

Shell Canada Ltd.

Site Servicing Report 5 Orchard Drive, Ottawa

Hazeldean Road and Fringewood Drive



Prepared by:

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 Date:
 September, 2020

 Project #:
 60593779

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Stamp is limited to the report preparation. Calculations and drawings contained herein are prepared by others.

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Note: Civil design drawings and calculations discussed and referred to within this report are prepared and stamped by CTM Design Services Ltd.

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- Appendix B. 5 Orchard Drive Pre-Application Consultation Meeting Notes (July 22, 2019)
- Appendix C. City of Ottawa Development Servicing Study Checklist
- Appendix D. Sanitary Sewer Calculations and Supporting Information
- Appendix E. Overall Site Servicing Plan (Sheet C103.0)

1. INTRODUCTION

AECOM has been retained by Shell Canada Ltd. (Shell) to complete the grading, site servicing plans and memo and stormwater design in support of the development of a proposed gas station, convenience store, car wash and other associated amenities in the City of Ottawa. The site is located on the southwest corner of the intersection of Hazeldean Road and Fringewood Drive. Throughout this report, the proposed Shell gas station is referred to as the subject site.

1.1 Background Documents

The subject site is 0.306 ha (3065 m²) of a larger site plan by Campanale Homes at 5 Orchard Drive. The larger site plan has been presented to the City as part of the Draft Plan of Subdivision within the report entitled Functional Servicing and Stormwater Management Report for Campanale Homes 5 Orchard Drive (DSEL, March 2019). The 2019 Functional Servicing Report demonstrated that the servicing of the entire proposed development could be undertaken as per the City of Ottawa design standards. The overall site includes residential and commercial area and the subject site is part of the commercial area. The total commercial area is 1.82 ha with the subject site being one-sixth of that area. Shell will be leasing the property for the subject site from Campanale Homes and has agreed to submit an independent site servicing design to the City.

The following background documentation was referenced in the preparation of this memo:

- Functional Servicing and Stormwater Management Report for Campanale Homes 5 Orchard Drive (DSEL, March 2019)
- Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletins ISDTB-2014-01 (February 2014), PIEDTB-2016-01 (September 2016) and ISTB-2018-01 (March 2018)
- Ottawa Design Guidelines Water Distribution and Technical Bulletins ISD-2010-2 (December 2010), ISDTB-2014-02 (May 2014) and ISDTB-2019-02 (March 2018)
- Stormwater Management Planning and Design Manual (Ontario Ministry of the Environment, 2003)

1.2 Existing Conditions and Infrastructure

The subject site is located on the southwest corner of the intersection of Hazeldean Road and Fringewood Drive (see Figure 1.1). Under current conditions, the site drains from southwest to northeast toward the intersection. Runoff from the site is captured in one of two ditch inlet catch basins (DICBs) servicing the entire development area. The approximate location of these DICBs is indicated in Figure 1.1 and shown on Sheet C103.0 presented in **Appendix E**. These DICBs are connected into the existing Hazeldean Road storm sewer system. There are no existing water and sanitary services on the subject site itself. The 2019 Functional Servicing Report identified the existing sanitary sewer and watermain services within the municipal right-of-ways adjacent the subject site, but no storm sewer currently exists within Fringewood Drive. The 2019 Functional Servicing Report is provided in **Appendix A**.

A storm sewer in Fringewood Drive, and the ultimate outlet for the site, has been designed, approved by the City of Ottawa and a Ontario Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) has been issued. The storm sewer is anticipated to be constructed concurrently with the future subdivision to the south of the subject site. Following discussions with the adjacent developer, it is anticipated that the subdivision and installation of the Fringewood Drive storm sewer will be in advance of the construction of the subject site. Therefore, for the purposes of this report and design, it is assumed that the storm sewer within Fringewood Drive exists.



Existing ditch inlets (approximate location)



1.3 Consultation and Permits

Pre-consultation meeting was undertaken with the City of Ottawa in July 16, 2019. The meeting was coordinated with the review and consultation process associated with the entire development area and the 2019 Functional Servicing Report. The minutes from the pre-consultation meeting are included in **Appendix B**.

Development of the site may proceed subject to compliance and approval from the City of Ottawa Planning and Development Approvals process. Approval can be obtained following the submission of detailed engineering drawings, reports and calculations supporting the development of the subject site following review and the satisfaction of City of Ottawa staff. The first round of comments was received from the City dated June 26, 2020 and this current submission addresses those comments.

A tree conservation memo has been produced for the subject site entitled *5 Orchard Drive = Tree Conservation Report Memo* (WSP, February 13, 2020). The memo outlines the inventory of tree to be impacted by the development of the subject site, mitigation measures and tree compensation suggestions. At this time, there is no anticipated need for a tree removal permit from the City. A copy of the memo accompanies the application package.

The Development Servicing Study Checklist in support of this servicing application is provided in Appendix C.

2. GEOTECHNICAL CONSIDERATIONS

A geotechnical investigation was undertaken for the subject site and documented in the report entitled *Draft Geotechnical Investigation Report Proposed Shell Service Station 5 Orchard Drive Ottawa Ontario* (Gemtec, June 2019). The recommendations from that report were incorporated into the design of the subject site. A copy of the report accompanies the application package.

3. **DEVIATIONS**

There are no deviations from the City of Ottawa guidelines as part of the design of the subject site.

4. WATER SERVICING

4.1 Design Criteria

The design criteria applied to the water servicing design followed the Ottawa Water Distribution Guidelines and associated Technical Bulletins. A summary of the applicable criteria is presented below:

- Industrial Space = 35,000 L/ha/d
- Industrial Maximum Daily Demand = 1.5 x average day L/gross ha/d
- Industrial Maximum Hour Demand = 1.8 x average day L/gross ha/d
- 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 the range of 350 kPa and 480 kPa
- During normal operating conditions pressure must not drop below 275 kPa
- During normal operating conditions pressure shall not exceed 552 kPa
- During fire flow operating pressure must not drop below 140 kPa

The anticipated water demand and required minimum and maximum water pressures are based on the Ottawa Water Distribution Guidelines. Boundary conditions for the subject site were provided by the City of Ottawa and obtained from the 2019 Functional Servicing Report (see **Appendix A**). A summary of the water demand information is provided below:

The consumption rate was first estimated based on the Ottawa Water Distribution Guidelines for Industrial Space, using 35,000 L/ha/d. The area of the subject site is 0.3065 Ha, giving an average daily flow rate of 10,728 L/day or 7.45 L/min. Applying the peak factors noted above, the Maximum Day and Maximum Hour demand are calculated as 11.18 L/min and 13.41 L/min, respectively.

The above estimation is considered low for this site due the car wash which will be part of the development. The anticipated Maximum hour flow, based on similar car wash facilities, is in the range of 5,000 L/Hour or 83 L/min

Per the Ottawa Water Distribution Guidelines and Technical Bulletin ISTB-2018-02, the FUS method was used to estimate the required fire flow for the subject site. Below is a summary of the calculation:

F = 220C(A)^0.5 Where: C = 0.8 A = 168 sq.m. + 112 sq.m. = 280 sq.m. F = 220 (0.8) (280)^ 0.5 F = 3000 L/min Add a separation charge of 30% F = 4000 L/min (rounded to nearest 1000) From the 2019 Functional Servicing Report, an assumed commercial fire flow requirement of 15,000 L/min was used for the entire commercial development, including the subject site. The report includes simulations performed using EPANET that show:

- During Peak Hour Demand, the operating pressure does not drop below 140 kPa, and
- During Maximum Day Demand plus Fire Flow, operating pressure must not drop below 140 kPa.

4.2 Proposed Servicing

The 2019 Functional Servicing Report identified the existing 200 mm diameter watermain located in Fringewood Drive (see **Sheet C801.0**) as the water supply point for the proposed residential and commercial development, via a new looped (double connection) 200 mm diameter watermain. The subject site will be connected to the northern portion of this new watermain, a section of which will be constructed as part of the subject site. The existing watermain in Fringewood Drive is located within the City of Ottawa 3W pressure zone.

The proposed water service connection from Fringewood Drive into the commercial site (private property) along the southern portion of the subject site is presented on **Sheet C801.0**. The lateral from Fringewood Drive into the site is proposed to be a 200 mm diameter watermain. The subject site is proposed to be serviced off this water service located on private property via two (2) connections: a 200 mm diameter pipe extended to the north for a proposed fire hydrant; and a 100 mm diameter pipe to service the car wash and building The minimum pipe size on the site is 50 mm diameter.

4.3 Summary and Conclusions

From **Sections 4.1 to 4.3**, water service calculations provided in 2019 Functional Servicing Report (**Appendix A**) and **Sheet C801.0**, the water servicing design for the subject site meets the City of Ottawa requirements.



