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DESIGN BRIEF

FOR

CAIVAN (STITTSVILLE) INC.

PROPOSED RESIDENTIAL SITE

PLAN

MAGNOLIA PHASE 1 STACKED TOWNS

CITY OF OTTAWA

PROJECT NO.: 25-1494

OCTOBER 2026

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FOR
PROPOSED RESIDENTIAL SITE PLAN**

CAIVAN (STITTSVILLE) INC.

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare a Design Brief in support of a site plan application for the residential condominium block within Phase 1 of the Magnolia subdivision on behalf of Caivan (Stittsville) Inc.

The overall Magnolia Subdivision land area is approximately 75.4 ha (all land use components) and is located within the City of Ottawa urban boundary in the Stittsville ward. The subject site plan block is within Phase 1 of the Magnolia Subdivision lands and the area is bound by Flewellyn Road to the South, proposed West SWM Pond to the east, the proposed subdivision to the north (*Stittsville South – Area 6*) and west. The 2.37 ha site plan (Q4 Architects Inc., October 2026) is provided in **Appendix A**.

The objective of this report is to provide sufficient details with respect to the design of the proposed site services in support of the application of site plan control.

1.1 Existing Conditions

The **Magnolia Phase 1 Condo Block** lands have a gradual slope south towards the existing Flewellyn Road right-of-way. All existing stormwater flows are conveyed overland to the existing Flewellyn Road ditch system, and ultimately to the downstream Faulkner Municipal Drain.

1.2 Site Plan Layout

The proposed project consists of 13 blocks of stacked dwellings, above ground parking, walkways, and amenity space. See proposed site plan in **Appendix A**.

The predicted populations currently associated with the development concept are described in the following table below.

Table 1: Development Statistics for Magnolia Phase 1 Condo Site Plan

Land Use	Total Area (ha)	Residential Units	Residential Population per Unit *	Population
Stacked Dwellings	0.63	264	2.7	713
Amenity	0.33			
Landscaped	0.59			
Roads/parking/Paved Area	0.82			
Total	2.37	264		713

* NOTE: Population projections may differ from population estimates used in background Transportation Studies, Planning Rationale, and other studies.

1.3 Consultation Summary

Consultation with the City of Ottawa Planning and Engineering Staff was initiated in December 2025 for the Magnolia Phase 1 Stacked Condo block to review City Standards, submission requirements, and the availability of background information. Comments on the 1st Submission were provided by the City of Ottawa and responses are included with the overall 2nd submission package.

1.4 Required Permits / Approvals

The City of Ottawa must approve detailed engineering design drawings and reports prior to construction of the proposed infrastructure identified in this report.

Other permits and approvals may be required, as detailed in the other studies submitted as part of the Planning Act applications (e.g. *Tree Conservation Report, Phase 1 Environmental Site Assessment, etc.*).

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following documents were referenced in the preparation of this report:

- Ottawa Sewer Design Guidelines,
City of Ottawa, *SDG002*, October 2012.
(*City Standards*)
 - Technical Bulletin ISDTB-2014-01, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, February 5, 2014.
(ISDTB-2014-01)
 - Technical Bulletin PIEDTB-2016-01, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, September 6, 2016.
(PIEDTB-2016-01)
 - Technical Bulletin ISTB-2018-01, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, March 21, 2018.
(ISTB-2018-01)
 - Technical Bulletin ISTB-2018-03, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, June, 2018.
(ISTB-2018-04)
 - Technical Bulletin ISTB-2019-02, Revisions to Ottawa Design Guidelines – Sewer,
City of Ottawa, July 8, 2019.
(ISTB-2019-02)
 - Technical Bulletin IWSTRB-2024-04, Screening Criteria – Infiltration-type LIDs for Development,
City of Ottawa, September 12, 2024.
- Ottawa Design Guidelines – Water Distribution
City of Ottawa, July 2010.
(*Water Supply Guidelines*)
 - Technical Bulletin ISD-2010-2
City of Ottawa, December 15, 2010.
(ISD-2010-2)
 - Technical Bulletin ISDTB-2014-02
City of Ottawa, May 27, 2014.
(ISDTB-2014-02)

