

Sidney W Woods, O.L.S., P.Eng.(1904-1980)
S. Kenneth Woods, P.Eng.*
Daniel Joyce, P.Eng.

334 Hatt St., Dundas Ontario L9H 2H9
Tel: (905)-627-0775, Fax:(905)-627-2818
swwoods@cogeco.net

City of Hamilton
Planning and Economic Development Department
Growth Management Division - Planning Section
71 Main Street West, 5th Floor
Hamilton ON L8P 4Y5

Date: October 15'20

Attn: Ms. Anita Fabac, MCIP, RPP, Manager of Development Planning, Heritage and Design

**Re: Functional Servicing Report for
125 Pirie Drive, Dundas (City File # FC-20-018)
(Proposed 4-Storey Retirement Home & 17 Bungalow Townhouse Units)
City of Hamilton**

Dear Madame;

The following constitutes our Functional Servicing Report (FSR) for the proposed development at No. 125 Pirie Drive, Dundas. It has been prepared to accompany a Zoning By-law Amendment (ZBA) application as referred to in Formal Consultation Document FC-20-018, dated March 27 2020. It addresses the required municipal storm-water, sanitary and water servicing for the project as per current City of Hamilton guidelines.

Please refer to the following accompanying documents:

- a.) Site Grading Plan, Drawing No. E-1338 Sheet 1 by Sidney W Woods Engineering (2011) Inc.
- b.) Site Servicing Plan, “ “ “ 2 “ “ “ “
- c.) Pre-Development Storm Area Plan, “ “ STM-PRE “ “ “
- d.) Post-Development “ “ “ “ “ POST “ “ “
- e.) “Stormtech MC-4500” Manufacturer Data Sheets
- f.) MIDUSS Output Files.
- g.) “Conservation Run Phase 1” subdivision General Plan of Services Drawing (As-Constructed)
- h.) “ “ “ “ “ Sanitary Area Plan Drawing (As-Constructed)
- i.) “ “ “ “ “ Storm Area Plan Drawing (As Approved)

1.) Background

The site comprises an area of 1.435Ha (127.0m x 113.5m approx) situated at the north-east corner of the intersection of Governor's Road & Pirie Drive at the west limit of the former Town of Dundas (now City of Hamilton). The legal description of the lands are specifically Lots Nos. 1 to 9 incl., plus Block 18 of Registered Plan 62M-683, which comprised a Plan of Subdivision named “Conservation Run Phase 1” in the year 1991. The site has remained vacant since 1991.

The “Conservation Run Phase 1” subdivision envisioned nine single family lot comprising Lots 1 to 9, and a multiple family townhouse development on Block 18. The design, sizing and construction of the

**Re: Functional Servicing Report for
125 Pirie Drive, Dundas (City File # FC-20-018)
(Proposed 4-Storey Retirement Home & 17 Bungalow Townhouse Units)
City of Hamilton**

adjacent infrastructure was accordingly carried out to facilitate the ultimate land use, please refer to the accompanying “Conservation Run” drawings. Shortly after registration of the “Conservation Run” subdivision in 1991, the original subdivider sold the lands comprising the current site to a third party for use as a single purpose institutional development. Hence, private sewer and water services to Lots Nos. 1 to 9 were **not** installed and neither were the proposed sanitary and storm service laterals to Block 18. The thinking was that the service laterals should wait until the ultimate detailed Site Plan design was carried out and the most suitable locations established.

The current development proposal is very similar in form to what was envisioned and accounted for by the original subdivision design. Only the storm-water servicing requires additional works as the current proposal results in higher run-off co-efficients than were shown on the original subdivision Storm Area Plan drawing.

STORM SERVICING:

2.) Existing Pre-Development Site Drainage

The site fronts to the south onto Governor's Road, and flanks and backs onto Pirie Drive along its west and north sides. Immediately abutting the site to the east are existing single-family residences and condominium townhouses. The existing site is 100% vacant and fully vegetated with grassland. The land topography rises steeply from Governor's Road to the south to the east-west leg of Pirie Drive to the north, please refer to accompanying Site Grading Plan and Pre-Dev Storm Area Plan drawings for existing ground contours. Centreline of Governor's Road elevation opposite middle of site equals 140.0m approx, with corresponding centreline of Pirie Drive elevation at the north end equaling 147.0m.

Minor fringe areas close to the roadway drain onto Pirie Drive along the north and west sides, however the majority of the lands drain south & south easterly towards Governor's Road and are intercepted by the existing roadside ditch running along the north side of the ROW. The roadside ditch drains into two existing ditch inlet catchbasins, one opposite the site (i.e. EX.MHCB shown on drawings) and one east of the site. A well defined drainage swale running north to south just west of the east property line separates and contains drainage between the site and the existing residential development to the east. The site receives zero drainage from external areas.

Per the accompanying Pre-Dev Storm Area Plan the existing pre-development site drainage equates to 1.435Ha at a co-efficient of imperviousness 'C' = 0.2.

