SERVICING & STORM WATER MANAGEMENT REPORT

FOR

7198-7214 AIRPORT ROAD

MISSISSAUGA, ONTARIO

February 16, 2022

Prepared by:

JAIN

Jain Infrastructure Consultants Ltd.
7405 East Danbro Crescent, 2nd Floor
Mississauga, Ontario
L5N 6P8 , Canada
Tel: (905) 285-9900
Fax: (905) 567-5246

1.0 INTRODUCTION

The purpose of this report is to present the storm water management, connections for sanitary sewage disposal, water distribution, storm drainage and appropriate measures to mitigate the impact of runoff with the proposed development.

The project site has two development phases. Phase 1 contains the addition of two storeys residential development above existing single storey building. Phase 2 is the redevelopment of 4 storey residential units with parking area on two existing dwellings. This report depicts the stormwater management and functional services connection approach for the whole site.

The subject site is located south of Airport Road as shown in Figure 1.

Figure 1 - Site Location Plan

2.0 EXISTING SITE CONDITIONS

Currently the site has existing brick & concrete block building with asphalt parking area and two single residential dwellings. The existing site has piped drainage network and outlet towards the existing storm sewer on Beverley Street. The exsiting Phase 1 building has water and sanitary service connections and the same will be reused for two stoteys addition, whereas new connections are to be proposed for Phase 2 development.

The elevations on the site ranges from 169.60 m to 169.28 m that falls from north to south side.

3.0 PROPOSED DEVELOPMENT

The project site proposed for redevelopment has approximately 0.52 ha area which contains footprint of new building and existing building. The proposed development consists of a 4 storey townhouse block with parking area. The proposed finished floor elevations are shown on drawing C102.

4.0 EXISTING SERVICES & STORM SEWER CONNECTION

The details of existing services available on surrounding site streets are as follows;

- An existing 450 mm dia. storm sewer on on Beverley Street
- An existing 525 mm dia. sanitary sewer on on Airport Road
- An existing 250 mm dia. sanitary sewer on Beverley Street
- An existing 300 mm dia watermain on Airport Road
- An existing 200 mm dia watermain on Beverley Street

The existing 375 mm dia storm sewer, 200 mm dia. sanitary and 100 mm dia. watermain are also available within project site limit for service connections for Phase 2 development.

Refer Drawing C101 for location and details of existing services.

5.0 STORM WATER MANAGEMENT CRITERIA AND METHODOLOGY

The following SWM criteria is applicable for the site;

Quantity Control

Quantity control is pre to post development flows for all storms (2,5,10,25,50 & 100) year. Pre development run-off coefficient will be considered as R=0.50.

Quality Control
The Quality control to MOE Enhanced level (80% removal of suspended solids)

Erosion and Sediment Control during Construction
Adequate measures are to be implemented to minimize the transportation of sediments out of the construction area.

5.1 Quantity Control

The whole site is divided into four catchment areas. Area “A1” consists of parking. Area “A2” is the footprint of existing building. Area “A3” is footprint of proposed building. Area “A4” is landscape area at the south west limit that is flowing uncontrolled in pre and post development conditions.

Stormwater management controls are proposed for catchments areas “A1”, “A2” and “A3” (0.49 ha) considering development changes in proposed conditions.

The pre and post development land use and runoff coefficients are shown in Figure DR01 and DR02, Appendix A.

5.1.1 Pre and Post Development Runoff coefficients

The Pre and post development land use and runoff coefficients are shown in Table 5.1 & Table 5.2 below;

Table 5.1- PRE DEVELOPMENT LAND USE & RUNOFF COEFFICIENT

Proposed Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient
Asphalt/Concrete	0.20	0.90
Building	0.11	0.90
Landscsape	0.18	0.25
Overall	0.49	0.50*

**Pre development run-off coefficient is considered as 0.50 (maximum)*

Table 5.2- POST DEVELOPMENT LAND USE & RUNOFF COEFFICIENT

Proposed Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient
Asphalt/Concrete	0.25	0.90
Building	0.17	0.90
Landscape	0.07	0.25
Overall	0.49	0.81

Detailed breakdown of the land use and runoff coefficients during pre and post-development conditions are given in Table B1 & Table B2, Appendix B.

5.1.2 Pre & Post Development Flow Calculations & Onsite Storage

The Rainfall intensities shall be calculated in accordance with City of Mississauga IDF curves. The “Modified Rational Method” is used to estimate flows from the drainage areas.
The pre and post development flows are calculated in Table B3, Appendix B.

The pre and post development flows with onsite storage requirements for 2-100 year storms are summarized in Table 5.3 below.

Table 5.3- PRE/POST DEVELOPMENT FLOWS & REQUIRED STORAGE

Return Period (yrs)	Pre Development (liters/sec)	Post Development (liters/sec)	Storage Required (m^3)
2	40.41	65.76	25.40
5	54.32	88.40	34.14
10	66.91	108.89	42.06
25	76.84	125.06	48.30
50	85.78	139.60	53.77
100	94.92	154.48	59.20
100yr Post to5 yr Pre (Orifice Control)	50.40	154.48	95.16*

** Maximum Storage Required*

The maximum onsite storage volume of **95.16 m^3** is required to control 100-year post development flows to 5-year predevelopment flow through orifice control. The calculation of required onsite storage volume is given in Table B4, Appendix B.

The following onsite storage capacities are available;

- **Parking Storage:** 49.72 m^3 of parking detention with a 250 mm maximum storage depth for 100year rainfall event. (Refer Drawing C102)

- **Roof Storage -New Building:** 708 m^2 footprint will provide a storage volume of 18.18 m^3 storage with 95 mm maximum depth allowing a flow of 6 l/sec (Refer Table B5a, Appendix B).

- **Roof Storage -Ex. Building:** 967 m^2 footprint will provide a storage volume of 28.91 m^3 storage with 91 mm maximum depth allowing a flow of 6 l/sec (Refer Table B5b, Appendix B).

- **Storm Pipes/Catch basins/Manhole Storage:** 12.11 m^3 (Refer Table B6, Appendix B)

Therefore, a total **108.92 m^3** of onsite detention is available compared to the required storage of **95.16 m^3**.

5.1.3 Orifice Control

To ensure that 5-year predevelopment flow is released from the project area, a 125 mm diameter orifice pipe (rated capacity:50.40 l/sec) is proposed at storm manhole STM MH2. The orifice sizing calculations are attached as Table B7, Appendix B.

5.2 Quality Control

To address quality and spills control from site, an oil & grit separator is proposed at the storm manhole STMH1. The stormceptor sizing calculations are attached in Appendix "C". which shows that the Stormceptor Model EFO4 unit will treat the impervious area up to 80% TSS removal for Level 1 water quality protection.

5.3 Minor Storm Drainage

Storm sewer network from the redevelopment area is proposed to convey the site drainage and connect to the existing site storm network. (Refer drawing C101).

Minor Storm drainage network is designed for the 10-year storm event. The design sheet is attached as Table B8, Appendix B.

5.4 Major System Drainage

The overland flow will not impact the building since the grading of the site ensures storm flows greater than 100 years will be able to flow overland towards Beverley Street through the site without any impact to adjacent properties.

The overland flow route is shown on site grading drawing C102.

6.0 WATER

Phase 1 development contains addition of 10 residential units on top of existing retail units. The retail units have existing service connections which will be reused for the residential addition. Service connections for 8 townhouse unitsin Phase 2 fronting Beverley street are provided from the region's 200 mm dia. watermain. The remaining 8 townhouse units will be serviced from the proposed watermain loop as shown on Drawing C101.

The Region of Peel connection demand table is attached in Appendix D.