LEGEND

NEW TELECOM NEW POWER LINE NEW WATER LINE EXISTING WATER LINE WATER VALVE

PROPOSED 200mmØ WATERMAIN TABLE (TO FIRE HYDRANT)							
STATION	SURFACE ELEVATION	T/WM ELEVATION	DEPTH OF COVER	SANITARY INVERT	STORM INVERT	DIFFERENCE	COMMENTS
0+100	105.156	102.000	3.156	-	-	-	CONNECTION 200 X 200 X 200 TEE
0+101.96	105.153	102.000	3.153	-	-	-	WATER VALVE WITH BOX
0+102.32	105.153	102.000	3.153	-	-	-	GAS LINE CROSSING
0+106.20	105.147	102.272	2.875	101.622	-	0.250	200Ø SANITARY LINE CROSSING, WATER LINE CROSSING OVER PIPE
0+107.93	105.144	101.877	3.267	-	102.377	0.500	675Ø STORM LINE CROSSING, WATER LINE CROSSING UNDER PIPE
0+112.03	105.307	102.000	3.307	-	-	-	REDUCER 200 X 150
0+113.47	105.315	102.000	3.315	-	-	-	HYDRANT VALVE
0+115.00	105.309	102.000	3.309	-	-	-	FIRE HYDRANT
	г						
	F	PROPOSED	100mmØ W	ATERMAI	N TABLE	(TO CAR W	/ASH)
STATION	SURFACE ELEVATION	T/WM ELEVATION	100mmØ W DEPTH OF COVER	ATERMAI SANITARY INVERT	N TABLE STORM INVERT	(TO CAR W	(ASH)
STATION 0+100.00	SURFACE ELEVATION 105.300	PROPOSED T/WM ELEVATION 102.000	100mmØ W DEPTH OF COVER 3.300	ATERMAI SANITARY INVERT	N TABLE STORM INVERT	(TO CAR W DIFFERENCE	VASH) COMMENTS 200 X 200 X100 TEE
STATION 0+100.00 0+102.290	SURFACE ELEVATION 105.300 105.239	T/WM ELEVATION 102.000 102.000	100mmØ W DEPTH OF COVER 3.300 3.239	ATERMAI SANITARY INVERT - -	N TABLE STORM INVERT - -	(TO CAR W DIFFERENCE - -	ASH) COMMENTS 200 X 200 X100 TEE GAS LINE CROSSING
STATION 0+100.00 0+102.290 0+103.150	SURFACE ELEVATION 105.300 105.239 105.218	PROPOSED T/WM ELEVATION 102.000 102.351	100mmØ W DEPTH OF COVER 3.300 3.239 2.867	ATERMAI SANITARY INVERT - - 101.801	N TABLE STORM INVERT - -	(TO CAR W DIFFERENCE - 0.250	VASH) COMMENTS 200 X 200 X100 TEE GAS LINE CROSSING 200Ø SANITARY LINE CROSSING, WATER LINE CROSSING OVER PIPE
STATION 0+100.00 0+102.290 0+103.150 0+105.150	SURFACE ELEVATION 105.300 105.239 105.218 105.178	PROPOSED T/WM ELEVATION 102.000 102.351 102.000	100mmØ W DEPTH OF COVER 3.300 3.239 2.867 3.178	ATERMAI SANITARY INVERT - 101.801 -	N TABLE STORM INVERT - - 102.541	(TO CAR W DIFFERENCE - 0.250 0.541	VASH) COMMENTS 200 X 200 X100 TEE GAS LINE CROSSING 200Ø SANITARY LINE CROSSING, WATER LINE CROSSING OVER PIPE 675Ø STORM LINE CROSSING, WATER LINE CROSSING UNDER PIPE
STATION 0+100.00 0+102.290 0+103.150 0+105.150 0+106.680	SURFACE ELEVATION 105.300 105.239 105.218 105.178 105.175	PROPOSED T/WM ELEVATION 102.000 102.351 102.000 102.000	100mmØ W DEPTH OF COVER 3.300 3.239 2.867 3.178 3.175	ATERMAI SANITARY INVERT - - 101.801 - - -	N TABLE STORM INVERT 102.541 103.570	(TO CAR W DIFFERENCE - 0.250 0.541 1.570	ASH) COMMENTS 200 X 200 X100 TEE GAS LINE CROSSING 200Ø SANITARY LINE CROSSING, WATER LINE CROSSING OVER PIPE 675Ø STORM LINE CROSSING, WATER LINE CROSSING UNDER PIPE 750Ø STORM LINE CROSSING, WATER LINE CROSSING UNDER PIPE

PROPOSED 50mmØ WATERMAIN TABLE (CAR WASH TO C-STORE)							
STATION	SURFACE ELEVATION	T/WM ELEVATION	DEPTH OF COVER	SANITARY INVERT	STORM INVERT	DIFFERENCE	COMMENTS
0+100	105.800	102.000	3.800	-	-	-	CONNECTION FROM CAR WASH
0+100.50	105.532	102.000	3.532	-	-	-	90° HORIZONTAL BEND
0+101.29	105.535	102.000	3.535	-	-	-	45° HORIZONTAL BEND
0+102.29	105.552	102.000	3.552	-	-	-	45° HORIZONTAL BEND
0+103.08	105.590	102.000	3.590	103.797	-	1.797	150Ø SANITARY LINE CROSSING, WATER LINE CROSSING UNDER PIPE
0+110.10	105.620	102.000	3.620	-	-	-	45° HORIZONTAL BEND
0+115.00	105.601	102.000	3.601	-	-	-	45° HORIZONTAL BEND
0+122.16	105.230	102.000	3.230	-	102.890	0.890	1050Ø STORM LINE CROSSING, WATER LINE CROSSING UNDER PIPE
0+133.33	105.260	102.000	3.260	-	-	-	45° HORIZONTAL BEND
0+139.47	105.320	102.000	3.320	-	-	-	45° HORIZONTAL BEND
0+142.00	105.450	102.000	3.450	-	-	-	CONNECTION TO C-STORE

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PROJECT

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REGISTRATION

LEGAL DESCRIPTION PART OF BLOCK 21 OF DRAFT PLAN OF SUBDIVISION OF PARTS OF LOTS 26 AND 27 OF REGISTERED PLAN 4R2506 PART 3, CONCESSION 11, GEOGRAPHIC TOWNSHIP OF GOULBOURN (CITY OF OTTAWA)

ISSUE/REVISION

D	2020-09-30	RE-ISSUED FOR SPA
С	2020-09-15	ISSUED TO CLIENT
В	2020-08-14	ISSUED FOR SWM ANALYSIS
Α	2020-03-31	ISSUED FOR SPA
I/R	DATE	DESCRIPTION

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KEY PLAN



CITY PLAN NO. 18131

GLOBAL PROJECT ID NUMBER

CAN01444

SHEET TITLE

SITE WATER SERVICING PLAN

CTM DESIGN FILE NAME

2020072_C103.0 SHEET NUMBER

C801.0

5. SANITARY SERVICING

5.1 Design Criteria

The following summarizes the parameters, as per the Ottawa Sewer Design Guidelines, used to design the sanitary sewer system for the subject site:

- Average Daily Demand = 280 L/d/per
- Peaking Factor = Harmon's Peaking Factor Max 3.8 and Min 2.0
- Industrial- 35,000 L/ha/day (gas station and car wash land use)
- Infiltration and Inflow Allowance = 0.33L/s/ha
- Sanitary sewers sized using Manning's Equation
- Commercial Peaking Factor = 1.50
- Minimum Sanitary Sewer Lateral = 135 mm diameter
- Minimum Manning's n = 0.013
- Minimum Depth of Cover = 2.5 m from crown of sewer to grade
- Minimum Full Flowing Velocity = 0.6 m/s
- Maximum Full Flowing Velocity 3.0 m/s

5.2 Proposed Sanitary Servicing and Calculations

The anticipated peak flow from the proposed subject site is provided below and supporting calculations are provided in **Appendix D**:

- Cumulative Average Daily Flow Rate = 0.74 L/s
- Peak Dry Weather Flow Rate = 1.11 L/s
- Peak Wet Weather Flow Rate = 1.71 L/s

The estimated sanitary flow based on the proposed subject site and associated uses is anticipated to be a wet weather flow of 1.71 L/s. The sanitary flow calculated is based on the Ottawa Sewer Design Guidelines Appendix 4-A (Daily Sewage Flow for Various Establishments) is 1.66 l/s. The estimated sanitary flow is less than the allowable amount of 1.71 l/s.

The sanitary sewer connection for the entire commercial site was proposed, in the 2019 Functional Servicing Report, to be serviced via a 250 mm diameter sanitary pipe in Fringewood Drive. This sanitary system was constructed in 2019 and is shown on City of Ottawa mapping (geoOttawa). The Fringewood Drive sanitary sewer connects to the 675 mm diameter sanitary sewer within Hazeldean Road. The Hazeldean Road system is tributary to the Kanata West Pumping Station.

The proposed sanitary servicing of the subject site is presented in **Sheet C802.0**. The connection of the entire site is proposed to be connected to the recently constructed (2019) 250 mm diameter sanitary system within Fringewood Drive. From this existing sanitary system, a 200 mm diameter pipe to service the entire commercial site is proposed to be extended west through the southern portion of the subject site. Service for the subject site is via a 200 mm diameter sanitary sewer extended north into the subject site. The smallest diameter sanitary pipe proposed on the subject site is a 150 mm diameter pipe. Calculations are presented on the attached Sanitary Sewer Design spreadsheet and were prepared using Manning's Equation. The sanitary sewer spreadsheet supporting the design of the subject site is presented in **Appendix D**.

5.3 Summary and Conclusions

From the above, calculations provided in **Appendix D** and **Sheet C802.0**, the sanitary sewer design for the subject site meets the City of Ottawa requirements.



