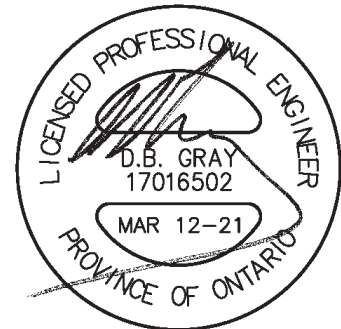


# SERVICING BRIEF & STORMWATER MANAGEMENT REPORT

Dunbar Court  
Ottawa, Ontario

Report No. 19062

October 13, 2020  
Revised March 12, 2021



NOT VALID UNLESS  
SIGNED & DATED



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

700 Long Point Circle  
Ottawa, Ontario K1T 4E9

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

# SERVICING FEASIBILITY REPORT

## Dunbar Court

### Ottawa, Ontario

This report describes the services and addresses the stormwater management requirements for the re-development Nepean Housing Corporation's existing community located at Dunbar Court which currently consists of 46 townhouse units. It is proposed that 4 townhouse units be demolished, and a 31-unit 3-storey apartment building be constructed.

This report forms part of the stormwater management design for the proposed development. Refer to drawings C-1 to C-9, also prepared by D. B. Gray Engineering Inc.

#### WATER SUPPLY FOR FIREFIGHTING:

There is a 150mm private watermain extending the full length of Dunbar Court, connecting to a 200mm municipal watermain in Bateman Drive and a 300mm watermain in an easement at the south end of the property adjacent to Gibbard Avenue. There are three existing private fire hydrants on the property. Two of the existing private fire hydrants are close to the proposed apartment building; about 23 m and 29 m unobstructed distances from the main entrance to the apartment building. Two new fire hydrants are proposed at the south end of the property connecting to Gibbard Avenue watermain and they will be about 47 m and 50 m unobstructed distances from the apartment building

The building will be wood-framed construction; a sprinkler system is not proposed. Based on this construction, a fire flow of 283.3 L/s (17,000 L/min) is required, as calculated as per the Fire Underwriter Survey "Water Supply For Fire Protection". The calculations were submitted to the City and boundary conditions were requested.

As per City of Ottawa Tech Bulletin ISTB-2018-02, the aggregate fire flow of all contributing fire hydrants within 150 m of the building can be used to supply the required fire flow. The two new on-site hydrants will be a Class AA and are within 75 m and can contribute 5,700 L/min (95 L/s) (as per Table 1 of ISTB-2018-02). That leaves 5,600 L/min, 2,800 L/min (46.7 L/s) each, to be supplied by the two closest existing private fire hydrants.

The boundary conditions received from the City (based on the City's computer model of the municipal water distribution system) includes the HGL (hydraulic grade line) of 119.0 m during a flow rate of 300 L/s at the Gibbard Avenue watermain and 124.0 m during a flow rate of 150 L/s at Bateman Drive watermain. This calculates to be 233 kPa (34 psi) at the two new hydrants. A model was created using EPANET software to analyze the hydraulics of the existing 150mm private watermain serving the existing on-site fire hydrants. Using 46.7 L/s flowrate at each of the existing on-site fire hydrant, the pressure at the hydrants were calculated to be 197 kPa (28.6 psi) and 198 kPa (28.7 psi). Since the pressures at all new

and existing hydrants will be above 138 kPa (20 psi) there is an adequate water supply for firefighting.

#### WATER SERVICE:

After the redevelopment 42 townhouse units will remain. The 31 apartment units will be comprised of 23 one-bedroom and 8 two-bedroom units. Based on the City of Ottawa Water Distribution Design Guidelines for residential properties (1.4 person per bachelor/one-bedroom unit; 2.1 persons per two-bedroom unit and 2.7 persons per townhouse unit; and 350 L/person/day) and Ministry of the Environment Design Guidelines for peaking factors the daily average flow is 0.7 L/s with a maximum daily and maximum hourly demand of 3.2 and 4.8 L/s, respectively.

To determine water pressure under these demands, boundary conditions, based on the City of Ottawa computer simulation of the water distribution system, at the subject location, are required. In summary, the requested the boundary conditions for the subject area were based on the following:

Average Daily Demand: 0.7 L/s.

Maximum Daily Demand: 3.2 L/s.

Maximum Hourly Demand: 4.8 L/s

Based on the boundary conditions received from the City, the minimum HGL (hydraulic grade line) is 127.0m and maximum is 134.2m. With these HGLs the static water pressure at the first floor of the proposed apartment building is calculated to vary from 302 kPa to 392 kPa (44 to 54 psi) which is on the low side of an acceptable range; a booster pump may be required for the domestic water supply.

Based on the AWWA water flow demand curve, and a water pressure at the meter of 338 kPa (49 psi), the peak demand for the building is expected to be 2.3 L/s (138 L/min / 36 USgpm). The AWWA method calculates the instantaneous demand and is used to size the water service. This peak demand will produce an acceptable velocity of 1.2 m/s in the proposed 50mm water service connection (up to 2.4 m/s is acceptable). The water service will connect to the existing 150 mm private watermain.

#### SANITARY SERVICE:

Dunbar Court is served by a private sanitary sewer system consisting of 250mm diameter sewer pipes, connecting to a 250mm municipal sanitary sewer in Bateman Drive.

Gabrielle Schaeffer (City of Ottawa Infrastructure Approvals) has stated there are no known issues with sanitary sewers in the area. However, she advised us to analyze the sewage load and capacity of the first sewer pipe segment downstream of Dunbar Court. This 250mm pipe segment, having a pipe slope of 0.50%, has a capacity of capacity of 43.9 L/s. The private

sewer system is also analyzed and the last pipe segment has a capacity of 39.2 L/s (250mm at 0.40% slope).

With the existing conditions, in addition to the 46 townhouse units in Dunbar Court, upstream of the point of connection, there are 18 single family houses and a 60-unit apartment building. Based on the City of Ottawa Sewer Design Guidelines for residential properties these numbers of residential units represents a population of 124 in Dunbar Court and a total upstream population of 297 (3.4 persons per single family unit; 2.7 persons per townhouse unit and 1.4 persons per average apartment unit). Also based on the City's guidelines (280 L/person/day and a 3.2 peaking factor) the existing flows are calculated to be 1.69 L/s in the last private sewer pipe segment and 5.36 L/s in the first pipe segment downstream of Dunbar Court which means the existing sewage load is only 4% and 12% of the sewer capacities respectively.

With the proposed development (4 townhouse units demolished and a 31-unit 3-storey apartment building constructed) the population of Dunbar Court increases to 181 and the total upstream population increases to 354 (based on the City's guidelines) and the proposed flows are calculated to be 2.28 L/s in the last private sewer pipe segment and 5.95 L/s in the first pipe segment downstream of Dunbar Court. The proposed sewage load will be only 6% and 14% of the sewer capacities respectively and therefore the increase in sanitary flows is expected to have a negligible impact.

A 150mm sanitary sewer service connection will be required. Based on the City's guidelines the peak flow generated by the proposed apartment building is calculated to be 0.83 l/s. This flow will be adequately handled by the proposed sanitary sewer service (having a 15.9 L/s capacity).

#### STORMWATER MANAGEMENT:

The existing development has no stormwater management (quality or quantity) control measures.

#### Water Quality:

The Rideau Valley Conservation Authority has commented: *"The RVCA requires enhanced quality protection (80% TSS removal) for the project. The quality protection would apply to the parking area or any runoff collected via the parking area."*

It was expected that since the majority of runoff will be from rooftop and landscaped areas, which is considered clean, and the runoff from only 15% of the area is draining from car parking area, it was expected that onsite water quality controls will be not be required.

Regardless, to meet the water quality target of 80% TSS removal an oil/grit separator (OGS) manhole is proposed. Although only 1,465 sq.m. is proposed to be redeveloped, and only 219 sq.m. will be for car parking, given the configuration of the existing storm sewers, to

capture the new parking areas the location of the OGS manhole will provide quality control for 4,849 sq.m. (over 20 times the area required). Specifically, an AquaShield Aqua-Swirl Concentrator model AS-3 is selected to achieve a minimum 80% TSS removal. Based on software supplied by the manufacturer, the Aqua-Swirl AS-3 will remove approximately 90% of TSS from the runoff produced by the drainage area. Output from the manufacturer's software is attached to this report. The Aqua-Swirl model AS-3 has a sediment capacity of 0.56 cubic metres and an oil/debris capacity of 417 litres.

In addition, a rain garden (around catch basin CB-2) and bioswale (draining to catch basin CB-8) will also provide quality control and promote groundwater recharge, with the infiltration / storage component designed to capture the first 10mm of rainfall without any outlet to the storm sewer system. The rain garden has a 184 sq.m. catchment area and provides 1.1 cu.m. of storage. The bioswale has a 1919 sq.m. catchment area and provides 12.1 cu.m. of storage.

An erosion and sediment control plan has been developed to be implemented during construction, (see drawing C-4 and notes 2.1 to 2.6 on drawing C-6). In summary: to filter out construction sediment capture filter sock inserts will be installed in all existing catch basins adjacent to the site; a silt fence barrier will be installed; a straw bale check dam will be installed; and any material deposited on a public road shall be removed.

#### Water Quantity:

The stormwater management criteria for quantity control are, in the area being re-developed, to control the post development peak flows for the 5-year and 100-year storm events to peak flows during the 5-year storm event using a pre-development runoff coefficient or runoff coefficient of 0.50, whichever is less; and a calculated time of concentration (not less than 10 minutes). It is calculated that the pre-development conditions reflect a 5-year runoff coefficient of 0.42 and a time of concentration of 1.2 minutes. Therefore, based on runoff coefficient of 0.42, a 10 minute time of concentration; and using the Rational Method; the maximum allowable release rate is 17.61 L/s for all storm events.