Water Demand Calculations

Phase 1 Addition:

Residential Units= 10

Occupancy = 2.7 Persons per unit

Population = 10 x 2.7 = 27 Persons

Phase 2 Addition:

Residential Units= 16

Occupancy = 2.7 Persons per unit

Population = 16 x 2.7 = 43 Persons

Total population = 70 persons

<u>Existing Retail Units</u>

Existing Retail Units Area = 967 m^2

Retail Occupancy = 9.3 persons/m^2

Retail Population = 967/9.3 = 104 Persons

Per capita commercial demand = 75 lpcd

Per capita residential demand = 280 lpcd

The total water demand is calculated as follows;

Average residential flow = 70 x 280 = 0.23 l/sec

Maximum residential day flow = 2.0 x 0.226 = 0.45 l/sec

Average commercial day flow = 104 x 75 = 0.09 l/sec

Maximum commercial day flow= 1.4 x 0.09 = 0.13 l/sec

Total Maximum day flow = 0.45 +0.13 = 0.58 l/sec

Peak demand = 3.0 x 0.226 + 3.0 x 0.09 = 0.96 l/sec

Fire Demand

Fire demand has been calculated as per Fire Under Writer Survey using the building construction, floor area and proximity to adjacent buildings. Fire flows are calculated for phase 1 (existing retail building with residential units addition) & phase 2 (Townhouse block) attached as Table D1 & D2, Appendix D.

Fire demand of 183 l/sec for phase 1 development is calculated as higher and considered for design flow.

Total Water Demand

The total water demand is calculated as Maximum daily demand + Fire demand = 0.58+183 = 183.58 l/sec.

A hydrant flow test on the existing city network will be carried out to confirm the available flows and pressure.

7.0 <u>SANITARY</u>

Phase 1 existing retail units have existing sanitry service connections which will be reused for the residential addition. Sanitary service connections for 8 townhouse units in Phase 2 fronting

Beverley street are provided from the region's 250 mm dia. sanitary sewer. The remaining 8 townhouse units will be serviced from the proposed 150 mm dia sanitary service as shown on Drawing C101.

The total sanitary flow is calculated as follows;

Per capita residential sanitary flow = 302.8 lpcd

Average residential sanitary flow = 70 x 302.8 = 0.245 l/sec

Per capita commercial sanitary flow = 75 lpcd

Average commercial sanitary flow = 104 x 75 = 0.09 l/sec

Total average sanitary flow = 0.245 + 0.09 = 0.335

Peak sanitary flow = 4.0 x 0.0335 = 1.34 l/sec

Inflitartion @ 0.2l/ha/sec = 0.2 x 0.52 = 0.104

Total sanitary flow = 1.34 + 0.104 = 1.45 l/sec

8.0 EROSION AND SEDIMENT CONTROL

An erosion and sediment control strategy will be implemented during the construction to mitigate the transportation of silt from the site. Drawing C103 shows silt fence and sediment control measures

To prevent construction-generated sediments from entering the storm sewer or leaving the site by overland flow, the following measures should be implemented with regular inspection and maintenance;

- Management of construction activities in a manner to minimize disturbed area and duration of soil disturbance;
- Provision of a mud mat construction access to minimize sediment on adjacent municipal road;
- Installation of drain inlet protection at each catch basin and storm manhole cover within the construction site and downstream of the construction access on the adjacent municipal road;
- Installation and maintenance of silt fences (OPSD 219.130 or equivalent) around the perimeter of any construction/disturbed areas;
- Periodically removal of sediments accumulated behind silt fences or sediment protection when 50% of its individual design capacity has been reached
- Dust control measures should be followed during construction.
- Erosion and sediment control practices to be decommissioned after paving, landscaping or other stabilization measures and restoration of disturbed areas have been completed.

9.0 CONCLUSIONS

- The post development flows (2-100-year storm) from the redevelopment area has been controlled to less than pre-development levels through orifice control using onsite detention and storage in storm network.
- Quality control is provided through provision of oil/grit stormceptor
- Overland flow route through the site ensures that major overland flows are safely carried through the site.
- Water & Sanitary Service connections are proposed for the new townhouse units from site services and city mains.
- Sediment and erosion control measures shall be implemented, such as the installation of mud mat, temporary silt fence and filter fabric at the existing catch basins.

Proposed site servicing, grading and erosion control plans are submitted separately as full size drawings with this report.

We trust you will find this submission complete and in order. Should you have any questions, please contact the undersigned.

Respectfully Submitted,
Jain Infrastructure Consultants Ltd.

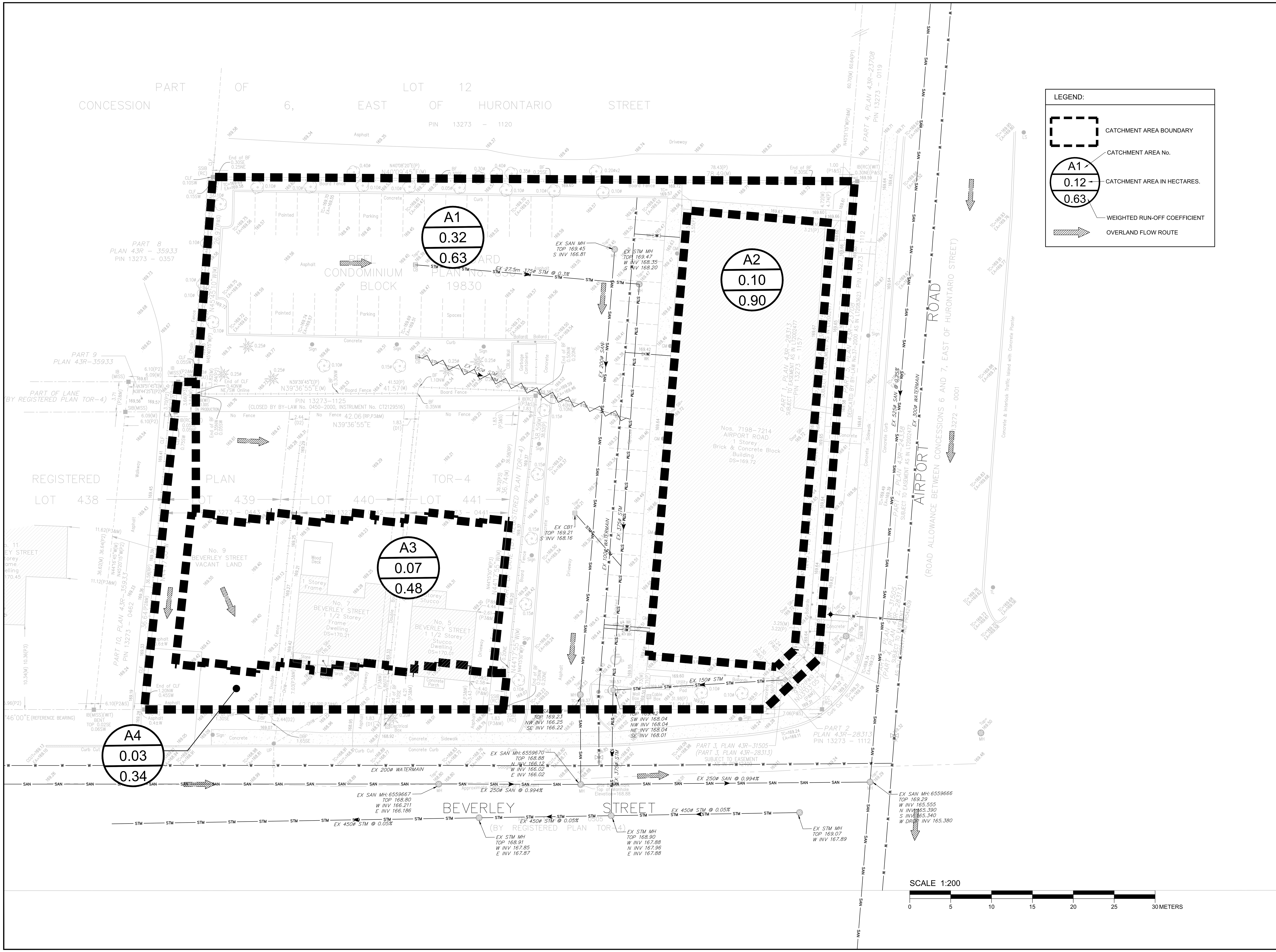
PROFESSIONAL ENGINEER
LICENSED
Y.AYUB
February 16, 2022
PROVINCE OF ONTARIO