- Technical Bulletin ISTB-2018-02
City of Ottawa, March 21, 2018.
(ISTB-2018-02)
- Technical Bulletin ISTB-2021-03
City of Ottawa, August 18, 2021
(ISTB-2021-03)
- Technical Bulletin IWSTRB-2024-05
City of Ottawa, November 18, 2024
(IWSTB-2024-05)
- Design Guidelines for Sewage Works,
Ministry of the Environment, 2008.
(MOE Design Guidelines)
- Stormwater Planning and Design Manual
Ministry of the Environment, March 2003.
(SWMP Design Manual)
- Erosion & Sediment Control Guidelines for Urban Construction
Greater Golden Horseshoe Area Conservation Authorities, December 2006
(E&S Guidelines)
- Ontario Building Code Compendium
Ministry of Municipal Affairs and Housing Building Development Branch,
January 1, 2010 Update (OBC)
- Hydraulic Capacity and Modeling Analysis – Stittsville South Urban Expansion Area
Phase 1 Development (Final Report). GeoAdvice Engineering Inc., August 26, 2026.
- Geotechnical Investigation, Proposed Residential Development, 5993, 6070 & 6115
Flewellyn Road, Ottawa
Paterson Group (PG5570-2), July 5, 2024
(Stittsville South Geotechnical)
- Hydrogeological Existing Conditions Report, Proposed Residential Development, 5993
& 6115 Flewellyn Road & 6030 & 6070 Fernbank Road, Ottawa, Ontario
Paterson Group (PH4625-REP.01.R1), July 5, 2024
(Stittsville South Hydrogeology)
- Stittsville South Expansion Lands – Transportation Report. CGH Transportation (PN:
2021-128), November 2023.
- Scoped Master Servicing Study for Stittsville South Urban Expansion Area (W-4),
DSEL (21-1247), August 2025. (DSEL Scoped MSS)
- Functional Servicing Report for Stittsville South Urban Expansion Area (W-4), DSEL
(21-1247), January 2026. (DSEL Functional Servicing Report)
- Design Brief & Stormwater Management Report for Magnolia Subdivision Phase 1,
DSEL (21-1247), February 2026. (DSEL Phase 1 Design Brief)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The Magnolia Phase 1 Site Plan lands, within the Magnolia Subdivision, is located adjacent to the City of Ottawa's Pressure Zone (PZ) 3W. The pressure zone receives supply from the Campeau Drive and Glen Cairn Pump stations. The Stittsville Elevated Tank provides balanced storage during peak usage and fire conditions. The Magnolia Phase 1 lands will be serviced by the existing 250 mm diameter watermain located within the Parade Drive and Aridus ROW.

An extension of the watermain network is proposed within the Magnolia Phase 1 Subdivision, which will feed the subject site plan block. The watermain for the subdivision and site plan were designed in accordance with the **GeoAdvice Hydraulic Analysis** (August 2026) included in **Appendix B**.

3.2 Water Supply Servicing Design

As shown on **Drawing 4**, water servicing will be provided internal to the site via 200 mm watermain that will be looped within the site plan block and connect to the 250 mm diameter watermain on Street 1 (E) and 200 mm watermain on Street 6 (N). All units in each block will be serviced from the 200 mm watermain within the Private streets. The subject lands will be metered at the connections to Street 1 and Future Street once developed in the future phase (W), and all mains contained within are private. It is noted that the ultimate watermain connection to the future phase to the west will require a municipal easement to extend the watermain from the ROW to the limit of the site plan block where it will be connected to the proposed water meter.

A temporary watermain is proposed from the location of the ultimate western connection, north along the west boundary and east along the north boundary of the site plan block connecting to the proposed Street 6 temporary turning circle.

Table 2: Water Supply Design Criteria

Design Parameter	Value
<i>Extracted from Section 4: Ottawa Design Guidelines, Water Distribution (July 2010)</i>	
Residential – Multi Family Townhome	2.7 p/unit
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480kPa
During fire flow operating pressure must not drop below	140 kPa
<i>GeoAdvice Hydraulic Analysis, GeoAdvice, January 2026 for Population Exceeding 3000 Persons</i>	
Residential – MLT	219 L/cap/day
Residential – Average Day Demand	Population x Demand
Residential – Max Day Demand	AVDY x 2.5
Residential – Peak Hour Demand	MXDY x 2.2
Fire Flow Requirement	13,000 L/min

As outlined in the City of Ottawa Design Guidelines, the generally accepted practice is to design new water distribution systems to operate between 350kPa (50psi) and 480kPa (70psi). Per the **GeoAdvice Hydraulic Analysis**, the modeled service pressures are 552 kPa and 437 kPa for the Average Day Demand Maximum Pressure and Peak Hour Demand Minimum Pressure, respectively for the Phase 1 subdivision, which includes the site plan block.

