



November 14, 2024

Our File: 24-6034

Shamim Begum, M.Eng., P.Eng.
Development Engineer
City of Edmonton
10111 104 Avenue NW
Edmonton, Alberta
T5J 0J4

Attention: Ms. Shamim Begum

Re: Servicing report to support the rezoning of 11630 87 Avenue, with 8715 and 8719 117 Street

Introduction

Aplin Martin was retained by Westrich Pacific Corporation to provide a drainage servicing report to support the rezoning application for two parcels: the first is located at 11630 87 Avenue, to be referred to as the South Lot; the other property is located directly adjacent to the north at 8715 and 8719, referred to as the North Lot. Both properties are in the Windsor Park neighbourhood in Edmonton.

There is currently a lane between the two properties, and it is the client's intention to relocate the lane to the north. This report will assume that this lane closure and relocation has occurred, include a brief analysis of the change to the lane servicing connections, and will analyze the servicing for the proposed lot configuration. The file planner with the city has requested that we proceed with our analysis assuming no consolidation, therefore this report will evaluate the lots individually with separate servicing.

The south lot is currently zoned CN and is occupied by a single-storey commercial building and parking lot. The north lot is single family homes. The proposed zoning for both lots is MU to support high-density residential with some commercial frontage.

The following is a summary of the sanitary and storm servicing requirements for the sites.

Existing Conditions

The north lot is currently occupied by two single family homes with individual storm services to the main in 117 Street and sanitary services connecting to the sanitary main in the lane to the south and east of the properties.

The south lot has multiple existing service connections. There are three separate 150mm sanitary services along the east edge of the property, all connecting into a 200mm main in the lane to the



east. The existing building likely connects to one or both of the services toward the north end of the property. The third service is assumed to not be in use.

There is a 200mm storm line coming into the site on the west side, approximately 10 meters north of the south edge of the property. This 200mm pipe extends east across most of the property and sits within a URW. There are two 150mm storm services connected to the 200mm pipe. The first is located near the centre of the property and connected to a catch-basin within the parking lot; the second is at the east end of the 200mm pipe within the URW and does not have a clear onsite connection point. The 200mm pipe drains to a manhole west of the property within 117 Street and the flow is directed north in a 250mm main. The existing site servicing is shown in Figure 1.

The lane closure will require the removal of a 200mm sanitary main and a 200mm storm main. The sanitary main has only one service connecting to the single family home to the north. Removal of this main will not affect any adjacent properties or services. The storm main connects a manhole with two catch basins located in the lane east of the site, as well as a service connection to the church to the east. This manhole will need to be reconnected to the system with the lane closure. A new connection to the existing 250mm main in 117 Street can be provided at the new lane alignment. This new line can traverse the new lane and extend south to connect to the existing manhole and catch basins. The proposed storm servicing is shown in Figure 2.

At minimum slope, a 250mm pipe has 31L/s capacity. The existing allowable discharge rate for the Church site was provided by the City as 10.7L/s, using 34.5% of the pipe capacity. With the lane relocation, the same total area will drain into the catch-basins, in a slightly different layout with the east-west lane relocated north. Flows from the 0.08 ha catchment area total 19.3L/s, bringing the 250mm pipe capacity used to 95%. The flow in the pipe is not expected to change from existing conditions as the area captured by the catch basins has not changed, and the proposed connection point is approximately 36m downstream from the existing connection point. The invert at the existing main connection point allows for minimum 2m cover on the proposed main to the existing manhole connection.

Sanitary Design

The north lot has two separate single-family lots. The City of Edmonton Terms of reference for Neighbourhood Structure Plans indicate 2.8 persons per single family lot. The peak dry weather flow (PDWF) is 0.0622L/s adding infiltration gives a total pre-development flow of 0.106L/s for the north lot. Calculations are summarized in the table below.