Yasar Ayub, P. Eng.
February 16, 2022

Usman Arif
Project Designer
February 16, 2022

Appendix A

Figures



CLIENT:

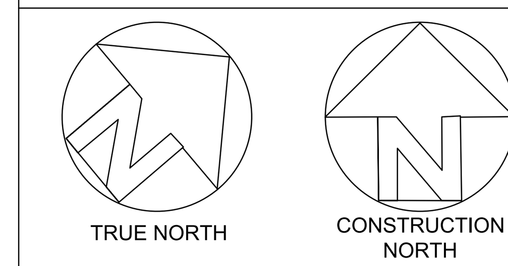
Arjun Kumar / 2182402 Ontario Inc.
28 Pinewood Trail, Mississauga ON
tel: (647) 990-4290
email: AKumar@live.ca

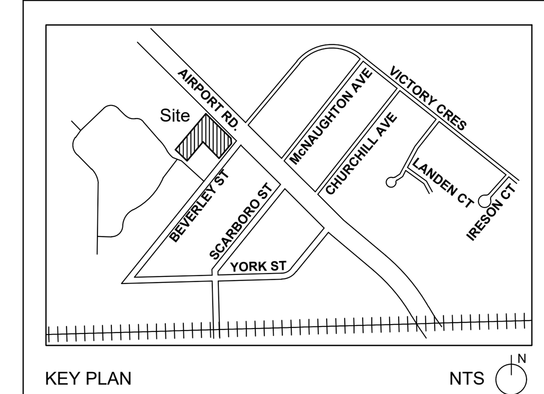
CONSULTANT:

JAIN

Jain Infrastructure Consultants Ltd.
7405 EAST DANBRO CRESCENT
MISSISSAUGA, ON L5N 6P8
TEL: (905) 285-9900, FAX: (905) 567-5246
Email: yayub@jainconsultants.com

SEAL:





KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

SURVEYOR'S REAL PROPERTY REPORT-PART 1
PLAN OF SURVEY OF ALL OF LOTS 439, 440 AND 441 REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN NO. 830
CITY OF MISSISSAUGA REGIONAL MUNICIPALITY OF PEEL

INFORMATION TAKEN FROM A SURVEY PERFORMED BY PEARSON & PEARSON SURVEYING LTD. 2021 (O.L.S.)
10933 JANE STREET, SECOND FLOOR, MAPLE ONTARIO, L6A 1S1
(289) 553-5453
michelepearson@pearsonandpearson.ca

BEARING NOTE

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHWESTERLY LIMIT OF BEVERLEY STREET SHOWN ON SURVEYOR'S REAL PROPERTY REPORT BY RABIDEAU & CZERWINSKI, O.L.S., DATED NOVEMBER 18, 2009 AS HAVING A BEARING OF N39°46'00"E.

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK.
BENCHMARK : 172 ELEVATION = 170.722m

No.	Description	Date
1	ISSUED FOR SITE PLAN APPROVAL	2022/02/16

PROJECT:
7198-7214 AIRPORT RD
Mississauga, ON L4T 1E9

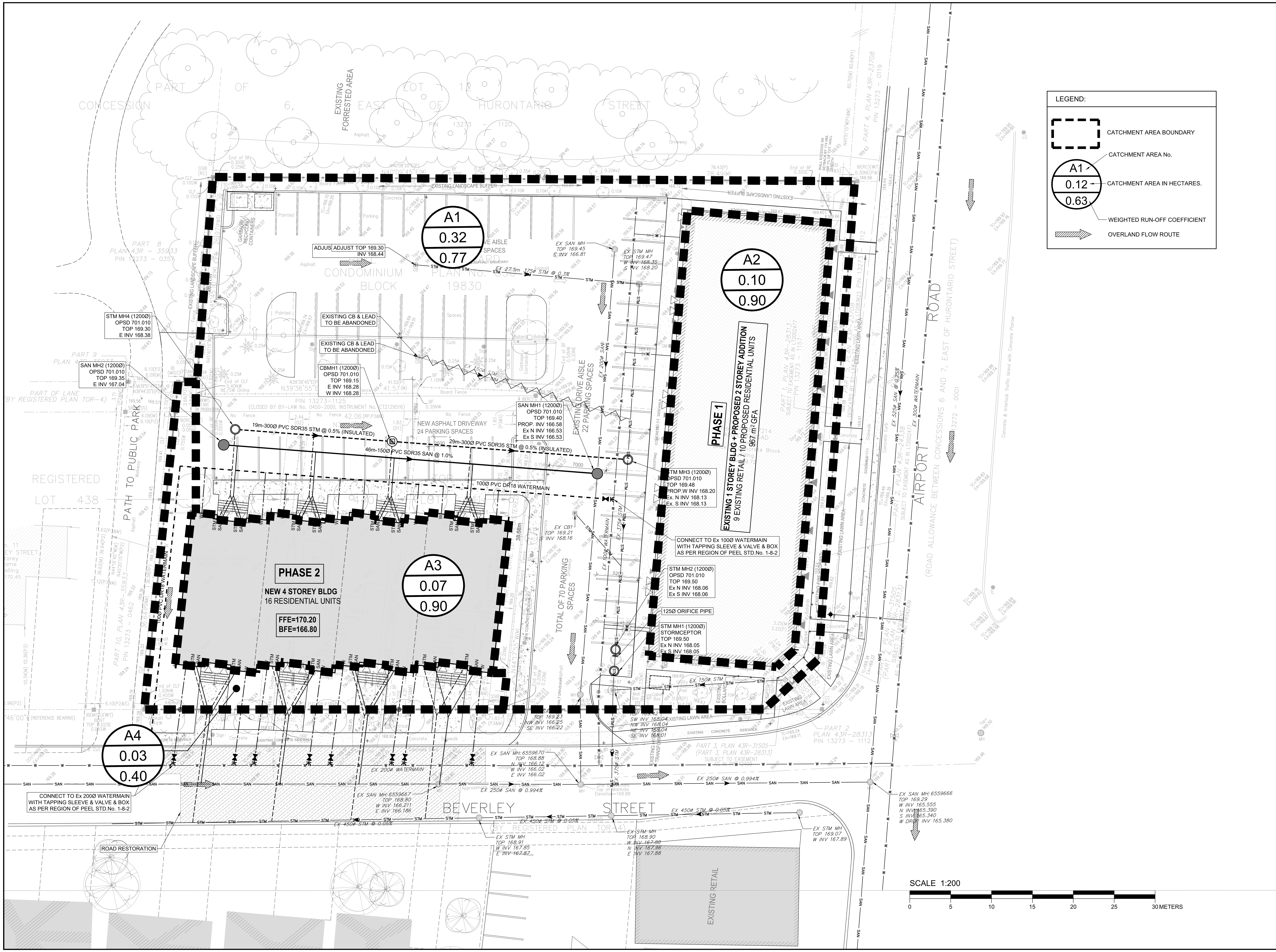
TITLE:

PRE DEVELOPMENT DRAINAGE PLAN-PHASE 2

PROJECT NO: 21001

CHECKED: Y.A.

