McLeod Development Inc.

Functional Servicing Report

Project Location :

6645, 6655, 6665 McLeod Road

Niagara Falls, Ontario

**Prepared for:**

-

Prepared by:

AM Engineering

Jan, 2025

File No: 24083

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1.0 INTRODUCTION

This report addresses the existing and proposed Site Servicing in support of a proposed building and associated parking/driveways on the subject site. The proposed structure is a Stacked Townhouse development comprising three blocks. Block A has 18 units, Block B, 12 Units and Block C, 12 units. The subject site is located at 6645, 6655 & 6665 McLeod Road, Niagara Falls. The site is located north of McLeod Road. **(See Figure 1)**.
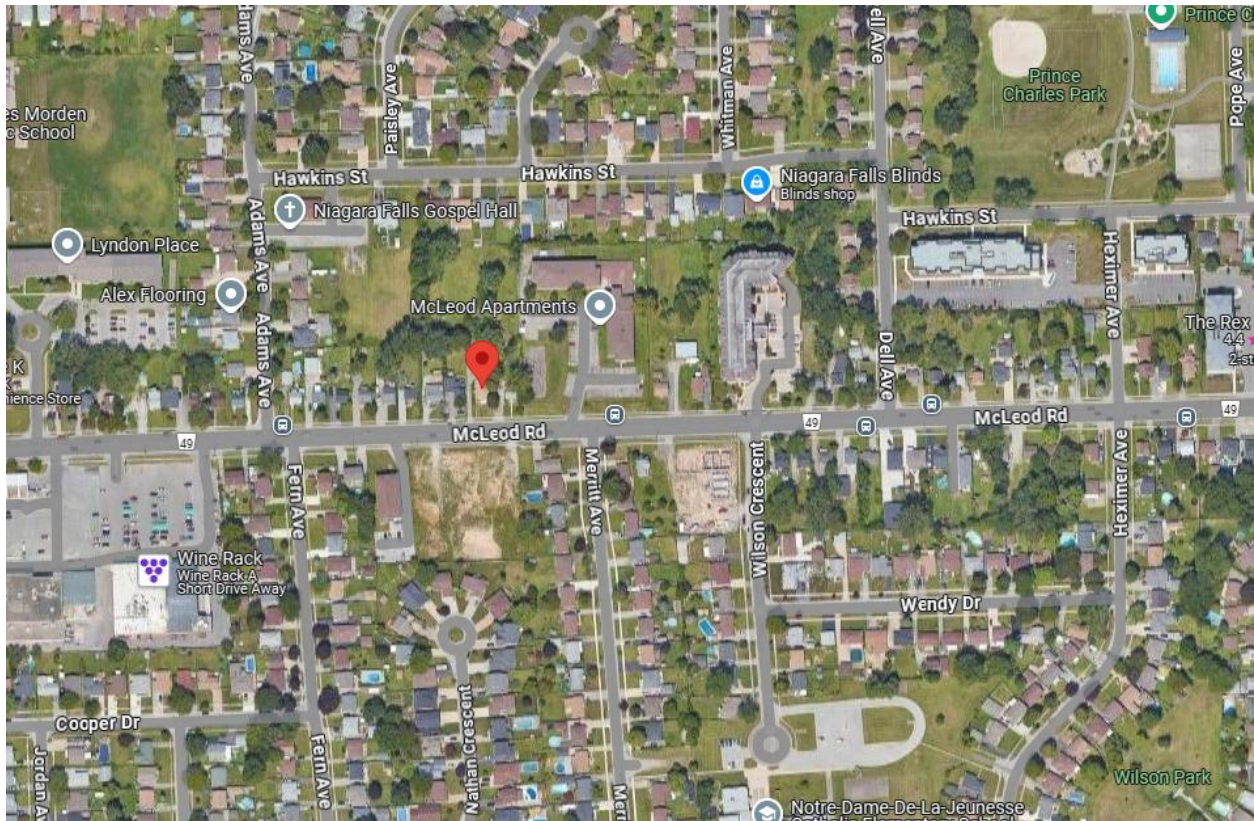
Figure 1: Location Map

2.0   SANITARY SERVICING

2.1   Existing Sanitary Servicing

The property is currently occupied by a single family residential and is serviced with municipal water and sanitary. The site has an area of 4220m^2 (0.422 ha).

