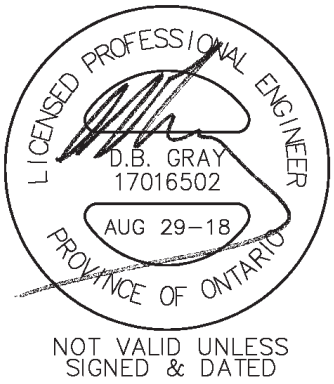
SERVICING BRIEF &
STORMWATER MANAGEMENT REPORT

Eight Residential Lots
Hemphill Street / Shea Road
Richmond (Ottawa), Ontario

Report No. 17037

August 29, 2018



NOT VALID UNLESS
SIGNED & DATED

D. B. G R A Y E N G I N E E R I N G I N C.

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

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
dbgray@rogers.com

SERVICING BRIEF &
STORMWATER MANAGEMENT REPORT

Eight Residential Lots
Hemphill Street / Shea Road
Richmond (Ottawa), Ontario

This report is a description of the services for eight proposed residential lots on 1.18 hectares (ha) of land on Hemphill Street and west Shea Road, in Richmond. Seven of the lots, located on 0.76 ha, will be serviced by a municipal sanitary sewer. Four of these lots (Lots 1 to 4) have frontage on Hemphill Street. A proposed extension of Hemphill Street will be constructed to provide frontage to the other three lots (Lots 6 to 8). One lot (Lot 5 – 0.42 ha) will have frontage on Shea Road and will be serviced by a private on-site septic system. All lots will be serviced by private wells. This report also addresses the drainage and stormwater management of the proposed development

Refer to drawings C-1 to C-3 prepared by D. B. Gray Engineering Inc.

WATER SUPPLY FOR FIRE FIGHTING:

The proposed development is in a rural area with no municipal water supply but it is expected that an on-site water supply for firefighting will not be required. (Buildings less than 600 sq.m. typically do not require an on-site water supply.)

ON-SITE WELLS:

Dwellings on the proposed lots will be served by on-site wells. Three test wells have been constructed and, as per the Hydrogeological Investigation prepared by Moray Associates Ltd. (File No. 017630), *"there is a sufficient groundwater supply of acceptable quality … to satisfy the requirements of the proposed residential subdivision."* Of the seven lots fronting onto Hemphill Street, all existing and proposed wells will be located in the rear yard of the and are expect to be approximately 20m from the front of the house and the sanitary sewer connection. This is in excess of the minimum 15m required. The proposed well on Lot 5 will be located in the front yard, 20m from the south property line, 20m from the proposed septic system and therefore there will be adequate clearance from existing and proposed septic systems. (The proposed septic system on Lot 5 will be located 15m from the property line common with Lot 1 and therefore there will be adequate clearance from existing and proposed wells.)

City of Ottawa staff has advised that there either needs to be sufficient side yard setbacks (from the side lot line to the proposed dwellings) on each lot to provide access

to the well or provide access to drill a new well in the rear yard in the future. Alternatively, access easements to gain access to the rear yards via adjacent lot(s) can be provided. It is proposed that access easements (combined with drainage easements) will be provided.

SANITARY SERVICE:

There is an existing 250mm municipal sanitary sewer in Hemphill Street. There are also five existing sanitary sewer laterals stubs terminating at the property line of the subject property. These laterals were installed when the municipal sewer was constructed in the 1990s. The proposed sanitary sewer connections will connect to these laterals and two new sanitary connections will be constructed. (Two test pits were excavated to locate two of the laterals and to determine their depth.)

City of Ottawa staff has advised that there are capacity issues with the Richmond sanitary sewer system that is, in part, due foundation drain sump pumps, in many houses, discharging to the sanitary sewer. The City has also advised that it must be demonstrated that existing flows contributing to the sanitary system have been removed, on a two for one basis, to accommodate the proposed development and, in the past, this has consisted of land developers persuading existing Richmond home owners to agree to remove their sump pump connections from the sanitary system. The City has clarified that the “two for one” condition refers to flow, which means for every one litre per second flow generated from the proposed development, two litres per second flow must be removed from the system by having foundation drain sump pumps disconnected from the system.

