Starlight Investments

STORMWATER MANAGEMENT AND SERVICING REPORT

1637-1645 Bathurst Street, City of Toronto

December 16, 2019

Project No. 20284

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1 INTRODUCTION

1.1 SCOPE OF THE STORMWATER MANAGEMENT AND SERVICING REPORT

Starlight Investments is proposing to redevelop five existing residential sites located at 1637, 1639, 1641, 1643, and 1645 Bathurst Street in the City of Toronto. LEA Consulting Ltd. has been retained by Starlight Investments to prepare a Stormwater Management and Servicing Report in support of the Zoning By-law Amendment and Site Plan Approval application for the proposed 4-storey apartment development project in the City of Toronto. This stormwater management and servicing report shall:

- Examine the potential water quality, quantity, and water balance impacts of the proposed development, and summarize how each will be addressed in accordance with the City of Toronto's Wet Weather Flow Management Guidelines (WWFMG); and
- Review the water supply, storm and sanitary servicing requirement of the proposed residential development and propose a site servicing plan.

1.2 SITE LOCATION

The proposed development site, encompassing five existing properties (1637, 1639, 1641, 1643, and 1645 Bathurst Street), is bounded by Bathurst Street to the west, a private laneway to the east, and residential properties to the north and south. The site is located within the block bounded by Ardmore Road to the north and Burton Road to the south. Site access is via the private laneway off Bathurst Street. This report will focus on a 0.416 ha area as the development subject site.

1.3 STORMWATER MANAGEMENT PLAN OBJECTIVES

The objectives of the stormwater management (SWM) plan are to determine site specific stormwater management requirements, review the potential stormwater environment impact by the proposed residential development, and address the City's requirements for stormwater quantity control and quality control as required. Stormwater management design documenting the strategy along with the technical information necessary for the sizing of the proposed stormwater management systems are included in this report.

1.4 SWM DESIGN CRITERIA – CITY OF TORONTO

The SWM plan for the proposed development shall conform to the criterion and/ or guidelines from the City of Toronto. The City of Toronto requires that all stormwater management plans shall follow the Wet Weather Flow Management Guidelines (WWFMG) dated November 2006. A summary of the stormwater management criteria applicable to this project is as follows:

- **Water Balance:** The WWFMG requires a site to retain stormwater on-site, to the extent practicable, to achieve the same level of annual volume of overland runoff allowable from the development site under pre-development conditions. Typically, the minimum on-site runoff retention will require the site to retain all runoff from a 5mm storm event through infiltration, evapotranspiration or rainwater reuse.

- **Water Quality:** Based on the WWFMG, the site is required to provide a long-term removal of 80% of total suspended solids (TSS) on an average annual basis.
- **Erosion Control:** As indicated in WWFMG, 'For small infill/redevelopment sites < 2.0 ha, erosion control in the form of stormwater detention is normally not required, provided the on-site minimum runoff retention from a small design rainfall event (typically 5mm) is achieved under the Water Balance Criteria.'
- **Water Quantity Control and Discharge to Municipal Infrastructure:** The allowable release rate to the municipal storm sewer system from the development site during a 2-year design storm event must not exceed the peak runoff rate from the site under pre-development conditions during the same storm event, or existing capacity of the receiving storm sewer, whichever is less. When the % imperviousness of a development site under pre-development condition is higher than 50% (regardless of what the post-development condition is), the maximum value of C (Runoff Coefficient) used in calculating the pre-development peak runoff rate is limited to 0.5.

2 EXISTING CONDITIONS

2.1 GENERAL

The site is currently occupied by five existing residential buildings, a paved private lane with access off Bathurst Street, and associated landscaping and concrete walkways. The total drainage area is 0.416 ha. A runoff coefficient of 0.74 is estimated for existing conditions. Refer to **Appendix A-01** and **Appendix A-02** for existing land use breakdown. Since the existing site imperviousness is greater than 50%, the maximum runoff coefficient of 0.50 is used hereinafter in calculating the pre-development peak flow rate in accordance with the WWFMG. The current site also accepts external drainage from the portion of private laneway outside of the property boundary. Refer to **Appendix B-01** for existing land use breakdown of the external drainage area. **Figure 1** in **Appendix H** illustrates the overland flow routes, grading and land use details under existing conditions.