The Modified Rational Method is used to calculate the required storage volume. The runoff coefficients for the 100-year event are increased by 25% to maximum 1.00.

Stormwater will be stored within the development on the roof of the proposed building.

#### Drainage Area I

(Uncontrolled Flow Off Site – 668 sq.m.):

Given the configuration of the existing storm sewers it is not possible to control the runoff from the perimeter of the site without great expense and without increasing the risk of flooding the existing buildings; therefore, it will be allowed to flow uncontrolled off the site.

	100-year	5-year
Maximum flow rate:	22.22 L/s	11.61 L/s

Drainage Area II (Roof – 797 sq.m.):

Each of the three roof drains will be a flow control type which will restrict the flow and cause the storm water to pond on the roof. The flow control type roof drain shall be installed with a parabolic shaped slotted weir (1 slot per weir drain at 0.0124 l/s per mm per slot - 5 USgpm per inch per slot); the opening at top of flow control weir shall be a minimum 50 mm in diameter: Watts roof drain with a Watts Accutrol Weir RD-100-A1 or equal. The roof drain will be installed at the low point of the roof which will be 150mm lower than the perimeter of the roof. Six scuppers, each 385 mm wide and installed 150 mm above the roof drains, are required (refer to architectural for exact locations and details). The roof shall be designed to carry the load of water having a 50 mm depth at scupper and 200 mm depth at roof drain (refer to structural).

	100-year	5-year
The maximum release rate:	5.03 L/s	3.85 L/s
The maximum ponding depth:	135 mm	103 mm
The maximum stored volume:	27.88 cu.m.	12.44 cu.m.

The Entire Site:

	100-year	5-year
Pre-development flow rate:	34.93 L/s	17.61 L/s
Maximum allowable release rate:	17.61 L/s	17.61 L/s
Maximum release rate:	27.25 L/s	15.46 L/s

As previously stated, given the configuration of the existing storm sewers it is not possible to control the runoff from the perimeter of the site without great expense and without increasing the risk of flooding the existing buildings. The uncontrolled flow is greater than the maximum allowable release rate; therefore, the City's design criteria cannot be achieved during the 100-year event; however, it is about 22% less than pre-development conditions. For the 5-year storm event the maximum post-development release rate is calculated to be 12% less than the maximum allowable

In addition, the rain garden and bioswale will also provide quantity control and storage.

The post development stormwater flows contributing to the private and municipal storm sewer system is expected to have a positive impact given that it is 12% to 22% less than pre-development flows.

CONCLUSIONS:

1. There is an adequate water supply for firefighting from the municipal watermain.
2. The range of water pressures in the municipal watermain is on the low side of an acceptable range; a booster pump may be required for the domestic water supply.
3. The proposed water service connection is adequately sized to serve the development.

4. The expected sanitary sewage flow rate will be adequately handled by the proposed sanitary sewer service connection and private sanitary sewer.
5. The sanitary flow contributing to the existing municipal sanitary sewer is expected to have an acceptable impact.
6. The existing development has no stormwater management (quality or quantity) control measures. An enhanced quality protection (80% TSS removal) is required to be applied to the parking area or any runoff collected via the parking area. To meet the water quality target of 80% TSS removal an oil/grit separator (OGS) manhole is proposed. Although only 1,465 sq.m. is proposed to be redeveloped, and only 219 sq.m. will be for car parking, given the configuration of the existing storm sewers, to capture the new parking areas the location of the OGS manhole will provide quality control for 4,849 sq.m. (over 20 times the area required). The OGS is sized to remove approximately 90% of TSS from the runoff produced by the drainage area. In addition, a rain garden and will also provide quality control and promote groundwater recharge.
7. An erosion and sediment control plan has been developed to be implemented during construction.
8. The stormwater management criteria for quantity control are, in the area being re-developed, to control the post development peak flows for the 5-year and 100-year storm events to peak flows during the 5-year storm event using a pre-development runoff coefficient. Stormwater will be stored within the development on the roof of the proposed building. Given the configuration of the existing storm sewers it is not possible to control the runoff from the perimeter of the site without great expense and increasing the risk of flooding the existing buildings; therefore, it will be allowed to flow uncontrolled off the site. The uncontrolled flow is greater than the maximum allowable release rate; therefore, the criteria cannot be achieved during the 100-year event; however, it is about 22% less than pre-development conditions. For the 5-year storm event the maximum post-development release rate is calculated to be 12% less than the maximum allowable. In addition, the rain garden and bioswale will also provide some quantity control and storage.
9. The post development stormwater flows contributing to the private and municipal storm sewer system is expected to have a positive impact given that it is 12% to 22% less than pre-development flows.



# D. B. GRAY ENGINEERING INC.

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

700 Long Point Circle  
Ottawa, Ontario K1T 4E9

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

24-Jan-20  
REVISED 08-Oct-20

Dunbar Court  
Ottawa, Ontario

## Fire Flow Requirements

### Proposed 31-Unit 3-Storey Apartment Building (East of Firewall)

Fire flow requirement as calculated as per Fire Underwriter Survey "Water Supply For Fire Protection".

$F = 220 C A^{0.5}$  = the required fire flow in litres per minute

C = coefficient related to the type of construction  
= 1.5 Wood Frame Construction

A = total floor area (all storeys excluding basements at least 50% below grade)

Proposed Building South	3rd Floor	519 sq.m.
	2nd Floor	519 sq.m.
	Ground Floor	519 sq.m.
	<b>TOTAL FIRE AREA:</b>	<b>1557 sq.m.</b>

F = 13,021 L/min  
= 13,000 L/min (rounded off to the nearest 1,000 L/min)

-15% Charge for Combustible Occupancy

= 11,050 L/min

0% Reduction: No Sprinkler System

= - L/min

Increase for Separation Exposed Buildings

			Adjacent Building		Length- Height Factor	
			Constuction	Length m		Storeys
18%	North	3.1 to 10m	W-F	17	2	34
10%	East	20.1 to 30m	W-F	29	4	116
17%	South	3.1 to 10m	W-F	10	2	20
10%	West	FIREWALL				0

= 55% Total Increase for Exposure (maximum 75%)  
= 6,078 L/min Increase

= 17,128 L/min

F = 17,000 L/min (rounded off to the nearest 1,000 L/min)

= 283.3 L/s



# D. B. GRAY ENGINEERING INC.

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

700 Long Point Circle  
Ottawa, Ontario K1T 4E9

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

25-Jan-20  
REVISED 08-Oct-20

Dunbar Court  
Ottawa, Ontario

## Fire Flow Requirements

### Proposed 31-Unit 3-Storey Apartment Building (West of Firewall)

Fire flow requirement as calculated as per Fire Underwriter Survey "Water Supply For Fire Protection".

$$F = 220 C A^{0.5} = \text{the required fire flow in litres per minute}$$

C = coefficient related to the type of construction  
= 1.5 Wood Frame Construction

A = total floor area (all storeys excluding basements at least 50% below grade)

Proposed Building South	3rd Floor	278 sq.m.
	2nd Floor	278 sq.m.
	Ground Floor	278 sq.m.
	<b>TOTAL FIRE AREA:</b>	<b>834 sq.m.</b>

$$F = 9,530 \text{ L/min}$$

$$= 10,000 \text{ L/min (rounded off to the nearest 1,000 L/min)}$$

-15% Charge for Combustible Occupancy

$$= 8,500 \text{ L/min}$$

0% Reduction: No Sprinkler System

$$= - \text{ L/min}$$

Increase for Separation Exposed Buildings

		Adjacent Building			Length- Height Factor
		Constuction	Length m	Storeys	
12% North	10.1 to 20m	W-F	13	2	26
10% East	FIREWALL				0
12% South	10.1 to 20m	W-F	10	2	20
12% West	10.1 to 20m	W-F	14	2	28
46% Total Increase for Exposure (maximum 75%)					
= 3,910 L/min Increase					

$$= 12,410 \text{ L/min}$$

$$F = 12,000 \text{ L/min (rounded off to the nearest 1,000 L/min)}$$

$$= 200.0 \text{ l/s}$$

# D. B. GRAY ENGINEERING INC.

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

700 Long Point Circle  
Ottawa, Ontario K1T 4E9

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

REVISÉ      13-Apr-20  
08-Oct-20

**Dunbar Court  
Ottawa, Ontario**

**Water Demand**

**PROPOSED DEVELOPMENT  
42 EXISTING TOWNHOUSE UNITS  
+ 31-UNIT 3-STOREY APARTMENT BUILDING**

	Number of Units	Persons Per Unit	Population
UNIT TYPE:			
Single Family:	0	3.4	0
Semi- detached:	0	2.7	0
Duplex:	0	2.3	0
Townhouse:	42	2.7	113
APARTMENTS:			
1 Bedroom:	23	1.4	32
2 Bedroom:	8	2.1	17
Average Apartment:	0	1.8	0
TOTAL:	73		162

**DAILY AVERAGE**

	350	litres / person / day			
	39.5	l/min	0.7	l/s	10 USgpm

**MAXIMUM DAILY DEMAND**

	4.8	(Peaking Factor for a population of 162: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)			
	189.2	l/min	3.2	l/s	50 USgpm

**MAXIMUM HOURLY DEMAND**

	7.2	(Peaking Factor for a population of 162 Table 3-3 MOE Design Guidelines for Drinking-Water Systems)			
	285.6	l/min	4.8	l/s	75 USgpm

Elevation of Water Meter: 96.04 m ASL  
Finish Floor Elevation: 95.14 m ASL

Static Pressure at Water Meter

MINIMUM HGL:	127.0	m ASL	44	psi	304	kPa
MAXIMUM HGL:	134.2	m ASL	54	psi	374	kPa



Douglas Gray <d.gray@dbgrayengineering.com>

---

**RE: Dunbar Court**

1 message

---

**Schaeffer, Gabrielle** <gabrielle.schaeffer@ottawa.ca>  
To: Douglas Gray <d.gray@dbgrayengineering.com>  
Cc: Caoimhin Kennedy <c.kennedy@dbgrayengineering.com>

Fri, May 1, 2020 at 9:16 AM

Hi Doug,

I see your interpretation. I am fine with proceeding with your assessment.