City records indicate that existing sanitary on McLeod include 525mm and 600 diameter sewers. Refer to conceptual layout sketch in the Appendix.

All redundant services to the property shall be capped at the property line by the Developer's Contractor.

2.2   Proposed Sanitary Servicing and Peak Discharge Rates

It is proposed to construct three blocks of Stacked Townhouses as well as parking and driveway to service the development.

The proposed peak sanitary discharge generated from the development has been calculated as follows:

The proposed peak sanitary discharge generated from the development has been calculated based on Table 8.2.1.3.A of the 2024 Ontario Building Code (OBC)

2.2.1   Apartment Occupancy (Table 8.2.1.3.A)

➢ Apartment - @ 275 L/day per person
➢ Population (apartments) = 1.6 persons per Unit x 42 Units = 68 pple
   For 42 units (18+12+12) = [42 x 1.6 x 275]=18480 L/day = 0.04 L/s

Total Average Flow   = 0.214 L/s

Peaking Factor $= 1 + \dfrac{14}{4+P^{0.5}} = 1 + \dfrac{14}{4+0.068^{0.5}} = 4.28$

                              Therefore use 4.0 (max allowed)

Design Peak Discharge   = 0.214 x 4.00 = **0.856 L/s**

Infiltration Amount   =Catchment Area x 0.286 L/s/ha

                                     = 0.286 L/s/ha x 0.4220 ha = **0.121 L/s**

Peak Discharge   = Residential Flow + Infiltration Amount

                                     = 0.856 L/s + 0.121 L/s

                                     = **0.977 L/sec**

2.3   Sewer Full Flow Capacity:

It is proposed to provide a 150mm diameter sewer at a minimum 0.5% slope off the 525mm diameter sewer om McLeod Road. The calculation for sewer full flow capacity is as follows:

$$Q = \frac{1}{n} \; x \; A \; x \; R^{\frac{2}{3}} \; x \; S^{\frac{1}{2}}$$

Where:

Q = Design Flow (m^3/s)

'n = Mannings roughness coefficient

A = Cross sectional area of flow (m^2)

R = Hydraulic radius (Area/wetted perimeter)

S = Slope of pipe (m/m)

The existing sewer is a 150mm diameter PVC at 0.5% slope.

$$Q = \frac{1}{0.013} \; x \; 0.0177 \; x \; 0.0375^{\frac{2}{3}} \; x \; 0.005^{\frac{1}{2}} = 0.01077 m^3/s \;\; = 10.77 l/s$$

The sanitary sewer has adequate capacity for the expected peak flow (10.77 L/s > 0.977 L/s).

3.0 WATER

3.1 Existing Conditions

City records indicate that a 200mm diameter watermain is available on McLeod Road as well as 25mm copper K water services to the property. These services shall be capped at the main by City's Public Works Department at the Developer's expense.

3.2 Water Usage

Peak water usage for the proposed development is estimated based on the "Fixture Unit Method" as per Table 7.6.3.2.A of the Ontario Building Code (OBC) 2024. The fixture units were estimated based architectural floor plans.

Table 1: Fixture Units Calculation:

Fixture or Device	Minimum Size of Supply Pipe	Private Use Hydraulic Load (fixture units)	Quantity	Total Hydraulic Load (fixture units)
Bathroom group(a) with 6 LPF flush	N/A	3.6	58	208.8
Bathtub with or without shower head	1/2''	1.4		
Bathtub with ¾ in. spout	3/4''	10		
Bidet	3/8''	2		
Clothes washer	1/2''	1.4	42	58.8
Dishwasher	3/8''	1.4	42	58.8
Water closet, 6 LPF or less with flush	3/8''	2.2		
Hose bibb:				
½" supply	1/2''	2.5		
¾" supply	3/4''			
Combination hot and cold	1/2''	2.5		
Shower head:				
Single head	1/2''	1.4		
Multi-head, fixture unit per head	1/2''	1.4		
Sink:				
Bathroom (lavatory)	3/8''	0.7	10	7
Bar	3/8''	1		
Kitchen	3/8''	1.4	42	58.8
Laundry	3/8''	1.4	42	58.8
Other:				
			Total:	451.0

Conversion of fixture units to flow (L/s) was done as per Table 7.4.10.5

__451.0 Fixtures Units = 108.63 gal/min = 6.85 L/s__

3.3 Fire Flow Demand Requirements

Fire flow requirements for the proposed development have been estimated using the Fire Underwriter's Survey: *Water Supply for Public Fire Protection - 1999*. The calculations are provided below:

1. Building Construction

Proposed buildings are un-sprinkled and combustible construction.

