Bulletin PIEDTB-2016-01 City of Ottawa, September 2016. *(PIEDTB-2016-01)*
  - Technical Bulletin ISTB-2018-01 City of Ottawa, January 2018*. (ISTB-2018-01)*
  - Technical Bulletin ISTB-2018-04 City of Ottawa, March 2018. *(ISTB-2018-04)*
  - Technical Bulletin ISTB-2019-02 City of Ottawa, February 2019. *(ISTB-2019-02)*
- Ottawa Design Guidelines – Water Distribution City of Ottawa, July 2010. (*Ottawa Water Guidelines*)
  - Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. *(ISD-2010-2)*
  - Technical Bulletin ISDTB-2014-02 City of Ottawa, May 2014. (ISDTB-2014-02)
  - Technical Bulletin ISTB-2018-02 City of Ottawa, March 2018. *(ISTB-2018-02)*
  - Technical Bulletin ISTB-2021-03 City of Ottawa, August 2021. *(ISTB-2021-03)*

Ministry of Environment, Conservation and Parks:

- Stormwater Planning and Design Manual, Ministry of the Environment, March 2003. *(MECP Stormwater Design Manual)*
- Design Guidelines for Sewage Works, Ministry of the Environment, 2008. (*MECP Sewer Design Guidelines*)

Other:

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

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was held with City staff on August 4th, 2022, regarding the proposed site servicing. Specific design parameters to be incorporated within this design include the following:

- Pre-development and post-development flows shall be calculated using a time of concentration (Tc) no less than 10 minutes.
- Control 5- year post development flows to a total release rate of 35.8 L/s/ha and 100 -year post development flows to a total release rate of 74.2 L/s/ha as per the Kanata South Business Park Stormwater Management Report dated February 1986

4.0 WATERMAIN

4.1 Existing Watermain

The site is located within the 3W pressure zone, as per the Water Distribution System mapping included in *Appendix C*. There is one private hydrant located on site, and one municipal fire hydrant on Terence Matthews Crescent available to service the development.

4.2 Proposed Watermain

It is proposed to service the new addition through the existing building. A mechanical consultant will need to review and confirm if upgrades to the existing building are required.

Table 1, below, summarizes the water supply design criteria obtained from the *Ottawa Water Guidelines* and utilized for the water analysis.

Table 1: Water Supply Design Criteria

Site Area	0.54 ha
Commercial	28,000 L/gross ha/day
Max Day Peaking Factor	1.5 x avg. day
Peak Hour Peaking Factor	1.8 x max. day

The Fire Underwriters Survey 2020 (FUS) method was utilized to estimate the required fire flow for the site. Fire flow requirements were calculated per City of Ottawa Technical Bulletin *ISTB-2018-02*. The following parameters were coordinated with the architect.

- Type of construction – Non-Combustible Construction
- Occupancy Type – Limited Combustible
- Sprinkler Protection – No Sprinkler System

The results of the calculations yielded a required fire flow of *7,000 L/min* (116.67 L/s). The detailed calculations for the FUS can be found in *Appendix C*.

The city provided the estimated water pressures at both the average day scenario, peak hour scenario, and the max day plus fire flow scenario for the demands indicated by the correspondence in *Appendix C*.

Table 2: Summary of Estimated Water Demand

Scenario	Proposed Demands (L/S)	Connection 1 HGL (m H_2O)*/kPa
Average Day Demand	0.05	63.4 / 622.2
Maximum Daily + Fire Flow Demand (FUS)	116.74	57.3 / 562.3
Peak Hourly Demand	0.12	58.9 / 578.0
**Adjusted for an estimated ground elevation of 63.9m above the connection point.*		

The normal operating pressure range is anticipated to be 578.0 kPa to 622.2 kPa and will not be less than 275 kPa (40 psi) or exceed 689 kPa (100 psi). The proposed watermains will meet the minimum required 20 psi (140 kPa) from the *Ottawa Water Guidelines* at the ground level under maximum day demand and fire flow conditions.

To confirm the adequacy of fire flow to protect the proposed development, public fire hydrants within 150 m of the proposed building were analysed per City of Ottawa *ISTB 2018-02* Appendix I Table 1. The results are summarized below.

Table 3: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m (5,700 L/min)	Fire Hydrant(s) within 150m (3,800 L/min)	Combined Fire Flow (L/min.)
2920 Sheffield Road	7,000	FH1	FH2	9500

Based on City guidelines (*ISTB-2018-02*), the existing hydrants provide adequate protection for the proposed development. A hydrant coverage figure can be found in *Appendix C*.

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is an existing 150 mm diameter service connection to the 250 mm diameter PVC sanitary sewer within Terence Matthews Crescent, tributary to the Glen Cairn trunk sewer. The existing service includes a maintenance hole located within the property. No changes are proposed to the existing sanitary sewer system.

5.2 Proposed Sanitary Sewer

A new 150 mm diameter gravity sanitary service will be connected to the existing service at the existing maintenance hole located within the property. Refer to drawing C102 for a detailed servicing layout.

Table 4, below, summarizes the wastewater design criteria identified by the *Ottawa Sewer Guidelines*.

Table 4: Sanitary Design Criteria

Design Parameter	Value
Site Area	0.54 ha
Commercial Area	28,000 L/gross ha/d
Commercial Peaking Factor	1.5
Extraneous Flow Allowance	0.33 L/s/ha

Table 5 below, summarizes the total estimated wastewater flow from the existing and proposed development. Refer to *Appendix D* for detailed calculations.

Table 5: Summary of Estimated Sanitary Flow

Design Parameter	Total Flow (L/s)
Total Estimated Average Dry Weather Flow	0.07
Total Estimated Peak Dry Weather Flow	0.09
Total Estimated Peak Wet Weather Flow	0.25

As noted above, the development is proposed to be serviced via the existing 150 mm sanitary service connection to the 250 mm PVC sanitary sewer south located within Terence Matthews Crescent. The proposed sanitary system will be connected to the existing system at the existing on-site maintenance hole. Due to the complexity of the downstream network the City will need to advise of any downstream constraints.

The flow from the proposed development is constricted on the 150 mm sewer between the proposed MH1 and the existing sanitary maintenance hole. The full flowing capacity of a 150 mm diameter service at a 1.0% slope is estimated to be *15.89 L/s*. Per the Sanitary Sewer Design Sheet included in *Appendix D*, a peak wet weather flow of *0.20 L/s* will be conveyed within the 150 mm diameter service, therefore the proposed system is sufficient sized for the development.

Based on the topographic survey, the existing 150 mm diameter sanitary service has a slope of approximately 2.44% between the existing on-site maintenance hole and the connection to the main. As demonstrated by the Sanitary Sewer Design Sheet included in *Appendix D*, the existing service has sufficient capacity to accommodate the combined flow of *0.25 L/s*.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

Stormwater runoff from the existing building and parking lot is conveyed through a 200-250 mm diameter service connection to the 450 mm diameter concrete storm sewer located within Terence Matthews Crescent. One catch basin maintenance hole and two catch basins are used to collect stormwater runoff. An ICD located in the catch basin maintenance hole restricts flow leaving the site, directing excess runoff to a depressed storage area in front of the existing building.

6.2 Proposed Storm Sewers

The proposed development will be serviced by extending the existing 250 mm service connection to the existing 450 mm diameter storm sewer within Terence Matthews Crescent.

Runoff collected on the roofs of the proposed building will be stored and controlled internally using roof drains. Roof drains will be used to limit the flow from the roof to the specified allowable release rate. For calculation purposes a Watts Accutrol roof drain was used to estimate a reasonable roof flow. Other products may be specified at detailed building design provided release rates and storage volumes are respected. Roof drainage will be conveyed to the proposed structure STMH1, downstream of the ICD.

Runoff from the proposed surface parking lot and landscaped areas will be directed towards catch basins and landscaping catch basins. Storm flows will be controlled by an inlet control device (ICD) within the existing catch basin maintenance hole to limit the flow to the specified allowable release rate.

Foundation drainage is proposed to be conveyed via a 250 mm storm service connected to the proposed maintenance structure STMH1 without flow attenuation.

See CCO-23-0422 - *POST* include in *Appendix F* of this report for more details. The Stormwater Management design for the subject property will be outlined in *Section 7.0* of this report.

7.0 PROPOSED STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

As per *Section 6.2*, stormwater management for the proposed development will be provided by catch basin flow attenuation and roof storage. The controlled stormwater flow will be directed to the existing 450 mm diameter storm sewer within Terence Matthews Crescent.

In summary, the following design criteria have been employed in developing the stormwater management design for the site as directed by the RVCA and City:

Quality Control

- Quality controls are not anticipated to be required based on the South Kanata Business Park Stormwater Management report.

Quantity Control

- Post-development flow to be restricted to 35.8 L/s/ha for the 5-year event and 74.2 L/s/ha for the 100-year event per the South Kanata Business Park Stormwater Management report.

7.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \text{ (L/s)}$$

Where: C = Runoff coefficient
I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)
A = Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected to function as intended. The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Undeveloped and Grass	0.20

As per the *City of Ottawa - Sewer Design Guidelines*, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

7.3 Pre-Development Drainage

As per the previous stormwater management report prepared by D.B. Gray Engineering and included in *Appendix B*, flow attenuation was utilized in the existing design. The pre-development

peak flows are summarized below in *Table 6*. See CCO-23-0422 - *PRE* in *Appendix E* and *Appendix G* for calculations.

Table 6: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Q (L/s)	
		5-Year	100-Year
A1	0.54	32.82	37.87

7.4 Post-Development Drainage

To meet the stormwater objectives, the development will contain flow attenuation via surface storage and rooftop storage.

Based on the criteria listed in *Section 7.1*, the development will be required to restrict flow to the 35.8 L/s/ha for the 5-year event, and 74.2 L/s/ha for the 100-year event. It is estimated that the target release rate during the 100-year event will be *39.89 L/s*. See *Appendix G* for calculations.

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-23-0422 - *POST* in *Appendix F* of this report for more details. A summary of the post-development runoff calculations can be found below.

Table 7: Post-Development Runoff Summary

Drainage Area	Area (ha)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)	100-year Storage Required (m^3)	100-year Storage Available (m^3)
B1	0.08	1.68	3.12	35.50	39.01
B2	0.01	0.36	0.72	4.44	4.89
B3	0.39	12.80	13.33	96.05	96.67
B4	0.05	4.15	8.52	-	-
Total	0.54	18.99	25.69	135.98	140.57

Runoff from areas B1 and B2 will be controlled and stored on the roofs of the proposed building using 4 and 1 roof drains, respectively. Roof drains will be used to limit the flow from the roof to the specified allowable release rate. For calculation purposes a Watts Accutrol roof drain in the fully exposed position was used to estimate a reasonable roof flow. Other products may be specified at detailed building design provided release rates and storage volumes are respected. Runoff from the roof and foundation will be directed to the proposed STMH1, downstream of the ICD.

As seen in *Table 8*, below, roof flow will be restricted to a maximum release rate of 3.84 L/s, allowing for a proposed 43.9 m^3 of roof storage.

Table 8: Roof Drainage Summary

Drainage Area	Area (ha)	# of Roof Drains	Storage Depth (mm)		Flow Per Roof Drain (L/s)		Total Flow Rate (L/s)	
			5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
B1	0.08	4	35	65	0.42	0.78	1.68	3.12
B2	0.01	1	30	60	0.36	0.72	0.36	0.72

Runoff for area B3 will flow overland towards the proposed catch basin systems. Stormwater will be restricted by a Tempest LMF105 ICD (or equivalent product) to a maximum release rate of *13.33 L/s*. The catch basin system will provide *96.67* m^3 of surface storage.

The flow from Area B4 will be unrestricted and maintain existing drainage patterns.

7.5 Quality Control

As noted in *Section 7.1*, quality controls are not anticipated to be required for the development due to the findings of the South Kanata Business Park Stormwater Management Report. Parking lot drainage is directed to an on-site swale and subdrain system that will provide an opportunity for on-site quality treatment before discharging to the municipal system.

8.0 EROSION AND SEDIMENT CONTROL

8.1 Temporary Measures

Before construction begins, temporary silt fence, straw bale or rock flow check dams will be installed at all-natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown on the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion or at the instruction of the City, Conservation Authority or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The rock flow, straw bale & silt fence check dams and barriers shall be inspected weekly and after rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required. Fibre roll barriers are to be installed at all existing curb inlet catch basins and filter fabric is to be placed under the grates of all existing catch basins and manholes along the frontage of the site and any new structures immediately upon installation. The measures for the existing/proposed structures are to be removed only after all areas have been paved. Care shall be taken at the removal stage to ensure that any silt that has accumulated is properly handled and disposed of. Removal of silt fences without prior removal of the sediments shall not be permitted.

Although not anticipated, work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the City and/or Conservation Authority to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as ground conditions warrant. Please see the *Site Grading, Drainage and* Sediment *& Erosion Control Plan* for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

8.2 Permanent Measures

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed/sod and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from any watercourse to ensure that no sediment is washed out into the watercourse. As the vegetation growth within the site provides a key component to the control of sediment for the site, it must be properly maintained once established. Once the construction is complete, it will be up to the landowner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

9.0 SUMMARY

- A new *950 m^2* building addition is proposed to be constructed at 100 Terence Matthews Crescent.
- It is proposed to service the new building through the existing building for water. Storm and sanitary services are proposed to be extended to service the proposed building.
- It is proposed to service the development area via a series of a series of catch basin storage and roof storage. The storm system will connect to the existing 450 mm diameter concrete storm sewer located within Terence Matthews Crescent.
- Storage for the 5- through 100-year storm events will be provided by catch basin storage and rooftop storage.
- Quality controls are not anticipated to be required.

10.0 RECOMMENDATION

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management report in support of the proposed development at 100 Terence Matthews Crescent.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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11.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of DS Studio INC. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Parks and Climate Change, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A
KEY PLAN

McINTOSH PERRY

250 125 0 250

Scale 1:10,000 Metres

LEGEND

- Site Location
- Local Road
- Major Road
- Watercourse
- Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry, 2022.

CLIENT: DS STUDIO

PROJECT: 100 TERENCE MATTHEWS CRESCENT

TITLE: SITE LOCATION

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PROJECT NO: CCO-23-0422		FIGURE:
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GIS	MG	
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APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

File Number: PC2022-0180
August 4, 2022

Pre-Application Consultation Meeting Minutes

Property Address: 100 Terence Matthews
Location: Virtual – Microsoft Teams
Meeting Date: August 4, 2022

City of Ottawa:	Molly Smith – File Lead
	Slema Hassan – Urban Design
	Jeff Goettling – Parks
	Abi Dieme – Infrastructure
	Cam Elsby - Infrastructure
	Steven Payne – Planning Coop
Applicant:	Leila – Project Architect
	Chaya Bhardwaj – Applicant Team
	Mike Lensniewki – Builder
	Gino Aiello – Landscape Architect
	Curtis Melanson – Civil Engineer
	Dian Sarhane – Applicant Team
Regrets:	Neeti Paudel - Transportation

Applicant Comments

1. New application is for a 1 storey, 900m^2 office expansion
2. Parking requirements were met by the previous site plan
3. Not adding a driveway
4. Could this application be included as a revision to the previous site plan application
    a. Original siteplan was done in 2019
    b. File D07-12-19-0031
5. The applicant considering rooftop storage solution for stormwater management

Planning Comments

1. The Site Plan Control application (Standard) will be considered a revision.
2. Please provide an updated planning rationale/brief with the application.
3. The subject lands in the new Official Plan are in Schedule 5 – Suburban (West) Transect, designated as Mixed Industrial.
4. Lands are zoned IP6 – Business Park Industrial Zone, Subzone 6.
5. Please include a zoning stats table on the site plan, including parking provisions.

   a. Please provide accessible stalls near the entrance of the new addition and in accordance with the City's Accessibility Design Standards for stall type and access aisle requirements
   b. Area C – Suburban
   c. Table 101 – Minimum parking space rates for an office is 2.4 per 100 m2 of gross floor area
   d. You will need to provide enough parking for both the existing building and proposed building. Please confirm that all parking has been satisfied from the earlier parking expansion.
6. Please ensure the building abides by setback provisions to avoid having to submit to the Committee of Adjustment.
7. If possible, provide covered bicycle parking on the site.
   a. The subject lands are located along a major bicycle corridor.
   b. Bicycle parking is required at a 1 per 250 m2 of GFA
8. Please confirm on the site plan that garbage is screened from view through an opaque fence.
9. Please provide the proposed walkway width on the site plan.
10. More tree planting along the Western side of the property would bolster environmental screening. If there's adequate space, please include more trees along the rear property line.
11. What is the anticipated timeline for this application?
   a. *The applicant is looking to submit the applications soon with the aspiration to start building early next year*

Feel free to contact Molly Smith, Planner II (File Lead), at Molly.Smith@ottawa.ca for follow-up questions.

