FUNCTIONAL SERVICING REPORT
EMBLEM DEVELOPMENTS
DUNDAS STREET HIGH RISE CONDOMINIUM
86-90 DUNDAS STREET EAST
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

Prepared By: **SKIRA & ASSOCIATES LTD.**
3464 Semenyk Court, Suite 100
Mississauga, Ontario
L5C 4P8

Telephone: **(905) 276-5100**
Fax: **(905) 270-1936**

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Revised: **September 23, 2019**

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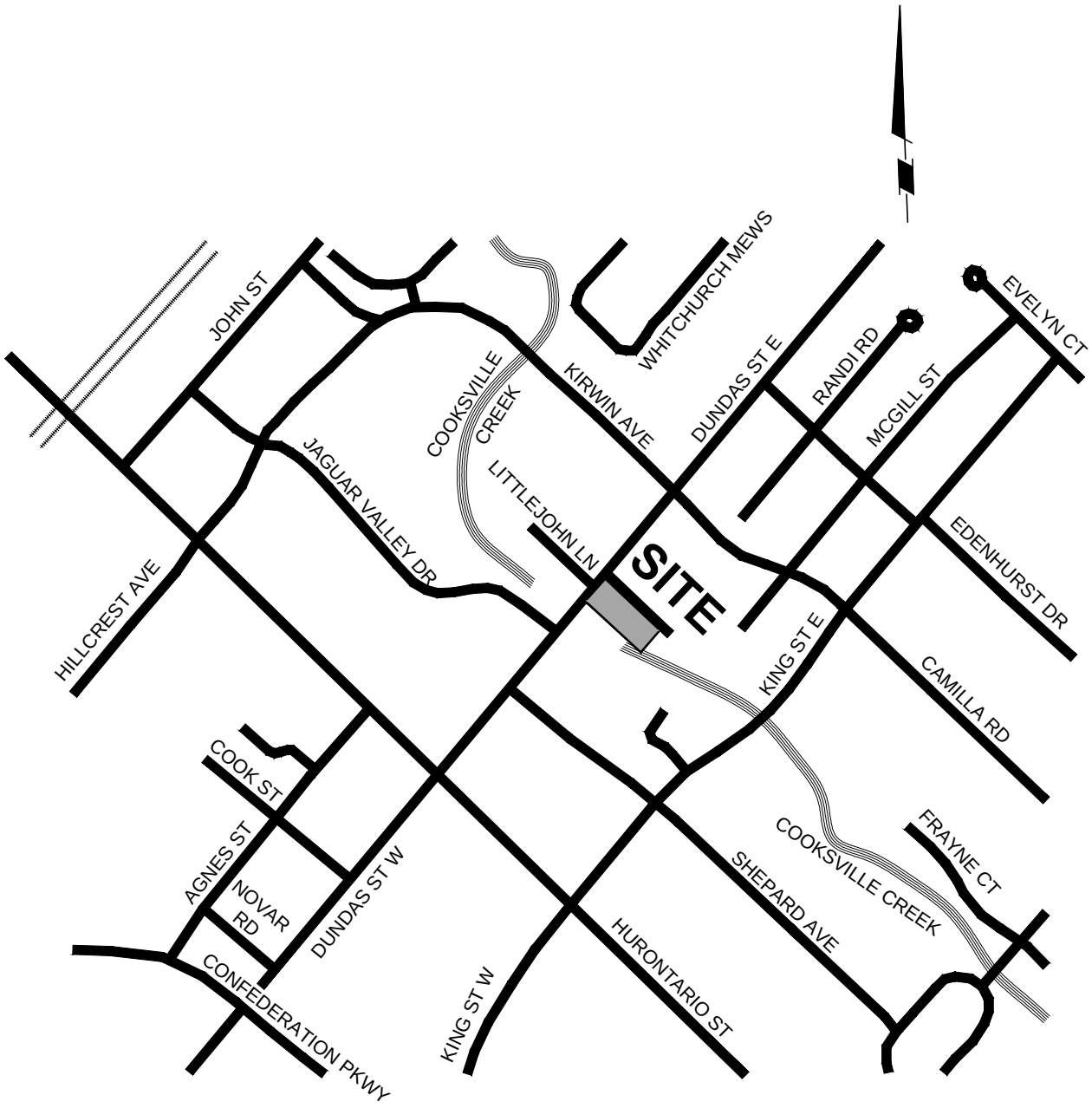
1.0 INTRODUCTION

The purpose of this report is to define the existing and proposed servicing scheme in support of the Proposed 16-storey High Rise Condominium Apartments consisting of 324m² commercial space and 334 condominium units.