3.) Existing Municipal Storm Sewer System & Approved Drainage Areas

Please review both of the accompanying “Conservation Run Phase 1” General Plan of Services and Storm Area Plan drawings. There are existing 300mm dia and 525mm dia municipal storm sewers

**Re: Functional Servicing Report for
125 Pirie Drive, Dundas (City File # FC-20-018)
(Proposed 4-Storey Retirement Home & 17 Bungalow Townhouse Units)
City of Hamilton**

opposite both the north-east and south-east corners of the site respectively, available to service the project. The subdivision Storm Area Plan allocates co-efficient of imperviousness “C” values of C = 0.4 and C = 0.6 to the single lot areas (0.435Ha) and townhouse areas (1.0Ha) respectively, for an overall 'C' value of 'C' = 0.539 for the total 1.435Ha site. For the purposes of this report we will look at both the 5-Year and 100-Year storms for peak runoff calculations.

Utilizing the Rational Method to calculate storm runoff and the City of Hamilton's RBG rainfall curves, $I(\text{mm/h}) = a/(t+b)^c$, and $\text{runoff} = 2.78 \times C \times I (\text{mm/hr}) \times A(\text{Ha})$

Return Storm	IDF Parameters		
	<u>a</u>	<u>b</u>	<u>c</u>
5-Year	688.2	5.0	0.753
100-Year	1036.1	4.5	0.733

==> 5-Year 10 min rainfall intensity I = 89.56mm/hr

==> 100-Year 10 min “ “ I = 145.92mm/hr

==> Peak Allowable Post-Dev **5-Year Storm** outflow from total site
= $2.78 \times 0.539 \times 89.56 \times 1.435 = 192.57\text{l/s}$ (litres/s).

==> Peak Allowable Post-Dev **100-Year Storm** outflow from total site
= $2.78 \times 0.539 \times 145.92 \times 1.435 = 313.76\text{l/s}$ (litres/s).

It is understood that the post-development storm outflows cannot exceed the above values.

4.) Proposed Post-Development Storm-Water Drainage

Please refer to accompanying proposed Site Grading & Servicing Plan drawings as well as our Post-Dev Storm Area plan for the project. The proposed development comprises the placement of 17 bungalow townhome units over Lots 1 to 9 of R.P. 62M-683 at the north end of the site and a single 4-storey 155-unit retirement home over the Block 18 portion of of R.P. 62M-683.

As per the detailed breakdown of proposed post development drainage surfaces listed on the post-Dev Stm Area Plan, the proposal will result in the site area of 1.435Ha having an overall post-development runoff co-efficient of imperviousness “C” value of 0.689. This value compares with a pre-development site 'C' = 0.2 and allocated/approved 'C' = 0.539 per approved “Conservation Run Phase 1” subdivision. The proposed grading and servicing design will direct the frontyard and roof drainage from the bungalow townhomes (0.184Ha @ C=0.897 + 0.093Ha @ C=0.889) northwards to Pirie Drive while

**Re: Functional Servicing Report for
125 Pirie Drive, Dundas (City File # FC-20-018)
(Proposed 4-Storey Retirement Home & 17 Bungalow Townhouse Units)
City of Hamilton**

the bungalow rearyards and retirement home areas will be collected to drain southerly towards Governor's Road.

A proposed private 250mm dia storm sewer running parallel to Pirie Drive within the frontyards will connect storm service laterals to each of the bungalow townhouse units and then connect to the existing 300mm dia municipal storm sewer within Pirie Drive via a proposed road cut in the vicinity of the north-east corner of the site. Please note that this component of the post development site drainage will be “uncontrolled” and not attenuated. Additionally, an area of 0.051Ha comprising sideyard area along the west side of the site will also drain “uncontrolled” onto Pirie Drive.

The remainder of the proposed post-development site drainage area will be collected through the proposed internal storm sewer system within Block 18 as shown on the accompanying Site Servicing Plan and routed through a proposed underground SWM detention system with outlet control.

The proposed controlled outflow will then connect to the existing 525mm dia municipal storm sewer at the existing EX.MHCB manhole-catchbasin on the north side of Governor's Road, via a proposed 450mm dia storm service lateral as shown on both the accompanying Site Servicing Plan drawing and on the “Conservation Run Phase 1” General Plan of Services drawing.

We breakdown the post development site drainage areas into controlled and uncontrolled as follows:

Total Uncontrolled Post-Development Drainage Area = 0.328Ha @ 'C' = 0.816

Total Controlled “ “ “ “ = 1.107Ha @ 'C' = 0.651

Runoff outflow = $2.78 \times C \times I \times A$ as described in section 3.) above.

==> Peak 5-Year Outflow from Uncontrolled Area = $2.78 \times 0.816 \times 89.56 \times 0.328 = 66.64\text{litres/s}$

==> Peak 100-Year Outflow from Uncontrolled Area = $2.78 \times 0.816 \times 145.92 \times 0.328 = 108.57\text{litres/s}$

5.) Proposed SWM Quantity Control System

To evaluate the peak outflows from the controlled area, we utilize the MIDUSS hydrologic program to model and route both the 100-Year and 5-Year storms through the proposed underground “Stormtech” detention chamber system. Please refer to the accompanying MIDUSS output text files for each of the two storms. Outflow from the “Stormtech” system is restricted by incorporating a 225mm orifice tube connection between proposed MH2 and MH1. Discharge through the orifice is calculated using the formula $Q = 0.82 \times (2gh)^{0.5} \times A$, where h = water depth above orifice and A = cross-sectional area of conduit.

