



File: 23141

FUNCTIONAL SERVICING REPORT

7701 LUNDY'S LANE

May 2024

INTRODUCTION

This report addresses the servicing needs and requirements for the proposed development located at 7701 Lundy's Lane in the City of Niagara Falls, as part of the Zoning By-Law Amendment and Site Plan Approval application process. The site is located at the northwest corner of the Lundy's Lane and Beaverdams Road intersection. Historically, the property has been occupied by a motel with an asphalt driveway/parking area and a pool.

The development site is approximately 0.68 hectares in size. It is proposed to convert an existing two-storey motel into a residential apartment building with 96 units. Additionally, a new six-storey building containing 42 residential units will be constructed. The site will include an associated asphalt parking lot, concrete curbs, catch basins, storm sewers, sanitary service, and water service. The objectives of this study are as follows:

1. Identify domestic and fire protection water service needs for the site;
2. Identify sanitary servicing needs for the site; and,
3. Identify stormwater management needs for the site.

WATER SERVICING

The subject site is surrounded by an existing 300mm diameter municipal watermain on Lundy's Lane (Regional Road #20) and a 200mm diameter municipal watermain on Beaverdams Road.

Under the existing conditions, the motel is serviced by the 300mm diameter municipal watermain on Lundy's Lane and the 200mm diameter municipal watermain on Beaverdams Road. Since the two-storey motel will be converted into a residential apartment building with the same number of units, no additional water service connection is required to provide water supply to the future 96 residential units of the existing two-storey building.

Additionally, it is proposed to connect to the 300mm diameter municipal watermain with a new 150mm diameter water service to provide domestic water supply to the proposed six-storey building.



Table 1 summarizes the projected water demand calculations for the proposed six-storey building. The water demands were calculated based on the 2021 Niagara Water Master Servicing Plan Update (MSPU).

Table 1. Water Demand Calculations (Six-Storey Building)								
Number of Units	Density (ppu)	Population (persons)	Avg. Day Demand Rate (L/cap/day)	Avg. Day Demand (L/s)	Max Day Demand		Peak Hour Demand	
					Peak Factor	(L/s)	Peak Factor	(L/s)
42	1.10	46	240	0.13	1.65	0.21	3.00	0.39

As shown on Table 1, an assumed per capita rate of 1.10 people per unit was apply. It is expected than the six-storey building generate an Average Day Demand of 0.13L/s, calculated using a rate of 240L/cap/day for residential per 2021 MSPU. A peak factor of 1.65 was apply to calculate the expected Max Day Demand of 0.21L/s, and the Peak Hour Demand of 0.39L/s was calculated using a peak factor of 3 per 2021 MSPU.

There is an existing fire hydrant fronting the site on Lundy’s Lane, which currently provide fire protection to the site. Additionally, there is a second hydrant located at the east side of Beaverdams Road. It is proposed to relocate the existing fire hydrant fronting the site on Lundy’s Lane approximately 28 meters west from its current location.

An analysis has been conducted per the Fire Underwrites Survey (FUS), to determined the minimum fire flow required, with the inclusion of a sprinkler system for the six-storey building. The calculation determined that a minimum of 121.9L/s fire flow is required. The fire flow calculations are attached in Appendix A.

Therefore, the existing 300mm diameter watermain on Lundy’s Lane (RR #20) will adequately provide domestic water supply, and the existing fire hydrants will provide adequate fire protection for the site.

SANITARY SERVICING

There are two municipal sanitary sewer systems surrounding the site, a 375mm diameter sanitary sewer on Lundy’s Lane (RR #20) and a 300mm diameter sanitary sewer on Beaverdams Road. The existing 375mm diameter sanitary sewer has a full flow capacity of approximately 142.86L/s and the existing 300mm diameter sanitary sewer has a full flow capacity of approximately 105.81L/s.

Figure 1, attached in Appendix B, delineates the existing sanitary drainage areas contributing to the two existing sanitary sewer systems. Under the current conditions, the two-storey motel is



discharging a sanitary outflow of approximately 0.40L/s from drainage area S2 into the existing 375mm diameter municipal sanitary sewer on Lundy’s Lane and a sanitary outflow of approximately 0.24L/s from drainage area S1 into the existing 300mm diameter municipal sanitary sewer on Beaverdams Road.

It is proposed to convert the existing motel units into residential apartment units and construct a new six-storey apartment building. As shown in Figure 2, three sanitary drainage areas are proposed. The proposal includes maintaining the existing sanitary services for the two-storey building connected to the existing 375mm and 300mm diameter sanitary sewer systems.