3.3 Fire Flow Requirements

Per **GeoAdvice Hydraulic Analysis**, the available fire flows, as shown on Figure Appendix E, for the site plan block range from 162 L/s to 210 L/s, which will be supplied by the internally looped 200 mm diameter watermain. The 200 mm watermain is sized to the minimum diameter that satisfies the Max Day plus fire and Peak Hour demand.

The City of Ottawa's recent Technical Bulletin (IWSTB-2024-05) states that the requirement for levels of fire protection on private property in urban areas is covered in Section A-3.2.5.7 of the OBC. Fire flow requirements, provided in the **GeoAdvice Hydraulic Analysis**, were estimated for the most constrained blocks consisting of 12 units, yielded a required fire flow of 6,300 L/min. All other blocks required 4,500 L/min or less fire flow within the site plan. For the Blocks adjacent to the existing housing rear yards, a 4.5m offset from the property line of the proposed blocks was used, see **Appendix B**, for a mark-up example of the most constrained buildings within the site plan block.

3.4 Water Supply Conclusion

The site plan blocks will be serviced internally with meter chambers installed within the property boundary at the site entrances. The looped watermain network ultimately connects to the Magnolia Phase 1 subdivision at Street 1 (E) and an ultimate connection to the future phase at the west boundary. A temporary watermain is proposed along the west and north boundary of the site plan block in the interim. The system has been reviewed for required domestic demand and fire flows and meets all necessary requirements.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site was considered in the design of the Magnolia Subdivision - Phase 1 (see Phase 1 **Drawing 44, Appendix C**) with sanitary flows conveyed to the existing Shea Road Sanitary Pump Station located north of the existing Davidson Pond which serves as the outlet for the overall development. Please refer to the **Sanitary Drainage Plan (Drawing 15)** prepared by DSEL.

4.2 Wastewater Design

The site plan block has an internal network of sanitary sewers that will direct flows to the proposed sanitary sewer within Street 1 of the Magnolia Subdivision. Blocks 1, 12 and 13 will have direct lateral connections to the 250 mm diameter sanitary sewer within Street 1 of the subdivision. Each unit has one lateral servicing two units (upper and lower) as shown in **Drawing 2**. The internal sanitary sewer layout within the site plan will consist of a 200 mm PVC sanitary sewer that will follow the internal private streets, connecting Private Street 3 (MH 118A) and Private Street 5 (MH 176A) to Phase 1 of the Subdivision at MH 119A and 120A, respectively.

The site plan has 264 units resulting in a population of 713 persons. As shown on the Phase 1 Subdivision Sanitary Drainage Plan (**Drawing 44, Appendix C**), the downstream sewer system assumed a population of 722 persons. Therefore, the site plan has been adequately designed for in the downstream sewer system and ultimately the existing sanitary pump station which has capacity available to accommodate the site plan block as demonstrated in the **DSEL Phase 1 Design Brief**. The sanitary design sheet is included in **Appendix C**.

Table 5 below summarizes the design standards used in the development of the proposed wastewater sewer system for the Magnolia Subdivision - Phase 1.

Table 3: Wastewater Design Criteria

Design Parameter	Value
Current Design Guidelines	
Residential – Stacked TH Condo	2.7 p/unit
Average Daily Demand	280 L/d/person
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Infiltration and Inflow Allowance	0.33 L/s/ha
Park Flows	28,000 L/ha/d
Park Peaking Factor	1.0
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
<i>Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012, and associated Technical Bulletins.</i>	

4.3 Sanitary HGL Analysis

As part of the **DSEL Phase 1 Design Brief**, PCSWMM was used to analyze the sanitary HGL elevations within the proposed development lands under Rare and Annual flow conditions. As shown in **Appendix D**, Blocks 1-3 which connect to the municipal sanitary sewer on Street 1 have USF elevations that range from 104.28 m to 104.39 m. The max HGL for the Annual and Rare scenarios within the sewers adjacent to these blocks ranges from 103.54 m - 103.55 m. Therefore, minimum freeboard is sufficient for both the Rare and Annual flow conditions for Blocks 1-3.

For blocks internal to the subdivision, USF elevations range from 104.05 (Block 11) to 104.56 (Block 4) which are 0.50 m to 1.01 m above the HGL at the connection to the subdivision. Therefore, minimum freeboard is assumed to be sufficient for both the Rare and Annual flow conditions for all Blocks. The subdivision sanitary HGL models will be updated to incorporate the private site plan sewers prior to final approval.