Thanks,

Gabrielle

---

**From:** Douglas Gray <d.gray@dbgrayengineering.com>  
**Sent:** May 01, 2020 7:59 AM  
**To:** Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>  
**Cc:** Caoimhin Kennedy <c.kennedy@dbgrayengineering.com>  
**Subject:** Re: Dunbar Court

**CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.**

**ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.**

Hi Gabrielle

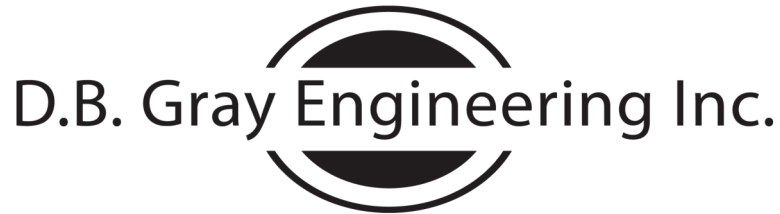
Thank you for the boundary conditions.

With respect to peaking factors: You are correct if you are using Table 4.2 in the Ottawa Design Guidelines as modified by Technical Bulletin ISD-2010-2 (i.e. The maximum hour daily demand is calculated using the peaking factor multiplied by the max. day demand, not the average day demand.)

However, Table 4.2 is for 501 to 3,000 persons and, as per the Ottawa Guidelines, Table 3-3 in the MOE Design Guidelines is to be used for peaking factors for 0 to 500 persons. The MOE Guidelines states that "*Table 3.1 provides peaking factors for use with average day demand ...*"

Therefore our calculations are correct.

Regards, Doug



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

700 Long Point Circle

Tel: 613-425-8044

Ottawa, Ontario K1T 4E9

[d.gray@dbgrayengineering.com](mailto:d.gray@dbgrayengineering.com)

On Tue, Apr 28, 2020 at 8:26 AM Schaeffer, Gabrielle <[gabrielle.schaeffer@ottawa.ca](mailto:gabrielle.schaeffer@ottawa.ca)> wrote:

Hi Doug,

I reviewed your calculations and noticed a small error: The maximum hour daily demand is calculated using the peaking factor multiplied by the max. day demand, not the average day demand. This change to the guidelines were made in the Technical Bulletin 2010-02.

The following are boundary conditions, HGL, for hydraulic analysis at 1 Dunbar Crt (zone 2W) assumed to be connected to the 305mm on Gibbard and 203mm on Bateman (see attached PDF for location).

Minimum HGL = 127.0m, same at both connections

Maximum HGL = 134.2m, same at both connections

Gibbard Connection:

MaxDay + FireFlow (300L/s) = 119.0m

MaxDay + FireFlow (150 L/s) = 126.0m

Bateman Connection:

MaxDay + FireFlow (150 L/s) = 124.0m

Available Flow @ 20psi = 240L/s assuming a ground elevation of 93.6m

*These are for current conditions and are based on computer model simulation.*

*Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.*

Regards,

**Gabrielle Schaeffer, P.Eng**

Senior Engineer - Infrastructure Applications

City of Ottawa

Development Review - West Branch

Planning, Infrastructure and Economic Development Department

110 Laurier Ave., 4th Floor East;

Ottawa ON K1P 1J1

Mail Code 01-14

Tel: 613-580-2424 x 22517

Fax: 613-560-6006

*\*\*\*During this period of uncertainty surrounding COVID-19, we are following recommended best practices to minimize the risk of exposure, while ensuring service to our clients remains as uninterrupted as possible. I am working from home, and my work hours may be affected, but I will respond to emails at my earliest opportunity. Should there be delays, I thank for your understanding and patience.\*\*\**

---

**From:** Douglas Gray <d.gray@dbgrayengineering.com>  
**Sent:** April 14, 2020 7:14 AM  
**To:** Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>  
**Cc:** Caoimhin Kennedy <c.kennedy@dbgrayengineering.com>  
**Subject:** Re: Dunbar Court

**CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.**

**ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.**

Hi Gabrielle

13

(Please forward this email to the correct person if it is not you.)

Dunbar Court currently consists of 46 townhouse units. It is proposed that 4 townhouse units be demolished and a 28-unit apartment building constructed.

The private watermain in Dunbar Court connects to the 305mm on Gibbard and 203mm on Bateman (see attached PDF for location).

Please provide the boundary conditions at Dunbar Court.

Average daily demand: 0.7 l/s.

Maximum daily demand: 3.2 l/s.

Maximum hourly daily demand: ~~4.8 l/s~~ **23L/s**

Fire Flow demand: 300.0 l/s

Fire Flow + Max Day: 303.2 l/s

We are considering alternative designs so please also provide the boundary conditions for a fire flow demand of 150.0 l/s.

Average daily demand: 0.7 l/s.

Maximum daily demand: 3.2 l/s.

Maximum hourly daily demand: ~~4.8 l/s~~ **23L/s**

Fire Flow demand: 150.0 l/s

Fire Flow + Max Day: 153.2 l/s

Our calculations are attached.

Regards, Doug



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

**700 Long Point Circle**

Ottawa, Ontario K1T 4E9

[d.gray@dbgrayengineering.com](mailto:d.gray@dbgrayengineering.com)

On Wed, Aug 1, 2018 at 10:12 AM Schaeffer, Gabrielle <[gabrielle.schaeffer@ottawa.ca](mailto:gabrielle.schaeffer@ottawa.ca)> wrote:

Hi Doug,

The following are boundary conditions, HGL, for hydraulic analysis at 1 Dunbar Crt (zone 2W) assumed to be connected to the 305mm on Gibbard and 203mm on Bateman (see attached PDF for location).

Minimum HGL = 127.0m, same at both connections

Maximum HGL = 134.2m, same at both connections

Gibbard Connection:

MaxDay + FireFlow (300L/s) = 119.0m

MaxDay + FireFlow (417 L/s) = 112.0m

Bateman Connection:

Available Flow @ 20psi = 240L/s assuming a ground elevation of 93.6m

These are for current conditions and are based on computer model simulation.

*Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.*

Regards,

Gabrielle

**From:** Douglas Gray <[d.gray@dbgrayengineering.com](mailto:d.gray@dbgrayengineering.com)>  
**Sent:** Friday, July 27, 2018 1:13 PM  
**To:** Schaeffer, Gabrielle <[gabrielle.schaeffer@Ottawa.ca](mailto:gabrielle.schaeffer@Ottawa.ca)>  
**Cc:** Lucio Renna <[l.renna@dbgrayengineering.com](mailto:l.renna@dbgrayengineering.com)>  
**Subject:** Re: Dunbar Court

Hi Gabrielle



Dunbar Court currently consists of 46 townhouse units. It is proposed that 4 townhouse units be demolished and a 28-unit apartment building constructed.

Please provide the boundary conditions at Dunbar Court.

Average daily demand: 0.7 l/s.

Maximum daily demand: 3.3 l/s.

Maximum hourly daily demand: 5.0 l/s

Fire Flow demand: 416.7 l/s

Fire Flow + Max Day: 420.0 l/s

There may be a sprinkler system in the apartment building so please also provide the boundary conditions for a fire flow demand of 300.0 l/s.

Average daily demand: 0.7 l/s.

Maximum daily demand: 3.3 l/s.

Maximum hourly daily demand: 5.0 l/s

Fire Flow demand: 300.0 l/s

Fire Flow + Max Day: 303.3 l/s

Our calculations are attached.

Attached is geoOttawa map showing the location of the watermain in Dunbar Court. This watermain has two connection points. It connects to the City watermain in Bateman Dr and to a City watermain in the former Knowdale Rd ROW now adjacent to Gibbard Ave.

Regards, Doug

## D. B. GRAY ENGINEERING INC.

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

700 Long Point Circle

Tel: 613-425-8044

Ottawa, Ontario K1T 4E9

[d.gray@dbgrayengineering.com](mailto:d.gray@dbgrayengineering.com)

On Tue, Jul 24, 2018 at 1:08 PM, Schaeffer, Gabrielle <[gabrielle.schaeffer@ottawa.ca](mailto:gabrielle.schaeffer@ottawa.ca)> wrote:

Hi Doug,

Concerning the downstream sanitary capacity, it is up to the proponent to assess if sufficient capacity is available downstream and should be included in the servicing report. Review of the report will be completed once a formal application has been submitted.

Thank you for the boundary conditions requests. One edit is required in the Sprinkler system FUS calculations. As per the FUS Guide for Determination of Required Fire Flow, the Exposure increase is to be based on the calculated fire flow determined at step 2 (Occupancy). Therefore the calculation should be as follows:  $RFF = 13600 - (13600 \times 50\%) + (13600 \times 65\%) = 15,640 \text{ L/min}$ . Please revise your calculations a request accordingly.

Additionally, if a full 50% reduction for sprinklers is being sought-after, please provide a letter from the mechanical engineer indicating how the system will meet all FUS requirements for a fully supervised sprinkler system. Please ensure a fully supervised system is proposed as per page G-100 of Appendix H of the Ottawa Design Guidelines – Water Distribution, which is provided in Technical Bulletin ISTB-2018-02 dated March 21, 2018 (attached for your convenience).