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MANHOLE

NEW POWER LINE NEW SANITARY LINE EXISTING SANITARY LINE

NEW TELECOM

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GLOBAL PROJECT ID NUMBER

CAN01444

SHEET TITLE

SITE SANITARY SERVICING PLAN

CTM DESIGN FILE NAME

2020072_C103.0 SHEET NUMBER

C802.0

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6. STORM SERVICING AND STORMWATER MANAGEMENT

The storm servicing design and stormwater management evaluation for the subject site was undertaken and documented in a separate report entitled *Shell Canada Stormwater Management Report 5 Orchard Drive, Stittsville, City of Ottawa* (AECOM, 2020). The results from that design and evaluation documented in that report were incorporated into the design of the subject site. A copy of the report accompanies the application package.

7. SEDIMENT AND EROSION CONTROL

Sediment and erosion control measures are presented on **Sheet C101.0**. The following mitigation measures are proposed during the construction phase of the subject site servicing:

- Heavy duty silt fence per OPSD 219.110 around the perimeter of the site with the exception of construction access point;
- Diversion ditch around the perimeter of the site within the heavy duty silt fence;
- Erosion control blankets within the diversion ditch;
- Rock flow check dams per OPSS Prov 804 at numerous locations within the diversion ditch;
- Sediment traps and rock flow check dams at numerous locations within the diversion ditches per OPSD 219.220;
- Sediment control mud mat (minimum 450 mm depth of 50 mm clear stone) at the construction access point from Fringewood Drive; and,
- Sediment traps with filter cloth to be installed on all existing ditch inlets and catchbasins within the vicinity of the site (details and protected inlets indicated on **Sheet C101.0**).

To facilitate construction, access will be via Fringewood Drive. A diversion ditch is proposed around the perimeter of the site inside the heavy duty silt fence to capture and convey runoff from the site to the existing ditch inlet on the northeast corner of the property (see **Sheet C101.0** for location). This ditch inlet is connected into the storm sewer system in Hazeldean Road. Rock check dams and sediment traps are located at the existing ditch inlet and at strategic locations throughout the diversion ditch to retain and allow sediment deposition prior to discharging into the Hazeldean Road storm sewer system. To protect the side slopes of the diversion ditch, erosion control blankets are proposed.

The sediment and erosion control plan presented will be used as a base for the contractor who is responsible for installation, maintenance and monitoring of the measures during construction. The contractor will be responsible to adjust and repair any sediment and erosion control measures as required. The contractor's installation, inspection and maintenance requirements are captured on the general notes and erosion and sediment control plan presented on **Sheet C101.0**.





SITE INFORMATION

MUNICIPAL ADDRESS 5 ORCHARD DR STITTSVILLE, ONTARIO ZONING ARTERIAL MAINSTREET SUBZONE 9 - AM9

	After Construction Prio	r to Final Acceptance	After Final Acceptance
spection equency	Approval to Remove	Removal Responsibility	Inspection/Maintenance Responsibility
Veekly minimum)	Consultant	Developer's Contractor	N/A
Veekly minimum)	Consultant	Developer's Contractor	N/A
Veekly minimum)	Developer's Contractor	Developer's Contractor	N/A
Veekly minimum)	Consultant	Developer's Contractor	N/A
Veekly minimum)	Developer's Contractor	Developer's Contractor	N/A
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ISSUE/REVISION

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С	2020-09-30	RE-ISSUED FOR SPA
В	2020-07-07	REVISED PER SPA COMMENTS
Α	2020-03-31	ISSUED FOR SPA
I/R	DATE	DESCRIPTION

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KEY PLAN



CITY PLAN NO. 18131

GLOBAL PROJECT ID NUMBER

CAN01444

SHEET TITLE

SITE

SEDIMENT AND EROSION CONTROL PLAN

CTM DESIGN FILE NAME

2020072 C101.0 SHEET NUMBER

C101.0

8. APPROVAL AND PERMIT REQUIREMENTS

The following is a list of the approval and permits required to develop the subject site:

- Ontario Ministry of Environment, Conservation and Parks Environmental Compliance Approval (ECA) under the Ontario Water Resources Act for water service, sanitary and storm sewer pipes and stormwater management measures;
- Mississippi Valley Conservation Authority Review of site servicing to provide agreement to the site development in support of the ECA application submission;
- City of Ottawa Approvals for the development application, municipal sign-off on the ECA application and all other applicable permits required for connection of services to the ROW and site development.



Appendix A

Functional Servicing and Stormwater Management Report for Campanale Homes 5 Orchard Drive, City of Ottawa (DSEL, March 2019)



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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

CAMPANALE HOMES 5 ORCHARD DRIVE

CITY OF OTTAWA

PROJECT NO.: 18-1006

MARCH 2019 - REV. 3

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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT FOR CAMPANALE HOMES 5 ORCHARD DRIVE

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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT FOR CAMPANALE HOMES 5 ORCHARD DRIVE

CITY OF OTTAWA

MARCH 2019 – REV. 3 PROJECT NO.: 18-1006

1.0 INTRODUCTION

David Schaeffer Engineering Ltd. (DSEL) has been retained by Campanale Homes to prepare a Functional Servicing and Stormwater Management Report in support of the Draft Plan of Subdivision (DPS) for the proposed development at 5 Orchard Drive.

The subject property is located within the City of Ottawa urban boundary, in the Stittsville ward. As illustrated in *Figure 1*, the subject property is bounded by Hazeldean Road to the north, Fringewood Drive to the east, an existing restaurant to the west and existing residential development to the south. The subject property measures approximately **3.97** *ha* and is designated Arterial Mainstreet (AM9) under the current City of Ottawa zoning by-law.



Figure 1: Site Location

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The proposed development consists of **1.82** *ha* of commercial space and **2.13** *ha* of residential land: comprised of 65 townhouse units; 2 semi-detached units; and 7 single home units.

The objective of this report is to support the application for Draft Plan of Subdivision by providing sufficient detail demonstrating that the proposed development is supported by existing and proposed municipal servicing infrastructure. Additionally, this report will demonstrate that the site design conforms to current City of Ottawa design standards.

1.1 Existing Conditions

The subject site is currently undeveloped. Two existing parallel ditches run from the south side of the property toward two ditch-inlet catch basins (DICBs) at the north edge of the property along Hazeldean Road. The existing DICBs outlet into the existing 675 mm diameter stormwater on Hazeldean Road. There is also a ditch along the southern property line which collects storm water runoff from the existing residential units on the adjacent property and outlets into the western most ditch of the two previously mentioned ditches. Note that in existing conditions there is a drop in elevation between the gravel shoulder and the subject property, to the north of the subject site, along Hazeldean Road. Sewer system and watermain distribution mapping collected from the City of Ottawa indicate that the following services exist across the property frontages, within the adjacent municipal right-of-ways:

Hazeldean Road:

- > 762 mm watermain;
- \succ 675 mm storm sewer;
- ➢ 450 mm storm sewer;
- > 150 mm sanitary sewer at northwest corner of site; and
- ➢ 675 mm sanitary sewer northeast of site.

Fringewood Drive:

> 200 mm watermain.

1.2 Required Permits / Approvals

Development of the site is subject to the City of Ottawa Planning and Development Approvals process. The City of Ottawa must approve detailed engineering design drawings and reports prepared to support the proposed development plan before issuing approval. The subject property contains existing trees. Development, which may require removal of existing trees, may be subject to the City of Ottawa Urban Tree Conservation By-law No. 2009-200.

1.3 **Pre-consultation**

Pre-consultation correspondence and the servicing guidelines checklist are located in *Appendix A*.

Further pre-consultation with City Staff has been completed via email. Associated correspondence is located in *Appendix A*.

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2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report:

- Ottawa Sewer Design Guidelines, City of Ottawa, October 2012. (City Standards)
 - Technical Bulletin ISDTB-2014-01 City of Ottawa, February 5, 2014. (ITSB-2014-01)
 - Technical Bulletin PIEDTB-2016-01
 City of Ottawa, September 6, 2016.
 (PIEDTB-2016-01)
 - Technical Bulletin ISTB-2018-01
 City of Ottawa, March 21, 2018.
 (ISTB-2018-01)
- Ottawa Design Guidelines Water Distribution City of Ottawa, July 2010. (Water Supply Guidelines)
 - Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. (ISDTB-2010-2)
 - Technical Bulletin ISDTB-2014-02
 City of Ottawa, May 27, 2014.
 (ISDTB-2014-02)
 - Technical Bulletin ISDTB-2018-02 City of Ottawa, March 21, 2018. (ISDTB-2018-02)
- Stormwater Planning and Design Manual, Ministry of the Environment, March 2003. (SWMP Design Manual)
- Ontario Building Code Compendium
 Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
 (OBC)

West End Pumping Stations Decommissioning & By-Pass Sewers Fringewood Drive By-Pass Sewer Design Novatech, May 2018. (Fringewood By-Pass Sewer Design)

- Hunting Properties Development / Proposed Realignment of Channel on 2 and 3 Iber Road
 JF Sabourin and Associates Inc., March 2017. (JFSA Channel Realignment)
- Hazeldean Road Widening Poole Creek to Terry Fox Drive Stormwater Management
 IBI Group, November 2009 (Hazeldean SWM Report)
- 5 Orchard External Stormwater Management Cost Implications DSEL, March 2019 (External SWM Cost Implications)
- 5 Orchard Drive Stormwater Functional Servicing Analysis JF Sabourin and Associates Inc., March 2019 (5 Orchard JFSA Memo)
- Kanata West Master Servicing Study Stantec Consultin Ltd., June 2006 (Kanata West Master Servicing Plan)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 3W pressure zone, as shown by the Pressure Zone map in *Appendix B.* Watermains exist within Hazeldean Road and Fringewood Drive.

