FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

IN SUPPORT OF RE-ZONING & DRAFT PLAN OF SUBDIVISION APPLICATIONS

Regent Park Phases 4 and 5

City of Toronto

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File Number: 20030

Prepared For:

Toronto Community Housing Corp.

&

2747199 Ontario Limited (Tridel)

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No.	**Revision**	**Date**

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1.0 INTRODUCTION

1.1 PURPOSE

Counterpoint engineering has been retained by Toronto Community Housing Corporation (TCHC) and their development partner *2747199 Ontario Limited (Tridel)* to prepare this Functional Servicing & Stormwater Management Report in support of the Rezoning and Draft Plan of Subdivision applications being submitted for the subject lands.

The purpose of this Report is to address conceptually the provision of storm and sanitary sewers, stormwater management, water distribution, and road servicing for the proposed residential development. Additionally, the Report will provide details on stormwater management in response to Toronto's Wet Weather Flow Management Master Plan (WWFMMP) Guidelines.

This Report is also intended to meet the requirements of development approval required under the Planning Act, which in turn satisfies the conditions for the Municipal Class Environment Assessment process for the storm and sanitary sewers, stormwater management, water distribution and road servicing for the subject lands.

1.2 BACKGROUND

The phase 4 & 5 Regent Redevelopment lands are located between Oak Street to the south, Gerrard Street East to the North, River Street to the east and Dreamers Way to the west. The redevelopment block is subdivided by existing TCHC owned Sackville Street & Sumach Street that run between Oak Street and Gerrard Street. Although not municipal roads, both streets have existing municipal combined sewers and Watermains. This report is intended to supplement to the original May 2005 FSR prepared by Dillon Consulting. The remaining redevelopment area is approximately 6.45 ha and is made up of three redevelopment blocks with two existing public roads (Sackville Street & Sumach Street) and a new Public Road (Tubman Avenue).

It should be noted that as part of the revitalization of Regent Park new municipal roads with new/revitalize municipal servicing has been installed on Oak Street, Sackville Street, Sumach

Street and Tubman Avenue between River Street to the east, Parliament Street to the west, Dundas Street East to the south and Oak Street to the north. Additionally, Dreamers Way between Oak Street and Gerrard Street just east of Parliament Street. As mentioned above, the roads and their associated sewers and watermains are active and are in the process of final maintenance and assumption.

The proposed redevelopment for the subject site will consist of 4 development blocks with 5 midrise buildings of a maximum of 12 stories and 7 high rise buildings ranging from 18 to 39 stories. Each of the three development blocks will have a common element underground that is shared and accessed by the buildings above. Ownership of the mid and high rise buildings will be split between TCHC and Market units. Refer to the proposed Building Heights & Setbacks plan prepared by Karakusevic Carson Architects.

1.3 STUDY PARAMETERS

The background documents listed below have been considered in the functional grading and servicing design for the proposed site and preparation of this Report:

- Concept Master Plan prepared by Karakusevic Carson Architects;
- City of Toronto Design Criteria for Sewers and Watermains, 2021;
- City of Toronto Wet Weather Flow Management Guidelines, November 2006;
- Toronto Sewer Atlas, 2010
- Fire Underwriters Survey, 1999

2.0 STORMWATER MANAGEMENT

2.1 EXISTING CONDITIONS

The site is currently serviced by the existing municipal infrastructure within the adjacent roads to the blocks. As storm sewer were only introduced to this area in the past few years because

of the earlier Regent Park Phases, storm flows from the existing buildings and surfaces drain to the existing combined sewers. Additionally, the current buildings have no on-site quality or quantity controls.

Under the original redevelopment condition, the 6.45 ha site is identified to have three main drainage areas. Block 1 & and the western third of Block 2 drains to the Dundas Street Storm Trunk via the Storm sewer on Sackville. The remainder of Block 2 drains to the Dundas Street Storm Trunk via the Sumach Storm sewer and Blocks 3 and 4 drain to the Dundas Storm Trunk via storm sewers on Tubman Avenue. Refer to the **Storm Drainage Plan SD-1** in appendix 'A' for the existing proposed drainage patterns and areas.

2.2 PROPOSED CONDITIONS

Each of the Four redevelopment blocks will be developed with a common element underground encompassing the majority of the blocks. As such the allowable release has been calculated assuming one Stormwater Management Tank per Building underground per ownership element except for part of Block 2 that will have no underground. The storage for these buildings (2F and 2G) will be provided by an underground storage system to be connected to the Oak Street Storm sewer. The eastern third of Block 2 that was previously designed with the drainage split between the two outlets has been redirected to solely drain to the Sumach Storm sewer. As this is additional flow to the Sumach outlet, the capacity of the Oak and Sumach Storm sewers were reviewed. The review determined that the addition of this small area (0.37 ha @ 0.50) would not impact the existing drainage system. The stormwater tanks for the majority of the buildings will be located near or along the Oak Street frontage and connections will be made to the storm sewers within the adjacent ROW.

2.3 ALLOWABLE RELEASE RATE

The sites imperviousness under existing conditions is higher than 50%. Under Wet Weather Guidelines the maximum value of C (Runoff Coefficient) used in calculating the pre-development peak runoff rate is limited to 0.50 for the 2-year storm event. As the existing site has greater than 50% imperviousness this rule applies.

In Table 1a below the allowable release rates for the development blocks have been broken down based on the building ownership (TCHC/Market). Table 1b speaks to the allowable release rates for the three public roads. The allowable release from buildings and roads have been based on the above criteria and has been displayed in the table below.

$$Q_A = C \times A \times i \times N \text{ (L/s)}$$

Table 1a - Allowable Release Rate Buildings

Variables	Building 1A	Building 1B & C	Building 2D & E	Building 2F & G	Building 2H & I	Building 3J & K	Building 4L & M
A - Site Area (ha)	0.55	1.01	0.81	0.60	0.95	0.94	0.96
Tc (min)	10	10	10	10	10	10	10
C - Runoff Coefficient	0.50	0.50	0.50	0.50	.5	0.50	0.50
i - Intensity	88.19	88.19	88.19	88.19	88.19	88.19	88.19
N – Constant	2.778	2.778	2.778	2.778	2.778	2.778	2.778
Q - Release Rate (L/s)	**67.4**	**123.7**	**99.2**	**73.5**	**116.4**	**115.1**	**117.6**

Table 1b - Allowable Release Rate Roads

Variables	Sackville Street	Sumach Street	Tubman Avenue
A - Site Area (ha)	0.22	0.23	0.18
Tc (min)	10	10	10
C - Runoff Coefficient	0.50	0.50	0.50
i - Intensity	88.19	88.19	88.19
N – Constant	2.778	2.778	2.778
Q - Release Rate (L/s)	**26.9**	**28.2**	**22.0**

2.4 QUANTITY CONTROL

The allowable post development release rate to the redevelopment Blocks will be **218.0, 317.3 & 254.8 L/s** as individually calculated in Section 2.3.

Quantity control will be provided on-site via underground storage tanks/systems within the P1 Levels of the common element undergrounds for each TCHC/Market Buildings. The storage for auxiliary buildings (2F and 2G) will be provided by an underground storage system to be connected to the Oak Street Storm sewer. To ensure that the 100-year post development peak flows from the sites are attenuated to their 2-year allowable release rate. An onsite storage system and orifice control device will be required on each storm service connection. Refer to **Appendix A** for detailed calculations.

Table 2 – Peak Flow and Storage Summary - 100-Year Storm Event

Area ID	Area (ha)	Runoff Coefficient	t_c (min)	Storage Available (m^3)	Storage Required (m^3)	100-Year Release Rate (L/s)	Description	Size (mm)
Outlet to Sackville								-
Building 1A	0.55	0.85	10		155	67.4	TBD	
Building 1B&C	1.01	0.85	10		284	123.7	TBD	
Sackville ROW	0.22	0.85	10		62	26.9	TBD	
	1.78	0.85	10		501	218.0		Outlet Allowable 218.0 l/s
Outlet to Sumach								
Building 2D&E	0.810	0.85	10		228	99.2	TBD	
Building 2F&G	0.600	0.85	10		169	73.5	TBD	
Building 2H&I	0.950	0.85	10		267	116.4	TBD	
Sumach ROW	0.230	0.85	10		65	28.2	TBD	
	2.59	0.85	10		501	317.3		Outlet Allowable 317.3 l/s
Outlet to River								
Building 3J&K	0.940	0.85	10		265	115.1	TBD	
Tubman ROW	0.180	0.85	10		51	22.0	TBD	
Building 4L&M	0.960	0.85	10		270	117.6	TBD	
	2.08	0.85	10		585	254.8		Outlet Allowable 254.8 l/s
Total	6.450			0	1587	790.1		

1. Refer to **Appendix A** for modified rational calculations.

In emergency and/or extreme weather conditions the at grade access lid to the underground storage tank located adjacent to Oak Street will allow water to discharge overland to the municipal street. The access lid is to be as per OPSD 401.010 – Type B – Open Cover.

The design of all internal piping within the building must provide adequate capacity for full capture and conveyance of all flows generated by storms up to and including the 100-year rainfall event. All design and associated calculations for the internal storm system, including the design of the internal inlet structures, piping and mechanical appurtenances is to be completed by the Mechanical Engineer.

Table 3 – Approved vs Proposed Release Rates

Area ID	Area (ha)	Runoff Coefficient	t_c (min)	Intensity (i)	Approved Release Rate (L/s)	Proposed Release Rate (L/s)
Outlet to Sackville	2.130	0.58	10	88.19	301.1	218.0
Outlet to Sumach	2.230	0.61	10	88.19	333.9	317.3
Outlet to Tubman	2.080	0.54	10	88.19	273.4	254.8
	6.440					

Based on the Table 3 above the approved allowable release from the development blocks and roads are greater than the proposed release rates. As such, there will be capacity within the existing Storm sewer system to service the proposed development.

2.5 FOUNDATION DRAINAGE

As per the City of Toronto's Sewer-Use Bylaw, sewer connections for foundation drainage are not permitted. Groundwater flow have not been included in the storm or sanitary flow calculations. All building will be built with watertight foundations.

2.6 WATER QUALITY

The Wet Weather Flow Management Guidelines stipulate that 80% removal of TSS is required on an average annual loading basis from all runoff leaving the proposed development.

Each block at detailed design will be evaluated based on land-use to determine the initial TSS removal credit and the amount of remaining TSS removal required. The site shall also capture the 5mm storm event, which will capture an average of 50% of annual rainfall, therefore removing this volume out of the runoff discharged, and providing a 50% TSS removal average. A stormwater treatment unit shall be provided for each block connection, which provides an additional TSS removal. The treatment units are proposed to be upstream of each of the proposed storm connections from the sites to the receiving municipal sewers in the right-of-way. These combined efforts will achieve the 80% TSS removal target.

2.7 WATER BALANCE

The Wet Weather Flow Guidelines indicate that the minimum on-site runoff retention requires the proponent to retain all runoff from a small design rainfall event for impervious areas – typically 5mm (In Toronto, storms with 24 hour volumes of 5mm or less contribute about 50% of the total average annual rainfall volume). Water balance efforts such as the use of green roofs, landscaped areas, and water reuse cisterns will be provided to achieve the required water balance objectives.

A water reuse cistern is suggested as a low-impact development strategy for each of the blocks/block connections that are sized to provide storage for the 5mm storm. These water balance efforts, along with the approximate provided landscape areas will provide adequate 5mm water balance for the entire site. Further details will be provided during detailed design.

2.8 EROSION AND SEDIMENT CONTROL

During construction, erosion and sediment control will be implemented on site. This will be achieved through methods such as installation of a silt fence around the perimeter of the site, placement of mud mats at site access points to municipal roadways and the use of sediment control barriers at catchbasins located in proximity to the site. Further site specific erosion and

sediment control measures will be considered during detailed design which is to be completed after draft plan approval is granted.

3.0 SANITARY SERVICING

3.1 EXISTING SANITARY SERVICING

As part of the previous three development phases of the Regent Park Revitalization the existing combined sewers servicing the future phases 4 and 5 were replaced with separated Storm and Sanitary sewer that were installed on Oak Street. Under the proposed condition the Sanitary flows for the new phases will be conveyed to either the Sackville, Sumach or River Street outlet to the HLI. Capacity for the future development blocks have been created by eliminating the Storm flows from the existing combined sewer system. This will be discussed in detail in a later section of this report. For previous subdivision sewer works please refer to the Drainage Plans attached to the report in **Appendix B**.

3.2 PROPOSED SANITARY RELEASE RATE

The proposed developments will be serviced by municipal connections to the existing sanitary sewers on Oak Street and/or to the Combined sewers on Sackville or Sumach. As discussed above the Sanitary capacity of the development has been created by directing the storm flows from the site away from the combined sewer system and to the dedicated storm sewers constructed as part of the previous phases of work.

Using the City of Toronto Sanitary Design criteria, the equivalent population for the proposed buildings were determined and Sanitary flows calculated and summarized based on the collecting sewer branch that discharges to the HLI. Details on each building within the development can be found in **Appendix B**.

The equivalent population for the proposed development was calculated using the non-residential floor space, the residential unit breakdown, the city of Toronto person per unit and office space guidelines to be approximately **6880 persons**. Using a per capita flow of **240 l/s** for residential areas and **250 l/s** for commercial areas, the resulting peak sanitary flow for the

proposed development has been calculated to be approximately **65.53 l/s** including an infiltration allowance of 0.26 L/s/ha. Refer to **Appendix B** for detailed calculations.

Table 4 – Sanitary Discharge Summary

Drainage Outlet	Existing Sanitary (L/S)	Offset Storm Flows (L/S)	Proposed Sanitary (L/s)	Net Change (L/s)	Approved Sanitary Discharge Phase III (L/s)
Sackville					
Block 1	13.2	253.5			
Part of Block 2	4.29	83.19			
Total	17.49	336.69	26.39	327.79	19.68
Sumach					
Block 2	8.27	159.2	10.96	156.51	12.57
River					
Block 3 & 4	12.07	254.8	28.18	238.69	21.63

Based on the offset of the storm flows there is capacity within the existing sewer system for the proposed redevelopment. Based on this methodology the site will be in compliance with MECP Procedure F-5-5. However, as the Proposed Sanitary flows are greater than the previously approved flows for the Sackville and River outlets a review of the local Oak Street sanitary sewer capacity was undertaken. The results of the Oak Street capacity review have been included in **Appendix B**. Based on the calculations both the Sackville Outlet and the River Outlet have free flow capacity after the additional sanitary flows were added. As such, we expect no capacity issues within the Sanitary drainage system and the existing infrastructure can support the Phase IV & V revitalization as proposed.

4.0 WATERMAIN SERVICING

4.1 EXISTING WATER SERVICING

The existing site as well as the surrounding municipal roads currently have a watermain network servicing the site. The existing site buildings are currently serviced by connections to the existing municipal watermains. The available surrounding watermains are as follows:

- An existing 200mm watermain along Oak Street
- An existing 200mm watermain along Dreamers Way
- An existing 150mm watermain along Gerrard Street East
- An existing 150mm watermain along River Street
- An existing 300mm watermain along Sumach Street
- An existing 150mm watermain along Sackville Street

4.2 DOMESTIC DEMAND

The expected domestic water usage rate for the development was calculated based on site stats and usage rate of **190 litres/capita/day** for apartments and condominiums based on the City's required per capita demand. Maximum day and peak hour factors were based on the City of Toronto Design Criteria for residential and commercial land use and calculated by separately defined blocks.

The domestic demands for each development block within the site have been calculated and summarized in **Table 5** below. Refer to **Appendix C** for water demand calculations.

Table 5 – Domestic Water Demand Summary

Building	Population	Maximum Day Flow (l/min)	Peak Hour Flow (l/min)	Minimum Hour Flow (l/min)
1A	634	109	210	70
1B	471	81	155	52
1C	777	134	257	86
2D	388	67	129	43
2E	530	91	175	59
2F	153	26	50	17
2G	16	2	5	2
2H	445	77	147	50
2I	540	93	179	60
3J	459	79	152	51
3K	682	117	226	76
4L	542	93	179	60
4M	1262	217	417	140
TOTAL	**6880**	**1166**	**2181**	**762**

4.3 FIRE DEMAND

Fire flow demand was estimated using the Fire Underwriters Survey. The development blocks primarily consist of residential apartment buildings with retail/office areas. Each apartment building was assumed to be of fire-resistive construction and sprinklered. This means that the floor area shall be estimated using the largest floor area plus 25% of the next two adjoining floors. Fire flow was calculated for the observed critical/largest building of the site. It was determined that the most critical fire flow was identified at Building 4L, which had a resulting fire flow of **9,000 L/min**. Refer to **Appendix C** for the fire flow demand calculations for the critical Blocks on-site.

4.4 TOTAL DEMAND

The total demand is the greater of Maximum Day + Fire Flow or the Peak Hour Demand. Based on Fire Flow requirements, Maximum Day + Fire Flow governs the water demand for the proposed development**.** Therefore, the development shall provide the required flow and pressures during max day demand, which is summarized for each block above in **Table 5**, plus

fire flow. Based on the calculations, it is anticipated that Building 3L will govern the overall max day plus fire flow demand requirement of **9,093 L/min** (9,000 L/min + 93 L/min).

The City of Toronto Design Criteria sets out watermain pressure requirements and can be summarized as follows:

1. Maximum Pressure = under normal conditions the maximum static pressure shall not exceed 690 kPa (100 psi).
2. The minimum pressure under any non-fire demand scenario will not be less than 275 kPa (40 psi)
3. Under conditions of simultaneous maximum day and fire flow demands, the pressure shall not drop below 140 kPa (20 psi) at any point in the water system.

The capacity of the surrounding watermain infrastructure was confirmed around the proposed development by a series of flow test conducted by Lozzi Aqua Check on November 17, 2021. Copies of the flow tests have been included in **Appendix C** with the for detailed calculations of the water demand. Based on observations, there are no anticipated issues with the water servicing for the development.

5.0 PROPOSED PUBLIC ROADS

The redevelopment site is well serviced by a network of existing public roads that will provide access to the development blocks. As a result, only one new public road is proposed (Tubman Avenue). The surface treatment of existing Sackville Street and Sumach Street will be modified to provide a better pedestrian experience and these existing roads will be made Municipal streets as well. A proposed cross section for Tubman Avenue has been included in **Appendix C**.

6.0 CONCLUSIONS

This FSR/SWM report presents a site servicing strategy for the proposed development that addresses the requirements of the applicable regulatory agencies and provides the basis for detailed servicing and Stormwater management design. Based on the review of the existing municipal servicing, the proposed redevelopment can be accommodated with no adverse downstream impact or any external upgrades.

We trust this report sufficiently addresses all aspects of the site servicing.

Sincerely,
Counterpoint Engineering Inc.