Additionally, it is proposed to connect the six-storey building with a new 150mm diameter sanitary service to the existing 375mm diameter sewer on Lundy’s Lane. A sanitary peak flow from drainage areas S20 and S30 of approximately 1.38L/s is expected to discharge into the existing 375mm diameter sanitary sewer on Lundy’s Lane, and a sanitary peak flow of approximately 0.61L/s from drainage area S10 is expected to discharge into the existing 300mm diameter sanitary sewer on Beaverdams Road.

Table 2 summarizes the sanitary peak flows and compares the existing and proposed sanitary sewer conditions. All the sanitary sewer calculations can be found in Appendix B.

Sanitary Sewer System	No. Units		Population		Land Use		Peak Flow (L/s)		
	Ex.	Prop.	Ex.	Prop.	Ex.	Prop.	Existing	Proposed	Change
Beaverdams Road	44	44	68	48	Com.	Res.	0.24	0.61	+ 0.37
Lundy's Lane	52	94	81	103	Com.	Res.	0.40	1.38	+ 0.98

As shown in Table 2, the proposed sanitary peak flow to discharge into the 300mm diameter sanitary sewer on Beaverdams Road is higher by 0.37L/s, which is negligible. The proposed sanitary peak flow to discharge into the 375mm diameter sanitary sewer on Lundy’s Lane is higher by 0.98L/s and will occupy 0.7% of the 375mm sanitary sewer total capacity.

Therefore, it is expected that this will be an acceptable addition to the current capacity of the existing 300mm diameter sanitary sewer on Beaverdams Road and the 375mm diameter sanitary sewer on Lundy’s Lane.

STORMWATER MANAGEMENT

The existing stormwater is currently collected by a 150mm diameter stormwater system within the site and conveyed to an existing municipal 600mm diameter stormwater sewer on Lundy’s Lane (RR #20). It is proposed to connect the proposed six-story building to the existing site stormwater system and outlet to the existing 600mm diameter stormwater sewer.



The percent impervious calculation was used to determine the site imperviousness for both existing and future conditions. From the analysis, the 0.68 hectare site has an imperviousness of 89.4% under the existing conditions and 88.2% under the future conditions. As the site currently has limited stormwater flow to the Lundy's Lane stormwater system, and the imperviousness of the redevelopment is less than the existing conditions, stormwater quantity control is not required for this site. Table 3 summarizes the percent impervious calculations.

Table 3. Weighted Percent Impervious Calculations			
Existing Conditions - 7701 Lundy's Lane			
Area Type	Area (m²)	% Impervious	Impervious Area (m²)
Buildings	2,228	100%	2,228.0
Asphalt Road/Parking	3,622	100%	3,622.0
Concrete Surfaces	5	100%	5.0
Pool	240	100%	240.0
Landscape/Greenspace	721	0.1%	0.7
Total Catchment Impervious Area (m²)			6,096
Total Catchment Area (m²)			6,816
Weighted Percent Impervious (%)			89.4%
Proposed Conditions - 7701 Lundy's Lane			
Area Type	Area (m²)	% Impervious	Impervious Area (m²)
Buildings	2,809	100%	2,809.0
Asphalt Road/Parking	3,087	100%	3,087.0
Concrete Surfaces	60	100%	60.0
Landscape Amenity Area	353	15%	53.0
Landscape/Greenspace	507	0.1%	0.5
Total Catchment Impervious Area (m²)			6,009
Total Catchment Area (m²)			6,816
Weighted Percent Impervious (%)			88.2%

The area contributing to the Total Suspended Solids (TSS) production is the parking lot. Under the existing conditions 3,622m² (53%) of the site is covered by the existing asphalt parking lot. The construction of the future six-storey building will reduce the parking lot size to 3,087m² (45%). Therefore, as the source area of TSS production is 8% less than the existing conditions and the areas contributing clean stormwater are increased, the subject site does not require quality controls.



CONCLUSIONS AND RECOMMENDATIONS

Therefore, based on the above comments and design calculations provided for this site, the following summarizes the servicing for this site.

1. The existing municipal 300mm diameter watermain on Lundy's Lane will have sufficient capacity to provide water supply.
2. The existing municipal fire hydrants on Lundy's Lane will have sufficient capacity to provide fire protection.
3. The existing 375mm diameter sanitary sewer on Lundy's Lane will have adequate capacity for the proposed development.
4. Stormwater quantity controls are not considered necessary for this site.
5. Stormwater quality controls are not considered necessary for this site.