Transportation

Staff do not have many concerns with the proposed development. Please see below:

1. TIA will not be required.
2. Noise Impact Study is recommended for the following:
   a) The site is within 100m of Carleton Place rail corridor which is an active corridor
3. On site plan:
   a) The access should be designed as per City standards as per SC7.1
   b) Consider extending the internal pathway to connect to Terence Matthews.
   c) Parking stalls at end of dead end parking stalls and driveways require adequate turning spaces.
   d) Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
   e) Minimum aisle width should be 6.7 m.

Feel free to reach out to Neeti Paudel, Transportation Project Manager, at Neeti.Paudel@ottawa.ca.

Urban Design

1. Urban Design does not have any concerns with the proposed application
2. The applicants will be required to submit a design brief

Feel free to reach out to Selma Hassan, Urban Designer, at Selma.Hassan@ottawa.ca.

Engineering

Infrastructure Information – All existing and proposed utilities (municipal pipes) must be shown on the servicing plans

Water:
District Plan No. 3W
Outstanding frontage fee to be confirmed

The frontage charge is the charge payable by any person applying for a water service connection permit to one of the ROC (Region of Ottawa) financed watermains, based on the frontage of the property to which the service is to be provided. The frontage charge is payable **before the service connection is approved and constructed**. Frontage charges are applicable to all watermains installed after January 1, 1969."

Existing Connection point: 305 DI watermain on Terence Matthews Cres

Demonstrate that the existing private watermain has capacity for the proposed extension. If not, a new connection to the 305mm watermain on Terence Matthews will be required. The existing connection would be blanked at the watermain.

Submission documents must include:

- Boundary conditions (civil consultant to request boundary conditions from the City's assigned Project Manager, Development Review). Water boundary conditions request

must include the location of the service and the expected loads required by the proposed development. Please provide all the following information:

- Location of existing service connection (show on a plan or map)
- Type of development and the amount of fire flow required.
- Average daily demand: ___ l/s.
- Maximum daily demand: ___l/s.
- Maximum hourly daily demand: ___ l/s.
- Supporting Calculations for all demands listed above and required fire flow per the Fire Underwriter Surveys.

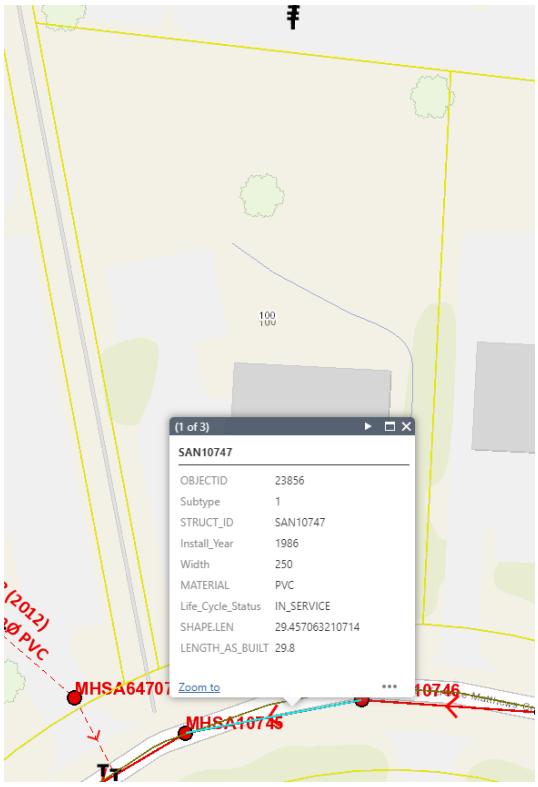
- Watermain system analysis demonstrating adequate pressure per section 4.2.2 of the Water Distribution Guidelines.
- Fire protection (Fire demand, Hydrant Locations). A hydrant coverage table and map demonstrating adequate fire protection shall be included. Please review Technical Bulletin ISTB-2018-02, Appendix I table 1 – maximum flow to be considered from a given hydrant
- Proposed emergency route (to be satisfactory to Fire Services)

Further note that:

- Institutional buildings with a basic day demand greater than 50 m3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area
- A water meter sizing questionnaire (water data card) will have to be completed prior to receiving a water permit (water card will be provided post approval)

Sanitary:

Existing Connection Point: **250mm sanitary main on Terrence Matthews Cres**



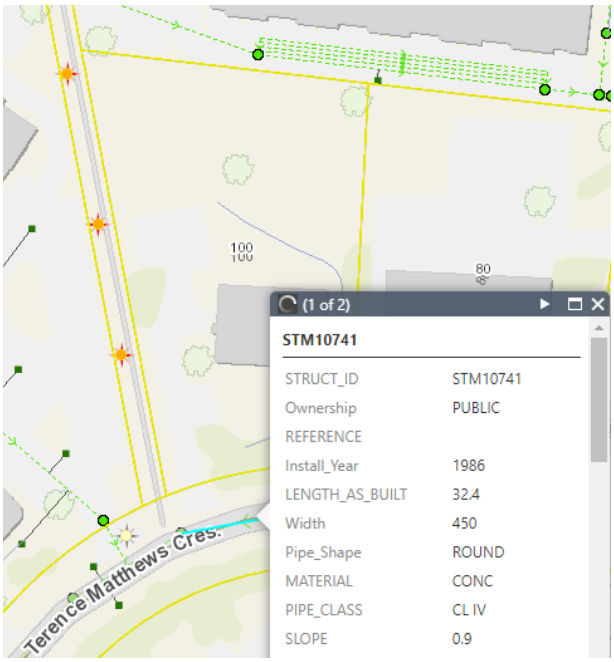
Demonstrate that the existing private sanitary sewer has capacity for the proposed extension. If not, a new connection to the sewer on Terence Matthews will be required. The existing connection would be capped at the property line.

Is a monitoring manhole required on private property? ☒ **Yes** (if not already existing)
☐ **No**

- Provide an analysis to demonstrate that there is adequate residual capacity in the receiving and downstream wastewater system to accommodate the proposed development
- Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

Storm:

Existing Connection Point**:** 450mm storm sewer on Terence Matthews.



Demonstrate that the existing private storm sewer has capacity for the proposed extension. If not, a new connection to the sewer on Terence Matthews will be required. The existing connection would be capped at the property line.

Stormwater Management:

- Quality Control:
  Rideau Valley Conservation Authority to provide criteria.
- Quantity Control:
  - Design storm for receiving sewer: 5-year design storm
  - Runoff coefficient (C): C=0.5 or C=pre-development, whichever is less
  - Time of concentration (Tc): To be calculated, min Tc=10mins
  - Allowable flow rate: 35.8 L/s/ha during the 5-year event
    74.2 L/s/ha during the 100-year event

Additional Notes

- No Capital Works Projects that would impact the application has been identified
- No moratorium that would impact the application has been identified
- Any easement identified should be shown on all plans

Refer to following list of required supporting plans and studies required for the infrastructure component of your submission

For information on preparing required studies and plans refer to:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

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)

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).

Feel free to reach out to Abibatou Dieme, Project Manager, at Abibatou.Dieme@ottawa.ca.

Parks

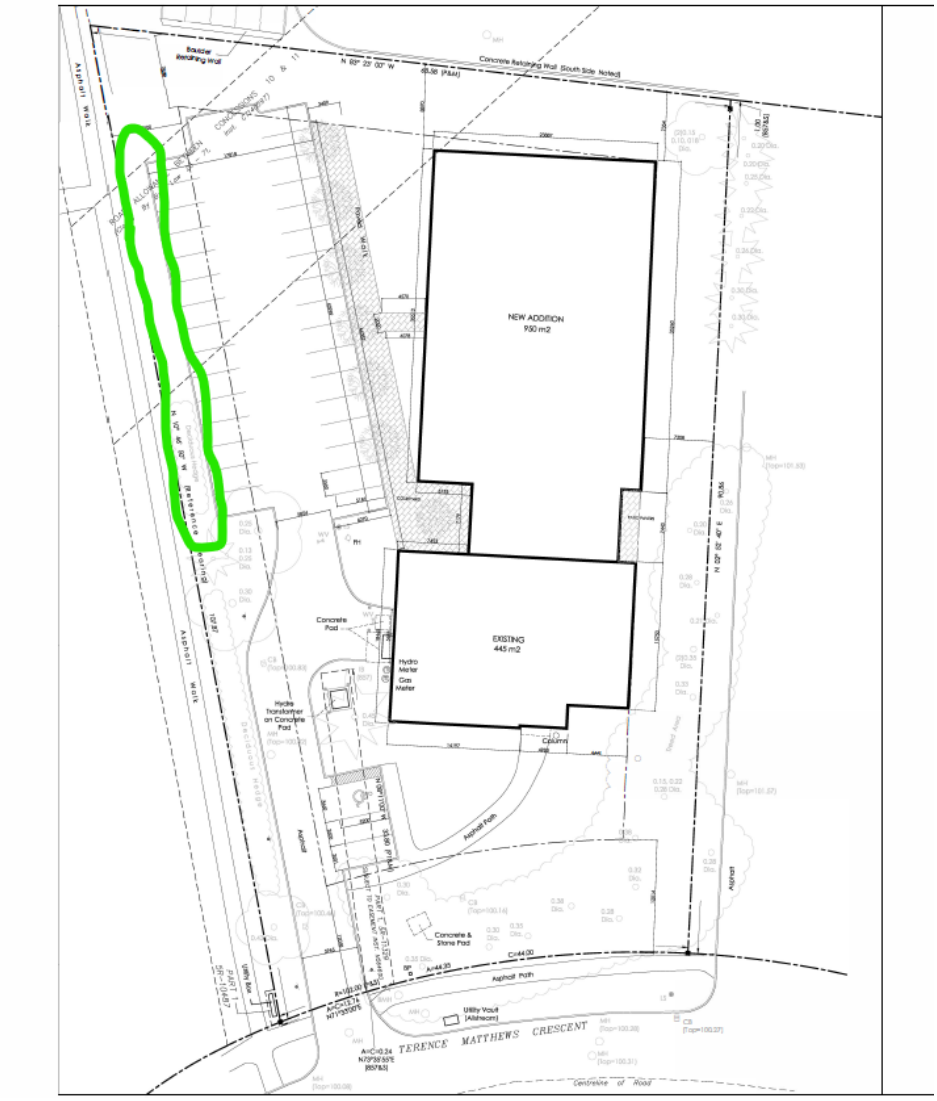
1. Cash-in-lieu of parkland and associated appraisal fee will be required as a condition of approval as per the Parkland Dedication (By-law No. 2009-95) | City of Ottawa. Value of noted lands to be appraised through a Real Estate Valuation Advisor within the Planning Real Estate & Eco Development Department. The exact amount will be identified as a condition of site plan approval.
2. For Commercial and industrial purposes, the parkland requirement is calculated as 2% of the gross site land area.
3. The conveyance of land for purposes or the payment of money in-lieu of accepting the conveyance is not required for development, redevelopment, subdivisions or consents, where it is known, or can be demonstrated that the required parkland conveyance or money in-lieu thereof has been previously satisfied. The onus is on the proponent to provide this information.
4. Parks and Facilities Planning requests that the proponent describe within the planning rationale or by other means how the application will meet the Parkland Dedication (By-law No. 2009-95) requirements.
5. Parks and Facilities Planning is currently undertaking a legislated review for the replacement of the Parkland Dedication By-law, with the new by-law to be considered by City Council in early July 2022. To ensure you are aware of parkland dedication requirements for your proposed development, we encourage you to familiarize yourself with the existing Parkland Dedication By-law and to sign up for project notifications on the Engage Ottawa project page.

Feel free to reach out to Jeff Goettling, Planner II, at Jeff.Goettling@ottawa.ca.

Environmental Planning

1. Applicant is encouraged to plant more locally appropriate native trees on the property. Especially, along the western boundary between their parking lot and the

pathway (marked in green below). This will not only contribute to the urban canopy, reduce the heat island effect and help remove air particulates but it will offer shading to parked vehicles.



Forestry

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. As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (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. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
5. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
6. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
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 Tree Protection Specification or by searching Ottawa.ca
    a. the location of tree protection fencing must be shown on a plan
    b. show the critical root zone of the retained trees
    c. if excavation will occur within the critical root zone, please show the limits of excavation

Landscape Plan tree planting requirements:

For additional information on the following please contact adam.palmer@Ottawa.ca

Ensure that tree planting opportunities are maximized.

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
- Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

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 include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

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 ensure adequate soil volumes are 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

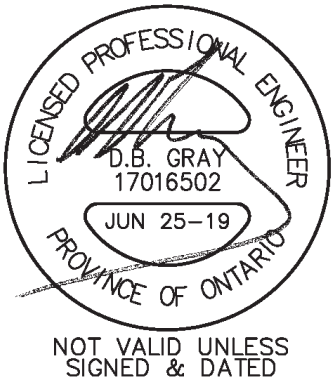
Please contact Planning Forester Mark Richardson (Mark.Richardson@ottawa.ca) for follow-up questions.

STORMWATER MANAGEMENT REPORT

100 Terence Matthews Crescent
Kanata (Ottawa), Ontario

Report No. 18034

February 28, 2019
Revised June 25, 2019



D. B. GRAY ENGINEERING INC.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
dbgray@rogers.com

STORMWATER MANAGEMENT REPORT

100 Terence Matthews Crescent
Kanata (Ottawa), Ontario

This report addresses the stormwater management requirements of a 5,410 sq.m. property located at 100 Terence Matthews Crescent in Kanata. There are no proposed changes to the existing 604 sq.m. building. The existing parking area is proposed to be expanded. There is an existing stormwater detention area (depressed grassed area) in the front yard.

This report forms part of the stormwater management design for the proposed development. Also refer to drawings C-1 to C-4 prepared by D. B. Gray Engineering Inc.

Water Quality:

There are no existing on-site quality control measures and no permanent measures are proposed.

An erosion and sediment control plan has been developed to be implemented during construction, (see drawing C-3 and notes 2.1 to 2.4 on drawing C-2). In summary: to filter out construction sediment a filter sock inserts will be installed in all existing on-site and catch basins adjacent to the site.

Water Quantity:

The subject property is located in the Kanata South Business Park. As per "Engineering Guidelines For Lot Development In Kanata South Business Park", prepared by A.J. Robinson & Associates Inc., the maximum allowable release rate for the 1:100-year storm event is 74.2 l/s/ha and for the 1:5-year event it is 35.8 l/s/ha. Therefore for the subject property the maximum allowable release rate should be 40.14 l/s and 19.37 l/s for the 100-year and 5-year storm sewer respectively. To achieve the 1:100-year release rate it is calculated that the required storage volume should have been 33.74 cu.m. However, as per the original 1986 design (see Otto + Bryden drawings A.1 & G.1) only 29.50 cu.m. was provided. Furthermore, while it is calculated that the original orifice restricted the 100-year flow to 36.90 l/s (less than the maximum allowable of 40.14 l/s) to achieve this flow rate 36.65 cu.m. of storage should have been provided. In addition it is calculated that the original design only restricted the 5-year release rate to 32.82 l/s (about 170% of the allowable of 19.37 l/s). In 1986 the runoff coefficients for the 100-year event were generally not increased by 25% (to maximum 1.00) as is currently required. If the runoff coefficients were increased, the required storage would be 46.99 cu.m. but as previously stated only 29.50 cu.m. was provided.

The proposed stormwater quantity control measures detailed in this report are based on the criteria that the new release rates are equal to or less than the current release rates while providing sufficient storage to achieve the proposed release rates.

Calculations are based on the Rational Method. The runoff coefficients for the 100 year event are increased by 25% to maximum 1.00.

Drainage Area I (Uncontrolled Flow Off Site – 655 sq.m.):
The runoff from the perimeter of the site (about 16% of the total) is currently allowed to flow uncontrolled off the site. It is proposed that this area will be reduced to about 12% of the total.

