

January 20, 2025

Scott MacCallum, MBA, P.Eng.
Clayton Developments Limited
 200-90 Western Parkway
 Bedford, NS B4B 2J3

Dear Mr. MacCallum,

Re: Water and Wastewater Capacity Memo – Additional Multi-Unit Density
Opal Ridge Development – Dartmouth, Nova Scotia

At the request of Clayton Developments Limited (CDL), Strum has reviewed the capacity of the potable water system and the downstream wastewater sewer system for the Opal Ridge Development in Dartmouth, Nova Scotia, in the interest of adding 617 additional units to the development. The following is a breakdown of the updated proposed density for the Opal Ridge Development:

Table 1: Proposed Densities

Block Identifier	Original Density (Units)	Proposed Density Increase (Units)	New Proposed Density (Units)	Location of Connection to Existing System
Block A	174	-	174	Highway 111
Block B	193	127	320	Highway 111
Block C	87	17	104	Highway 111
Block D	91	35	126	Highway 111
Block E	45 (townhouses)	-	45 (townhouses)	Highway 111
Block F	51	27	78	Highway 111
Block G	76	28	104	Highway 111
Block H	188	383	571	Peddars Way
Total	905	617	1,522	

Sanitary System

Strum completed wastewater capacity analysis using the hydraulic methodology outlined in the Halifax Water Design Specification (2023). Populations for multi-unit and single unit/townhouse units were taken as 2.25 and 3.35 people/unit respectively as indicated in the HW standards. Population densities and physical system information for the existing downstream wastewater sewer systems was completed in reference to a previous study completed by SDMM Limited titled “Penhorn Crombie Lands, Dartmouth – Downstream Wastewater Sewer Analysis”, dated September 7, 2018.

Based on the updated analysis, the Opal Ridge Development and the existing downstream sanitary system have sufficient capacity to support the proposed additional density. Please refer to the detailed sanitary calculation table and sanitary system schematic drawing 20-7306-A01 included as attachments to this letter.

Water System

Strum also updated the original hydraulic water model using the latest version of Bentley WaterCAD in accordance with Halifax Water Design Specification (2023) requirements. The model contains geometry (elevations and locations of nodes, pipes, water tanks, valves, etc.) based on the current system. Domestic flow demand was added at each node within the development area based on the anticipated unit density provided by CDL in **Table 1**. Domestic flows for the following demand scenarios were calculated based on the Halifax Water standards: Average Day, Maximum Day, Peak Hour, & Minimum Hourly flow demands. As per Halifax Water standards, in all non-fire flow scenarios, the minimum allowable pressure in the system is 175 kPa (40 psi) during peak hour demands, the maximum allowable pressure in the system is 620kPa (90 psi) during minimum hour demands, and the maximum allowable flow velocity is 1.5 m/s.

In addition to the various demand scenarios noted above, a representative fire flow demand was applied to each junction. The required fire flow was applied as per Halifax Water standards as shown in **Table 2** below. In accordance with Halifax Water standards, in the fire flow scenario, the minimum allowable residual pressure is 150 kPa (22 psi) at the point anywhere in the system during fire flow, and the maximum allowable flow velocity is 2.4 m/s.

Required fire flows were estimated using the published values in the Halifax Water Design Specification (2023), and also reviewed against the interpretation of the required fire flow calculation in the Fire Underwriters Survey's "Water Supply for Public Fire Protection". The assumptions made for the proposed multi-unit residential buildings were as follows: Non-Combustible (Type II) construction, protected vertical openings, Residential occupancies, (standard) automatic sprinkler protection, and variable exposure adjustment charge. The results are shown below in **Table 2**.

Table 2: Water Model Summary

Criteria	Required Fire Flow – Halifax Water (L/min)	Required Fire Flow – Fire Underwriters Calculation* (L/min)	Available Fire Flow (L/min)	Max Pressure (PSI)	Min Pressure (PSI)
Block A	13,620	6,368	18,461	62	62
Block B	13,620	6,792	15,115	61	60
Block C	13,620	5,687	13,241	61	60
Block D	13,620	6,369	15,539	58	58
Block E	4,542	-	17,473	56	56
Block F	13,620	4,899	14,566	58	57
Block G	13,620	5,304	12,897	59	59
Block H	13,620	5,769	12,878	61	60

*Calculation assumes the following: Non-Combustible (Type II) construction (C=0.8), protected vertical openings (reduced total effective area), Residential occupancies (-15%), automatic sprinkler protection with standard water supply (-40%), and exposure adjustment charge (+3-4%)

Based on the updated hydraulic water model, the current public water system has sufficient capacity to support the proposed additional density. Although the full required fire flow is not fully achieved at all locations in accordance with the Halifax Water Design Specification (2023), the Fire Underwriters Survey estimate was easily surpassed, accounting for expected construction, occupancy, and fire protection systems. Ultimate adequacy of the system and private fire pump design shall be confirmed during final design of each building once the exact construction type and occupancy is known. Please refer to the water system schematic drawing 20-7306-A03 included as attachments to this letter.

We trust that this meets your current requirements. If you have any questions, please contact me.

Thank you,

Original Signed

Ben Crouse, P.Eng.,
Senior Civil Engineer
Associate
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