2. Base Fire Flow

   F   = base fire flow requirement (L/min)
       $= 220 \times C \times A^{0.5}$

   A   = 910 sq.m (floor area) [2 adjoining floor + 50% floor above - > 1 hour rating]
   C   = fire resistance coefficient
       = 1.0 (combustible construction)

   F $= 220 \times 1.0 \times 910^{0.5} = 6636.6$ l/min = 7000 L/min [to the nearest 1000 L/min]

3. Adjustment for Sprinkler System

   Proposed building shall not be equipped with a sprinkler system.

   No reduction due to sprinkler system

4. Adjustment for Adjacent Buildings

East face within 10.1-20m of building	= add 15% of Adjusted F
West face within 10.1-20m of building	= add 15% of Adjusted F
South face >45m of building	= add 0% of Adjusted F
North face >45m of building	= add 0% of Adjusted F_
Total	= 30% of Adjusted F (Max Value)
	= 30% x 7000 l/min = 2100 l/min

5. Final Fire Flow Calculation   = 7000 + 2100

                                   = 9,100 L/min

                                   =9,000 L/min [rounded the nearest 1000 L/min]

                                   = **150 L/s**

3.4   Available Fire Flow

A fire hydrant is located on McLeod Road directly opposite the proposed entrance to the property. Fire flow test results (attached) indicate that the required flow of 150 L/s would be available at an estimated 40 psi.

Figure 2: Fire Hydrant

The unobstructed distance between the existing fire hydrant on McLeod Road and the main entrances to the Block C building is approximately 112m. This exceeds the requirements of the Ontario Building Code section 3.2.5.5 that stipulates this distance should not exceed 90m. It therefore proposed to provide a private Fire Hydrant as shown on the conceptual layout sketch to satisfy the OBS requirement.

4.0   STORMWATER SERVICING

Storm drainage for the proposed conditions shall be provided through surface and underground drainage systems. The minor system comprises swales and storm sewers. Major flows shall be directed to McLeod Road. Stormwater Management is discussed in detail in a SWM report provided under a separate cover.

5.0   SUMMARY

The main findings of the functional servicing report for the proposed development are:

1. The property can be adequately serviced through the proposed sanitary and water services.

AM Engineering.

LICENSED PROFESSIONAL ENGINEER

G. S. MUNDI
100203897

2025-01-28

PROVINCE OF ONTARIO

Gurbir Mundi, P.Eng.

APPENDIX A

FIRE HYDRANT TEST

Water Supply Test

Name of Risk:	Mcloed Development Inc	File No:	240633
Address:	6655 McLeod Road	Tested By:	D. Boyes
Municipality	Niagara Falls	Date:	December 16th, 2024

System Data

Size of Main: 300mm PVC   Dead End: _____   Two Ways: x   Loops: _____

Source Reliable: Yes   City   If No Explain: _____

Comments: Hydrant located @ 6655 McLeod was out of service at time of flow test.

Test Data

Location of Test Hydrants:
Static: 6705 McLeod Road
Flowed: 6536 McLeod Road

Static: 92 psi   Time: 8   A.M

Test No:	No. of Outlets	Orifice Size	Pitot PSI	Equivalent Flow GPM	Total Flow GPM	Residual Pressure Psi	Comments
1	1	2 ½"	52	1216	1216	90	Hose Monster
2	2	2 ½"	40/40	1067/1067	2134	87	Hose Monster