	Existing		Proposed	
	100-year	5-year	100-year	5-year
The maximum flow rate:	10.22 l/s	4.90 l/s	8.02 l/s	3.87 l/s

Drainage Area II (4,755 sq.m.):
An inlet control device (ICD) located in the outlet pipe of an existing on-site catch basin manhole (CB/MH-2) currently controls the release of stormwater from the site. It is proposed that the existing ICD be removed and replaced. The ICD currently restricts the flow and forces the stormwater to back up into the stormwater detention area. It is proposed that the stormwater detention area be modified to increase the storage capacity. The ICD shall be a plug style with a round orifice design manufactured by Pedro Plastics (or approved equal manufactured by IPEX) and shall be sized by the manufacturer for a discharge rate of 29.84 l/s at 2.74m head. It is calculated that an orifice area of 6,678 sq.mm. (±92 mm diameter) and a discharge coefficient of 0.61 will restrict the outflow rate to 29.84 l/s at a head of 2.74m. Based on this orifice the maximum outflow rate for the 1:5 year storm event is calculated to be 28.95 l/s at 2.57 m. To achieve these release rates the maximum storage volume of the detention area increases from 29.50 cu.m. to 68.66 cu.m.

	Existing		Proposed	
	100-year	5-year	100-year	5-year
Uncontrolled flow off site:	10.22 l/s	4.90 l/s	8.02 l/s	3.87 l/s
The max. ICD release rate:	28.53 l/s	27.92 l/s	29.84 l/s	28.95 l/s
	38.74 l/s	32.82 l/s	37.87 l/s	32.82 l/s
The max. stored volume:	29.50 m^3	13.55 m^3	68.66 m^3	22.23 m^3

Therefore:
The existing release rate for the 100-year storm event for the site is 38.74 l/s and the proposed release rate is 37.87 l/s (less than the existing).
The existing release rate for the 5-year storm event for the site is 32.82 l/s and the proposed release rate is also calculated to be 32.82 l/s (equal to the existing).

CONCLUSION:

1. With the proposed modifications to the existing stormwater management facility the release rates will be less than or equal to the existing release rates.

STORMWATER MANAGEMENT CALCULATIONS

The orifice calculations are based on the following formula:

$$Q = C_d \times A_o \sqrt{2gh} \times 1000$$

where:

Q = flowrate in litres per second
C_d = coefficient of discharge
A_o = orifice area in sq.m.
g = 9.81 m/s2
h = head above orifice in meters

Storage calculations for the stormwater detention area are based on the following formulas for volume of a cone and for volume of a prismodal shape:

Volume of a Cone Formula:

$$V = (A \times d)/3$$

where:

V = volume in cu.m.
A = ponding area in sq.m.
d = ponding depth in meters

Volume of a Prismodal Formula:
(accurate if both length and width are changing proportionally)

$$V = (A_{top} + A_{bottom} + (A_{top} \times A_{bottom}))^{0.5}) / 3 \times d$$

where:

V = volume in cu.m.
A_{top} = area of pond in sq.m.
A_{bottom} = area of bottom of depressed area
d = ponding depth in meters

Summary Table

ONE HUNDRED-YEAR EVENT

DRAINAGE AREA	A.J. Robinson Criteria Release Rate (74.2 l/s/ha)	Original Design Release Rate	Original Design Release Rate (C-values Increased)	Proposed Maximum Release Rate	A.J. Robinson Criteria (74.2 l/s/ha) Required Volume	Original Design Volume	Original Design (C-values Increased) Volume Provided	Proposed Maximum Volume Required & Provided
	l/s	l/s	l/s	l/s	cu.m.	cu.m.	cu.m.	cu.m.
ORIGINAL AREA 'A' or AREA I (Uncontrolled flow off site)	8.38	8.38	10.22	8.02	-	-	-	-
ORIGINAL AREA 'B' or AREA II	31.77	28.53	28.53	29.84	33.74	Required 36.65 Provided 29.50	Required 46.99 Provided 29.50	68.66
TOTAL	40.14	36.90	38.74	37.87	33.74	29.50	29.50	68.66

FIVE-YEAR EVENT

DRAINAGE AREA	A.J. Robinson Criteria Release Rate (74.2 l/s/ha)	Original Design Release Rate		Proposed Maximum Release Rate	A.J. Robinson Criteria (74.2 l/s/ha) Required Volume	Original Design Volume		Proposed Maximum Volume Required & Provided
	l/s	l/s		l/s	cu.m.	cu.m.		cu.m.
ORIGINAL AREA 'A' or AREA I (Uncontrolled flow off site)	4.90	4.90		3.87	-	-		-
ORIGINAL AREA 'B' or AREA II	14.47	27.92		28.95	23.49	13.55		22.23
TOTAL	19.37	32.82		32.82	23.49	13.55		22.23

100 Terence Matthews Crescent
Ottawa, Ontario

STORM WATER MANAGEMENT CALCULATIONS
Rational Method

ONE HUNDRED-YEAR EVENT

A.J. Robinson CRITERIA DESIGN

(As per Engineering Guidelines For Lot Development In Kanata South Business Park" prepared by A.J. Robinson & Associates Inc.)

RELEASE RATE CRTIERIA:	74.2	l/s/ha
SITE AREA	0.541	ha
MAXIMUM ALLOWABLE RELEASE RATE	40.14	l/s

DRAINAGE AREA A (Uncontrolled Flow Off Site):

			C
Roof Area:	0	sq.m.	0.90
Asphalt/Concrete Area:	51	sq.m.	0.90
Landscaped Areas:	825	sq.m.	0.20
Total Catchment Area:	876	sq.m.	0.24

Area (A):	876	sq.m.
Time of Concentration:	15	min.
Rainfall Intensity (i):	143	mm/hr (100-year event)
Runoff Coeficient (C):	0.24	
Flow Rate (2.78AiC):	8.38	l/s

DRAINAGE AREA B

(A.J. Robinson Criteria Release Rate (74.2 l/s/ha) - ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	469	sq.m.	0.90
Asphalt/Concrete Area:	726	sq.m.	0.90
Landscaped Areas:	3339	sq.m.	0.20
Total Catchment Area:	4534	sq.m.	0.38

Water Elevation:	100.66	m
Centroid of ICD Orifice:	97.96	m
(ICD in Outlet Pipe of CB/MH-2):		
Head:	2.70	m
Orifice Area:	7155	sq.mm.
Coefficient of Discharge:	0.610	
Maximum Release Rate:	31.77	l/s

DETENTION AREA Volume Provided: 29.50 cu.m.

Max. Vol. Required: 33.74 cu.m.

Time	i	2.78AiC	Release Rate	Stored Rate	Stored Volume
min.	mm/hr	l/s	l/s	l/s	cu.m.
5	243	117.62	31.77	85.86	25.76
10	179	86.54	31.77	54.77	32.86
15	143	69.25	31.77	37.49	33.74
20	120	58.13	31.77	26.37	31.64
25	104	50.33	31.77	18.56	27.84
30	92	44.52	31.77	12.76	22.96
35	83	40.02	31.77	8.25	17.33
40	75	36.42	31.77	4.65	11.16
45	69	33.46	31.77	1.70	4.58
50	64	30.99	30.99	0.00	0.00
55	60	28.90	28.90	0.00	0.00
60	56	27.09	27.09	0.00	0.00
65	53	25.51	25.51	0.00	0.00
70	50	24.13	24.13	0.00	0.00
75	47	22.90	22.90	0.00	0.00
80	45	21.80	21.80	0.00	0.00
85	43	20.82	20.82	0.00	0.00
90	41	19.92	19.92	0.00	0.00
95	39	19.11	19.11	0.00	0.00
100	38	18.37	18.37	0.00	0.00
105	36	17.69	17.69	0.00	0.00
110	35	17.06	17.06	0.00	0.00
115	34	16.48	16.48	0.00	0.00
120	33	15.94	15.94	0.00	0.00
125	32	15.44	15.44	0.00	0.00
130	31	14.97	14.97	0.00	0.00
135	30	14.54	14.54	0.00	0.00
140	29	14.13	14.13	0.00	0.00
145	28	13.74	13.74	0.00	0.00
150	28	13.38	13.38	0.00	0.00
180	24	11.58	11.58	0.00	0.00
210	21	10.25	10.25	0.00	0.00
240	19	9.21	9.21	0.00	0.00
270	17	8.38	8.38	0.00	0.00
300	16	7.70	7.70	0.00	0.00

ONE HUNDRED-YEAR EVENT

APPROXIMATE ORIGINAL DESIGN -1986

DRAINAGE AREA A (Uncontrolled Flow Off Site):

			C
Roof Area:	0	sq.m.	0.90
Asphalt/Concrete Area:	51	sq.m.	0.90
Landscaped Areas:	825	sq.m.	0.20
Total Catchment Area:	876	sq.m.	0.24
Area (A):	876	sq.m.	
Time of Concentration:	15	min.	
Rainfall Intensity (i):	143	mm/hr (100-year event)	
Runoff Coeficient (C):	0.24		
Flow Rate (2.78AiC):	8.38	l/s	

DRAINAGE AREA B

(APPROXIMATE ORIGINAL DESIGN - 1986 - ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	469	sq.m.	0.90
Asphalt/Concrete Area:	726	sq.m.	0.90
Landscaped Areas:	3339	sq.m.	0.20
Total Catchment Area:	4534	sq.m.	0.38

Water Elevation:	100.66	m
Centroid of ICD Orifice: (ICD in Outlet Pipe of CB/MH-2):	97.96	m
Head:	2.70	m
Orifice Area:	6425	sq.mm.
Coefficient of Discharge:	0.610	
Maximum Release Rate:	28.53	l/s

DETENTION AREA Volume Provided: 29.50 cu.m.

Max. Vol. Required: 36.65 cu.m.

Time min.	i mm/hr	2.78AiC l/s	Release Rate l/s	Stored Rate l/s	Stored Volume cu.m.
5	243	117.62	28.53	89.10	26.73
10	179	86.54	28.53	58.01	34.81
15	143	69.25	28.53	40.73	36.65
20	120	58.13	28.53	29.61	35.53
25	104	50.33	28.53	21.80	32.70
30	92	44.52	28.53	16.00	28.79
35	83	40.02	28.53	11.50	24.14
40	75	36.42	28.53	7.89	18.94
45	69	33.46	28.53	4.94	13.33
50	64	30.99	28.53	2.47	7.41
55	60	28.90	28.53	0.37	1.22
60	56	27.09	27.09	0.00	0.00
65	53	25.51	25.51	0.00	0.00
70	50	24.13	24.13	0.00	0.00
75	47	22.90	22.90	0.00	0.00
80	45	21.80	21.80	0.00	0.00
85	43	20.82	20.82	0.00	0.00
90	41	19.92	19.92	0.00	0.00
95	39	19.11	19.11	0.00	0.00
100	38	18.37	18.37	0.00	0.00
105	36	17.69	17.69	0.00	0.00
110	35	17.06	17.06	0.00	0.00
115	34	16.48	16.48	0.00	0.00
120	33	15.94	15.94	0.00	0.00
125	32	15.44	15.44	0.00	0.00
130	31	14.97	14.97	0.00	0.00
135	30	14.54	14.54	0.00	0.00
140	29	14.13	14.13	0.00	0.00
145	28	13.74	13.74	0.00	0.00
150	28	13.38	13.38	0.00	0.00
180	24	11.58	11.58	0.00	0.00
210	21	10.25	10.25	0.00	0.00
240	19	9.21	9.21	0.00	0.00
270	17	8.38	8.38	0.00	0.00
300	16	7.70	7.70	0.00	0.00

ONE HUNDRED-YEAR EVENT

APPROXIMATE ORIGINAL DESIGN
(RUNOFF COEFFICIENTS INCREASED BY 25% TO MAXIMUM OF 1.00)

DRAINAGE AREA A (Uncontrolled Flow Off Site):

			C
Roof Area:	0	sq.m.	1.00
Asphalt/Concrete Area:	51	sq.m.	1.00
Landscaped Areas:	825	sq.m.	0.25
Total Catchment Area:	876	sq.m.	0.29
Area (A):	876	sq.m.	
Time of Concentration:	15	min.	
Rainfall Intensity (i):	143	mm/hr (100-year event)	
Runoff Coeficient (C):	0.29		
Flow Rate (2.78AiC):	10.22	l/s	

DRAINAGE AREA B

(APPROXIMATE ORIGINAL DESIGN - 1986 - C-VALUES INCREASED - ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	469	sq.m.	1.00
Asphalt/Concrete Area:	726	sq.m.	1.00
Landscaped Areas:	3339	sq.m.	0.25
Total Catchment Area:	4534	sq.m.	0.45

Water Elevation:	100.66	m
Centroid of ICD Orifice: (ICD in Outlet Pipe of CB/MH-2):	97.96	m
Head:	2.70	m
Orifice Area:	6425	sq.mm.
Coefficient of Discharge:	0.610	
Maximum Release Rate:	28.53	l/s

DETENTION AREA Volume Provided: 29.50 cu.m.

Max. Vol. Required: 46.99 cu.m.

Time min.	i mm/hr	2.78AiC l/s	Release Rate l/s	Stored Rate l/s	Stored Volume cu.m.
5	243	136.95	28.53	108.43	32.53
10	179	100.76	28.53	72.23	43.34
15	143	80.63	28.53	52.11	46.89
20	120	67.68	28.53	39.16	46.99
25	104	58.60	28.53	30.07	45.11
30	92	51.84	28.53	23.31	41.96
35	83	46.60	28.53	18.07	37.95
40	75	42.40	28.53	13.88	33.30
45	69	38.96	28.53	10.44	28.18
50	64	36.09	28.53	7.56	22.69
55	60	33.64	28.53	5.12	16.89
60	56	31.54	28.53	3.01	10.85
65	53	29.71	28.53	1.18	4.61
70	50	28.09	28.09	0.00	0.00
75	47	26.66	26.66	0.00	0.00
80	45	25.39	25.39	0.00	0.00
85	43	24.24	24.24	0.00	0.00
90	41	23.20	23.20	0.00	0.00
95	39	22.25	22.25	0.00	0.00
100	38	21.39	21.39	0.00	0.00
105	36	20.59	20.59	0.00	0.00
110	35	19.86	19.86	0.00	0.00
115	34	19.19	19.19	0.00	0.00
120	33	18.56	18.56	0.00	0.00
125	32	17.98	17.98	0.00	0.00
130	31	17.43	17.43	0.00	0.00
135	30	16.93	16.93	0.00	0.00
140	29	16.45	16.45	0.00	0.00
145	28	16.00	16.00	0.00	0.00
150	28	15.58	15.58	0.00	0.00
180	24	13.49	13.49	0.00	0.00
210	21	11.93	11.93	0.00	0.00
240	19	10.72	10.72	0.00	0.00
270	17	9.76	9.76	0.00	0.00
300	16	8.97	8.97	0.00	0.00

ONE HUNDRED-YEAR EVENT

PROPOSED DESIGN

DRAINAGE AREA I (Uncontrolled Flow Off Site):

			C
Roof Area:	0	sq.m.	1.00
Asphalt/Concrete Area:	51	sq.m.	1.00
Landscaped Areas:	604	sq.m.	0.25
Total Catchment Area:	655	sq.m.	0.31
Area (A):	655	sq.m.	
Time of Concentration:	15	min.	
Rainfall Intensity (i):	143	mm/hr (100 year event)	
Runoff Coeficient (C):	0.31		
Flow Rate (2.78AiC):	8.02	l/s	

DRAINAGE AREA II

(PROPOSED DESIGN - ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	469	sq.m.	1.00
Asphalt/Concrete Area:	1427	sq.m.	1.00
Landscaped Areas:	2859	sq.m.	0.25
Total Catchment Area:	4755	sq.m.	0.55

Water Elevation: 100.50 m

Centroid of ICD Orifice: 97.76 m
(ICD in Outlet Pipe of CB/MH-2):

Head: 2.74 m

Orifice Diameter: 92 mm

Orifice Area: 6678 sq.mm.

Coefficient of Discharge: 0.610

Maximum Release Rate: 29.84 l/s

DETENTION AREA

Area sq.m.	Depth m		
334	0.34	68.66	cu.m.

Achieved Vol: 68.66 cu.m.