3.2 Water Supply Servicing Design

The subject property is proposed to be serviced through two connections to the existing 203 mm watermain within Fringewood Drive.

Table 1, below, summarizes the *Water Supply Guidelines* employed in the preparation of the water demand estimate.

Water Supply	Design Criteria
Design Parameter	Value
Commercial-Floor space	2.5 L/m²/d
Single Family House	3.4 P/unit
Semi-Detached House	2.7 P/unit
Townhouse	2.7 P/unit
Average Daily Demand	280 L/d/per
Residential Maximum Daily Demand	3.6 x Average Daily *
Residential Maximum Hourly	5.4 x Average Daily *
Commercial Maximum Daily Demand	1.5 x avg. day L/gross ha/d
Commercial Maximum Hour Demand	1.8 x avg. day L/gross ha/d
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	350 kPa and 480 kPa
operating pressure is within	
During normal operating conditions pressure must	275 kPa
not drop below	
During normal operating conditions pressure shall	552 kPa
not exceed	
During fire flow operating pressure must not drop	140 kPa
below	
* Residential Max. Daily and Max. Hourly peaking factors per Mo	DE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500
** Table updated to reflect ISD-2010-2	

Table 1Water Supply Design Criteria

Table 2, below, summarizes the anticipated water demand and boundary conditions for the proposed development; calculated using the **Water Supply Guidelines.** The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow as indicated by the correspondence located in **Appendix A**.

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Proposed Water Demand				
Design Parameter	Anticipated Demand ¹ (L/min)	Boundary Conditions ² Fringewood Dr. (South of valve) (m H ₂ O / kPa)	Boundary Conditions ² Fringewood Drive (North of valve) (m H ₂ O / kPa)	
Average Daily Demand	71.2	56.4 / 553.7	56.0 / 549.3	
Max Day + Fire Flow (@10,000L/min)	190.9+10,000 = 10,190.9	40.8 / 400.6	53.3 / 522.8	
Max Day + Fire Flow (@15,000L/min)	190.9+15,000 = 15,190.9	26.1 / 256.4	52.4 / 513.9	
Peak Hour	300.3	52.6 / 516.4	52.7 / 516.9	
 Water demand calculation per <i>Water Supply Guidelines</i>. See <i>Appendix B</i> for detailed calculations. Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 104.56m for connection 1 and 105.01m for connection 2 to the municipal watermain. See <i>Appendix A</i>. 				

Table 2Proposed Water Demand

The residential component of the development is contemplated to meet the criteria for the **10,000** *L/min* maximum fire flow cap, as per *ISDTB-2014-02*. As the commercial component is considered a future development and details have not yet been established, maximum fire flow for the commercial component was assumed to be **15,000** *L/min*, as per *ISDTB-2014-02*.

3.3 Watermain Modelling

EPANet was utilized to model the proposed watermain system during peak hour, average day and max daily water demand, plus fire flow scenarios. The model was developed to assess pipe sizing.

EPANET uses pipe length, pipe diameter, elevation and friction loss factors based on pipe diameter obtained from *Water Supply Guidelines, Table 4.4*. Minor loss coefficients based on bends, valves and tees in the pipe were also utilized in the model. EPANet calculated pressure drop using the Hazen-Williams equation and is used to assess the pressure that is being provided to each node.

To model the maximum daily flow scenario, **10,000L/min** was applied to each of the proposed hydrants for the residential part of the site and **15,000L/min** at the connection to the future commercial component of the property.

Table 3, below, summarizes pressures reported during average day, peak hour and maximum daily plus fire flow scenarios for nodes at points of interest.

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Table 3				
	Model S	imulation Output	Summary	
Node ID	Average Day (kPa)	Peak Hour (kPa)	Max Day + Fire Flow	Max Day + Fire Flow
	(((10,000L/min) (kPa)	(15,000L/min) (kPa)
10	553.3	516.4	399.6	255.4
12	551.8	516.7	401.3	252.0
14	552.0	516.6	395.3	251.1
15	552.4	517.0	330.5	232.1
17	551.5	516.8	409.5	253.2
18	552.2	516.8	381.3	247.2
19	551.6	516.8	396.0	175.1
20	552.4	517.2	303.3	203.9
21	552.6	517.3	269.8	214.2
23	552.8	517.5	284.8	209.8
25	552.1	516.4	395.9	251.7

The pressures modeled in average day scenario are either near or exceed the maximum allowable, per **Table 2**. Pressures which exceed the desired operation pressure in the peak hour scenario, however, do not exceed the maximum allowable pressure. It is recommended a pressure check is performed during construction to determine if pressure reducing valves are required.

The pressures during maximum daily plus fire flow scenarios as well as peak hour scenarios fall within the required pressure range outlined in **Table 2**. For the residential area, the node yielding the lowest pressure during fire flow scenario at **10,000L/min** is node 21. For the commercial area of the development, the fire flow scenario of **15,000 L/min** was modeled through node 19. The pressure at both of these critical nodes fall above the minimum required pressure indicated in **Table 1**.

Model output reports, as well as, figures for each model scenario are found in *Appendix B*.

3.4 Water Supply Conclusion

It is proposed to service the development from two connections to the existing 203 mm watermain within Fringewood Drive.

The contemplated development was analyzed using 10,000 L/min max fire flow for the residential components and assuming 15,000 L/min maximum fire flows for the future commercial component.

Water modeling was completed to confirm that adequate pressure is available to service the ultimate proposed development based on boundary conditions received from the *City of Ottawa*. Fire flow scenario pressures fall within the guidelines outline in *Table 2*.

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however, pressure check should be completed during construction to determine if pressure reducing valves will be required. The municipal system is capable of delivering water within the *Water Supply Guidelines* pressure range.

The design of the water distribution system conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject property lies within the future Kanata West Pump Station catchment area, per the *Kanata West Master Servicing Plan*.

There is an existing 675 mm diameter sanitary sewer within Hazeldean Road. Currently there is no sanitary sewer services within Fringewood Drive, on the section of the road directly adjacent to the subject property.

Pre-consultation with the City of Ottawa indicates that the Hazeldean Road sanitary sewer has been sized to convey additional flows from the proposed subdivision, upon completion of the Kanata West Pumping Station (KWPS), which is slated for completion in the summer of 2019. It is anticipated the contemplated development will proceed after the completion of the KWPS, therefore, the downstream system will have capacity to convey flow from the subject property.

4.2 Wastewater Design

The proposed development will be serviced via a connection to the existing 675 mm diameter sanitary sewer within Hazeldean Road through a future 250 mm diameter sanitary sewer within Fringewood Drive, running along the east end of the property.

Table 4, below, summarizes the *City Standards* employed in the calculation of wastewater flow rates for the proposed development.

Table 4			
Wastewater Design Criteria			
Design Parameter	Value		
Average Daily Demand	280 L/d/per		
Single Family House	3.4 P/unit		
Semi-Detached House	2.7 P/unit		
Townhouse	2.7 P/unit		
Peaking Factor	Harmon's Peaking Factor. Max 3.8, Min 2.0		
Commercial Floor Space	28,000 L/ha/d		
Infiltration and Inflow Allowance	0.33 L/s/ha		
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$		
Commercial Peaking Factor	1.50 per City of Ottawa Sewer Design Guidelines Appendix 4B		
Minimum Sanitary Sewer Lateral	135 mm diameter		
Minimum Manning's 'n'	0.013		
Minimum Depth of Cover	2.5 m from crown of sewer to grade		
Minimum Full Flowing Velocity	0.6 m/s		
Maximum Full Flowing Velocity	3.0 m/s		
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012 updated per ISTB-2018-01			

Table 5, below, demonstrates the anticipated peak flow from the proposed development. See *Appendix C* for associated calculations.

Summary of Proposed Wastewater Flows		
Design Parameter Anticipated Sanitary		
	Flow (L/s)	
Average Dry Weather Flow Rate	1.26	
Peak Dry Weather Flow Rate	3.24	
Peak Wet Weather Flow Rate	4.51	

Table 5

The estimated sanitary flow for the contemplated development anticipates a peak wet weather flow of 4.51 L/s.

A future sanitary sewer is contemplated to be constructed within Fringewood Drive starting in May 2019. A gravity sanitary connection from the existing subdivision to the north will by-pass the existing Fringewood Pump Station, thus directing wastewater flows from the proposed development to the existing 675 mm sanitary sewer within Hazeldean Road.

In the design of the bypass sewer, the subject property was estimated to have a total anticipated peak flow equal to 6.22 L/s as indicated in the Fringewood By-Pass Sewer Design (FBPSD), calculation shown in Appendix C. The contemplated development results in a reduction of **1.71L/s** flow to the future sanitary sewer than that anticipated in the (FBPSD), therefore, the future sewer has sufficient capacity to convey the wastewater flow from the subject site. Refer to **Appendix C** for a copy of **FSPSD**, including future sanitary design sheets and sanitary drainage figure.

4.3 Wastewater Servicing Conclusions

The site is tributary to the existing sanitary sewer within Hazeldean Road.