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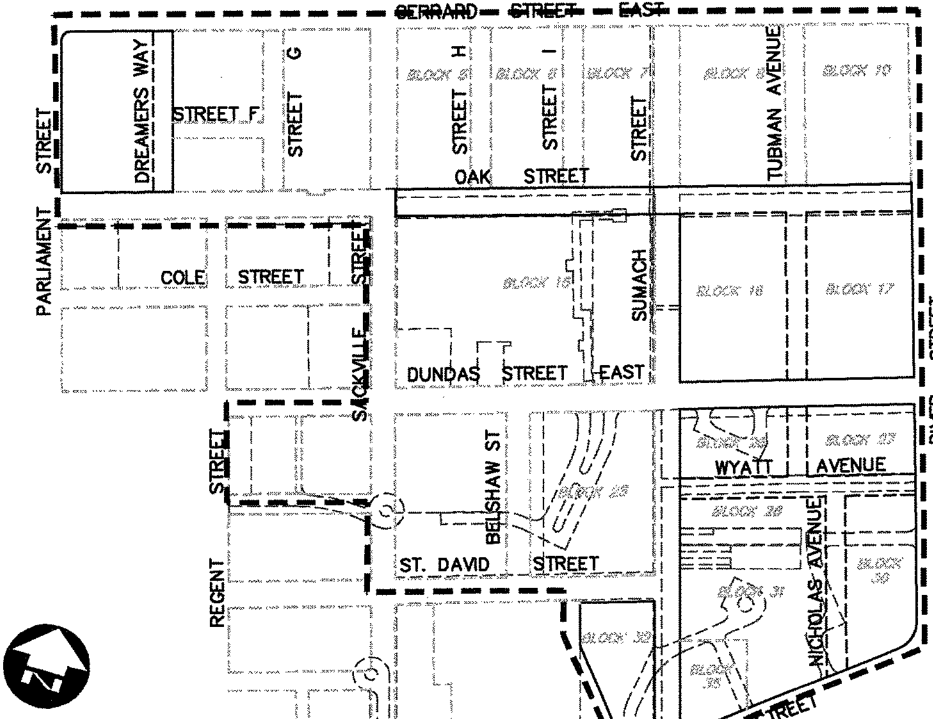
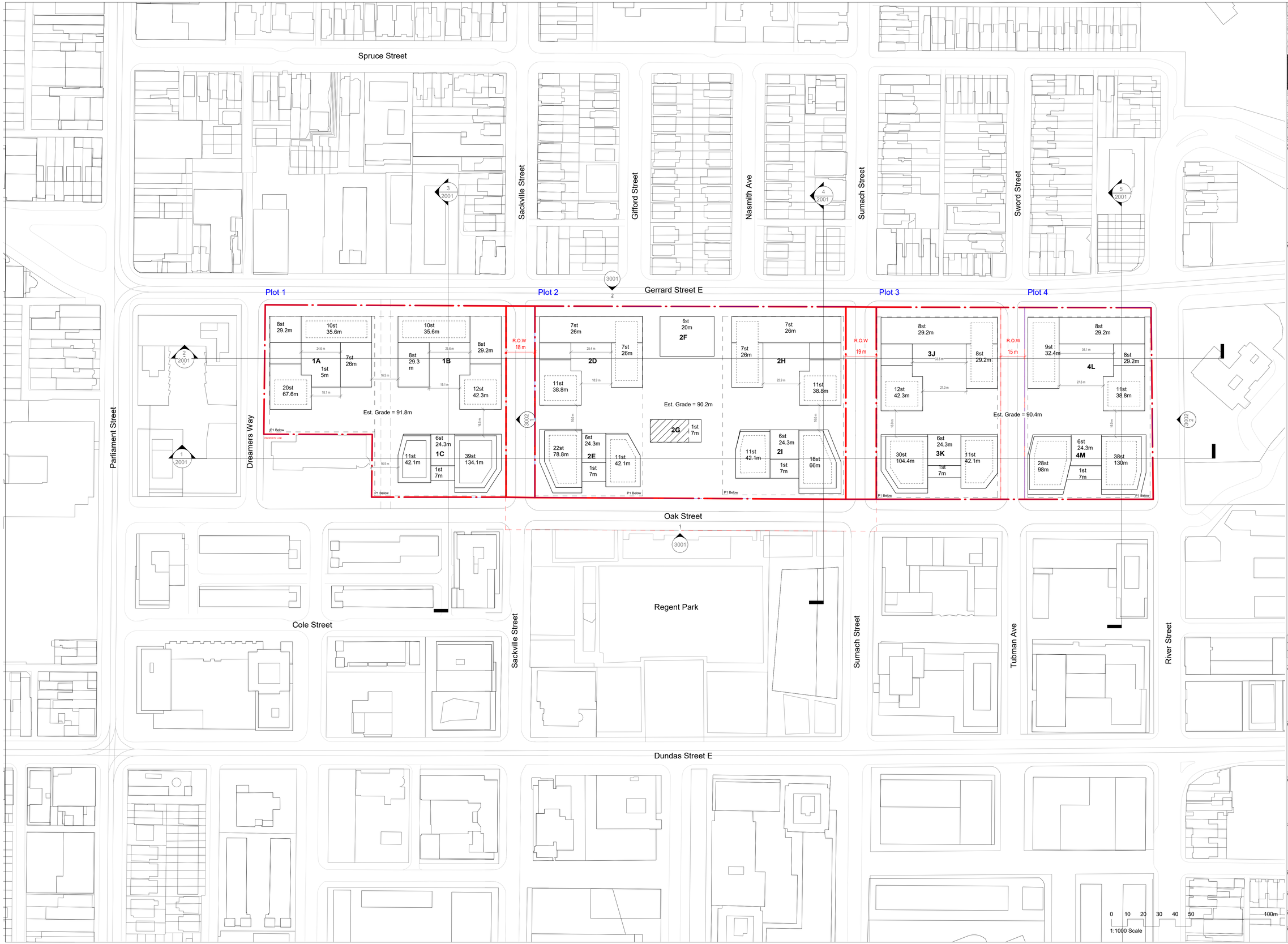

GERRARD STREET EAST
DREAMERS WAY
STREET F
STREET G
STREET H
STREET I
OAK STREET
TUBMAN AVENUE
PARLIAMENT STREET
COLE STREET
SACKVILLE STREET
SUMACH STREET
DUNDAS STREET EAST
RIVER STREET
WYATT AVENUE
REGENT STREET
BELSHAW ST
ST. DAVID STREET
NICHOLAS AVENUE
SHUTER STREET

KEY PLAN

N.T.S.



KEY PLAN

CLIENT

Toronto Community Housing Corporation (TCHC) and 2747199 Ontario Limited (Deltera Inc.)

NOTES

- Plot Boundary
- Phases 4&5 Property Line
- City of Toronto Owned Lands
- Potential Retention
- Proposed Underground Parking Layout
- Potential Mechanical Plant

All heights measured from established grade to top of roof slab, excluding mechanical plant and parapets.

Established grade measured above Canadian Geodetic Datum

DRAFT

P02	S3	P2 - Draft for Client Review	11/15/22
P01	S4	P1 - Issued for ZBA	04/14/22
P00	S3	P1 - Draft for Client Review	04/01/22
Rev	Status	Reason for Issue	Date

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PROJECT

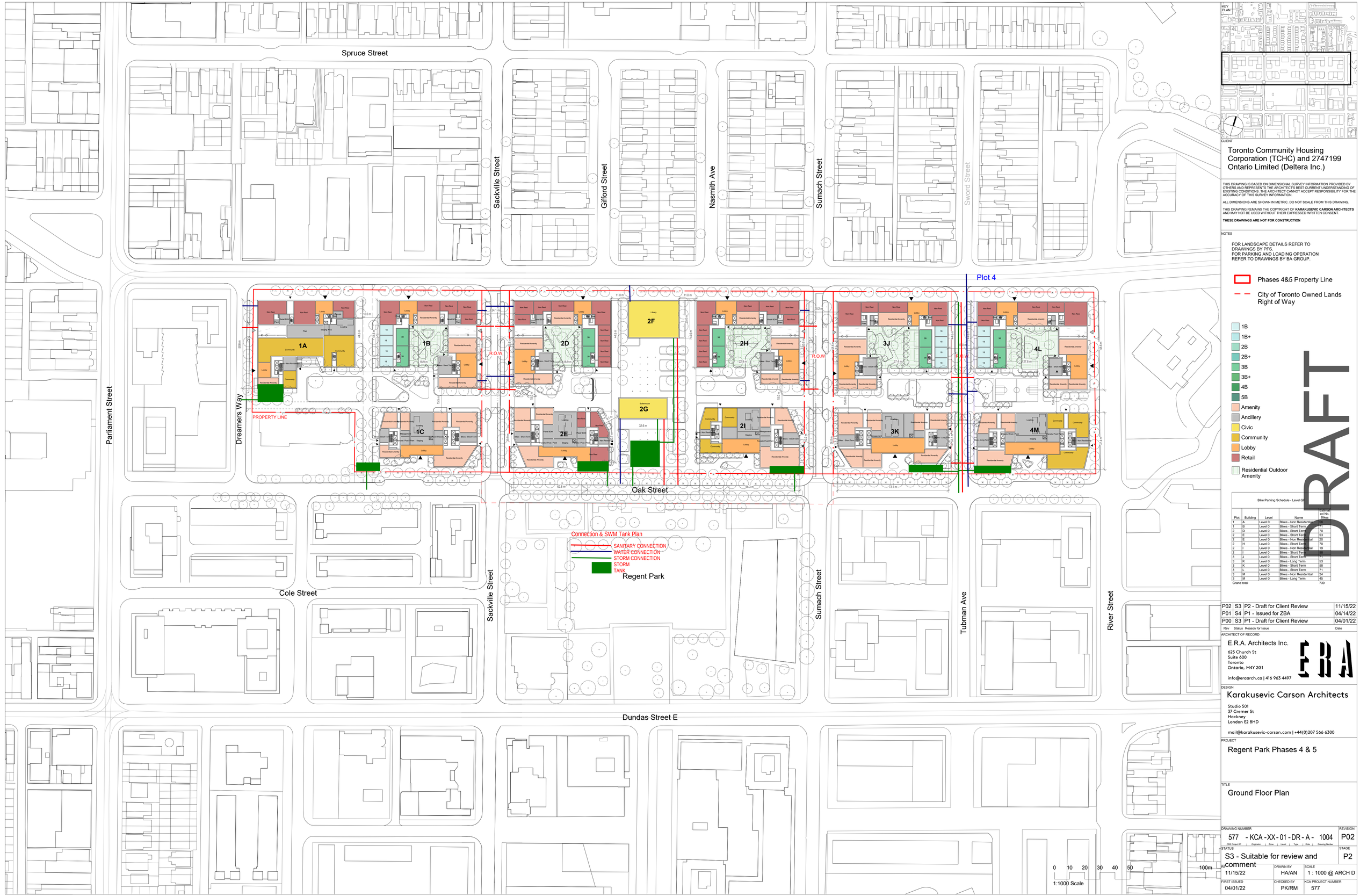
Regent Park Phases 4 & 5

TITLE

Site Plan

DRAWING NUMBER								REVISION
577	- KCA -	XX -	XX -	DR -	A -	0003		P02
CDE Project N°	Originator	Zone	Level	Type	Role	Drawing Number		

STATUS		STAGE
S3 - Suitable for review and comment		P2
ISSUED	DRAWN BY	SCALE
11/15/22	HA/AN	1 : 1000 @ ARCH D
FIRST ISSUED	CHECKED BY	KCA PROJECT NUMBER
04/01/22	PK/RM	577



KEY PLAN

CLIENT

Toronto Community Housing Corporation (TCHC) and 2747199 Ontario Limited (Deltera Inc.)

NOTES

FOR LANDSCAPE DETAILS REFER TO DRAWINGS BY PFS.
FOR PARKING AND LOADING OPERATION REFER TO DRAWINGS BY BA GROUP.

- Phases 4&5 Property Line
- City of Toronto Owned Lands Right of Way

- 1B
- 1B+
- 2B
- 2B+
- 3B
- 3B+
- 4B
- 5B
- Amenity
- Ancillery
- Civic
- Community
- Lobby
- Retail
- Residential Outdoor Amenity

Bike Parking Schedule - Level GF

Plot	Building	Level	Name	Count ed No. Bikes
1	A	Level 0	Bikes - Non Residential	58
1	B	Level 0	Bikes - Short Term	71
2	D	Level 0	Bikes - Short Term	70
2	E	Level 0	Bikes - Short Term	53
2	E	Level 0	Bikes - Non Residential	20
2	H	Level 0	Bikes - Short Term	70
2	I	Level 0	Bikes - Non Residential	19
2	I	Level 0	Bikes - Short Term	58
3	J	Level 0	Bikes - Short Term	71
3	K	Level 0	Bikes - Long Term	53
3	K	Level 0	Bikes - Short Term	58
3	L	Level 0	Bikes - Short Term	71
3	M	Level 0	Bikes - Non Residential	24
3	M	Level 0	Bikes - Long Term	45
Grand total				739

Rev	Status	Reason for Issue	Date
P02	S3	P2 - Draft for Client Review	11/15/22
P01	S4	P1 - Issued for ZBA	04/14/22
P00	S3	P1 - Draft for Client Review	04/01/22

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PROJECT

Regent Park Phases 4 & 5

TITLE

Ground Floor Plan

DRAWING NUMBER: 577 - KCA - XX - 01 - DR - A - 1004 (CDE Project N° | Originator | Zone | Level | Type | Role | Drawing Number)

REVISION: P02

STATUS: S3 - Suitable for review and comment

STAGE: P2

DRAWN BY	SCALE
HA/AN	1 : 1000 @ ARCH D

FIRST ISSUED	CHECKED BY	KCA PROJECT NUMBER
11/15/22	PK/RM	577
04/01/22		

DRAFT

Appendix A

Storm Servicing

counterpoint engineering

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data		
Location:	Toronto	a
Event	100 Year	b
		c

Area ID	Area (ha)	Runoff Coefficient	t_c (min)	Intensity (i)	Approved Release Rate (L/s)
Outlet to Sackville	2.130	0.58	10	88.19	301.1
Outlet to Sumach	2.230	0.61	10	88.19	333.9
Outlet to Tubman	2.080	0.54	10	88.19	273.4
	6.440				

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.18 ha

Rational Method - Allowable Release Rate - Street J

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.180	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.022	m^3/s
Q=CiA/360		**22.0**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.22 ha

Rational Method - Allowable Release Rate - Sackville Street

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.220	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.027	m^3/s
Q=CiA/360		**26.9**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.23 ha

Rational Method - Allowable Release Rate - Sumach Street

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.230	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.028	m^3/s
Q=CiA/360		**28.2**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.55 ha

Rational Method - Allowable Release Rate - Bldg 1A

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.550	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.067	m^3/s
Q=CiA/360		**67.4**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 1.01 ha

Rational Method - Allowable Release Rate - Bldg 1B & C

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	1.010	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.124	m^3/s
Q=CiA/360		**123.7**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.81 ha

Rational Method - Allowable Release Rate - Bldg 2D & E

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.810	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.099	m^3/s
Q=CiA/360		**99.2**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.6 ha

Rational Method - Allowable Release Rate - Bldg 2F & G

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.600	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.073	m^3/s
Q=CiA/360		**73.5**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.95 ha

Rational Method - Allowable Release Rate - Bldg 2H & I

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.950	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.116	m^3/s
Q=CiA/360		**116.4**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.94 ha

Rational Method - Allowable Release Rate - Bldg 3 J & K

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.940	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.115	m^3/s
Q=CiA/360		**115.1**	**l/s**

counterpoint engineering

Allowable Release Rate

Project Name: Regent Park Phase 4 & 5

Project Number: 21123

Site Area 0.96 ha

Rational Method - Allowable Release Rate - Bldg 4 L & M

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	**0.5**	
Site Area	A	0.960	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.118	m^3/s
Q=CiA/360		**117.6**	**l/s**

counterpoint engineering

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.7
Event	100 Year	b	0
		c	0.8

Area ID	Area (ha)	Runoff Coefficient	t_c (min)	Storage Available (m^3)	Storage Required (m^3)	100-Year Release Rate (L/s)	Description	Size (mm)
Outlet to Sackville								-
Building 1A	0.55	0.85	10		155	67.4	TBD	
Building 1B&C	1.01	0.85	10		284	123.7	TBD	
Sackville ROW	0.22	0.85	10		62	26.9	TBD	
	1.78	0.85	10		501	218.0		Outllet Allowable 218.0 l/s
Outlet to Sumach								
Building 2D&E	0.810	0.85	10		228	99.2	TBD	
Building 2F&G	0.600	0.85	10		169	73.5	TBD	
Building 2H&I	0.950	0.85	10		267	116.4	TBD	
Sumach ROW	0.230	0.85	10		65	28.2	TBD	
	2.59	0.85	10		501	317.3		Outllet Allowable 317.3 l/s
Outlet to River								
Building 3J&K	0.940	0.85	10		265	115.1	TBD	
Tubman ROW	0.180	0.85	10		51	22.0	TBD	
Building 4L&M	0.960	0.85	10		270	117.6	TBD	
	2.08	0.85	10		585	254.8		Outllet Allowable 254.8 l/s
	6.450			0	1587	790.1		

counterpoint engineering

Modified Rational **Area:** **Building 1A**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.550	ha
Runoff Coefficient	0.85	
AC	0.47	
Tc	10	
Time Increment	10	
Release Rate	67.4	L/s
Storage Required	155	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.33	195	40	155	********
20	144	0.19	224	81	143	
30	104	0.14	243	121	122	
40	83	0.11	258	162	96	
50	69	0.09	269	202	67	
60	60	0.08	279	243	37	
70	53	0.07	288	283	5	
80	47	0.06	296	323	-27	
90	43	0.06	303	364	-61	
100	40	0.05	309	404	-95	
110	37	0.05	315	445	-129	
120	34	0.04	321	485	-164	
130	32	0.04	326	525	-199	
140	30	0.04	331	566	-235	
150	29	0.04	335	606	-271	
160	27	0.04	340	647	-307	
170	26	0.03	344	687	-343	
180	25	0.03	348	728	-380	
190	24	0.03	352	768	-416	
200	23	0.03	355	808	-453	
210	22	0.03	359	849	-490	
220	21	0.03	362	889	-527	
230	20	0.03	365	930	-564	

counterpoint engineering

Modified Rational **Area:** **Building 1B&C**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	1.010	ha
Runoff Coefficient	0.85	
AC	0.86	
Tc	10	
Time Increment	10	
Release Rate	123.7	L/s
Storage Required	284	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.60	358	74	284	********
20	144	0.34	412	148	263	
30	104	0.25	447	223	224	
40	83	0.20	473	297	176	
50	69	0.16	495	371	123	
60	60	0.14	513	445	68	
70	53	0.13	529	520	9	
80	47	0.11	543	594	-50	
90	43	0.10	556	668	-112	
100	40	0.09	568	742	-174	
110	37	0.09	579	816	-237	
120	34	0.08	589	891	-302	
130	32	0.08	599	965	-366	
140	30	0.07	608	1039	-432	
150	29	0.07	616	1113	-497	
160	27	0.07	624	1188	-564	
170	26	0.06	632	1262	-630	
180	25	0.06	639	1336	-697	
190	24	0.06	646	1410	-764	
200	23	0.05	653	1485	-832	
210	22	0.05	659	1559	-900	
220	21	0.05	665	1633	-968	
230	20	0.05	671	1707	-1036	

counterpoint engineering

Modified Rational **Area:** **Sackville ROW**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.220	ha
Runoff Coefficient	0.85	
AC	0.19	
Tc	10	
Time Increment	10	
Release Rate	26.9	L/s
Storage Required	62	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.13	78	16	62	********
20	144	0.07	90	32	57	
30	104	0.05	97	49	49	
40	83	0.04	103	65	38	
50	69	0.04	108	81	27	
60	60	0.03	112	97	15	
70	53	0.03	115	113	2	
80	47	0.02	118	129	-11	
90	43	0.02	121	146	-24	
100	40	0.02	124	162	-38	
110	37	0.02	126	178	-52	
120	34	0.02	128	194	-66	
130	32	0.02	130	210	-80	
140	30	0.02	132	226	-94	
150	29	0.01	134	243	-108	
160	27	0.01	136	259	-123	
170	26	0.01	138	275	-137	
180	25	0.01	139	291	-152	
190	24	0.01	141	307	-166	
200	23	0.01	142	323	-181	
210	22	0.01	144	340	-196	
220	21	0.01	145	356	-211	
230	20	0.01	146	372	-226	

counterpoint engineering

Modified Rational **Area:** **Building 2D&E**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.810	ha
Runoff Coefficient	0.85	
AC	0.69	
Tc	10	
Time Increment	10	
Release Rate	99.2	L/s
Storage Required	228	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.48	287	60	228	********
20	144	0.28	330	119	211	
30	104	0.20	358	179	180	
40	83	0.16	379	238	141	
50	69	0.13	397	298	99	
60	60	0.11	411	357	54	
70	53	0.10	424	417	8	
80	47	0.09	436	476	-40	
90	43	0.08	446	536	-90	
100	40	0.08	456	595	-140	
110	37	0.07	464	655	-190	
120	34	0.07	473	714	-242	
130	32	0.06	480	774	-294	
140	30	0.06	487	833	-346	
150	29	0.05	494	893	-399	
160	27	0.05	501	952	-452	
170	26	0.05	507	1012	-505	
180	25	0.05	512	1071	-559	
190	24	0.05	518	1131	-613	
200	23	0.04	523	1191	-667	
210	22	0.04	528	1250	-722	
220	21	0.04	533	1310	-776	
230	20	0.04	538	1369	-831	

counterpoint engineering

Modified Rational **Area:** **Building 2F&G**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.600	ha
Runoff Coefficient	0.85	
AC	0.51	
Tc	10	
Time Increment	10	
Release Rate	73.5	L/s
Storage Required	169	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.35	213	44	169	********
20	144	0.20	245	88	156	
30	104	0.15	265	132	133	
40	83	0.12	281	176	105	
50	69	0.10	294	220	73	
60	60	0.08	305	265	40	
70	53	0.07	314	309	6	
80	47	0.07	323	353	-30	
90	43	0.06	330	397	-66	
100	40	0.06	337	441	-103	
110	37	0.05	344	485	-141	
120	34	0.05	350	529	-179	
130	32	0.05	356	573	-218	
140	30	0.04	361	617	-256	
150	29	0.04	366	661	-295	
160	27	0.04	371	706	-335	
170	26	0.04	375	750	-374	
180	25	0.04	380	794	-414	
190	24	0.03	384	838	-454	
200	23	0.03	388	882	-494	
210	22	0.03	391	926	-535	
220	21	0.03	395	970	-575	
230	20	0.03	399	1014	-616	

counterpoint engineering

Modified Rational **Area:** **Building 2H&I**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.950	ha
Runoff Coefficient	0.85	
AC	0.81	
Tc	10	
Time Increment	10	
Release Rate	116.4	L/s
Storage Required	267	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.56	337	70	267	********
20	144	0.32	387	140	248	
30	104	0.23	420	209	211	
40	83	0.19	445	279	166	
50	69	0.16	465	349	116	
60	60	0.13	482	419	64	
70	53	0.12	498	489	9	
80	47	0.11	511	559	-47	
90	43	0.10	523	628	-105	
100	40	0.09	534	698	-164	
110	37	0.08	545	768	-223	
120	34	0.08	554	838	-284	
130	32	0.07	563	908	-344	
140	30	0.07	572	977	-406	
150	29	0.06	579	1047	-468	
160	27	0.06	587	1117	-530	
170	26	0.06	594	1187	-593	
180	25	0.06	601	1257	-656	
190	24	0.05	608	1327	-719	
200	23	0.05	614	1396	-783	
210	22	0.05	620	1466	-846	
220	21	0.05	626	1536	-910	
230	20	0.05	631	1606	-975	