In conclusion, there exists adequate municipal infrastructure to service the proposed development. We trust the above comments and enclosed calculations are satisfactory for approval. If you have any questions or require additional information, please do not hesitate to contact our office.

Yours very truly,

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Encl.



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Jason Schooley, P.Eng.



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CONSULTANTS**
ENGINEERS / PLANNERS

APPENDICES



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APPENDIX A

Fire Underwriters Survey (FUS) Calculation Sheet

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

7701 Lundy's Lane, Niagara Falls

Required Fire Flow in Litres per Minute

F=	7,313	(L/m)
	121.88	(L/s)
	1,932	(USgmp)

Type of Construction

Non-Combustible Construction (unprotected metal structural components, masonry or metal walls).

C=	0.80
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Total Floor Area in square metres

Note: Single largest floor area (582m²) plus 25% of each of the two adjoining floors.

A=	873	(m ²)
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Total Number of Floors

6

2. Combustibility of Contents (may not reduce fire flow demand below 2,000 L/min)

Non-Combustible

=	-25%
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3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).

Yes	-30%
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Water supply standard for both system and fire department hose lines (Yes/No).

Yes	-10%
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Is system fully monitored (Yes/No).

Yes	-10%
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Total Sprinkler Reduction to Overall Fire Flow Demand

-50%

4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

7701 Lundy's Lane (Six-Storey Building)

Distance to Nearest Building to the North

32.0 m	5%
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Distance to Nearest Building to the South

39.9 m	5%
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Distance to Nearest Building to the East

2.0 m	25%
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Distance to Nearest Building to the West

12.3 m	15%
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Total Spacial Separation to Adjacent Structures

50%

Additions

Is roof wood shingles or shakes (Yes/No).

No



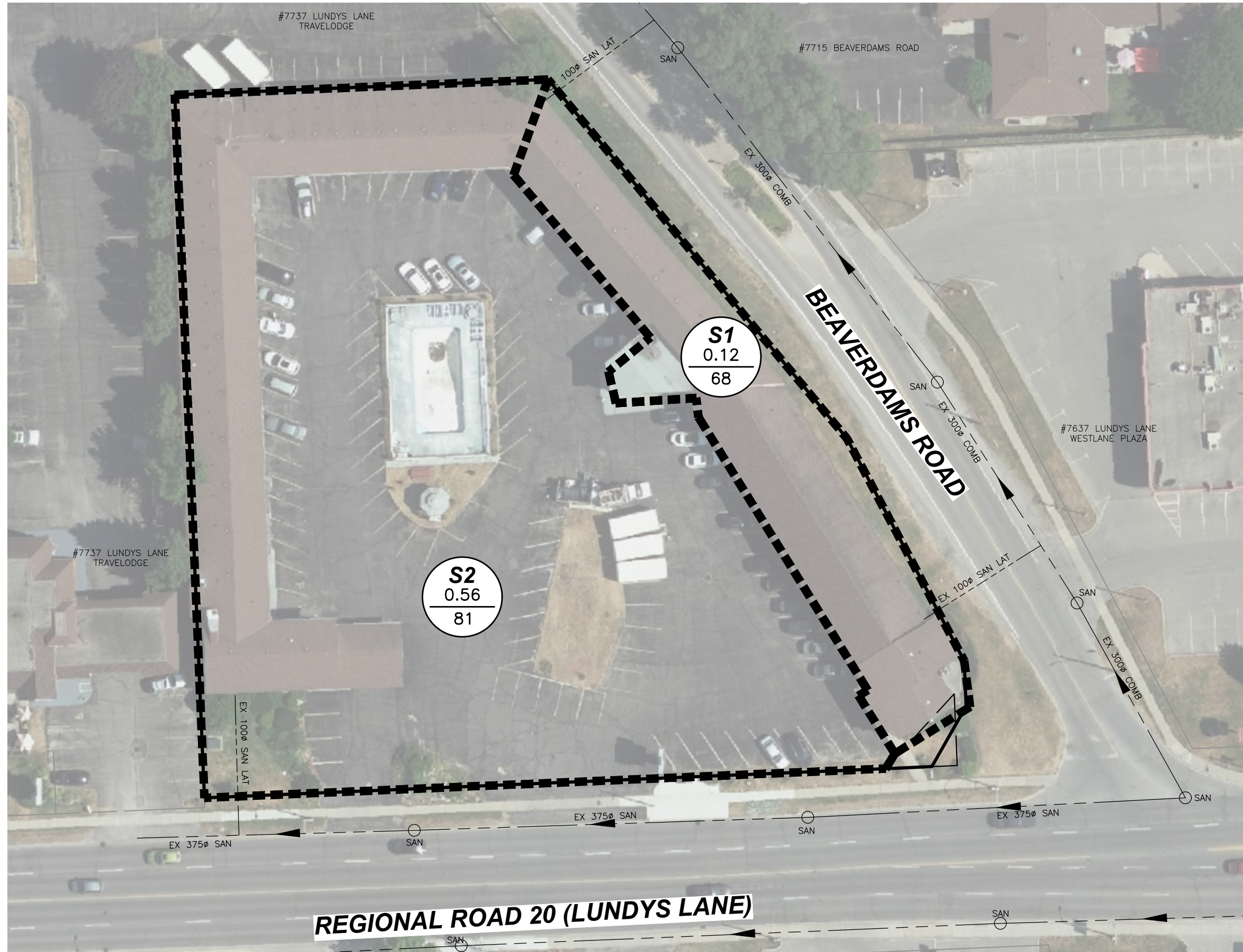
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APPENDIX B