Regards,

Gabrielle

**From:** Douglas Gray <d.gray@dbgrayengineering.com>  
**Sent:** Wednesday, July 11, 2018 1:31 PM  
**To:** Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>  
**Cc:** Lucio Renna <l.renna@dbgrayengineering.com>  
**Subject:** Dunbar Court

Hi Gabrielle

A couple of months ago we discussed the servicing of two existing affordable housing projects that are being proposed to be re-developed. This email concerns Dunbar Court. (I will send another email concerning Hammill Court in a few days.)

Dunbar Court currently consists of 46 townhouse units. It is proposed that 4 townhouse units be demolished and a 28-unit apartment building constructed.

We have calculated that the current sanitary sewage flow to be 2.36 l/s. With the proposed re-development we have calculated that the sanitary flows will be 3.13 l/s. (See attached Sanitary Sewer Design Form.) As we previously discussed please inquire if the increase ( 0.77 l/s) will cause any downstream capacity issues.

Also please provide the boundary conditions at Dunbar Court.

Average daily demand: 0.7 l/s.

Maximum daily demand: 3.3 l/s.

Maximum hourly daily demand: 5.0 l/s

Fire Flow demand: 366.7 l/s

Fire Flow + Max Day: 370.0 l/s

There may be a sprinkler system in the apartment building so please also provide the boundary conditions for a fire flow demand of 133.3 l/s.

Average daily demand: 0.7 l/s.

Maximum daily demand: 3.3 l/s.

Maximum hourly daily demand: 5.0 l/s

Fire Flow demand: 183.3 l/s

Fire Flow + Max Day: 186.6 l/s

Our calculations are attached.

Also attached is geoOttawa map showing the location of the watermain in Dunbar Court. This watermain has two connection points. It connects to the City watermain in Bateman Dr and to a City watermain in the former Knowdale Rd ROW. now adjacent to Gibbard Ave.

Thanks, Doug

## D. B. GRAY ENGINEERING INC.

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

700 Long Point Circle

Tel: 613-425-8044

Ottawa, Ontario K1T 4E9

[d.gray@dbgrayengineering.com](mailto:d.gray@dbgrayengineering.com)

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

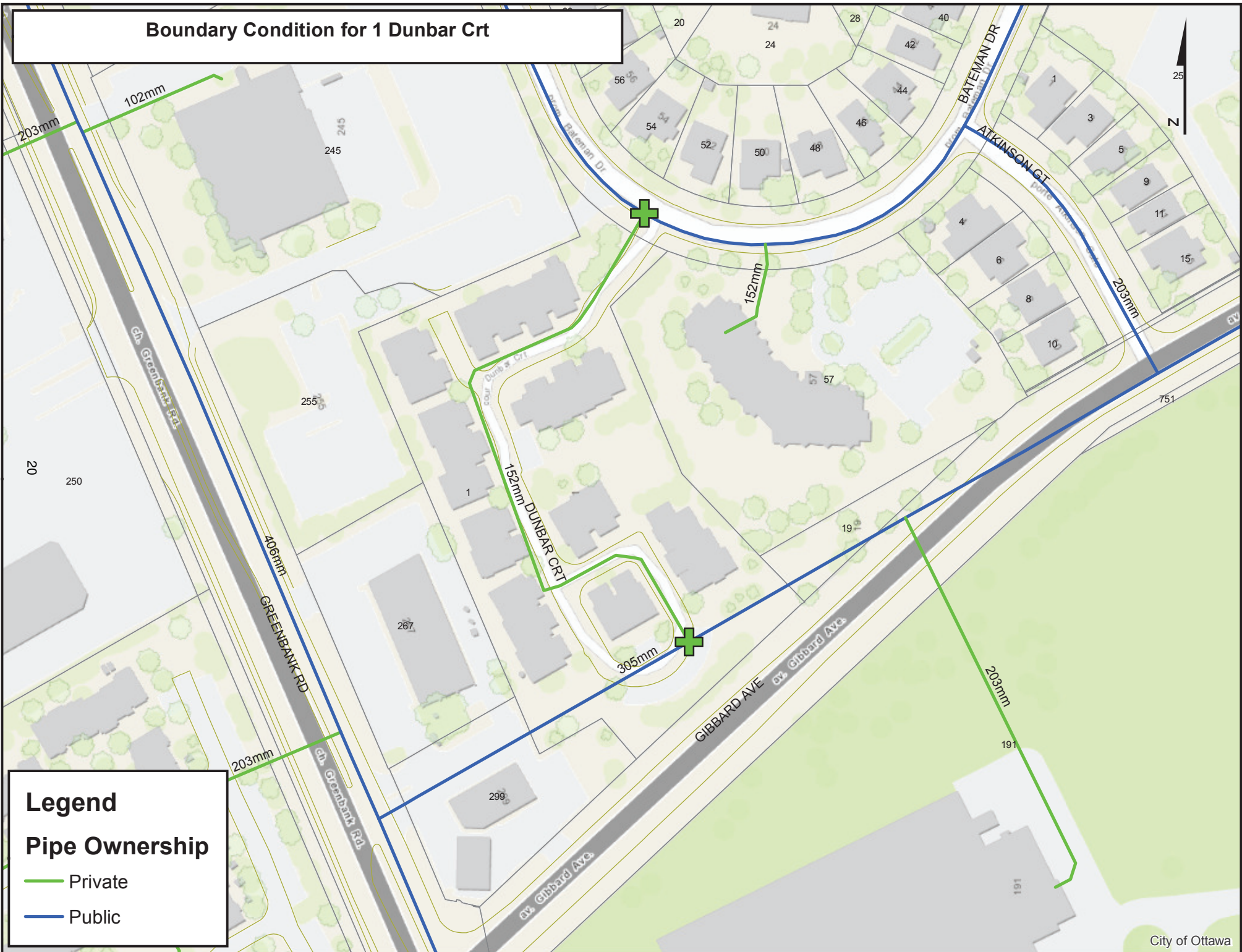
This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

# Boundary Condition for 1 Dunbar Crt



## Legend

### Pipe Ownership

- Private
- Public



## Dunbar Court Ottawa, Ontario

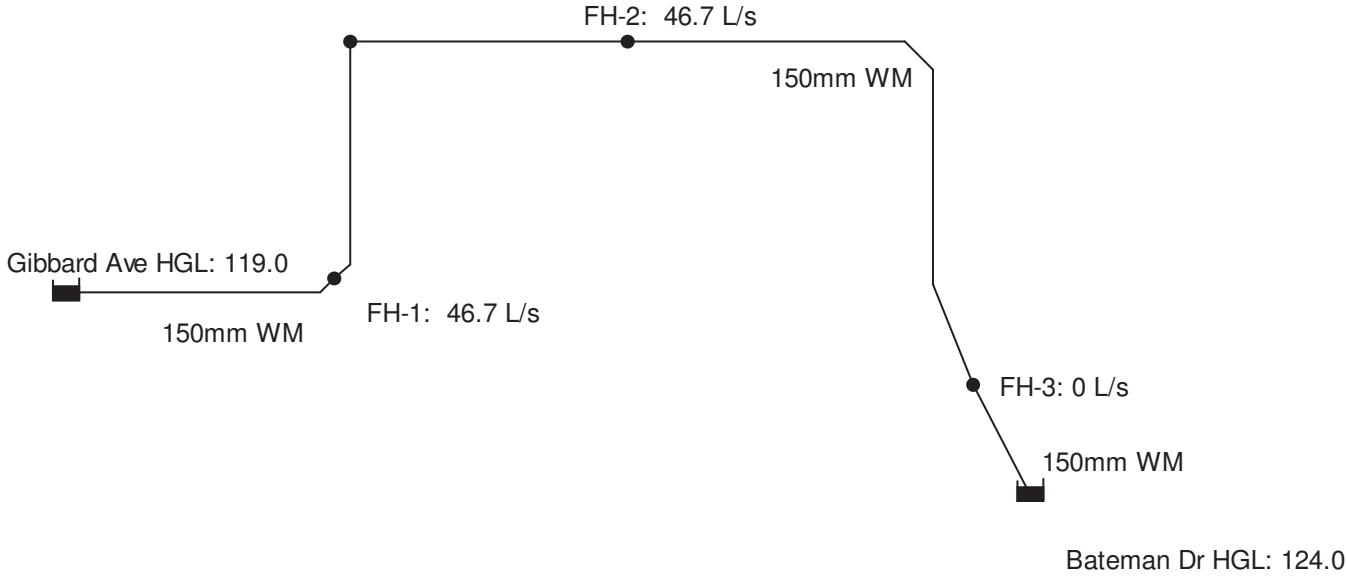
### EPANET HYDRAULIC MODELLING RESULTS

Gibbard Ave MAX DAY + FIRE FLOW: 300 L/s - HGL = 119.0

Bateman Dr MAX DAY + FIRE FLOW: 150 L/s - HGL = 124.0

Node ID	Demand	Head	Elevation	Pressure		
	L/s	m	m	m	psi	kPa
1 Reservoir 1	-50.54	119.00	95.26	23.74	33.8	233
2 FH-1 (46.7 L/s +1.1 L/s Domestic)	47.80	115.11	94.95	20.16	28.7	198
3 Node 3	0.00	115.10	95.05	20.05	28.5	197
4 FH-2 (46.7 L/s +1.1 L/s Domestic)	47.80	115.09	95.00	20.09	28.6	197
5 FH-3 (0 L/s +1.1 L/s Domestic)	1.10	121.29	93.95	27.34	38.9	268
6 Reservoir 2	-46.16	124.00	93.65	30.35	43.2	298

