



November 3, 2014

Mr Ashraf Hanna, P.Eng.
Manager, Engineering & Construction Services
City of Toronto - Etobicoke York District
Etobicoke Civic Centre
399 The West Mall, 3rd Floor, South Block
Toronto ON M9C 2Y2

Our Reference: 13003.100

Dear Sir

**RE: Site Servicing Assessment
Proposed Residential Development
2313 & 2323 Lakeshore Boulevard West
Shoreline Towers Inc (c/o Osgoode Properties Ltd)
City of Toronto – Etobicoke York District**

GHD Inc. has been retained by *Shoreline Towers Inc (c/o Osgoode Properties Ltd)* to provide professional engineering services related to the preparation of a 'Site Servicing Assessment' for a proposed residential development to be located at the current municipal addresses of 2313 & 2323 Lakeshore Boulevard West, in the City of Toronto – Etobicoke York District.

This report has been prepared in support of the Rezoning Application being submitted for the subject lands. Included in the following is our account of the existing infrastructure in the vicinity of the subject lands, and recommendations for the provision of sanitary drainage, stormwater management, and water distribution / fire protection in accordance with City of Toronto criteria.

BACKGROUND

The subject lands included in the proposed development are located on the lands municipally known as 2313 & 2323 Lakeshore Boulevard West, in the City of Toronto – Etobicoke York District. The site is bound by several mid-rise residential buildings (incl. asphalt parking lots) to the north, two mid-rise residential buildings and Lakeshore Boulevard West to the west, several mid-rise residential buildings (incl. asphalt parking lots) to the south, and Lake Ontario to the east. Vehicular access to the site is currently provided off Lakeshore Boulevard West. The subject site is approximately 0.53 hectares in size. A key plan indicating the site location has been provided as **Figure 1.0** on the following page. A reduced copy of the proposed site plan and topographic / boundary survey plan have been included in **Appendix 'A'**.

The proposed development lands currently consist of an asphalt driveway and parking areas, and grassed areas.

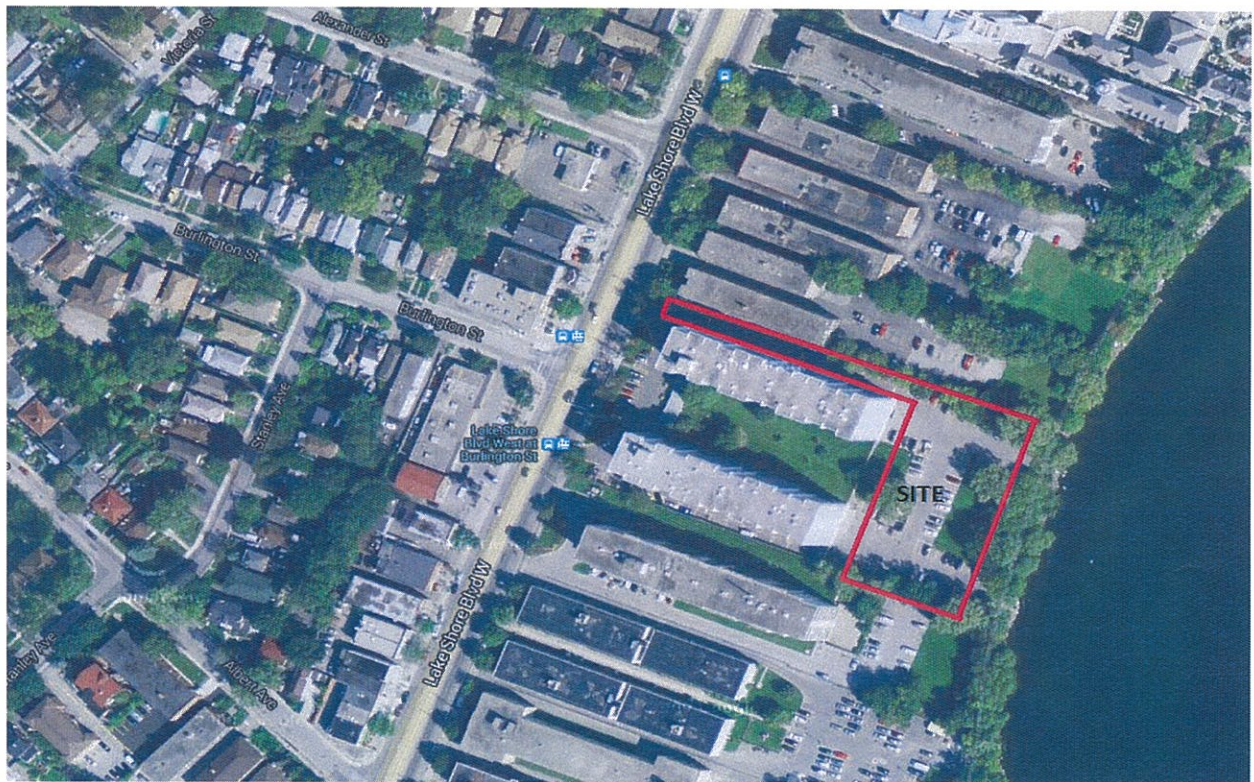
GHD

11 Allstate Parkway Suite 310 Markham ON L3R 9T8 Canada
T 1 905 752 4300 F 1 905 752 4301 E ytomail@ghd.com W www.ghd.com

The proposed development will consist of a 25-storey residential condominium tower with approximately two hundred and forty-one (241) units. The proposed building will also include approximately fifty-four (54) parking spaces to be located aboveground and three hundred and twenty-six (326) parking spaces to be provided within the underground garage structure. Access to the site will continue to be provided off Lakeshore Boulevard West.

The subject residential development being discussed herein is associated with the proposed Precinct B development initiative that is part of the overall Mimico 20/20 Revitalization Plan. The Mimico 20/20 Revitalization Plan consists of seven (7) development Precincts (A through G) that will see the construction of residential condominiums, parks, public road networks, and pedestrian pathways along the waterfront.

An 8-metre wide strip of land located along the northern portion of the subject site is proposed to be conceded to the City of Toronto to make up part of the municipal R.O.W. for a future public road network when Precinct A to the north develops. The municipal underground infrastructure will be designed to City of Toronto municipal road standards and implemented when the proposed building is constructed, but the surface configuration will only be constructed to City's municipal road standards when the balance of the road is conveyed. A 6-m driveway and fire route will be provided / maintained until the lands to the north develop.



*Source: Google Maps

Figure 1.0

The aforementioned future public road network to be constructed as part of the Precinct A development would be designed to current City of Toronto guidelines and standards.

SANITARY DRAINAGE

Existing Sanitary Drainage

Adjacent to the site and flowing westerly on Lakeshore Boulevard West is an existing 450mm diameter sanitary subtrunk sewer that discharges to an existing 900mm diameter sanitary trunk sewer located at the intersection of Lakeshore Boulevard West and Superior Avenue. Wastewater flows in this 900mm diameter sanitary trunk sewer are conveyed to a sewage pumping station located on Superior Avenue, and ultimately discharged to The Queensway sanitary trunk sewer via an existing 600mm diameter forcemain traveling northeasterly on Albert Avenue.

The size and location of the existing sanitary sewers in the vicinity of the subject site have been determined from information provided by the City of Toronto including sanitary drainage area maps, and record plan/profile drawings.

Proposed Sanitary Drainage

Contributing sanitary flows from the proposed redevelopment were calculated based on the following design criteria:

- A residential generation rate of 240 litres/person/day
- A residential population density of 1.4 persons/unit (1-bedroom / 1-bedroom+den)
- A residential population density of 2.1 persons/unit (2-bedroom)
- A residential population density of 3.1 persons/unit (within the 2-storey suites)
- A peaking factor of 4.0 (based on Harmon's equation)

Given the above noted criteria, a total unit count of 241 residential units, and a total equivalent population of approximately 422 persons, the peak wastewater flows generated by the proposed development was calculated to be approximately 4.7 l/s. Our calculations are presented in **Appendix 'B'**.

It should be noted that the sanitary drainage areas adjacent and upstream to the subject development site consist predominantly of single family dwellings, townhouse units, and small scale low-rise commercial buildings. As such, these areas would be contributing minimal flows to the downstream sanitary sewer system, and given the large size of the existing sanitary subtrunk sewers adjacent to the site, it is our opinion that there is adequate capacity within the system to accommodate the post-development sanitary flows from the subject development.

Nonetheless, to confirm that the sanitary flows from the subject development can be adequately accommodated through the existing sanitary infrastructure, we undertook an evaluation for the capacity of the adjacent existing 450mm diameter Lakeshore Boulevard West sanitary subtrunk sewer system at its shallowest leg, and found that this leg would be flowing at 51.7% of full capacity under post-development conditions.

Furthermore, based on a review of the conclusions drawn in the report titled 'Mimico 20/20 Revitalization Infrastructure Analysis and Functional Servicing Requirement' prepared by URS for the City of Toronto, and the external existing contributing areas, it is our opinion that the surrounding sanitary infrastructure can accommodate the subject residential development and other future redevelopments in the area as part of the Mimico 20/20 Revitalization.

We would propose the subject development be serviced via a single service connection to the 450mm diameter Lakeshore Boulevard West sanitary subtrunk sewer. The exact location and size of the proposed sanitary connection will be determined at the time of detailed design during the Site Plan Approval stage. The design of the aforementioned sanitary service connection would be subject to current City of Toronto guidelines and standards.

An investigation of the adjacent existing sanitary sewer including the confirmation of the invert elevations and slope / gradient for this sewer will be completed at the time of detail design during the Site Plan Approval stage of this project.

STORM DRAINAGE

Existing Storm Drainage

There is an existing 300-525mm diameter storm sewer adjacent to the subject site that travels westerly on Lakeshore Boulevard West and discharges to an existing 1500x1200mm storm box culvert flowing southeasterly on Superior Avenue. Storm flows in the Superior Avenue storm box culvert outlet easterly to Lake Ontario via a storm outfall located approximately 300 metres southeasterly to the subject development site.

The size and location of the existing storm sewers in the vicinity of the subject site have been determined from information provided by the City of Toronto including storm drainage area maps, and record plan/profile drawings.

The topography of the site indicates that storm runoff drained predominantly to Lake Ontario via overland flow under pre-development conditions.

Pre-Development Flows

The pre-development runoff rates for the site were calculated based on the following:

- Paved / impervious areas totalling approximately 4,188 m²
- Landscaped / pervious areas totalling approximately 1,150 m²

Based on the above, the 2-year, 5-year and 100-year pre-development release rates were calculated to be approximately 99.4 l/s, 148.5 l/s and 282.1 l/s respectively. Our calculations are included in **Appendix 'C'**.

Water Quality

Currently, there are no quality control measures incorporated on the subject lands. As such, all the runoff from the existing at-grade asphalt driveway and parking lot, which contains relatively high concentrations of contaminants (oil and grit), is currently being discharged untreated to the Lake Ontario.

Proposed Storm Drainage

Criteria

The proposed quantity/quality control criteria incorporated in the design of the internal servicing for the proposed redevelopment, are to be implemented as follows:

- Control the 100-year post-development flow to the allowable release rate for the site, based on the lesser of the 2-year pre-development flow, the 2-year event at a composite runoff coefficient of 0.5, or the capacity of the receiving storm sewer
- Storm flows greater than the 100-year storm to be directed to the surrounding road allowance and/or watercourse via overland flow
- Water quality control measures are to be implemented to achieve 80% overall TSS removal
- Implementation of the City's 'Wet Weather Flow Management' guidelines is required (including Water Balance)

The proposed development will be designed to meet the above outlined criteria and achieve Tier 1 of the Toronto Green Development Standards.

Post-Development Flows

Given the above criteria, the **allowable stormwater release rate** for the subject site was calculated to be **65.4 l/s** (2-year event @ C=0.5). Based on the proposed site plan for the subject redevelopment, the post-development runoff rate was calculated for the 100-year rainfall event. Our calculations were based on the following:

- Uncontrolled rooftop areas totalling approximately 1,627 m²
- Green rooftop areas totalling approximately 791 m² (incl. vegetated rooftop and planters)
- Impervious / paved areas totalling approximately 1,556 m²
- Pervious / landscaped / areas totalling approximately 1,364 m²

Based on the above, the 100-year post-development flow was determined to be approximately 236.7 l/s. Our calculations are presented in **Appendix 'C'**.

Since the 100-year post-development flows of 236.7 l/s exceed the allowable release rate of 65.4 l/s for the site, there will be a requirement for quantity controls and on-site storage. We have calculated that approximately 104 m³ of storage volume will be required to attenuate the aforementioned 100-year post-development flows to the allowable level. The required stormwater storage volume will be provided via the implementation of a stormwater storage cistern to be located within the underground of the proposed building; the details of which will be discussed further in a separate 'Stormwater Management Implementation Report' to be prepared at the time detailed design during the Site Plan Approval stage.

Quantity Control

We would propose that post-development storm flows from the site be directed to the existing 300-525mm diameter Lakeshore Boulevard West storm sewer via a single service connection. The exact size and

location of the service connection will be determined at the time of detailed design during the Site Plan Approval stage. The design of the aforementioned storm service connection would be subject to current City of Toronto guidelines and standards.

An investigation of the adjacent existing storm sewer including the confirmation of the invert elevations and slope / gradient for this sewer will be completed at the time of detail design during the Site Plan Approval stage.

An orifice tube or eccentric reducer will likely be required to control post-development storm flows to the allowable release rate for the site; however, this will be discussed further in a separate 'Stormwater Management Implementation Report' to be prepared at the time of detailed design during the Site Plan Approval stage.

Quality Control

Under post-development conditions, the majority of the site will consist of rooftop areas and landscaped areas, which are considered to produce runoff free of oil and grit contaminants. As such, it is possible that no specific on-site water quality control measures would be required for this development to achieve the City of Toronto's requirement for 80% T.S.S. removal. However, this issue will also be investigated further as part of a separate 'Stormwater Management Implementation Report' to be prepared at the time of detailed design during the Site Plan Approval stage.

Infiltration / Water Balance

Under the City of Toronto stormwater management criteria and in accordance with the City's 'Wet Weather Flow Management' guidelines, methods to enhance infiltration are to be implemented where possible. Due to the extent of the proposed underground parking garage, the opportunity for the implementation and the feasibility of servicing solutions that promote infiltration may be limited.

Given the above, a rainwater harvesting system may be required to achieve the City of Toronto's requirement for 5mm of initial abstraction. This matter will also be investigated further as part of a separate 'Stormwater Management Implementation Report' to be prepared at the time of detailed design during the Site Plan Approval stage.

Erosion and Sediment Control

Erosion and sediment control will be provided on-site during construction, including the provision of a silt fence around the site perimeter, silt sacks on the external catchbasins adjacent to the site and a mud mat at the access point of the site to control mud tracking by construction traffic. Regular maintenance of the erosion / sediment control measures presented herein will be implemented during the duration of construction.

WATER DISTRIBUTION

Water supply in the vicinity of the subject development site consists of existing 150mm and 300mm diameter watermain located on the north and south sides of Lakeshore Boulevard West respectively.

Based on information obtained from the City of Toronto, there is an abandoned 200mm diameter watermain just south of the aforementioned 300mm diameter watermain.

Domestic Demand

The domestic demand for the site is based on an equivalent population of approximately 422 persons. Given a consumption rate of 191 litres/capita/day for multi-unit low and high-rise buildings, the domestic demand for the site is as follows:

Average Day = 191 litres /capita/day x 422 persons = 56 litres/min.

Maximum Day = 1.3 x Average Day = 73 litres/min.

Peak Hour = 2.5 x Average Day = 140 litres/min.

Fire Demand

Based on the provided site plan, it is assumed that the building will have protected openings (as defined by the Fire Underwriters Survey) and a sprinkler system. It is also assumed that the building will be constructed of fire resistive material. Given the above, the estimated fire flow required is given by the following formula (as based on the Fire Underwriters Survey):

$$F = 220 * C * A^{0.5}$$

For a building with fire resistive construction, $C = 0.6$.

For fire resistive buildings with adequately protected vertical openings, 'A' is taken as the area of the largest floor plus 25% of each of the two immediately adjoining floors.

As such, $A = 3,213 \text{ m}^2$

Therefore $F = 7,000 \text{ litres/min.}$

As the proposed development will be built of fire resistive material, the fire flow can be reduced by 25%, thus $F = 5,250 \text{ litres/min.}$

As the development will be equipped with an automatic sprinkler system, the fire flow may be further reduced by 30% (equaling 1,575 litres/min).

$F = 3,675 \text{ litres/min.}$

Finally, the fire flow will be increased by 30% due to exposure to structures within 45 metres of the proposed building (equaling 1,575 litres/min).

Thus, $F = 5,000 \text{ litres/min.}$

Our calculations are included in **Appendix 'D'** at the back of this report.

Total Demand

The total demand is the greater of the Maximum Day Domestic plus the Fire Flow or the Peak Hour demand. Thus, the total demand for the subject development is approximately 5,073 litres per minute (85 litres per second or 1,340 U.S. gallons per minutes approximately).

To confirm the adequacy of the adjacent existing municipal water distribution system to meet domestic water supply and fire flow requirements for the proposed development, flow and pressure tests were undertaken adjacent to the subject site. At the direction of our firm, Corix Water Services Inc. conducted

flow and pressure tests on the 300mm diameter watermain located on Lakeshore Boulevard West on November 12, 2013 at 9:15 AM. The testing of this 300mm diameter watermain revealed a static pressure of 74 pounds per square inch and a residual pressure of 65 pounds per square inch at a fire flow rate of 725 U.S gallons per minute. Based on the above information, we have calculated the available flow at the desired residual pressure of 20 pounds per square inch, as per the guidelines provided by the 'National Fire Protection Association (NFPA)', to be approximately 1,910 U.S gallons per minute (approximately 7,230 litres per minute or 120.5 litres per second). The test results and fire flow / protection calculations are included in **Appendix 'D'**.

Given the above, we are satisfied that there is sufficient pressure and capacity in the existing water distribution system to accommodate the proposed development. We would therefore recommend that the subject development be serviced off the aforementioned existing 300mm diameter Lakeshore Boulevard West watermain via a single service connection. The exact size and location of the proposed service connection(s) will be determined at the time of detailed design prior to the Site Plan Approval stage. The design of the aforementioned water service connection would be subject to current City of Toronto guidelines and standards.

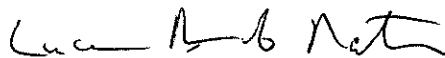
It should be noted that if the final height of the proposed residential building exceeds 84 metres, a second connection for fire protection will be provided.

CONCLUSION

Based on the above we are satisfied that the proposed development can be serviced utilizing the existing surrounding municipal infrastructure. This can be achieved without any adverse impact to the municipal services of the surrounding areas.

Please do not hesitate to contact our office should you have any questions or concerns regarding this assessment.

Sincerely
GHD Inc.




Lucanu B. Mateus, B.Eng., E.I.T.
Project Assistant
905 752 4386

LM/RS/jlm



Rasheed Serrao, P.Eng.
Group Leader, Urban Development
905 752 4380

Appendix A
Reduced Site Plan
Topographic / Boundary Survey Plan

	SCHAEFFER DZALDOV BENNETT LTD.			
	ONTARIO LAND SURVEYORS			
84 JARDIN DRIVE		CONCORD, ONTARIO L4K 3P3		TEL: (416) - 887-0101
DRAWN: SAM	CHECKED: RAP	SCALE 1:250	JOB No. 12-414-00	

PLAN OF SURVEY OF
PART OF LOTS 377, 378 AND 379, REGISTERED PLAN 164
AND PART OF
WATER LOT PATENTED TO THOMAS JOHN JERMYN JANUARY 3, 1896
IN FRONT OF LOTS 378 AND 379, REGISTERED PLAN 164
AND ALL OF
WATER LOT PATENTED TO THOMAS JOHN JERMYN MAY 23, 1898
IN FRONT OF LOTS 377 AND 378, REGISTERED PLAN 164

CITY OF TORONTO
(FORMERLY CITY OF ETOBICOKE)

Scale 1:500

Marshall Macklin Monaghan
Ontario Limited
ONTOARIO LAND SURVEYORS
2005

PE6422

I HEREBY CERTIFY THAT THIS PLAN IS IN ACCORDANCE WITH THE SURVEY ACT AND THE REGULATIONS MADE UNDER THEREOF

PLAN 66R-22062

DATE 13 SEPTEMBER, 2005

DATE Oct. 7, 2005

R.J. STEWART
ONTOARIO LAND SURVEYOR

R.J. STEWART
ONTOARIO LAND SURVEYOR

SCHEDULE					
PART	LOT	PLAN	OWNER	PIN	AREA
1	PART OF LOTS 377, 378 AND 379	REGISTERED PLAN 164			
2	ALL OF WATER LOT PATENTED TO THOMAS JOHN JERMYN MAY 23, 1898		1044893 ONTARIO LIMITED	ALL OF 07624-0201	1.0526 3.0557
3	PART OF WATER LOT PATENTED TO THOMAS JOHN JERMYN JAN. 3, 1896				1.4217 3.5131

PART 1, PLAN 66R-9323
CL 2019
CROWN LAND

ONTARIO

PART 1, PLAN 66R-9323
CL 2019
CROWN LAND

LAKE

LAKESHORE BOULEVARD WEST
REVERTED TO MUNICIPALITY BY O/C DATED FEBRUARY 21, 1929
PLAN No. 2530 (MTC PLAN A42-24)
PIN 07624-0219

PART 1 PLAN 66R-12411
(ACKNOWLEDGMENT AS
IN INST. No. H6689/011)

PART 1, PLAN 66R-18686
LOT 12, REGISTERED PLAN M-205

PART 1, PLAN 66R-18686

PART 3, PLAN 66R-18686

WATER LOT 1, IN FRONT OF LOT C, BROKEN CONCESSION

BEARING NOTE:

THE REFERENCE FOR BEARINGS IS THE NORTH LINE
OF PLAN 66R-0689, STATED THEREIN AS
BEING 100°14'44" WEST, BEING REFERRED
TO THE 1920 N. MERIDIAN

NOTE:

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE
CONVERTED TO FEET BY DIVIDING BY 0.3048

LEGEND

- 2 SURVEY MONUMENT FOUND
- 3 SURVEY MONUMENT PLANTED
- 4 STANDARD IRON BAR
- 5 SHORT STANDARD IRON BAR
- 6 IRON PIPE
- 7 ROUND IRON BAR
- 8 CEMENT CROSS
- 9 WOODEN CROSS
- 10 CROWN PATENT TO THOMAS JOHN JERMYN OLS 48170
- 11 CROWN PATENT TO THOMAS JOHN JERMYN OLS 48907
- 12 PLAN 66R-0123 (O-1019)
- 13 PLAN 66R-18686
- 14 INST. No. H6689/011
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- 100 INST. No. H6689/011

SURVEYOR'S CERTIFICATE

I CERTIFY THAT
THIS PLAN AND SURVEY ARE CORRECT AND IN ACCORDANCE WITH THE
SURVEY ACT, THE SURVEYORS ACT, THE LAND TITLES ACT AND
THE REGULATIONS MADE UNDER THEREOF

DATE 13 SEPTEMBER, 2005

R.J. STEWART
ONTOARIO LAND SURVEYOR

the toronto and region
conservation authority
5 Shoreham Drive, Downsview, Ontario
M3N 1S4

MARSHALL MACKLIN MONAGHAN
ONTOARIO LIMITED

Ontario
Land
Surveyors

Drawing No.
20.00.568-13

20.00.568-13

Appendix B

Sanitary Sewer Calculations

Project Name: 2313 & 2323 Lakeshore Blvd W
Project Number: 13003-100
Date Created: November 6, 2013
Date Printed: November 4, 2014

Sanitary Sewer Calculations (Proposed)

	Residential Unit Count 1-Bed / 1-Bed+Den	Residential Unit Count 2-Bed	Residential Unit Count 2-Storey Suite*	Total Residential Unit Count	Total Equivalent Population	Generation Rate (L/day)	Generation Peak Rate (L/s)
Current Proposed Development	141	85	15	241	422	101,376	4.7

Site Area = 0.53 Hectares
 Residential generation rate = 240 L/person/day
 Residential population density = 1.4 persons/unit (Bachelor, 1-Bed, 1-Bed+Den Units)
 Residential population density = 2.1 persons/unit (2-Bed, 2-Bed+Den Units)
 Residential population density = 3.1 persons/unit (3-Bed, 3-Bed+Den Units)
 Peaking factor = 4.0 (Based on Harmon's Equation)

*** Note: 2-Storey Suites were assumed to be 3-bedroom units**

Appendix C

Stormwater Management Calculations

PROJECT: 2313 & 2323 Lakeshore Blvd W
 PROJECT No: 13003-400
 CREATED: November 6, 2013
 PRINTED: November 4, 2014

STORMWATER MANAGEMENT CALCULATIONS
 2313 & 2323 LAKESHORE BOULEVARD WEST
 PRE - DEVELOPMENT
 PROPOSED RESIDENTIAL DEVELOPMENT
 CITY OF TORONTO - ETOBICOKE YORK DISTRICT

SITE AREA		5338 m ²			
CONTRIBUTING AREAS					
	<u>Area (m²)</u>				
Controlled Roof Areas:	0 m ²				
Uncontrolled Roof Areas:	<u>0 m²</u>				
Total Roof Areas:	0 m ²				
Uncontrolled Roof Areas:	0 m ²				
Paved / Impervious Areas:	4188 m ²				
Landscaped / Pervious Areas:	<u>1150 m²</u>				
TOTAL SITE AREA	5338 m ²				
TOTAL AREA	5338 m ²				
(Excluding Controlled Roof)					
	<u>Area (m²)</u>	<u>Area*RC</u>	<u>Percent</u>	<u>Runoff Coefficients</u>	
CONTROLLED ROOF AREAS:	0		0%		
UNCONTROLLED ROOF AREAS:	0	0	0%	Rooftops	0.90
PAVEMENT / IMPERVIOUS AREAS:	4188	3769	78%	Pavement/Concrete	0.90
LANDSCAPED / PERVIOUS AREAS:	<u>1150</u>	<u>288</u>	22%	Landscape	0.25
TOTAL AREA	5338	4057			
(Excluding Controlled Roof Area)					
COMPOSITE RUNOFF COEFFICIENT	0.76				

2 YEAR PRE-DEVELOPMENT FLOW

Time of Concentration	10 min		
2 year intensity	88.19 mm/hr		
Uncontrolled Roof Areas Runoff:	0.0 l/s		
Paved / Impervious Areas Runoff:	92.3 l/s		
Landscaped / Pervious Areas Runoff:	7.0 l/s		
RELEASE RATE:	99.4 l/s		

5 YEAR PRE-DEVELOPMENT FLOW

Time of Concentration	10 min		
5 year intensity	131.79 mm/hr		
Uncontrolled Roof Areas Runoff:	0.0 l/s		
Paved / Impervious Areas Runoff:	138.0 l/s		
Landscaped / Pervious Areas Runoff:	10.5 l/s		
RELEASE RATE:	148.5 l/s		

100 YEAR PRE-DEVELOPMENT FLOW

Time of Concentration	10 min		
100 year intensity	250.32 mm/hr		
Uncontrolled Roof Areas Runoff:	0.0 l/s		
Paved / Impervious Areas Runoff:	262.1 l/s		
Landscaped / Pervious Areas Runoff:	20.0 l/s		
RELEASE RATE:	282.1 l/s		

ALLOWABLE RELEASE

Runoff Coefficient	0.5		
2 year intensity	88.19 mm/hr	ALLOWABLE RELEASE RATE:	65.4 l/s

PROJECT: 2313 & 2323 Lakeshore Blvd W
 PROJECT No: 13003-400
 CREATED: November 6, 2013
 PRINTED: November 4, 2014

STORMWATER MANAGEMENT CALCULATIONS
 2313 & 2323 LAKESHORE BOULEVARD WEST
 POST - DEVELOPMENT
 PROPOSED RESIDENTIAL DEVELOPMENT
 CITY OF TORONTO - ETOBICOKE YORK DISTRICT

SITE AREA	5338 m ²				
CONTRIBUTING AREAS					
	<u>Area (m²)</u>	# Controlled Roof Drains	0		
		Controlled Roof Release Rate	0.0 l/s (# drains X 1.5 l/s each)		
Controlled Roof Areas:	0 m ²				
Green Roof Areas:	791 m ²				
Uncontrolled Roof Areas:	1627 m ²				
Total Roof Areas:	2418 m ²				
Paved / Impervious Areas:	1556 m ²				
Landscaped / Pervious Areas:	1364 m ²				
TOTAL SITE AREA	5338 m ²				
TOTAL AREA	5338 m ²				
(Excluding Controlled Roof Area)					
	<u>Area (m²)</u>	<u>Area*RC</u>	<u>Percent</u>	<u>Runoff Coefficients</u>	
CONTROLLED ROOF AREAS:	0		0%		
UNCONTROLLED ROOF AREAS:	1627	1464	30%	Non-Green Rooftop	0.90
GREEN ROOF AREAS:	791	198	15%	Green Rooftop	0.25
PAVED / IMPERVIOUS AREAS:	1556	1400	29%	Paved	0.90
LANDSCAPED / PERVIOUS AREAS:	1364	341	26%	Landscaped	0.25
TOTAL AREA	5338	3403			
(Excluding Controlled Roof Area)					
COMPOSITE RUNOFF COEFFICIENT	0.64				

2 YEAR POST-DEVELOPMENT FLOW

Time of Concentration	10 min				
2 year intensity	88.19 mm/hr				
		Controlled Roof Runoff:	0.0 l/s		
		Green Roof Runoff:	4.8 l/s		
		Uncontrolled Roof Runoff:	35.9 l/s		
		Contributing Roof Runoff:	40.7 l/s		
		Paved / Impervious Runoff:	34.3 l/s		
		Landscaped / Pervious Runoff:	8.4 l/s		
		RELEASE RATE:	83.4 l/s		

5 YEAR POST-DEVELOPMENT FLOW

Time of Concentration	10 min				
5 year intensity	131.79 mm/hr				
		Controlled Roof Runoff:	0.0 l/s		
		Green Roof Runoff:	7.2 l/s		
		Uncontrolled Roof Runoff:	53.6 l/s		
		Contributing Roof Runoff:	60.8 l/s		
		Paved / Impervious Runoff:	51.3 l/s		
		Landscaped / Pervious Runoff:	12.5 l/s		
		RELEASE RATE:	124.6 l/s		

100 YEAR POST-DEVELOPMENT FLOW

Time of Concentration	10 min				
100 year intensity	250.32 mm/hr				
		Controlled Roof Runoff:	0.0 l/s		
		Green Roof Runoff:	13.8 l/s		
		Uncontrolled Roof Runoff:	101.8 l/s		
		Contributing Roof Runoff:	115.6 l/s		
		Paved / Impervious Runoff:	97.4 l/s		
		Landscaped / Pervious Runoff:	23.7 l/s		
		RELEASE RATE:	236.7 l/s		

PROJECT: 2313 & 2323 Lakeshore Blvd W
 PROJECT No: 13003-400
 CREATED: November 6, 2013
 PRINTED: November 4, 2014

STORMWATER MANAGEMENT CALCULATIONS
 2313 & 2323 LAKESHORE BOULEVARD WEST
 REQUIRED STORAGE VOLUME
 PROPOSED RESIDENTIAL DEVELOPMENT
 CITY OF TORONTO - ETOBICOKE YORK DISTRICT

DESIGN

100 YEAR POST TO 2 YEAR @ 0.5

CONTROL 100 YEAR POST TO 2 YEAR PRE

SITE AREA (LESS CONTROLLED ROOF)

5338 m²

ALLOWABLE RELEASE FROM SITE

65.4 l/s

COMPOSITE RUNOFF COEFFICIENT

0.64

TIME OF CONCENTRATION

10 minutes

100 YEAR STORM $I = 59.7 / (t/60)^{0.80}$

TIME	RAINFALL	CONTROLLED ROOF	ROOF, IMPERVIOUS	TOTAL	STORAGE
minutes	INTENSITY	RUNOFF	& PERVIOUS	RUNOFF	VOLUME
	mm/hr	l/s	l/s	l/s	m ³
1.0	1579.4	0.0	1493.2	1493.2	85.7
2.0	907.1	0.0	857.6	857.6	95.1
3.0	655.8	0.0	620.0	620.0	99.8
4.0	521.0	0.0	492.6	492.6	102.5
5.0	435.8	0.0	412.0	412.0	104.0
6.0	376.7	0.0	356.1	356.1	102.9
7.0	333.0	0.0	314.8	314.8	99.8
8.0	299.2	0.0	282.9	282.9	96.3
9.0	272.3	0.0	257.5	257.5	92.5
10.0	250.3	0.0	236.7	236.7	88.6
11.0	231.9	0.0	219.3	219.3	87.8
12.0	216.3	0.0	204.5	204.5	86.8
13.0	202.9	0.0	191.8	191.8	85.7
14.0	191.2	0.0	180.8	180.8	84.4
15.0	181.0	0.0	171.1	171.1	83.0
16.0	171.9	0.0	162.5	162.5	81.5
17.0	163.7	0.0	154.8	154.8	79.9
18.0	156.4	0.0	147.9	147.9	78.1
19.0	149.8	0.0	141.6	141.6	76.3
20.0	143.8	0.0	135.9	135.9	74.5
21.0	138.3	0.0	130.7	130.7	72.5
22.0	133.2	0.0	125.9	125.9	70.5
23.0	128.6	0.0	121.5	121.5	68.4
24.0	124.3	0.0	117.5	117.5	66.3
25.0	120.3	0.0	113.7	113.7	64.1
26.0	116.6	0.0	110.2	110.2	61.9
27.0	113.1	0.0	106.9	106.9	59.7
28.0	109.8	0.0	103.8	103.8	57.4
29.0	106.8	0.0	101.0	101.0	55.0
30.0	103.9	0.0	98.3	98.3	52.6

REQUIRED STORAGE: 104.0 m³

Appendix D
Fire Flow Calculations
Fire Protection Calculations
Flow & Pressure Test Results

Fire Flow Calculations

As per Fire Underwriter's Survey Guidelines

PROJ: 2313 & 2323 Lakeshore Blvd West
JOB#: 13003-100

DATE CREATED:
DATE PRINTED:

January 28, 2013
November 4, 2014

C	Coefficient related to type of construction		[yes/no]	
	• Wood frame			1.5
	• Ordinary construction			1
	• Non-combustible construction			0.8
	• Fire resistive construction (< 2 hrs)			0.7
	• Fire resistive construction (> 2 hrs)	yes		0.6
	• Interpolation (Using FUS Tables)			
A	Area of structure considered (m ²)	3,213	<==>	34,587 ft ²
F	Required fire flow (L/min)			
	F = 220 C (A) ^{0.5}		7,000 L/min	
	Occupancy hazard reduction of surcharge		[yes/no]	
	• Non-combustible	yes		-25%
	• Limited combustible			-15%
	• Combustible			0%
	• Free burning			15%
	• Rapid burning			25%
				5,250 L/min (1)
	Sprinkler Reduction			
	• Non-combustible - Fire Resistive (3)	yes	30%	1,575 L/min (2)
	Exposure surcharge (cumulative (%), 4 sides)		[yes/no]	
	0 - 3 m			25%
	3.1 - 10 m			20%
	10.1 - 20 m	yes	15%	2 side 30%
	20.1 - 30 m		10%	
	30.1 - 45 m		5%	
	Cumulative Total			30%
				1,575 L/min (3)
<div style="border: 1px solid black; padding: 5px;"> REQUIRED FIRE FLOW [(1) - (2) + (3)] (2,000 L/min < Fire Flow < 45,000 L/min) <div style="display: flex; justify-content: space-between;"> <div>or</div> <div>5,000 L/min</div> </div> <div style="display: flex; justify-content: space-between;"> <div>or</div> <div>83.33 L/s</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>1,321 USGPM</div> </div> </div>				

Fire Protection Computations

As per the 'National Fire Protection Association (NFPA) Guidelines

PROJ: 2313 & 2323 Lakeshore Blvd W
JOB#: 13003-100

DATE CREATED:
DATE PRINTED:

November 12 2013
November 4, 2014

Q_F Observed Flow

c Coefficient; 0.90 - 1.0*

d Nozzle / Outlet Diameter

p Pitot Pressure

c 1.00

d 1.75 in.

p 63 psi

$$Q_F = 29.83 * c * (d^2) * (p^{0.5}) \text{ U.S. GPM}$$

Q_F 725 U.S. GPM

Q_R Available Flow

h_R Drop in pressure from static pressure to
desired residual baseline pressure

h_F Drop in pressure from static pressure to
actual residual pressure measured during test

Static Pressure 74 psi

Desired Residual Pressure 20 psi

Measured Residual Pressure 65 psi

$$Q_R = (Q_F) * (h_R^{0.54}) / (h_F^{0.54}) \text{ U.S. GPM}$$

Q_R 1,910 U.S. GPM

or 7,230 L/min

or 121 L/s

Note: Coefficient of 1.0 used when Flow Straightener is utilized on the fire hydrant



Water Services

10 Estate Drive, Toronto, Ontario M1H 2Z1

Phone: 416.282.1665 Fax: 416.282.7702 Toll Free: 1.888.349.2493

www.corix.com

SITE NAME: 2313 Lakeshore Blvd W. Etobicoke DATE: Nov 12/13

LOCATION: 2313 Lakeshore Blvd W. Etobicoke

TEST DATA TIME OF TEST: 9:15 Am

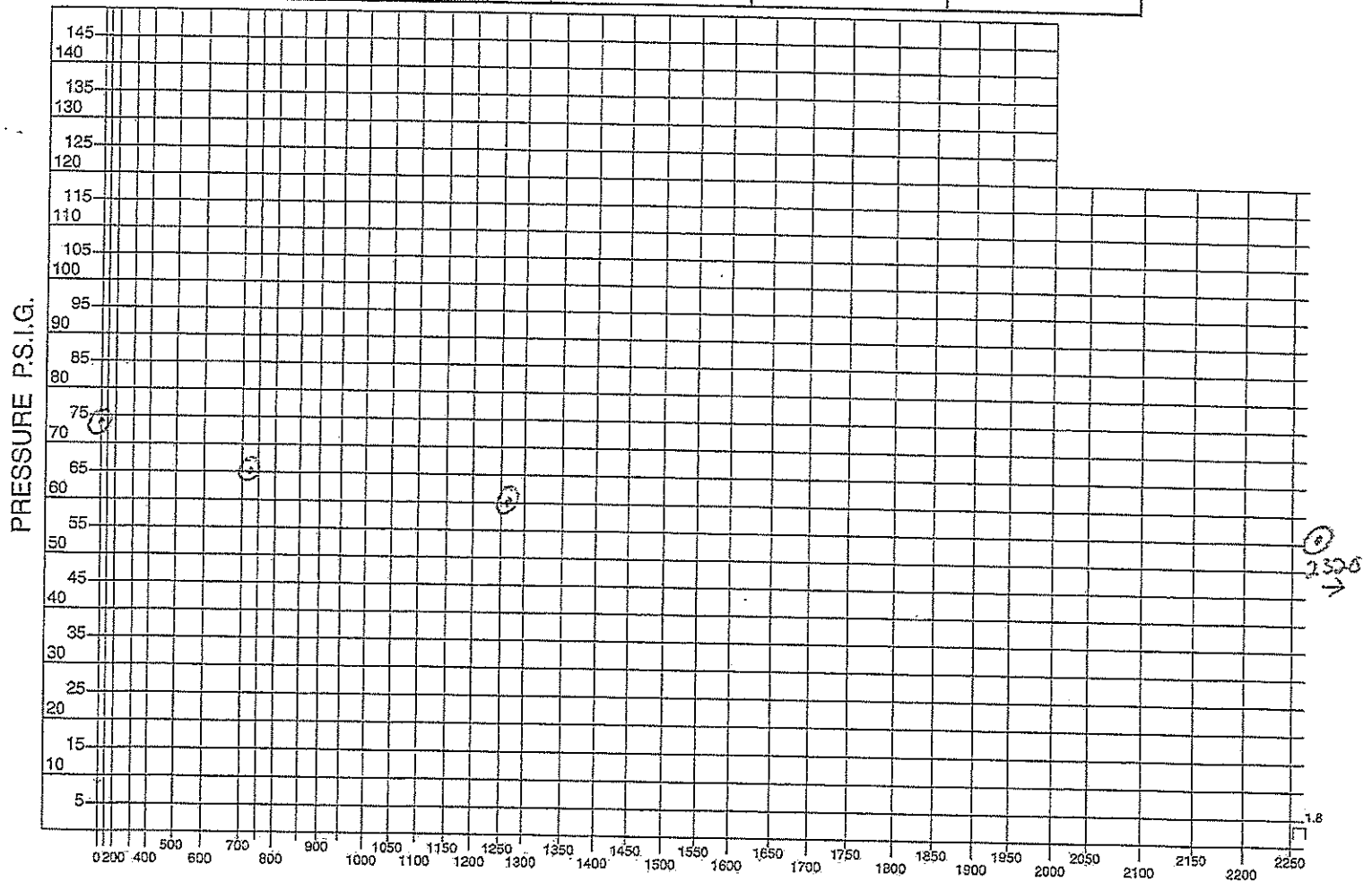
LOCATION OF TEST: (FLOW) 2313 Lakeshore Blvd (Cerr 3P)

(RESIDUAL) 2335 Lakeshore Blvd (Kentville 3P)

MAIN SIZE: 300mm

STATIC PRESSURE: 74

	NUMBER OF OUTLETS & ORIFICE SIZE	PITOT PRESSURE	FLOW (U.S. G.P.M.)	RESIDUAL PRESSURE
#1	1x1 3/4	63	721	65
#2	1x2 1/2	56	1253	60
#3	2x2 1/2	48	2320	56
#4				



FLOW U.S. G.P.M.

COMMENTS: Performed one NFPA 291 Flow Test

Authorized Signature _____ Corix Water Services Signature [Signature]

www.ghd.com