A future sanitary sewer is contemplated to be constructed adjacent to the subject property within Fringewood Drive. The proposed development results in a decrease in wastewater flow of **1.71L/s** to the future sanitary sewer contemplated in the *Fringewood By-Pass* Sewer Design. The proposed future Fringewood Drive sanitary sewer has sufficient capacity to convey wastewater flow from the subject property to the existing sanitary sewer with Hazeldean Road

The proposed wastewater design conforms to all relevant *City Standards*.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the Carp River sub-watershed via Poole Creek and City of Ottawa storm sewer system and is therefore, reviewed by the Mississippi Valley Conservation Authority (MVCA). Runoff from the subject site is collected and conveyed by storm sewers within Hazeldean Road to an interim stormwater wetland located on Hazeldean Road, east of the intersection of Hazeldean Road and Huntmar Drive. The interim wetland discharges to a ditch that conveys flow along the north edge of the existing commercial development on Hazeldean, eventually discharging to the Carp River.

Two parallel ditches currently exist on the subject property that lead to two existing DICBs; refer to **DICB 1** and **DICB 2** on drawing **EX-SWM-1**, accompanying this report. The majority of the flow from the subject site is picked up by the ditch draining to **DICB 1**, with flow from the east portion of the site directed to **DICB 2**. A portion of flow from the west of the site is directed to Poole Creek, denoted as **P1** on the drawing **EX-SWM-1**.

Based on the topographic survey of Hazeldean Road, adjacent to the site, major overland flow is directed east and south down Fringewood Drive. The Major overland flow route for this area, 100-year subtract 10-year storm event, shown as *MH400, MH405 & MH413* on drawing *EX-SWM-1*, would enter the site and be captured by *DICB 2*.

The runoff from the rear yards of the Cloverloft Court properties that bound the south edge of the subject property, shown as *EX2* and *EX3* in *EX-SWM-1*, flow into a rear yard ditch that runs along the south property line of the subject property. Drainage area *EX2* drains to the *DICB 1*, whereas, *EX3* drains to *DICB 2*.

Drainage from the existing subdivision to the south of the subject property drains east towards the intersection of Fringewood Drive and Cloverloft Court. Note that based on field inspection completed by DSEL in May 2018, a culvert crossing Fringewood Drive at Cloverloft Court is perched and would not accept flow from *EX5*, thus it is assumed all *EX5* drainage by-passes this culvert and is directed north to *DICB 2*. Further investigation will be conducted in the Spring 2019, when a survey will be completed to determine the ditch and culvert inverts.

Both **DICB 1** and **DICB 2** discharge to the existing 675 mm diameter storm sewer within Hazeldean Road. The stormwater discharge is conveyed through the existing storm sewer within Hazeldean road to ditches north of Hazeldean Road, and east of Huntmar Drive which convey directly to the Carp River.

Drainage from the existing restaurant located west of the subject property drains to the existing storm sewer within Hazeldean Road through existing catch basins, denoted as *EX6* on *EX-SWM-1*.

The estimated pre-development peak flows from the subject site and external areas for the 2, 5, and 100-year events are summarized in Table 6 and Table 7, below:

Summary of Ex	Summary of Existing Peak Storm Flow Rates from Subject Property				
City of Ottawa Design Storm	Estimated Peak Flow Rate to DICB1 (3.14 Ha) (L/s)	Estimated Peak Flow Rate to DICB2 (0.78 Ha) (L/s)	Estimate Peak Flow to Poole Creek (0.05 Ha) (L/s)		
2-year	72.1	15.6	3.4		
5-year	96.9	21.0	4.6		
100-year	206.0	44.6	9.9		

Table 6

Та	ıb	le	7
			-

Summary of Existing Peak Storm Flow Rates from External Area City of Ottawa Design **External Peak Flow Estimated Peak Flow** Rate to DICB2 Rate to DICB1 (EX2 Storm 0.422 Ha) (L/s) (MH400, MH405, MH413*, EX3, EX4, EX5 4.104 Ha) (L/s) 2-year 30.9 182.3 5-year 41.9 245.1 457.9 100-year 89.8

* Only Major System Contributions from MH400, MH405 & MH413 (100-Year - 10-Year)

Based on field investigation by DSEL in May 2018, no stormwater management controls for flow attenuation exist on-site.

A capacity analysis of the existing DICB capture rate and DICB leads was completed to determine if the existing DICB are capable of capturing the 100-year storm in the 100year storm event. DICB elevation, head and capture rate are summarized in Table 8. below:

Summary of Existing DICD Capture Rate				
Parameter DICB 1 DICB 2				
DICB Grate Invert Elevation (m)	103.98	103.65		
DICB Lead Invert (m)	102.94	102.71		
Ponding Level ¹ (m)	104.49	104.49		
Assumed Downstream HGL ² (m)	103.08	102.77		
Total Head ³ (m)	1.41	1.72		
DICB Grate Capture Rate ⁴ (L/s)	660	660		
375mm DICB Lead Capture⁵ (L/s)	354	391		
1) Spill Elevation across Fringewood Drive per topographic survey				

Table 8 mmary of Existing DICB Canture Pate

2) Downstream HGL assumed equal to obvert of Ex. 675mm Storm within Hazeldean Road

3) Total Head equal to Ponding Level less the downstream HGL

4) DICB capture rate determined from Design Chart 4.20 from the MTO Drainage Management Manual, 1997 using 0.51m of ponding, capture rate multiplied by 1.2 to account for 1200mm x 600mm grate and then by 0.5 to account for blockages. DICB2 has a higher ponding than DICB1 so the capture rate for DICB1 was used for both DICBs conservatively.

5) Orifice equation used per the City Standards, refer to Appendix D for orifice equation

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Per the above, the flow through the DICB lead will restrict flow to **354** *L/s* and **391** *L/s* to **DICB 1** and **DICB 2**, respectively. Based on the total flows summarized in **Table 6 & 7**, **DICB 1** is capable of conveying the 100-year flow form areas **DICB 1** and **EX 2**. Flow to **DICB 2** exceeds **391** *L/s* in the 100-year storm event. Ponding will occur in the existing condition up to the elevation of 104.49 where spill will occur across Fringewood Drive to the adjacent property. The spill is conveyed through a tributary of the carp river, currently the adjacent property is proposed to be re-developed and the tributary re-aligned. The spill from the subject property has been accounted for in the design of the re-aligned tributary and downstream culverts, described in **JFSA Channel Alignment**.

A design sheet has been prepared by DSEL in lieu of the design information from the City of Ottawa for the Hazeldean storm sewer in the existing condition, located in *Appendix* **D**. The design sheet indicates that storm sewers are surcharged in the existing condition. A hydraulic grade line (HGL) analysis was complete for the existing storm sewer, by JFSA, and outlined in the **5** Orchard JFSA Memo. The results of the HGL analysis conclude that spill to the surface occurs in the existing condition at manholes 405, 413, 421,426 and 13. Refer to drawing **EX-SWM-1**, for drainage area IDs and **Appendix D** for HGL results prepared by JFSA.

5.2 Post-development Stormwater Management Target

Based on City of Ottawa standards, stormwater management requirements for the proposed development are as follows:

- The release rate for the subject property is limited by the capacity of the existing storm sewers within Hazeldean Road. A hydraulic grade line analysis was completed for the existing sewers to determine the maximum available capacity of the sewers. To ensure that the hydraulic grade line in the proposed condition does not impact the proposed development or have negative impact on the downstream system, the allowable release rate for the subject property has been determined to be **251.9 L/s**;
- As stormwater quality control is constrained on the residential portion of the subject site, a larger portion of the allowable release rate is allocated to the residential block of **200** *L*/**s**, with the remaining **51.9** *L*/**s** to be the release rate for the commercial block;
- Uncontrolled Flow to Poole Creek is less than during the existing condition in the 5-Year and 100-Year event;
- All storms, up to and including the City of Ottawa 100-year design event, are to be attenuated on site; and
- Quality controls are required, as per correspondence with the MVCA, 70% TSS removal will be necessary. Refer to *Appendix A* for correspondence. However, the quality control that will be provided will be 80% TSS removal.

5.3 **Proposed Stormwater Management System**

It is proposed that the stormwater for the development will be serviced by the existing 675 mm diameter storm sewer on Hazeldean Road via a new storm sewer extended south on Fringewood Drive.

It is proposed to service the residential component of the development with a proposed 450 mm diameter storm sewer that would connect to a proposed 675 mm diameter storm sewer within Fringewood Drive. The commercial component of the site would connect independently to the proposed storm sewer within Fringewood Drive. The existing swale along Fringewood Drive would be regraded to flow towards the existing **DICB 2**.

It is contemplated to re-grade the existing roadside ditch south of the subject property to re-direct flow from EX5 to the Hazeldean Tributary on the 2 lber Road lands, located on the east side of Fringewood Drive. Refer to drawing SWM-1, accompanying this report, for storm servicing and stormwater management details.

Drainage to existing **DICB 2** would include major system flow only (100-Year – 10-Year Flow) from a portion of Hazeldean Road (Area MH400, MH405, MH413) and major and minor system flow from Fringewood Drive (Area EX4). A 100-year flow rate of 105.5 L/s is contemplated to continue to discharge to **DICB 2**.