Link ID	Diameter	Length	Roughness	Loss Coeff.	Flow	Velocity
	mm	m			L/s	m/s
Pipe 1	150	33.4	100	2.40	50.54	2.86
Pipe 2	150	27.2	100	3.00	2.74	0.16
Pipe 3	150	33.4	100	0.80	2.74	0.16
Pipe 4	150	80.1	100	1.85	45.06	2.55
Pipe 5	150	24.7	100	2.60	46.16	2.61



22



Network Table - Nodes

Node ID	Elevation m	Demand LPS	Head m	Pressure m
Junc 2	94.95	47.80	115.11	20.16
Junc 3	95.05	0.00	115.10	20.05
Junc 4	95.00	47.80	115.09	20.09
Junc 5	93.95	1.10	121.29	27.34
Resvr 1	119	-50.54	119.00	0.00
Resvr 6	124.0	-46.16	124.00	0.00

Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s
Pipe 1	33.4	150	100	50.54	2.86
Pipe 2	27.2	150	100	2.74	0.16
Pipe 3	33.4	150	100	2.74	0.16
Pipe 4	80.1	150	100	-45.06	2.55
Pipe 5	24.7	150	100	-46.16	2.61

# Dunbar Court

## PROPOSED 31-Unit 3-Storey Apartment Building

### Ottawa, Ontario

## Peak Water Demand

#### WATER FIXTURE VALUE

(AWWA Manual M22 - Sizing Water Service Lines and Meters)

	No.	F.V.	Total	
Bathtub		8	0	
Toilet - tank	32	6	192	
Toilet - flush valve		24	0	
Lavs.	32	1.5	48	
Bidet		2	0	
Urinal - wall flush valve		10	0	
Shower	31	2.5	77.5	
K. Sink	32	1.8	57.6	
Dishwasher		1.3	0	
Clothes Washer	6	3	18	
Commercial Sink		4	0	
J. Sink	1	4	4	
Commercial Dishwasher		4	0	
Commercial Washer		4	0	
Hose 1/2 in		5	0	
Hose 3/4 in		12	0	
			397.1	
Peak Demand (fig 4-2 or 4-3 AWWA M22)			41	USgpm
Pressure @ Meter	338	kPa	49	psi
Pressure Factor (table 4-1 AWWA M22)			0.89	
Peak Demand			36	USgpm
Irrigation - hose 1/2 in	0		0	USgpm (includes pressure factor)
<b>TOTAL PEAK DEMAND</b>	<b>138</b>	<b>l/min</b>	<b>36</b>	<b>USgpm</b>
			<b>2.3</b>	<b>l/s</b>
Nominal Size			2.0	in
			3.9	ft/s
			50	mm
			1.2	m/s

# D.B. GRAY ENGINEERING INC.

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

700 Long Point Circle  
Ottawa, Ontario K1T 4E9

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

## SANITARY SEWER DESIGN FORM

Average Daily Flows:  
Residential: 280 l/capita/day  
Commercial: 28,000 l/ha/day  
Institutional: 28,000 l/ha/day  
Light Industrial: 35,000 l/ha/day  
Heavy Industrial: 55,000 l/ha/day

Peaking Factor:  
Residential (Harron Equation):  $P.F. = 1 + \frac{14}{4 + p^{0.5}} \times 0.8$   
P = Population / 1000  
Commercial & Institutional: 1.5 if contribution >20%, otherwise use 1.0  
Industrial: As per Ottawa Guidelines Appendix 4-B

PROJECT: DUNBAR COURT

Designed By: DBG

8-Oct-18

Infiltration Allowance: 0.33 l/s/ha

Page: 1 of 1

LOCATION			Section							Cumulative Residential		Section Non-Residential				Cumulative				SEWER DATA							COMMENTS		
			Single Family	Semi / Townhouse	Duplex / Triplex	Apartments (average)	Apartments (1 Bed.)	Apartments (2 Bed.)	Apartments (3 Bed.)	Residential Area	Pop.	Peaking Factor	Area	Flow	Peaking Factor	Flow	Area	Sewage Flow	Infiltration Flow	Total Flow	Type of Pipe	Dia. Actual (mm)	Dia. Nom. (mm)	Slope (%)	Length (m)	Capacity (l/s)		Velocity (m/s)	Ratio Q/Qfull
STREET	FROM	TO	ppu = 3.4	ppu = 2.7	ppu = 2.3	ppu = 1.8	ppu = 1.4	ppu = 2.1	ppu = 3.1	ha																			
<b>UPSTREAM OF EXISTING DUNBAR COURT DEVELOPMENT</b>																													
Bateman Dr	Upstream of MH5 in Bateman	MH 5 in Bateman	18			60					5.6	169	3.2	0.000			0.0	5.6	1.75	1.85	3.60		254.0	250	0.50	33.4	43.9	0.87	0.08
<b>EXISTING DUNBAR COURT DEVELOPMENT - 46 TOWNHOUSE UNITS</b>																													
Dunbar Court	MH7	MH6	4								0.18	11	3.2	0.000			0.0	0.18	0.11	0.06	0.17		254.0	250	0.30	18.4	34.0	0.67	0.01
Dunbar Court	MH6	MH4	7								0.151	30	3.2	0.000			0.0	0.33	0.31	0.11	0.42		254.0	250	0.30	28.0	34.0	0.67	0.01
Dunbar Court	MH-5	MH4	5								0.140	14	3.2	0.000			0.0	0.14	0.14	0.05	0.19		254.0	250	0.30	23.0	34.0	0.67	0.01
Dunbar Court	MH4	MH3	13								0.276	78	3.2	0.000			0.0	0.75	0.81	0.25	1.06		254.0	250	0.30	68.5	34.0	0.67	0.03
Dunbar Court	MH3	MH2	15								0.318	119	3.2	0.000			0.0	1.07	1.23	0.35	1.58		254.0	250	0.30	32.0	34.0	0.67	0.05
Dunbar Court	MH2	MH1	2								0.160	124	3.2	0.000			0.0	1.23	1.29	0.40	1.69		254.0	250	0.30	32.0	34.0	0.67	0.05
Dunbar Court	MH1	MH 5 in Bateman									0.000	124	3.2	0.000			0.0	1.23	1.29	0.40	1.69		254.0	250	0.40	9.0	39.2	0.77	0.04
<b>DOWNSTREAM OF EXISTING DUNBAR COURT DEVELOPMENT</b>																													
Bateman Dr	MH 5 in Bateman	MH 4 in Bateman	1								0.100	297	3.2	0.000			0.0	6.93	3.08	2.29	5.36		254.0	250	0.50	34.0	43.9	0.87	0.12
<b>UPSTREAM OF PROPOSED DUNBAR COURT DEVELOPMENT</b>																													
Bateman Dr	Upstream of MH5 in Bateman	MH 5 in Bateman	18			60					5.6	169	3.2	0.000			0.0	5.6	1.75	1.85	3.60		254.0	250	0.50	33.4	43.9	0.87	0.08
<b>PROPOSED DEVELOPMENT - 42 EXISTING TOWNHOUSE UNITS + 28 UNIT APARTMENT BUILDING</b>																													
Dunbar Court	MH7	MH6	4								0.18	11	3.2	0.000			0.0	0.18	0.11	0.06	0.17		254.0	250	0.30	18.4	34.0	0.67	0.01
Dunbar Court	MH6	MH4	4					31			0.151	87	3.2	0.000			0.0	0.33	0.90	0.11	1.01		254.0	250	0.30	28.0	34.0	0.67	0.03
Dunbar Court	MH-5	MH4	5								0.140	14	3.2	0.000			0.0	0.14	0.14	0.05	0.19		254.0	250	0.30	23.0	34.0	0.67	0.01
Dunbar Court	MH4	MH3	13								0.276	135	3.2	0.000			0.0	0.75	1.40	0.25	1.65		254.0	250	0.30	68.5	34.0	0.67	0.05
Dunbar Court	MH3	MH2	15								0.318	176	3.2	0.000			0.0	1.07	1.82	0.35	2.17		254.0	250	0.30	32.0	34.0	0.67	0.06
Dunbar Court	MH2	MH1	2								0.160	181	3.2	0.000			0.0	1.23	1.88	0.40	2.28		254.0	250	0.30	32.0	34.0	0.67	0.07
Dunbar Court	MH1	MH 5 in Bateman									0.000	181	3.2	0.000			0.0	1.23	1.88	0.40	2.28		254.0	250	0.40	9.0	39.2	0.77	0.06
<b>DOWNSTREAM OF EXISTING DUNBAR COURT DEVELOPMENT</b>																													
Bateman Dr	MH 5 in Bateman	MH 4 in Bateman	1								0.100	354	3.2	0.000			0.0	6.93	3.67	2.29	5.95		254.0	250	0.50	34.0	43.9	0.87	0.14



Douglas Gray <d.gray@dbgrayengineering.com>

**RE: RVCA Stormwater Management Comments - Dunbar Court**

1 message

**Eric Lalande** <eric.lalande@rvca.ca>  
To: Ryan Faith <r.faiht@dbgrayengineering.com>

Mon, Oct 26, 2020 at 9:47 AM

Hi Ryan,

The RVCA requires enhanced quality protection (80% TSS removal) for the project. The quality protection would apply to the parking area or any runoff collected via the parking area.

Thank you,

**Eric Lalande, MCIP, RPP**

Planner, RVCA

613-692-3571 x1137

---

**From:** Ryan Faith <r.faiht@dbgrayengineering.com>  
**Sent:** Monday, October 26, 2020 8:51 AM  
**To:** Jamie Batchelor <jamie.batchelor@rvca.ca>; Eric Lalande <eric.lalande@rvca.ca>  
**Cc:** Douglas Gray <d.gray@dbgrayengineering.com>  
**Subject:** Re: RVCA Stormwater Management Comments - Dunbar Court

Hi Jamie & Eric,

Jamie, thanks for your assistance with this one.