Based on the City of Ottawa Sewer Design Guidelines for residential properties (7 single family dwellings – 3.4 person per unit – 280 l/person/day – 3.2 peaking factor and a 0.33 l/s/ha infiltration flow) the flow generated from the proposed development is calculated to be 0.49 l/s. Based on this flow the City will require 0.98 l/s removed from the sanitary system. Typical residential sump pumps are rated from 30 to 50 USgpm (1.9 to 3.1 l/s) but the actual flow would be about half of the rated flow (0.9 l/s to 1.6 l/s). Therefore, depending on the size of the pump, one or two Richmond home owners will need to be persuaded to disconnect their pumps from the sanitary sewer.

There are four single family dwellings currently connected to the municipal sanitary sewer in Hemphill Street. Based on the City Sewer Guidelines the existing flow is calculated to be 0.41 l/s. With the proposed development the flow will increase to 0.90 l/s. This flow will be adequately handled by the existing municipal sanitary sewer (250mm at 0.30% - 34.0 l/s capacity) and with the disconnection of foundation drain sump pump(s) it is expected that the proposed development will have a positive acceptable impact.

Lot 5 is a large lot (0.42 ha) and will have more than adequate space to accommodate the proposed septic system. As previously stated this proposed septic system will be

located 15m from the property line common with Lot 1 and therefore there will have adequate clearance from existing and proposed wells.

DRAINAGE, STORM SEWERS & STORMWATER MANAGEMENT:

There is an existing 450mm municipal storm sewer in Hemphill Street. There are also five existing storm sewer laterals stubs terminating at the property line. These laterals were installed when the municipal sewer was constructed in the 1990s. However, it is known that the hydraulic grade line (HGL) of the municipal storm sewer is high at approximately 93.70; and with the existing grade elevations of the subject property being approximately the same elevation as the HGL; with the City requirement for the basements to be 0.3 m above the HGL; and with the existing centerline of road elevation being as low as 93.94, it not practical to have the foundation drains of the proposed dwellings to connect to, and drain by gravity to, the municipal storm sewer. Alternatively, it is proposed that the foundation drains drain to a sump and be pumped to grade.

The subject lands are very flat but they appear to drain to the Shea Road roadside ditch. A 900mm culvert conveys the drainage under Shea Road to a ditch (labelled as “Moore Drain” on geoOttawa) that conveys the drainage about 130m to the east of Shea Road to “Flowing Creek Drain”. (GeoOttawa also labels a waterway to the west of the Shea Road culvert as “Moore Drain” but there is no evidence that this drain exists at this location. All geoOttawa aerial photography, dating from 2017 back to 1976, provides evidence that the “Moore Drain”, or any other ditch or waterway, has not existed at this location for more than 40 years. GeoOttawa also labels a ditch or waterway as “Moore Drain” about 275m north of the subject property.)

A proposed ditch around the rear perimeter of the seven lots will drain the rear yard of these lots, and Lot 5, to the Shea Road culvert and to “Flowing Creek Drain”. The proposed ditch will be located within drainage easements (some of which will also be access easements – see On-Site Wells).

The front yards of the proposed lots will drain to the street and drain to the existing municipal storm sewer in Hemphill Street. Based on the size of the municipal storm sewer (450mm) and that stubs were provided for the storm sewer connections the municipal storm that the storm sewer was and is adequately sized for the proposed lots.

Stormwater management, quantity and/or quality control is not expected to be required, and none is proposed.

CONCLUSIONS:

1. There is no municipal water supply but it is expected that an on-site water supply for firefighting will not be required.

2. Dwellings on the proposed lots will be served by on-site wells and, as per the Hydrogeological Investigation "*there is a sufficient groundwater supply of acceptable quality … to satisfy the requirements of the proposed residential subdivision."*

3. All existing and proposed wells for the seven Hemphill Street lots will be located in the rear yard and will be located excess of 15m from the front of the house and the sanitary sewer connection. The proposed well on Lot 5 will be located in the front yard and will be adequate clearance from existing and proposed septic systems.