Max. Vol. Required: 68.66 cu.m.

Time min.	i mm/hr	2.78AiC l/s	Release Rate l/s	Stored Rate l/s	Stored Volume cu.m.
5	243	176.15	29.84	146.31	43.89
10	179	129.60	29.84	99.75	59.85
15	143	103.71	29.84	73.87	66.48
20	120	87.06	29.84	57.22	68.66
25	104	75.37	29.84	45.53	68.29
30	92	66.68	29.84	36.83	66.30
35	83	59.93	29.84	30.09	63.19
40	75	54.54	29.84	24.70	59.27
45	69	50.12	29.84	20.27	54.74
50	64	46.42	29.84	16.57	49.72
55	60	43.27	29.84	13.43	44.32
60	56	40.57	29.84	10.72	38.61
65	53	38.21	29.84	8.37	32.63
70	50	36.14	29.84	6.29	26.43
75	47	34.30	29.84	4.45	20.04
80	45	32.65	29.84	2.81	13.49
85	43	31.18	29.84	1.33	6.79
90	41	29.84	29.84	0.00	0.00
95	39	28.62	28.62	0.00	0.00
100	38	27.51	27.51	0.00	0.00
105	36	26.49	26.49	0.00	0.00
110	35	25.55	25.55	0.00	0.00
115	34	24.68	24.68	0.00	0.00
120	33	23.87	23.87	0.00	0.00
125	32	23.12	23.12	0.00	0.00
130	31	22.43	22.43	0.00	0.00
135	30	21.77	21.77	0.00	0.00
140	29	21.16	21.16	0.00	0.00
145	28	20.58	20.58	0.00	0.00
150	28	20.04	20.04	0.00	0.00
180	24	17.35	17.35	0.00	0.00
210	21	15.35	15.35	0.00	0.00
240	19	13.79	13.79	0.00	0.00
270	17	12.55	12.55	0.00	0.00
300	16	11.53	11.53	0.00	0.00

FIVE-YEAR EVENT

A.J. Robinson CRITERIA DESIGN

(As per Engineering Guidelines For Lot Development In Kanata South Business Park" prepared by A.J. Robinson & Associates Inc.)

RELEASE RATE CRTIERIA:	35.8	l/s/ha
SITE AREA	0.541	ha
MAXIMUM ALLOWABLE RELEASE RATE	19.37	l/s

DRAINAGE AREA A (Uncontrolled Flow Off Site):

			C
Roof Area:	0	sq.m.	0.90
Asphalt/Concrete Area:	51	sq.m.	0.90
Landscaped Areas:	825	sq.m.	0.20
Total Catchment Area:	876	sq.m.	0.24

Area (A):	876	sq.m.
Time of Concentration:	15	min.
Rainfall Intensity (i):	84	mm/hr (5-year event)
Runoff Coeficient (C):	0.24	
Flow Rate (2.78AiC):	4.90	l/s

DRAINAGE AREA B

(A.J. Robinson Criteria Release Rate (35.8 l/s/ha) - FIVE-YEAR EVENT)

			C
Roof Area:	469	sq.m.	0.90
Asphalt/Concrete Area:	726	sq.m.	0.90
Landscaped Areas:	3339	sq.m.	0.20
Total Catchment Area:	4534	sq.m.	0.38

Approximate Water Elevation:	100.62	m
Centroid of ICD Orifice: (ICD in Outlet Pipe of CB/MH-2):	97.96	m
Head:	2.66	m
Orifice Area:	3282	sq.mm.
Coefficient of Discharge:	0.610	
Maximum Release Rate:	14.47	l/s

DETENTION AREA Volume: 23.49 cu.m.

Max. Vol. Required: 23.49 cu.m.

Time min.	i mm/hr	2.78AiC l/s	Release Rate l/s	Stored Rate l/s	Stored Volume cu.m.
5	141	68.42	14.47	53.95	16.18
10	104	50.50	14.47	36.02	21.61
15	84	40.49	14.47	26.02	23.42
20	70	34.05	14.47	19.57	23.49
25	61	29.51	14.47	15.04	22.56
30	54	26.14	14.47	11.66	20.99
35	49	23.51	14.47	9.04	18.99
40	44	21.41	14.47	6.94	16.66
45	41	19.69	14.47	5.22	14.09
50	38	18.25	14.47	3.78	11.33
55	35	17.02	14.47	2.55	8.41
60	33	15.97	14.47	1.49	5.38
65	31	15.04	14.47	0.57	2.23
70	29	14.23	14.23	0.00	0.00
75	28	13.52	13.52	0.00	0.00
80	27	12.87	12.87	0.00	0.00
85	25	12.29	12.29	0.00	0.00
90	24	11.77	11.77	0.00	0.00
95	23	11.29	11.29	0.00	0.00
100	22	10.86	10.86	0.00	0.00
105	22	10.46	10.46	0.00	0.00
110	21	10.09	10.09	0.00	0.00
115	20	9.75	9.75	0.00	0.00
120	19	9.43	9.43	0.00	0.00
125	19	9.14	9.14	0.00	0.00
130	18	8.87	8.87	0.00	0.00
135	18	8.61	8.61	0.00	0.00
140	17	8.37	8.37	0.00	0.00
145	17	8.14	8.14	0.00	0.00
150	16	7.93	7.93	0.00	0.00
180	14	6.87	6.87	0.00	0.00
210	13	6.08	6.08	0.00	0.00
240	11	5.47	5.47	0.00	0.00
270	10	4.98	4.98	0.00	0.00
300	9	4.58	4.58	0.00	0.00

FIVE-YEAR EVENT

APPROXIMATE ORIGINAL DESIGN -1986

DRAINAGE AREA A (Uncontrolled Flow Off Site):

			C
Roof Area:	0	sq.m.	0.90
Asphalt/Concrete Area:	51	sq.m.	0.90
Landscaped Areas:	825	sq.m.	0.20
Total Catchment Area:	876	sq.m.	0.24

Area (A):	876	sq.m.
Time of Concentration:	15	min.
Rainfall Intensity (i):	84	mm/hr (5-year event)
Runoff Coeficient (C):	0.24	
Flow Rate (2.78AiC):	4.90	l/s

DRAINAGE AREA B

(APPROXIMATE ORIGINAL DESIGN - 1986 - FIVE-YEAR EVENT)

			C
Roof Area:	469	sq.m.	0.90
Asphalt/Concrete Area:	726	sq.m.	0.90
Landscaped Areas:	3339	sq.m.	0.20
Total Catchment Area:	4534	sq.m.	0.38

Approximate Water Elevation:	100.55	m
Centroid of ICD Orifice: (ICD in Outlet Pipe of CB/MH-2):	97.96	m
Head:	2.59	m
Orifice Area:	6425	sq.mm.
Coefficient of Discharge:	0.610	
Maximum Release Rate:	27.92	l/s

DETENTION AREA Volume: 13.55 cu.m.

Max. Vol. Required: 13.55 cu.m.

Time	i	2.78AiC	Release Rate	Stored Rate	Stored Volume
min.	mm/hr	l/s	l/s	l/s	cu.m.
5	141	68.42	27.92	40.50	12.15
10	104	50.50	27.92	22.58	13.55
15	84	40.49	27.92	12.58	11.32
20	70	34.05	27.92	6.13	7.36
25	61	29.51	27.92	1.60	2.39
30	54	26.14	26.14	0.00	0.00
35	49	23.51	23.51	0.00	0.00
40	44	21.41	21.41	0.00	0.00
45	41	19.69	19.69	0.00	0.00
50	38	18.25	18.25	0.00	0.00
55	35	17.02	17.02	0.00	0.00
60	33	15.97	15.97	0.00	0.00
65	31	15.04	15.04	0.00	0.00
70	29	14.23	14.23	0.00	0.00
75	28	13.52	13.52	0.00	0.00
80	27	12.87	12.87	0.00	0.00
85	25	12.29	12.29	0.00	0.00
90	24	11.77	11.77	0.00	0.00
95	23	11.29	11.29	0.00	0.00
100	22	10.86	10.86	0.00	0.00
105	22	10.46	10.46	0.00	0.00
110	21	10.09	10.09	0.00	0.00
115	20	9.75	9.75	0.00	0.00
120	19	9.43	9.43	0.00	0.00
125	19	9.14	9.14	0.00	0.00
130	18	8.87	8.87	0.00	0.00
135	18	8.61	8.61	0.00	0.00
140	17	8.37	8.37	0.00	0.00
145	17	8.14	8.14	0.00	0.00
150	16	7.93	7.93	0.00	0.00
180	14	6.87	6.87	0.00	0.00
210	13	6.08	6.08	0.00	0.00
240	11	5.47	5.47	0.00	0.00
270	10	4.98	4.98	0.00	0.00
300	9	4.58	4.58	0.00	0.00

FIVE-YEAR EVENT

PROPOSED DESIGN

DRAINAGE AREA I (Uncontrolled Flow Off Site):

			C
Roof Area:	0	sq.m.	0.90
Asphalt/Concrete Area:	51	sq.m.	0.90
Landscaped Areas:	604	sq.m.	0.20
Total Catchment Area:	655	sq.m.	0.25

Area (A):	655	sq.m.
Time of Concentration:	15	min.
Rainfall Intensity (i):	84	mm/hr (5-year event)
Runoff Coeficient (C):	0.25	
Flow Rate (2.78AiC):	3.87	l/s

DRAINAGE AREA II

(PROPOSED DESIGN - FIVE-YEAR EVENT)

			C
Roof Area:	469	sq.m.	0.90
Asphalt/Concrete Area:	1427	sq.m.	0.90
Landscaped Areas:	2859	sq.m.	0.20
Total Catchment Area:	4755	sq.m.	0.48

Water Elevation: 100.33 m

Centroid of ICD Orifice: 97.76 m
(ICD in Outlet Pipe of CB/MH-2):

Head: 2.57 m

Orifice Diameter: 92 mm

Orifice Area: 6678 sq.mm.

Coefficient of Discharge: 0.610

Maximum Release Rate: 28.95 l/s

DETENTION AREA

Area sq.m.	Depth m		
243	0.17	22.23	cu.m.

Achieved Vol: 22.23 cu.m.

Max. Vol. Required: 22.23 cu.m.

Time min.	i mm/hr	2.78AiC l/s	Release Rate l/s	Stored Rate l/s	Stored Volume cu.m.
5	141	89.41	28.95	60.47	18.14
10	104	65.99	28.95	37.04	22.23
15	84	52.92	28.95	23.97	21.58
20	70	44.49	28.95	15.55	18.66
25	61	38.57	28.95	9.62	14.43
30	54	34.15	28.95	5.21	9.37
35	49	30.73	28.95	1.78	3.74
40	44	27.98	27.98	0.00	0.00
45	41	25.73	25.73	0.00	0.00
50	38	23.85	23.85	0.00	0.00
55	35	22.25	22.25	0.00	0.00
60	33	20.86	20.86	0.00	0.00
65	31	19.66	19.66	0.00	0.00
70	29	18.60	18.60	0.00	0.00
75	28	17.66	17.66	0.00	0.00
80	27	16.82	16.82	0.00	0.00
85	25	16.07	16.07	0.00	0.00
90	24	15.38	15.38	0.00	0.00
95	23	14.76	14.76	0.00	0.00
100	22	14.19	14.19	0.00	0.00
105	22	13.67	13.67	0.00	0.00
110	21	13.19	13.19	0.00	0.00
115	20	12.74	12.74	0.00	0.00
120	19	12.33	12.33	0.00	0.00
125	19	11.95	11.95	0.00	0.00
130	18	11.59	11.59	0.00	0.00
135	18	11.25	11.25	0.00	0.00
140	17	10.94	10.94	0.00	0.00
145	17	10.64	10.64	0.00	0.00
150	16	10.36	10.36	0.00	0.00
180	14	8.98	8.98	0.00	0.00
210	13	7.95	7.95	0.00	0.00
240	11	7.15	7.15	0.00	0.00
270	10	6.51	6.51	0.00	0.00
300	9	5.99	5.99	0.00	0.00

25-Jun-19

100 Terence Mathews Crescent
Ottawa, Ontario

TIME OF CONCENTRATION CALCULATIONS

			C-values
Pasture (slope 0-5%)	1630	sq.m.	0.30
Grass	1180	sq.m.	0.20
Total Catchment Area	2810	sq.m.	0.26

Time of Concentration:

Sheet Flow:

Airport Formula

$$Tc = \frac{3.26\,(1.1 - C)\,(L)^{1/2}}{Sw^{0.33}} + \frac{\text{Flow In Ditch } Ld}{V} \text{ min}$$

Runoff Coefficient (C):	0.30	see above Pasture (slope 0-5%)
Sheet Flow Distance (L):	40	m
Slope of Land (Sw):	2.7	%
Time of Concentration (Sheet Flow):	11.9	min

Swale Flow:

Length of Swale (Ld):	70	m
Valley Flow Velocity (V):	0.27	m/s (see below)
Time of Concentration (Swale Flow):	4.3	min
Time of Concentration (Tc):	16.2	min

Runoff (Rational Method):

$Q = 2.78\,CiA$ l/s

Area (A):	2810	sq.m.
Time of Concentration:	16.2	min. (see above)
Rainfall Intensity (i):	80	mm/hr (5-year event)
Runoff Coefficient (C):	0.26	see above
5-Year Flow (Q_5):	16.1	l/s

Swale Slope:	1.4%	
Ditch Manning Roughness Coefficient n:	0.04	mowed grass
Side Slope:	20	:1
Lot Side Slope:	20	:1
Ditch Bottom Width:	-	m
Water Depth:	0.06	m
Water Top Width:	2.20	
Water Cross-Section Area:	0.06	sq.m.
Wetted Perimeter:	2.20	m
Hydraulic Radius:	0.03	m
Velocity:	0.27	m/s Based on water depth
Velocity:	0.27	m/s Using Manning's Formula:

LEGEND:

STORM
SANITARY
WATER
BELL
HYDRO
GAS
TYPICAL CONCRETE CURB
DEPRESSED CONC. CURB
NEW FIRE HYDRANT

SITE SERVICING NOTES

1. The Contractor shall arrange and pay for all permits required for road cuts, water and sewer connections, etc.

2. The location of utilities is approximate only. Exact location shall be determined by consulting the appropriate utility companies. The contractor shall be responsible for adequate protection of all utilities during construction. Costs for protection and reinstatement shall be deemed to be included in tendered prices.

3. Work for installation of site services shall generally consist of the following:
   (i) Supply and installation of all piping and appurtenances as shown and detailed to within 1.5 m of building walls.
   (ii) Connection to existing systems as detailed including all restoration work necessary to reinstate surfaces to the condition that existed prior to construction.
   (iii) All work shall be performed, as applicable, in accordance with R.M.O.C. Standard Specifications, City of Kanata Specifications and in particular, with OPSS 407, 410 and 701.
   (iv) Applicable City of Kanata standard drawings governing work are S-1, S-1A, S-6, S-7, S-8, S-9, S-10, S-11, S-14 and S-15.

4. Materials shall be as follows:
   (i) Storm sewer shall be equal to ASTM Specification C-76, Class III rubber gasket joint.
   (ii) Sanitary sewer shall be PVC pipe SDR-35 with rubber gasket.
   (iii) Watermain shall be cement-lined ductile iron tyton joint pipe, Class 50.
   (iv) Catchbasin manholes shall be precast 1200 x 1200, catchbasins shall be precast 600 x 600, manholes shall be 1200 diameter as City of Kanata standards.
   (v) Frames and covers shall be either OPSD 400-01 or OPSD 401-02.
   (vi) Bedding material shall be 150 mm Granular 'A' compacted to 95% Standard Proctor density.

5. The contractor shall ensure that acceptable native backfill (weathered grey clay) is used for 2 metres below finished grade to the road subgrade and compacted to 90% Standard Proctor. Roadways shall be restored with 600 mm, Granular 'B' Type II, 150 mm Granular 'A' Type II and 50 mm HL8. Reference shall be made to geotechnical report prepared by Golder Associates for this particular site.

6. A certificate of approval verifying that underground construction, backfill and restoration has been carried out in accordance with the specifications will be required. The contractor will be responsible for providing adequate notices to inspection authorities during construction so that proper inspection in accordance with the City of Kanata Sewer By-Law can be carried out.