North Lot Existing Sanitary Flow Generation						
Population		Average Flow	PF	PDWF	I/I	Total Flow
p/unit	Pers.	(L/s)		L/s	L/s	L/s
2.8	5.6	4.366	4.366	0.062	0.043	0.106



In the south lot, the existing building has various commercial uses: a convenience store, diner, barber shop, and a bank. Using the commercial sanitary flow generation factors from the Edmonton design standards gives a peak dry weather flow (PDWF) of 3.95L/s. Adding the general infiltration allowance gives a total predevelopment rate of 4.01L/s. The existing sanitary main has a capacity of 20.76L/s, therefore the existing site is using approximately 19% of the pipe capacity. Detailed calculations below.

South Lot Existing Sanitary Flow Generation							
Commercial Use	Average Flow		Total Flow	PF	PDWF	I/I	Total Flow
	m ³ /day	L/s	L/s		L/s	L/s	L/s
Convenience Store	2	0.023	0.185	21.4	3.96	0.057	4.01
Diner	10	0.116					
Barber Shop	2	0.023					
Bank	2	0.023					

The proposed development with this rezoning will have a maximum of 278 units with some commercial frontage on the ground floor. The unit split between the lots is 38 units on the north lot and 240 on the south lot. The proposed MU zone calls for an average commercial flow generation of 60m³/day/ha. Peak design flows are summarized in the table below, with detailed calculations attached.

Proposed Sanitary Flow Generation		
	North Lot	South Lot
Peak commercial flow	2.679	3.422
Peak residential flow	0.503	2.640
I/I	0.043	0.057
Total	3.225	6.119
Increase	3.119	2.109
Receiving main cap. used	16%	29%

All units L/s unless otherwise indicated

The proposed sanitary flows account for a significant portion of the receiving pipe capacity, therefore further analysis was conducted. Upstream from the site is a stub at the north end of a University of Alberta residence complex. John Parks with the University of Alberta confirmed that a significant portion of the block of university properties to the south of the site have sanitary connections to the 200mm main in the lane east of our site. EPCOR Modelling was requested to conduct a hydraulic assessment of the sanitary system and found that the existing main has adequate capacity for the proposed sanitary flows. Correspondence regarding the modelling inputs and results are attached. Proposed sanitary service connection and flows are shown in

Figure 2 attached. The north lot can use the 200mm sanitary stub at the southeast corner of the site and the south lot can reuse the existing 150mm service on the east edge of the site.

Storm Design

The storm runoff from both sites is assumed to be uncontrolled under pre-development conditions. The north site can use the 200mm main stub at the southwest corner of the site as its service connection. Downstream from this connection point is a 250mm pipe at 0.46%, with a capacity of 40L/s.

The existing 200mm storm service line within the URW can be used as the ultimate service connection for the south lot. The section of the 200mm line extending into the site will be removed to allow for the building to be constructed and a new service connection can be made where the line meets the west property line. The condition and suitability of the existing line will need to be confirmed at detailed design. Once the flow enters the system it travels north toward 89 Avenue. The first pipe the flow enters is 250mm at 0.25% slope, however the next downstream pipe has a lesser slope of 0.20%. The second pipe is used to determine the capacity restraints for the south lot. The proposed connection point, as well as offsite pipe information are shown in Figure 2.

Existing runoff for the 5 year and 100 year frequency storms were calculated to determine pre-development flow conditions. The north lot has a runoff coefficient of 0.60 due to the large yard greenspaces. The south lot has a runoff coefficient of 0.95, due to the majority of the site being covered by impervious surfaces. Runoff values are shown in the table below:

Storm Frequency	North Lot	South Lot
5 year	23.5L/s	49.4L/s
100 year	58.0L/s	97.6L/s

Detailed pre-development runoff calculations are attached.

North Lot Post-Development

Applying the standard controlled release rate of 35L/s/ha to the 0.15ha site, the allowable release rate for this development will be 5.4L/s. This is a 77 percent reduction in the predevelopment 5-year flow; however the reduced flow still accounts for too much of the existing infrastructure capacity. The onsite flow will be further reduced to accommodate the offsite capacity constraints. Post-development storm flow options are summarized in the table below:



Release Rate (L/s/ha)	Flow Rate (L/s)	Decrease from 5 year runoff	Capacity used of receiving storm main	Storage Required (1 in 100 year) (m ³)
35	5.4	77.0%	13%	60
25	3.9	83.4%	10%	69
20	3.1	86.8%	8%	76
12	1.9	91.9%	5%	91

Detailed calculations are attached.