counterpoint engineering

Modified Rational **Area:** **Sumach ROW**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.230	ha
Runoff Coefficient	0.85	
AC	0.20	
Tc	10	
Time Increment	10	
Release Rate	28.2	L/s
Storage Required	65	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.14	82	17	65	********
20	144	0.08	94	34	60	
30	104	0.06	102	51	51	
40	83	0.04	108	68	40	
50	69	0.04	113	85	28	
60	60	0.03	117	101	15	
70	53	0.03	120	118	2	
80	47	0.03	124	135	-11	
90	43	0.02	127	152	-25	
100	40	0.02	129	169	-40	
110	37	0.02	132	186	-54	
120	34	0.02	134	203	-69	
130	32	0.02	136	220	-83	
140	30	0.02	138	237	-98	
150	29	0.02	140	254	-113	
160	27	0.01	142	270	-128	
170	26	0.01	144	287	-143	
180	25	0.01	146	304	-159	
190	24	0.01	147	321	-174	
200	23	0.01	149	338	-189	
210	22	0.01	150	355	-205	
220	21	0.01	151	372	-220	
230	20	0.01	153	389	-236	

counterpoint engineering

Modified Rational **Area:** **Building 3J&K**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.940	ha
Runoff Coefficient	0.85	
AC	0.80	
Tc	10	
Time Increment	10	
Release Rate	115.1	L/s
Storage Required	265	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.56	334	69	265	********
20	144	0.32	383	138	245	
30	104	0.23	416	207	208	
40	83	0.18	440	276	164	
50	69	0.15	460	345	115	
60	60	0.13	477	414	63	
70	53	0.12	492	484	9	
80	47	0.11	506	553	-47	
90	43	0.10	518	622	-104	
100	40	0.09	529	691	-162	
110	37	0.08	539	760	-221	
120	34	0.08	548	829	-281	
130	32	0.07	557	898	-341	
140	30	0.07	566	967	-402	
150	29	0.06	573	1036	-463	
160	27	0.06	581	1105	-524	
170	26	0.06	588	1174	-586	
180	25	0.06	595	1243	-649	
190	24	0.05	601	1313	-711	
200	23	0.05	607	1382	-774	
210	22	0.05	613	1451	-837	
220	21	0.05	619	1520	-901	
230	20	0.05	625	1589	-964	

counterpoint engineering

Modified Rational **Area:** **Tubman ROW**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.180	ha
Runoff Coefficient	0.85	
AC	0.15	
Tc	10	
Time Increment	10	
Release Rate	22.0	L/s
Storage Required	51	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.11	64	13	51	********
20	144	0.06	73	26	47	
30	104	0.04	80	40	40	
40	83	0.04	84	53	31	
50	69	0.03	88	66	22	
60	60	0.03	91	79	12	
70	53	0.02	94	93	2	
80	47	0.02	97	106	-9	
90	43	0.02	99	119	-20	
100	40	0.02	101	132	-31	
110	37	0.02	103	146	-42	
120	34	0.01	105	159	-54	
130	32	0.01	107	172	-65	
140	30	0.01	108	185	-77	
150	29	0.01	110	198	-89	
160	27	0.01	111	212	-100	
170	26	0.01	113	225	-112	
180	25	0.01	114	238	-124	
190	24	0.01	115	251	-136	
200	23	0.01	116	265	-148	
210	22	0.01	117	278	-160	
220	21	0.01	119	291	-172	
230	20	0.01	120	304	-185	

counterpoint engineering

Modified Rational **Area:** **Building 4L&M**

Project Name: Regent Park Phase 4 & 5
Project Number: 21123

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.960	ha
Runoff Coefficient	0.85	
AC	0.82	
Tc	10	
Time Increment	10	
Release Rate	117.6	L/s
Storage Required	270	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.57	341	71	270	********
20	144	0.33	391	141	250	
30	104	0.24	424	212	213	
40	83	0.19	450	282	167	
50	69	0.16	470	353	117	
60	60	0.14	488	423	64	
70	53	0.12	503	494	9	
80	47	0.11	516	564	-48	
90	43	0.10	529	635	-106	
100	40	0.09	540	706	-166	
110	37	0.08	550	776	-226	
120	34	0.08	560	847	-287	
130	32	0.07	569	917	-348	
140	30	0.07	578	988	-410	
150	29	0.07	586	1058	-473	
160	27	0.06	593	1129	-536	
170	26	0.06	600	1199	-599	
180	25	0.06	607	1270	-663	
190	24	0.05	614	1340	-727	
200	23	0.05	620	1411	-791	
210	22	0.05	626	1482	-855	
220	21	0.05	632	1552	-920	
230	20	0.05	638	1623	-985	

counterpoint engineering

Modified Rational **Area:** **River**

Project Name: #REF!
Project Number: #REF!

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.940	ha
Runoff Coefficient	0.85	
AC	0.80	
Tc	10	
Time Increment	10	
Release Rate	115.1	L/s
Storage Required	265	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.56	334	69	265	********
20	144	0.32	383	138	245	
30	104	0.23	416	207	208	
40	83	0.18	440	276	164	
50	69	0.15	460	345	115	
60	60	0.13	477	414	63	
70	53	0.12	492	484	9	
80	47	0.11	506	553	-47	
90	43	0.10	518	622	-104	
100	40	0.09	529	691	-162	
110	37	0.08	539	760	-221	
120	34	0.08	548	829	-281	
130	32	0.07	557	898	-341	
140	30	0.07	566	967	-402	
150	29	0.06	573	1036	-463	
160	27	0.06	581	1105	-524	
170	26	0.06	588	1174	-586	
180	25	0.06	595	1243	-649	
190	24	0.05	601	1313	-711	
200	23	0.05	607	1382	-774	
210	22	0.05	613	1451	-837	
220	21	0.05	619	1520	-901	
230	20	0.05	625	1589	-964	

Counterpoint Engineering

Water Balance

Regent Park Phases 4 & 5

City of Toronto's Green Standard Tier 1 Section QW 2.2

Initial Abstraction Asphalt, I	1	mm
Initial Abstraction Pervious, P	5	mm
Initial Abstraction Roof, R	1	mm
Toronto's small design rainfall event has 5mm excess rainfall		

Type of Area	Area	Units	% Redevelopment Area
Non-Green Roof Building Area	1.049	ha	51%
Asphalt / Impervious	0.207	ha	10%
Pervious / Green Roof Area	0.711	ha	34%
Total Area	2.070	ha	95%

Initial Abstraction= Percent Impervious (Roof) *R + Percent Impervious (Asphalt)* I + Percent Previous Green Roof * P

Initial Abstraction= 0.51 x 1mm + 0.10 x 1mm + 0.34 x 5mm

Initial Abstraction (credit)= 2.32 mm

Required Development Retention = (Excess Rainfall- Initial Abstraction) * (Total Development Area)

Required Development Retention = (5mm - 2.32 mm) x (2.070)ha

Required Development Retention (debit)= 55.4 m^3

Counterpoint Engineering

Water Balance

Regent Park Phases 4 & 5

City of Toronto's Green Standard Tier 1 Section QW 2.2

Initial Abstraction Asphalt, I	1	mm
Initial Abstraction Pervious, P	5	mm
Initial Abstraction Roof, R	1	mm
Toronto's small design rainfall event has 5mm excess rainfall		

Type of Area	Area	Units	% Redevelopment Area
Non-Green Roof Building Area	0.888	ha	45%
Asphalt / Impervious	0.495	ha	25%
Pervious / Green Roof Area	0.597	ha	30%
Total Area	1.980	ha	100%

Initial Abstraction= Percent Impervious (Roof) *R + Percent Impervious (Asphalt)* I + Percent Previous Green Roof * P

Initial Abstraction= 0.45 x 1mm + 0.25 x 1mm + 0.30 x 5mm

Initial Abstraction (credit)= 2.21 mm

Required Development Retention = (Excess Rainfall- Initial Abstraction) * (Total Development Area)

Required Development Retention = (5mm - 2.21 mm) x (1.980)ha

Required Development Retention (debit)= 55.3 m^3

Counterpoint Engineering

Water Balance

Regent Park Phases 4 & 5

City of Toronto's Green Standard Tier 1 Section QW 2.2

Initial Abstraction Asphalt, I	1	mm
Initial Abstraction Pervious, P	5	mm
Initial Abstraction Roof, R	1	mm
Toronto's small design rainfall event has 5mm excess rainfall		

Type of Area	Area	Units	% Redevelopment Area
Non-Green Roof Building Area	1.002	ha	48%
Asphalt / Impervious	0.416	ha	20%
Pervious / Green Roof Area	0.662	ha	32%
Total Area	2.080	ha	100%

Initial Abstraction= Percent Impervious (Roof) *R + Percent Impervious (Asphalt)* I + Percent Previous Green Roof * P

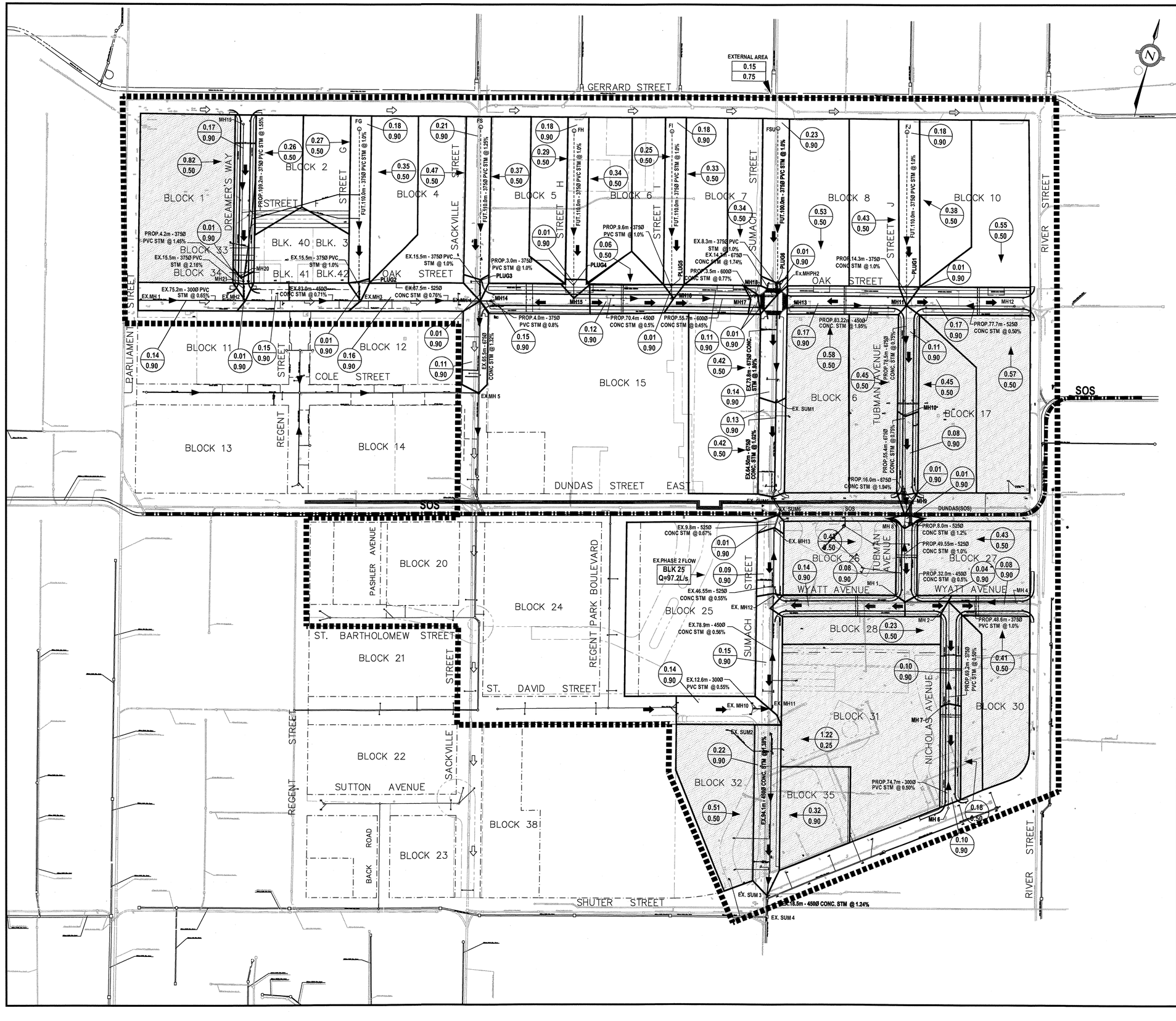
Initial Abstraction= 0.48 x 1mm + 0.20 x 1mm + 0.32 x 5mm

Initial Abstraction (credit)= 2.27 mm

Required Development Retention = (Excess Rainfall- Initial Abstraction) * (Total Development Area)

Required Development Retention = (5mm - 2.27 mm) x (2.080)ha

Required Development Retention (debit)= 56.7 m^3



LEGEND

- 0.27 / 0.50 — DENOTES DRAINAGE AREA IN ha; DENOTES STORM RUN-OFF
- STORM DRAINAGE BOUNDARY
- STORM OVERFLOW SEWER (SOS)
- SUB-STORM DRAINAGE BOUNDARY
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- FUTURE STORM SEWER
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED OVERLAND FLOW DIRECTION
- PHASE 3

BENCHMARK:

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5	06/11/14	ISSUED FOR TENDER	LDS	LDS
4	02/10/14	3RD SUBMISSION TO CITY	LDS	LDS
3	31/07/14	2ND SUBMISSION TO CITY	LDS	LDS
2	05/06/14	REVISED STREET O	LDS	LDS
1	09/05/14	1ST SUBMISSION TO CITY	LDS	LDS

DILLON CONSULTING
235 Yorkland Blvd., Suite 800, Toronto, ON M2J 4Y8
Phone: (416) 229-4646 Fax (416) 229-4692

LICENSED PROFESSIONAL ENGINEER — M. Z. HOSSAIN — 100155339 — April 24/15 — PROVINCE OF ONTARIO

TORONTO ENGINEERING & CONSTRUCTION SERVICES
Development Engineering

ACCEPTED TO BE IN ACCORDANCE WITH THE CITY OF TORONTO STANDARDS.

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MANAGER, DEVELOPMENT ENGINEERING — DATE: MAY 19 2015

REGENT PARK - PHASE 3

STORM DRAINAGE PLAN

DESIGN	MZH	DRAWN	GCC	CHECKED	TY	JOB No. 12-6942
SCALE:	1:1250				DWG:	SD-1
DATE:	APRIL 2015				SHEET	43 OF 69

Appendix B

Sanitary Servicing

Counterpoint Engineering Inc.

Project: Regent Park Phases 4&5
Project No: 21123
Location: Sackville
Site Area: 2.13 ha

Proposed Sanitary Flow Calculations

As per Design Criteria for Sewers and Watermains - Second Edition November 2021 City of Toronto
Design flow = average daily dry weather flow x peaking factor + infiltration

Persons Per Unit and per Land Use

1BR/1BR+Den	1.4	ppu
2BR/2BR+Den/	2.1	ppu
3BR/3BR+Den	3.1	ppu
Over 3B	5.1	ppu
Commercial / Retail	1.1	persons/100m^2
Offices	3.3	persons/100m^2

	Residential Units					Office	Retail
	S / 1B / 1B+D	2B / 2B + D	3B / 3B+D	Over 3B	Total Units	Area (m^2)	Area (m^2)
Outlet to Sackville							
Block 1							
Building A	19	76	88	19	202	2306	
Building B	175	61	17	0	253	1318	
Building C	321	111	30	0	462		
Block 2							
Building D	140	49	13	0	202	1444	
Building E	212	73	19	0	304	599	
TOTAL UNITS / AREA (m^2)	**867**	**370**	**167**	**19**	**1423**	**5667**	**0.0**

	Population S / 1BR / 1B + D	Population 2BR / 2BR + D	Population 3BR / 3BR + D	Population Over 3B	TOTAL POPULATION
Residential	1214	777	518	97	2606
Retail		-	-	-	0
Office		-	-	-	188
Total Equivalent Population					**2794**

Plea flow Design Parameters

Residential Average flow		240	litres/person/day
Commercial/Office Average flow		250	litres/person/day
Infiltration		0.26	litres/second/ha

Harmon Peaking Factor

PF = 1 + (14/(4+(P/1000)$^{1/2}$))

Residential Population		Harmon Peak Factor
2606		**3.49**

Residential Flow	25.29	**l/s**	*peaked flows
Commercial and Office Flow	0.54	**l/s**	
Infiltration	0.55	**l/s**	
Groundwater Flows	0.00	**l/s**	
Total Peak Flow	**26.39**	**l/s**	

Counterpoint Engineering Inc.

Project: Regent Park Phases 4&5
Project No: 21123
Location: Sumach
Site Area: 2.2 ha

Proposed Sanitary Flow Calculations

As per Design Criteria for Sewers and Watermains - Second Edition November 2021 City of Toronto
Design flow = average daily dry weather flow x peaking factor + infiltration

Persons Per Unit and per Land Use

1BR/1BR+Den	1.4	ppu
2BR/2BR+Den/	2.1	ppu
3BR/3BR+Den	3.1	ppu
Over 3B	5.1	ppu
Commercial / Retail	1.1	persons/100m^2
Offices	3.3	persons/100m^2

	Residential Units					Office	Retail
	S / 1B / 1B+D	2B / 2B + D	3B / 3B+D	Over 3B	Total Units	Area (m^2)	Area (m^2)
Outlet to Sumach							
Block 2							
Building F	0	0	0	0	0	4554	
Building G	0	0	0	0	0	405	
Building H	17	55	59	14	145	1503	
Building I	13	75	86	15	189	572	
TOTAL UNITS / AREA (m^2)	**30**	**130**	**145**	**29**	**334**	**7034**	**0.0**

	Population S / 1BR / 1B + D	Population 2BR / 2BR + D	Population 3BR / 3BR + D	Population Over 3B	TOTAL POPULATION
Residential	42	274	450	148	914
Retail		-	-	-	0
Office		-	-	-	233
Total Equivalent Population					**1147**

Plea flow Design Parameters

Residential Average flow		240	litres/person/day
Commercial/Office Average flow		250	litres/person/day
Infiltration		0.26	litres/second/ha

Harmon Peaking Factor
PF = 1 + (14/(4+(P/1000)$^{1/2}$))

Residential Population		Harmon Peak Factor
914		**3.82**

Residential Flow	9.71	**l/s**	*peaked flows
Commercial and Office Flow	0.67	**l/s**	
Infiltration	0.58	**l/s**	
Groundwater Flows	0.00	**l/s**	
Flow	**10.96**	**l/s**	

Counterpoint Engineering Inc.

Project: Regent Park Phases 4&5
Project No: 21123
Location: River
Site Area: 2.08 ha

Proposed Sanitary Flow Calculations

As per Design Criteria for Sewers and Watermains - Second Edition November 2021 City of Toronto
Design flow = average daily dry weather flow x peaking factor + infiltration

Persons Per Unit and per Land Use

1BR/1BR+Den	1.4	ppu
2BR/2BR+Den/	2.1	ppu
3BR/3BR+Den	3.1	ppu
Over 3B	5.1	ppu
Commercial / Retail	1.1	persons/100m^2
Offices	3.3	persons/100m^2

	Residential Units					Office	Retail
	S / 1B / 1B+D	2B / 2B + D	3B / 3B+D	Over 3B	Total Units	Area (m^2)	Area (m^2)
Outlet to River							
Block 3							
Building J	174	61	16	0	251	1079	
Building K	282	98	26	0	406		
Block 4							
Building L	17	66	77	22	182	794	
Building M	103	164	168	43	478	916	
TOTAL UNITS / AREA (m^2)	**576**	**389**	**287**	**65**	**1317**	**2789**	**0.0**

	Population S / 1BR / 1B + D	Population 2BR / 2BR + D	Population 3BR / 3BR + D	Population Over 3B	TOTAL POPULATION
Residential	807	817	890	332	2846
Retail		-	-	-	0
Office		-	-	-	93
Total Equivalent Population					**2939**

Plea flow Design Parameters

Residential Average flow		240	litres/person/day
Commercial/Office Average flow		250	litres/person/day
Infiltration		0.26	litres/second/ha

Harmon Peaking Factor

PF = 1 + (14/(4+(P/1000)$^{1/2}$))

Residential Population		Harmon Peak Factor
2846		**3.46**

Residential Flow	27.37	**l/s**	*peaked flows
Commercial and Office Flow	0.27	**l/s**	
Infiltration	0.54	**l/s**	
Groundwater Flows	0.00	**l/s**	
Total Peak Flow	**28.18**	**l/s**	

Counterpoint Engineering Inc.