7. The catchbasin manhole with outlet pipe to offsite storm sewer services shall be equipped with an orifice plate fixed to the outlet pipe. The orifice plate shall be attached to a min. 150 mm long pipe sleeve with an outside diameter slightly smaller than the inside diameter of the outlet pipe.

8. Seepage barriers of compacted weathered clay shall be constructed 2 metres inside property line on each service trench. The seepage barriers shall interrupt and replace the granular bedding and cover material and shall extend from trench wall to trench wall 1.5 metres wide.

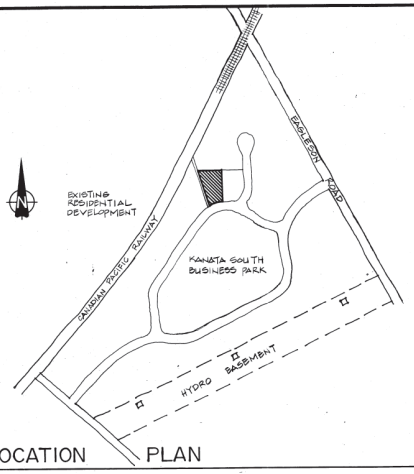
9. A 3 metre subdrain stub complete with filter fabric and end plug should be installed either side of the CB and CB/MH located within the access road.

10. A concrete cradle shall be provided under the pipe from the existing sewer or proposed manhole to the first pipe joint.

11. All edges of disturbed pavement shall be cut to form a neat and straight line prior to placing new pavement.

12. R.M.O.C. will connect 150 mm watermain to existing watermain. R.M.O.C. also to test chlorination and inspect installation. Co-ordination and cost of such work shall be the responsibility of the contractor. All watermain work and materials shall be in accordance with R.M.O.C. standards. Watermain shall have minimum of 2.2 metres of cover.

13. Contractor shall connect to sanitary sewer above springline with round machine cut hole and saddle.



LOCATION PLAN

14. Contractor shall connect to existing storm sewer manhole. Existing manhole shall be restored to meet City of Kanata approval.

15. Dimensions and layout information should be confirmed prior to commencement of the work. Record drawings shall be maintained and submitted prior to final payment.

16. Rip rap shall be in accordance with OPSS-511, Dec/83.

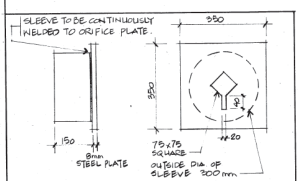
17. Contractor shall conform to general conditions of contract and shall co-ordinate his work with building construction, including connection to building services.

CB/MH 1:
T/G 100.97
INV. 99.13

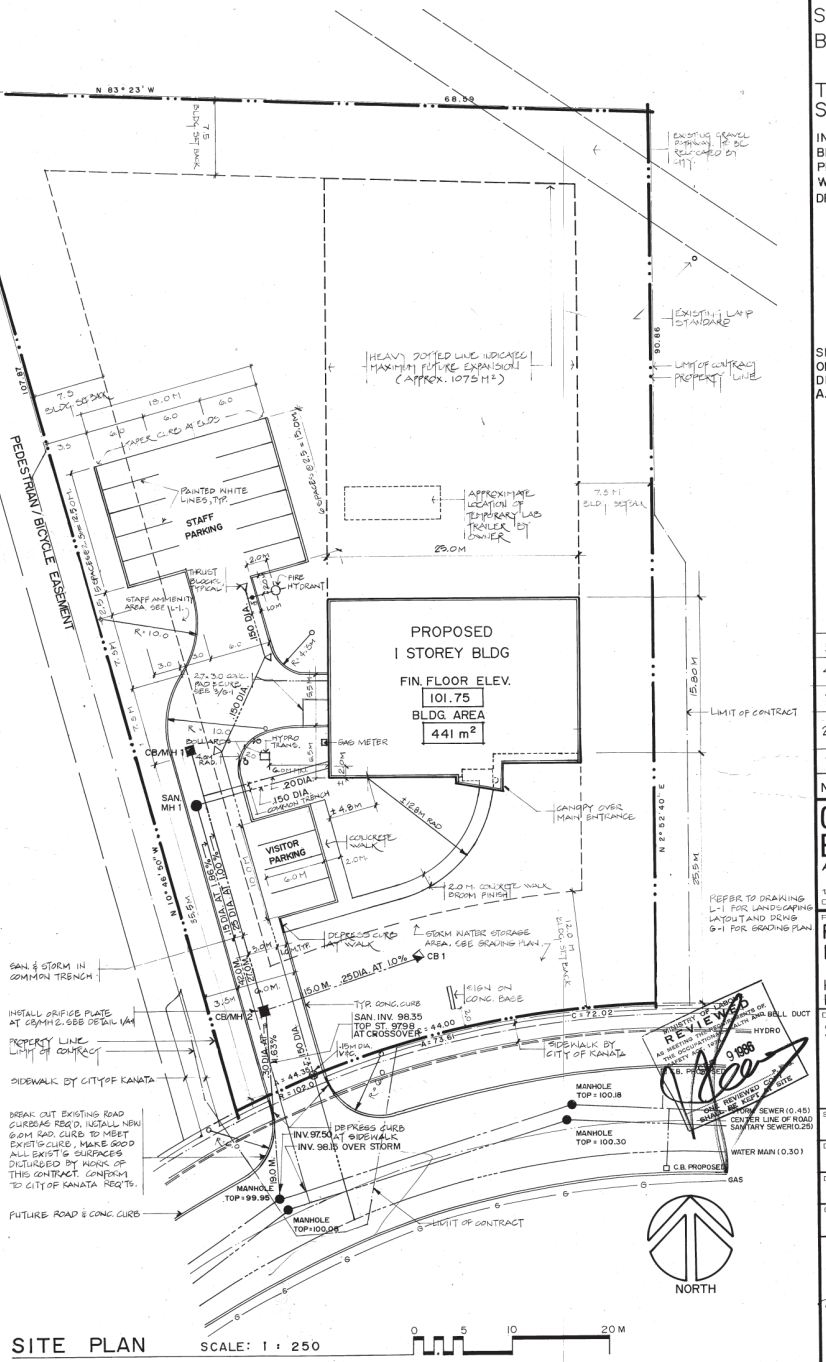
CB/MH2:
T/G 100.51
N.INV. 98.86
E.INV. 98.86
S.INV. 97.81

SAN MH 1:
T/G 100.88
E. INV. 99.43
S. INV. 98.93

CB 1:
T/G 100.21
INV. 98.97



1 ORIFICE PLATE DETAIL
SCALE: 1:10



SITE PLAN SCALE: 1:250

ZONING: MI-A
SITE AREA: 5411m² (1.33acres)
BUILDING AREA: 441m² (4750ft²)
TOTAL PARKING SPACES: 16

INFORMATION ON THIS PLAN HAS BEEN OBTAINED FROM A SURVEY PREPARED BY FAIRHALL, MOFFAT & WOODLAND, ONTARIO LAND SURVEYOR DRWG REF. NO. 162(b)-10-GOULBOURN.

PART OF THE WEST HALF OF LOT 32
CONCESSION 11 AND
PART OF THE EAST HALF OF LOT 31
CONCESSION 10 AND
PART OF THE ROAD ALLOWANCE BETWEEN CONCESSIONS 10 & 11.

SITE SERVICES INFORMATION SHOWN ON THIS DRAWING HAS BEEN DESIGNED AND REVIEWED BY A. J. ROBINSON & ASSOCIATES.

No	ISSUED	DATE
5	GENERAL REVIEW PER TD PCR	AUG 27 1986
4	ISSUED FOR STRUCTURAL STEEL TENDER	AUG 25 1986
3	SUBMITTED TO CITY OF KANATA PER SITE PLAN AGREEMENT	AUG 13 1986
2	STORM WATER LINE REVISED, CB/MH2 & CB1 RESUBMITTED TO CITY OF KANATA	JUNE 27, 1986
1	TO CITY OF KANATA FOR SITE PLAN CONTROL APPLICATION	JUNE 26 1986

OTTO + BRYDEN ARCHITECTS
12 YORK STREET, SUITE 400
OTTAWA, ONTARIO K1N 5S6 (613)230-7367

PROJECT NAME
FARRINGTON LOCKWOOD LABORATORY
KANATA SOUTH BUSINESS PARK

DRAWING TITLE
SITE PLAN

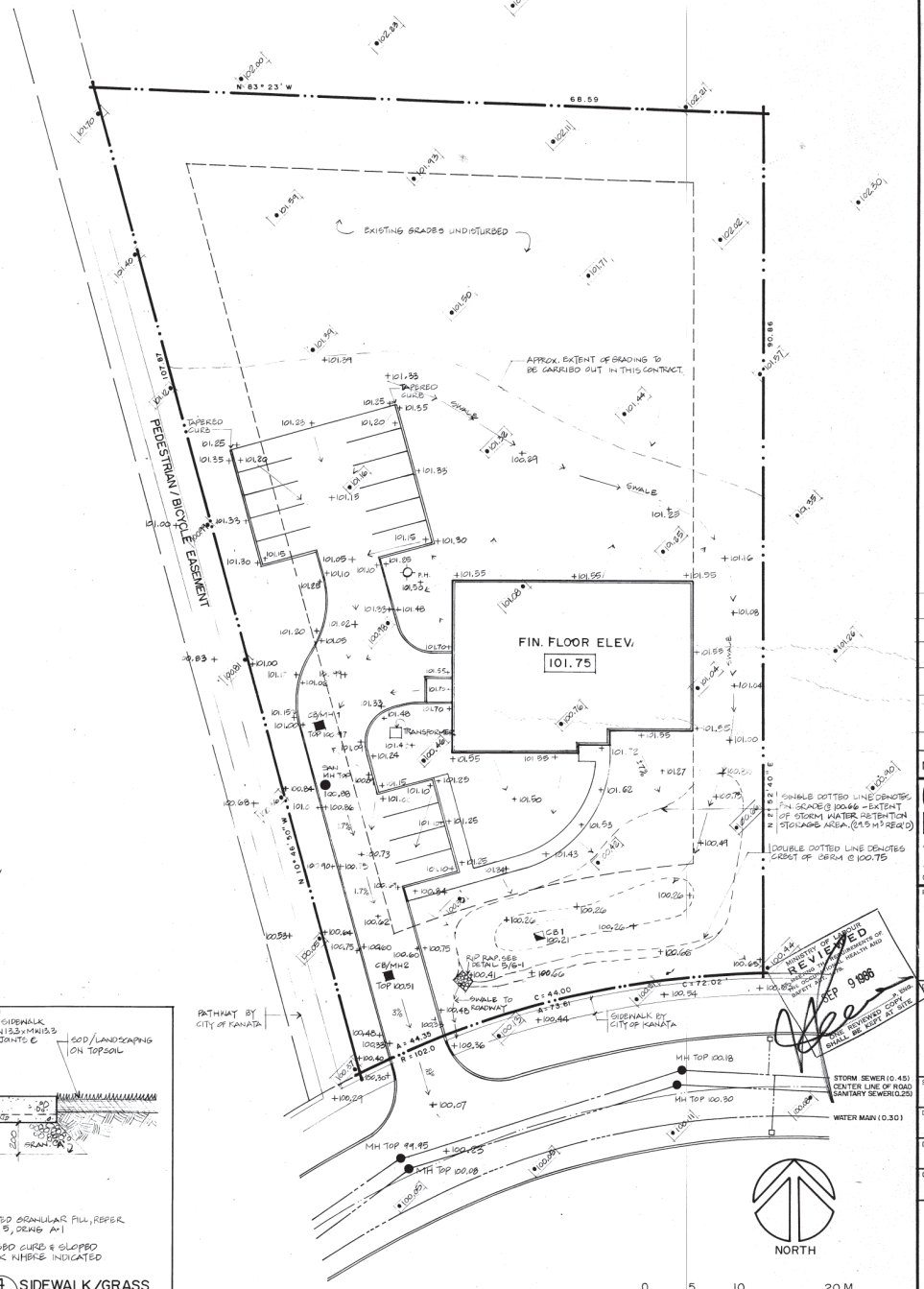
SCALE
JOB No. 408-86
DATE
DESIGNED BY D. M.
DRAWN BY R.S. D.M.
CHECKED BY D.B.

DRAWING No. A-1
REV. NO. 5
APPENDIX "J"

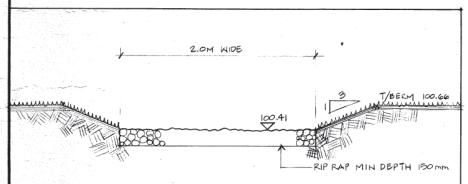
22

LEGEND

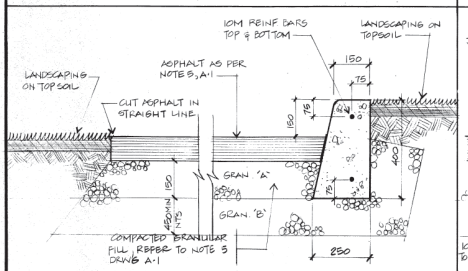
100.76	EXISTING GRADES
+ 101.00	NEW FINISHED GRADE.
	DEPRESSED CURB, CONC. TYPICAL CONC. CURB



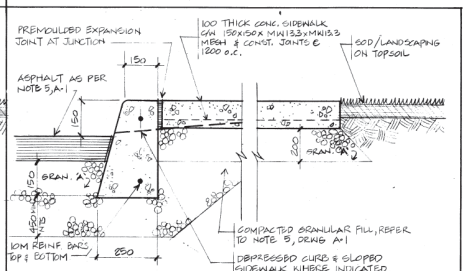
GRADING PLAN SCALE: 1:250



5 OVERFLOW DETAIL
SCALE 1:25



1 GRASS / ASPHALT 2 ASPHALT / CURB
SCALE: 1:10



3 ASPHALT / SIDEWALK 4 SIDEWALK / GRASS
SCALE: 1:10

SURFACE DRAINAGE & STORM WATER MANAGEMENT SHOWN ON THIS DRAWING HAS BEEN DESIGNED AND REVIEWED BY A.J. ROBINSON & ASSOCIATES.