The existing parcel of land is part of Block 15, Concession 1, south of Dundas Street in Mississauga. The site is located on the south side of Dundas Street East, east of Hurontario Street. **Refer to Figure No. 1.**

It is intended that this Functional Servicing Report will be sufficient to support amendments to the Official Plan and Zoning Bylaw and will result in an "approval in principle", of the design proposal by the City of Mississauga, Region of Peel and any other relevant Authorities. Detailed design for a Servicing Agreement will be undertaken in conjunction with the Site Plan Application at a later date.



SKIRA & ASSOCIATES LTD.
CONSULTING ENGINEERS
3464 Semenyk Court, Suite 100, Mississauga, Ontario L5C 4P8
Tel. (905) 276-5100 Fax. (905) 270-1936 Email - info@skiraconsult.ca

KEY PLAN

PROJECT No. 212-M107	**FIGURE No. 1**
DATE - MAY 2016	
SCALE - N.T.S.	DRAWN BY - E.W.

2.0 STUDY AREA INFORMATION

The subject property is known legally as Part of Lot 15, Concession 1, south of Dundas Street in the City of Mississauga, Regional Municipality of Peel.

The site is bound by Dundas Street on the north, Cooksville Creek on the west, and existing residential to the east. **Refer to Figure No. 1.**

The site is located on 86 and 90 Dundas Street East and is presently developed with buildings and a parking lot. The total site area is 0.54 Ha. An area of 0.17 Ha will be dedicated to the City of Mississauga for the access and maintenance of Cooksville Creek.

The site is relatively flat with a gentle slope from north to south with a grade differential of approximately 1.00m. Presently, the subject site is developed with buildings and a parking lot. The existing building and parking surface is scheduled for demolition prior to construction start. **Refer to Dwg. 212-M107-2.**

The majority of the site will be developed with a high rise condominium building, surface parking, driveways, loading areas, and landscape areas.

3.0 TRANSPORATION SYSTEM

The subject site is located on the southeast corner of Dundas Street East and Cooksville Creek, east of Hurontario Street.

Access to the proposed high rise condominium will be from Dundas Street East.

The existing road system will provide good access to major arterial roads, being Hurontario Street and Cawthra Road. Both Cawthra Road and Hurontario Street connect to nearby Highways 403, 401, and Queen Elizabeth Way.

This existing road pattern will provide good access to nearby commercial districts, employment districts, municipal offices, community centres, and parks.

Road widening for Dundas Street will be required.

4.0 STORM DRAINAGE SYSTEM

Currently, the site is developed. Existing site drains surface and through a 200mm diameter storm outlet to Cooksville Creek. The existing building and parking surface area will be demolished prior to construction.

The proposed high rise condominium will be provided with a new 300mm diameter storm connection located at the southwest end of the site, discharging directly into Cooksville Creek. The existing 200mm diameter storm connection at the north end will be removed.

The proposed 300mm storm outlet is approximately at 106.19m elevation. New headwall will be constructed at the outlet of 300mm pipe to the creek, at the 25-yr water level elevation provided by AMEC. Therefore, surface drainage and roof runoff will be by gravity.

The connection will provide sufficient depth and capacity for post-development storm water runoff. The underground parking foundations drains will require sump pumps to be pumped to the storm connection.

Onsite stormwater management will be provided to restrict 100-yr post-development flows of proposed development to 2-yr pre-development levels at 0.25 runoff co-efficient. **Refer to Dwg. 212-M107-1.**

4.1 Pre-development Conditions

Onsite stormwater management will be required to restrict 100-yr post-development flows to the 2-yr pre-development levels:

A = 0.3729 Ha
C = 0.25
T_c = 15.00 min
I_{2yr} = 59.89 mm/hr

$Q = CIA / 360$
Q_{2yr} = 0.0155

Therefore, maximum allowable discharge from the site is **0.0155 m³/s**.