The north lot runoff will be reduced to 25L/s/ha, or 3.9L/s. The flow in excess of this rate will require 69m³ of storage, to be provided onsite.

South Lot Post-Development

Applying the standard controlled release rate of 35L/s/ha to the 0.20ha site, the allowable release rate for this development will be 7.17L/s. This is an 85 percent reduction in the predevelopment 5-year flow, however the existing infrastructure is undersized compared to current standards so the onsite flow will be further reduced. Post-development storm flow options are summarized in the table below:

Release Rate (L/s/ha)	Flow Rate (L/s)	Decrease from 5 year runoff	Capacity used of receiving storm main	Storage Required (1 in 100 year) (m ³)
35	7.2	85.4%	27%	79
20	4.1	91.7%	15%	100
12	2.5	94.9%	9%	121
6.5	1.3	97.4%	5%	137

The release rate of 12L/s/ha is proposed to reduce the flow to 2.5L/s. To achieve the reduced runoff rate, an orifice will be applied and 121m³ of storage will be provided onsite. This provides capacity for excess runoff of storms up to the 100-year frequency. Detailed post-development and storage calculations are attached.

This proposed storm flows were evaluated by EPCOR Modelling and determined to be an adequate runoff reduction.

The site will mostly be covered by the proposed building, with minimal soft landscaping. Any overland flows not captured by the roof, such as on access points and walkways surrounding the building, will be directed away from the building.

Sanitary and storm flows should be re-evaluated at detailed design based on final site plans and statistics.

We trust that this provides the necessary information, should you have any questions or concerns please don't hesitate to contact us.



APLIN MARTIN

Yours truly,

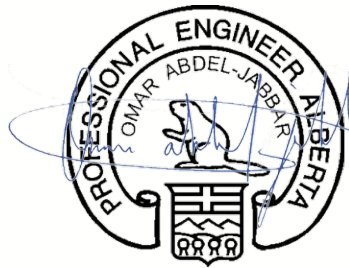
APLIN & MARTIN CONSULTANTS LTD.

Report prepared by:

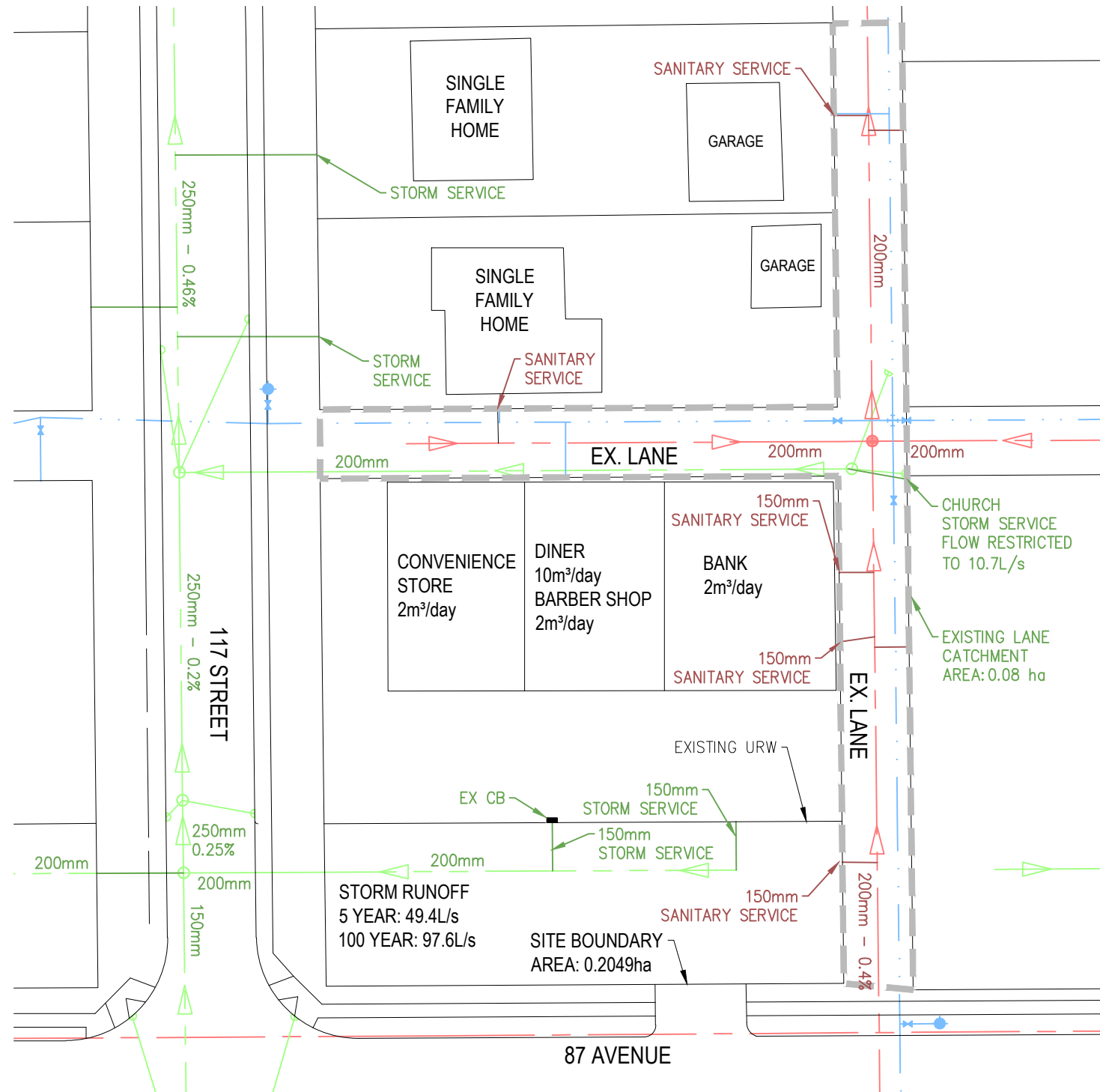
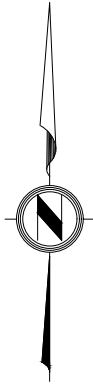
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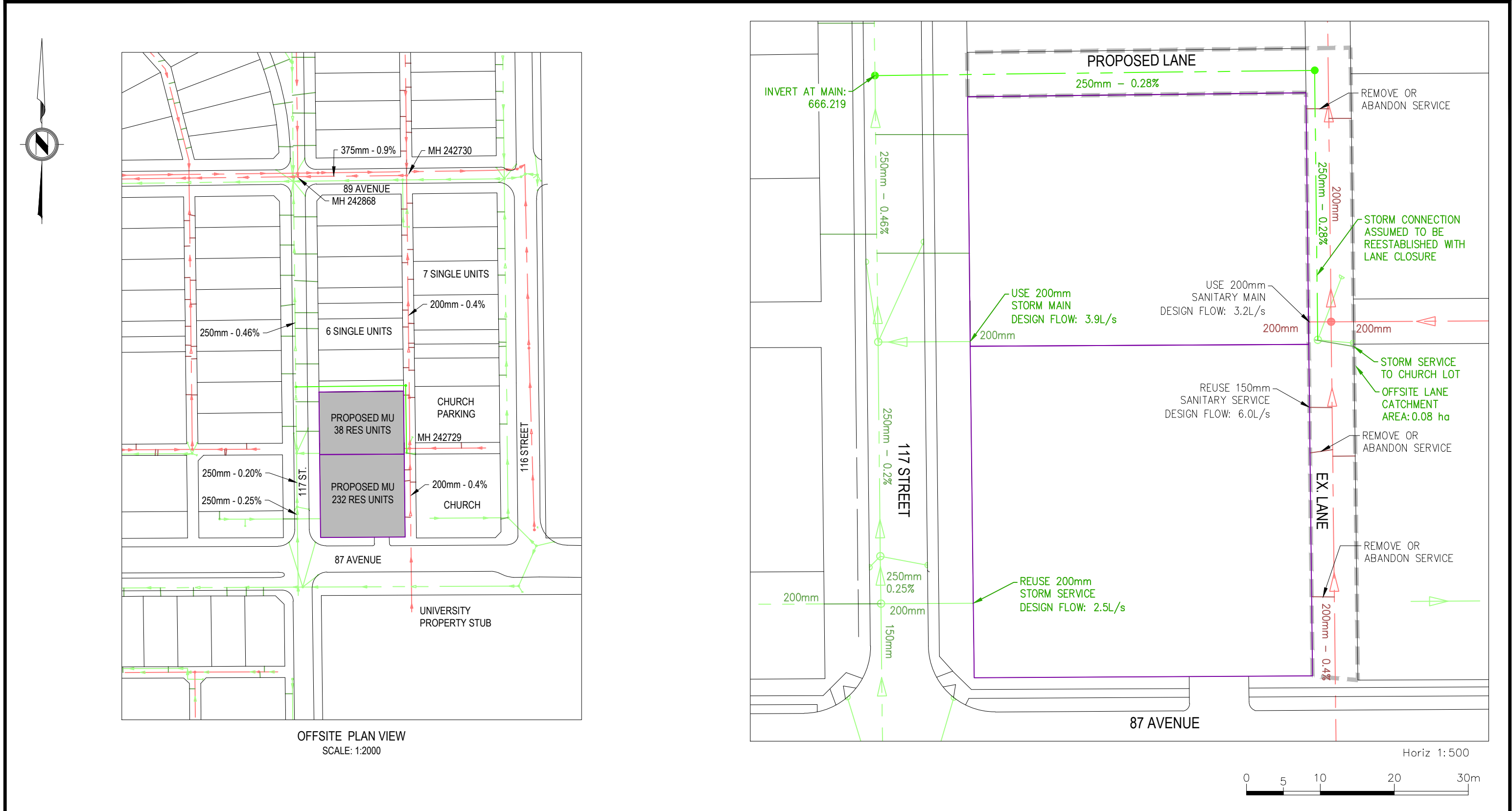
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