Following is the stage-discharge-storage table for the proposed u/g detention system:

**Re: Functional Servicing Report for
 125 Pirie Drive, Dundas (City File # FC-20-018)
 (Proposed 4-Storey Retirement Home & 17 Bungalow Townhouse Units)
 City of Hamilton**

Proposed Stormtech System Stage-Discharge-Storage Table

<u>Depth</u> (m)	<u>Discharge</u> (cu.m./s)	<u>Volume</u> (cu.m.)
.000	.000	.0
.125	.0510	8.1
.250	.0722	10.9
.375	.0884	32.4
.500	.102	44.0
.625	.114	55.0
.750	.125	65.3
.875	.135	74.7
1.000	.144	83.2
1.125	.153	90.8
1.250	.162	97.2
1.375	.169	101.9
1.500	.177	103.0
1.625	.184	104.2
1.750	.191	104.6

Please refer to attached MIDUSS output files:

a.) 5-Year Storm:

Peak Allowable Post-Dev 5-Year Storm outflow from total site = 192.57l/s (litres/s).

Less Peak 5-Year Storm outflow from uncontrolled portion of site = 66.64l/s (litres/s).

=====

==> Required Peak 5-Year Outflow from controlled portion of site = 125.93l/s (litres/s).

MIDUSS calculates peak 5-Year outflow from SWM detention system = 110l/s << 125.92l/s

==> Required attenuation of 5-Year outflow is achieved. Peak outflow coincides with a detention depth of 0.582m and detention volume utilization of 52cu.m. Out of available 104.6cu.m.

b.) 100-Year Storm:

Peak Allowable Post-Dev 100-Year Storm outflow from total site = 313.76l/s (litres/s).

Less Peak 100-Year Storm outflow from uncontrolled portion of site = 108.57l/s (litres/s).

=====

==> Required Peak 100-Year Outflow from controlled portion of site = 205.19l/s (litres/s).

MIDUSS calculates peak 100-Year outflow from SWM detention system = 167l/s << 205.19l/s

==> Required attenuation of 100-Year outflow is achieved. Peak outflow coincides with a detention depth of 1.336m and detention volume utilization of 100cu.m. out of total available volume of 104.6cu.m.

**Re: Functional Servicing Report for
125 Pirie Drive, Dundas (City File # FC-20-018)
(Proposed 4-Storey Retirement Home & 17 Bungalow Townhouse Units)
City of Hamilton**

6.) Proposed SWM Quality Control.

Stormwater quality treatment will be provided by proposed “Hydrostorm HS4” oil/grit separator manhole at MH1. It is intended that the proposed HS4 OGS manhole will provide greater than 70% TSS removal in line with “Normal” level of treatment per MOECC guidelines. Detailed sizing and design to be provided accordingly at Site Plan stage.

SANITARY SERVICING

7.) Similar to the storm system, the adjacent existing sanitary sewers have accounted for the development of the site. Please refer to accompanying “Conservation Run” General Plan of Services drawing. We propose to service the 17 bungalow townhouse units by installing a private 200mm dia sanitary sewer parallel to Pirie Drive within the frontyard area with 150mm dia individual service laterals to each unit. This private 200mm dia sanitary sewer will then connect to the existing 250mm dia municipal sanitary sewer on Pirie Drive at the north-east corner of the site via road cut.

Sanitary service to the proposed retirement home will be provided through a proposed 200mm dia sanitary sewer connection from the existing sanitary manhole EX.SMH on the north side of Governor's Road as shown on our site Servicing Plan drawing.

WATER SERVICING

8.) Water servicing to the proposed 17 bungalow townhouse units will be provided by installing a private 100mm dia watermain parallel to Pirie Drive within the frontyard area with 25mm dia individual service laterals to each unit. The proposed private 100mm dia watermain will connect to the existing 200mm dia municipal watermain on the north side of Pirie Drive opposite the northeast corner of the site.

An existing 150mm dia water service to Block 18 of 62M-683 was installed as part of the construction of the “Conservation Run Phase 1” subdivision in 1991. We propose to utilize this 150mm dia water service as shown on our Site Servicing Plan drawing to connect to the proposed retirement home.

**Re: Functional Servicing Report for
125 Pirie Drive, Dundas (City File # FC-20-018)
(Proposed 4-Storey Retirement Home & 17 Bungalow Townhouse Units)
City of Hamilton**

Should you require any further information please do not hesitate to contact this office.

Yours sincerely;
SIDNEY W. WOODS ENGINEERING (2011) INC.

per.....
Daniel Joyce, P.Eng.

cc- Fieldgate Properties Limited
attn: Mr Jordan Dyer, Project Coordinator