DRAWING NO: DR01



CLIENT:

Arjun Kumar / 2182402 Ontario Inc.
28 Pinewood Trail, Mississauga ON
tel: (647) 990-4290
email: AKumar@live.ca

CONSULTANT:

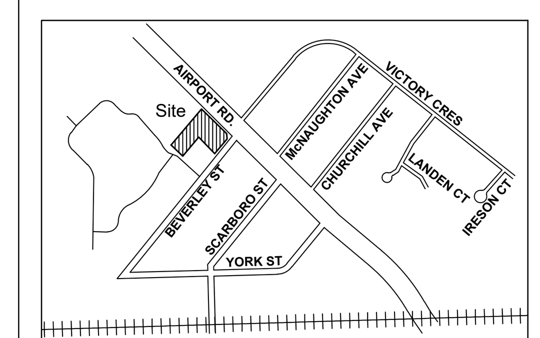
JAIN

Jain Infrastructure Consultants Ltd.
7405 EAST DANBRO CRESCENT
MISSISSAUGA, ON L5N 6P8
TEL: (905) 285-9900, FAX: (905) 567-5246
Email: yayub@jainconsultants.com

SEAL:

TRUE NORTH

CONSTRUCTION NORTH



KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

SURVEYOR'S REAL PROPERTY REPORT-PART 1
PLAN OF SURVEY OF ALL OF LOTS 439, 440 AND 441 REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN NO. 830
CITY OF MISSISSAUGA REGIONAL MUNICIPALITY OF PEEL

INFORMATION TAKEN FROM A SURVEY PERFORMED BY PEARSON & PEARSON SURVEYING LTD. 2021 (O.L.S.)
10933 JANE STREET, SECOND FLOOR, MAPLE ONTARIO, L6A 1S1
(289) 553-5453
michelepearson@pearsonandpearson.ca

BEARING NOTE

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHWESTERLY LIMIT OF BEVERLEY STREET SHOWN ON SURVEYOR'S REAL PROPERTY REPORT BY RABIDEAU & CZERWINSKI, O.L.S., DATED NOVEMBER 18, 2009 AS HAVING A BEARING OF N39°46'00"E.

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK.
BENCHMARK : 172 ELEVATION = 170.722m

No.	Description	Date
1	ISSUED FOR SITE PLAN APPROVAL	2022/02/16

PROJECT:
7198-7214 AIRPORT RD
Mississauga, ON L4T 1E9

TITLE:
POST DEVELOPMENT DRAINAGE PLAN-PHASE 2

PROJECT NO: 21001

DRAWING NO: DR02

CHECKED: Y.A.

Appendix B

B1 - Pre Development Land use and Runoff Coefficients Calculations
B2 - Post Development Land use and Runoff Coefficients Calculations
B3 – Peak Flow Calculations
B4 - Onsite Storage Calculations
B5a & B5b - Roof Storage Calculations
B6 – Site, Pipes, Manholes Storage Calculation
B7 - Orifice Sizing Calculations
B8 - Storm Sewer Design Sheet

TABLE B1. **Land use Breakdown and Composite Runoff Coefficients Calculations Existing Conditions**

Project: 7198-7214 Airport Road, Mississauga,ON

Date: 16-Feb-22
Designer: UA
Checked By: YA

TABLE B1.1 OVERALL LAND USE (Area A1, A2 & A3)

Existing Land Use Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Asphalt/Concrete	0.195	0.90	0.18
Building	0.114	0.90	0.10
Landscape	0.177	0.25	0.04
Overall	0.486	0.66	0.28

TABLE B1.2 CATCHMENT AREA A1

Existing Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Landscape	0.131	0.25	0.033
Concrete	0.037	0.90	0.033
Asphalt	0.150	0.90	0.135
Overall	0.318	0.63	0.066

TABLE B1.3 CATCHMENT AREA A2

Existing Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Building	0.097	0.90	0.087
Overall	0.097	0.90	0.087

TABLE B1.4 CATCHMENT AREA A3

Existing Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Existing Building	0.018	0.90	0.016
Asphalt/Concrete	0.007	0.90	0.007
Landscape	0.046	0.25	0.011
Overall	0.071	0.48	0.000

TABLE B1.5 CATCHMENT AREA A4

Existing Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Existing Building	0.001	0.90	0.001
Asphalt/Concrete	0.004	0.90	0.003
Landscape	0.029	0.25	0.007
Overall	0.034	0.34	0.000

** Maximum runoff coefficient of 0.50 is used for calculating allowable pre development flows*

*** Catchment Area "A4 =0.034" is excluded from SWM calculations as it is flowing uncontrolled in pre and post development conditions.*

TABLE B2. **Land use Breakdown and Composite Runoff Coefficients Calculations Proposed Conditions**

Project: 7198-7214 Airport Road, Mississauga,ON

Date: 16-Feb-22
Designer: UA
Checked By: YA

TABLE B2.1 OVERALL LAND USE (Area A1, A2 & A3)

Proposed Land Use Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Asphalt/Concrete	0.254	0.90	0.23
Building	0.167	0.90	0.15
Landscape	0.064	0.25	0.02
Overall	0.486	0.81	0.40

TABLE B2.2 CATCHMENT AREA A1

Proposed Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Landscape	0.064	0.25	0.016
Concrete	0.047	0.90	0.042
Asphalt	0.207	0.90	0.187
Overall	0.318	0.77	0.016

TABLE B2.3 CATCHMENT AREA A2

Proposed Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Building	0.097	0.90	0.087
Overall	0.097	0.90	0.087

TABLE B2.4 CATCHMENT AREA A3

Proposed Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Building	0.071	0.90	0.064
Overall	0.071	0.90	0.064

TABLE B2.5 CATCHMENT AREA A4

Proposed Land Use/ Cover	A, Area (hectares)	R, Runoff Coefficient	A x R
Concrete	0.008	0.9	0.007
Landscape	0.026	0.25	0.006
Overall	0.034	0.40	0.014

*** Catchment Area "A4 =0.034" is excluded from SWM calculations as it is flowing uncontrolled in pre and post development conditions.*

TABLE B3 PEAK FLOWS CALCULATION USING RATIONAL METHOD
EXISTING AND PROPOSED CONDITIONS

Project: 7198-7214 Airport Road, Mississauga,ON

Date: 16-Feb-22
Designer: UA
Checked By: YA

TABLE B3.1 Intensity-Duration-Frequency Parameters, City of Mississauga

$I = A/(T_c+B)^C$

Return Period		IDF Parameters		Intensity (mm/hr)
	A	B	C	Tc 15 min
2 year	610	4.60	0.780	59.89
5 year	820	4.60	0.780	80.51
10 year	1010	4.60	0.780	99.17
25 year	1160	4.60	0.780	113.89
50 year	1300	4.70	0.780	127.13
100 year	1450	4.90	0.780	140.69

TABLE B3.2 Peak Flows - Existing Conditions

Existing Condition	Area (ha.)	R*	A x R
Area A1	0.318	0.50	0.16
Area A2	0.097	0.50	0.05
Area A3	0.071	0.48	0.03
Total	0.486	0.50	0.24

** Maximum runoff coefficient of 0.50 is used for calculating allowable pre development flows*

T c = 15 minutes						
Storm Event						
2 year	**5 year**	**10 year**	**25 year**	**50 year**	**100 year**	
Intensity (mm/hr)						
59.9	80.5	99.2	113.9	127.1	140.7	
Peak Flow (cms)						
0.026	0.036	0.044	0.050	0.056	0.062	*Catchment Area A1*
0.008	0.011	0.013	0.015	0.017	0.019	*Catchment Area A2*
0.006	0.008	0.009	0.011	0.012	0.013	*Catchment Area A3*
0.040	0.054	0.067	0.077	0.086	0.095	*Total*

TABLE B3.3 Peak Flows - Proposed Condition

Proposed Condition	Area (ha.)	R	A x R
Area A1	0.318	0.77	0.24
Area A2- Bldg/Roof	0.097	0.90	0.09
Area A3- Bldg/Roof	0.071	0.90	0.06
Total Area	0.486	0.81	0.40

T c = 15 minutes						
Storm Event						
2 year	**5 year**	**10 year**	**25 year**	**50 year**	**100 year**	
Intensity (mm/hr)						
59.9	80.5	99.2	113.9	127.1	140.7	
Peak Flow (cms) - Uncontrolled						
0.041	0.055	0.067	0.077	0.086	0.096	*Catchment Area A1*
0.014	0.019	0.024	0.028	0.031	0.034	*Catchment Area A2*
0.011	0.014	0.018	0.020	0.022	0.025	*Catchment Area A3*
0.066	0.088	0.109	0.125	0.140	0.154	*Total*