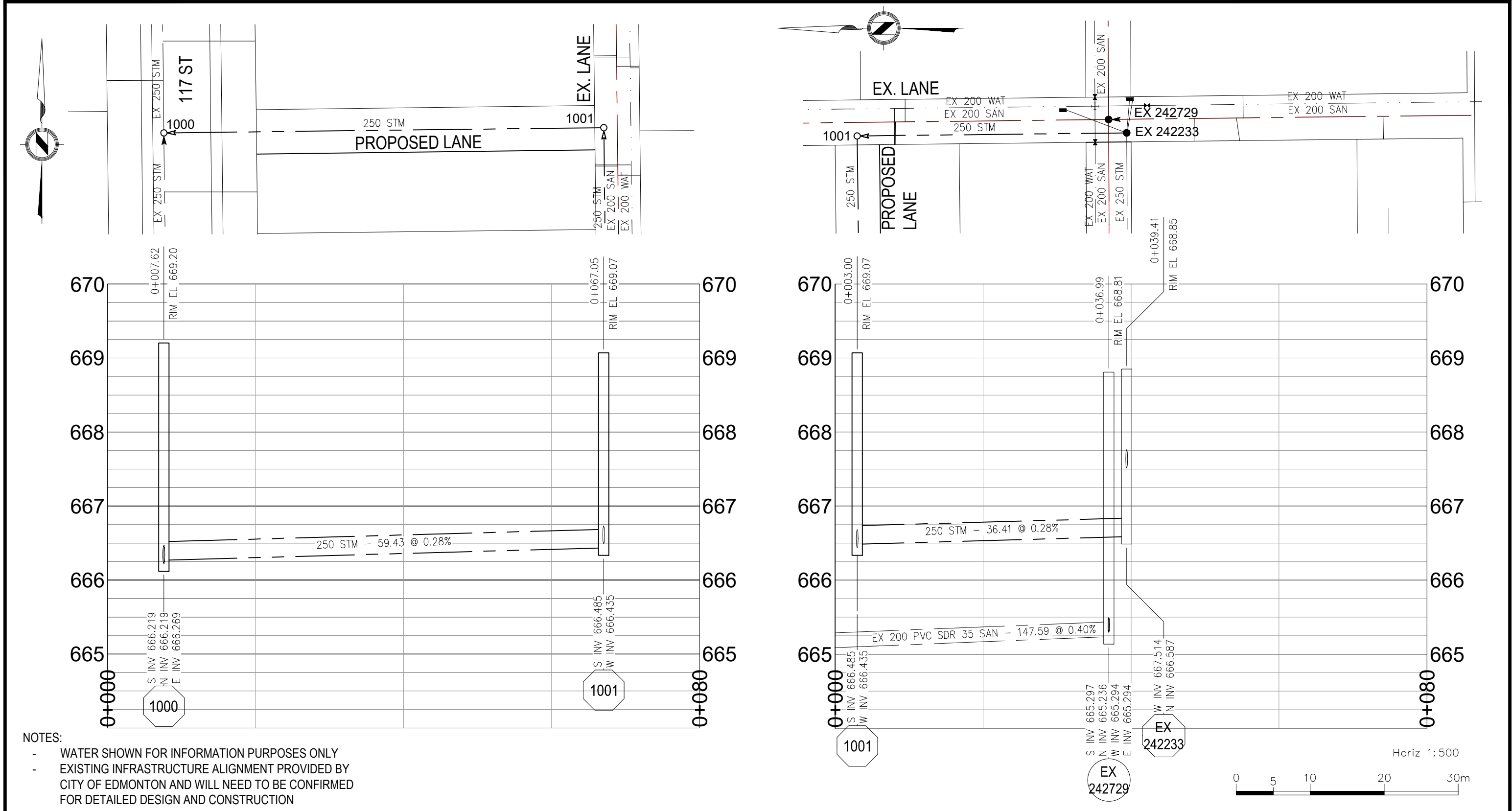
- NOTES:
- WATER SHOWN FOR INFORMATION PURPOSES ONLY
 - EXISTING INFRASTRUCTURE ALIGNMENT PROVIDED BY CITY OF EDMONTON AND WILL NEED TO BE CONFIRMED FOR DETAILED DESIGN AND CONSTRUCTION