Eric, this is a reminder we are still waiting for your comment on the stormwater management for the site.

If you have any questions, let me know.

Thanks,

[Redacted signature area]

On Fri, Oct 16, 2020 at 8:55 AM Jamie Batchelor <jamie.batchelor@rvca.ca> wrote:

Good Morning Ryan,

I'm forwarding your inquiry to my colleague Eric Lalande who would be the RVCA planner for this area.

Jamie Batchelor, MCIP, RPP

Planner, ext. 1191

[Jamie.batchelor@rvca.ca](mailto:Jamie.batchelor@rvca.ca)



3889 Rideau Valley Drive  
PO Box 599, Manotick ON K4M 1A5  
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | [www.rvca.ca](http://www.rvca.ca)

This message may contain information that is privileged or confidential and is intended to be for the use of the individual(s) or entity named above. This material may contain confidential or personal information which may be subject to the provisions of the Municipal *Freedom of Information & Protection of Privacy Act*. If you are not the intended recipient of this e-mail, any use, review, revision, retransmission, distribution, dissemination, copying, printing or otherwise use of, or taking of any action in reliance upon this e-mail, is strictly prohibited. If you have received this e-mail in error, please contact the sender and delete the original and any copy of the e-mail and any printout thereof, immediately. Your cooperation is appreciated.

**From:** Ryan Faith <[r.faith@dbgrayengineering.com](mailto:r.faith@dbgrayengineering.com)>  
**Sent:** Friday, October 16, 2020 8:48 AM  
**To:** Jamie Batchelor <[jamie.batchelor@rvca.ca](mailto:jamie.batchelor@rvca.ca)>  
**Cc:** Douglas Gray <[d.gray@dbgrayengineering.com](mailto:d.gray@dbgrayengineering.com)>  
**Subject:** RVCA Stormwater Management Comments - Dunbar Court

Hi Jamie,

We are working on a proposed affordable housing 3 storey apartment building for Nepean Housing on 1465 sq.m of land at Dunbar Court in Ottawa. Aside from adding two new catch-basins in landscaped areas and a storm sewer connection to the building, we do not plan on modifying the existing storm sewer in Dunbar Court.

Please comment on the stormwater management for the site. If you have any questions, let me know.

I have attached a site plan and our grading plan for your reference.

Thanks,

## Site Information

Project Name: Dunbar Court Site Area (hectares): 0.4849

Unit Label: OGS 1 Runoff Coeff. : .77

Unit Location: Ottawa, ON Target Removal Efficiency(%): 80% based on NJDEP

## Product Recommendation

Aqua-Swirl™ Model	Net Annual TSS Removal Efficiency	Chamber Diameter	Maximum Inside Diameter (mm)		Oil/Debris Storage Capacity	Sediment Storage Capacity
<b>AS-3</b>	<b>90.46 %</b>	991 mm.	Offline	BYP <sup>5</sup>	417 L	0.56 m <sup>3</sup>
			251 mm.	535 mm.		

## Rainfall Information

NCDC Station<sup>1</sup>: OTTAWA MACDONALD-CARTIER INT'L A Data Range<sup>4</sup>: 261,759 readings taken hourly between 1967 to 2007 (~40 years)

Rainfall Event Range (mm/hre)	Rainfall Interval Point (mm/hre)	Operating Rate (Lps/m <sup>2</sup> )	Total Rainfall (%)	Removal Efficiency (%) <sup>2</sup>	Relative Efficiency(%)
02.00 - 03.00	02.50	02.90	44.18	95.17	42.04
03.00 - 04.00	03.50	04.06	21.52	93.57	20.14
04.00 - 05.00	04.50	05.22	11.68	91.74	10.71
05.00 - 06.00	05.50	06.38	06.68	89.68	05.99
06.00 - 07.00	06.50	07.54	04.03	87.39	03.52
07.00 - 08.00	07.50	08.70	01.99	84.88	01.69
08.00 - 09.00	08.50	09.86	01.84	82.14	01.51
09.00 - 10.00	09.50	11.02	01.81	79.17	01.43
10.00 - 15.00	12.50	14.51	04.12	68.89	02.84
15.00 - 20.00	17.50	20.31	01.02	47.20	00.48
20.00 - 25.00	22.50	26.11	00.54	19.81	00.11

Total Cumulative Rainfall %: **99.41<sup>3</sup>** Net Annual %: **90.46**

## Sales Agent Information

Agent Name: Dave Kanters Phone: 416-347-2799

Company Name: Soleno Fax: \_\_\_\_\_

Address: 347, 15-75 Bayly St. W. E-mail: dkanters@soleno.com

City, State Zip: Ajax, ON L1S7K7

## Footnotes

- Recorded as hourly precipitation rainfall data (inches), National Climatic Data Center (NCDC)
- Based on Tennessee Tech University laboratory testing of the AquaSwirl™ Model AS-3 for OK-110 silica particles 50-125 microns(Neary, 2002)
- 90% Rainfall Event, calculated as a cumulative percentile of individual events, www.stormwatercenter.net, sizing criteria (Center for Watershed Protection)
- NCDC data may not be consecutive, skipping days, months and/or years in the range of dates.
- The Aqua-Swirl™ Internal Bypass (BYP) provides full treatment of the "first flush," while the peak design storm is diverted and channeled through the main conveyance pipe. Please refer to your local representative for more information.
- When applicable, the performance curve was adjusted via Peclet Scaling to provide estimated sizing per NJDEP PSD (d50 = 67 microns).

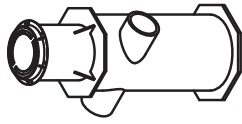


**To receive pricing and/or technical support on the Aqua-Swirl, please contact Soleno.**  
(www.Soleno.com)

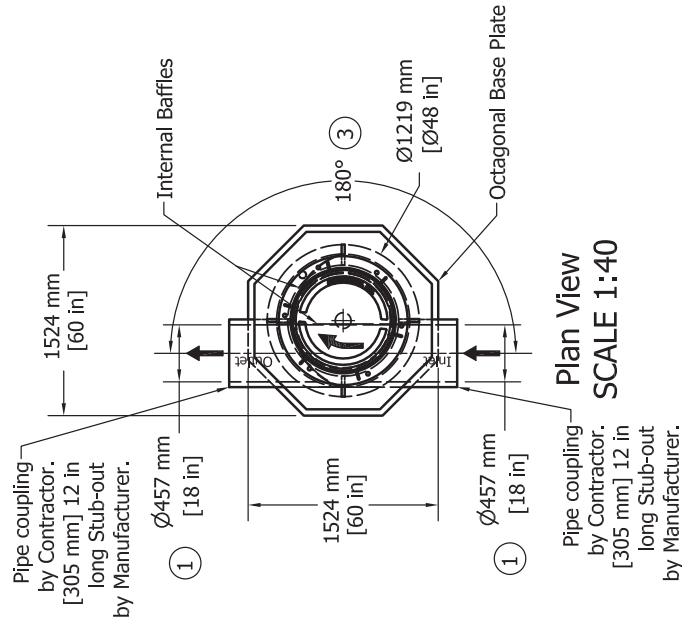
Paul Antoine  
Sales Representative  
Tel: 613-292-4094  
Email: pantoine@soleno.com

David KanTERS  
Engineer, Technical Service  
Tel: 416-347-2799  
Email: dkanTERS@soleno.com

Aqua-Swirl High Density Polyethylene (HDPE) Stormwater Treatment System



**Projected View  
SCALE 1:80**

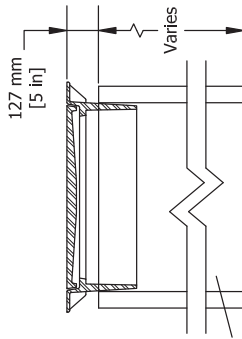


**Plan View  
SCALE 1:40**

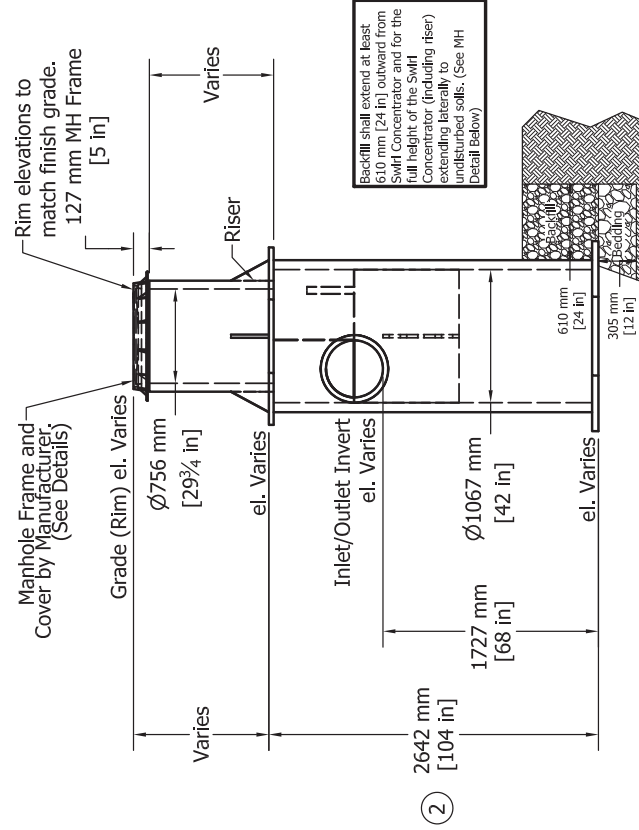
System shall be designed for the following capacities:  
Swirl Treatment Flow: 51 L/s [1.8 cfs]  
Swirl Sediment Storage: 0.57 m<sup>3</sup> [20 ft<sup>3</sup>]  
Swirl Oil/Debris Storage: 416 L [110 gal]

- ① AS-3 BYP inlet/outlet pipe size ranges from 254 mm [10 in] to 533 mm [21 in].
- ② AS-3 chamber height may vary from 2286 mm [90 in] to 2642 mm [104 in], depending on inlet/outlet pipe size.
- ③ Orientation may vary from a minimum of 90° to a maximum of 180°.