Figure 1 – Existing Sanitary Drainage Area Plan

Figure 2 – Proposed Sanitary Drainage Area Plan

Sanitary Sewer Design Sheet



7701 LUNDY'S LANE NIAGARA FALLS EXISTING SANITARY DRAINAGE AREA PLAN



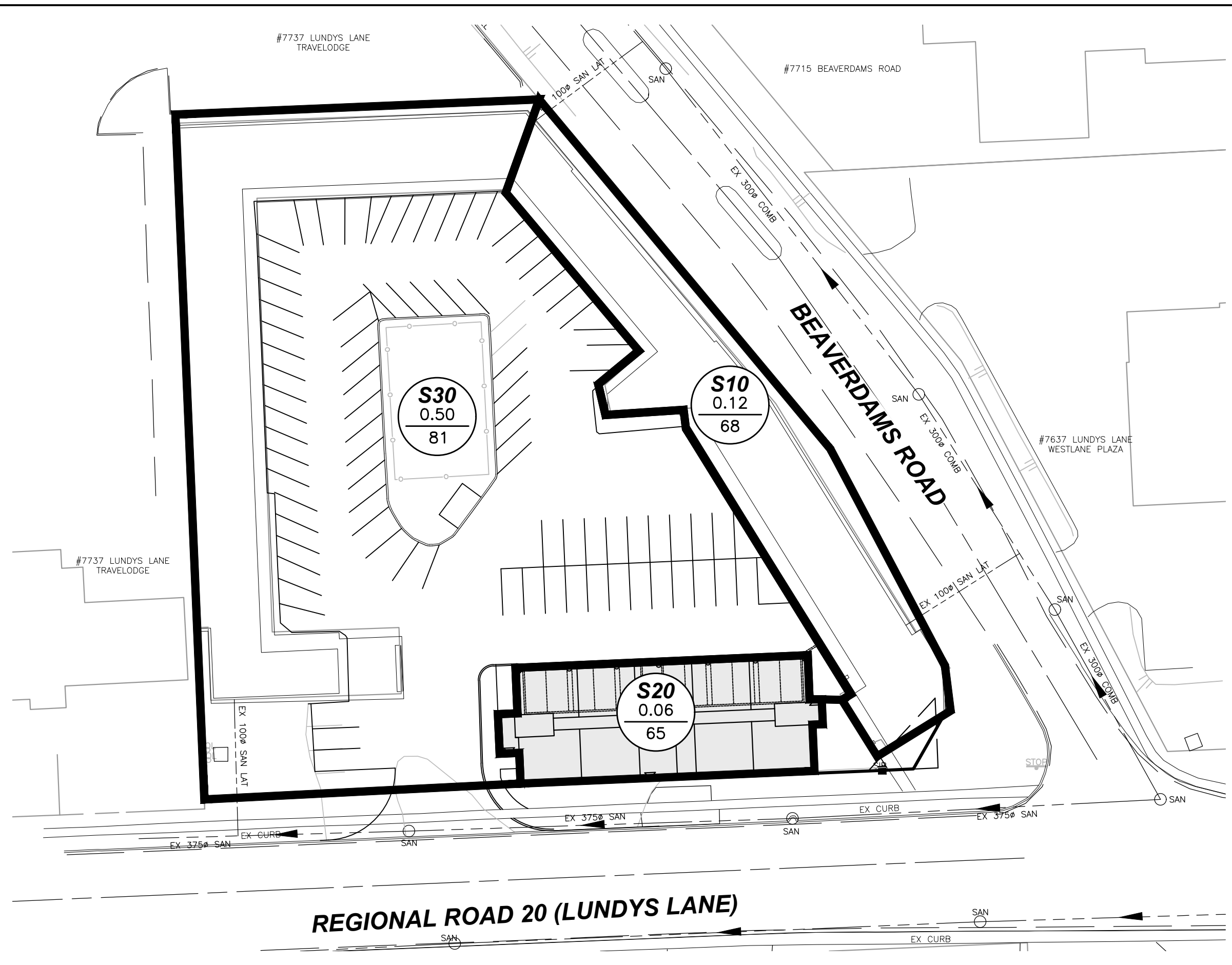
LEGEND

A0	DRAINAGE AREA NUMBER
0.00	DRAINAGE AREA IN HECTARES
00	POPULATION
■■■■	DRAINAGE AREA BOUNDARY



DATE	2024-05-28
SCALE	1:500 m
REF No.	.
DWG No.	FIGURE 1

7701 LUNDY'S LANE NIAGARA FALLS FUTURE SANITARY DRAINAGE AREA PLAN



LEGEND

	DRAINAGE AREA NUMBER
	DRAINAGE AREA IN HECTARES
	POPULATION
	DRAINAGE AREA BOUNDARY



DATE 2024-05-28

SCALE 1:500 m

REF No.

DWG No. **FIGURE 2**

UPPER CANADA CONSULTANTS
3-30 HANNOVER DRIVE
ST.CATHARINES, ONTARIO
L2W 1A3

DESIGN FLOWS

RESIDENTIAL: 255 LITRES/PERSON/DAY (AVERAGE DAILY FLOW)
 INFILTRATION RATE: 0.286 L / s / ha (M.O.E FLOW ALLOWANCE IS BETWEEN 0.10 & 0.28 L / s / ha)
 POPULATION DENSITY (EXISTING): 1.55 PERSONS / MOTEL UNIT
 POPULATION DENSITY (PROPOSED): 1.10 PERSONS / APARTMENT UNIT
 COMMERCIAL (MOTEL): 200 L / Day / Bed (MECP)
 COMMERCIAL PEAKING FACTOR: 2.0

SEWER DESIGN

PIPE ROUGHNESS: 0.013 FOR MANNING'S EQUATION