2.2 RAINFALL INFORMATION

The rainfall intensity for the site is calculated using the following equation:

Rational Formula: $Q = 2.78CIA$ (L/s)

Where:
C: runoff coefficient
I: rainfall intensity (mm/hr)
A: drainage area (ha)

IDF Curve Equation: $I = aT^{C}$ (for the City of Toronto)

Where:
I: rainfall intensity (mm/hr)
T: time of concentration (hour)
a, c: parameters

The parameters (a and c) recommended for use in the City of Toronto are defined in Section 3.1 of the WWFM Guidelines and are summarized in **Table 1**. An initial time of concentration, T, of 10 minutes (or 0.167 hours) is recommended in the WWFMG document.

Table 1: Values of a and C parameters for the City of Toronto

Return Period	*a*	*C*
2-year	21.8	-0.78
10-year	38.7	-0.80
50-year	53.5	-0.80
100-year	59.7	-0.80

2.3 ALLOWABLE FLOW RATE

Relevant policies from the WWFMG restrict flow rates on this site to the allowable flow rates for discharge to municipal sewers. According to the WWFMG, Section 2.2.3.8, the allowable release rate to the municipal storm sewer system from the proposed redevelopment area is 51.01 L/s, based on the 2-year pre-development flow rate calculated with a runoff coefficient value of 0.50.

The calculated peak flow rates for the site in the pre-development condition are summarized below in **Table 2**. Detailed calculations are provided in **Appendix A-03** and **Appendix B-03**.

Table 2: Pre-Development Peak Flow (L/s)

Return Period (Year)	Rainfall Intensity (mm/hr)	Peak Flow Rate from Site Area (L/s)	Peak Flow Rate from External Drainage Area (L/s)
2	88.19	51.01	3.55
10	162.27	93.85	6.54
50	224.32	129.74	9.04
100	250.32	144.78	10.09

3 POST-DEVELOPMENT CONDITIONS

3.1 GENERAL

The proposed development consists of a 4-storey residential building with 2 level of below-grade parking garage. The roof of the 4th floor will have green roof, private terraces and outdoor amenity. **Figure 02**, in **Appendix H**, shows the location of the proposed building, as well as other features of the site. The portion of the private laneway outside of the property limit will also be enhanced with permeable pavers to improve existing drainage condition.

Based on the proposed development site condition within property limits, two sub-catchment areas are delineated within the property boundary as follows:

Sub-catchment #1: This sub-catchment consists of a 4-storey apartment and some landscape area. Surface rainfall runoff will be collected by building roof leaders or area drains, conveyed through proposed internal storm pipes to the proposed storage cistern, and outlet to the existing municipal storm sewer manhole, EX.MH1, on Bathurst Street. Based on the proposed land use, the composite runoff coefficients are estimated at 0.72 for this sub-catchment. Refer to **Appendix A-02** for details.

Sub-catchment #2: This sub-catchment consists of some landscaped area, the patio at the backyard, and the private laneway within the site boundary. The private laneway will be paved with permeable pavers to promote on-site infiltration. During rainfall events, surface rainfall runoff from this sub-catchment area will be captured by existing catchbasins and discharged into existing storm sewers within the laneway. Refer to **Figure 2** in **Appendix G** for details of proposed development drainage condition. Due to the constraint of existing storm and sanitary sewer configuration (sanitary sewer located on top of storm sewers with concrete encasement), rainfall runoff flow from this sub-catchment will be drained to the municipal sewers without control under post-development condition. Based on the proposed land use, the composite runoff coefficient is estimated at 0.53 for this sub-catchment. Refer to **Appendix A-02** for details.

The land use within property limit is provided below in **Table 3** for comparison between existing and proposed condition.

Table 3: Land Use Area Breakdown of Site Area

Land-Use	Area (m^2)			Coverage (%)		
	Existing Condition	Proposed Condition		Existing Condition	Proposed Condition	
		SC #1	SC #2		SC #1	SC #2
Building	1507	1784	0	36.2	42.9	0
Green Roof	0	474	0	0	11.4	0
At-Grade Impervious Surface	1605	442	339	38.6	10.6	8.1
At-Grade Pervious Surface	0	0	512	0	0	12.3
At-Grade Landscaped Area	1049	381	229	25.2	9.2	5.5
Total	**4161**	**3081**	**1080**	**100**	**74.0**	**26.0**

External Drainage Area: This external sub-catchment consists of the rest of the private laneway outside of the property area. The private laneway will be paved with permeable pavers to promote on-site infiltration and water quality treatment. During rainfall events, surface rainfall runoff from this sub-catchment area will be captured by existing catchbasins and discharged into existing storm sewers within the laneway. Refer to **Figure 2** in **Appendix H** for details of proposed development drainage condition. Based on the proposed land use, the composite runoff coefficient is estimated at 0.40 for this sub-catchment. Refer to **Appendix B-02** for details.