Peak Flow (cms) - Controlled						
0.050	0.050	0.050	0.050	0.050	0.050	*Orifice control @ 50.40 l/sec*

TABLE B3.4 Change in Peak Flows (Reduction -ve; Increase +ve)

Percent Change (%)					
24.7%	-7.2%	-24.7%	-34.4%	-41.2%	-46.9%

On-Site Storage Calculator

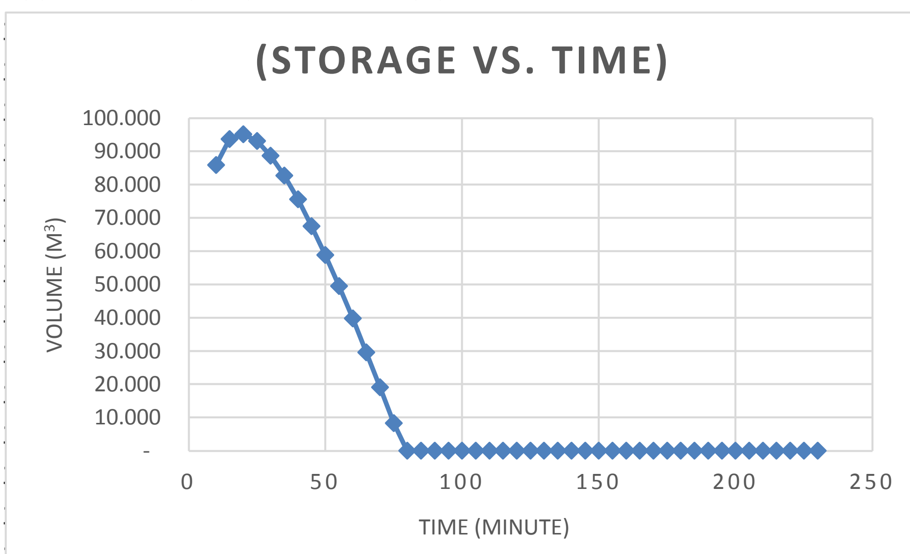
Mississauga

Table B4 -Overall Site

Project: 7198-7214 Airport Road
By: UA
Date: 16-Feb-22

R = 0.81 100 yr rainfall:
A = 0.49 ha
$Q_{release}$ = 0.050 m^3/s
50.40 L/s

T.C (min)	i_{100} (mm/hr)	Q_{100} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
10	176.312	0.194	0.143	85.917	
15	140.690	0.154	0.104	93.672	
20	118.122	0.130	0.079	95.161	***
25	102.410	0.112	0.062	93.073	
30	90.775	0.100	0.049	88.690	
35	81.773	0.090	0.039	82.715	
40	74.579	0.082	0.031	75.573	
45	68.683	0.075	0.025	67.540	
50	63.753	0.070	0.020	58.805	
55	59.563	0.065	0.015	49.502	
60	55.952	0.061	0.011	39.730	
65	52.805	0.058	0.008	29.564	
70	50.035	0.055	0.005	19.062	
75	47.575	0.052	0.002	8.271	
80	45.375	0.050	-	-	
85	43.395	0.048	-	-	
90	41.601	0.046	-	-	
95	39.967	0.044	-	-	
100	38.474	0.042	-	-	
105	37.101	0.041	-	-	



On-Site Storage

Calculator

Mississauga

Table B5a - Phase 2 Building

Project: 7198-7214 Airport Road

By: UA

Date: 16-Feb-22

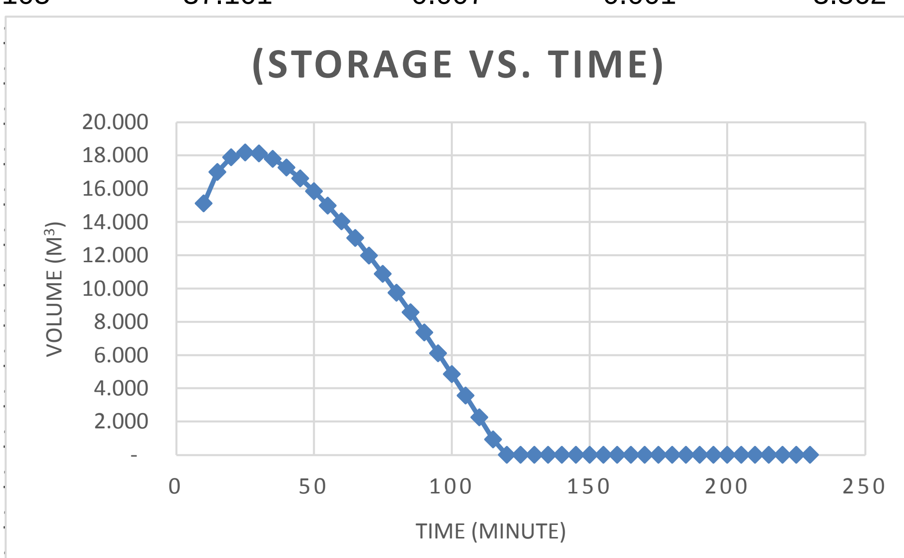
R = 0.90 100 yr rainfall:

A = 0.0708 ha

$Q_{release}$ = 0.006 m^3/s

6.00 L/s

T.C (min)	i_{100} (mm/hr)	Q_{100} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
10	176.312	0.031	0.025	15.120	
15	140.690	0.025	0.019	17.007	
20	118.122	0.021	0.015	17.884	
25	102.410	0.018	0.012	18.184	***
30	90.775	0.016	0.010	18.114	
35	81.773	0.014	0.008	17.788	
40	74.579	0.013	0.007	17.274	
45	68.683	0.012	0.006	16.616	
50	63.753	0.011	0.005	15.845	
55	59.563	0.011	0.005	14.983	
60	55.952	0.010	0.004	14.045	
65	52.805	0.009	0.003	13.043	
70	50.035	0.009	0.003	11.987	
75	47.575	0.008	0.002	10.885	
80	45.375	0.008	0.002	9.742	
85	43.395	0.008	0.002	8.563	
90	41.601	0.007	0.001	7.353	
95	39.967	0.007	0.001	6.114	
100	38.474	0.007	0.001	4.850	
105	37.101	0.007	0.001	3.562	



On-Site Storage

Calculator

Mississauga

Table B5b - Phase 1 Ex. Building

Project: 7198-7214 Airport Road

By: UA

Date: 16-Feb-22

R = 0.90

A = 0.0967 ha

$Q_{release}$ = 0.006 m^3/s

6.00 L/s

100 yr rainfall:

T.C (min)	i_{100} (mm/hr)	Q_{100} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
10	176.312	0.043	0.037	21.974	
15	140.690	0.034	0.028	25.211	
20	118.122	0.029	0.023	27.067	
25	102.410	0.025	0.019	28.137	
30	90.775	0.022	0.016	28.701	
35	81.773	0.020	0.014	28.914	***
40	74.579	0.018	0.012	28.871	
45	68.683	0.017	0.011	28.631	
50	63.753	0.015	0.009	28.237	
55	59.563	0.014	0.008	27.718	
60	55.952	0.014	0.008	27.095	
65	52.805	0.013	0.007	26.386	
70	50.035	0.012	0.006	25.603	
75	47.575	0.012	0.006	24.756	
80	45.375	0.011	0.005	23.854	
85	43.395	0.010	0.004	22.902	
90	41.601	0.010	0.004	21.908	
95	39.967	0.010	0.004	20.874	
100	38.474	0.009	0.003	19.806	
105	37.101	0.009	0.003	18.706	