SANITARY SEWER DESIGN SHEET - PROPOSED DRY CONDITIONS

Project: Regent Park Phases 4 & 5
Client: TCHC
Job No.: 21123
Prepared by: J.F.
Checked by: R.S.
Date: 20 Nov.-2022

Notes:

Commerical /Retail/Industrial 136 p/ha
Proposed Residential Average Flow = 240 litres/day/person
0.0028 litres/s/person
Peaking Factor M = $1 + 14 / (4 + p^{1})$ p=thousands
Commercial, Institutional and Industrial Peak Flow Factor= 250 litres/day/person
0.0029 litres/s/person
Infiltration factor = 0.26 l/sec per hectare

Groundwater long Term Discharge
Block 1 2 L/s
Block 40 1 L/s
Block 16 2 L/s
Block 17 2 L/s

1	2	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
STREET	MANHOLE		LENGTH	TRIBUTARY AREAS (ha)				Residential Population (per Unit)				ICI Population 136 p/ha		Residential Flow 240 L / c / day			Commercial Flows 250 L / c / day	Extraneous Flows	DESIGN PEAK FLOW	SEWER						
				INCREMENT			TOTAL	Number of Units	POP. DENSITY	POP. EQUIV.	TOTAL		TOTAL	Avg. Flow	Peaking Factor	Peak Flow	Peak Flow		EXPECT.	SIZE	SLOPE	Capacity	V(m/s)		Flow depth	Qa/Qf
	FROM	TO	(m)	RES	COM	IND/INST		Units	Per./Unit	Persons	Persons	(ha)	Persons	(L/s)	FACTOR	(L/s)	(L/s)	(L/s)	(L/s)	(mm)	(%)	(L/s)	FULL	ACTUAL	%	%
Scakville Outlet																										
Dreamers Way	13A	14A	93.4	1.73	0.00	0.00	1.73			1567	1567	0.00	77	4.35	3.67	16.0	0.22	2.45	18.6	250	1.50	72.8	1.48	1.240	34.5%	25.6%
	14A	2A	15.6	0.01	0	0.00	0.01			0	0	0.00	0	0.00	3.67	0.0	0.00	0.45	19.1	250	1.22	65.7	1.34	1.152	36.5%	29.0%
Oak Street	1A	2A	61.0	0.15	0	0.00	0.15			0	0	0	0	0.00	4.50	0.0	0.00	0.04	0.04	300	1.31	98.0	1.39	0.161	1.5%	0.0%
	2A	3A	77.1	0.41	0	0.00	0.41			235	235	0.00	0	0.65	3.62	2.4	0.00	1.15	22.63	300	1.10	89.8	1.27	1.054	34.0%	25.2%
	3A	6A	85.1	1.16	0	0.00	1.16			1203	1203	0.00	44	3.34	3.44	11.5	0.13	0.30	34.56	300	1.10	89.8	1.27	1.186	43.0%	38.5%
	6A	5A	7.5	0.00	0	0.00	0.00			0	0	0.00	0	0.00	3.44	0.0	0.00	0.00	34.56	300	1.10	89.8	1.27	1.186	43.0%	38.5%
River Outlet																										
Tubman Avenue	F3A	8A	103.8	1.14	0	0.00	2.08			2846	2846	0.28	93	7.91	3.46	27.4	0.27	0.54	28.18	250	1.00	59.5	1.21	1.189	48.0%	47.4%
	7A	8A	100.0	1.23	0	0.00	1.23			1568	1568	0	0	4.36	3.67	16.0	0.00	4.32	20.29	250	0.50	42.0	0.86	0.845	48.5%	48.2%
Oak Street	10A	8A	55.7	1.12	0	0.00	0.00			0	0	0	0	0.00	4.50	0.0	0.00	0.00	0.00	250	1.50	72.8	1.48	0.000	0.0%	0.0%
	8A	9A	85.1	1.19	0	0.00	1.19			1654	1654	0	0	4.59	3.17	14.5	0.00	0.31	63.32	375	0.50	94.6	0.86	0.915	59.5%	66.9%
	9A	12A	6.9	0.01	0	0.00	0.01			0	0	0	0	0.00	3.17	0.0	0.00	0.00	63.32	375	0.44	88.8	0.80	0.870	62.0%	71.3%

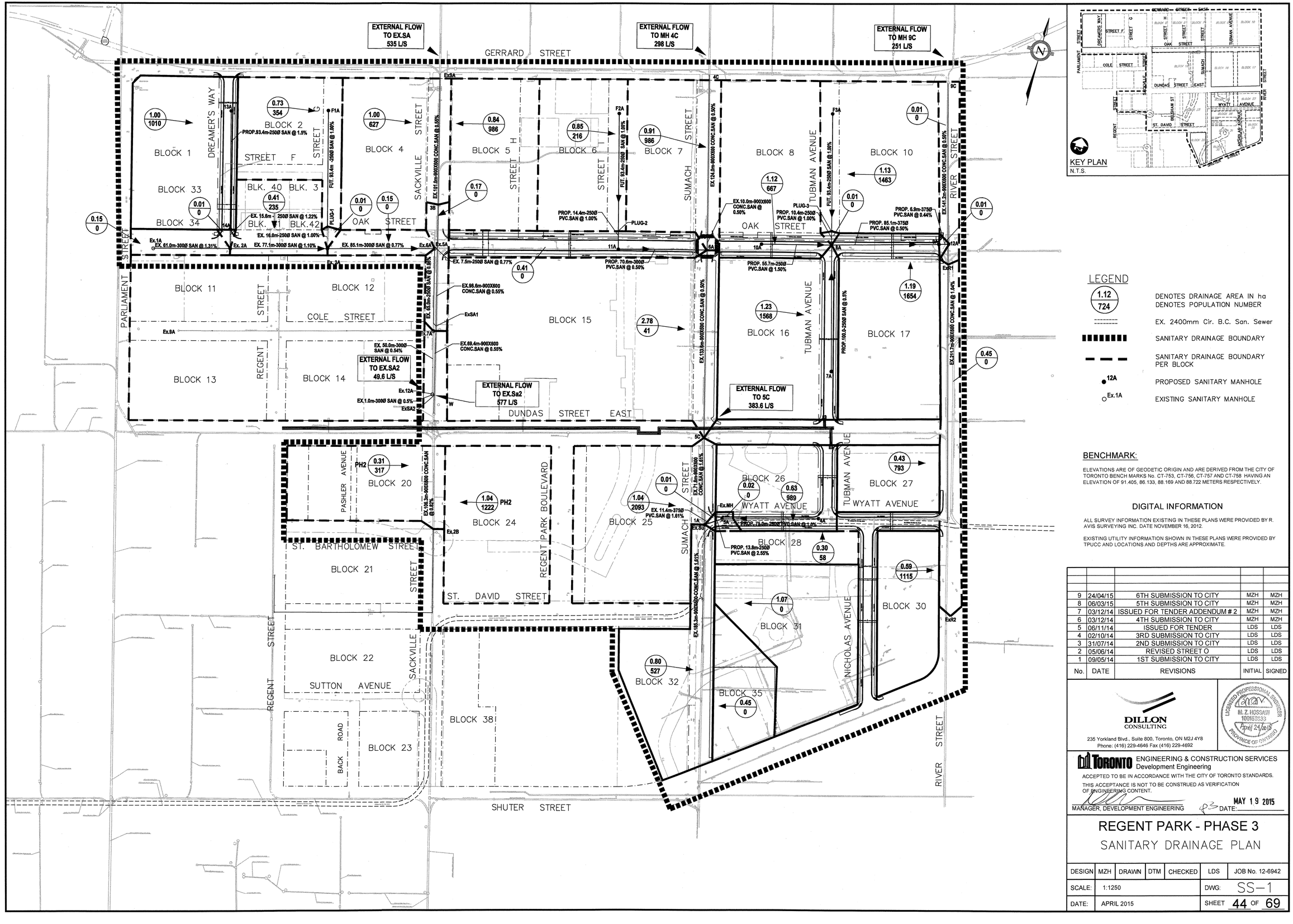
PARK REVITALIZATION

CHARGING TO THE EXISTING COMBINED SEWERS

Residential Average Daily Flow=	240.0	L/cap/day	
Peak Extraneous Flow=	5.0	L/ha/s	

T initial =	10.00	min
a=	21.80	
b=	0.00	
c=	0.78	

Combined Sewer System	Regent Park SAN Sewer			Development Phase	Develop ment Block	Proposed Area			EXISTING SANITARY FLOW					EXISTING STORM SEWER			
	Location	From	To	No.	No.	Block Area	Retail	Bldg Footprint	Residential Pop (pop/ha) 170	Harmon Coeff. M	Peak Flow	Infiltration Flow 5 L/ha/s	TOTAL FLOW	RUN-OFF	Intensity	TOTAL FLOW	**TOTAL EXISTING FLOW**
						(ha)	(ha)	(ha)	86.0		(L/s)	(L/s)	(L/s)		(mm/hr)	(L/s)	**(L/s)**
Sackville				Phase 4 & 5	1	2.07							13.2	0.5	88.19	253.55	266.75
					2	0.68							4.29	0.5	88.19	83.291	87.58
																Total	354.33
Sumach				Phase 4 & 5	2	1.3							8.27	0.5	88.19	159.23	167.50
River				Phase 4 & 5	3	2.08							12.07	0.5	88.19	254.77	266.84



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LICENSED PROFESSIONAL ENGINEER M. Z. HOSSAIN 100152933 April 24/15 PROVINCE OF ONTARIO

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MANAGER, DEVELOPMENT ENGINEERING DATE: MAY 19 2015

REGENT PARK - PHASE 3

SANITARY DRAINAGE PLAN

DESIGN	MZH	DRAWN	DTM	CHECKED	LDS	JOB No. 12-6942
SCALE:	1:1250				DWG:	SS-1
DATE:	APRIL 2015				SHEET	44 OF 69

From Dillon Report

- Estimated Sanitary and Storm Flow Discharging to the Existing Combined Sewers

REGENT PARK REVITALIZATION

ESTIMATED COMBINED FLOW DISCHARGING TO THE EXISTING COMBINED SEWERS

AFTER PHASE 1 AND PHASE 2 CONSTRUCTION

Residential Average Daily Flow= 450 L/cap/day
Peak Extraneous Flow= 0.260 L/ha/s

Combined Sewer System	Regent Park SAN Sewer			Development Phase	Development Block	Proposed Area			Unit Count	Estimated Equivalent Population			PROPOSED SANITARY FLOW (L/s)					
	Location	From	To	No.	No.	Block Area	Retail	Bldg Footprint	Residential	Retail (pop/ha)	Residential multiplier (pop/unit)	TOTAL Equivalent	Harmon Coeff. M	Residential Flow 450 L/cap/day	Peak Flow	Infiltration Flow 0.26 L/ha/s	TOTAL FLOW	
						(ha)	(ha)	(ha)	Unit	110	2.30	Pop		(L/s)	(L/s)	(L/s)	(L/s)	
SACKVILLE STREET COMBINED SEWER																		
Sackville	Oak	Parliamer	Sackvill	Phase 4	1	0.83		0.383	441	0	1,014	1,014	3.80	5.28	20.05	0.216	20.27	
				Phase 4	2	0.47		0.348	131	0	301	301	4.08	1.57	6.40	0.123	6.52	
				Phase 1	3	0.27		0.117	87	0	200	200	4.15	1.04	4.32	0.070	4.39	
				Phase 4	4	0.77		0.562	227	0	522	522	3.96	2.72	10.78	0.201	10.98	
Sackville	Oak	Street H	Sackvill	Phase 5	5	0.68		0.582	245	0	564	564	3.95	2.93	11.58	0.176	11.76	
Sackville	Cole	Parliamer	Sackvill	Phase 1	11	0.57	0.11		118	12	271	284	4.10	1.48	6.05	0.149	6.20	
				Phase 1	12	0.58			211	0	485	485	3.98	2.53	10.06	0.150	10.21	
				Phase 1	13	0.69	0.32		294	35	676	711	3.90	3.70	14.46	0.179	14.64	
				Phase 1	14	0.69	0.18	0.243	349	19	803	822	3.86	4.28	16.52	0.179	16.70	
		Community Centre		Phase 1	15	1.27	0.64			70	0	70	4.50	0.36	1.64	0.330	1.97	
TO SACKVILLE STREET FROM GERRARD TO WEIR NORTH OF DUNDAS SOS																	104	
				Regent Street 30		0.43		0.310	28	0	64	64	4.29	0.34	1.44	0.112	1.55	
				Ex. Church SAN		0.30		0.220			57	57	4.30	0.30	1.27	0.077	1.35	
				Phase 2	20	0.31			112	0	258	258	4.11	1.34	5.51	0.080	5.59	
				Phase 2	21	0.54			181	0	416	416	4.01	2.17	8.70	0.139	8.84	
				Phase 2	22	0.53			116	0	267	267	4.10	1.39	5.70	0.138	5.83	
				Phase 2	23	0.28		0.145	44	0	101	101	4.24	0.53	2.24	0.073	2.31	
				Phase 2	24	1.04	0.70	1.200	424	77	975	1,052	3.81	5.08	19.34	0.271	19.61	
				Phase 2	38	0.44	0.44				114	114	4.23	0.59	2.51	0.115	2.63	
TO SACKVILLE STREET FROM DUNDAS STREET EAST TO SHUTER STREET										0	2,252						48	
TOTAL SANITARY FLOW TO SACKVILLE STREET COMBINED SEW						10.69			3,008		6,918	7,303					151	L/s

Combined Sewer System	Regent Park SAN Sewer			Development Phase	Development Block	Proposed Area			Unit Count	Estimated Equivalent Population			PROPOSED SANITARY FLOW (L/s)					
	Location	From	To	No.	No.	Block Area	Retail	Bldg Footprint	Residential	Retail (pop/ha)	Residential multiplier (pop/unit)	TOTAL Equivalent	Harmon Coeff. M	Residential Flow 450 L/cap/day	Peak Flow	Infiltration Flow 0.26 L/ha/s	TOTAL FLOW	
						(ha)	(ha)	(ha)	Unit	110	2.30	Pop		(L/s)	(L/s)	(L/s)	(L/s)	
SUMACH STREET COMBINED SEWER																		
Sumach	Oak	Street I	Sumach	Phase 5	6	0.66		0.582	181	0	416	416	4.01	2.17	8.70	0.172	8.87	
				Phase 5	7	0.64		0.582	245	0	564	564	3.95	2.93	11.58	0.166	11.75	
		Aquatic Center		Phase 2	15	1.60					1,350	1,350	3.71	7.03	26.10	0.416	26.52	
TO SUMACH STREET FROM GERRARD TO WEIR NORTH OF DUNDAS STREET EAST																	47	
				Phase 2	25	1.17			752	0	1,730	1,730	3.63	9.01	32.74	0.304	33.04	
TO SUMACH STREET FROM DUNDAS STREET TO WEIR NORTH OF HLI													4.50	0.00	0.00	0.000	33	
				Phase 3	26	0.33	0.16	0.480	360	17	828	845	3.85	4.31	16.61	0.086	16.69	
				Phase 3	27	0.33	0.15	0.471	253	16	582	598	3.94	3.03	11.94	0.085	12.02	
				Phase 3	28	0.23		0.301	28	0	64	64	4.29	0.34	1.44	0.060	1.50	
				Phase 3	32	0.46		0.228	288	0	662	662	3.91	3.45	13.48	0.120	13.60	
				Phase 3	35	0.33			0	0	0	0	4.50	0.00	0.00	0.086	0.09	
TO SUMACH STREET SOUTH OF MARK STREET													4.50	0.00	0.00	0.000	44	
TOTAL SANITARY FLOW TO SUMACH STREET COMBINED SEWEI						5.74			2,107		6,196	6,230					124	L/s
RIVER STREET COMBINED SEWER																		
				Phase 5	8	0.96		0.659	244	0	561	561	3.95	2.92	11.54	0.250	11.79	
				Phase 5	10	0.94		0.657	530	0	1,219	1,219	3.74	6.35	23.76	0.244	24.01	
				Phase 3	16	0.89	0.12	0.708	534	13	1,228	1,241	3.74	6.40	23.93	0.231	24.16	
				Phase 3	17	0.87	0.11	0.594	586	13	1,348	1,360	3.71	7.02	26.06	0.226	26.29	
TO RIVER STREET WEIR NORTH OF SOS													4.50	0.00	0.00	0.000	86	
				Phase 3	30	0.49		0.679	413	0	950	950	3.81	4.95	18.87	0.127	19.00	
TO RIVER STREET WEIR NORTH OF HLI													4.50	0.00	0.00	0.000	19	
TOTAL SANITARY FLOW TO RIVER STREET COMBINED SEWER						4.15			2,307		5,306	5,332					105	L/s

	Block Area Pop		Residential Units	Retail Pop	Residential Pop	TOTAL Equivqlent Pop		TOTAL FLOW	
SUMMARY FOR REGENT PARK REDEVELOPMENT	21 ha		7,422	272	17,071	18,864	people	381	L/s
TOTAL ESTIMATED SANITARY FLOW TO BE GENERATED FROM THE REGENT PARK REDIVELOPMENT								381	L/s

REGENT PARK REVITALIZATION
ESTIMATED SANITARY FLOW DISCHARGING TO THE EXISTING COMBINED SEWERS

		T initial =	10.00 min
		a=	732.00
Residential Average Daily Flow=	318.0 L/cap/day	**b=**	5.90
Peak Extraneous Flow=	5.0 L/ha/s	**c=**	0.81

Combined Sewer System	Regent Park SAN Sewer			Development Phase	Development Block	Proposed Area			EXISTING SANITARY FLOW					EXISTING STORM SEWER			
	Location	From	To	No.	No.	Block Area	Retail	Bldg Footprint	Residential Pop (pop/ha) 170	Harmon Coeff. M	Peak Flow	Infiltration Flow 5 L/ha/s	TOTAL FLOW	RUN-OFF	Intensity	TOTAL FLOW	TOTAL EXISTING FLOW
						(ha)	(ha)	(ha)	86.0		(L/s)	(L/s)	(L/s)		(mm/hr)	(L/s)	(L/s)
SACKVILLE STREET COMBINED SEWER																	
Sackville	Oak	Parliament	Sackville	Phase 4	1	0.83		0.383	71.4	4.28	1.12	4.15	5.27	0.5	78.30	32.50	37.77
				Phase 4	2	0.47		0.348	40.6	4.33	0.65	2.36	3.01	0.5	78.30	18.48	21.49
				Phase 1	3	0.27		0.117	200.1				4.39		78.30	0.00	4.39
				Phase 4	4	0.77		0.562	66.5	4.29	1.05	3.87	4.92	0.5	78.30	30.29	35.21
Sackville	Oak	Street H	Sackville	Phase 5	5	0.68		0.582	58.1	4.30	0.92	3.38	4.29	0.5	78.30	26.43	30.72
Sackville	Cole	Parliament	Sackville	*Phase 1*	11	0.57	0.11	0.463	283.7				6.20		78.30	0.00	6.20
				Phase 1	12	0.58		0.580	485.3				10.21		78.30	0.00	10.21
				Phase 1	13	0.69	0.32	0.690	711.3				14.64		78.30	0.00	14.64
				Phase 1	14	0.69	0.18	0.243	822.0				16.70		78.30	0.00	16.70
			Community Centre	*Phase 1*	15	1.27	0.64	0.635	69.9				1.97		78.30	0.00	1.97
TO SACKVILLE STREET FROM GERRARD TO WEIR NORTH OF DUNDAS SOS									2808.8				72			107.69	
				Regent Street 30		0.43		0.310	37.0	4.34	0.59	2.15	2.74	0.5	78.30	16.85	19.60
				Ex. Church SAN		0.30		0.220	25.5	4.37	0.41	1.48	1.89	0.5	78.30	11.62	13.51
				Phase 2	20	0.31		0.309	257.6				5.59		78.30	0.00	5.59
				Phase 2	21	0.54		0.536	416.3				8.84		78.30	0.00	8.84
				Phase 2	22	0.53		0.531	266.8				5.83		78.30	0.00	5.83
				Phase 2	23	0.28		0.145	101.2				2.31		78.30	0.00	2.31
				Phase 2	24	1.04	0.70	1.200	1052.2				19.61		78.30	0.00	19.61
				Phase 2	38	0.44		0.440	114.1				2.63		78.30	0.00	2.63
TO SACKVILLE STREET FROM DUNDAS STREET EAST TO SHUTER STREET									2270.8				49			28.47	
TOTAL SANITARY FLOW TO SACKVILLE STREET COMBINED SEWER						10.69			5,080				121			136.17	257

Combined Sewer System	Regent Park SAN Sewer			Development Phase	Development Block	Proposed Area			EXISTING SANITARY FLOW					EXISTING STORM SEWER			
	Location	From	To	No.	No.	Block Area	Retail	Bldg Footprint	Residential Pop (pop/ha) 170	Harmon Coeff. M	Peak Flow	Infiltration Flow 5 L/ha/s	TOTAL FLOW	RUN-OFF	Intensity	TOTAL FLOW	TOTAL EXISTING FLOW
						(ha)	(ha)	(ha)	86.0		(L/s)	(L/s)	(L/s)		(mm/hr)	(L/s)	(L/s)
SUMACH STREET COMBINED SEWER																	
Sumach	Oak	Street I	Sumach	Phase 5	6	0.66		0.582	56.8	4.30	0.90	3.30	4.20	0.5	78.30	25.84	30.04
				Phase 5	7	0.64		0.582	55.0	4.31	0.87	3.20	4.07	0.5	78.30	25.06	29.13
			Aquatic Center	*Phase 2*	15	1.21			1350.0				26.52		78.30	0.00	26.52
TO SUMACH STREET FROM GERRARD TO WEIR NORTH OF DUNDAS STREET EAST									1461.8	3.69			35			50.90	
										4.50	0.00	0.00	0.00				
				Phase 2	25	1.17		1.168	1729.6				33.04		78.30	0.00	33.04
TO SUMACH STREET FROM DUNDAS STREET TO WEIR NORTH OF HLI									1729.6	3.63			33			0.00	
				Phase 3	26	0.33	0.16	0.480	28.4	4.36	0.46	1.65	2.11	0.5	78.30	12.95	15.06
				Phase 3	27	0.33	0.15	0.471	28.0	4.36	0.45	1.63	2.07	0.5	78.30	12.72	14.80
				Phase 3	28	0.23		0.301	19.7	4.38	0.32	1.15	1.46	0.5	78.30	8.97	10.43
				Phase 3	32	0.46		0.228	39.6	4.33	0.63	2.30	2.93	0.5	78.30	18.01	20.94
				Phase 3	35	0.33			28.4	4.36	0.46	1.65	2.11	0.5	78.30	12.92	15.03
TO SUMACH STREET SOUTH OF MARK STREET									144.0	4.20			11			65.57	
TOTAL SANITARY FLOW TO SUMACH STREET COMBINED SEWER						5.35			3,191				79			116	195
RIVER STREET COMBINED SEWER																	
				Phase 5	8	0.96		0.659	82.6	4.27	1.30	4.80	6.10	0.5	78.30	37.59	43.68
				Phase 5	10	0.94		0.657	80.8	4.27	1.27	4.70	5.97	0.5	78.30	36.80	42.77
				Phase 3	16	0.89	0.12	0.708	76.3	4.27	1.20	4.44	5.63	0.5	78.30	34.73	40.36
				Phase 3	17	0.87	0.11	0.594	74.7	4.28	1.18	4.35	5.52	0.5	78.30	34.02	39.54
TO RIVER STREET WEIR NORTH OF SOS									314.4				23			143.14	
				Phase 3	30	0.49		0.679	42.1	4.33	0.67	2.45	3.12	0.5	78.30	19.18	22.31
TO RIVER STREET WEIR NORTH OF HLI									42.1				3			19.18	
TOTAL SANITARY FLOW TO RIVER STREET COMBINED SEWER						4.15			357				26			162	189
TOTAL PROPOSED SANITARY FLOW GENERATED FROM THE REGENT PARK REDIVELOPMENT													226			415	641

REGENT PARK REVITALIZATION
ESTIMATED SANITARY FLOW DISCHARGING TO THE EXISTING COMBINED SEWERS

	PROPOSED ESTIMATED SAN FLOW		EX. ESTIMATED COMBINED FLOW AFTER PHASE 1 AND PHASE2 CONSTRUCTION		DIFFERENCE FROM CURRENT TO ULTIMATE	
	EQUIVALENT POP	SAN FLOW	EQUIVALENT POP	FLOW	EQUIVALENT POP	SAN FLOW
		L/s		L/s		L/s
SACKVILLE STREET COMBINED SEWER	7,303	151	5,080	257	2,223	(106)
SUMACH STREET COMBINED SEWER	6,230	124	3,191	195	3,038	(71)
RIVER STREET COMBINED SEWER	5,332	105	357	189	4,975	(83)
TOTAL:	18,864	381	8,627	641	10,237	(260)

CONCLUSSION:
The table above demonstrates that total population number will increase from the current to the ulimate design, but total sewage flow conveying to each of the existing 3 combined sewers will dicrease.