Please see accompanied Aqua-Swirl specification notes. See Site Plan for actual system orientation. Approximate dry (pick) weight: 700 kg [1600 lbs].



**Adjustable Frame and Cover**



**Elevation View  
SCALE 1:40**

Structure #:	AS-3 STD	Rvw'd:		Rvw. Date:	
Drawn By:	OFlores				
Scale:	As Shown				
Date:	3/8/2018				
U.S. Patent No. 6524473 and other Patent Pending					

Aqua-Swirl Concentrator  
AS-3 BYP CW STD

Standard Detail



2733 Knoxville Parkway, Knoxville, TN 37943  
Phone: (888) 344-9844 Fax: (615) 826-2112  
www.aquashieldinc.com

Dubar Court  
Ottawa, Ontario

BIOSWALE INFILTRATION CALCULATIONS

			C
Roof Area:	1156	sq.m.	0.90
Asphalt/Concrete Area:	27	sq.m.	0.90
Landscaped:	<u>736</u>	<u>sq.m.</u>	<u>0.20</u>

Total Catchment Area    1919    sq.m.    0.63

Required Volume Required to Capture:    10    mm rain event:    12.1    cu.m.

Pipes				
Diameter	Length	Volume		
mm	m	cu.m.		
Perforated Pipes in Drywell	0	0.0	0.0	0.0    cu.m.

Infiltration							
Depth	Width	Length	Total	Net of	Void		
m	m	m	Volume	Pipe	Volume		
			cu.m.	Volume	40%		
				cu.m.	cu.m.		
0.60	1.80	28.00	30.2	30.2	12.1	12.1	cu.m.

Achieved Volume:    12.1    cu.m.

Percolation Rate:    75 mm/hr    (sand - trace silt)

Time to Draw Down:    8.0 Hours

Dubar Court  
Ottawa, Ontario

RAIN GARDEN INFILTRATION CALCULATIONS

			C
Roof Area:	0	sq.m.	0.90
Asphalt/Concrete Area:	98	sq.m.	0.90
Landscaped:	<u>86</u>	sq.m.	<u>0.20</u>

Total Catchment Area    184    sq.m.    0.57

Required Volume Required to Capture:    10    mm rain event:    1.1    cu.m.

	Pipes				
	Diameter	Length	Volume		
	mm	m	cu.m.		
Perforated Pipes in Drywell	0	0.0	0.0	0.0	cu.m.

Drywell					
			Total	Net of	Void
Depth	Width	Length	Volume	Pipe	Volume
m	m	m	cu.m.	cu.m.	40%
					cu.m.
0.30	4.50	2.00	2.7	2.7	1.1
					1.1    cu.m.

Achieved Volume:    1.1    cu.m.

Percolation Rate:    75 mm/hr    (sand - trace silt)

Time to Draw Down:    4.0 Hours

## STORMWATER MANAGEMENT CALCULATIONS

The orifice calculations are based on the following formula:

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

where:

Q = flowrate in litres per second

$C_d$  = coefficient of discharge

$A_o$  = orifice area in sq.m.

g = 9.81 m/s<sup>2</sup>

h = head above orifice in meters

Flow control roof drain calculations are based on the following formula:

$$Q = N \times S \times d \times F$$

where:

Q = flowrate in litres per second

N = number of roof drains

S = slots per weir

d = pond depth at roof drain in mm

F = flowrate through each slot

0.0124 litres per second per mm pond depth (5 USgpm per inch)

Storage calculations on the roof area are based on the following formula for volume of a cone:

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

where:

V = volume in cu.m.

A = ponding area in sq.m.

d = ponding depth in meters

## Summary Tables

ONE HUNDRED YEAR EVENT					
Drainage Area	100-Year Flow Rate (L/s)	Maximum Allowable Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA I (Uncontrolled Flow Off Site)	-	-	22.22	-	-
AREA II (Roof)	-	-	5.03	27.88	27.88
TOTAL	34.93	17.61	27.25	27.88	27.88

FIVE YEAR EVENT					
Drainage Area	5-Year Flow Rate (L/s)	Maximum Allowable Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA I (Uncontrolled Flow Off Site)	-	-	11.61	-	-
AREA II (Roof)	-	-	3.85	12.44	12.44
TOTAL	17.61	17.61	15.46	12.44	12.44

Dunbar Court  
 Ottawa, Ontario

STORMWATER MANAGEMENT CALCULATIONS  
 Rational Method

PRE-DEVELOPMENT CONDITIONS

100-Year Flow Rate

			C
Roof Area:	255	sq.m	1.00
Asphalt/Concrete Area:	195	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	<u>1015</u>	<u>sq.m</u>	<u>0.25</u>
Total Catchment Area:	1465	sq.m	0.48

Bransby William Formula (Used when C > 0.40)

$$T_c = \frac{0.057 \cdot L}{S_w^{0.2} \cdot A^{0.1}} \text{ min}$$

Sheet Flow Distance (L):	22	m
Slope of Land (Sw):	4	%
Area (A):	0.1465	ha
Time of Concentration (Sheet Flow):	1.2	min

Area (A):	1465	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
Runoff Coefficient (C):	0.48	
100-Year Pre-Development Flow Rate (2.78AiC):	34.93	L/s

5-Year Flow Rate and Maximum Allowable Release Rate

			C
Roof Area:	255	sq.m	0.90
Asphalt/Concrete Area:	195	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	<u>1015</u>	<u>sq.m</u>	<u>0.20</u>
Total Catchment Area:	1465	sq.m	0.42

Bransby William Formula (Used when C > 0.40)

$$T_c = \frac{0.057 \cdot L}{S_w^{0.2} \cdot A^{0.1}} \text{ min}$$

Sheet Flow Distance (L):	22	m
Slope of Land (Sw):	4	%
Area (A):	0.1465	ha
Time of Concentration (Sheet Flow):	1.2	min

Area (A):	1465	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	104	mm/hr
Runoff Coefficient (C):	0.42	
5-Year Pre-Development Release Rate (2.78AiC):	17.61	L/s
(Maximum Allowable Release Rate)		

# ONE HUNDRED-YEAR EVENT

## DRAINAGE AREA I (Uncontrolled Flow Off Site)

(ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	0	sq.m	1.00
Asphalt/Concrete Area:	523	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	145	sq.m	0.25
	<hr/>		<hr/>
Total Catchment Area:	668	sq.m	0.84
Area (A):	668	sq.m	
Time of Concentration:	15	min	
Rainfall Intensity (i):	143	mm/hr	
Runoff Coefficient (C):	0.84		
Release Rate (2.78AiC):	22.22	L/s	

## DRAINAGE AREA II (Roof)

(ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	797	sq.m	1.00
Asphalt/Concrete Area:	0	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	0	sq.m	0.25

Total Catchment Area: 797 sq.m 1.00

No. of Roof Drains: 3  
 Slots per Wier: 1 0.0124 L/s/mm/slot (5 USGPM/in/slot)

Depth at Roof Drain: 135 mm

Maximum Release Rate: 5.03 L/s Pond Area: 618 sq.m

Achieved Volume: 27.88 cu.m

Maximum Volume Required: 27.88 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
10	179	39.56	5.03	34.53	20.72
15	143	31.66	5.03	26.63	23.96
20	120	26.58	5.03	21.54	25.85
25	104	23.01	5.03	17.97	26.96
30	92	20.35	5.03	15.32	27.58
35	83	18.30	5.03	13.26	27.85
40	75	16.65	5.03	11.62	27.88
45	69	15.30	5.03	10.26	27.71
50	64	14.17	5.03	9.14	27.41
55	60	13.21	5.03	8.18	26.98
60	56	12.38	5.03	7.35	26.46
65	53	11.66	5.03	6.63	25.86
70	50	11.03	5.03	6.00	25.19
75	47	10.47	5.03	5.44	24.46
80	45	9.97	5.03	4.93	23.68
85	43	9.52	5.03	4.48	22.86
90	41	9.11	5.03	4.07	22.00
95	39	8.74	5.03	3.70	21.11
100	38	8.40	5.03	3.36	20.18
105	36	8.09	5.03	3.05	19.23
110	35	7.80	5.03	2.77	18.25
115	34	7.53	5.03	2.50	17.25
120	33	7.29	5.03	2.25	16.23
125	32	7.06	5.03	2.02	15.19
130	31	6.85	5.03	1.81	14.13
135	30	6.65	5.03	1.61	13.05
140	29	6.46	5.03	1.42	11.97
145	28	6.28	5.03	1.25	10.86
150	28	6.12	5.03	1.08	9.75
180	24	5.30	5.03	0.26	2.82
210	21	4.68	4.68	0.00	0.00
240	19	4.21	4.21	0.00	0.00
270	17	3.83	3.83	0.00	0.00
300	16	3.52	3.52	0.00	0.00



# FIVE-YEAR EVENT

## DRAINAGE AREA I (Uncontrolled Flow Off Site)

(FIVE-YEAR EVENT)

			C
Roof Area:	0	sq.m	0.90
Asphalt/Concrete Area:	523	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	145	sq.m	0.20
			<hr/>
Total Catchment Area:	668	sq.m	0.75
Area (A):	668	sq.m	
Time of Concentration:	15	min	
Rainfall Intensity (i):	84	mm/hr	
Runoff Coefficient (C):	0.75		
Release Rate (2.78AiC):	11.61	L/s	