No	ISSUED	DATE
6	SIDEWALK REINF REVISED FOR TENDER	AUG 27 1986
5	SIDEWALK GRANULAR BASE REVISED	AUG. 25, 1986
4	ISSUED FOR STRUCTURAL STEEL TENDER	AUG 05 1986
3	SUBMITTED TO CITY OF KANATA FOR SITE PLAN AGREEMENT	AUG 13 1986
2	STORM WATER STORAGE AREA REVISED - RESUBMITTED TO CITY OF KANATA	JUNE 27, 1986
1	TO CITY OF KANATA FOR SITE PLAN CONTROL APPLICATION	JUNE 26, 1986

OTTO + BRYDEN ARCHITECTS
12 YORK STREET, SUITE 400
OTTAWA, ONTARIO, K1N 5S6 (613) 230-7387

PROJECT NAME
FARRINGTON LOCKWOOD LABORATORY
KANATA SOUTH BUSINESS PARK

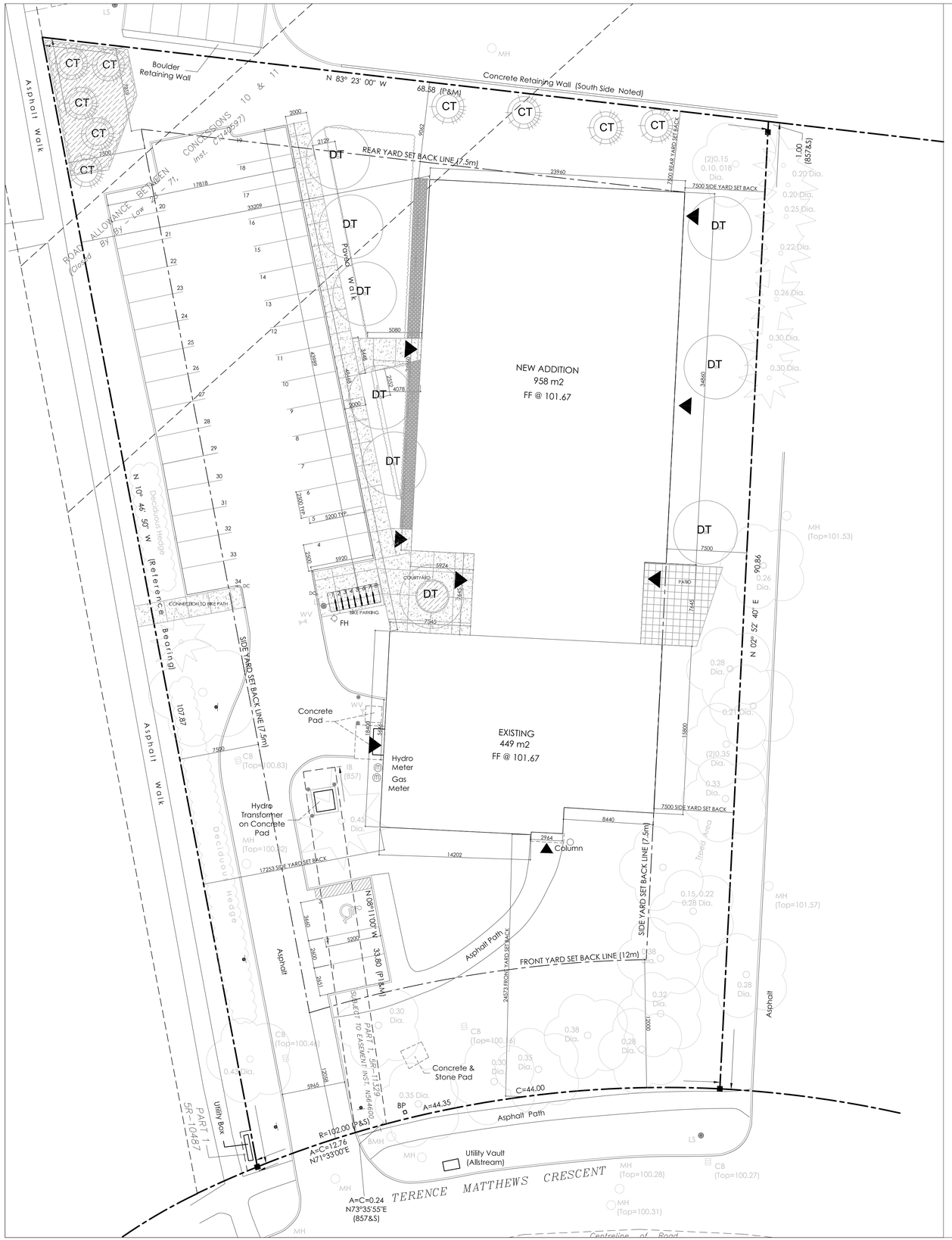
DRAWING TITLE
GRADING PLAN

SCALE: AS SHOWN	JOB No. 408-86
DATE	DESIGNED BY D.M.
DRAWN BY R.S. D.M.	
CHECKED BY D.B.	

DRAWING No. G·1
REV #5 REV #6

23

K+E



SCALE

0m 5 10 15

SCALE 1:200

LEGEND

PROPERTY LINE
SETBACK LINE
EASMENT
PAVING
LIGHT STANDARD
SIGN
CATCH BASIN
BOLLARD
WATER VALVE
FIRE HYDRANT
MANHOLE
DEPRESSED CURB

..\01 PLOTS\20220628-SITE PLAN\20220705_GCIG_SPA_geoOttawa.PNG

SITE DATA

LEGAL DESCRIPTION	PART 30, 5R-10105, PIN 04744-0135
CIVIL ADDRESS	100 TERENCE MATTHEWS CR, KANATA, ON
ZONING NOTES	OFFICIAL PLAN DESIGNATION: GENERAL URBAN AREA, ZONING: BUSINESS PARK INDUSTRIAL ZONE : IP4 ABUTTING ZONES: IP4
BUILDING AREA	1407 m2

PROJECT STATS

PROVISION	REQUIRED	PROVIDED
MINIMUM LOT AREA	4,000 m2	5,480 m2
MINIMUM LOT WIDTH	45 m	45 m
MAXIMUM LOT COVERAGE	N/A	N/A
MINIMUM FRONT YARD AND CORNER SIDE YARD	12 m	24.6 m
MINIMUM INTERIOR SIDE YARD	7.5 m	7.5 m
MINIMUM REAR YARD	7.5 m	7.5 m
MAXIMUM FLOOR SPACE INDEX	2	0.25
MAXIMUM BUILDING HEIGHT	22 m	4.75 m
MINIMUM WIDTH OF LANDSCAPING II) ABUTTING A STREET	3 m	24.6 m
MINIMUM WIDTH OF LANDSCAPING III) IN ALL OTHER CASES	NO MINIMUM	N/A
PARKING	2.4/100 m2 GFA = 34	34
BICYCLE PARKING	1 / 250 m2 GFA = 6	6
LOADING SPACES	1 IF 1000-10000 m2 GFA = 1	1

GENERAL NOTES

NOT FOR CONSTRUCTION

NO.	ISSUED	DATE

SEAL

DS STUDIO

www.dsstudio.ca | 647 702 9350 | info@dsstudio.ca

PROJECT

GIFFORD CARR
INSURANCE BUILDING

DRAWING TITLE

SITE PLAN

Date	2022-06-28
Drawn by	
Checked by	
Scale	1:200

DRAWING NUMBER

A0.01

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-23-0422 - 100 Terence Matthews - Existing Water Demands

Project:	100 Terence Matthews
Project No.:	CCO-23-0422
Designed By:	FV
Checked By:	AG
Date:	September 29, 2022
Site Area:	0.54 gross ha

Commercial (Existing): 445 m2

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.01	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d

MAXIMUM DAILY DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.02	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d

MAXIMUM HOUR DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.04	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.01	L/s
MAXIMUM DAILY DEMAND	0.02	L/s
MAXIMUM HOUR DEMAND	0.04	L/s

McINTOSH PERRY

CCO-23-0422 - 100 Terence Matthews - Proposed Water Demands

Project:	100 Terence Matthews
Project No.:	CCO-23-0422
Designed By:	FV
Checked By:	AG
Date:	September 29, 2022
Site Area:	0.54 gross ha

Commercial (Proposed): 950 m2

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.03	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d

MAXIMUM DAILY DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.05	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d

MAXIMUM HOUR DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.08	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.03	L/s
MAXIMUM DAILY DEMAND	0.05	L/s
MAXIMUM HOUR DEMAND	0.08	L/s

McINTOSH PERRY

CCO-23-0422 - 100 Terence Matthews - Total Water Demands

Project:	100 Terence Matthews
Project No.:	CCO-23-0422
Designed By:	FV
Checked By:	AG
Date:	September 29, 2022
Site Area:	0.54 gross ha

Commercial (Existing): 445 m2
Commercial (Proposed): 950 m2

Total Commercial: 1395 m2

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.05	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d

MAXIMUM DAILY DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.07	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d

MAXIMUM HOUR DEMAND	Residential	0.00	L/s
	Commerical/Industrial/ Institutional	0.12	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.05	L/s
MAXIMUM DAILY DEMAND	0.07	L/s
MAXIMUM HOUR DEMAND	0.12	L/s

McINTOSH PERRY

CCO-23-0422 - 100 Terence Matthews - OBC Fire Calculations

Project:	100 Terence Matthews
Project No.:	CCO-23-0422
Designed By:	FV
Checked By:	AG
Date:	September 29, 2022

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Office Building

Building is classified as Group : D - Business And Personal Service Occupancies (from table 3.2.2.55)

Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating. 86.7

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+...etc.]

K	16	(from Table 1 pg A-31)
V	6,730	(Total building volume in m^3.)
Stot	1.6	(From figure 1 pg A-32)
Q =	172,297.69 L	

→

From Figure 1 (A-32)

Snorth	7.35	m	0.3
Seast	7.31	m	0.3
Ssouth	24.29	m	0.0
Swest	17.34	m	0.0

*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

5400 L/min if Q > 162,000 L and < 190,000 L

1427 gpm

McINTOSH PERRY

CCO-23-0422 - 100 Terence Matthews - Fire Underwriters Survey

Project:	100 Terence Matthews
Project No.:	CCO-23-0422
Designed By:	FV
Checked By:	AG
Date:	September 29, 2022

From the Fire Underwriters Survey (2020)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:
City of Ottawa Technical Bulletin ISTB-2018-02 Applied Where Applicable

A. BASE REQUIREMENT (Rounded to the nearest 1000 L/min)

F = 220 x C x √A Where:

F = Required fire flow in liters per minute — 0
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type: Non-Combustible Construction

C = 0.8

A = 1,405.6 m^2

Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area) = 1,405.6 m^2

Calculated Fire Flow	6,598.5 L/min
	7,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:

Limited Combustible: -15%

Fire Flow	5,950.0 L/min

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Non-Sprinklered: 0%

Reduction	0.0 L/min

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	10.1 to 20	Wood frame	90	2	180.0	15%
Exposure 2	10.1 to 20	Wood frame	15.7	2	31.4	11%
Exposure 3	Over 30 m	Wood frame	N/A	N/A	N/A	0%
Exposure 4	Over 30 m	Wood frame	N/A	N/A	N/A	0%
					% Increase*	26%

Increase*	1,547.0 L/min

E. Total Fire Flow (Rounded to the Nearest 1000 L/min)

Fire Flow	7,497.0 L/min
Fire Flow Required**	7,000.0 L/min

*In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%
**In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

115 Walgreen Road, R.R.3. Carp, ON K0A 1L0 | T. 613-836-2184 | F. 613-836-3742
info@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

CCO-23-0422 - 100 Terence Matthews - Boundary Condition Unit Conversion

Project:	100 Terence Matthews
Project No.:	CCO-23-0422
Designed By:	FV
Checked By:	AG
Date:	September 29, 2022

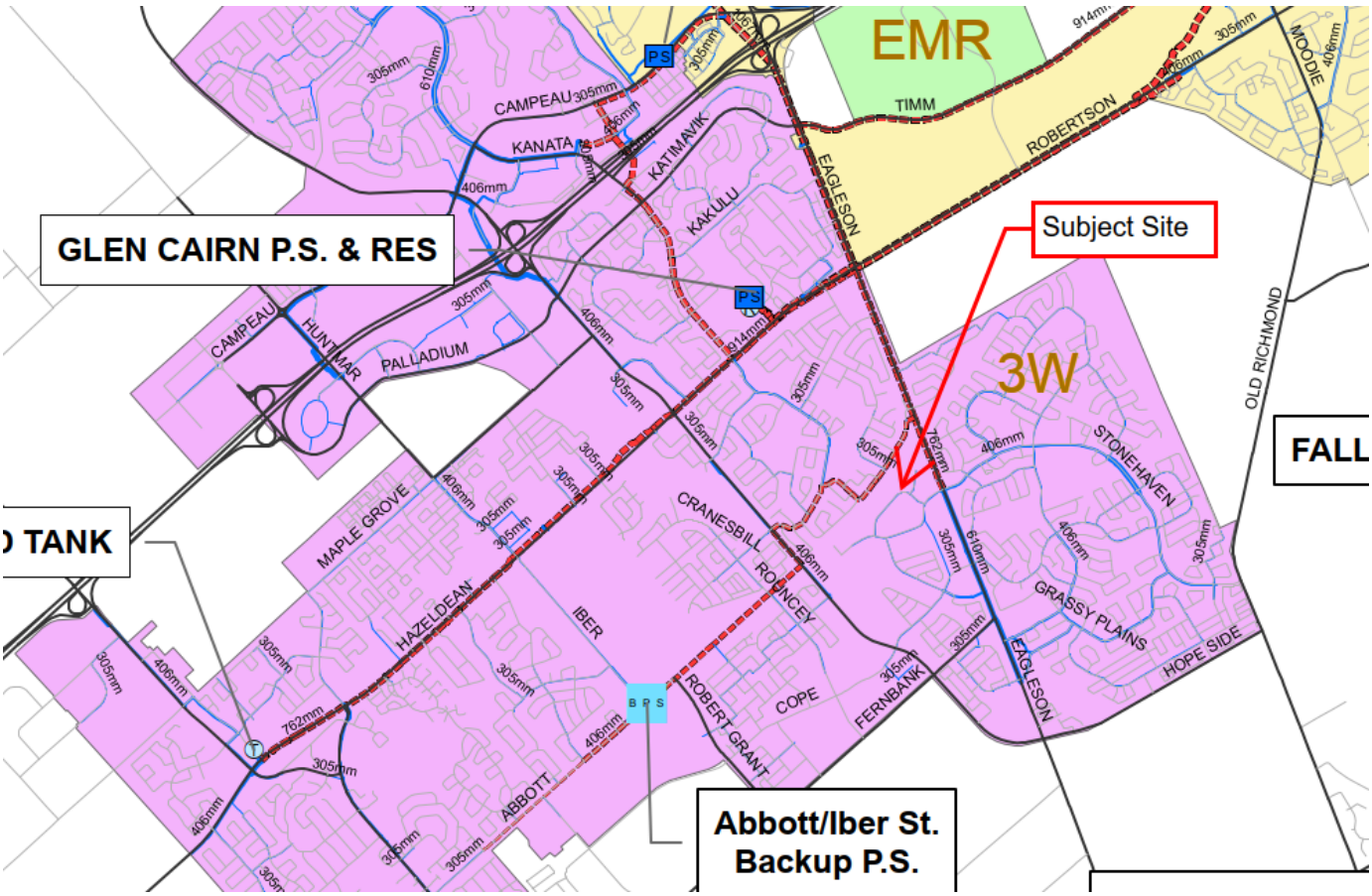
Boundary Conditions Unit Conversion

Terence Matthews Crescent

Scenario	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	161.1	97.7	63.4	90.2	622.2
Max Day + Fire Flow (116.74 L/s)	155.0	97.7	57.3	81.6	562.3
Peak Hour	156.6	97.7	58.9	83.8	578.0

100 Terence Matthews

Pressure Zone Figure

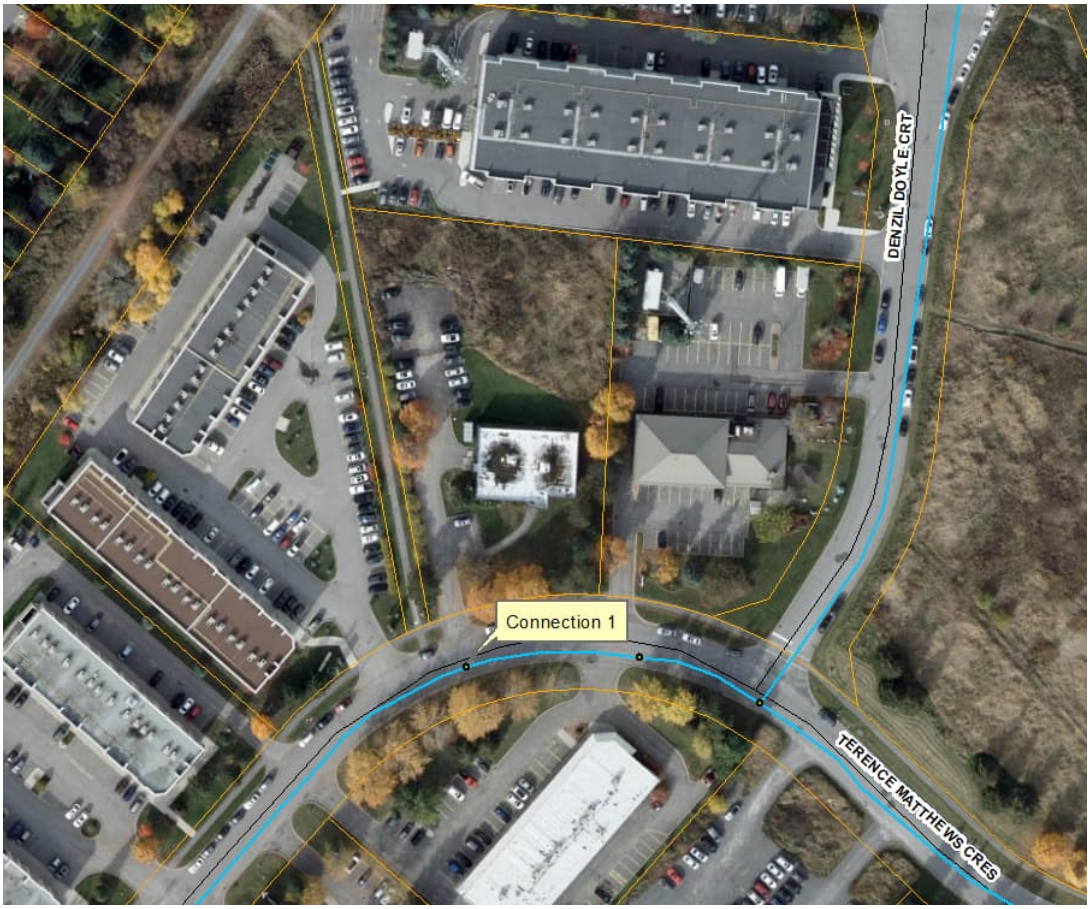


Boundary Conditions
100 Terence Matthews Crescent

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	3	0.05
Maximum Daily Demand	4	0.07
Peak Hour	7	0.12
Fire Flow Demand #1	7,000	116.67

Location



Results

Connection 1 – Terence Matthews Cres.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.1	86.7
Peak Hour	156.6	80.2
Max Day plus Fire 1	155.0	78.0

Ground Elevation = 100.1 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.