The land use within the external drainage area is provided in **Table 4** for comparison between existing and proposed condition.

Table 4: Land Use Area Breakdown of External Drainage Area

Land-Use	Area (m^2)		Coverage (%)	
	Existing Condition	Proposed Condition	Existing Condition	Proposed Condition
At-Grade Impervious Surface	290	0	100	0
At-Grade Pervious Surface	0	290	0	100
Total	**290**	**290**	**0**	**0**

3.2 PEAK FLOW RATES UNDER PROPOSED CONDITION

Based on the proposed site condition and rainfall parameters, the Rational Method is adopted to calculate peak flows at different design storm events.

The calculated peak flow rates for the two sub-catchment areas within the property limits in the post-development condition are summarized in **Table 5**. Detailed calculations are provided in **Appendix A-04**.

Table 5: Post-Development Peak Flow Rates from Site Area (L/s)

Return Period	2 - Year	10 - Year	50 - Year	100 - Year
Sub-Catchment #1	54.36	100.02	138.27	154.29
Sub-Catchment #2	13.89	25.57	35.34	39.44
Total	**68.21**	**125.51**	**173.51**	**193.62**

The calculated peak flow rates for the two sub-catchment areas within the property limits in the post-development condition are summarized in **Table 6**. Detailed calculations are provided in **Appendix B-04**.

Table 6: Post-Development Peak Flow Rates from External Drainage Area (L/s)

Return Period	2 - Year	10 - Year	50 - Year	100 - Year
Peak Flow Rate	2.84	5.23	7.23	8.07

3.3 STORMWATER DISCHARGE COMPARISON

Based on the review and analysis of existing and proposed site conditions, **Table 7** summarizes the key hydrologic parameters of the site area.

Table 7: Site Area Key Hydrologic Parameters

Imperviousness		Runoff Coefficient		100-year Peak Flow Rate	
Existing Condition	Proposed Condition	Existing Condition	Proposed Condition	Existing Condition	Proposed Condition
74.8	61.6	0.50	0.67	144.78	193.62

Although the actual pre-development runoff coefficient for the proposed development site is 0.72, the maximum runoff coefficient of 0.50 is considered under pre-development condition in accordance with the City's design criteria. Since the 100-year peak flow rate increased in the proposed condition based on the runoff coefficient of 0.50, mitigation measures are required in accordance with the TRCA design criteria and, thus, are presented in subsequent Section.

Based on the review and analysis of existing and proposed site conditions, **Table 8** below summarizes the key hydrologic parameters of the external drainage area under existing and proposed condition.

Table 8: External Drainage Area Key Hydrologic Parameters

Imperviousness		Runoff Coefficient		100-year Peak Flow Rate	
Existing Condition	Proposed Condition	Existing Condition	Proposed Condition	Existing Condition	Proposed Condition
100	0	0.50	0.40	10.09	8.07

As evident from the table above, the percentage imperviousness, the runoff coefficient, and the 100-year peak flow rate decreased significantly in the proposed condition through improvement of the laneway with permeable pavers. Therefore, no mitigations measures are proposed for the external drainage area in the subsequent section.

4 GROUNDWATER DISCHARGE

In order to obtain information about the subsurface condition, assess any potential subsurface environmental impacts, and investigate the requirement for groundwater discharge from the development site, McClymont & Rak Engineers Inc. is retained by Starlight Investments to provide a geohydrology assessment dated December 2019.

The geohydrology assessment provided the following condition with respect to subsurface soil and groundwater conditions:

- The overburden geology in the study area consists of predominantly silt to silty clay matrix, high in matrix carbonate content and clast poor;

- Groundwater was measured at a depth of 6.23 to 11.28 meters below ground surface (mbgs), with corresponding elevations of 167.27 to 160.67 meters above sea level (masl). It is McClymont & Rak's opinion that the groundwater flows typically tends to flow towards south, towards Lake Ontario;
- One groundwater sample was collected from monitoring wells BH1 in August 2017. Groundwater quality analysis indicated that, for all parameters analysed, the sample complies with both the City of Toronto Storm Sewer Discharge criteria and the City of Toronto Sanitary and Combined Sewer Discharge criteria. Therefore, groundwater from the proposed development site is suitable for discharge into the City's storm and sanitary sewers without prior treatment.