4. It is proposed that access easements (combined with drainage easements) will provide access to the well in the rear yard or to provide access to drill a new well in the rear yard in the future.

5. The proposed sanitary sewer connections will connect to five existing sanitary sewer laterals stubs and two new sanitary connections will be constructed to service the seven Hemphill Street lots.

6. Lot 5 will have more than adequate space to accommodate the proposed septic system which will have adequate clearance from existing and proposed wells.

7. There are capacity issues with the Richmond sanitary sewer system and it must be demonstrated that existing flows contributing to the sanitary system have been removed, on a two for one basis. This means that, depending on the size of the pump, one or two Richmond home owners will need to be persuaded to disconnect their foundation drain sump pumps from the sanitary sewer.

8. The proposed development the will increase the sanitary flow from 0.41 l/s to 0.90 l/s, which will be adequately handled by the existing municipal sanitary sewer (250mm at 0.30% - 34.0 l/s capacity) and with the disconnection of foundation drain sump pump(s) it is expected that the proposed development will have a positive acceptable impact.

9. Since the HGL of the municipal storm sewer is very high it not practical to have the foundation drains of the proposed dwellings on the seven Hemphill Street lots to drain to the municipal storm sewer, therefore, it is proposed that the foundation drains drain to a sump and be pumped to grade.

10. Lot 5 foundation drains will also drain to a sump and be pumped to grade.

11. The front yards of the seven proposed lots on Hemphill Street will drain to the street and existing municipal storm sewer in Hemphill Street. Based on the size of the

municipal storm sewer (450mm) and that stubs were provided for the storm sewer connections it is believed that the municipal storm that the storm sewer was and is adequately sized for the proposed lots.

12. A proposed ditch around the rear perimeter of the seven lots will drain the rear yard of these lots, and Lot 5, to the Shea Road culvert and to “Flowing Creek Drain”. The proposed ditch will be located within drainage easements some of which will also be access easements.

13. Stormwater management, quantity and/or quality control, is not expected to be required, and none is proposed.

D.B. GRAY ENGINEERING INC.

SANITARY SEWER DESIGN FORM

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

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

Average Daily Flows:
Residential: 280 l / capita / day
Commercial: 50000 l / ha / day
Instituational: 50000 l / ha / day
Light Industrial: 35000 l / ha / day
Heavy Industrial: 55000 l / ha / day

Peaking Factor:
Residential (Harmon Equation): $P.F. = 1 + \frac{14}{4 + P^{0.5}}$
P = Population / 1000
Commercial & Institutional: 1.5
Industrial: As per Ottawa Guidelines Appendix 4-B