Appendix C

Water Servicing

Counterpoint Engineering Inc.

Water Demand Design Calculations

Project: Regent Park Phases 4&5
Project No: 21123
Location: Toronto, Ontario
Site Area: 6.200 ha

Persons Per Unit and per Land Use

1BR/1BR+Den	1.4	ppu
2BR/2BR+Den/	2.1	ppu
3BR/3BR+Den	3.1	ppu
Over 3B	5.1	ppu
Hotel	1.0	person/bed
Commercial / Retail	1.1	persons/100m^2
Offices	3.3	persons/100m^2

	Residential Units					Office	Retail
	S / 1B / 1B+D	2B / 2B + D	3B / 3B+D	Over 3B	Total Units	Area (m^2)	Area (m^2)
1A	19	76	88	19	202	2306	
1B	175	61	17	0	253	1318	
1C	321	111	30	0	462		
2D	140	49	13	0	202	1444	
2E	212	73	19	0	304	599	
2F	0				0	4554	
2G	0				0	405	
2H	17	55	59	14	145	1503	
2I	13	75	86	15	189	572	
3J	174	61	16		251	1079	
3K	282	98	26		406		
4L	17	66	77	22	182	794	
4M	103	164	168	43	478	916	
TOTAL UNITS / AREA (m^2)	**1473**	**889**	**599**	**113**	**3074**	**15490**	**0.0**

	Population S / 1BR / 1B + D	Population 2BR / 2BR + D	Population 3BR / 3BR + D	Over 3B	Total Population
Residential	2063	1867	1857	577	6364
Office					514
Retail	-	-		-	0
Total Equivalent Population					**6878**

City of Toronto Watermain Guidelines
Per Capita Demand

Single Family	320	(l/capita/day)
Multi-Unit	190	(l/capita/day)

Peaking Factors

Land Use	Minimum Hour	Maximum Hour	Maximum Day
Residential	0.70	2.48	1.65
Commercial	0.84	1.20	1.10
Industrial	0.84	0.90	1.10
Institutional	0.84	0.90	1.10
Apartment	0.84	2.50	1.30

*Values used for Residential (Multi-Unit) Land Use

Water Demand based on Equivalent Population

Land Use	Population	Minimum Hour (L/min)	Maximum Hour (L/min)		Maximum Day (L/min)	Fire Flow Required (L/min)	Max Day + Fire Flow (L/min)
Apartment	6364	705.3	2099.2		1091.6	-	-
Office	514	57.0	81.4		74.6		
Retail	0	0.0	0.0		0.0	-	-
Totals	**6878**	**762**	**2181**		**1166**	**9000**	**10166**

* See attached table in Appendix B for Fire Flow Duration

Counterpoint Engineering Inc.

REQUIRED FIRE FLOW WORKSHEET - PROPOSED DEVELOPMENT
Fire Underwriters Survey

Project : **Regent Park Phases 4&5**
Project No: **21123**

Guide for Determination of Required Flow Copyright I.S.O

$$F = 220C\sqrt{A}$$ where

F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Type of Construction		Class Factor
WF	Wood Frame	1.5
OC	Ordinary Construction	1.0
NC	Non-Combustible	0.8
FC	Fire-Resistive	0.6

Contents		% Reduction
NC	Non-Combustible	25
LC	Limited Combustible	15
C	Combustible	0
FB	Free Burning	15
RB	Rapid Burning	25

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

1) Fire Flow — Building 1A

Type of Construction:	nc		GF Area 3174 m2
C=	0.8		
A*=	4761	m^2	
F=	12,144	**L/min**	
	12,000	**L/min**	(round to the nearest 1,000L/min)

Note: Assuming Ordinary Construction building. Assuming Vertical Openings are adequately protected. Area is the total of the largest floor (level 1) plus 25% of the next 2 adjoining floors above.

2) Occupancy Reduction/Surcharge

Contents Factor:		LC			
Reduction/Surcharge of		-15%	=	-1,822	L/min
F=	12000L/min +	-1822	L/min =	10,178	**L/min**

3) System Type Reduction

NFPA 13 Sprinkler:		YES	30%		
Standard Water Supply:		YES	10%		
Fully Supervised:		YES	10%		
Total			50%		
Reduction of		50%	L/min =	5,089	L/min
F=	10178L/min -	5,089	L/min =	5,089	**L/min**

4) Separation Charge

Building Face	Dist(m)	Charge
North	27	10%
East	17.5	15%
South	16.5	15%
West	23	10%
Total		50%

of 10178 **L/min** = 5,089 **L/min**
(max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F= 5089L/min + 5089L/min = 10,178 **L/min** (2,000L/min<F<45,000L/min)

F=	10,000	**L/min**	(round to the nearest 1,000L/min)
F=	167	**L/s**	
F=	2,642	**gpm**	

Counterpoint Engineering Inc.

REQUIRED FIRE FLOW WORKSHEET - PROPOSED DEVELOPMENT
Fire Underwriters Survey

Project : **Regent Park Phases 4&5**
Project No: **21123**

Guide for Determination of Required Flow Copyright I.S.O

$$F = 220C\sqrt{A}$$ where

F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Type of Construction		Class Factor
WF	Wood Frame	1.5
OC	Ordinary Construction	1.0
NC	Non-Combustible	0.8
FC	Fire-Resistive	0.6

Contents		% Reduction
NC	Non-Combustible	25
LC	Limited Combustible	15
C	Combustible	0
FB	Free Burning	15
RB	Rapid Burning	25

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

1) Fire Flow — Building 1C

Type of Construction:	nc		GF Area 2106 m2
C=	0.8		
A*=	3159	m^2	
F=	9,892	**L/min**	
	10,000	**L/min**	(round to the nearest 1,000L/min)

Note: Assuming Ordinary Construction building. Assuming Vertical Openings are adequately protected. Area is the total of the largest floor (level 1) plus 25% of the next 2 adjoining floors above.

2) Occupancy Reduction/Surcharge

Contents Factor:		LC			
Reduction/Surcharge of		-15%		=	-1,484 L/min
F=	10000L/min +	-1484	L/min	=	8,516 **L/min**

3) System Type Reduction

NFPA 13 Sprinkler:		YES	30%		
Standard Water Supply:		YES	10%		
Fully Supervised:		YES	10%		
Total			50%		
Reduction of		50%	L/min	=	4,258 L/min
F=	8516L/min -	4,258	L/min	=	4,258 **L/min**

4) Separation Charge

Building Face	Dist(m)	Charge
North	15	15%
East	25	10%
South	17	15%
West	20	15%
Total		55%

of 8516.2 **L/min** = 4,684 **L/min**
(max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F= 4258L/min + 4684L/min = 8,942 **L/min** (2,000L/min<F<45,000L/min)

F=	9,000	**L/min**	(round to the nearest 1,000L/min)
F=	150	**L/s**	
F=	2,378	**gpm**	

Counterpoint Engineering Inc.

REQUIRED FIRE FLOW WORKSHEET - PROPOSED DEVELOPMENT
Fire Underwriters Survey

Project : **Regent Park Phases 4&5**
Project No: **21123**

Guide for Determination of Required Flow Copyright I.S.O

$$F = 220C\sqrt{A}$$ where

F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Type of Construction		Class Factor
WF	Wood Frame	1.5
OC	Ordinary Construction	1.0
NC	Non-Combustible	0.8
FC	Fire-Resistive	0.6

Contents		% Reduction
NC	Non-Combustible	25
LC	Limited Combustible	15
C	Combustible	0
FB	Free Burning	15
RB	Rapid Burning	25

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

1) Fire Flow — Building 4L

Type of Construction:	nc		GF Area 2015 m2
C=	0.8		
A*=	3936	m^2	
F=	11,042	**L/min**	
	11,000	**L/min**	(round to the nearest 1,000L/min)

Note: Assuming Ordinary Construction building. Assuming Vertical Openings are adequately protected. Area is the total of the largest floor (level 1) plus 25% of the next 2 adjoining floors above.

2) Occupancy Reduction/Surcharge

Contents Factor:		LC			
Reduction/Surcharge of		-15%	=	-1,656	L/min
F=	11000L/min +	-1656	L/min =	9,344	**L/min**

3) System Type Reduction

NFPA 13 Sprinkler:		YES	30%		
Standard Water Supply:		YES	10%		
Fully Supervised:		YES	10%		
Total			50%		
Reduction of		50%	L/min =	4,672	L/min
F=	9344L/min -	4,672	L/min =	4,672	**L/min**

4) Separation Charge

Building Face	Dist(m)	Charge			
North	15	15%			
East	29	10%			
South	27	10%			
West	19	15%			
Total		50%	**of** 9343.7 **L/min**	= 4,672	**L/min**

(max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F= 4672L/min + 4672L/min = 9,344 **L/min** (2,000L/min<F<45,000L/min)

F=	9,000	**L/min**	(round to the nearest 1,000L/min)
F=	150	**L/s**	
F=	2,378	**gpm**	

Lozzi Aqua Check Massimo Lozzi

12307 Woodbine Ave, P.O. Box 519 Cell: 416 990-2131

Gormley, ON L0H 1G0 E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 9:00 am

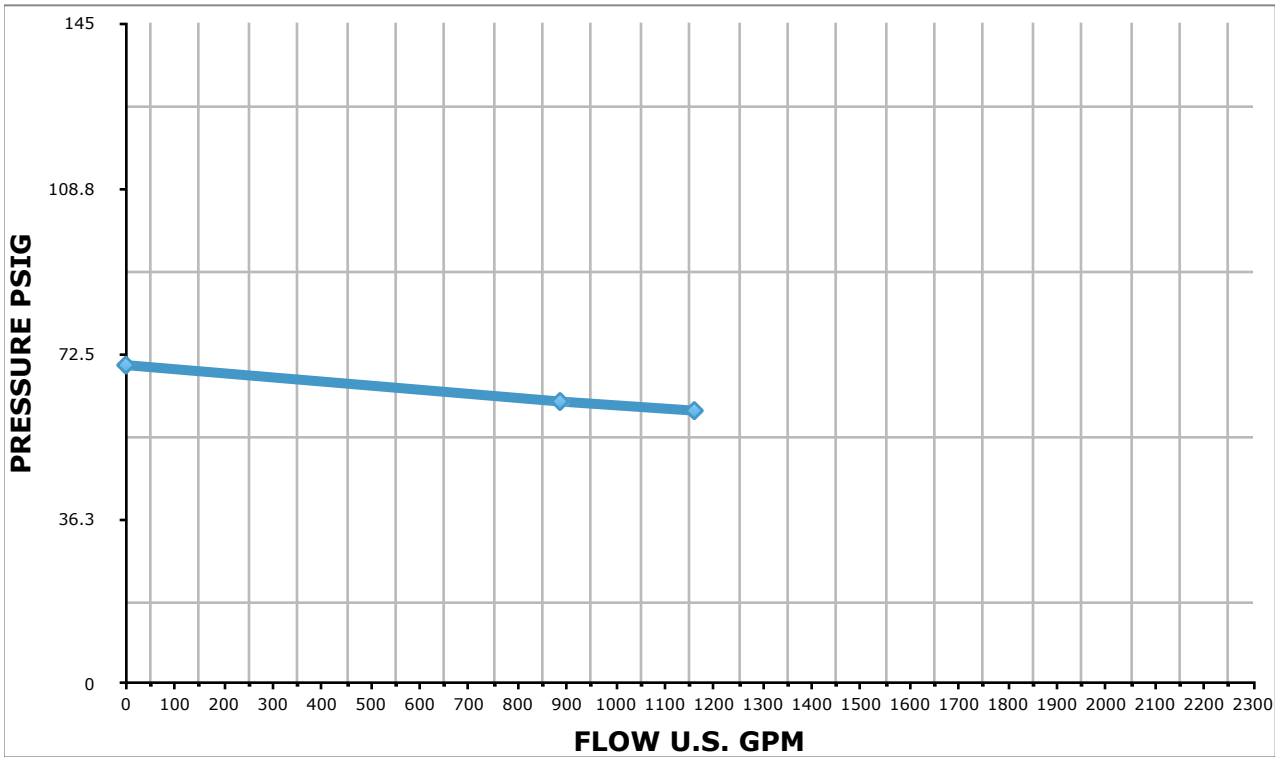
Location of Flow Hydrant: At 463 Gerrard St. E

Residual Hydrant: S/W corner of River St. And Gerrard St. E

Main Size: 150mm Static Pressure: 70 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	70
2.	1 x 2 ½	28	886	62
3.	2 x 2 ½	12	1160	60

Note: Flow test conducted in accordance with NFPA 291



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Massimo Lozzi

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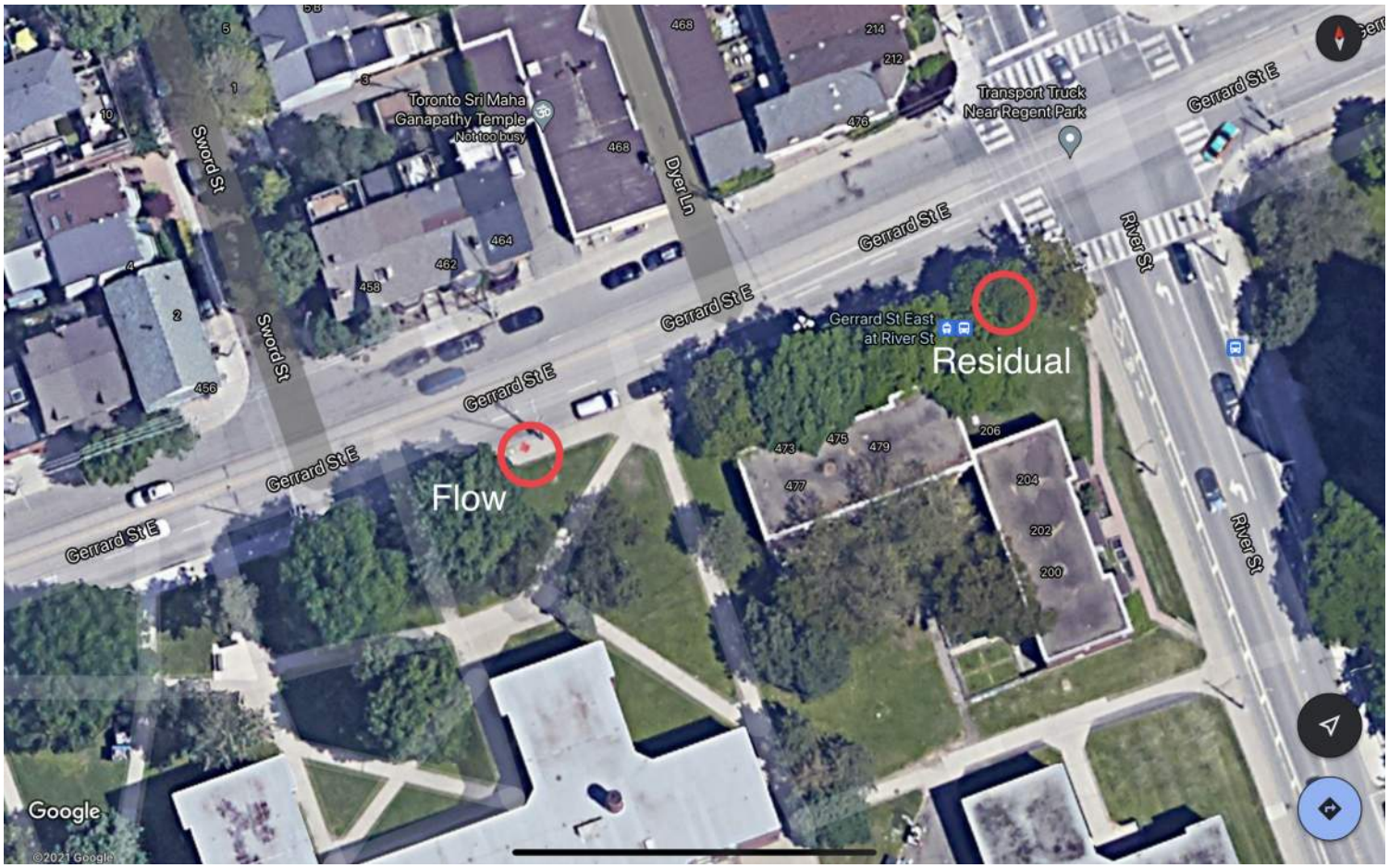
E-mail: lozziaquacheck@gmail.com

Site Map:



counterpoint engineering

NFPA Theoretical Flow Calculations

Project Name: **Regent Park Phases 4&5**
Project Number: **21123**

Based on National Fire Protection Association Guidelines, the available flow at the minimum residual pressure of 20psi can be calculated based on the observed flow at the observed pressure readings, as follows:

River At Gerrard St. E.

$$\mathbf{Q_F = 29.83 \times c \times d^2 \times p^{0.5}}$$, where

Q_F = observed flow (US GPM)
c = hydrant nozzle coefficient (0.90 - 0.95)
d = nozzle diameter (in)
p = observed pitot pressure

$$\mathbf{Q_R = Q_F \times h_F^{0.54} / h_R^{0.54}}$$, where

Q_R = available flow
Q_F = observed flow (US GPM)
h_F = drop from measured static to desired baseline pressure
h_R = drop from measured static to measured residual pressure

Based on flow test results obtained by Lozzi Aqua Check***, November 17, 2021***

c =	0.9	
d =	2.5	in
number of ports =	2	
p =	12	

Q_F = 1163 US GPM

Measured Static Pressure =	70	psi	
Measured Residual Pressure =	60	psi	
Desired Residual Pressure =	20	psi	, minimum per City of Toronto design criteria

Q_R = 2772 US GPM per fire conneciton
10,494 L/min

Lozzi Aqua Check Massimo Lozzi

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Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 9:30 am

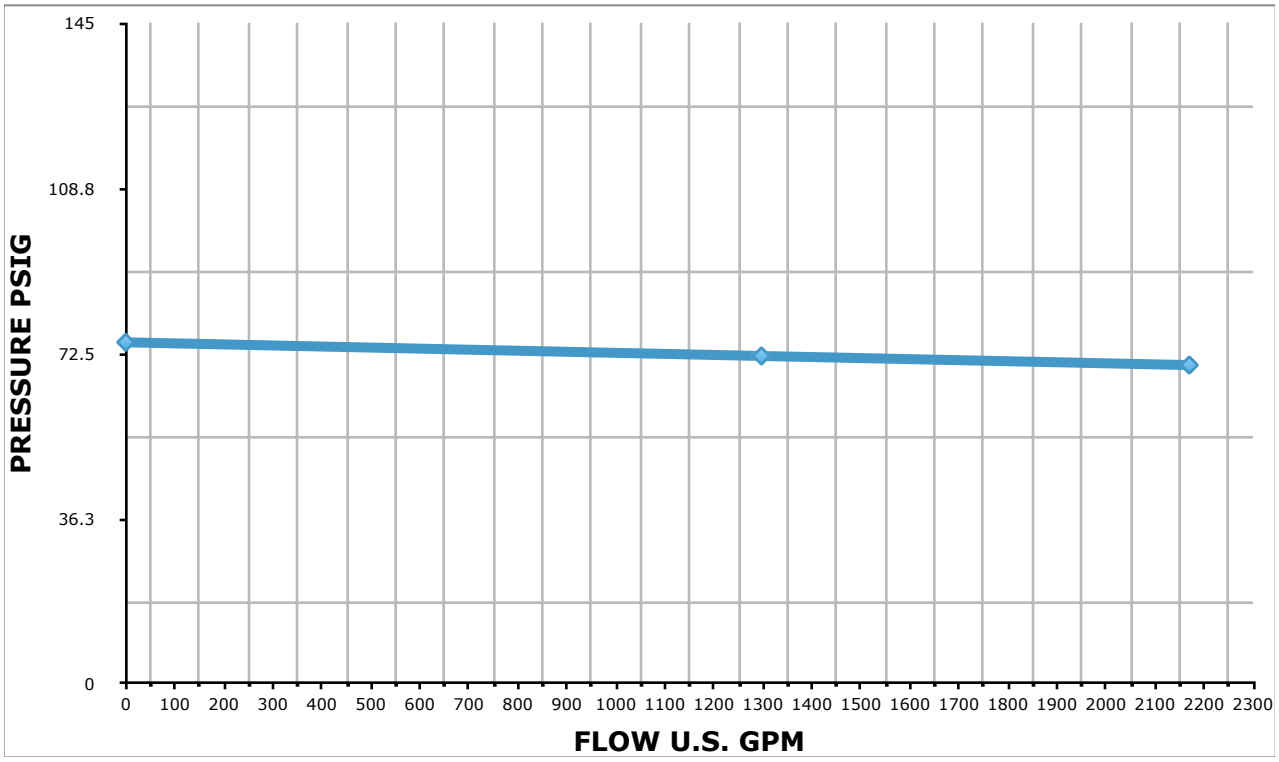
Location of Flow Hydrant: East side of River St., North of Oak St.

Residual Hydrant: S/E corner of Dundas St. E and River St.

Main Size: 150mm Static Pressure: 75 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	75
2.	1 x 2 ½	60	1297	72
3.	2 x 2 ½	42	2170	70

Note: Flow test conducted in accordance with NFPA 291



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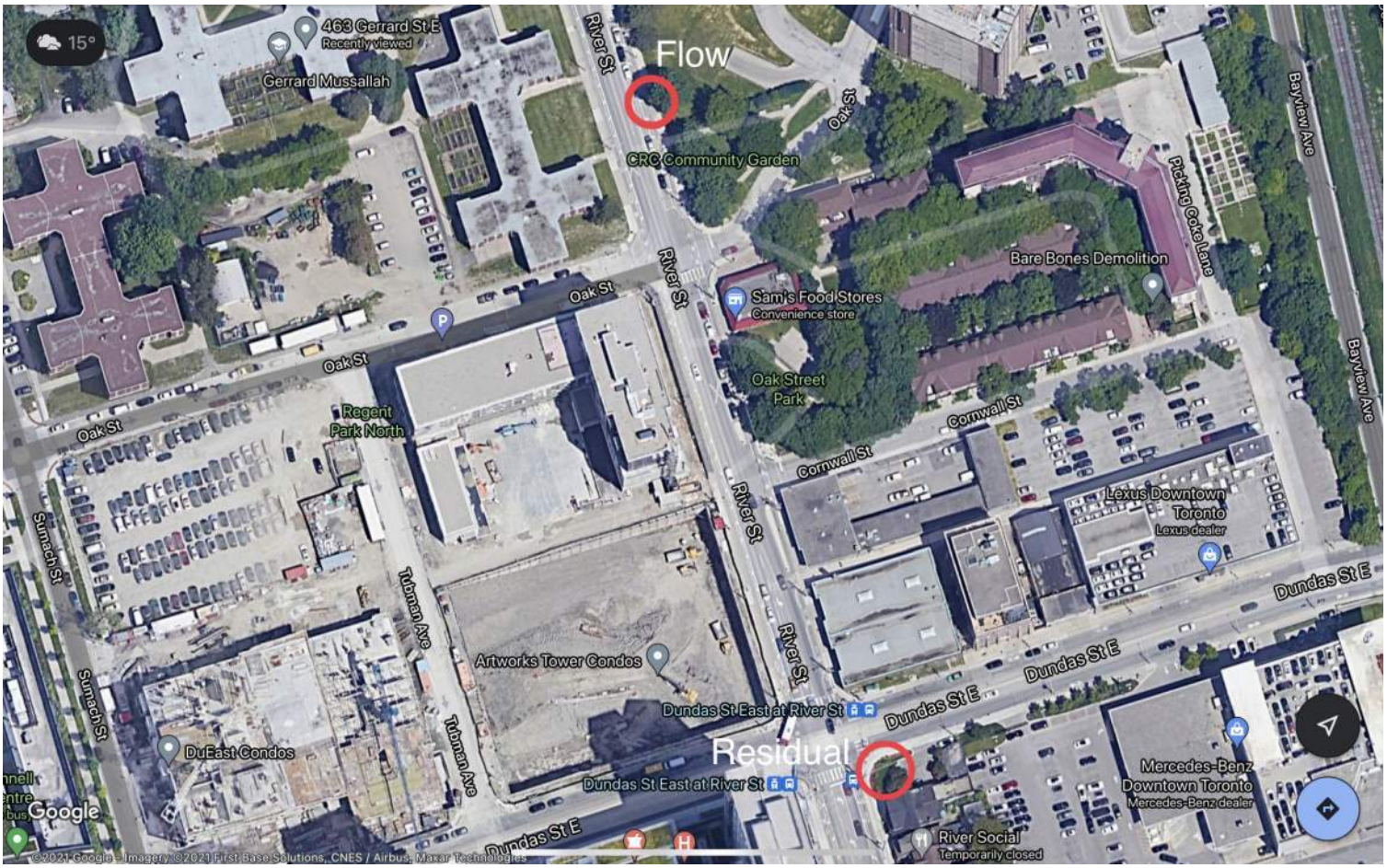
Site Map:



counterpoint engineering

NFPA Theoretical Flow Calculations

Project Name: **Regent Park Phases 4&5**
Project Number: **21123**

Based on National Fire Protection Association Guidelines, the available flow at the minimum residual pressure of 20psi can be calculated based on the observed flow at the observed pressure readings, as follows:

River At Oak

$$\mathbf{Q_F = 29.83 \times c \times d^2 \times p^{0.5}}$$, where

Q_F = observed flow (US GPM)
c = hydrant nozzle coefficient (0.90 - 0.95)
d = nozzle diameter (in)
p = observed pitot pressure

$$\mathbf{Q_R = Q_F \times h_F^{0.54} / h_R^{0.54}}$$, where

Q_R = available flow
Q_F = observed flow (US GPM)
h_F = drop from measured static to desired baseline pressure
h_R = drop from measured static to measured residual pressure

Based on flow test results obtained by Lozzi Aqua Check***, November 17, 2021***

c =	0.9	
d =	2.5	in
number of ports =	2	
p =	42	

Q_F = 2175 US GPM

Measured Static Pressure =	75	psi	
Measured Residual Pressure =	70	psi	
Desired Residual Pressure =	20	psi	, minimum per City of Toronto design criteria

Q_R = 7939 US GPM per fire conneciton
30,054 L/min

Lozzi Aqua Check Massimo Lozzi

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Gormley, ON L0H 1G0 E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 10:00 am

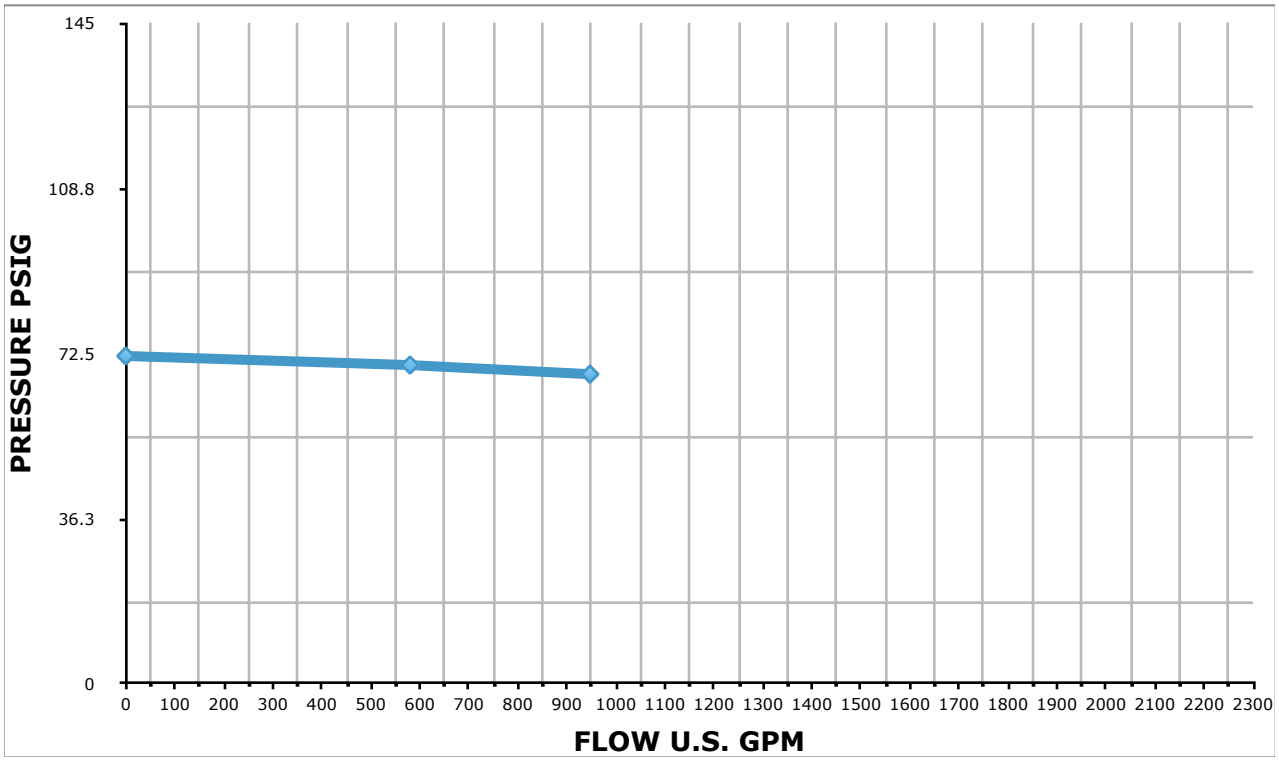
Location of Flow Hydrant: On Oak St. near Sackville St.

Residual Hydrant: On Oak St. Near Sumach St.

Main Size: 200mm Static Pressure: 72 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	72
2.	1 x 2 ½	12	580	70
3.	2 x 2 ½	8	947	68

Note: Flow test conducted in accordance with NFPA 291



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Massimo Lozzi

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E-mail: lozziaquacheck@gmail.com

Site Map:

counterpoint engineering

NFPA Theoretical Flow Calculations

Project Name: **Regent Park Phases 4&5**
Project Number: **21123**

Based on National Fire Protection Association Guidelines, the available flow at the minimum residual pressure of 20psi can be calculated based on the observed flow at the observed pressure readings, as follows:

Oak At Sackville

$$\mathbf{Q_F = 29.83 \times c \times d^2 \times p^{0.5}}$$, where

Q_F = observed flow (US GPM)
c = hydrant nozzle coefficient (0.90 - 0.95)
d = nozzle diameter (in)
p = observed pitot pressure

$$\mathbf{Q_R = Q_F \times h_F^{0.54} / h_R^{0.54}}$$, where

Q_R = available flow
Q_F = observed flow (US GPM)
h_F = drop from measured static to desired baseline pressure
h_R = drop from measured static to measured residual pressure

Based on flow test results obtained by Lozzi Aqua Check***, November 17, 2021***

c =	0.9	
d =	2.5	in
number of ports =	2	
p =	8	

Q_F = 949 US GPM

Measured Static Pressure =	72	psi	
Measured Residual Pressure =	68	psi	
Desired Residual Pressure =	20	psi	, minimum per City of Toronto design criteria

Q_R = 3792 US GPM per fire conneciton
14,355 L/min

Lozzi Aqua Check Massimo Lozzi

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Gormley, ON L0H 1G0 E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 10:30 am

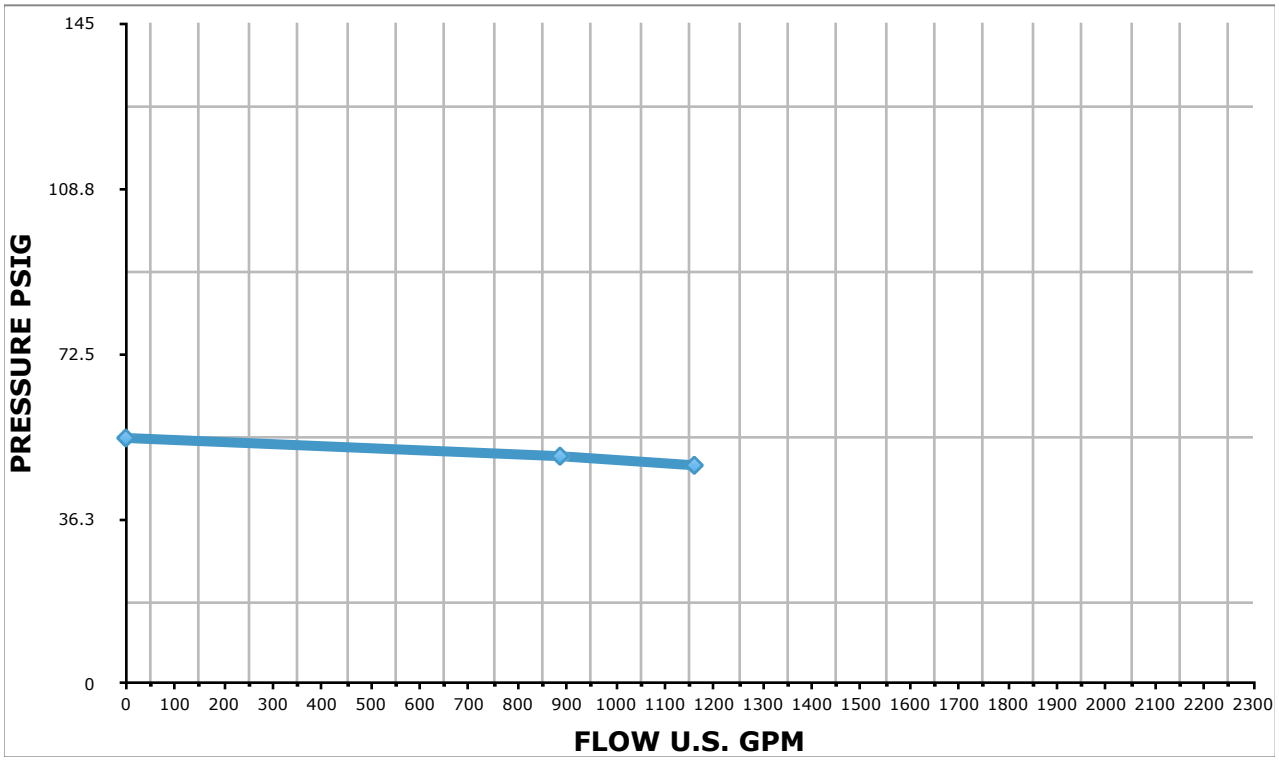
Location of Flow Hydrant: 407 Gerrard St. E

Residual Hydrant: S/W corner of Gerrard St. E & Sumach St.

Main Size: 150mm Static Pressure: 54 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	54
2.	1 x 2 ½	28	886	50
3.	2 x 2 ½	12	1160	48

Note: Flow test conducted in accordance with NFPA 291



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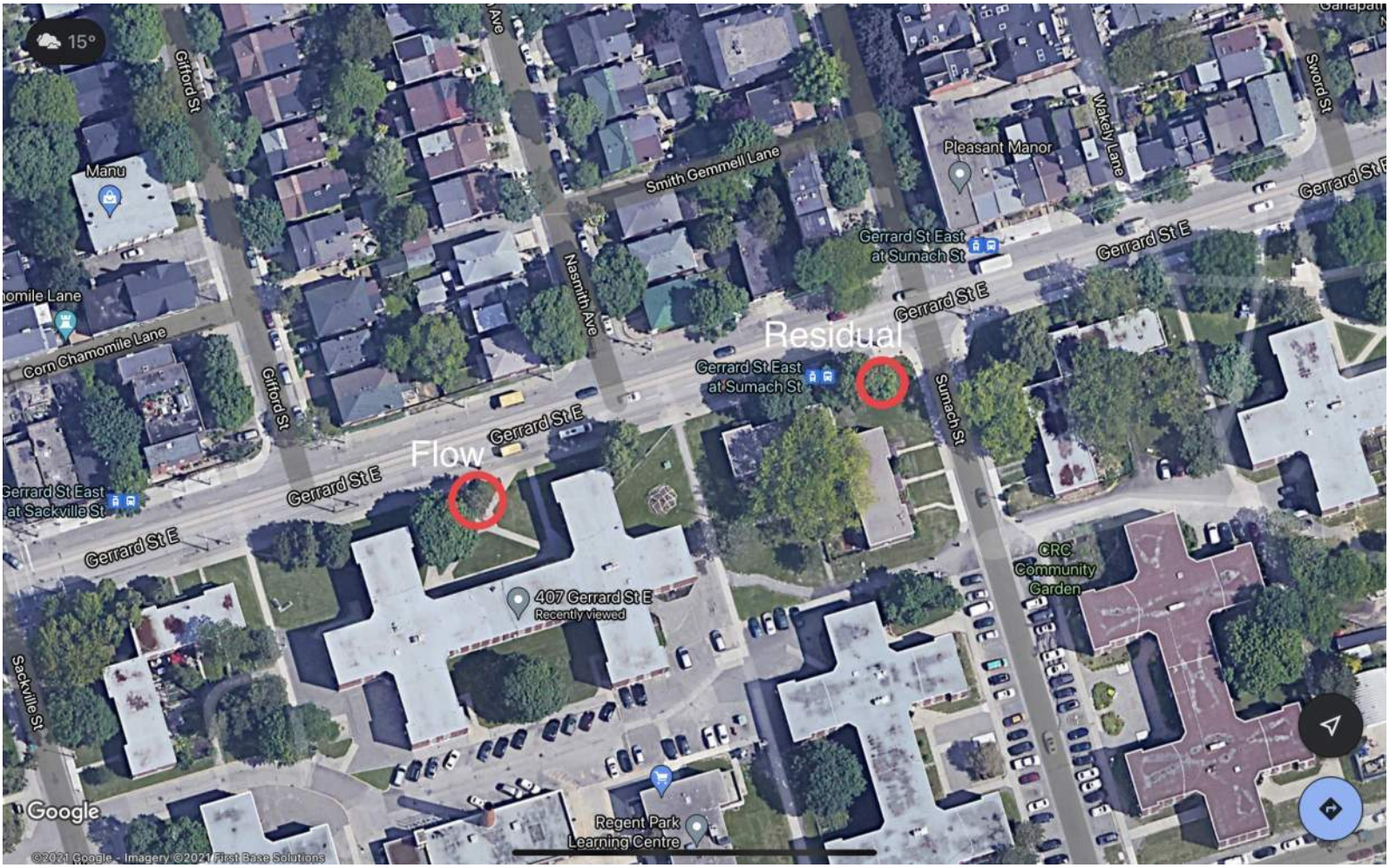

Lozzi Aqua Check Massimo Lozzi

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Gormley, ON L0H 1G0 E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 11:00 am

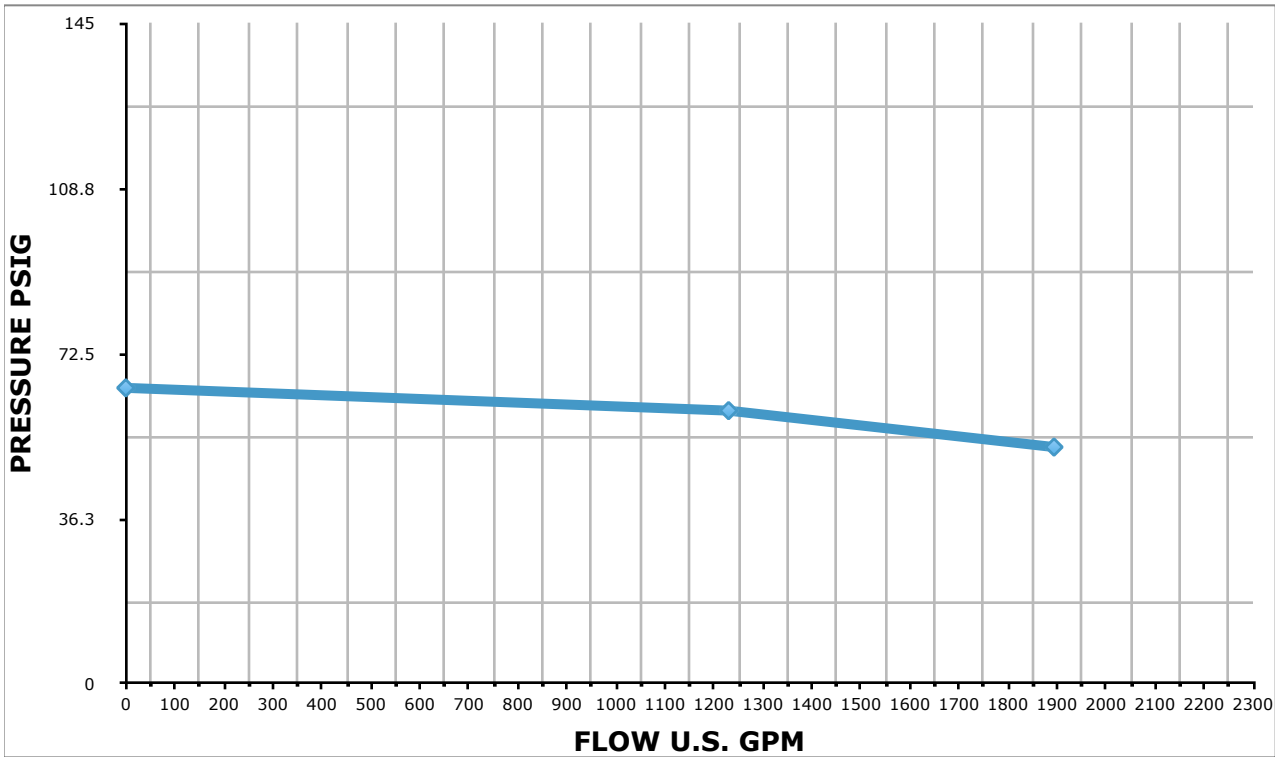
Location of Flow Hydrant: On Dreamers Way North of Oak St.

Residual Hydrant: On Dreamers Way South of Gerrard St. E.

Main Size: 200mm Static Pressure: 65 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	65
2.	1 x 2 ½	54	1230	60
3.	2 x 2 ½	32	1894	52

Note: Flow test conducted in accordance with NFPA 291



counterpoint engineering

NFPA Theoretical Flow Calculations

Project Name: **Regent Park Phases 4&5**
Project Number: **21123**

Based on National Fire Protection Association Guidelines, the available flow at the minimum residual pressure of 20psi can be calculated based on the observed flow at the observed pressure readings, as follows:

Dreamer Way at Gerrard st. E.

$$\mathbf{Q_F = 29.83 \times c \times d^2 \times p^{0.5}}$$, where

Q_F = observed flow (US GPM)
c = hydrant nozzle coefficient (0.90 - 0.95)
d = nozzle diameter (in)
p = observed pitot pressure

$$\mathbf{Q_R = Q_F \times h_F^{0.54} / h_R^{0.54}}$$, where

Q_R = available flow
Q_F = observed flow (US GPM)
h_F = drop from measured static to desired baseline pressure
h_R = drop from measured static to measured residual pressure

Based on flow test results obtained by Lozzi Aqua Check***, November 17, 2021***

c =	0.9	
d =	2.5	in
number of ports =	2	
p =	32	

Q_F = 1898 US GPM

Measured Static Pressure =	65	psi	
Measured Residual Pressure =	52	psi	
Desired Residual Pressure =	20	psi	, minimum per City of Toronto design criteria

Q_R = 3712 US GPM per fire conneciton
14,051 L/min

Lozzi Aqua Check Massimo Lozzi

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Gormley, ON L0H 1G0 E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 9:00 am

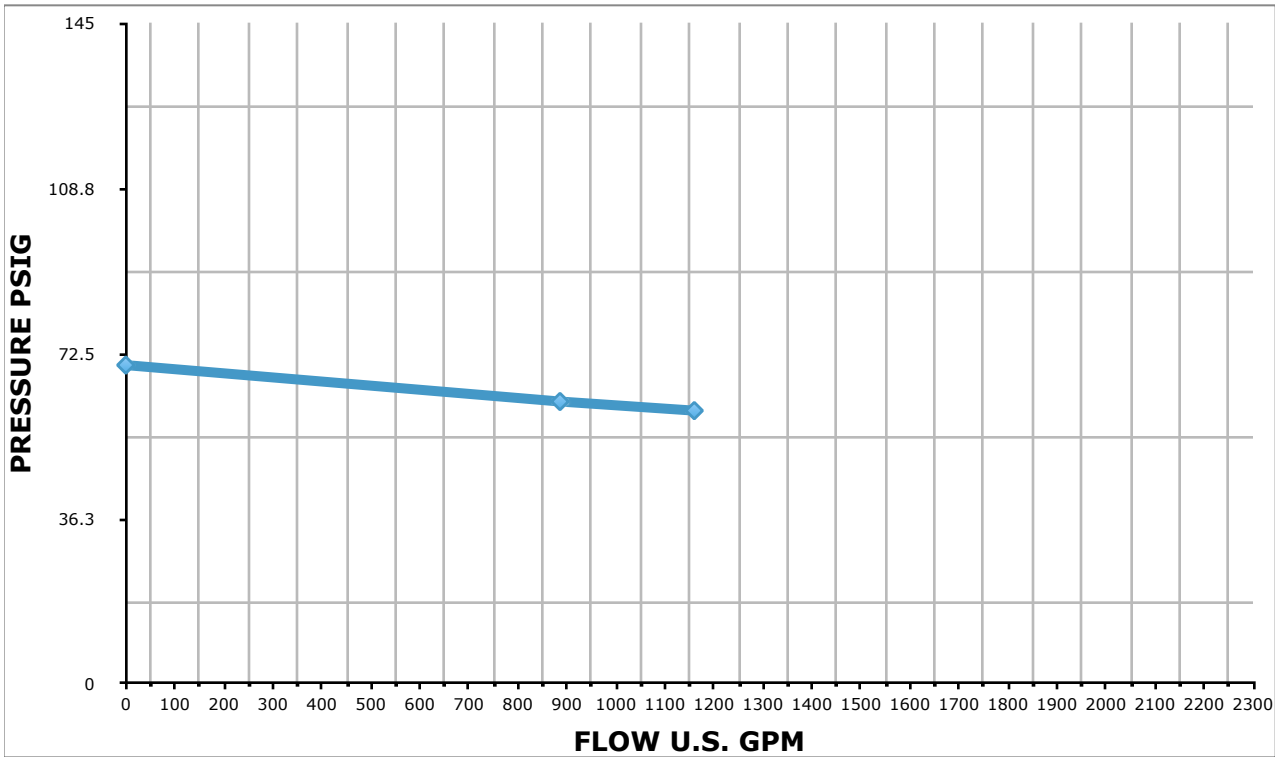
Location of Flow Hydrant: At 463 Gerrard St. E

Residual Hydrant: S/W corner of River St. And Gerrard St. E

Main Size: 150mm Static Pressure: 70 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	70
2.	1 x 2 ½	28	886	62
3.	2 x 2 ½	12	1160	60

Note: Flow test conducted in accordance with NFPA 291



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Gormley, ON L0H 1G0

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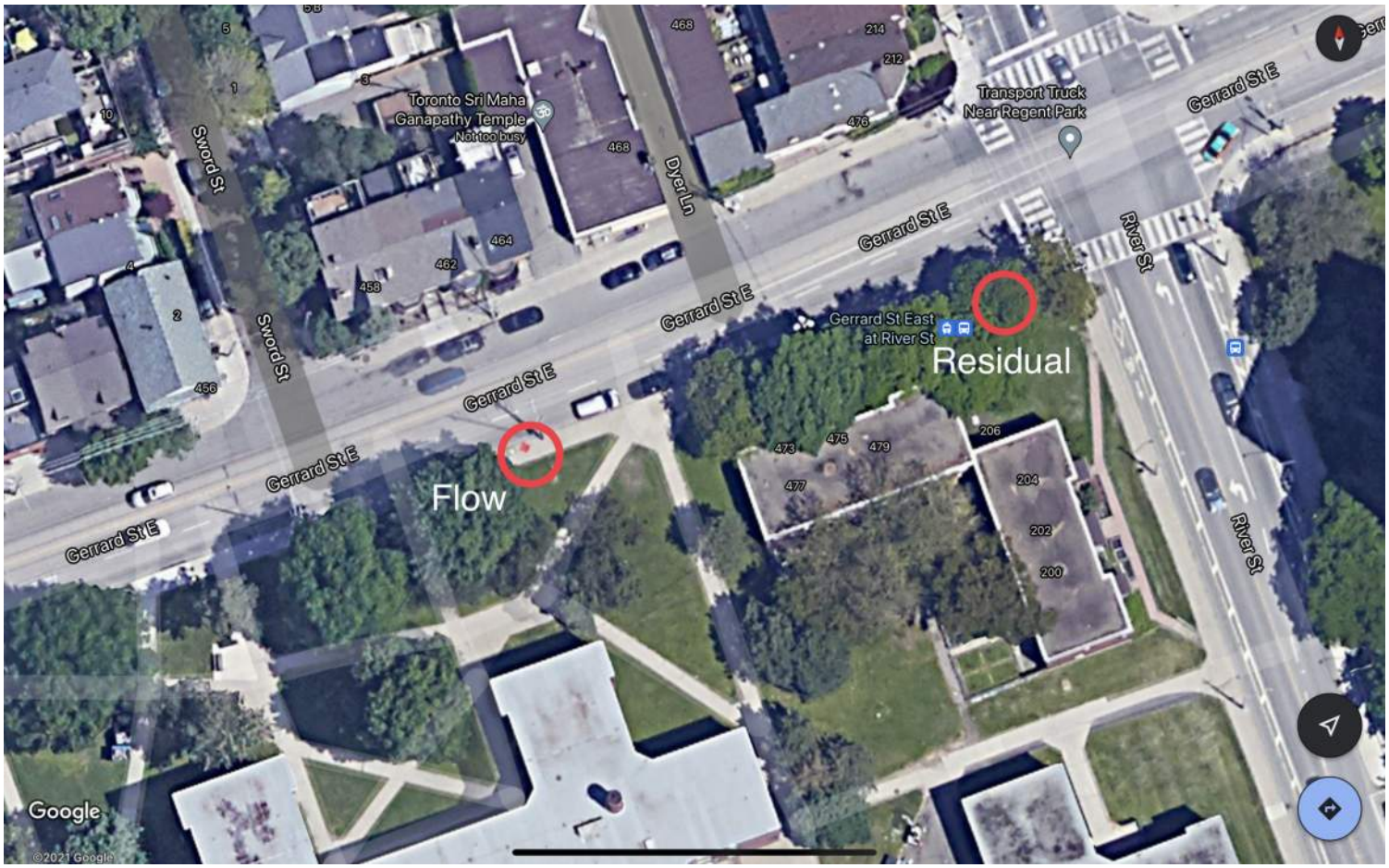
Site Map:



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Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 9:30 am

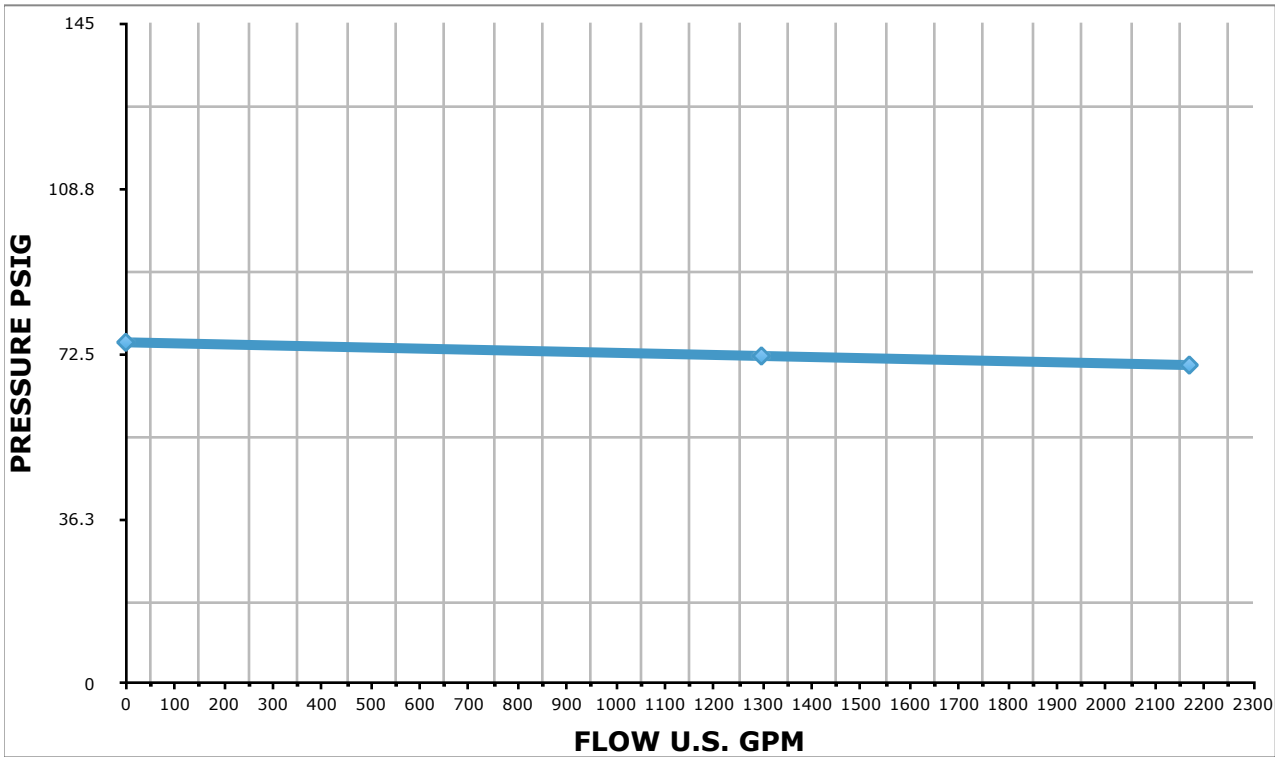
Location of Flow Hydrant: East side of River St., North of Oak St.

Residual Hydrant: S/E corner of Dundas St. E and River St.

Main Size: 150mm Static Pressure: 75 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	75
2.	1 x 2 ½	60	1297	72
3.	2 x 2 ½	42	2170	70

Note: Flow test conducted in accordance with NFPA 291



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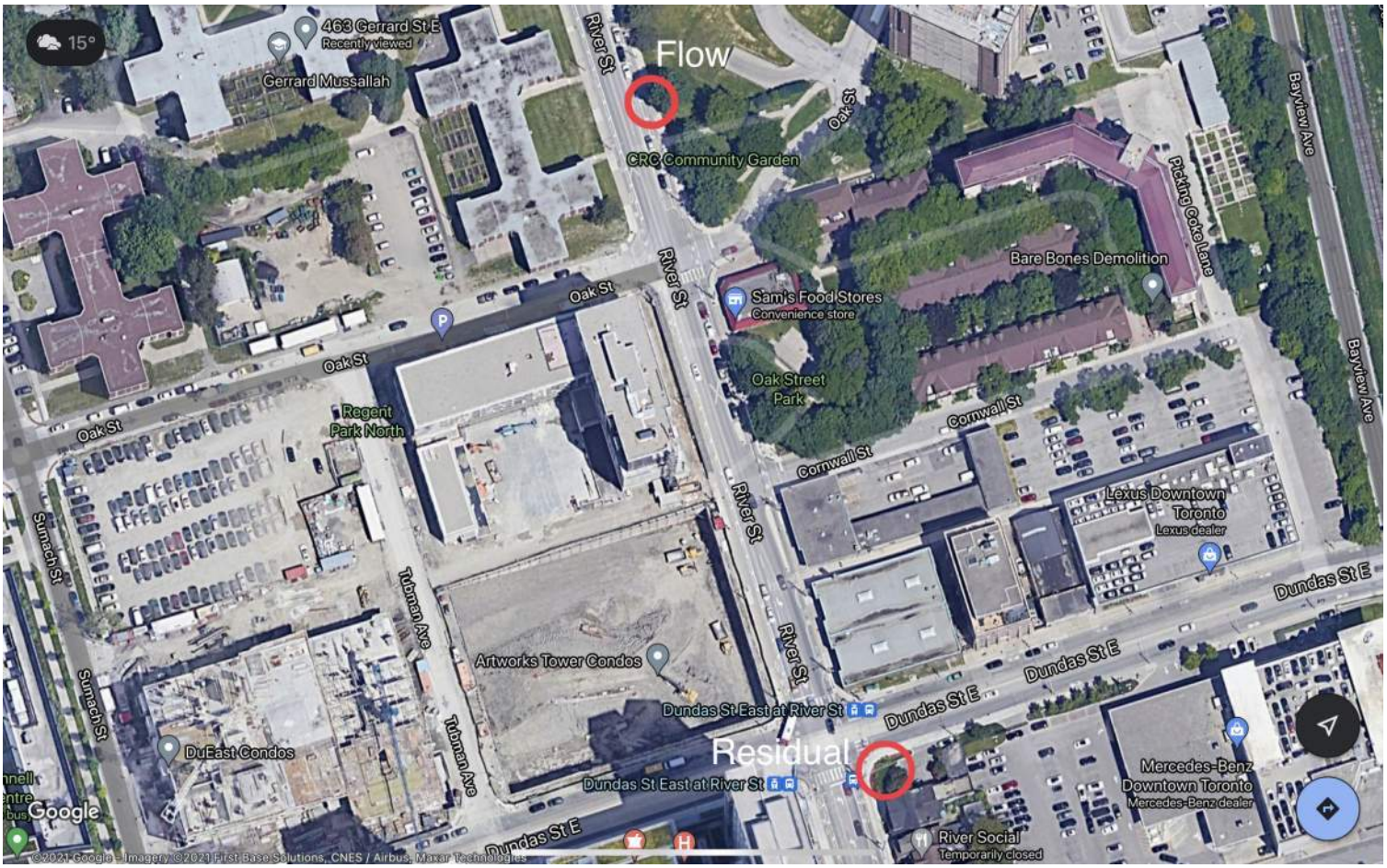

Lozzi Aqua Check Massimo Lozzi

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Gormley, ON L0H 1G0 E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 10:00 am

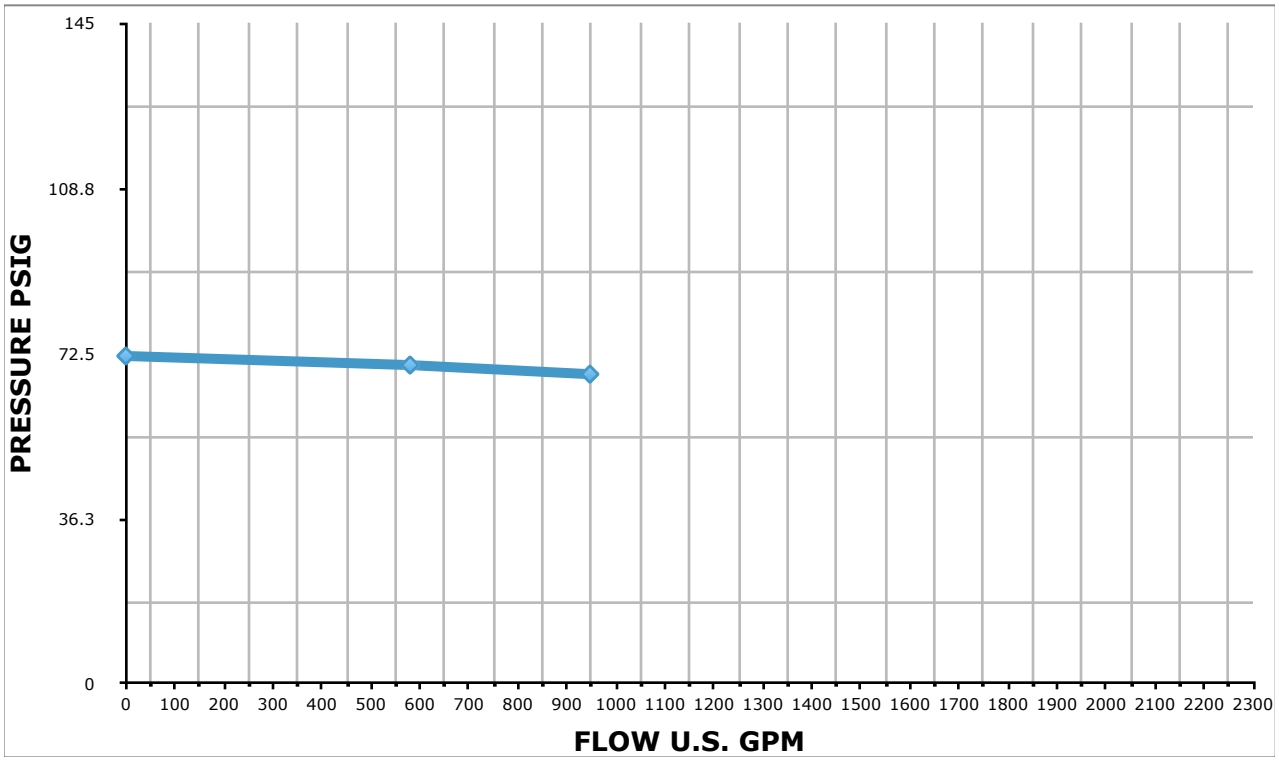
Location of Flow Hydrant: On Oak St. near Sackville St.

Residual Hydrant: On Oak St. Near Sumach St.

Main Size: 200mm Static Pressure: 72 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	72
2.	1 x 2 ½	12	580	70
3.	2 x 2 ½	8	947	68

Note: Flow test conducted in accordance with NFPA 291



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Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 10:30 am

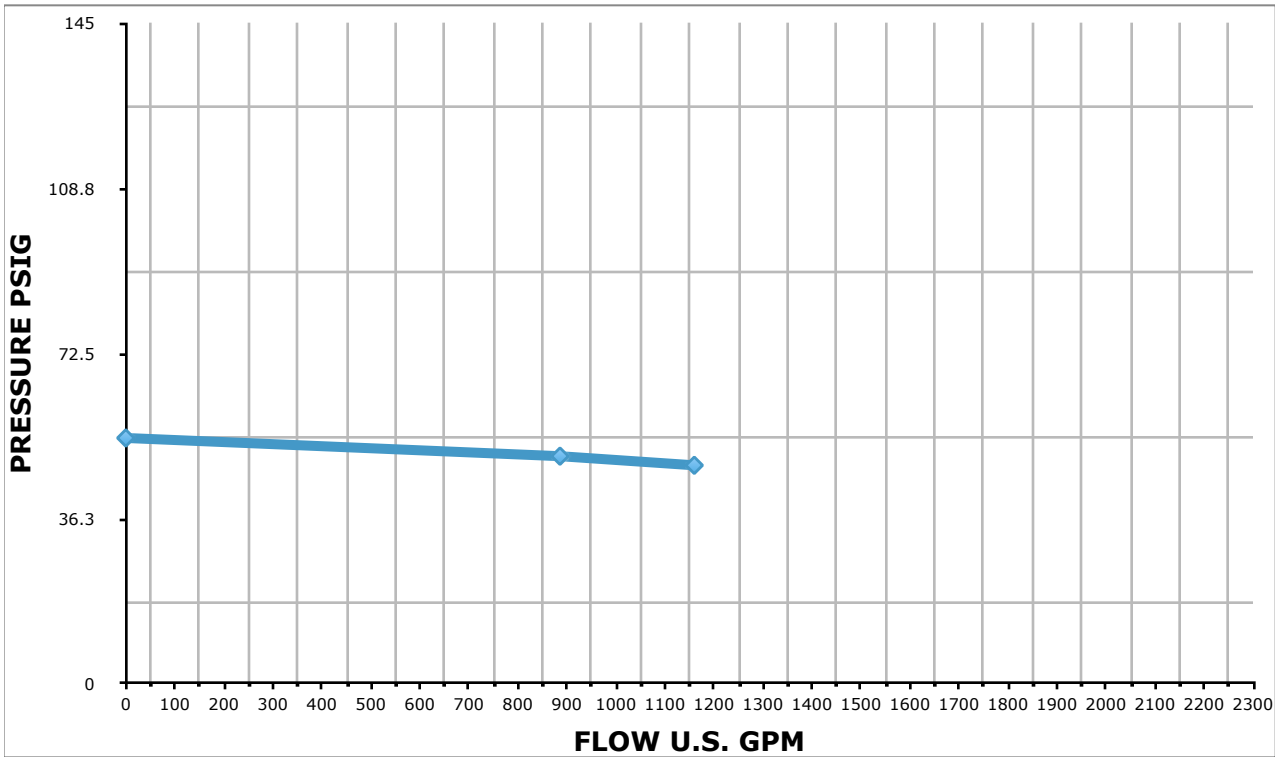
Location of Flow Hydrant: 407 Gerrard St. E

Residual Hydrant: S/W corner of Gerrard St. E & Sumach St.

Main Size: 150mm Static Pressure: 54 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	54
2.	1 x 2 ½	28	886	50
3.	2 x 2 ½	12	1160	48

Note: Flow test conducted in accordance with NFPA 291



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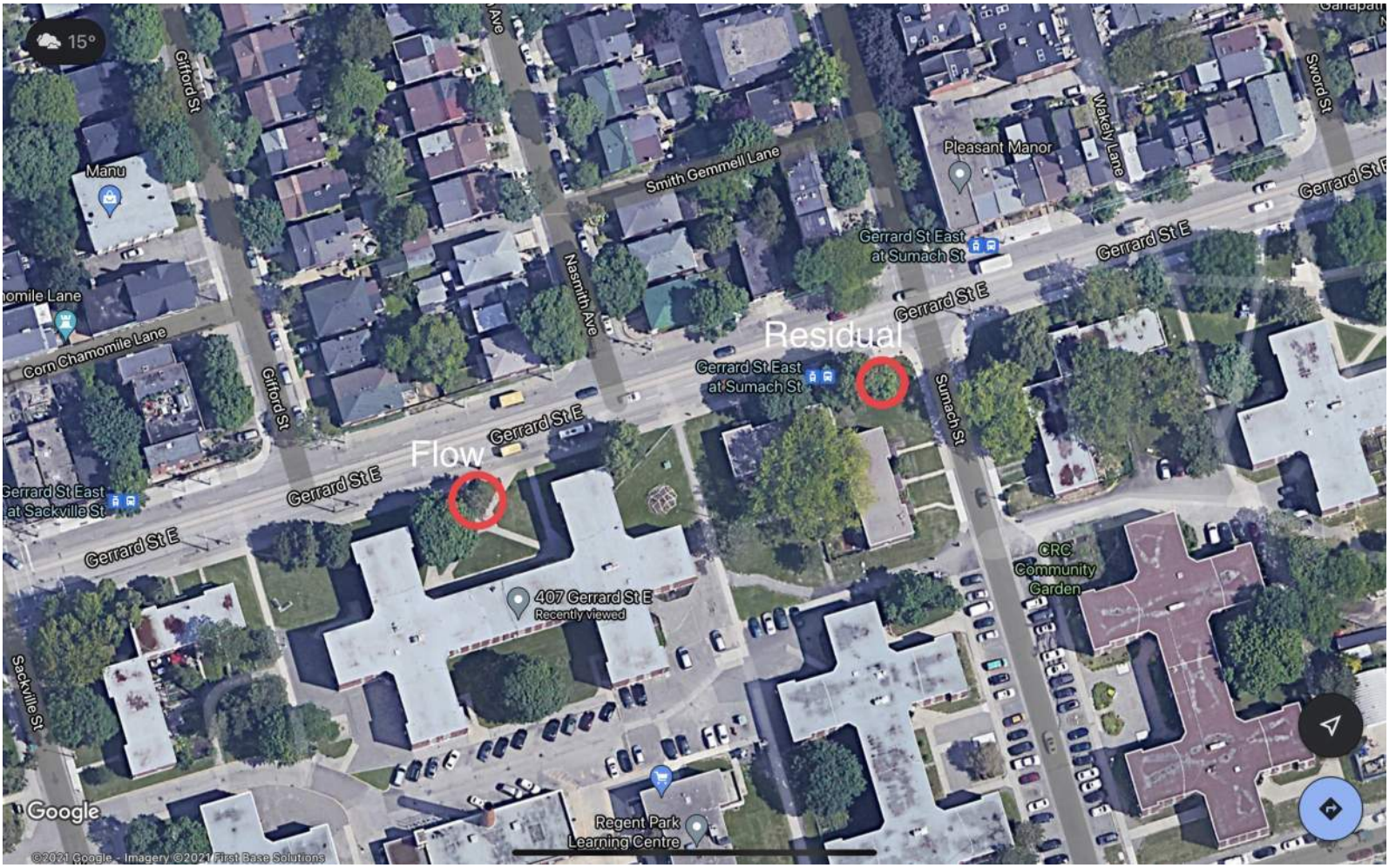

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Gormley, ON L0H 1G0 E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: Regent Park Date: November 17, 2021

Time of Test: 11:00 am

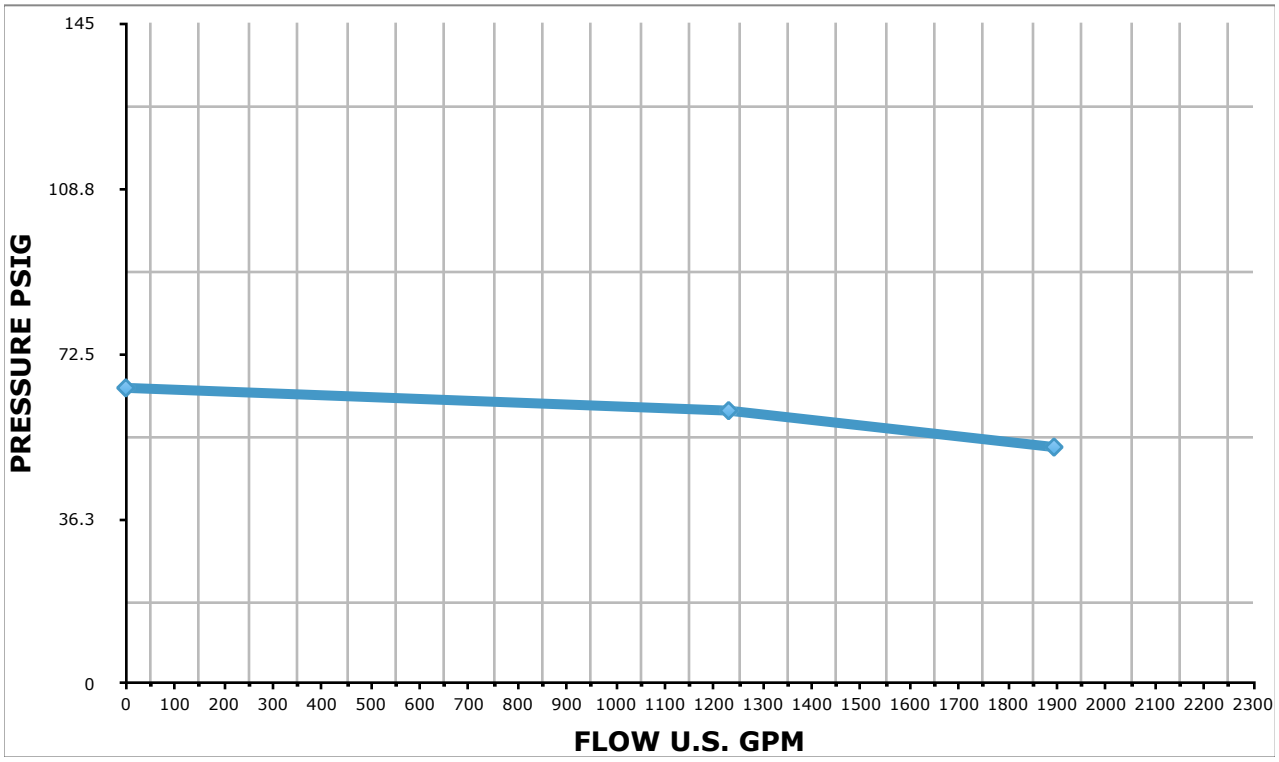
Location of Flow Hydrant: On Dreamers Way North of Oak St.

Residual Hydrant: On Dreamers Way South of Gerrard St. E.

Main Size: 200mm Static Pressure: 65 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	65
2.	1 x 2 ½	54	1230	60
3.	2 x 2 ½	32	1894	52

Note: Flow test conducted in accordance with NFPA 291



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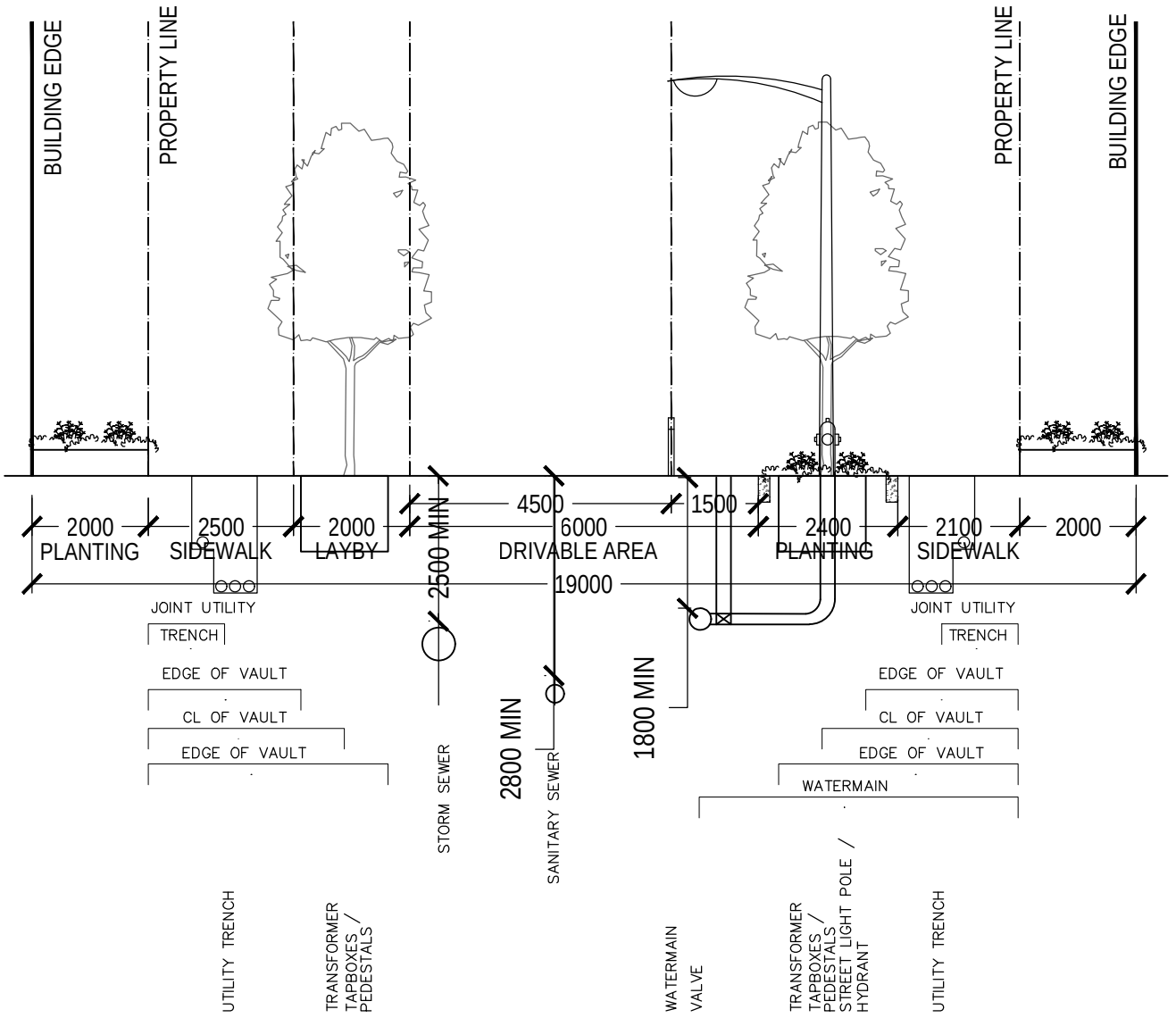
Site Map:

Map not available.

Appendix D

Proposed Public Roads

TUBMAN EXTENSION



Appendix E

Groundwater

TORONTO

December 2017

SERVICING REPORT GROUNDWATER SUMMARY

The form is to be completed by the Professional that prepared the Servicing Report.
Use of the form by the City of Toronto is not to be construed as verification of engineering/hydrological content.

For City Staff Use Only:	
Name of ECS Case Manager (please print)	

A. SITE INFORMAITON		**Included in SR (reference page number)**	**Report Includes this information City staff (Check)**
Date Servicing Report was prepared: **November 30, 2022**		Cover	
Title of Servicing Report: FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT		Cover	
Name of Consulting Firm that prepared Servicing Report: Counterpoint Engineering		Cover	
Site Address	**Regent Park** Toronto, Ontario	Cover	
Postal Code			
Property Owner (identified on planning request for comments memo)	Toronto Community Housing Corp. & 2747199 Ontario Limited (Tridel)	Cover	
Proposed description of the project (ex. number of point towers, number of podiums, etc.)	Four blocks of multiple towers up to 39 storey	Page 4	
Land Use (ex. commercial, residential, mixed, industrial, institutional) as defined by the Planning Act	Mixed Use	Page 4	
Number of below grade levels	2		

SERVICING REPORT GROUNDWATER SUMMARY

Does the SR include a private water drainage system (PWDS)? **PWDS: Private Water Drainage System:** A subsurface drainage system which may consist of but is not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection or drainage system for disposal in a municipal sewer.	If **Yes** continue completing Section B (Information Relating to Groundwater) **ONLY** **If Yes, Number of PWDS?** **0** *(Each of these PWDS may require a separate Toronto Water agreement)* If **No** skip to Sections C (On-site Groundwater Containment) and/or D (Water Tight Requirements) as applicable	◯YES ☒ NO	
B. INFORMATION RELATING TO GROUNDWATER		**Included in SR (reference page number)**	**Report Includes this information City Staff (Check)**
A copy of the pump schedule(s) for **ALL** groundwater sump pump(s) for the development site has been included in the SR **or** A letter written by a Mechanical Consultant (signed and stamped by a Professional Engineer of Ontario) shall be attached to the SR stating the peak flow rate of the groundwater discharge for the development site for all groundwater sump pump(s). This peak flow rate must be based on the pump schedule(s) that have been designed by the			

SERVICING REPORT GROUNDWATER SUMMARY

Mechanical Consultant. A template of this letter is attached in Schedule A. ****If there is more than one groundwater sump they must ALL be included in the letters along with a combined flow****			
Is it proposed that the groundwater from the development site will be discharged to the sanitary, combined or storm sewer?	☒ Sanitary Sewer ◯ Combined Sewer ◯ Storm Sewer		
Will the proposed PWDS discharge from the site go to the Western Beaches Tunnel (WBT)? *Reference attached WBT drainage map*	◯ YES ☒ NO **If Yes, private water discharge fees will apply and site requires a sanitary discharge agreement.**		
What is the street name where the receiving sewer is located?	Dreamers Way, Oak Street, Tubman.		
What is the diameter of the receiving sewer?	250 & 300		
Is there capacity in the proposed local sewer system? ☒ YES ◯ NO	Are there any improvements required to the sewer system? If yes, identify them below and refer to the section and page number of the SR where this information can be found. If a sewer upgrade is required, the owner is required to enter into an Agreement with the City to improve the infrastructure? ◯ YES		
Has Toronto Water-WIM confirmed that there is there capacity in the proposed infrastructure listed below? - Trunk System? ◯ YES ◯ NO			

December 2017

SERVICING REPORT GROUNDWATER SUMMARY

-Pumping Station? ◯ YES ◯ NO -Wastewater treatment plant? ◯ YES ◯ NO -Outfall? ◯ YES ◯ NO -Combined Sewer Overflow? ◯ YES ◯ NO *If there is no capacity in any of the above then alternative options need to be considered by the Owner and site cannot discharge to City sewer system.			
Total allowable peak flow rate during a 100 year storm event (L/sec) to storm sewer When groundwater is to be discharged to the storm sewer the total groundwater and stormwater discharge shall not exceed the permissible peak flow rate during a 2 year pre development storm event, as per the City's Wet Weather Flow Management Guidelines, dated 2006	__790.1_____ L/sec	Page 6	
Short-Term Groundwater Discharge Provide proposed total flow rate to the sanitary/combined sewer in post-development scenario Total Flow (L/sec) = sanitary flow + peak short-term groundwater flow rate	To be Determined during the SPA process for each block ___N/A_____ L/sec		

SERVICING REPORT GROUNDWATER SUMMARY

Long-Tem Groundwater Discharge Provide proposed total flow rate to the sanitary/combined sewer in post-development scenario Total Flow (L/sec) = sanitary flow + peak long-term groundwater flow rate	__0_____ L/sec	Page 9	
Does the water quality meet the receiving sewer Bylaw limits? ◯ YES ☒ NO	If the water quality does not meet the applicable receiving sewer Bylaw limits and the applicant is proposing a treatment system the applicant will need to include a letter stating that a treatment system will be installed and the details of the treatment system will be included in the private water discharge application that will be submitted to TW EM&P.		
C. ON-SITE GROUNDWATER CONTAINMENT		**Included in SR (reference page number)**	**Report Includes this information City Staff (Check)**
How is the site proposing to manage the groundwater discharge on site?	Watertight Foundation	Page 9	
Has the above proposal been approved by:	◯ TW-WIM And ◯ TW-EM&P And ◯ ECS		

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If the site is proposing a groundwater infiltration gallery, has it been stated that the groundwater infiltration gallery will not be connected to the municipal sewer? A connection between the infiltration gallery/dry well and the municipal sewer is not permitted Please be advised if an infiltration gallery/dry well on site is not connected to the municipal sewer, the site **must** submit two letters using the templates in Schedule B and Schedule C.	◯ YES ☒ NO		
Confirm that the infiltration gallery can infiltrate 100% of the expected peak groundwater flow year round, ensure that the top of the infiltration trench is below the frost line (1.8m depth), not less than 5 m from the building foundation, bottom of the trench 1m above the seasonally high water table, and located so that the drainage is away from the building.			
D. WATER TIGHT REQUIREMENTS		**Included in SR (reference page number)**	**Report Includes this information City Staff (Check)**
If the site is proposing a water tight structure: 1. The owner must submit a letter using the template in Schedule D. 2. A Professional Engineer (Structural), licensed to practice in Ontario and qualified in the subject must submit a letter using the template in Schedule E. 3. A Professional Engineer (Mechanical), licensed to practice in Ontario and qualified in the subject must submit a letter using the template in Schedule F.			

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SERVICING REPORT GROUNDWATER SUMMARY

Provide a copy of the approved SR to Toronto Water Environmental Monitoring & Protection Unit at pwapplication@toronto.ca.

Consulting Firm that prepared Servicing Report: __Counterpoint Engineering_____

Professional Engineer who completed the report summary: ___Rasheed Serrao_____
Print Name

Professional Engineer who completed the report summary: _____ Nov. 30, 2022
Signature Date & Stamp