Static & Residual Pressure Hydrant

6705 McLeod Rd, Niagara Falls, ON L2G 3G3

6655 McLeod Rd, Niagara Falls, ON L2G 3G3

Flow Hydrant

6536 McLeod Rd, Niagara Falls, ON L2G 3G4

McLeod Rd

A Name You Can Trust For Certified Personnel and Quality Workmanship
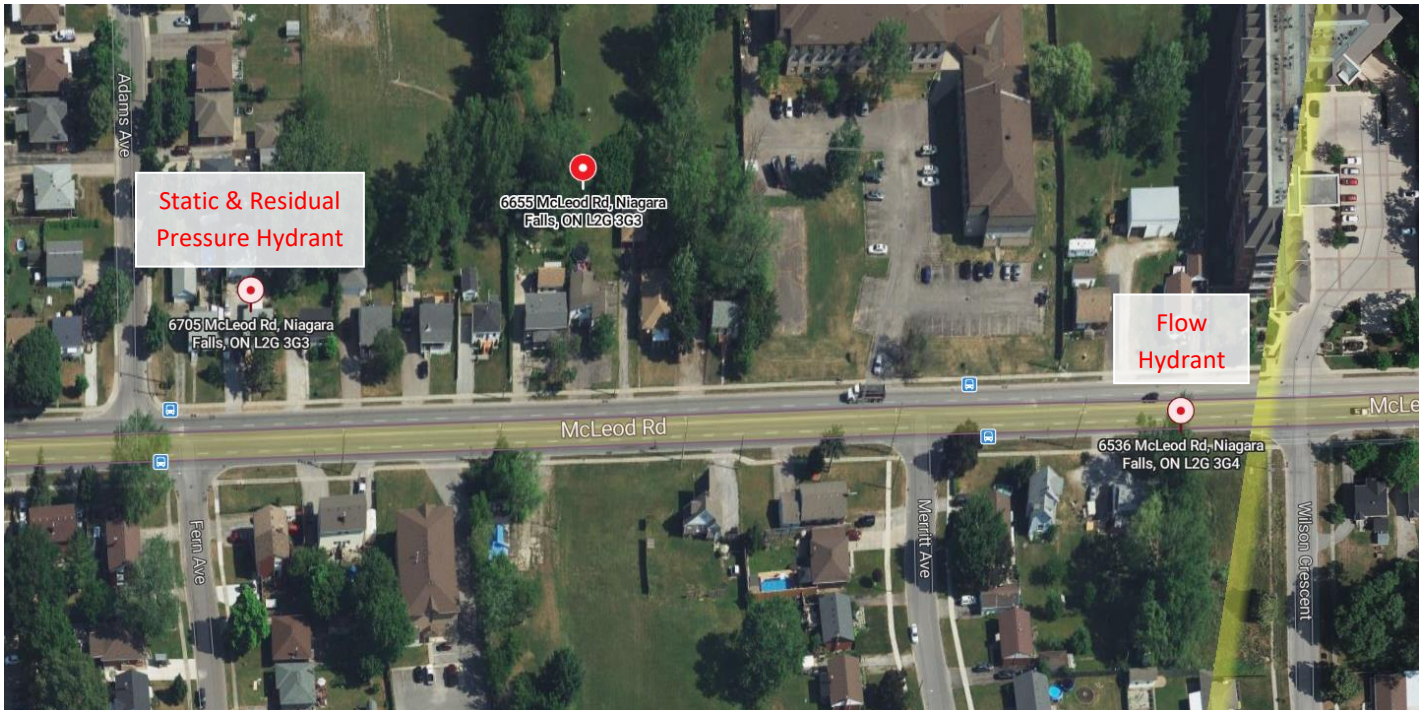
APPENDIX B

CONCEPTUAL LAYOUT SKETCH

CONCEPTUAL WATER AND SANITARY LAYOUT
N.T.S

PROP. TREES

EX. TREES TO REMAIN

BLOCK- D
4 ROWS
12 UNITS

11   14

ENTRY   ENTRY

150 SAN SERV.

PROP. TRANSFORMER

46   38

PROP. SHRUBS

13.69

PROP. TRANSFORMER

3/8

EX. TREES TO REMAIN

SAN MH

37

150 SAN SERV.

100 WM

PROP. TREES

BLOCK- B
4 ROWS
12 UNITS

7

30

100 WS

150 X100 REDUCER

13.62

EX. TREES TO REMAIN

23   29

FH   150 WM

WASTE COLLECTION

12.73   aisle

22

150 WM

6.00   150 SAN

1

PROP. TRANSFORMER

7.73   7.73   7.73   7.73   6m

100 WS

BLOCK- A
6 ROWS
18 UNITS

6   1

ENTRY   ENTRY   ENTRY

150 SAN SERV.

INSPECTION MH

SHARED DRIVEWAY 3.75 M WIDE EACH SIDE

PROP. WIDENING

10.21   10.67

PROP. TREES

ENTRY

PLOT 6633

EX.525 SAN@.27%

EX.200 WM   MCLEOD RD

EX.600 SAN@.33%

EXISTING FIRE HYDRANT

EX.1200 STM@.41%