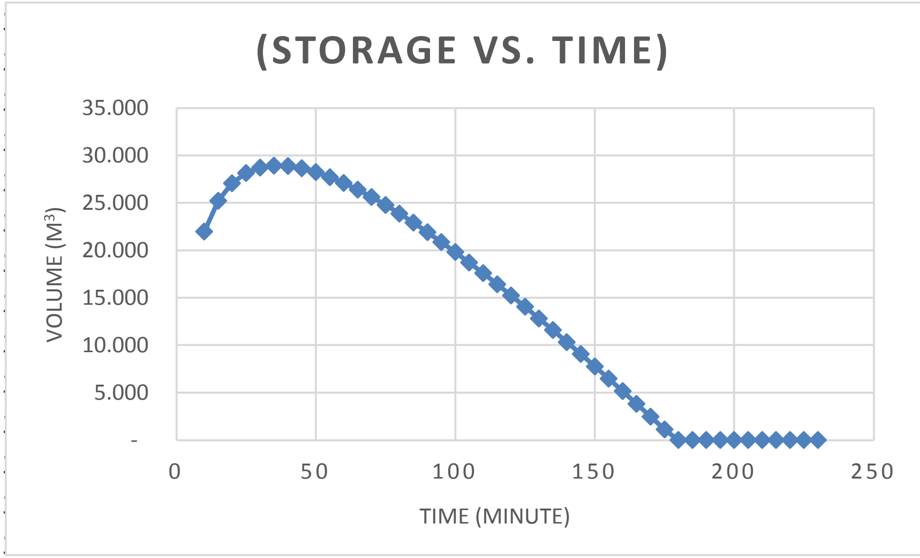


TABLE B6 Parking, Pipes, Manholes Storage Calculation

Project: 7198-7214 Airport Road, Mississauga, Ontario

Date: 16-Feb-22
Designer: UA
Checked By: YA

MANHOLES/ CB'S STORAGE

Description	Length (m)	Width (m)	Height (m)	Volume (m^3)
Ex CB1	0.6	0.6	1.24	0.45
Ex CB2	0.6	0.6	0.96	0.35
Ex STM MH	1.2	1.2	1.2	1.36
CBMH1	1.2	1.2	1.12	1.27
STM MH2	1.2	1.2	1.34	1.52
STM MH3	1.2	1.2	1.27	1.44
STM MH4	1.2	1.2	1.02	1.15
TOTAL				7.52

PIPES STORAGE

FROM MH	TO MH	Length (m)	DIA (m)	Volume (m3)
Ex CB1	Ex 375 Ø	8	0.3	0.57
Ex CB2	Ex STM MH	28	0.375	3.09
Ex STM MH	STM MH3	22	0.375	2.43
STM MH4	CBMH1	19	0.3	1.34
CBMH1	STM MH3	29	0.3	2.05
STM MH3	STM MH2	23	0.375	2.54
TOTAL				4.59

VOLUME: **12.11** **m^3**

PARKING DETENTION				
Ponding Area No.	Area (m^2)	Depth (m)	Volume (m^3)	HWL (m) (100yr)
A1	220.00	0.19	13.93	169.40
A2	186.00	0.10	6.20	169.40
A3	355.00	0.25	29.58	169.40
TOTAL VOLUME:			**49.72**	

TOTAL VOLUME: **61.83** **m^3**

TABLE B7 Orifice Sizing Calculation

Project: 7198-7214 Airport Road, Mississauga,ON

Date: 16-Feb-22
Designer: UA
Checked By: YA

Location	HWL	Orifice Inv.	c	a	g	Orifice dia.	h	Q	
	(m)	(m)		(m^2)		(m)	(m)	(l/sec)	(m^3/sec)
STM MH2	169.40	168.06	0.82	0.012266	9.81	0.125	1.28	50.40	0.050

Proposed 125 mm Dia. Orifice pipe with rated capacity 50.4 lit/sec

City of Mississauga

Engineering Department

Table B8 - Storm Drainage Design Chart

7198-7214 Airport Road, Mississauga,ON

DESIGN STORM:	10 YEAR RETURN
I (10-YEAR):	$1010/(T.C + 4.6)^{0.78}$
td (start):	15.0 minutes

Jain Infrastructure Consultants Ltd.	
PROJECT:	7198 Airport Road
PREPARED BY:	UA
FILE No.:	2021-515
DATE PREPARED	16-Feb-22

LOCATION	**MANHOLES** FROM MH#	TO MH#	**A** area (ha)	**C** runoff Coeffi.	**A x C**	**ACC.** A x C	**td (min)**	**I (mm/hr)**	**q** (10-YR) (l/s)	**STORM SEWER DESIGN INFORMATION** size (mm)	slope (%)	length (m)	Q full (l/s)	V full (m/s)	**TIME** SECT. (min)	**REMARKS**
Parking	STMH 4	CBMH1	0.15	0.90	0.14	0.14	15.00	99.17	37	300	0.50	19.0	68	0.97	0.33	
Parking	CBMH1	STM MH3	0.00	0.90	0.00	0.14	15.33	97.89	37	300	0.50	29.0	68	0.97	0.50	
Parking	*STM MH3*	*STM MH2*	*0.24*	*0.90*	*0.22*	*0.35*	*15.83*	*96.02*	*94*	*375*	*0.30*	*23.0*	*96*	*0.87*	*0.44*	
Parking	*STM MH2*	*STM MH1*	*0.10*	*0.90*	*0.09*	*0.44*	*16.27*	*94.43*	*116*	*375*	*0.30*	*3.0*	*96*	*0.87*	*0.06*	*Oifice controlled*
Parking	*STM MH1*	*EX. CBMH*	*0.00*	*0.90*	*0.00*	*0.44*	*16.33*	*94.23*	*115*	*375*	*0.30*	*3.0*	*96*	*0.87*	*0.06*	*flow @ 50.40 l/sec*

Appendix C
Stormceptor Sizing Summary

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

01/27/2022

Province:	Ontario
City:	Mississauga
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20
Site Name:	
Drainage Area (ha):	0.49
Runoff Coefficient 'c':	0.81
Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	13.46
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	50.40
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	7198 Airport Road
Project Number:	
Designer Name:	USMAN ARIF
Designer Company:	Jain Infrastructure Consultants
Designer Email:	uarif@jainconsultants.com
Designer Phone:	647-510-0353
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	80
EFO6	89
EFO8	94
EFO10	97
EFO12	99

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 80

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

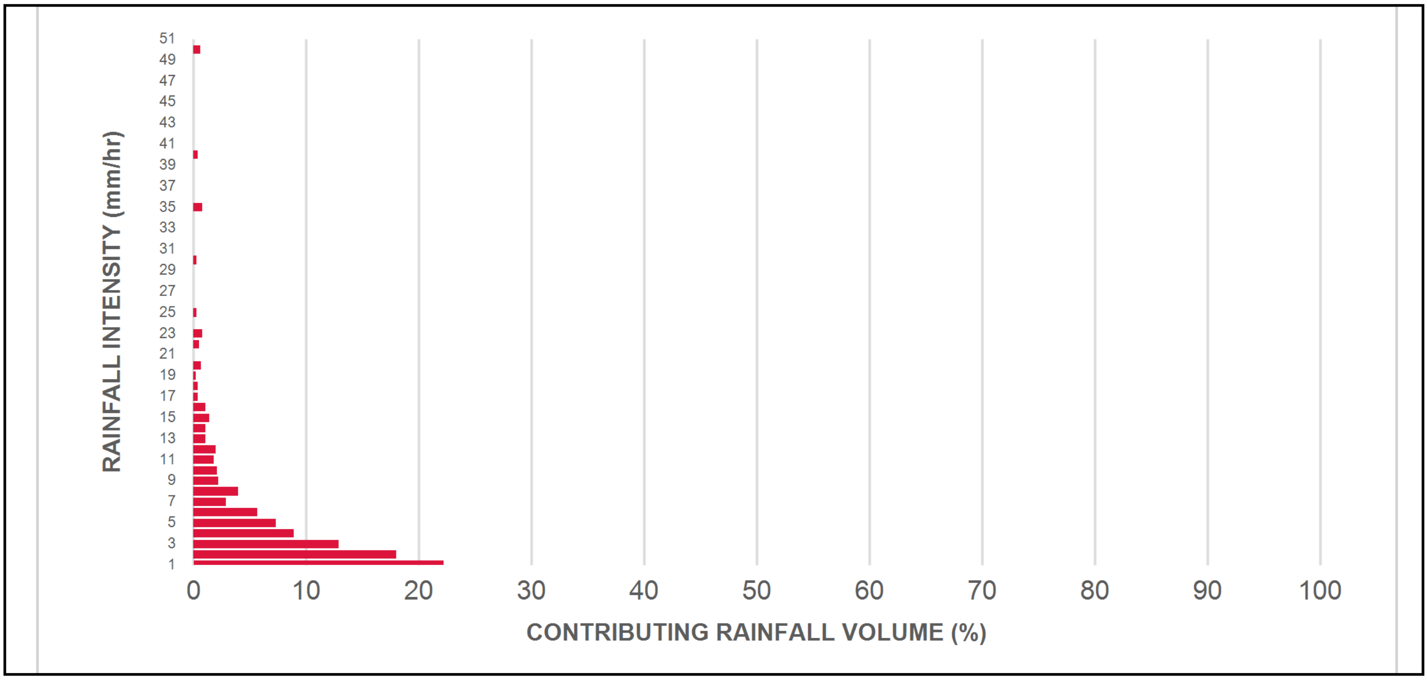
Particle Size (μm)	Percent Less Than	Particle Size Fraction (μm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