 PIPE SIZES: 1.016 IMPERIAL EQUIVALENT FACTOR
 PERCENT FULL: TOTAL PEAK FLOW / CAPACITY

MUNICIPALITY: NIAGARA FALLS

PROJECT : 7701 LUNDY'S LANE

PROJECT NO: 23141

Peaking Factor= $M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = design population in thousands

LOCATION							RESIDEN TIAL	COMMER CIAL			DESIGN FLOW					
Location and Description	From M.H	To M.H.	Increment (hectares)	Number of Units	Population Increment	Peaking Factor	Flow (L/s)	Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)	Pipe Diameter (mm)	Pipe Length (m)	Pipe Slope (%)	Full Flow Velocity (m/s)	Full Flow Capacity (L/s)	Percent Full
PRE-DEVELOPMENT CONDITIONS																
S1 - BEAVERDAMS RD	SITE	EX	0.12	44	68	2.00		0.20	0.03	0.24	300	53.3	1.10	1.45	105.81	0.2%
S2 - LUNDY'S LANE	SITE	EX	0.56	52	81	2.00		0.24	0.16	0.40	375	77.4	0.61	1.25	142.86	0.3%
POST-DEVELOPMENT CONDITIONS																
S10 - BEAVERDAMS RD	SITE	EX	0.12	44	48	4.00	0.57		0.03	0.61	300	53.3	1.10	1.45	105.81	0.6%
S20 - LUNDY'S LANE	SITE	EX	0.06	42	46	4.00	0.55		0.02	0.56	375	49.5	0.60	1.24	141.68	0.4%
S30 - LUNDY'S LANE	SITE	EX	0.50	52	57	4.00	0.68		0.14	1.38	375	77.4	0.61	1.25	142.86	1.0%