5.4 **Proposed Quantity Controls**

The release rate for the proposed development is restricted to ensure the hydraulic grade line allows for gravity drainage for the majority of residential units. A sewer analysis was completed for the downstream Hazeldean storm sewer system in the post-development condition to ensure no negative impacts, refer to **Appendix D** for HGL analysis in the proposed condition. To provide gravity drainage for the proposed units and improve the downstream condition, a release rate of 251.9 L/s was selected as described in Section 5.1. Refer to the sewer analysis included in Appendix D.

Table 9, below, summarizes post-development flow rates and anticipated storage for the development of the property.

Stormwater Flowrate and Storage Summary				
Control Area	5-Year	5-Year	100-Year	100-Year
	Release Rate	Storage	Release Rate	Storage
	(L/s)	(m ³)	(L/s)	(m³)
Unattenuated Areas to Poole Creek	0.6	0.0	1.2	0.0
Residential Areas	116.7	169.5	200.0	416.9
Commercial Areas	30.3	434.9	51.9	843.1
Total Comm + Res to Hazeldean*	147.0	604.4	251.9	1260.0
* Total Flow does not include Flow to Poole Creek				

Table 9 Ctores Cumment

It is anticipated that 416.9 m^3 of storage will be required for the residential development and 843.1 m^3 of storage will be needed for the future commercial development in order

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to attenuate flows to the target flow rate of **251.9** *L*/**s** in the 100-year storm event. Refer to storage calculations that are contained within *Appendix D*.

To achieve the allowable release rate, the proposed residential portion of the development will employ a combination of Low Impact Development (LID) practice infiltration chambers located in the 8 m easement between the commercial and residential properties, as well as, take advantage of surface ponding on the streets. Proposed surface ponding will be designed in accordance with *City Standards*. The commercial block is contemplated to use similar stormwater management techniques to attenuate to the allowable release rate.

An HGL analysis was completed for the proposed condition, summarized in the **5** *Orchard JFSA Memo*, for the downstream Hazeldean storm sewer network. The analysis concluded that adequate freeboard is provided from the 100-year HGL to the proposed Underside of Footing (USF) of the development and that the HGL is lowered in the proposed condition compared to the existing condition within the existing storm sewer system. Spill will continue to occur within the Hazeldean storm sewer system during the 100-year storm event, however, the spill is less than in the existing condition. Only road drainage and the subject property are connected to the storm system, so the resulting spill presents no risk of surcharging into existing foundation drains.

A preliminary stormwater analysis was completed by JFSA, summarized in the **5** Orchard JFSA Memo, which reviewed the impacts of the development on the water levels within the Carp River and the tributary to the Carp River using the City of Ottawa's PCSWMM model of the Carp River. Based on the results from the **5** Orchard JFSA Memo, the tributary to the Carp River has sufficient capacity to convey stormwater in the 100-year storm event. Sheer stress was also analyzed from the existing to proposed condition, during detailed design, and it was concluded that a geomorphological review will be required to determine if erosion control measures are necessary for the proposed condition. At the outlet to the Carp River, the analysis concluded that there are no impacts to the 100-year water levels within the Carp River in the proposed condition, refer to Appendix D for **5** Orchard JFSA Memo.

A detailed hydrologic model will be completed during the detailed design phase to confirm the conclusions from the **5** Orchard JFSA Memo and confirm storage requirements. During detailed design, efforts will be made to reduce the LID infiltration chambers maximize surface ponding within the right-of-way.

The unattenuated area directed to Poole Creek, U1 on drawing **SWM-1**, is less than the flow to Poole Creek in the pre-development condition shown in **Table 7** for the 5 and 100-year storm events. The drainage area consists of rear yard area, which is considered clean water, therefore, quality controls are not anticipated for the uncontrolled area draining to Poole Creek.

Due to the depth of the existing storm sewer within Hazeldean Road, the proposed four blocks of townhomes units closest to Fringewood Drive will be required to use sump

pumps, discharging to the surface to service the foundation drains, refer to **CSP-1**, accompanying this report for applicable units.

5.5 Proposed Quality Control

Quality controls are proposed to be provided by the interim Wetland located approximately 380 m north-east of the intersection of Huntmar Drive and Hazeldean Road. As discussed in **Section 5.1**, a portion of the 5 Orchard site was contemplated to drain to the interim Wetland. Per the **Hazeldean SWM Report**, a total of **3.84 Ha** of External Drainage and **3.51 Ha** of Hazeldean Road runoff was contemplated to drain to the interim Wetland, for a total of **7.35 Ha**. **3.08 Ha** of the subject property at 5 Orchard Drive was allocated to drain to the interim Wetland.

The total proposed drainage area to the interim pond includes **3.94 Ha** from the subject site; **0.87 Ha** of external drainage from Fringewood Drive, Existing Residential and an Existing Restaurant on Hazeldean Road and **3.91 Ha** of Hazeldean Road widening for a total of **8.72 Ha**. This results in an increase in **1.37 Ha** compared to the contemplated drainage in the **Hazeldean SWM Report**.

The pond sizing was reviewed to confirm if it can accommodate the additional site drainage and external flow not contemplated in the *Hazeldean SWM Report*. Interim Westland Quality Control is summarized in *Table 10*, below, refer to *Appendix D* for quality control calculations.

	Area (Ha)	Impervious (%)	Required Extended Detention (m³)	Required Permanent Pool (m ³)
Per Hazeldean SWM Report	7.35	77%	294	331
Per 5 Orchard FSR	8.72	71%	349	401
Provided Volumes in Interim SW	M Pond pe	r Hazeldean		
SWM Report			406	432

Table 10 Interim Wetland Quality Control

The interim Wetland facility has sufficient permanent pool and extended detention volume to treat the drainage area from the development and external area to the required **80% TSS Removal**.

Upon the decommissioning of the Hazeldean Road interim Wetland, it is proposed to achieve the quality control of 80% TSS removal through the implementation of an Oil/Grit Separator (OGS). The proposed OGS would be installed downstream of the interim wetland and will discharge to the existing ditch as shown on figure 1 provided in *Appendix D*. The OGS has been sized to treat all drainage areas that are directed in the interim to the Wetland. Detailed description of cost and reasonability is included in a separate memo, *External SWM Cost Implications*, included in *Appendix D* of this

report. Sizing report and shop drawings for the proposed OGS are also included in *Appendix D*.

5.6 Stormwater Management Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm, in accordance with City of Ottawa, *City Standards*. The post-development allowable release rate to the sewer within Hazeldean Road was calculated to be 251.9 L/s; with an estimated 416.9 m^3 of storage required for the residential development and 843.1 m^3 of storage required in the future commercial development in order to meet this release rate.

Four blocks of townhomes will be required to be sump pumped due to the shallow connection to the existing storm sewer within Hazeldean Road.

Please refer to **5** Orchard JFSA Memo and the External SWM Cost Implications, both located in Appendix D, for further information on Quality and Quantity controls in the existing and proposed conditions.

The proposed stormwater design conforms to all relevant *City Standards* and Policies for approval.

6.0 UTILITIES

Utility servicing will be coordinated with the individual utility companies prior to site development.

7.0 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 underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs installed under the grate during construction to protect from silt entering the storm sewer system.

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

Erosion and sediment controls must be in place during construction. The following 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 existing ditches;
- > No refueling or cleaning of equipment near existing watercourses;
- Provide sediment traps and basins during dewatering;
- Install filter cloth between catch basins and frames;
- Plan construction at proper time to avoid flooding; and
- Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

- > Verification that water is not flowing under silt barriers; and
- > Clean and change filter cloth at catch basins.

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Campanale Homes to prepare a Functional Servicing and Stormwater Management report in support of the application for Draft Plan of Subdivision for the proposed development at 5 Orchard Drive. The preceding report outlines the following:

- Based on boundary conditions provided by the City the existing municipal water infrastructure is capable of providing the proposed development with water within the City's required pressure range. Pressure check will need to be completed during construction to determine if pressure reducing valves will be required;
- The proposed development is anticipated to have a peak wet weather flow of 4.51 L/s directed to the Stittsville Trunk Sewer, the property has been contemplated in the sizing of the future sewer to be installed within Fringewood Drive;
- The proposed development will be required to attenuate post development flows to an equivalent release rate of 251.9 L/s to the sewer within Hazeldean Road, for all storms up to and including the 100-year storm event;
- It is anticipated that 416.9 m³ of storage will be required for the residential development and 843.1 m³ of storage will be needed for the future commercial development to attenuate stormwater to the allowable release rate to the storm sewer within Hazeldean Road; and
- Utility services would need to be coordinated with utility companies prior to development.

Prepared by, David Schaeffer Engineering Ltd.



Reviewed by, **David Schaeffer Engineering Ltd.**



Per: Steven L. Merrick, P.Eng

Per: Stephen Pichette, P.Eng.