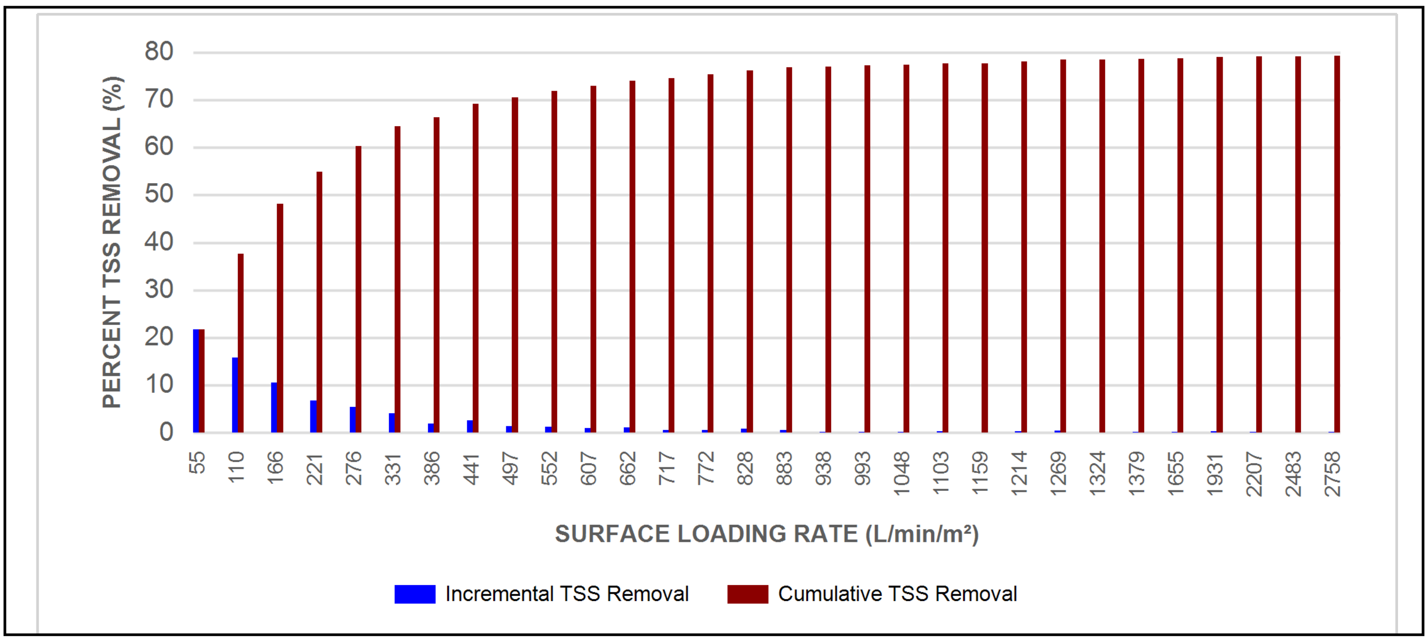
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	22.2	22.2	1.10	66.0	55.0	98	21.8	21.8
2	18.0	40.2	2.21	132.0	110.0	88	15.8	37.6
3	12.9	53.0	3.31	199.0	166.0	82	10.6	48.1
4	8.9	61.9	4.41	265.0	221.0	76	6.8	54.9
5	7.3	69.2	5.52	331.0	276.0	74	5.4	60.3
6	5.7	74.9	6.62	397.0	331.0	72	4.1	64.4
7	2.9	77.8	7.72	463.0	386.0	69	2.0	66.4
8	4.0	81.8	8.83	530.0	441.0	67	2.6	69.1
9	2.2	84.0	9.93	596.0	497.0	65	1.4	70.5
10	2.1	86.1	11.03	662.0	552.0	62	1.3	71.8
11	1.8	87.8	12.14	728.0	607.0	60	1.1	72.9
12	2.0	89.8	13.24	794.0	662.0	60	1.2	74.0
13	1.1	90.8	14.34	861.0	717.0	59	0.6	74.6
14	1.1	92.0	15.45	927.0	772.0	59	0.7	75.3
15	1.4	93.4	16.55	993.0	828.0	58	0.8	76.1
16	1.1	94.5	17.65	1059.0	883.0	58	0.7	76.8
17	0.4	94.9	18.76	1125.0	938.0	58	0.2	77.0
18	0.4	95.3	19.86	1192.0	993.0	57	0.2	77.2
19	0.2	95.5	20.96	1258.0	1048.0	56	0.1	77.4
20	0.7	96.2	22.07	1324.0	1103.0	55	0.4	77.7
21	3.8	100.0	23.17	1390.0	1159.0	54	2.0	79.8
22	0.5	100.5	24.27	1456.0	1214.0	53	0.3	80.1
23	0.8	101.3	25.38	1523.0	1269.0	52	0.4	80.5
24	-1.3	100.0	26.48	1589.0	1324.0	50	N/A	79.8
25	0.3	100.3	27.58	1655.0	1379.0	49	0.1	79.9
30	0.3	100.6	33.10	1986.0	1655.0	41	0.1	80.1
35	0.8	101.5	38.62	2317.0	1931.0	35	0.3	80.4
40	0.4	101.9	44.14	2648.0	2207.0	31	0.1	80.5
45	-1.9	100.0	49.65	2979.0	2483.0	27	N/A	80.0
50	0.0	100.0	50.00	3000.0	2500.0	27	0.0	80.0
Estimated Net Annual Sediment (TSS) Load Reduction =								**80 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

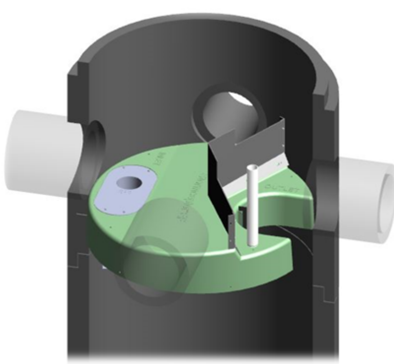
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

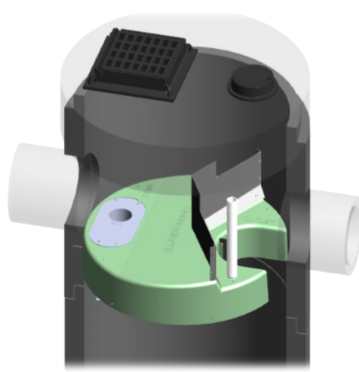
DESIGN FLEXIBILITY

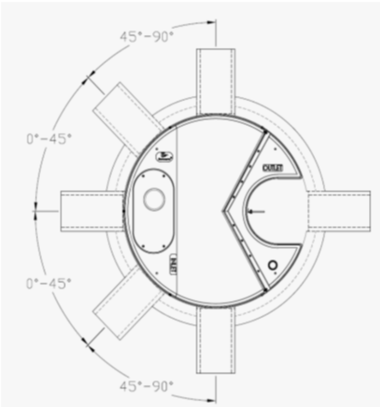
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR “OIL GRIT SEPARATOR” (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program’s **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada, and only rainfall intensities greater than 0.5 mm/hr shall be included in sizing calculations. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Appendix D
Fire Flow Calculations
Demand Table