					 APLIN MARTIN Aplin & Martin Consultants Ltd. 606 - 10117 Jasper Avenue, Edmonton, A.B. T5J 1W8 Tel: (780) 670-2644 www.aplinmartin.com	PROJECT		WINDSOR PARK SITE 6		DESIGN --	DATE 2024-11-13	SCALE 1:500		
							DRAWING		SERVICING EXISTING CONDITIONS		DRAWN MN	PROJECT NO. 24-6034		
											CHECKED --	DRAWING NO		REV
											APPROVED --	1		2
REV	DATE	DESCRIPTION			BY	APP								



					APLIN MARTIN Aplin & Martin Consultants Ltd. 606 - 10117 Jasper Avenue, Edmonton, A.B. T5J 1W8 Tel: (780) 670-2644 www.aplinmartin.com	PROJECT	WINDSOR PARK SITE 6	DESIGN --	DATE 2024-11-13	SCALE 1:500	
						DRAWN MN		PROJECT NO. 24-6034			
						DRAWING	PROPOSED SERVICING	CHECKED --	DRAWING NO 2		REV 4
								APPROVED --			
REV	DATE	DESCRIPTION				BY	APP				



NOTES:

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					 APLIN MARTIN Aplin & Martin Consultants Ltd. 606 - 10117 Jasper Avenue, Edmonton, A.B. T5J 1W8 Tel: (780) 670-2644 www.aplinmartin.com	PROJECT	WINDSOR PARK SITE 6	DESIGN MN	DATE 2024-10-10	SCALE		
								1:500 1:50				
							DRAWING	PROPOSED SERVICING PLAN AND PROFILE	DRAWN KCB	PROJECT NO. 24-6034	DRAWING NO 3	REV 1
									CHECKED --			
REV	DATE	DESCRIPTION				BY	APP		APPROVED --			

SANITARY SEWER FLOWS	
Project:	Windsor Site 6
Job No:	24-6034

Dsgn:	MN
Chkd:	OAJ
Date:	Wednesday, September 4, 2024

MU COMMERCIAL FLOW =

60 m3/ha/day

RESIDENTIAL FLOW =

220 L/d/person

AVG. COMMERCIAL FLOW =

0.23 L/s/ha

AVG. INDUSTRIAL FLOW =

0.23 L/s/ha

EXTRANEOUS FLOW=

0.28 L/s/ha



						PEAK FLOW CALCULATIONS								PIPE INFORMATION							
ZONING RES	ZONING COM	CONTRIBUTING AREA	UNITS	FLOW GEN	POPULATION		BASE FLOW (L/s)		PEAKING FACTOR		PEAK FLOW	I / I TOTAL	DESIGN FLOW	REQUIRED CAPACITY	PIPE DIAMETER	SLOPE	CAPACITY	CAPACITY USED	FULL VELOCITY	DESIGN VELOCITY	
					NEW	TOTAL	RESIDENTIAL	COM/IND FLOW	USE												
		(ha)	EACH	(m³/day)	PERSONS	PERSONS	TOTAL	TOTAL	COM / IND	RESIDENT.	(L/s)	(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	(%)	(m/s)	(m/s)	
North Lot																					
RA9		0.1543	38		57	57	0.145		3.46	0.503	0.043										
	MU			9.258				0.107	25.00	2.679			3.225	3.75	150	1.00	15.24	21%	0.862	0.683	
South Lot																					
RA9		0.2049	240		360	360	0.917		2.88	2.640	0.057										
	MU			12.294				0.142	24.05	3.422			6.119	7.11	150	1.00	15.24	40%	0.862	0.815	
						N LOT FLOW OFFSITE: 3.22 200 0.40 20.76 16% 0.660 0.480															
						S LOT FLOW OFFSITE: 6.12 200 0.40 20.76 29% 0.660 0.575															

Storm Runoff Calculations

Rational Method



Project: Windsor Site 6

File No.: 24-6034

Date: 9/4/2024

Completed by: M. Nasedkin

Pre-Development - North Lot		
Return Freq.	5	100
C	0.6	0.6
Modified C	0.6	0.75
I	91.37495	180.573
a	587.05	1290.08
b	6.56	8.76
c	0.76	0.75
t	5	5
A	0.1543	0.1543
Q	0.023499	0.058047

m³/s

$$Q = CIA/360$$

Q - discharge (m³/s)

C - runoff coefficient

I - rainfall intensity (mm/hr)

$$I = a/(t+b)^c$$

a,b,c From IDF Paramaters

t - design inlet time (min)

Note: apply runoff coefficient modification factor of:

- 1.1 For return period above 25 up to 50 Year
- 1.2 For return period above 10 up to 25 Year
- 1.25 For return period above 50 year

Storm Runoff Calculations

Rational Method



Project: Windsor Site 6

File No.: 24-6034

Date: 9/4/2024

Completed by: M. Nasedkin

Pre-Development - South Lot		
Return Freq.	5	100
C	0.95	0.95
Modified C	0.95	0.95
I	91.37495	180.573
a	587.05	1290.08
b	6.56	8.76
c	0.76	0.75
t	5	5
A	0.2049	0.2049
Q	0.049407	0.097637

m³/s

$$Q = CIA/360$$

Q - discharge (m³/s)

C - runoff coefficient

I - rainfall intensity (mm/hr)

$$I = a/(t+b)^c$$

a,b,c From IDF Paramaters

t - design inlet time (min)

Note: apply runoff coefficient modification factor of:

- 1.1 For return period above 25 up to 50 Year
- 1.2 For return period above 10 up to 25 Year
- 1.25 For return period above 50 year

STORM SEWER MINOR SYSTEM	
Project:	Windsor Site 6
Job No:	24-6034



Dsgn:	MN
Chkd:	OAJ
Date:	11/13/2024

IDF CURVE PARAMETERS

a 587.05
c 6.56
b 0.76

PIPE ROUGHNESS COEF. n = 0.013
RETURN PERIOD = 5 Year

AREA						RAINFALL								PIPE INFORMATION					
LOT	ADDED AREA (ha)	TOTAL AREA (ha)	C	CA	TOTAL CA	INITIAL TIME (min)	TIME IN PIPE (min)	TOTAL TIME (min)	Int. (mm/hr)	UNCONTR. FLOW (m³/s)	CONTROL FLOW (m³/s)	ALLOWED RELEASE (m³/s/ha)	DESIGN FLOW (m³/s)	SIZE (mm)	SLOPE (%)	CAPACITY (m³/s)	USED CAPACITY (%)	FULL VELOCITY (m/s)	DESIGN VELOCITY (m/s)
LANE	0.0800	0.08	0.95	0.08	0.08	5.00	0.95	5.95	91.37	0.0193	0.0107	0.250	0.0300	250	0.28	0.031	95%	0.64	0.729
						5.95	1.55	7.49	86.07	0.0182	0.0107	0.000	0.0289	250	0.28	0.031	92%	0.64	0.726
North	0.1543	0.15	0.60	0.09	0.09	5.00	1.60	6.60	91.37	0.0235		0.035	0.0054	200	1.00	0.033	16%	1.04	0.771
													0.0039	200	1.00	0.033	12%	1.04	0.705
													0.0031	200	1.00	0.033	9%	1.04	0.658
													0.0019	200	1.00	0.033	6%	1.04	0.564
													0.0010	200	1.00	0.033	3%	1.04	0.468
												0.035	0.0054	250	0.46	0.040	13%	0.82	0.577
													0.0039	250	0.46	0.040	10%	0.82	0.521
													0.0031	250	0.46	0.040	8%	0.82	0.487
													0.0019	250	0.46	0.040	5%	0.82	0.417
													0.0010	250	0.46	0.040	2%	0.82	0.346
South	0.2049	0.20	0.95	0.19	0.19	5.00	1.60	6.60	91.37	0.0494		0.012	0.0019	250	0.46	0.040	5%	0.82	0.417
													0.0072	200	1.00	0.033	22%	1.04	0.835
													0.0041	200	1.00	0.033	12%	1.04	0.718
													0.0025	200	1.00	0.033	7%	1.04	0.615
													0.0013	200	1.00	0.033	4%	1.04	0.510
												0.035	0.0072	250	0.20	0.027	27%	0.54	0.460
													0.0041	250	0.20	0.027	15%	0.54	0.393
													0.0025	250	0.20	0.027	9%	0.54	0.340
													0.0013	250	0.20	0.027	5%	0.54	0.282
													0.0025	250	0.46	0.040	6%	0.82	0.454



Project : Windsor Site 6

Date: 4-Sep-24

Area **0.154** ha
 Runoff Coeff. **0.95**
 Outlet Rate **0.0039** cms
 Outlet Rate/ha **0.025** cms/ha

Req'd Storage
Storm Event Volume (m³)

1:2 Year	12
1:5 Year	22
1:10 Year	30
1:25 Year	43
1:50 Year	54
1:100 Year	69
1:100 24 H	39
1937	31
1978	80
1988	11

1. Runoff Coefficient has been increased by 10% (to a maximum of 0.95) for events above the 1:10 Year.
2. Runoff Coefficient has been increased by 20% (to a maximum of 0.95) for events above the 1:25 year.
3. Runoff Coefficient has been increased by 25% (to a maximum of 0.95) for events above the 1:50 year, including the historical rainfall events.



Project : Windsor Site 6

Date: 4-Sep-24

Area **0.205** ha
 Runoff Coeff. **0.95**
 Outlet Rate **0.0025** cms
 Outlet Rate/ha **0.012** cms/ha

Req'd Storage
Storm Event Volume (m³)

1:2 Year	24
1:5 Year	40
1:10 Year	54
1:25 Year	75
1:50 Year	95
1:100 Year	121
1:100 24 H	113
1937	75
1978	145
1988	22

1. Runoff Coefficient has been increased by 10% (to a maximum of 0.95) for events above the 1:10 Year.
2. Runoff Coefficient has been increased by 20% (to a maximum of 0.95) for events above the 1:25 year.
3. Runoff Coefficient has been increased by 25% (to a maximum of 0.95) for events above the 1:50 year, including the historical rainfall events.