4.4 Wastewater Servicing Conclusions

The subject property will be serviced by local sanitary sewers which will outlet to existing infrastructure constructed as part of the Magnolia Subdivision Phase 1. The subject site has been contemplated in the downstream sewers and existing Shea Road Sanitary Pump Station. Sufficient capacity exists to support the development of the private site plan block.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

As discussed in the **DSEL Phase 1 Design Brief** the development of the site plan block was considered in the Magnolia Subdivision Phase 1 detailed subdivision design as a lumped block draining to the downstream West Pond. A separate PCSWMM model has been developed for the site plan block to assess the internal storm sewer system and confirm the minor and major system is sufficiently designed. This section will discuss the site plan model setup and results.

5.2 Stormwater Management Design and Objectives

The applied design criteria for the site plan block include the following::

- The site plan block has a drainage area of approximately 2.37 hectares with a runoff coefficient of 0.8.
- As modeled in the **DSEL Phase 1 Design Brief** the site plan block is required to capture the majority of the flows up to an including the 100 year design storm on-site.
- 2.06 hectares of the site plan block will be conveyed to MH 202 located at the southern entrance of Street 1 via a proposed storm sewer network.
- Areas adjacent to boundary roads adjacent to Street 1 (0.16 hectares) and Flewellyn (0.15 hectares) will be conveyed to the adjacent right-of-way consistent with the **DSEL Phase 1 Design Brief**.
- A fixed outlet condition which applies HGLs from the **DSEL Phase 1 Design Brief** PCSWMM model was considered at MH 202 to account for flows from the adjacent subdivision.
- Quantity, Quality and Erosion Control for the site plan block will be provided by the adjacent downstream West Pond.

On-site storm flows will be captured by local CB infrastructure and allocated to the West SWM Pond within the subdivision. **Table 6** below summarizes the design standards used for the proposed on-site storm sewer system. Storm calculation sheets and PCSWMM modeling for the subject property have been appended to this technical brief in **Appendix D**.

Table 4: Storm Sewer Design Criteria

Design Parameter	Value
Minor System Design Return Period	1:2 year (PIEDTB-2016-01) for private roads, without ponding
Major System Design Return Period	1:100 year
Intensity Duration Frequency Curve (IDF) 2-year storm event: A=732.951 B=6.199 C=0.810 5-year storm event: A = 998.071 B = 6.053 C = 0.814	$i = \frac{A}{(t_c + B)^C}$
Minimum Time of Concentration	10 minutes
Rational Method	$Q = CiA$

Storm sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
Runoff coefficient for paved and roof areas	0.9
Runoff coefficient for landscaped areas	0.2
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n' for pipe flow	0.013
Minimum Depth of Cover	1.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.8 m/s
Maximum Full Flowing Velocity	6.0 m/s
Clearance from 100-Year Hydraulic Grade Line to Building Opening	0.30 m
Design Parameter	Value
Extent of Major System	To be contained within the private road and parking areas or adjacent to the ROW provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100-year + 20%) and 15 cm vertical clearance is maintained between spill elevation on the street and the ground elevation at the nearest building envelope (PIEDTB-2016-01)
Stormwater Management Model (per DSEL Phase 1 Design Brief)	PCSWMM (version 7.4)
Model Parameters	Fo = 76.2 mm/hr, Fc = 13.2 mm/hr, DCAY = 4.14/hr, D.Stor.Imp. = 1.57 mm, D.Stor.Per. = 4.67 mm
Imperviousness	Based on runoff coefficient (C) where Percent Imperviousness = (C - 0.2) / 0.7 x 100%.
Design Storms	Chicago 3-hour Design Storms and 24-hour SCS Type II Design Storms. Maximum intensity averaged over 10 minutes.
Historical Events	July 1st, 1979, August 4th, 1988 and August 8th, 1996
Climate Change Street Test	20% increase in the 100-year, 3-hour Chicago storm
<i>Extracted from City of Ottawa Sewer Design Guidelines, October 2012, and ISSU, and based on recent residential subdivisions in City of Ottawa.</i>	

5.3 Hydraulic Grade Line Analysis

An HGL analysis was completed to ensure there will be sufficient freeboard between the HGL and the proposed underside of footing (USF). As shown in **Appendix D**, the minimum freeboard was found to be 0.33m in the 100-year storm event, which meets the 0.3 m freeboard required between the HGL and USF. In addition, the minimum freeboard of 0.0 m

for the 100-year +20% stress test was achieved. Therefore, the HGL analysis demonstrates that gravity service connections to the storm sewer are feasible throughout the proposed site plan block.