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.

APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-23-0422 - 100 Terence Matthews Crescent - Existing Sanitary Demands

Project:	100 Terence Matthews Crescent	
Project No.:	CCO-23-0422	
Designed By:	FV	
Checked By:	AG	
Date:	Sep-22	
Site Area	0.54	Gross ha
Commercial Area (Existing)	445.00	m^2

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.03
Wet	0.15
Total	0.18

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	0	0.00
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m² /d)	445.00	0.01
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.00	L/s
PEAK RESIDENTIAL FLOW	0.00	L/s
AVERAGE ICI FLOW	0.01	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.02	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.02	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.04	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.05	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.20	L/s

McINTOSH PERRY

CCO-23-0422 - 100 Terence Matthews Crescent - Proposed Sanitary Demands

Project:	100 Terence Matthews Crescent
Project No.:	CCO-23-0422
Designed By:	FV
Checked By:	AG
Date:	Sep-22

Site Area	0.54	Gross ha
Commercial Area (Existing)	445.00	m^2
Commercial Area (Proposed)	950.00	m^2

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.03
Wet	0.15
Total	0.18

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	0	0.00
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m² /d)	1395.00	0.05
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.00	L/s
PEAK RESIDENTIAL FLOW	0.00	L/s
AVERAGE ICI FLOW	0.05	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.07	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.07	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.07	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.09	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.25	L/s

SANITARY SEWER DESIGN SHEET

PROJECT: Building Addition
LOCATION: 100 Terence Matthews
CLIENT: DS Studio

McINTOSH PERRY

LOCATION				RESIDENTIAL									ICI AREAS							INFILTRATION ALLOWANCE			FLOW	SEWER DATA						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
STREET	AREA ID	FROM MH	TO MH	UNIT TYPES				AREA (ha)	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)						PEAK FLOW (L/s)	AREA (ha)		FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
				SF	SD	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM								L/s	(%)
													IND	CUM	IND	CUM	IND	CUM											
100 Terence Matthews		Prop. Bldg	MH1												0.10	0.10		0.00	0.05	0.54	0.54	0.18	0.22	15.89	11.41	150	1.00	0.871	15.66	98.59
100 Terence Matthews		MH1	MH2													0.10		0.00	0.05	0.00	0.54	0.18	0.22	15.89	21.26	150	1.00	0.871	15.66	98.59
100 Terence Matthews		MH2	EX. MH													0.10			0.05	0.00	0.54	0.18	0.22	15.89	10.82	150.00	1.00	0.87	15.66	98.59
100 Terence Matthews		EX. Bldg	EX. MH												0.04	0.14		0.00	0.07	0.54	0.54	0.18	0.25	11.23	13.24	150	0.50	0.616	10.99	97.81
100 Terence Matthews		EX. MH	Sanitary Main													0.14		0.23	0.16	0.54	0.54	0.18	0.34	24.82	39.14	150	2.44	1.361	24.48	98.63

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day	1.5
APT	2.3	p/p/u	COM	28,000	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): 280 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5)*0.8)
where P = population in thousands

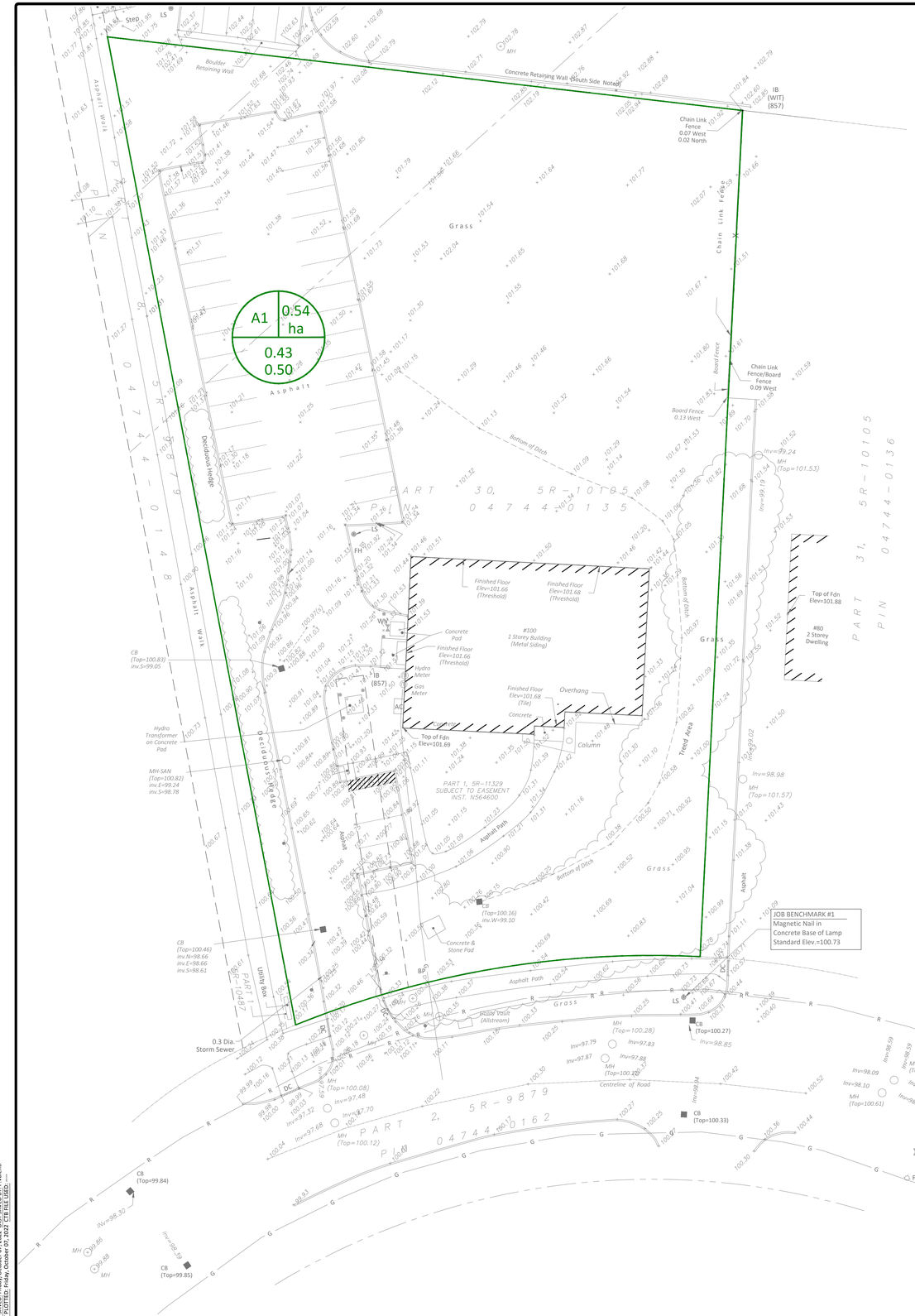
Designed: FV
Checked: AG
Project No.: CCO-23-0422

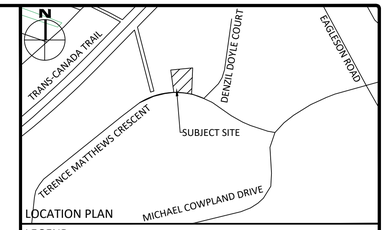
No.	Revision	Date
1.	Revision 1	2022-10-07

Sheet No: 1 of 1

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





LOCATION PLAN

LEGEND

	CONCRETE BARRIER CURB		LIMIT OF CONSTRUCTION
	CONCRETE WALKWAY		DRAINAGE SWALE
	PROPOSED ASPHALT		DRAINAGE DITCH
	PROPOSED PAVERS		SLOPING AT 3:1 UNLESS SPECIFIED
LSCB#	LANDSCAPING CATCHBASIN	95.50	SURFACE ELEVATION
CBMH# T/G	CATCHBASIN MANHOLE	95.50 (S)	SWALE ELEVATION
CB# T/G	CATCHBASIN	T/W 95.50 B/W 94.25	TOP OF WALL ELEVATION BOTTOM OF WALL ELEVATION
MH#A T/G	SANITARY SEWER MANHOLE		OVERLAND FLOW ROUTE
HYD B/F	FIRE HYDRANT		SILT FENCE BARRIER
	WATER VALVE		MUD MAT
M	WATER METER		DEPRESSED CURB
RM	REMOTE WATER METER		

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

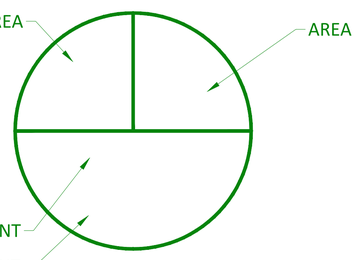
No.	Revisions	Date
1	ISSUED FOR REVIEW	OCT. 07, 2022

Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 250

0 5 10 15 20 25 Metres

LEGEND:



McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp: LICENSED PROFESSIONAL ENGINEER — A.J. GOSLING 100226726 — PROVINCE OF ONTARIO

Client:
DS STUDIO INC
95 PELHAM AVENUE
TORONTO, ON M6N 1A5

Project:
BUILDING ADDITION
100 TERENCE MATTHEWS CRESCENT

Drawing Title:
PRE-DEVELOPMENT DRAWING PLAN

Scale: 1:250	Project Number: CCO-23-0422
Drawn By: FV	
Checked By: AG	Drawing Number: PRE
Designed By: AG	

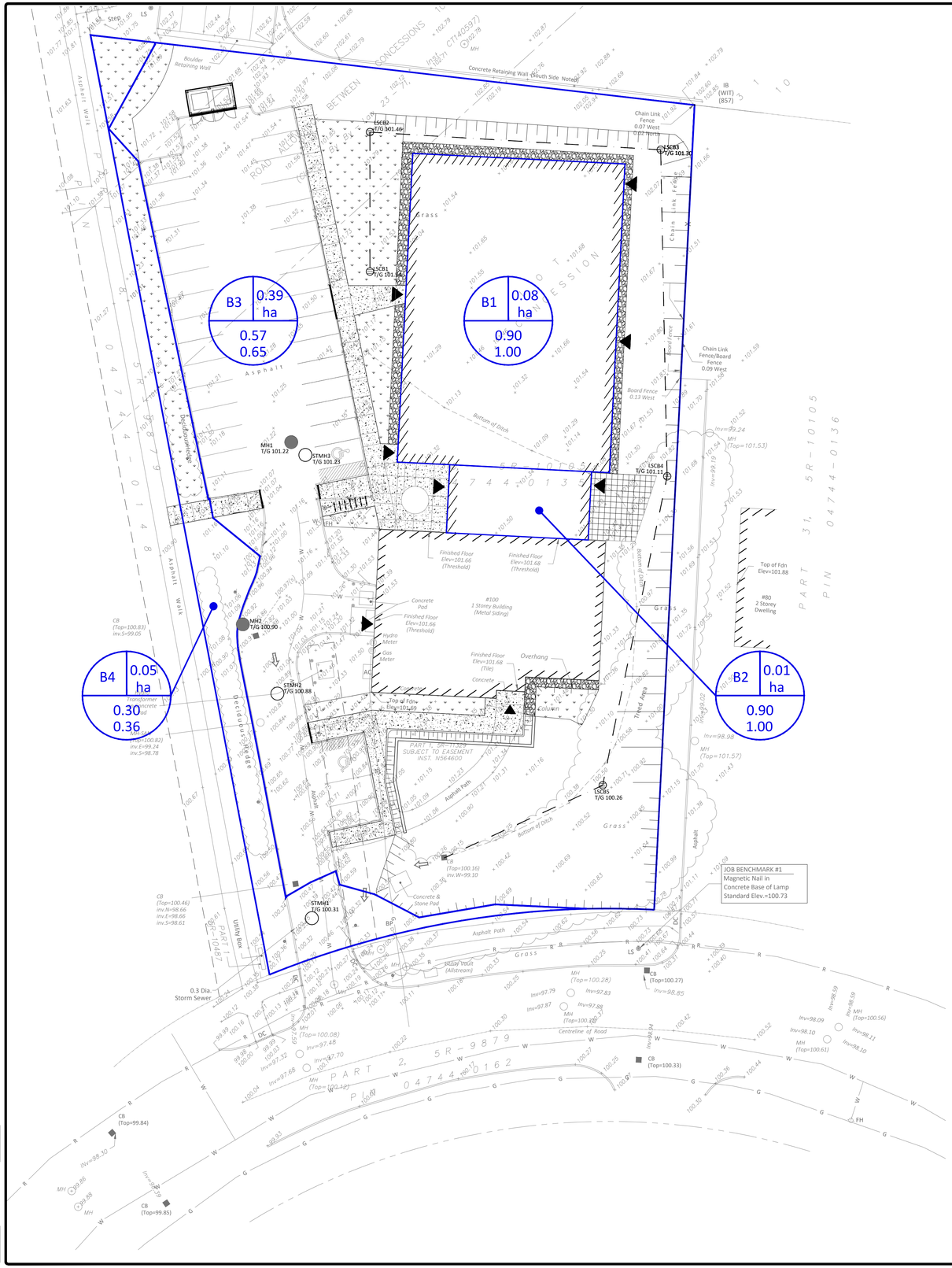
D07-12-XX-XXXX

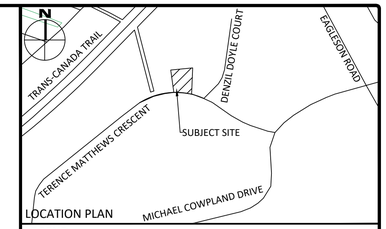
#XXXXX

FILENAME: U:\Ottawa\01 Project - Proposals\2023 Jobs\CCO\CCO-23-0422 DS Studio_Gifford Insurance_100 Terence Matthews\12 - Drawings\CCO-23-0422_Presentation.dwg
LAST SAVED: Friday, October 07, 2022 LAST SAVED BY: F.Valenti
LAST PLOTTED: Friday, October 07, 2022 CTB FILE USED:

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





LOCATION PLAN

LEGEND

- CONCRETE BARRIER CURB
- CONCRETE WALKWAY
- PROPOSED ASPHALT
- PROPOSED PAVERS
- LSCB# LANDSCAPING CATCHBASIN
- CBMH# T/G CATCHBASIN MANHOLE
- CB# T/G CATCHBASIN
- MH#A T/G SANITARY SEWER MANHOLE
- HYD B/F FIRE HYDRANT
- WATER VALVE
- WATER METER
- REMOTE WATER METER
- LIMIT OF CONSTRUCTION
- DRAINAGE SWALE
- DRAINAGE DITCH
- SLOPING AT 3:1 UNLESS SPECIFIED
- 95.50 SURFACE ELEVATION
- 95.50 (S) SWALE ELEVATION
- T/W 95.50 B/W 94.25 TOP OF WALL ELEVATION / BOTTOM OF WALL ELEVATION
- OVERLAND FLOW ROUTE
- SILT FENCE BARRIER
- MUD MAT
- DEPRESSED CURB

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

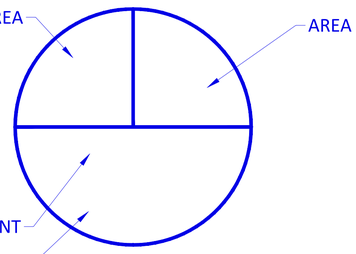
No.	Revisions	Date
1	ISSUED FOR REVIEW	OCT. 07, 2022

Check and verify all dimensions before proceeding with the work. Do not scale drawings.