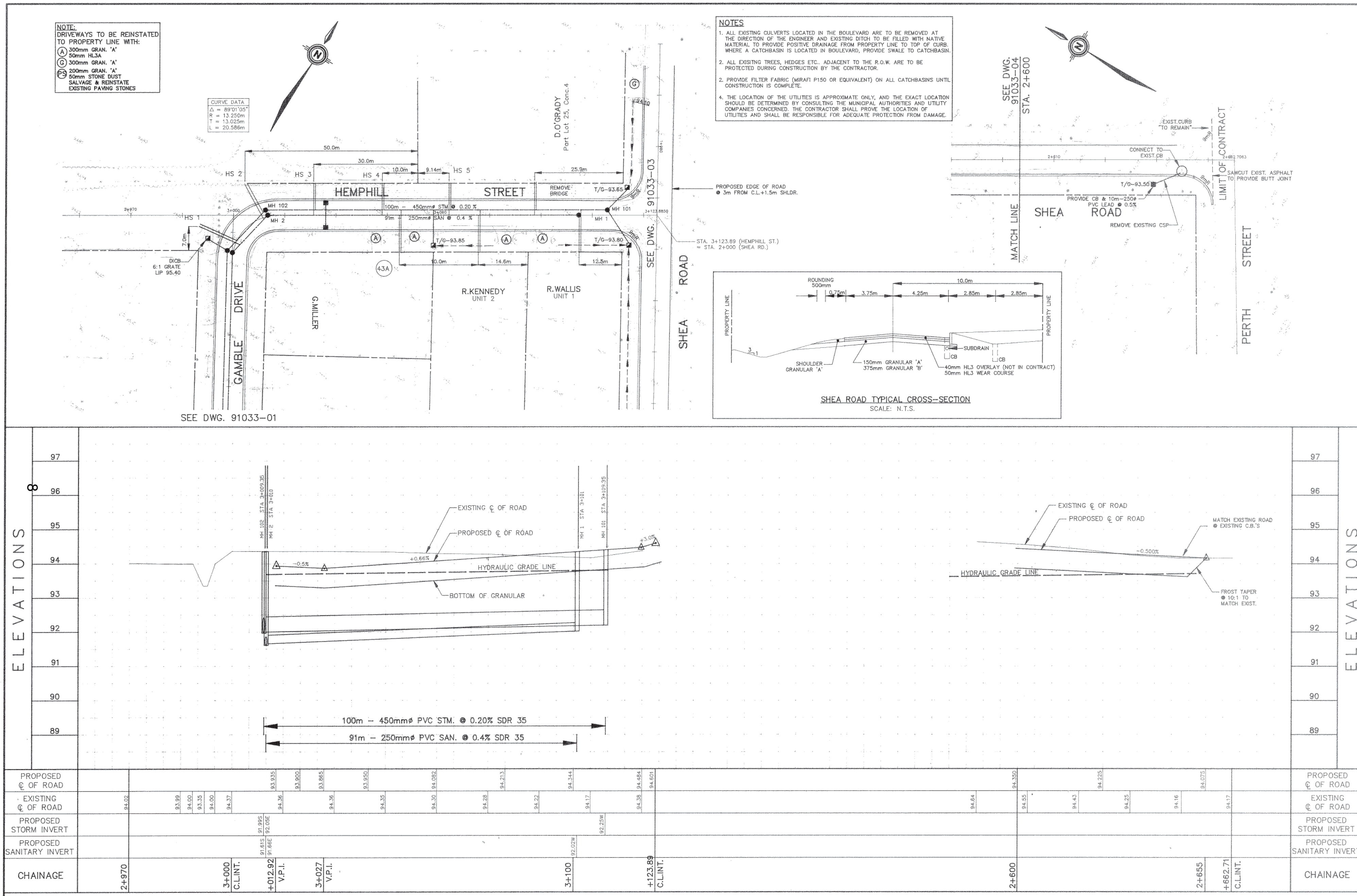
Infiltration Allowance: 0.33 l / s / ha

PROJECT: HEMPHILL ST

Designed By: DBG

23-Aug-18

LOCATION			Section								Cumulative Residential		Section Non-Residential			Cumulative					SEWER DATA								COMMENTS
			Single Family	Semi/Town house	Duplex / Triplex	Apartments (average)	Apartments (1 Bed.)	Apartments (2 Bed.)	Apartments (3 Bed.)	Resid-ential Area	Pop.	Peaking Factor	Area	Flow	Peaking Factor	Flow	Area	Sewage Flow	Infil-tration Flow	Total Flow	n = 0.013								
STREET	FROM	TO	ppu = 3.4	ppu = 2.7	ppu = 2.3	ppu = 1.8	ppu = 1.4	ppu = 2.1	ppu = 3.1												Type of Pipe	Dia. Actual (mm)	Dia. Nom. (mm)	Slope (%)	Length (m)	Capacity (l/s)	Velocity (m/s)	Ratio Q/Qfull	
			No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	ha			ha	l/ha/day		l/s	ha	l/s	l/s	l/s								
PROPOSED DEVELOPMENT - 7 SINGLE FAMILY DWELLINGS																												
			7							0.75	24	3.2				0.0	0.75	0.25	0.25	0.49								
EXISTING CONDITIONS - 4 SINGLE FAMILY DWELLINGS																												
Hemphill St	MH 1	MH 2	4							0.69	14	3.2				0.0	0.69	0.14	0.23	0.37		254.0	250	0.39	93	38.7	0.76	0.01	
Hemphill St / Gamble Dr	MH 2	MH 3	0							0.12	14	3.2				0.0	0.81	0.14	0.27	0.41		254.0	250	0.30	28.0	34.0	0.67	0.01	
PROPOSED CONDITIONS - 11 SINGLE FAMILY DWELLINGS																												
Hemphill St	MH 1	MH 2	7							0.92	24	3.2				0.0	0.92	0.25	0.30	0.55		254.0	250	0.39	93	38.7	0.76	0.01	
Hemphill St / Gamble Dr	MH 2	MH 3	4							0.64	37	3.2				0.0	1.56	0.39	0.51	0.90		254.0	250	0.30	28.0	34.0	0.67	0.03	