JAIN

PROJECT: 7198-7214 Airport Road, Mississauga,ON

CONNECTION DEMAND TABLE

WATER CONNECTION

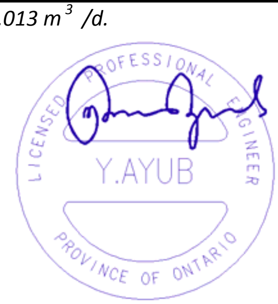
Connection point	200 mm dia. Watermain (Beverley Street)		
Pressure zone of connection point			
Total equivalent residential population to be serviced	70		
Total equivalent commercial population to be serviced	104		
Total lands to be serviced (ha)	0.52		
Hydrant flow test (TO BE COMPLETED)			
Hydrant flow test location	Goreway Drive		
	Pressure (kPa)	Flow (in l/s)	Time
Minimum water pressure			
Maximum water pressure			

No.	Demand type	Water Demands		
		Demand (l/s)		
		Residential	Commercial	Total
1	Average day flow	0.23	0.09	0.32
2	Maximum day flow	0.45	0.13	0.58
3	Peak hour flow	0.68	0.277	0.96
4	Fire flow (FUS Calcs attached)	183.0		
Analysis				
5	Maximum day plus fire flow	183.58	l/s	

WASTE WATER CONNECTION

Connection point		250 mm dia. Sanitary Sewer (Beverley Street)
Total equivalent residential population to be serviced 1)		70
Total equivalent commercial population to be serviced 1)		104
Total lands to be serviced (ha)		0.52
6	Wastewater sewer effluent (in l/s)	1.45

** As per Region of Peel Guidelines, population less than 1000 persons, sewage flow to be 0.013 m^3 /d.*



Yasar Ayub, P.Eng
Project Manager
16-Feb-22

JAIN

Project: 7198-7214 Airport Road, Mississauga,ON
Date:February 16, 2022

FIRE FLOW CALCULATIONS

(BASED ON 1999 PUBLICATION "WATER SUPPLY FOR PUBLIC FIRE PROTECTION" BY FIRE UNDERWRITERS SURVEY)

Table D1: FUS Determination of Required Fire Flow - Long Method
Phase 1 - Retail & 10 Residential units: Gross Floor Area : 2398 sq.m

STEP	TASK	TERM	OPTIONS	Multiplier Associated with Option	Choose	Value Used	Unit	Total Fire Flow
			Framing Material					
1	**Choose Frame used for Construction of Unit**	Coefficient related to type of construction (C)	Wood Frame	1.5	Ordinary Construction	1	N/A	
			Ordinary Construction	1				
			Non Combustible Construction	0.8				
			Fire resistive construction (<2 hrs)	0.7				
			Fire resistive construction (>2 hrs)	0.6				
			Floor Space Area					
2	**Choose Type of Housing(if TH, enter Number of Units per TH Block)**	Type of Housing	Single Family	1	Other(Public)	1	Unit	
			Townhouse-indicate # of units	-				
			Other (Comm,Ind, etc.)	1				
2.2	**# of Storeys**	Number of Floor/Storeys in the Unit (do not include basement)			3	3	Storeys	
3	**Enter Ground Floor Area of One Unit**	Measurement Units	Square Metres (m2)	1	799.3	2398	Area in Sq.m	
4	**Obtain Required Fire Flow without Reductions**	Required Fire Flow (without reductions or increases per FUS) ,F=220 X CX(A)$^{0.5}$ Round to nearest 1000 L/min						11000
5	**Apply Factors Affecting Burning**	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	**Choose Combustibility of Building Contents**	Occupancy Content hazard reduction or surcharge	Non Combustible	-0.25	Limited Combustible	0.15	N/A	9350
			Limited Combustible	-0.15				
			Combustible	0				
			Free Burning	0.15				
			Rapid Burning	0.25				
5.2	**Choose Reduction due to presence of Sprinklers**	sprinkler reduction	Complete Automatic Sprinkler Protection	-0.3	None	0	N/A	0
			None	0				
5.3	**Choose Seperation Distance Between Units**	Exposure Distance between Units	Side 1	10.1 to 20 m	0.15	0.15		1402.5
			Side 2	45.1m or greater	0			
			Side 3	20.1 to 30 m	0.1			
			Side 4	30.1 to 45 m	0.05			
6	**Obtain Required Fire Flow , Duration & Volume**	***Total Required Fire Flow (L/min)***						**10753**
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied						**11000**
		Total Required Fire Flow (above) in L/s						**183**
		Required Duration of Fire Flow (hrs)						**1.5**
		Required Volume of Fire Flow (m^3)						**990**

Yasar Ayub, P.Eng
Project Manager
16-Feb-22

Project: 7198-7214 Airport Road, Mississauga,ON
Date:February 16, 2022

FIRE FLOW CALCULATIONS
(BASED ON 1999 PUBLICATION "WATER SUPPLY FOR PUBLIC FIRE PROTECTION" BY FIRE UNDERWRITERS SURVEY)

Table D2: FUS Determination of Required Fire Flow - Long Method
Phase 2 - 16 Townhouse Block: Gross Floor Area : 1792 sq.m

STEP	TASK	TERM	OPTIONS	Multiplier Associated with Option	Choose	Value Used	Unit	Total Fire Flow
		Framing Material						
1	**Choose Frame used for Construction of Unit**	Coefficient related to type of construction (C)	Wood Frame	1.5	Ordinary Construction	1	N/A	
			Ordinary Construction	1				
			Non Combustible Construction	0.8				
			Fire resistive construction (<2 hrs)	0.7				
			Fire resistive construction (>2 hrs)	0.6				
		Floor Space Area						
2	**Choose Type of Housing(if TH, enter Number of Units per TH Block)**	Type of Housing	Single Family	1	Other(Public)	1	Unit	
			Townhouse-indicate # of units	-				
			Other (Comm,Ind, etc.)	1				
2.2	**# of Storeys**	Number of Floor/Storeys in the Unit (do not include basement)			3	3	Storeys	
3	**Enter Ground Floor Area of One Unit**	Measurement Units	Square Metres (m2)	1	597.3	1792	Area in Sq.m	
4	**Obtain Required Fire Flow without Reductions**	Required Fire Flow (without reductions or increases per FUS) ,F=220 X CX(A)$^{0.5}$ Round to nearest 1000 L/min						9000
5	**Apply Factors Affecting Burning**	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	**Choose Combustibility of Building Contents**	Occupancy Content hazard reduction or surcharge	Non Combustible	-0.25	Limited Combustible	0.15	N/A	7650
			Limited Combustible	-0.15				
			Combustible	0				
			Free Burning	0.15				
			Rapid Burning	0.25				
5.2	**Choose Reduction due to presence of Sprinklers**	sprinkler reduction	Complete Automatic Sprinkler Protection	-0.3	None	0	N/A	0
			None	0				
5.3	**Choose Seperation Distance Between Units**	Exposure Distance between Units	Side 1	10.1 to 20 m	0.15	0.25		1912.5
			Side 2	45.1m or greater	0			
			Side 3	20.1 to 30 m	0.1			
			Side 4	10.1 to 20 m	0.15			
6	**Obtain Required Fire Flow , Duration & Volume**	***Total Required Fire Flow (L/min)***						**9563**
		Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied						**10000**
		Total Required Fire Flow (above) in L/s						**167**
		Required Duration of Fire Flow (hrs)						**1.5**
		Required Volume of Fire Flow (m^3)						**900**

Yasar Ayub, P.Eng
Project Manager
16-Feb-22