© DSEL

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LEGEND:

EXISTING WATERMAIN
 EXISTING SANITARY SEWER
 EXISTING STORM SEWER
 EXISTING BELL LINE
 GAS EXISTING GAS LINE
 EXISTING HYDRO LINE

EXISTING OVERLAND FLOW DIRECTION

FUTURE DEVELOPMENT BY OTHERS

SPILL ELEVATION

SPILL ELEVATION



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SPILL

ELEVATION

120 Iber Road, Unit 103 Stittsville, ON K2S 1E9 Tel. (613) 836-0856 Fax. (613) 836-7183 www.DSEL.ca

EXISTING CO 5 ORCHARI

ONDITIONS D DRIVE	PROJECT No.:	18-1006
	SCALE:	1:500
	DATE:	MARCH 2019
	DRAWING No.	EX-1
	SHEET NO.	1 OF 7



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Appendix **B**

5 Orchard Drive Pre-Application Consultation Meeting Notes (July 22, 2019)

5 Orchard Drive Pre-application Consultation Meeting Notes

Location: Room 5105E, City Hall Date: July 16, 2019

Attendees:	Colette Gorni, Planner, City of Ottawa
	Laurel McCreight, Planner, City of Ottawa
	Samantha Gatchene, Student Planner, City of Ottawa
	Rosanna Baggs, Project Manager (Transportation), City of Ottawa
	Lino Paoloni, Shell
	Kerry K. Morrison, Shell
	Bikram Arora, Shell
	Tony Batten, AECOM
	Cody Campanale, Campanale Homes
	Nadia De Santi, WSP
	Michael Hanifi, WSP
	Sarah MacDonald, WSP

Comments from the Applicant

Campanale Homes:

- 1. Campanale Homes has applied for a Plan of Subdivision and a Zoning By-law Amendment for the lands municipally known as 5 Orchard Drive. There is intended to be both residential and commercial uses on the property. These applications are pending.
- 2. Residential development will occur in the rear portion of the property. A mix of townhomes, semi- and single-detached dwellings along a cul-de-sac is proposed.
- 3. A future commercial block is planned along Hazeldean Road. However, Campanale Homes has not submitted an application with City for this portion of the site.
- 4. Campanale Homes has an agreement with Shell to lease lands in the north eastern portion of the site for use as a gas station.
- 5. There are two blocks that are being dedicated to the City of Ottawa as a part of the Plan of Subdivision application. An 8-metre block is being dedicated for storm water tanks and a watermain to service the residential block. The other block being dedicated is identified as a pedestrian pathway.

WSP/Shell:

- 6. This is the first shell site in Ottawa that WSP is working on. There will likely be many more.
- 7. The applicant is proposing a gas station use on the leased portion of the site. There will also be associated gas pumps, car wash, and convenience store.
- 8. There is an interest in proceeding with the Shell gas station ahead of the rest of the Plan of Subdivision.
- 9. The conceptual site plan layout was designed based on the queuing line placement and fuel delivery routes within the site.

Planning Comments

- 1. This is a formal pre-application consultation meeting for a Site Plan Control Application Standard. Application form, timeline and fees can be found <u>here</u>.
- Please confirm the number of parking spaces provided. A total of 7 spaces is required under the Zoning by-law for the proposed convenience store use (3.4 per 100m²).
- Please provide some bicycle parking on the site for the customers of the convenience store. Based on the size of the proposed retail building, the Zoning By-law requires 0.8 spaces be provided, which should be rounded up.
- 4. Please refer to <u>Section 112 Provisions for Drive-Through Operations</u> when designing the car wash facility on the site.
- 5. Registration of the associated subdivision is required before a building permit can be obtained. However, the applicant is encouraged to submit a site plan control application in advance of registration to begin the process.
- 6. Please reach out to the applicable Ward Councillor and set up a meeting to present plans for the site.

Urban Design Comments

- 1. The City prefers for drive through queuing lines be internal to the site and not adjacent to roadways.
- 2. Please provide landscaping along Hazeldean Road, and along the rear of the property. Coniferous trees would be a good option to provide year-round green.
- 3. Consider moving the convenience store building closer to Hazeldean Road.

4. Please note that the City of has 'Urban Design Guidelines for Gas Stations'.

Transportation Comments

- 1. Follow Traffic Impact Assessment Guidelines
 - Traffic Impact Assessment will be required.
 - Start this process asap.
 - Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
- 2. ROW protection on Hazeldean is 37.5m even.
- 3. Corner triangles as per OP Annex 1 Road Classification and Rights-of-Way at the following locations on the final plan will be required:
 - Local Road to Arterial Road: 5 metre x 5 metres
- 4. Noise Impact Studies required for the following:
 - Stationary (if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses)
- 5. The curb line on Fringewood will be required to be adjusted so that the through lane is reduce to 3.5m in width.
- 6. It is recommended that the path that the WB-20 takes to service the fuel storage tanks be plan in a way to minimize the access widths; i.e. make use of the entire site for turning movements, this can be accomplished by the entering by the future full movement access at the west end of the site. Otherwise, make use of truck turning aprons to reduce the access widths.
- 7. The current configuration of the drive thru car was queue may lead to congestion at the pumps. Recommended to relocate the drive-thru entrance.
- 8. On site plan:
 - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
 - 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). Provide on a separate drawing.

- Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
- Show lane/aisle widths.
- Sidewalk is to be constructed as per City Specification 7.1.
- Grey out any area that will not be impacted by this application. Private access minimum distance to signalized intersection as per TAC design;
 - i. On Hazeldean 70m
 - ii. On Fringewood 15m
- Clear throat length for the commercial block as per TAC design will be dependent on the use of the entire site of the site. The RIRO should expect a throat length of a minimum 15-25m.

Engineering Comments

- The Servicing Study Guidelines for Development Applications are available at the following link: <u>https://ottawa.ca/en/city-hall/planning-and-</u> <u>development/information-developers/development-application-review-</u> process/development-application-submission/guide-preparing-studies-and-plans
- Record drawings and utility plans are available for purchase from the City's Information Centre. Contact the City's Information Centre by email at <u>informationcentre@ottawa.ca</u> or by phone at (613) 580-2424 x44455
- Stormwater quantity control criteria be consistent with the quantity control criteria that will be specified in the approved subdivision Servicing and Stormwater Management Report
- Stormwater quality control Consult with the Conservation Authority (MVCA) for their requirements. Include the correspondence with the MVCA in the stormwater/site servicing report.
- 5. Oil and Grit separator is required for the proposed use (gas station)
- 6. MECP ECA is required (Industrial sewage works-direct submission)
- Sanitary quantity control criteria be consistent with the quantity control criteria that will be specified in the approved subdivision Servicing and Stormwater Management Report

- 8. When calculating the composite runoff coefficient (C) for the site (post development), please provide a drawing showing the individual drainage area and its runoff coefficient.
- 9. When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the storage requirement prior to the 1:100 year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.
- 10. Engineering plans are to be submitted on standard A1 size (594mm x 841mm) sheets.
- 11. Phase 1 ESA and Phase 2 ESA must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
- 12. Provide the following information for water main boundary conditions:
 - Location map with water service connection location
 - Average daily demand (I/s)
 - Maximum daily demand (l/s)
 - Maximum hourly demand (I/s)
 - Fire flow demand (provide fire detailed flow calculations based on the fire underwriters survey method)
 - If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES) and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.

Forestry Comments

- 1. If there are trees on site, a Tree Conservation Report (TCR) will be required.
- 2. A tree permit is required for the removal of trees.

TCR Requirements:

- a Tree Conservation Report (TCR) must be supplied for review along with the various other plans/reports required by the City; an approved TCR is a requirement for Site Plan approval
- any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
- 5. the removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
- 6. the TCR may be combined with the Landscape Plan
- 7. the TCR must list all trees greater than 10cm in diameter by species, diameter and health condition;
- the TCR must address all trees with a critical root zone that extends into the developable area – all trees that could be impacted by the construction that are outside the developable area need to be addressed.
- 9. Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees
- 10. If trees are to be removed, the TCR must clearly show where they are, and document the reason they can not be retained please provide a plan showing retained and removed treed areas
- 11. 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 listed on Ottawa.ca
- 12. Please ensure newly planted trees have an adequate soil volume for their size at maturity. The following is a table of recommended minimum soil volumes:

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

- 13. The City requests that all efforts are made to retain trees trees should be healthy, and of a size and species that can grow into the site and contribute to Ottawa's urban forest canopy
- 14. For more information on the TCR process or help with tree retention options, contact Mark Richardson <u>mark.richardson@ottawa.ca</u>

<u>MVCA</u>

- 1. The commercial component of the site should connect independently to the proposed storm sewer within Fringewood Drive.
- 2. The total release rate for the entire commercial section of the site is 51.9 L/s (100yr). A total of 843.1 m3 of storage has been estimated to be needed for the commercial portion of the site which needs to be considered in the proposed development as well. It's been mentioned that the commercial block is contemplated to use LID SWM techniques to attenuate to the allowable release rate.

Sincerely,

Witte Hori

Colette Gorni Planner I Development Review - West



APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

S indicates that the study or plan is required with application submission. Legend: A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer here:

S/A	Number of copies	ENG	GINEERING	S/A	Number of copies
S	15	1. Site Servicing Plan	2. Site Servicing Study	S	3
S	15	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	3
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
S	9	9. Transportation Impact Assessment (TIA)	10.Erosion and Sediment Control Plan / Brief	S	3
S	3	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		
		13.Hydraulic Water main Analysis	14.Noise / Vibration Study	S	3
	PDF only	15.Roadway Modification Functional Design	16.Confederation Line Proximity Study		

S/A	Number of copies	PLANNING	/ DESIGN / SURVEY	S/A	Number of copies
		17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		
		19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	15	21.Site Plan	22.Minimum Distance Separation (MDS)		
		23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		
		25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement		
S	15	27.Landscape Plan	28.Archaeological Resource Assessment Requirements: S (site plan) A (subdivision, condo)		
S	2	29.Survey Plan	30.Shadow Analysis		
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (Included in Planning Rationale)	S	Available online
		33.Wind Analysis			

S/A	Number of copies	ENV	IRONMENTAL	S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		
S	3	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		
		38.Record of Site Condition	39.Mineral Resource Impact Assessment		
S	3	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		
		42.Mine Hazard Study / Abandoned Pit or Quarry Study	43.Integrated Environmental Review (Draft, as part of Planning Rationale)		

S/A	Number of copies	ADDITION	AL REQUIREMENTS	S/A	Number of copies
S	1	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45.		