NOTE:
DRIVEWAYS TO BE REINSTATED TO PROPERTY LINE WITH:
(A) 300mm GRAN. 'A' 50mm HL3A
(G) 300mm GRAN. 'A'
(PS) 200mm GRAN. 'A' 50mm STONE DUST SALVAGE & REINSTATE EXISTING PAVING STONES

NOTES
1. ALL EXISTING CULVERTS LOCATED IN THE BOULEVARD ARE TO BE REMOVED AT THE DIRECTION OF THE ENGINEER AND EXISTING DITCH TO BE FILLED WITH NATIVE MATERIAL TO PROVIDE POSITIVE DRAINAGE FROM PROPERTY LINE TO TOP OF CURB. WHERE A CATCHBASIN IS LOCATED IN BOULEVARD, PROVIDE SWALE TO CATCHBASIN.
2. ALL EXISTING TREES, HEDGES ETC. ADJACENT TO THE R.O.W. ARE TO BE PROTECTED DURING CONSTRUCTION BY THE CONTRACTOR.
2. PROVIDE FILTER FABRIC (MIRAFI P150 OR EQUIVALENT) ON ALL CATCHBASINS UNTIL CONSTRUCTION IS COMPLETE.
4. THE LOCATION OF THE UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE.

NOTE: THIS PLAN WAS PRODUCED ON AN **AUTOCAD®** DRAFTING SYSTEM

No.	DATE	REVISION	BY	No.	DATE	REVISION	BY
1	06.08.92	GENERAL REVISIONS	S.M.C.				

SCALES
1:500 HORIZONTAL
1:50 VERTICAL

A.J.Robinson & Associates Inc.
CONSULTING ENGINEERS
P.O.Box 13130 Kanata,Ontario K2K 1X3
Telephone (613) 592-6060

DESIGN S.M.C.
CHECKED M.C.P.
DRAWN I.D.M.
CHECKED S.M.C.
APPROVED

TOWNSHIP OF GOULBOURN
LOCAL IMPROVEMENT PROJECT
SHEA ROAD / GAMBLE DRIVE
VILLAGE OF RICHMOND

HEMPHILL STREET
STA. 2+970 TO STA. 3+125.89
SHEA ROAD
STA. 2+600 TO STA. 2+662.71

PROJECT No. 91033B
CONTRACT No. –
DATED JUNE 1992
DWG. No: 91033–05

Gmail by Google

Douglas Gray <d.gray@dbgrayengineering.com>

FW: Hemphill Pre-Consult Notes

1 message

Scott Alain <s.alain@holzmanconsultants.com> Mon, Aug 28, 2017 at 10:31 AM
To: "aschoutenfarm@xplornet.com" <aschoutenfarm@xplornet.com>
Cc: "randy@moreyassociates.com" <randy@moreyassociates.com>, "d.gray@dbgrayengineering.com" <d.gray@dbgrayengineering.com>, "holzman@rogers.com" <holzman@rogers.com>

Good morning,

In conjunction with the email just sent, see below for the preconsultation notes.

Scott Alain, M.PL
Junior Planner
Holzman Consultants Inc.
tel: 1-613-614-1925

Begin forwarded message:

From: "McWilliams, Cheryl" <Cheryl.McWilliams@ottawa.ca>

Subject: Hemphill Pre-Consult Notes

Date: August 28, 2017 at 8:28:10 AM EDT

To: "holzman@rogers.com" <holzman@rogers.com>

Bill: Below are our notes from the preconsult meeting:

General:

Staff could only support the proposal as a subdivision application. Should you proceed through the consent process and the Committee chose to support the lot creations the same conditions and requirements would be imposed as if it were a plan of subdivision. The submission requirements for a complete subdivision application would be expected as part of the submission package for a severance(s).