SCALE 1 : 250

0 5 10 15 20 25 Metres

LEGEND:



McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
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www.mcintoshperry.com

N

Stamp: LICENSED PROFESSIONAL ENGINEER — A. J. GOSLING — 100226126 — 2022. 10. 07 — PROVINCE OF ONTARIO

Client:
DS STUDIO INC
95 PELHAM AVENUE
TORONTO, ON M6N 1A5

Project:
BUILDING ADDITION
100 TERENCE MATTHEWS CRESCENT

Drawing Title:
POST-DEVELOPMENT DRAINAGE PLAN

Scale: 1:250	Project Number: CCO-23-0422
Drawn By: FV	
Checked By: AG	Drawing Number: POST
Designed By: AG	

D07-12-XX-XXXX

#XXXXX

FILENAME: U:\Ottawa\01 Project - Proposals\2023 Jobs\CCO\CCO-23-0422 DS Studio_Gifford Insurance_100 Terence Matthews\12 - Drawings\CCO-23-0422_Presentation.dwg
LAST SAVED: Friday, October 07, 2022 LAST SAVED BY: F Valeni
LAST PLOTTED: Friday, October 07, 2022 PLOTTED BY: —

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

Tc (min)	Intensity (mm/hr)	
	5-Year	100-Year
20	70.3	120.0
10	104.2	178.6

C-Values	
Impervious	0.90
Gravel	0.60
Pervious	0.20

Pre-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)
A1	1,793	0	3,617	0.43	0.50

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)	
					5-Year	100-Year
A1	0.54	0.43	0.50	10	32.82	37.87
Total	0.54				32.80	37.87

*Pre-development flows per D.B. Gray Engineering SWM Report included in Appendix B

Post-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)
B1	835	0	0	0.90	1.00
B2	123	0	0	0.90	1.00
B3	2,011	110	1,822	0.57	0.65
B4	59	0	452	0.30	0.36

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)		
					5-Year	100-Year	
B1	0.08	0.90	1.00	10	21.77	41.46	*Roof*
B2	0.01	0.90	1.00	10	3.21	6.11	*Roof*
B3	0.39	0.57	0.65	10	64.88	126.51	*Surface Controlled + Ex. Roof*
B4	0.05	0.30	0.36	10	4.15	8.52	*Surface Uncontrolled*
Total	0.54				24.98	47.57	

Required Restricted Flow Per South Kanata Business Park Stormwater Management Report

Drainage Area	Area (ha)	C 5-Year	Tc (min)	Q (L/s) 5-Year	Q (L/s) 100-Year
A1	0.54	0.43	10	19.25	39.89

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/S)		Restricted Flow (L/S)		Storage Required (m^3)		Storage Provided (m^3)	
	5-year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
B1	21.77	41.46	1.68	3.12	18.75	35.50	21.01	39.01
B2	3.21	6.11	0.36	0.72	2.40	4.44	2.44	4.89
b3	64.88	126.51	12.80	13.33	37.38	96.05	41.05	96.67
B4	4.15	8.52	4.15	8.52				
Total	94.01	182.60	18.99	25.69	58.53	135.98	64.50	140.57

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
60	32.9	6.88	1.68	5.20	18.70
70	29.4	6.14	1.68	4.46	18.75
80	26.6	5.56	1.68	3.88	18.62
90	24.3	5.08	1.68	3.40	18.35
100	22.4	4.68	1.68	3.00	18.01

Maximum Storage Required 5-year =	19	m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	41.47	3.12	38.35	23.01
20	120.0	27.86	3.12	24.74	29.69
30	91.9	21.34	3.12	18.22	32.79
40	75.1	17.44	3.12	14.32	34.36
50	64.0	14.86	3.12	11.74	35.22
60	55.9	12.98	3.12	9.86	35.50
70	49.8	11.56	3.12	8.44	35.46
80	45.0	10.45	3.12	7.33	35.18
90	41.1	9.54	3.12	6.42	34.69
100	37.9	8.80	3.12	5.68	34.08

Maximum Storage Required 100-year =	35	m^3

5-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	600.23	0.035	21.01

Storage Available (m^3) =	21.01
Storage Required (m^3) =	18.75

100-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	600.23	0.065	39.01

Storage Available (m^3) =	39.01
Storage Required (m^3) =	35.50

*Area is 75% of the total roof area

Roof Drain Flow (B1)

Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	4	
	5-Year	100-Year
Rooftop Storage (m^3)	21.01	39.01
Storage Depth (mm)	0.035	0.065
Flow (Per Roof Drain) (L/s)	0.42	0.78
Total Flow (L/s)	1.68	3.12

Flow Rate Vs. Build-Up (One Weir)	
Depth (mm)	Flow (L/s)
15	0.18
20	0.24
25	0.30
30	0.36
35	0.42
40	0.48
45	0.54
50	0.60
55	0.66

*Roof Drain model to be Accutrol Weirs, See attached sheets
*Roof Drain Flow information taken from Watts Drainage website

CALCULATING ROOF FLOW EXAMPLES

1 roof drain during a 5 year storm
elevation of water = 25mm
Flow leaving 1 roof drain = (1 x 0.30 L/s) = 0.30 L/s

1 roof drain during a 100 year storm
elevation of water = 50mm
Flow leaving 1 roof drain = (1 x 0.60 L/s) = 0.60 L/s

4 roof drains during a 5 year storm
elevation of water = 25mm
Flow leaving 4 roof drains = (4 x 0.30 L/s) = 1.20 L/s

4 roof drains during a 100 year storm
elevation of water = 50mm
Flow leaving 4 roof drains = (4 x 0.60 L/s) = 2.40 L/s

Roof Drain Flow		
Flow (l/s)	Storage Depth (mm)	Drains Flow (l/s)
0.18	15	0.72
0.24	20	0.96
0.30	25	1.20
0.36	30	1.44
0.42	35	1.68
0.48	40	1.92
0.54	45	2.16
0.60	50	2.40
0.66	55	2.64
0.72	60	2.88
0.78	65	3.12
0.84	70	3.36
0.90	75	3.60
0.96	80	3.84
1.02	85	4.08
1.08	90	4.32
1.14	95	4.56
1.20	100	4.80
1.26	105	5.04
1.32	110	5.28
1.38	115	5.52
1.44	120	5.76
1.50	125	6.00
1.56	130	6.24
1.62	135	6.48
1.68	140	6.72
1.74	145	6.96
1.80	150	7.20

Note: The flow leaving through a restricted roof drain is based on flow vs. head information

Storage Requirements for Area B2

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B2	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
30	53.9	1.66	0.36	1.30	2.34
40	44.2	1.36	0.36	1.00	2.40
50	37.7	1.16	0.36	0.80	2.40
60	32.9	1.01	0.36	0.65	2.35
70	29.4	0.91	0.36	0.55	2.29

Maximum Storage Required 5-year =	2	m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B2	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
30	91.9	3.15	0.72	2.43	4.37
40	75.1	2.57	0.72	1.85	4.44
50	64.0	2.19	0.72	1.47	4.41
60	55.9	1.91	0.72	1.19	4.30
70	49.8	1.70	0.72	0.98	4.14
80	45.0	1.54	0.72	0.82	3.94
90	41.1	1.41	0.72	0.69	3.71
100	37.9	1.30	0.72	0.58	3.46
110	35.2	1.20	0.72	0.48	3.20
120	32.9	1.13	0.72	0.41	2.92

Maximum Storage Required 100-year =	4	m^3

5-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	81.44	0.030	2.44

Storage Available (m^3) =	2.44
Storage Required (m^3) =	2.40

100-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	81.44	0.060	4.89

Storage Available (m^3) =	4.89
Storage Required (m^3) =	4.44

*Area is 75% of the total roof area

Roof Drain Flow (B2)

Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	1	
	5-Year	100-Year
Rooftop Storage (m^3)	2.44	4.89
Storage Depth (mm)	0.030	0.060
Flow (Per Roof Drain) (L/s)	0.36	0.72
Total Flow (L/s)	0.36	0.72

Flow Rate Vs. Build-Up (One Weir)	
Depth (mm)	Flow (L/s)
15	0.18
20	0.24
25	0.30
30	0.36
35	0.42
40	0.48
45	0.54
50	0.60
55	0.66

*Roof Drain model to be Accutrol Weirs, See attached sheets
*Roof Drain Flow information taken from Watts Drainage website

CALCULATING ROOF FLOW EXAMPLES

1 roof drain during a 5 year storm
elevation of water = 25mm
Flow leaving 1 roof drain = (1 x 0.30 L/s) = 0.30 L/s

1 roof drain during a 100 year storm
elevation of water = 50mm
Flow leaving 1 roof drain = (1 x 0.60 L/s) = 0.60 L/s

4 roof drains during a 5 year storm
elevation of water = 25mm
Flow leaving 4 roof drains = (4 x 0.30 L/s) = 1.20 L/s

4 roof drains during a 100 year storm
elevation of water = 50mm
Flow leaving 4 roof drains = (4 x 0.60 L/s) = 2.40 L/s

Roof Drain Flow		
Flow (l/s)	Storage Depth (mm)	Drains Flow (l/s)
0.18	15	0.18
0.24	20	0.24
0.30	25	0.30
0.36	30	0.36
0.42	35	0.42
0.48	40	0.48
0.54	45	0.54
0.60	50	0.60
0.66	55	0.66
0.72	60	0.72
0.78	65	0.78
0.84	70	0.84
0.90	75	0.90
0.96	80	0.96
1.02	85	1.02
1.08	90	1.08
1.14	95	1.14
1.20	100	1.20
1.26	105	1.26
1.32	110	1.32
1.38	115	1.38
1.44	120	1.44
1.50	125	1.50
1.56	130	1.56
1.62	135	1.62
1.68	140	1.68
1.74	145	1.74
1.80	150	1.80

Note: The flow leaving through a restricted roof drain is based on flow vs. head information

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	64.89	12.80	52.09	31.25
20	70.3	43.78	12.80	30.98	37.17
30	53.9	33.56	12.80	20.76	37.38
40	44.2	27.52	12.80	14.72	35.34
50	37.7	23.48	12.80	10.68	32.03

Maximum Storage Required 5-year =	37	m^3

Tempest LMF105 selected based on SWM analysis

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	126.54	13.33	113.21	67.93
20	120.0	85.02	13.33	71.69	86.03
30	91.9	65.11	13.33	51.78	93.21
40	75.1	53.21	13.33	39.88	95.71
50	64.0	45.35	13.33	32.02	96.05
60	55.9	39.61	13.33	26.28	94.60
70	49.8	35.28	13.33	21.95	92.21
80	45.0	31.88	13.33	18.55	89.06
90	41.1	29.12	13.33	15.79	85.27
100	37.9	26.85	13.33	13.52	81.14

Maximum Storage Required 100-year =	96	m^3

5-Year Storm Event Storage Summary

		Water Elev. (m) =		100.39		
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CBX	100.16	98.61	395.4	0.23	1.73	40.5

Storage Available (m^3) =	41.1	*
Storage Required (m^3) =	37.4	

100-Year Storm Event Storage Summary

		Water Elev. (m) =		100.51		
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CBX	100.16	98.61	505.3	0.35	1.85	97.3

Storage Available (m^3) =	96.7	*
Storage Required (m^3) =	96.0	

*Available Storage calculated from AutoCAD

STORM SEWER DESIGN SHEET

PROJECT: Building Addition
LOCATION: 100 Terence Matthews Crescent
CLIENT: DS Studio Inc

McINTOSH PERRY

LOCATION				CONTRIBUTING AREA (ha)				RATIONAL DESIGN FLOW										SEWER DATA								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
STREET	AREA ID	FROM MH	TO MH	C-VALUE	AREA	INDIV AC	CUMUL AC	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)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr)	
																					DIA	W	H			(L/s)	(%)
Terence Matthews	B1,B2	EX. BLDG	STMH3	0.90	0.09	0.08	0.08	10.00	0.20	10.20	104.19	122.14	178.56	23.46				23.46	40.78	9.69	250			0.43	0.805	17.31	42.46%
Terence Matthews	B1,B2	STMH3	STMH2			0.00	0.08	10.20	0.56	10.76	103.14	120.91	176.74	23.23				23.23	40.78	27.10	250			0.43	0.805	17.55	43.04%
Terence Matthews	B1,B2	STMH2	STMH1			0.00	0.08	10.76	0.24	11.00	100.33	117.60	171.88	22.59				22.59	90.33	25.62	250			2.12	1.783	67.74	74.99%
Terence Matthews	B1,B2	STMH1	EX. MH			0.00	0.08	11.00	0.04	11.04	99.18	116.24	169.89	22.33				22.33	40.78	1.98	250			0.43	0.805	18.44	45.23%
Terence Matthews	B3	EX. CB	EX. MH	0.57	0.39	0.22	0.22	10.00	0.14	10.14	104.19	122.14	178.56	64.39				64.39	100.61	16.72	250			2.63	1.986	36.22	36.00%
Terence Matthews	B1,B2,B3	EX. MH	MHST10779			0.00	0.30	10.14	0.10	10.24	103.46	121.28	177.29	87.23				87.23	232.47	19.21	300			5.31	3.186	145.23	62.48%

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:
FV

Checked:
AG

Project No.:
CCO-23-0422

No.	Revision	Date
1.	ISSUED FOR REVIEW	2022-10-07

Date:
2022-10-07

Sheet No:
1 of 1

APPENDIX H
CITY OF OTTAWA DESIGN CHECKLIST

McINTOSH PERRY

City of Ottawa

4. Development Servicing Study Checklist

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

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

4.1 General Content

Criteria	Location (if applicable)
☐ Executive Summary (for larger reports only).	N/A
☐ Date and revision number of the report.	On Cover
☐ Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix A
☐ Plan showing the site and location of all existing services.	Site Servicing Plan (C102)
☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Summary of pre-consultation meetings with City and other approval agencies.	Appendix B
☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Statement of objectives and servicing criteria.	3.0 Pre-Consultation Summary

☐ Identification of existing and proposed infrastructure available in the immediate area.	N/A
☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Site Grading Plan (C101)
☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Site Grading Plan (C101)
☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐ Proposed phasing of the development, if applicable.	N/A
☐ Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Background Studies, Standards and References
☐ All preliminary and formal site plan submissions should have the following information: o Metric scale o North arrow (including construction North) o Key plan o Name and contact information of applicant and property owner o Property limits including bearings and dimensions o Existing and proposed structures and parking areas o Easements, road widening and rights-of-way o Adjacent street names	Site Grading Plan (C101)

4.2 Development Servicing Report: Water

Criteria	Location (if applicable)
☐ Confirm consistency with Master Servicing Study, if available	N/A
☐ Availability of public infrastructure to service proposed development	N/A
☐ Identification of system constraints	N/A
☐ Identify boundary conditions	Appendix C
☐ Confirmation of adequate domestic supply and pressure	N/A
☐ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Appendix C
☐ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐ Address reliability requirements such as appropriate location of shut-off valves	N/A
☐ Check on the necessity of a pressure zone boundary modification.	N/A
☐ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Appendix C, Section 4.2

☐ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Site Servicing Plan (C101)
☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☐ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Appendix C
☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

Criteria	Location (if applicable)
☐ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	N/A
☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 5.2 Proposed Sanitary Sewer

☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 5.3 Proposed Sanitary Design
☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A
☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2 Proposed Sanitary Sewer
☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐ Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Criteria	Location (if applicable)
☐ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Analysis of available capacity in existing public infrastructure.	N/A
☐ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Pre & Post-Development Plans
☐ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5-year event (dependent on the receiving sewer design) to 100-year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Set-back from private sewage disposal systems.	N/A
☐ Watercourse and hazard lands setbacks.	N/A
☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☐ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5-year return period) and major events (1:100-year return period).	Appendix G

☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Site Grading Plan
☐ Calculate pre-and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 7.0 Proposed Stormwater Management Appendix G
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐ Identification of potential impacts to receiving watercourses	N/A
☐ Identification of municipal drains and related approval requirements.	N/A
☐ Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ 100-year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Site Grading Plan (C101)
☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

☐ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 8.0 Sediment & Erosion Control
☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐ Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

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

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

4.6 Conclusion Checklist

Criteria	Location (if applicable)
☐ Clearly stated conclusions and recommendations	Section 9.0 Summary Section 10.0 Recommendations
☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	All are stamped
☐ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped