

STORMWATER MANAGEMENT REPORT

**PROPOSED SUBDIVISION AT 120 FAIRVIEW ROAD WEST
IN THE CITY OF MISSISSAUGA**

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STORMWATER MANAGEMENT REPORT
120 FAIRVIEW ROAD WEST, MISSISSAUGA, ON L5B 1K6

INTRODUCTION

In support of the Building Permit Application for the proposed subdivision at 120 Fairview Road West in the City of Mississauga, we herewith submit the following Stormwater Management Report.

The Stormwater Management Report has been undertaken to ensure that the proposed development can be constructed without any adverse impact to the surroundings and existing storm drainage and runoff patterns can be maintained.

The subject property is located south of Central Pkwy West and east of Joan Drive on the south side of Fairview Road West in the City of Mississauga in the Region of Peel as shown on the Key Plan.

The site's drainage is currently split draining to Fairview Road West and Sir Antonio Drive. The stormwater for the area will be controlled with storm pipe, rain barrel and enhanced grass swale.

The proposed area will consist of 0.1104 ha of building, 0.0740 ha of impermeable, 0.0319 ha of permeable and 0.1443 ha of landscaped area. The property will be graded and controlled to drain towards proposed catchbasins.

PREDEVELOPMENT CONDITION:

Drainage area towards Fairview Road West and Sir Antonio Drive

Existing Building area	= 382 m ²
Existing Impermeable area	= 336 m ²
Existing Grass area	= 2888 m ²
Total drainage area	= 3606 m ²

Composite runoff coefficient = **0.55**
(City of Mississauga Development requirement)

The 2-year pre-development peak flow

City of Mississauga 2 year rainfall intensity = 59.89 mm/hr

$$Q_{2\text{yr pre}} = 0.00278 \times 0.55 \times 59.89 \times 0.3606$$

$$= \mathbf{0.033 \text{ m}^3/\text{s}}$$

Allowed flow rate for development

Drainage area towards Fairview Road West and Sir Antonio Drive	0.033 m³/s
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POST-DEVELOPMENT CONDITION:

The drainage plan is shown figure 2. Drainage area #1-3 will be controlled and connected to the municipal storm sewer on Fairview Road West and Drainage area #6-7 will be controlled and connected to the municipal storm sewer on Sir Antonio Drive. The rear yard catchbasin is proposed to collect storm water. In addition, low impact development system is implemented. 2 No. of 55 gal rain barrels are proposed to each dwelling. One on each rear corner of the dwelling. And enhanced grass swale (CVC guideline) is proposed which provides 20% of runoff reduction.

DRAINAGE AREA (FREEHOLD LOTS)

DRAINAGE AREA DISCHARGE THROUGH THE STORMSEWER PIPE (ID#1 - ID#3)

ID#1: Drainage area collected by Catchbasin #1

	ID#1	Area	C
1	DWELLING #9 (RAIN BARREL #1)	45.18 m ²	0.9
2	DWELLING #9 (RAIN BARREL #2)	43.14 m ²	0.9
3	DWELLING #9	38.72 m ²	0.9
4	DWELLING #8 (RAIN BARREL #3)	41.55 m ²	0.9
5	DWELLING #7	24.76 m ²	0.9
6	GRASS	282.27 m ²	0.25

ID#1: Flow rate calculation collected by Catchbasin #1

duration	intensity	Q1	Q2	Q3	Q4	Q5	Q6	Qtotal	Q (20% reduction by enhanced grass swale)
15	140.69	0.001	0.001	0.001	0.001	0.001	0.003	0.009	0.007

ID#2: Drainage area collected by Catchbasin #2

	ID#2		C
1	DWELLING #8 (RAIN BARREL #4)	42.30 m ²	0.9
2	DWELLING #8	42.30 m ²	0.9
3	GRASS	125.53 m ²	0.25

ID#2: Flow rate calculation collected by Catchbasin #2

duration	intensity	Q1	Q2	Q3	Qttotal	Q (20% reduction by enhanced grass swale)
15	140.69	0.001	0.001	0.001	0.003	0.002

ID#3: Drainage area collected by Catchbasin #3

	ID#3		C
1	DWELLING #6 (RAIN BARREL #5)	31.25 m ²	0.9
2	DWELLING #6 (RAIN BARREL #6)	31.25 m ²	0.9
3	DWELLING #5 (RAIN BARREL #7)	31.25 m ²	0.9
4	DWELLING #5 (RAIN BARREL #8)	31.25 m ²	0.9
5	DWELLING #4 (RAIN BARREL #9)	31.25 m ²	0.9
6	DWELLING #4 (RAIN BARREL #10)	31.25 m ²	0.9
7	DWELLING #3 (RAIN BARREL #11)	32.64 m ²	0.9
8	DWELLING #3 (RAIN BARREL #12)	32.64 m ²	0.9
9	GRASS	322.15 m ²	0.25

ID#3: Flow rate calculation collected by Catchbasin #3

duration	intensity	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Qttotal	Q (20% reduction by enhanced grass swale)
15	140.69	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.010	0.008

DRAINAGE AREA THROUGH SHEET FLOW (ID#4 & ID#5)

The enhanced grass swale is provided to drainage area #4 and #5. The runoff from the dwelling and the grass area will be reduced by 20% from the enhanced grass swale.

ID#4: Uncontrolled drainage area drains to Sir Antonio Drive

	ID#4		C
1	DWELLING #7	32.75 m ²	0.9
2	DWELLING #6	57.52 m ²	0.9
3	DWELLING #5	57.52 m ²	0.9
4	DWELLING #4	59.69 m ²	0.9
5	PERMEABLE PAVE	160.00 m ²	0.5
6	IMPERMEABLE	14.39 m ²	0.9
7	GRASS	218.82 m ²	0.25

Flow rate from dwellings and grass area

Total dwelling areas = 207.48 m²

Grass area = 218.82 m²

Composite runoff coefficient = 0.57

City of Mississauga 100 year rainfall intensity = 140.69 mm/hr

$$Q = 0.00278 \times 0.57 \times 140.69 \times 0.0426$$

$$= \mathbf{0.009 \text{ m}^3/\text{s}}$$

$$Q_{20\% \text{ reduction}} = \mathbf{0.007 \text{ m}^3/\text{s}}$$

Flow rate from permeable pave and impermeable area

Total permeable pave areas = 160.00 m²

Total impermeable pave areas = 14.39 m²

Composite runoff coefficient = 0.53

$$Q = 0.00278 \times 0.53 \times 140.69 \times 0.0174$$

$$= \mathbf{0.004 \text{ m}^3/\text{s}}$$

$$Q_{ID\#4} = \mathbf{0.007 \text{ m}^3/\text{s} + 0.004 \text{ m}^3/\text{s}}$$

$$= \mathbf{0.011 \text{ m}^3/\text{s}}$$

ID#5: Uncontrolled drainage area drains to Fairview Road

	ID#5		C
1	DWELLING #8	49.60 m ²	0.9
2	DWELLING #7	40.93 m ²	0.9
3	PERMEABLE PAVE	80.76 m ²	0.5
4	IMPERMEABLE	13.53 m ²	0.9
5	GRASS	119.37 m ²	0.25

Flow rate from dwellings and grass area

Total dwelling areas = 90.53 m²

Grass area = 119.37 m²

Composite runoff coefficient = 0.53

$$Q = 0.00278 \times 0.53 \times 140.69 \times 0.0210$$

$$= \mathbf{0.004 \text{ m}^3/\text{s}}$$

$$Q_{20\% \text{ reduction}} = \mathbf{0.003 \text{ m}^3/\text{s}}$$

Flow rate from permeable pave and impermeable area

Total permeable pave areas = 80.76 m²

Total impermeable pave areas = 13.53 m²

Composite runoff coefficient = 0.56

$$Q = 0.00278 \times 0.56 \times 140.69 \times 0.0094$$

$$= \mathbf{0.002 \text{ m}^3/\text{s}}$$

$$Q_{ID\#5} = \mathbf{0.002 \text{ m}^3/\text{s} + 0.003 \text{ m}^3/\text{s}}$$

$$= \mathbf{0.005 \text{ m}^3/\text{s}}$$

DRAINAGE AREA (CONDOMINIUM)

DRAINAGE AREA DISCHARGE THROUGH THE STORMSEWER PIPE (ID#6 - ID#7)

ID#6: Drainage area collected by Catchbasin #4 & #5

	ID#6	Area	C
1	DWELLING #2 (RAIN BARREL #13)	35.54 m ²	0.9
2	DWELLING #2 (RAIN BARREL #14)	32.81 m ²	0.9
3	DWELLING #2	33.56 m ²	0.9
4	DWELLING #1 (RAIN BARREL #15)	35.54 m ²	0.9
5	DWELLING #1 (RAIN BARREL #16)	32.81 m ²	0.9
6	DWELLING #1	69.10 m ²	0.9
7	GRASS	438.17 m ²	0.25

ID#6: Flow rate calculation collected by Catchbasin #4 & #5

duration	intensity	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Qttotal	Q (20% reduction by enhanced grass swale)
15	140.69	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.012	0.010

ID#7: Drainage area collected by Catchbasin #6

	ID#2		C
1	DWELLING #2	35.54 m ²	0.9
2	PERMEABLE PAVE	104.52 m ²	0.5
3	IMPERMEABLE	458.11 m ²	0.9
4	GRASS	164.90 m ²	0.25

ID#7: Flow rate calculation collected by Catchbasin #6

duration	intensity	Q1	Q2	Q3	Q4	Qtotal
15	140.69	0.001	0.002	0.016	0.0016	0.021

Total 100 year post-development flow rate

FREEHOLD LOTS:

$$Q_{100\text{year post}} = 0.007 \text{ m}^3/\text{s} + 0.002 \text{ m}^3/\text{s} + 0.008 \text{ m}^3/\text{s} + 0.011 \text{ m}^3/\text{s} + 0.003 \text{ m}^3/\text{s}$$

$$= \mathbf{0.031 \text{ m}^3/\text{s}}$$

CONDOMINIUM:

$$Q_{100\text{year post}} = 0.010 \text{ m}^3/\text{s} + 0.021 \text{ m}^3/\text{s}$$

$$= \mathbf{0.031 \text{ m}^3/\text{s}}$$

Water Balance System

The City requires that the first 5mm of any rainfall shall be allowed to infiltrate into the ground or rainwater harvesting to improve water balance system. Therefore, rain barrel and enhanced grass swale have been proposed at the landscape spaces for rainwater harvesting.

Water Abstraction Quantities

Surface Type	Initial Abstraction (mm)	Runoff Coefficient	Area (ha)	Abstraction Volume (m ³)
Building	1	0.9	0.1104	1.10
Impermeable	1	0.9	0.0486	0.49
Permeable	5	0.5	0.0345	1.73
Landscape	5	0.25	0.1671	8.36
Total			0.3606	11.68

Total Area = 3606 m²

5mm (0.005m) Rain Fall volume for Total Area = 3606 m² X 0.005 m = 18.03 m³

Total Abstraction volume provided = 11.68 m³

Required recharge volume = 6.35 m³

Provided storage volume from rain barrels = 16 x 0.21 m³
= 3.36 m³

	Q _{ID#1}	Q _{ID#2}	Q _{ID#3}	Q _{ID#4}	Q _{ID#5}	Q _{ID#6}	Qtotal	Total Runoff volume
Without enhanced grass swale reduction	0.009	0.003	0.010	0.009	0.004	0.012	0.047	42.3
With enhanced grass swale reduction	0.007	0.002	0.008	0.007	0.003	0.010	0.037	33.3
Total reduced runoff volume								9.0

Reduced runoff volume captured by enhanced grass swale = 9.0 m³

Total rainwater harvesting volume = 9.0 m³ (> 6.35 m³)

EROSION AND SEDIMENT CONTROL

Access to the Site is via Sir Antonio Drive. A mud mat will be placed at the entrance to prevent transportations of the sediments off site. Sediment and erosion control measures shall be inspected regularly to ensure they are functioning properly.

Furthermore, as the site's runoff is conveyed via sheet flow, concentrated outflows are not expected to be a concern for this development. While we have provided recommendations herein for erosion and sediment control practices, it is crucial that the eventual Contractor understand that the erosion and sediment control measure design is considered a living practice, and additional measures may be required depending on site conditions and rainfall events during construction. Furthermore, it is crucial that these measures remain monitored and maintained throughout construction.

Conclusion and Recommendation

The preceding sections and the detailed design analysis appended herewith indicate that the proposed stormwater management system meets the City of Mississauga's requirements.

The discharge flow rate to the municipal road will be increased however, the addition of rain barrels and enhanced grass swale shall suffice to meet the water quantity requirements for a site of this nature.

Q_{allowed}	0.033 m³/s
$Q_{100 \text{ year post}}$	
Freehold Lots	0.031 m³/s
Condominium	0.031 m³/s

Required water balance recharge volume	18.03 m³
Provided recharge volume	24.04 m³

It is, therefore, recommended that this report be adopted for detailed design if the City of Mississauga finds the analysis noted herein, acceptable.

Land & Building Experts

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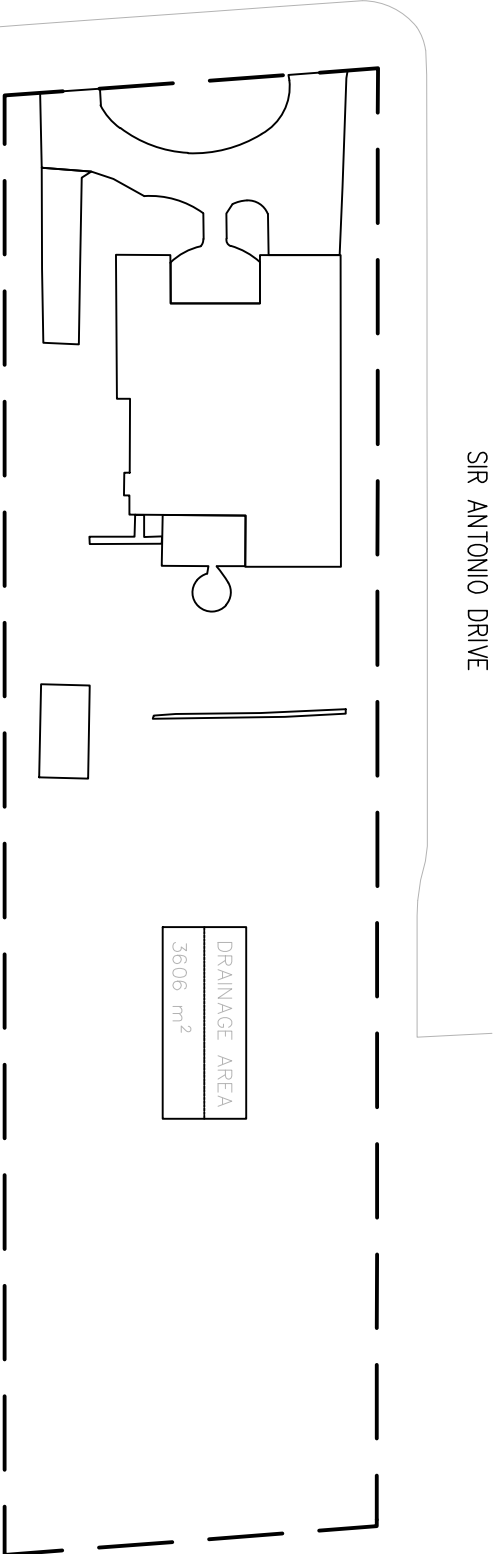
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March 05, 2024



FAIRVIEW ROAD WEST

SIR ANTONIO DRIVE



DRAINAGE AREA
3606 m ²

DRAINAGE AREA STATISTICS:

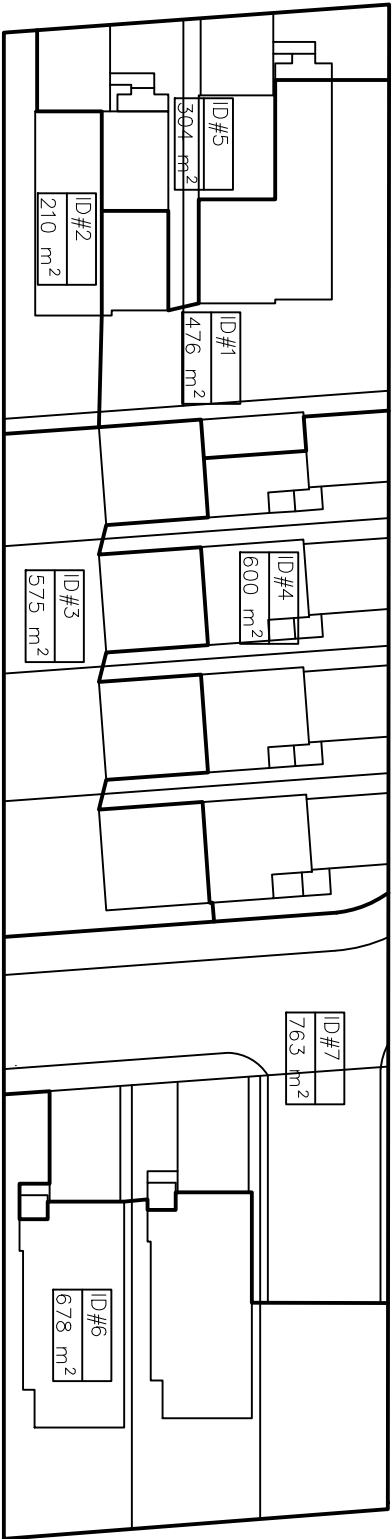
EXISTING BUILDING AREA	=	382 m ²
EXISTING IMPERMEABLE AREA	=	336 m ²
EXISTING GRASS AREA	=	2888 m ²
TOTAL DRAINAGE AREA	=	3606 m ²
COMPOSITE RUNOFF COEFFICIENT	=	0.55

FIGURE 1. PRE-DEVELOPMENT DRAINAGE AREAS

SCALE: N.T.S

FAIRVIEW ROAD WEST

SIR ANTONIO DRIVE



DRAINAGE AREA STATISTICS:

DRAINAGE AREA 1	=	476 m ²
DRAINAGE AREA 2	=	210 m ²
DRAINAGE AREA 3	=	575 m ²
DRAINAGE AREA 4	=	600 m ²
DRAINAGE AREA 5	=	304 m ²
DRAINAGE AREA 6	=	678 m ²
DRAINAGE AREA 7	=	763 m ²

TOTAL DRAINAGE AREA = 3606 m²

FIGURE 2. POST-DEVELOPMENT DRAINAGE AREAS

SCALE: N.T.S