4.2 Post-development Conditions

Required volume will be stored in the underground storage tank. Location details and final volumes will be established at detailed design stage of the project.

A = 0.3729 Ha
C = 0.95

Maximum storage required is as follows:

YEAR STORM
100 year

CITY
Mississauga

C = **0.950**
A (ha) = **0.37290**
Allow. Discharge Qa (m3/s) = **0.0155**
Safety Factor Sf = **0%**

Max. Required Detention (m3) = ***143.31***

RAINFALL DURATION *Tc (min)*	**RAINFALL INTENSITY** *I (mm/hr)*	**TOTAL UNCONTROLLED RUNOFF** *Q=CIA/360 (m3/sec)*	**INFLOW VOLUME Vi (m3)**	**OUTFLOW VOLUME Vo (m3)**	**REQUIRED DETENTION VOLUME (m3)** *D=(Vi-Vo)*Sf*
5	242.53	0.2387	71.60	4.76	66.84
10	176.31	0.1735	104.10	9.30	94.80
15	140.69	0.1384	124.60	13.84	110.76
20	118.12	0.1162	139.48	18.40	121.09
25	102.41	0.1008	151.16	22.95	128.21
30	90.77	0.0893	160.79	27.51	133.28
35	81.77	0.0805	168.98	32.07	136.91
40	74.58	0.0734	176.13	36.63	139.50
45	68.68	0.0676	182.48	41.20	141.29
50	63.75	0.0627	188.21	45.77	142.44
55	59.56	0.0586	193.42	50.34	143.08
60	55.95	0.0551	198.21	54.91	**143.31**
65	52.81	0.0520	202.65	59.48	143.18
70	50.03	0.0492	206.79	64.05	142.74

4.3 Water Balance Consideration

The latest City of Mississauga Water Balance Management Plan contains a water balance target/criteria that requires the site to retain 5mm of every rainfall and allow it to infiltrate back into the ground or use for irrigation purposes.

The required volume is as follows:

Area = 0.3729 hectares
V_{5mm} = 3729m² x 0.005m = **18.6 m³** per rainfall

4.3.1 Irrigation / Grey Water Recycling Chamber

The proposed underground storage tanks will be extended (1.0 m (depth)) below the outlet invert to provide storage for the 5mm rainfall for the purpose of reuse. Stored volume 18.6 m³ will be used for irrigation water use of the landscape area.

4.4 Quality Control

The proposed development will utilize a treatment train approach that includes clean roof runoff, landscaped areas, and a holding tank, prior to final treatment through a quality control device to provide quality control for the site.

Roof runoff from the proposed building is considered a clean water source as it is conveyed directly to the proposed underground storage tank without crossing a paved surface and picking up oils or contaminants. The 1.0m depth enlarged sump and chamber provided for irrigation will act as a settling chamber, similar to the oil/girt interceptor's settlement principle.

The runoff from the asphalt drive aisle will be diluted in the underground storage tank by the runoff contributed from the clean roof. Further, capturing the 5mm runoff and directing it back to the site for irrigating the proposed landscaping areas also reduces the amount of asphalt runoff that makes its way to the proposed quality control device.

Landscaped areas and sodded swales naturally promote filtration of rainfall runoff.

The final treatment will be provided through a quality control device. Through initial calculations, an oil grit interceptor STC 1000 will be provided to complete the treatment train for the site.

4.5 Orifice Control

The allowable discharge rate from the development will be controlled by means of an orifice restrictor plate installed at the outlet pipe located at the south corner of the site. The orifice plate will be installed over the outlet pipe inside the control MH 1. The orifice discharge rate was calculated using FlowMaster computer program developed by Haestad Methods Inc. (USA) and an output report is attached. The size of the orifice restrictor plate is 75mm diameter due to clogging possibility.

4.6 Overland Flow Route

Existing overland flow route is directed south westerly towards Cooksville Creek. Our proposed grading will continue to have the escape route in the same direction (in excess of 100-yr storm). As such, we are not modifying existing conditions.