Sanitary –

- You need to retrieve the old plan that shows the laterals on Hemphill
- There are capacity issues with the Richmond sanitary system that must be addressed as part of the submission.

- Must demonstrate that flows from the sanitary system have been removed to accommodate your proposal. It would be on a 2 for one removal to new basis. In the past this has consisted of the developers getting existing home owners to agree to remove their sump connections from the sanitary system. Our understanding is that incentives have been used to encourage this.

- The hydraulic grade line of the sewers is above the bottom of the ditch. The basements need to be 0.3 m above the hgl.

- Demonstrate that the sewer laterals are

    - the minimum separation distance from the well of 15 metres.

    - Appropriate slope for those off the end of Hemphill.

Grading and Drainage – split front /rear yard drainage on the lots. The rear into a swale out to She and the front to the storm sewer. Use best management practices.

Water –

- A hydrogeological report will be required. RVCA will be the reviewer for it

Transportation

- Shea has a 26 m protected row – so 13 metres from centerline will need to be conveyed.

- A road opening would be required as would a servicing extension agreement should the proponents not follow a plan of subdivision.

- The extension of Hemphill to be constructed to City standard, with mountable curbs.

Geotechnical Report – required and need to address footings 0.3 m above the high ground water level.

Cash in Lieu of Parkland is applicable for all new lots.

We will need a Tree Conservation Report. We will want to see appropriate trees retained and potentially some new plantings to achieve streetscape trees.

Cheryl McWilliams **MCIP, RPP**

Planner 3

Rural Planning

Planning, Infrastructure and Economic Development Department

Service de planification, d'Infrastructure et de Développement économique

City of Ottawa | Ville d'Ottawa

110 Laurier Ave W

Ottawa K1P 1J1

613 580-2424 ext./poste 30234

fax 613 580-2576

ottawa.ca/planning / ottawa.ca/urbanisme

Absence Alert - I will be out of the office September 1.

Gmail by Google

Douglas Gray <d.gray@dbgrayengineering.com>

Hemphill Severances

1 message

Hall, Kevin <Kevin.Hall@ottawa.ca> Thu, Sep 14, 2017 at 1:58 PM
To: DOUGLAS GRAY <dbgray@rogers.com>

Doug

I looked at the comments and re-visited the 2-1 condition for removal. The removal is for flow and not units. Ex. If your development will outlet 2l/s to the sanitary, then we require 4l/s of sump pump removal.

Hope that clarifies things up.

Kevin Hall, C.E.T.
Project Manager, Infrastructure Approvals
Development Review - Rural Services
Gestionnaire de projet, Approbation des demandes d'infrastructure
Examen des demandes d'aménagement (Services ruraux)
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27824
ottawa.ca/planning / ottawa.ca/urbanisme

City of Ottawa Servicing Study Checklist

General Content

Executive Summary (for large reports only): not applicable

Date and revision number of the report: see page 1 of Servicing Brief and Stormwater Management Report

Location map and plan showing municipal address, boundary, and layout of proposed development: see drawings C-1 to C-3

Plan showing the site and location of all existing services: see drawings C-1 to C-3

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: not applicable

Summary of Pre-consultation Meetings with City and other approval agencies: not available

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: not applicable

Statement of objectives and servicing criteria: see page 1 of Servicing Brief and Stormwater Management Report

Identification of existing and proposed infrastructure available in the immediate area: see drawings C-1 to C-3

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). see drawings C-1 to C-3

Concept level master grading plan to confirm existing and proposed grades in the development 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: not applicable

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: not applicable

Proposed phasing of the development, if applicable: not applicable

Reference to geotechnical studies and recommendations concerning servicing: see note 1.5 on drawing C-1

All preliminary and formal site plan submissions should have the following information:

- **Metric scale:** included
- **North arrow:** included
    - **(including construction North):** not included
- **Key Plan:** included

- **Name and contact information of applicant and property owner:** not available
- **Property limits**: included
    - **including bearings and dimensions:** not included
- **Existing and proposed structures and parking areas:** included
- **Easements, road widening and rights-of-way:** included
- **Adjacent street names:** included

Development Servicing Report: Water

Confirm consistency with Master Servicing Study, if available: not applicable

Availability of public infrastructure to service proposed development: see page 2 of Servicing Brief and Stormwater Management Report

Identification of system constraints: see page 2 of Servicing Brief and Stormwater Management Report

Confirmation of adequate domestic supply and pressure: see page 2 of Servicing Brief and Stormwater Management Report

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 locations throughout the development: not applicable

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: see page 2 of Servicing Brief and Stormwater Management Report

Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design: not applicable

Address reliability requirements such as appropriate location of shut-off valves: not applicable

Check on the necessity of a pressure zone boundary modification:. not applicable

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: not applicable

Description of the proposed water distribution network, including locations of proposed connections to the existing systems, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions: not applicable

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: not applicable

Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines: not applicable

Provision of a model schematic showing the boundary conditions locations, streets , parcels, and building locations for reference: not applicable

Development Servicing Report: Wastewater

Summary of proposed design criteria: see page 3 of Servicing Brief

(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): not applicable

Confirm consistency with Master Servicing Study and /or justification for deviations: not applicable

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 conditions of sewers: not applicable

Descriptions of existing sanitary sewer available for discharge of wastewater from proposed development: see page 3 of Servicing Brief and Stormwater Management Report

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): not applicable

Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix C) format. see page 7 of Servicing Brief and Stormwater Management Report

Description of proposed sewer network including sewers, pumping stations, and forcemains: see page 3 of Servicing Brief and Stormwater Management Report

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): not applicable

Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development: not applicable

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity: not applicable

Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding: not applicable

Special considerations such as contamination, corrosive environment etc: not applicable

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): see page 3 & 4 of Servicing Brief and Stormwater Management Report

Analysis of available capacity in existing public infrastructure. not applicable

A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern: see drawing C-2

Water quality 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: see Stormwater Management Report Servicing Brief and Stormwater Management Report

Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements: Servicing Brief and Stormwater Management Report

Descriptions of the references and supporting information.
Set-back from private sewage disposal systems. not applicable

Watercourse and hazard lands setbacks: not applicable

Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed: the pre-application consultation record is not yet been issued

Confirm consistency with sub-waterched and Master Servicing Study, if applicable study exists: not applicable

Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period). see drawings C-1 to C-3 and Servicing Brief and Stormwater Management Report

Identification of watercourses within the proposed development and how watercourses will be protected, or , if necessary, altered by the proposed development with applicable approvals. see drawings C-1 to C-3 and Servicing Brief and Stormwater Management Report

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: see Servicing Brief and Stormwater Management Report

Any proposed diversion of drainage catchment areas from one outlet to another. : not applicable

Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities. : not applicable

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: not applicable

Identification of potential impacts to receiving watercourses: Servicing Brief and Stormwater Management Report

Identification of municipal drains and related approval requirements. : not applicable

Descriptions of how the conveyance and storage capacity will be achieved for the development: see page 3 of Servicing Brief and Stormwater Management Report

100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading:

Inclusion of hydraulic analysis including hydraulic grade line elevations. : not applicable

Description of approach to erosion and sediment control during construction for the protection of receiving watercourses of drainage corridors: see notes 2.1 to 2.6 on drawing C-2

Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplains elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current: not applicable

Identification of fill constraints related to floodplain and geotechnical investigation. : not applicable

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 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: see page 19 of Servicing Brief and Stormwater Management Report

Application for Certificate of Approval (CofA) under the Ontario Water Resources Act:

Changes to Municipal Drains. : not applicable

Other permits (National Capital commission, Parks Canada, public Works and Government Services Canada, Ministry of transportation etc.) : not applicable

Conclusion Checklist

Clearly stated conclusions and recommendations: see page 5 of Servicing Brief

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: included