Servant, Dunbrack, McKenzie & MacDonald Ltd.
NOVA SCOTIA LAND SURVEYORS & CONSULTING ENGINEERS

36 Oland Crescent
Bayers Lake Business Park
Halifax, Nova Scotia B3S 1C6

Phone (902) 455-1537
Fax (902) 455-8479
Web sdmm.ca

RAYMOND A. LANDRY
MASc., P.Eng., LEED Green Associate
CHRISTOPHER J. FORAN
P.Eng.
GEOFFREY K. MacLEAN
P.Eng.
RACHAEL W. KYTE
P.Eng., LEED Green Associate
ALEXANDER W. PULSIFER
P.Eng.
BLAKE H. TRASK
P.Eng., NSLS

DANIEL S. GERARD
P.Eng., NSLS
CARL K. HARTLEN
NSLS
H. JAMES McINTOSH
P.Eng., NSLS, CLS
KEVIN A. ROBB
NSLS
MICHAEL S. TANNER
NSLS
ADAM J. PATTERSON
P.Eng., NSLS

March 19, 2019

Halifax Water
450 Cowie Hill Road
Halifax, NS

From: Rachael Kyte, P.Eng. File No. 1-6-57 (34160)

Re: Wyse Road Multi-Unit Building Development, Dartmouth, NS – Sanitary Lateral Size Confirmation

Project Summary:

	Commercial	Residential
MU1	17,363 sq ft	268 units
MU2	N/A	60 units
MU3	N/A	60 units
MU4	N/A	60 units
MU5	N/A	60 units
MU6	N/A	106 units
MU7	N/A	60 units
*From Architect		

References:

1. Halifax Water (HW) Design & Construction Specifications (2018 Edition), Section 4.2.2:
   - Q = [1.25 x (a x M)] + b Where;

     Q = Sanitary sewer flow.
     1.25 = Safety factor.
     a = Average dry weather flow.
     M = Peaking factor using Harmon Formula; M = 1 + [14 / (4 + $P^{0.5}$)]
     b = Long-term infiltration/inflow allowance.
     P = Population in thousands
   - Infiltration allowance: 0.28 L/ha_{gross}/s
   - Residential Average Dry Weather Flow: 300 L/day per person
   - Multi-Unit Dwelling Population: 2.25 people per unit

Calculation Summary:

Population (P)

Reference:

- ACWG Page 2-4 2.3.4.2: Commercial Flow Equivalent: 85 persons/ha
- HW Section 4.2.1 Residential (Multi-Unit): 2.25 people per unit

MU1

P = 2.25 people per unit x 268 Units = 603 people (or 0.603)
P = 85 persons/ha x 0.161 ha = 14 people (or 0.014)
Total P = **617 people (or 0.617)**

MU2, MU3, MU4, MU5 & MU7

P = 2.25 people per unit x 60 Units = **135 people (or 0.135)**

MU6

P = 2.25 people per unit x 106 Units = **239 people (or 0.239)**

Dry Weather Flow (a)

Reference:

ACWG Section 2.3.4.3, Table 2.1: Stores, shopping centers and office: 6 L/sq.m
HW Section 4.2.2: Residential: 300 L/day per person

MU1

a = 6 L/day per sq.m x 1,613 sq.m = 9,678 L/day (or 0.112 L/s)
a = 300 L/day per person x 617 people = 185,100 L/day (or 2.142 L/s)
Total a= **194,778 L/day (or 2.254 L/s)**

MU2, MU3, MU4, MU5 & MU7

a = 300 L/day per person x 135 people = **40,500 L/day (or 0.469 L/s)**

MU6

a = 300 L/day per person x 239 people = **71,700 L/day (or 0.830 L/s)**

Infiltration (b)

Reference:

HW Section 4.2.2: Infiltration allowance: 0.28 L/ha_{gross}/s

MU1

Lot Area =0.40 ha
b: 0.28 L/ha_{gross}/s x 0.40 ha = **0.11 L/s**

MU2
Lot Area =0.23 ha
b: 0.28 L/ha_{gross}/s x 0.23 ha = **0.064 L/s**

MU3
Lot Area =0.23 ha
b: 0.28 L/ha_{gross}/s x 0.23 ha = **0.064 L/s**

MU4
Lot Area =0.24 ha
b: 0.28 L/ha_{gross}/s x 0.24 ha = **0.067 L/s**

MU5
Lot Area =0.22 ha
b: 0.28 L/ha_{gross}/s x 0.22 ha = **0.062 L/s**

MU6
Lot Area =0.23 ha
b: 0.28 L/ha_{gross}/s x 0.23 ha = **0.064 L/s**

MU7
Lot Area =0.24 ha
b: 0.28 L/ha_{gross}/s x 0.24 ha = **0.067 L/s**

Peaking Factor (M)

$M = 1 + [14 / (4 + P^{0.5})]$

MU1
$M = 1 + [14 / (4 + (0.617)^{0.5})]$ = **3.92**

MU2, MU3, MU4, MU5 & MU7
$M = 1 + [14 / (4 + (0.135)^{0.5})]$ = **4.20**

MU6
$M = 1 + [14 / (4 + (0.239)^{0.5})]$ = **4.12**

Sanitary Sewer Flow (Q)

Q = [1.25 x (a x M)] + b

MU1
Q = [1.25 x (2.254 L/s x 3.92)] + 0.11 L/s = **11.15 L/s**

MU2
Q = [1.25 x (0.469 L/s x 4.20)] + 0.064 L/s = **2.53 L/s**

MU3
Q = [1.25 x (0.469 L/s x 4.20)] + 0.064 L/s = **2.53 L/s**

MU4
Q = [1.25 x (0.469 L/s x 4.20)] + 0.067 L/s = **2.53 L/s**

MU5
Q = [1.25 x (0.469 L/s x 4.20)] + 0.062 L/s = **2.52 L/s**

MU6
Q = [1.25 x (0.830 L/s x 4.12)] + 0.064 L/s = **4.34 L/s**

MU7
Q = [1.25 x (0.469 L/s x 4.20)] + 0.067 L/s = **2.53 L/s**

Sanitary Lateral Size Confirmation:

MU1
A 200 mm diameter PVC lateral at 2.00% slope has a capacity of 60 L/s. With the calculated flow of Q = 11.15 L/s, the proposed lateral will have sufficient flow capacity.

MU2, MU3, MU4, MU5, MU6 & MU7
A 150 mm diameter PVC lateral at 2.00% slope has a capacity of 28L/s. With the highest calculated flow of Q = 4.34 L/s, the proposed laterals will have sufficient flow capacity.

For additional information or discussion regarding these findings please contact the undersigned.

Regards,

Servant, Dunbrack, McKenzie & MacDonald Ltd.

Original Signed

Rachael Kyte, P.Eng.
Project Engineer

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