## DRAINAGE AREA II (Roof)

(FIVE-YEAR EVENT)

			C
Roof Area:	797	sq.m	0.90
Asphalt/Concrete Area:	0	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	0	sq.m	0.20

Total Catchment Area: 797 sq.m 0.90

No. of Roof Drains: 3  
 Slots per Wier: 1 0.0124 L/s/mm/slot (5 USGPM/in/slot)

Depth at Roof Drain: 103 mm

Maximum Release Rate: 3.85 L/s Pond Area: 361 sq.m

Achieved Volume: 12.44 cu.m

Maximum Volume Required: 12.44 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	141	28.15	3.85	24.30	7.29
10	104	20.78	3.85	16.93	10.16
15	84	16.66	3.85	12.81	11.53
20	70	14.01	3.85	10.16	12.19
25	61	12.14	3.85	8.30	12.44
30	54	10.75	3.85	6.91	12.43
35	49	9.67	3.85	5.83	12.24
40	44	8.81	3.85	4.96	11.91
45	41	8.10	3.85	4.25	11.49
50	38	7.51	3.85	3.66	10.98
55	35	7.00	3.85	3.16	10.42
60	33	6.57	3.85	2.72	9.80
65	31	6.19	3.85	2.34	9.14
70	29	5.86	3.85	2.01	8.44
75	28	5.56	3.85	1.71	7.71
80	27	5.30	3.85	1.45	6.96
85	25	5.06	3.85	1.21	6.18
90	24	4.84	3.85	1.00	5.38
95	23	4.65	3.85	0.80	4.56
100	22	4.47	3.85	0.62	3.72
105	22	4.30	3.85	0.46	2.87
110	21	4.15	3.85	0.30	2.01
115	20	4.01	3.85	0.16	1.13
120	19	3.88	3.85	0.03	0.25
125	19	3.76	3.76	0.00	0.00
130	18	3.65	3.65	0.00	0.00
135	18	3.54	3.54	0.00	0.00
140	17	3.44	3.44	0.00	0.00
145	17	3.35	3.35	0.00	0.00
150	16	3.26	3.26	0.00	0.00
180	14	2.83	2.83	0.00	0.00
210	13	2.50	2.50	0.00	0.00
240	11	2.25	2.25	0.00	0.00
270	10	2.05	2.05	0.00	0.00
300	9	1.89	1.89	0.00	0.00

1 Dunbar Court  
Pre-Consultation Meeting Minutes

Location: Room 4102E, City Hall  
Date: March 15, 2pm to 4pm

<b>Attendee</b>	<b>Role</b>	<b>Organization</b>
Stream Shen	Planner	City of Ottawa
Gabrielle Schaeffer	Project Manager (Engineer)	
Mark Young	Urban Designer	
Max Walker	Committee of Adjustment Planner	
Justin Marr	Planning Assistant	
Jane Thompson	Principal (Architect)	Jane Thompson Architect
Amie Henderson	Technologist	Nepean Housing Corporation
Deborah Edwards	Consultant	

Comments from Applicant

1. The applicant is proposing a 28 unit, three-storey apartment building adjacent to the outdoor play area. Four townhouses are proposed to be demolished to accommodate this proposal. Additional amenity space will be provided on the ground floor of the proposed building.
2. The Nepean Housing Corporation (NHC), a non-profit affordable rental-housing provider in Nepean, owns the property.
3. As various affordable rental housing projects reach the End of Operating Agreement, NHC is considering various intensification proposals to ensure that operating cost can be adequately addressed via the increase in rental income generating from the additional units.
4. The proposal requires a Major Zoning By-law amendment to permit the low-rise apartment (new R4 zone) use and to address the deficiency in minimum parking requirement.
5. NHC indicated that the existing parking spaces are underutilized and the proposed use does not require the minimum parking spaces outlined by the Zoning By-law.
6. The original proposal is to redevelop the parking area adjacent to Gibbard Avenue. However, after further research, there are major infrastructure pipes

parallel to Gibbard Avenue beneath the parking area. Therefore, the original proposal cannot be pursued.

### Planning Comments

1. This is a pre-consultation for a Major Zoning By-law Amendment and Site Plan Control application, Manager Approval, subject to Public Consultation for 1 Dunbar Court. Application form, timeline and fees can be found [here](#).
2. Please review and conform to the basic plans and studies requirements outlined [here](#).
3. Please include a section within the planning rationale that analyze the reduction in parking spaces and provide evidence (e.g. past records) on the underutilization of existing spaces.
4. Consider any shadow impact associated with the orientation of the proposed building.
5. Please ensure adequate separation distance is maintained.
6. Please avoid removing any required visitor parking spaces.
7. Any proposed severance will require further discussion and associated Environmental Compliance Approval from MOECC.
8. Please consult with the Ward Councillor and community association/neighbours once the design is finalized.
9. The pre-consultation meeting comments and list of required plans and studies will lapse on March 15, 2019.

### Engineering Comments

1. The Servicing Study Guidelines for Development Applications are available at the following address: <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans>
2. Servicing and site works shall be in accordance with the following documents:
  - ⇒ Ottawa Sewer Design Guidelines (October 2012)
  - ⇒ Ottawa Design Guidelines – Water Distribution (2010)
  - ⇒ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)

- ⇒ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
  - ⇒ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
  - ⇒ City of Ottawa Park and Pathway Development Manual (2012)
  - ⇒ City of Ottawa Accessibility Design Standards (2012)
  - ⇒ Ottawa Standard Tender Documents (latest version)
  - ⇒ Ontario Provincial Standards for Roads & Public Works (2013)
3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at [InformationCentre@ottawa.ca](mailto:InformationCentre@ottawa.ca) or by phone at (613) 580-2424 x.44455).
  4. The development boundary will need to be delineated on all engineering plans and be used in servicing calculations.
  5. The Stormwater Management Criteria, for the subject site, is to be based on the following:
    - i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
    - ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
    - iii. A calculated time of concentration (Cannot be less than 10 minutes).
    - iv. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.
    - v. Use of rooftop controls are recommended for this site, but are not limited to them.
  6. Contact the conservation authority for quality control requirements. Please include correspondence in the stormwater management report.
  7. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:
    - i. Location of service (map/plan view)
    - ii. Type of development and the amount of fire flow required (as per FUS, 1999).
    - iii. Average daily demand: \_\_\_ L/s.
    - iv. Maximum daily demand: \_\_\_ L/s.
    - v. Maximum hourly daily demand: \_\_\_ L/s.
  8. If severance (for mortgage purposes) is being pursued, please contact the local Ottawa District Ministry of the Environment and Climate Change office to discuss if

an MOECC Environmental Compliance Approval (Private Sewage Works) will be required for the proposed development. For residential applications contact Charlie Primeau (613) 521-3450, ext. 251 [Charlie.Primeau@ontario.ca](mailto:Charlie.Primeau@ontario.ca)

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x22517 or by email at [gabrielle.schaeffer@ottawa.ca](mailto:gabrielle.schaeffer@ottawa.ca)

### Transportation Comments

1. Please complete the Transportation Impact Assessment process prior to Site Plan application submission. If a site plan application is submitted prior to the completion of the TIA process, confirmation from Rosanna Baggs, City of Ottawa Transportation Project Manager, is required to deem the application complete.
2. A noise study is required due to the proposal's proximity to collector road.
3. If any exposed mechanical is proposed, a stationary noise assessment is also required.

### Forestry Comments

1. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City; an approved TCR is a requirement of Site Plan or Plan of Subdivision approval
2. Any removal of privately-owned trees 10cm or larger in diameter require a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
3. In this case, the TCR may be combined with the LP
4. The TCR must list all trees on site by species, diameter and health condition.
5. The TCR must address all trees with a critical root zone that extends into the developable area.
6. If trees are to be removed, the TCR must clearly show where they are and document the reason they can not be retained
7. All retained trees must also be shown and all retained trees within the area impacted by the development process must be protected as per the City guidelines listed on Ottawa.ca
8. 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

9. The City does encourage the retention of healthy trees wherever possible; please ask your design/planning team to find opportunities for retention wherever possible if the trees are healthy and will contribute to the design/function of the site. For more information on the process or help with tree retention options, contact Mark Richardson [mark.richardson@ottawa.ca](mailto:mark.richardson@ottawa.ca)
10. The removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR; note that Forestry Services may ask for compensation for any City-owned tree that has to be removed.

---

Please contact me at [Stream.Shen@ottawa.ca](mailto:Stream.Shen@ottawa.ca) or at 613-580-2424 ext. 24488 if you have any questions.

Sincerely,



Stream Shen MCIP RPP  
Planner II  
Development Review - West

## 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-9

**Plan showing the site and location of all existing services:** see drawings C-1 to C-9

**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 defensible design criteria:** not applicable

**Statement of objectives and servicing criteria:** see page 2 of Servicing Brief and Stormwater Management Report

**Identification of existing and proposed infrastructure available in the immediate area:** see drawings C-1 to C-9

**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-9

**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-6

**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

**Identification of system constraints:** see page 2 of Servicing Brief

**Confirmation of adequate domestic supply and pressure:** see page 2 of Servicing Brief

**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:** see page 2 & 9 to 14 of Servicing Brief

**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

**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 feeder mains, 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:** see page 3 of Servicing Brief

**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

**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 16 of Servicing Brief

**Description of proposed sewer network including sewers, pumping stations, and forcemains:** see page 4 of Servicing Brief

**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 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-4

**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-watershed 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-7 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-7 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 2.5 on drawing C-6

**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 7 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