Meeting Date: July 16, 2019

Application Type: Site Plan Control

File Lead (Assigned Planner): Colette Gorni

Infrastructure Approvals Project Manager: Santhosh Kuruvilla

Site Address (Municipal Address): 5 Orchard Drive

*Preliminary Assessment: 1 2 🔀 3 4 5

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Please note that PDF versions of all the listed requirements must be submitted with the application, stored in a USB drive or <u>CD</u>

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning, Infrastructure and Economic Development Department will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning, Infrastructure and Economic Development Department.

> 110 Laurier Avenue West, Ottawa ON K1P 1J1 110, av. Laurier Ouest, Ottawa (Ontario) K1P 1J1 Courrier interne : 01-14

Mail code: 01-14

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Appendix C

City of Ottawa – Development Servicing Study Checklist





Servicing study guidelines for development applications

4. Development Servicing Study Checklist

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

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

4.1 General Content

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





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

4.2 Development Servicing Report: Water

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





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

4.3 Development Servicing Report: Wastewater

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





4.4 Development Servicing Report: Stormwater Checklist

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

4





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

4.5 Approval and Permit Requirements: Checklist

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

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

4.6 Conclusion Checklist

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



Appendix D

Sanitary Sewer Calculations and Supporting Information

	Sanitary Sewer Design Sheet			
Site location (City)	5 Orchard Drive, Stittlsville, ON	n= 0.013	Checking Date (yyyy/mm/dd)	2020-09-10
	Ref# CAN01444		Reviewer	Jin Sun
Industrial flow: 35000 (L/ha/D)	Infiltration: 0.33 (L/s/ha)			

- q = *average* daily per capita flow (L/cap.d)
- I = Unit of peak extraneous flow (L/s/ha)
- Q(p) = peak population flow (L/s)
- Q(I) = peak extraneous flow (L/s)
- Q(d) = peak design flow (L/s)

Peaking Factor: 1.5 Q(p) = (P/1000)qM/86.4 (L/s) Q(I) = IA (L/s); where A= Area in hectares Q(d) = Q(p) + Q(I) (L/s) Manning Equation: Qcap. = (D/1000)^2 . 6 67*(S/100)^0.5/(3.211*n)*1000 (L/s) D: pipe size (mm) S: slope (grade) of pipe(%) n: roughness coefficient

	Location		Inlet Flow							Pipe										
N	ode ID				Cumulative		Cumulative	Peak	Flow	Length										
Upper	Lower	Link ID	Site Area (ha)	Cum Area (ha)	Avg. Daily Q(p) (l/s)	Peaking Factor	Infiltration Q(I) (I/s)	Q(p) DWF (l/s)	Q(d) WWF (l/s)	m	Dia of Pipe, mm	Grade of Pipe	Q Capacity (l/s)	Velocity	Qdesign/ Qcap	Capacity (%)	Velocity Actual Flow (m/s)	Type of Pipe	U.S. Invert	D.S. Invert
SSMH1	SSMH2	C1	0.11	0.11	0.04	1.50	0.04	0.07	0.10	28.74	200	0.40%	20.72	0.66	0.00	0.48%	0.21	PVC	101.887	101.772
Proceptor	SSMH2	C2	0.20	0.20	0.08	1.50	0.07	0.12	0.19	7.8	150	1.00%	15.21	0.86	0.01	1.23%	0.34	PVC	101.809	103.681
SSMH2	SSMH3	C3	0.00	0.31	0.12	1.50	0.10	0.19	0.29	3.94	200	0.40%	20.72	0.66	0.01	1.39%	0.26	PVC	101.712	101.696
Connection	SSMH4	C4	1.52	1.52	0.62	1.50	0.50	0.92	1.43	31.04	200	0.40%	20.72	0.66	0.07	6.88%	0.36	PVC	101.901	101.777
SSMH4	SSMH3	C5	0.00	1.52	0.62	1.50	0.50	0.92	1.43	5.27	200	0.40%	20.72	0.66	0.07	6.88%	0.36	PVC	101.717	101.696
SSMH3	EX. SAN 104	C6	0.00	1.83	0.74	1.50	0.60	1.11	1.71	13.70	200	0.65%	26.41	0.84	0.06	6.49%	0.46	PVC	101.636	101.547

ice -store	(per toilet	room)							
2000 liter /	/ day			2000	liter / day				
2 toilet roc	oms on site			4000	liter / day			0.05	liter / second
(truck was	h)			400	liter / day				
Assumed 4	0 cars wash	ned per day		16000	liter / day			0.19	liter / second
								0.23	liter / second
	ce -store 2000 liter / 2 toilet roc (truck wash Assumed 4	ce -store (per toilet 2000 liter / day 2 toilet rooms on site (truck wash) Assumed 40 cars wash	ce -store (per toilet room) 2000 liter / day 2 toilet rooms on site (truck wash) Assumed 40 cars washed per day	ce -store (per toilet room) 2000 liter / day 2 toilet rooms on site (truck wash) Assumed 40 cars washed per day Image: state st	Incernation Incernation 2000 liter / day 2000 2 toilet rooms on site 4000 2 toilet rooms on site 4000 (truck wash) 400 Assumed 40 cars washed per day 16000 Image: State of the state of	Interview Interview Interview 2000 liter / day 2000 liter / day 2000 liter / day 2 toilet rooms on site 4000 liter / day (truck wash) 400 liter / day Assumed 40 cars washed per day 16000 liter / day Interview Interview Interview Interview	Interview Interview Interview 2000 liter / day 2000 liter / day 2000 liter / day 2 toilet rooms on site 4000 liter / day 1000 liter / day (truck wash) 400 liter / day 1000 liter / day Assumed 40 cars washed per day 16000 liter / day 1000 liter / day Interview Interview 1000 liter / day 1000 liter / day Interview Interview Interview 10000 liter / day	Interview Interview Interview Interview 2000 liter / day 2000 liter / day Inter / day Inter / day 2 toilet rooms on site 4000 liter / day Inter / day Inter / day (truck wash) 400 liter / day Inter / day Inter / day Assumed 40 cars washed per day 16000 liter / day Inter / day Interview Interview Interview Interview Interview Interview	Incer-store (per toilet room) Incertain and an an an and an

Per the Appendix 4-A of Ottawa Sewer Design Guideline, Daily Sewage Flow for Convenience Store and Carwash building:

The detailed estalishments on the developement west of Shell site are unknown, therefore Sewage Flow estimated from the SSMH4 shall be Q(d)WWF.

Connection	SSMH4	C4	1.52	1.52	0.62	1.50	0.50	0.92	1.43	liter / second
SSMH4	SSMH3	C5	0.00	1.52	0.62	1.50	0.50	0.92	1.43	liter / second

Total sewage flow from Shell site and the development west of Shel site:			1.66	liter / second
	1	1		

Conclusion: 1.66 l/s estimated flow rate is less than 1.71 l/s allowable flow rate.





Overall Site Servicing Plan (Sheet C103.0)



AL NOTES SEE DRAWING C001.0	

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	TE TE TE TE TE
١E	PW PW PW
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SOUTH	EAST
 61.783	32.440
 66.042	33.049
68.843	28.262
57.826	33.074
67.318	0.478
1.075	4.264
51.055	9.893
12.448	21.918
34.971	20.085
44.695	34.270
67.094	26.476
6.691	34.815
47.314	42.673
64.035	29.120
35.369	37.335
 64.021	35.069
67.950	35.408
70.803	31.002



PROJECT

Shell Canada Products HAZELDEAN RD. & FRINGEWOOD DR. NTI

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Shell Canada

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CTM Design Services Ltd. 210, 340 Midpark Way SE Calgary, AB T2X 1P1 403.640.0990 tel www.ctmdesign.ca



REGISTRATION

LEGAL DESCRIPTION PART OF BLOCK 21 OF DRAFT PLAN OF SUBDIVISION OF PARTS OF LOTS 26 AND 27 OF REGISTERED PLAN 4R2506 PART 3, CONCESSION 11, GEOGRAPHIC TOWNSHIP OF GOULBOURN (CITY OF OTTAWA)

ISSUE/REVISION

D	2020-09-30	RE-ISSUED FOR SPA
С	2020-09-15	ISSUED TO CLIENT
В	2020-08-14	ISSUED FOR SWM ANALYSIS
Α	2020-03-31	ISSUED FOR SPA
I/R	DATE	DESCRIPTION

DRAWN BY

JNT

KEY PLAN



GLOBAL PROJECT ID NUMBER

CAN01444

SHEET TITLE

SITE SITE SERVICING PLAN

CTM DESIGN FILE NAME

2020072 C103.0 SHEET NUMBER

C103.0

CITY PLAN NO. 18131