5.0 SANITARY SEWER SYSTEM

The proposed high rise condominium tower will be serviced to the existing 825mm diameter sanitary sewer trunk, located on Dundas Street East and Regional easement, running from north-east corner and along the east side of the property.

The existing 825mm diameter sanitary sewer has sufficient depth to accept the sanitary flows from the high rise condominium building.

Proposed 250mm sanitary connection will be provided to service the development from the existing sanitary manhole (EX. SAN MH 28) on Dundas Street East right-of-way. An existing 150mm diameter sanitary sewer runs west, with a 4.0m drop pipe, from EX. SAN MH 28. As the proposed 250mm sanitary connection enters the EX. SAN MH 28 at an angle less than 90° to the outflow pipe, it is proposed to remove the existing 150mm sanitary sewer and utilize the drop pipe for the proposed connection. The drop pipe will help provide the necessary flow and angle to discharge to the existing sanitary sewer system. **Refer to Dwg. 212-M107-1.**

The proposed sanitary invert at property line is approximately 107.00m. The proposed lowest finished main floor is approximately 111.40m. Therefore, the building main floor and above will have gravity sewage flows. The basement and underground parking drains will require sanitary ejection pumps.

Sanitary Flow Calculations

A. Residential Condominium Development:
- One Bedroom – 147 units x 1.68 PPU = 246.96
- Two Bedrooms or more – 187 units x 2.54 PPU = 474.98

B. Retail Area – 0.0324 floor hectares x 50p/hectares = 1.62 population

Total Population = 246.96 + 474.98 + 1.62 = **723.56 ≈ 724**

Peak Factor $= 1 + \frac{14}{4 + P^{0.5}}$

Where, P = population in thousands

$= 1 + \frac{14}{4 + 0.724^{0.5}}$

= 1 + 2.89 = **3.89**

Expected Peak Flow Rate = 302.8 x 724 x 3.89

= 851,933 L/day = 9.86 L/s

6.0 WATER DISTRIBUTION SYSTEM

The proposed high rise condominium apartment will be serviced to the existing 300mm diameter watermain located on Dundas Street East.

The 300mm watermain will be utilized to provide external fire coverage for the building. New fire hydrant is required to be constructed on the 300mm watermain. **Refer to Dwg. 212-M107-1.**

Proposed new 200mm diameter watermain connection will be constructed for fire and 100 mm water service for domestic use for the proposed condominium.

Water Demand Calculations

A. Proposed Unit (Residential 308) (722 population, as per previous calculations)

Total Expected Peak Flow = 280 x 722 x 3.0

= 606,480 L/day = 7.02 L/s

Total Expected Maximum Daily Flow = 280 x 722 x 2.0

= 404,320 L/day = 4.68 L/s

Based on Fire Underwriter Survey 1999, the fire flow is calculated on the area of 2 largest floors + 50% of **8** floors using the following formula:

$F = 200\ C\sqrt{A}$

Where, C = coefficient of fire resistance construction == 0.60
A = area = 9,046
F = fire flow in L/min

F = 220 x 0.60 x √9,046 = 12,555 L/min = **209.24 L/s**

Calculated value can be reduced by 50% if automatic sprinkler system is included.

Therefore, F = 209.24 x 0.50 = **104.62 L/s**

B. Commercial Units

Total Expected Peak Flow = 300 x 2 x 3.0

= 2,700 L/day = 0.03 L/s

Total Expected Maximum Daily Flow = 300 x 2 x 1.40

= 840 L/day = 0.01 L/s

Maximum Peak Flow = 7.02 (Res.) + 0.03 (Com.) + 104.62 (Fire)

= **111.7 L/s**

Maximum Daily Flow = 4.68 (Res.) + 0.01 (Com.)

= **4.69 L/s**

The fire flow was conducted on the existing watermain and confirms that the existing system can provide sufficient domestic and fire flows. **See attached report.**

7.0 SUMMARY

The proposed high rise development can be fully serviced by connecting to existing services, which have been designed to accommodate the proposed development and therefore have sufficient capacity.

a. Dundas Street East will provide access to major road network.
b. Storm sewer outlet is to the existing Cooksville Creek.
c. 825 sanitary sewer is available on Dundas Street East to municipal easement and Cooksville Valley.
d. Watermain is available on Dundas Street East.

The findings and recommendations were prepared in accordance with accepted professional engineering principles and practices. Based on the above, the proposed development can be adequately serviced in accordance with the City's and Region's Standards. The findings of this report are global and are related to the servicing functionality of this application. These findings by no means are final and are not to replace the detail review of this application which shall take place upon submission of Site Plan or Servicing Agreement. In no case is the proposed development expected to negatively impact the existing infrastructure system.

Trusting that the above information will be satisfactory to your review and approval.

Yours truly,

SKIRA & ASSOCIATES LTD.

Michael Jozwik, P. Eng.
MJ:kg

NOTE: Limitation of Report

This report was prepared by **Skira & Associates Ltd.** for **Emblem Developments** and for review and approvals by government agencies only.

In light of the information available at the time of preparation of this report, any use by a **Third Party** of this report are solely the responsibility of such **Third Party** and **Skira & Associates Ltd.** accepts no responsibility for any damages, if any, suffered by the **Third Party.**

Worksheet
Worksheet for Circular Orifice

Project Description	
Worksheet	Orifice - 1
Type	Circular Orifice
Solve For	Diameter

Input Data		
Discharge	.0155	m³/s
Headwater Elevat	09.35	m
Centroid Elevatior	06.35	m
Tailwater Elevatio	06.19	m
Discharge Coeffic	0.60	

Results		
Diameter	65	mm
Headwater Height Above	3.00	m
Tailwater Height Above C	-0.16	m
Flow Area	3.4e-3	m²
Velocity	4.60	m/s

Applied
Fire Technology Inc.
Since 1987

Design • Consulting • Testing • Inspection

WATER SUPPLY TEST

Name of risk: ..... File No.: .....

Address: 120 DUNDAS STREET EAST Test by: AFTI

Municipality: MISSISSAUGA, ONT Date: JUNE 2, 2016

SYSTEM DATA:

Size of Main: 12" Dead End: ..... Two Ways: ✓ Loop: ✓

Source Reliable: YES If not explain: .....

Comments: .....

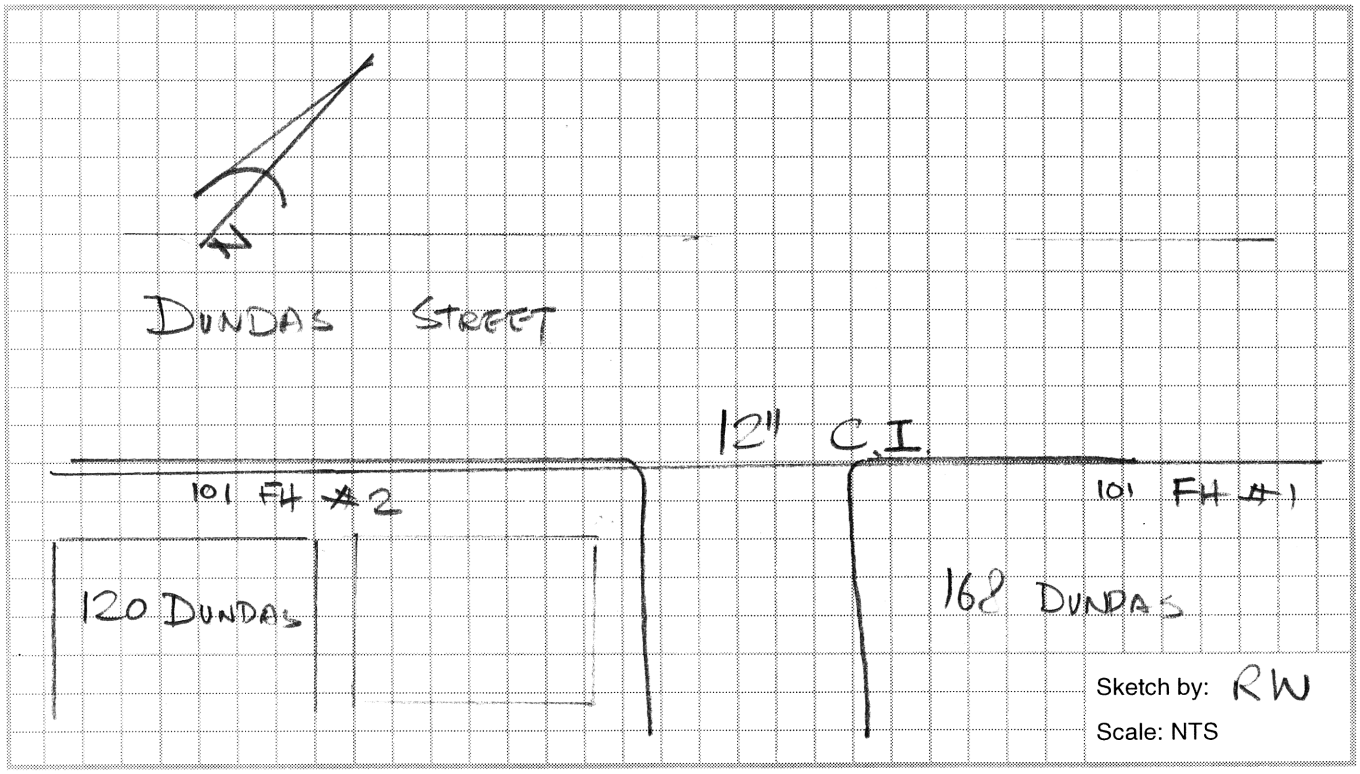
TEST DATA:

Location of test fire hydrants; Residual: #1 168 DUNDAS STREET EAST MISSISSAUGA

Flow: #2 120 DUNDAS STREET EAST MISSISSAUGA

Static pressure 74 psi Time: 10⁰⁰ A.M. — P.M.

Test No.	No. of Outlets	Orifice Size (in.)	Pitot Reading (psi)	Equivalent Flow gpm (U.S.)	Total Flow gpm (U.S.)	Residual Pressure (psi)	Comments
1	1	1¾	64	731	729	70	0.997
2	1	2½	62	1470	1323	68	0.9
3	2	2½	46	1265, 1265	2277	64	0.9
4							



Name and address of municipal authority who should receive a copy.

.....

STATIC: 74 PSI

(1) 729 USGPM@ 70 PSI

(2) 1323 USGPM@ 68 PSI

(3) 2277 USGPM@ 64 PSI

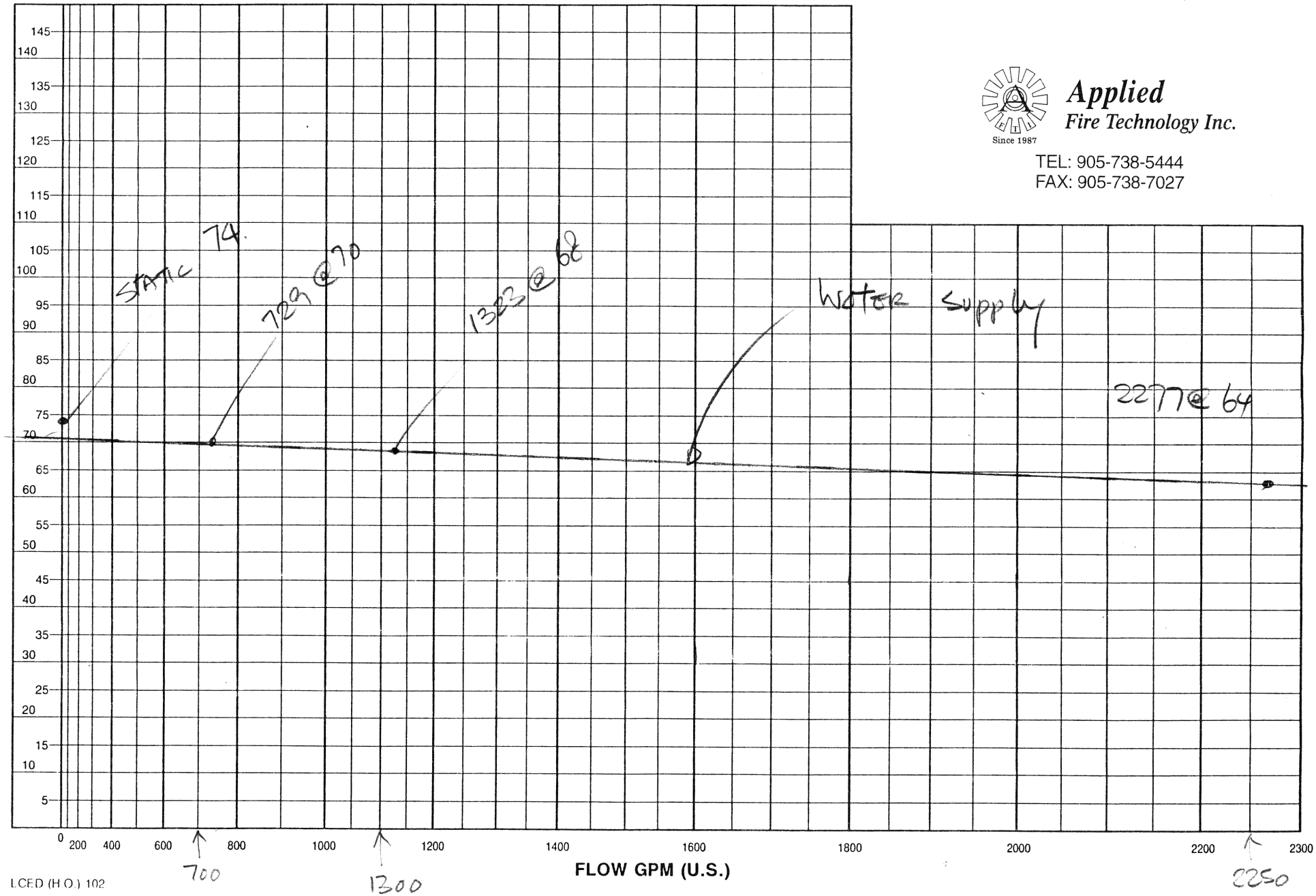
NAME OF RISK: _____ FILE NO.: _____

STREET: 120 DUNDAS STREET EAST

CITY: MISSISSAUGA, ONT.

DATE: JUNE 2. 2016 BY: AFT1

Applied
Fire Technology Inc.
Since 1987
TEL: 905-738-5444
FAX: 905-738-7027



LCED (H.O.) 102

Connection Multi Use Demand Table

WATER CONNECTION

Connection point [3]	DUNDAS STREET EAST			
Pressure zone of connection point				
Total equivalent population to be serviced [1]			724	
Total lands to be serviced			0.37 Ha	
Hydrant flow test				
Hydrant flow test location			120 DUNDAS ST. E.	
		Pressure (kPa)	Flow (in l/s)	Time
Minimum water pressure		441.3	143.66	
Maximum water pressure		482.6	45.99	

No.	Water demands			
	Demand type	Demand (in l/s)		
		Use 1 [5]	Use 2 [5]	Total
1	Average day flow	2.33	0.01	2.34
2	Maximum day flow	4.68	0.01	4.69
3	Peak hour flow	7.02	0.03	7.05
4	Fire flow [2]	104.62	—	104.62
Analysis				
5	Maximum day plus fire flow			109.31

WASTEWATER CONNECTION

				Total
Connection point [4]				MH 26
Total equivalent population to be serviced [1]		722	2	724
Total lands to be serviced				0.37 Ha
6	Wastewater sewer effluent (in l/s)			9.86

[1] The calculations should be based on the development estimated population (employment and/or residential).

[2] Please reference the Fire Underwriters Survey Document

[3] Please specify the connection point ID

[4] Please specify the connection point (wastewater line or manhole ID)
Also, the "total equivalent popopulation to be serviced" and the "total lands to be serviced" should reference the connection point. (The FSR should contain one copy of Site Servicing Plan)

[5] Please complete as many uses are necessary for the development.
(Please specify the use)

Please include the graphs associated with the hydrant flow test information table
Please provide Professional Engineer's signature and stamp on the demand table
All required calculations must be submitted with the demand table submission.