5.4 Minor System Design

The minor stormwater management system conveys internal site runoff to the downstream municipal storm network. Stormwater is collected on-site through a network of catch basins (CBs) and storm sewers, which direct flows to MH202 via a 900 mm diameter storm sewer into Street 1 (East) and outlets into the West SWM Pond (Block 1), that eventually drains into the Faulkner Municipal Drain (FMD).

Each catch basin in the system is modeled with inlet control devices (ICDs) to simulate the hydraulic performance of CB grates. The ICDs ensure the 2-year event is captured in the minor system with 6 cm or less of depth above the proposed grates. During significant rainfall events, this can result in minor ponding at CBs due to the grate constriction. Overall, the minor system design meets the City of Ottawa's design criteria and ensures effective stormwater conveyance within the site. CB ponding depth results for the 2-year, 5-year, 100-year, and stress tests are presented in **Appendix D**.

5.5 Major System Design

Major system conveyance, or overland flow (OLF), is provided to accommodate flows in excess of the minor system capacity. OLF is accommodated by generally storing stormwater up to the 100-year design event in road sags then routing additional surface flow along the road network and rear yards as shown in the Storm Drainage Plans, included as **Drawing 16**. All internal major system drainage is conveyed to a set of CB's designed to capture the full major system flows for the development prior to conveying these flows via the storm sewer network to the downstream West Pond.

Based on the PCSWMM model, it was determined that the 100-year depth of water on the streets at the ponding areas will not exceed 35 cm. Additionally, it was determined that the maximum water surface elevation will not touch the building envelopes during the 100-year +20% stress test. CB ponding depth results for the 2-year, 5-year, 100-year, and stress tests are presented in **Appendix D**.

5.6 Grading and Drainage Design

The following additional grading criteria and guidelines are applied to detailed design, per City of **Ottawa Guidelines** and standard industry practices:

- Slope in grassed areas will be between 2% and 7%;
- Grades in excess of 7% will require terracing to a maximum of a 3:1 slope;
- Swales are to be 0.15m deep with 3:1 side slopes unless otherwise indicated on the drawings; and,
- Perforated pipe will be required for drainage swales if they are less than 1.5% in slope;
- Grades within the roads and parking stalls are limited to min 1% and max 5%.

Drawing 13 illustrates the proposed detailed grading. External areas north of the development will be diverted around the proposed site plan block in the interim condition. It is expected that once those parcels are developed, stormwater will be attenuated on-site via rear yard catchbasins and directed toward the West SWM Pond.

5.7 Stormwater Servicing Conclusions

The stormwater from the proposed site plan block has been accounted for in downstream linear storm infrastructure and downstream West Pond. The downstream West Pond provides the required quantity, quality and erosion controls for the proposed site plan block. The uncontrolled drainage areas within the site plan block consist of roof and/or front/rear yard drainage and therefore do not require quality control. The downstream West Pond has been designed to over-control for these areas in conformance with the overall development as the SWM pond has been sufficiently sized to accommodate the site plan block.

6.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes agitated. Prior to topsoil stripping, earthworks or construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fencing will be installed around the perimeter of the active part of the site (and headwater features) and will be cleaned and maintained throughout construction. The silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catchbasins will have catchbasin inserts installed during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access to prevent mud tracking onto adjacent roads.

The following additional recommendations to the Contractor will be included in contract documents:

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from entering any existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.

The Contractor will be required to complete regular inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers.
- Clean and change inserts at catch basins.

7.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Caivan (Stittsville) Inc. to prepare a Design Brief in support of their application for site plan control. The preceding report outlines the following:

- Water – surrounding water main infrastructure within the Magnolia Subdivision is available to support the subject lands. Sufficient pressure is available within the City's desired pressure range.
- Wastewater – Blocks 1, 2 and 3 within the private development will have servicing connections directly to Street 1 of the Magnolia Subdivision and the remaining sanitary flows will be conveyed by gravity to the subdivision sanitary sewer network and ultimately to the existing Shea Road Sanitary Pump Station. The sanitary sewer network has capacity to support the site plan block.
- Stormwater – Stormwater was considered in the design of the receiving storm sewers and downstream West Pond facility which provides all necessary quantity, quality and erosion controls. The subject property consists of a series of rear lot catchbasins which capture 100 year flows and internal road/parking lot catchbasins equipped with 2 year ICD's and associated gravity sewers that allocate flows to the West SWM Pond as part of Phase 1 of the overall Magnolia Subdivision.

The submitted materials demonstrate that the water, sanitary, and storm services currently proposed and/or under construction can accommodate the contemplated development.

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Per: John Priamo, P.Eng.
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