Based on the design of the proposed development, the assumed footing of the underground structure will be at approximately 161.84 masl. Since the proposed construction will be below the groundwater table, groundwater will be encountered during the excavation. As such, both construction dewatering and long-term dewatering will be required at the proposed development site.

4.1 CONSTRUCTION DEWATERING

It is expected that the depth of the deepest excavation will be at an elevation of approximately 161.84 masl. According to the geohydrology assessment, the estimated steady state discharge rate for temporary construction dewatering is approximately 192 m^3/day. Since the estimated design rates would be within the MECP pumping limit of 50,000 - 400,000 L/day, the submission of an Environmental Activity and Sector Registry (EASR) application to the Ministry of the Environment, Conservation and Parks (MECP) will be required for construction dewatering.

During construction, the groundwater will discharge from the excavation site to the existing 375 mm storm sewer along the private laneway via EX.MH2. Since the water quality of the groundwater sample indicated no parameter exceeded the City of Toronto Storm Sewer Use By-Law criteria, treatments will not be required prior to discharge.

4.2 LONG TERM DEWATERING

The proposed development includes a permanent underfloor drainage system, which will ultimately discharge to the existing 1350 mm storm sewer along Bathurst Street via the proposed 250 mm storm service connection.

According to the geohydrology assessment, the long-term peak dewatering flow rate is approximately 91 m^3/day. Based on the recommendation from Reinbold Engineering Group, the groundwater sump pump will run approximately 8.1 hours per day, discharging groundwater at a maximum peak flow rate of 3.15 L/s as shown in **Appendix A**. As the discharge rate is above the threshold of 50 m^3/day, the MOECC Permit To Take Water (PTTW) is required. Since the quality of groundwater complies with the City of Toronto Storm Sewer Use By-Law Criteria, the groundwater will be discharged via the proposed storm sewer connection. No pre-treatment will be required prior to discharge.

5 PROPOSED SWM PLAN

5.1 WATER BALANCE REQUIREMENT

Based on the water balance criteria, the minimum on-site runoff retention requires retaining all runoff of the first 5 mm from each rainfall through infiltration, evapotranspiration or rainwater reuse. To satisfy the water balance criteria, an on-site storage volume of approximate 10.86 m^3 is required. Refer to **Appendix A-05** for details of calculations.

The potential methods to address the water balance criteria are outlined as follows:

- Green roof: For the purpose of capture and evapotranspiration of the 5mm rainfall over the roof;
- Permeable pavers: For the purpose of infiltration of rainfall into ground; and
- Irrigation of trees, plants and green roof on the property.

The exact application and consumption rates will be determined at the next design stage in consultation with project design team architect and mechanical engineer.

5.2 WATER QUANTITY CONTROL REQUIREMENT

As noted in Section 2.3, the allowable discharge rate to the municipal sewer system from the site is estimated to be 51.01 L/s as per the City's WWFM Guidelines, which is equivalent to the peak runoff rate under pre-development conditions during a 2-year design storm event with a maximum runoff coefficient of 0.50.

Sub-Catchment #1: Proposed Building and Front Yards:

Stormwater from this sub-catchment area will be collected by area drains and roof drains, piped to the proposed storage cistern, and outlet to municipal storm sewer at or below the allowable release rate. Since the groundwater quality is suitable for discharge to municipal storm sewer system, the proposed groundwater long term dewatering will be discharged via the proposed storm sewer connection. Moreover, due to site restraints, it is not feasible to implement discharge control for Sub-Catchment #2. Therefore, the discharge from this sub-catchment will be overcontrolled to satisfy the City's discharge control criteria.

Sub-Catchment #2: Private Laneway and Back Yards:

Based on record drawings, the existing 375mm (15") dia. storm sewer is located on top of the existing 225mm (9") dia. sanitary sewer with concrete encasement between manholes and are separated at manholes for maintenance access. It is, therefore, not feasible to break the encasement, make new connection between manholes, and divert stormwater to the proposed storage cistern to provide stormwater control for Sub-Catchment #2. Hence, runoff from Sub-Catchment #2 will drain to existing municipal sewers via existing catchbasins without any control.

Based on post-development conditions, the discharge rates and stormwater detention requirements for Sub-Catchment #1 at different storm events are estimated in **Appendix A-06** to **A-09** and summarized in **Table 9**.

Table 9: Required Stormwater Storage Volumes for Sub-Catchment #2

Return Period	2 - Year	10 - Year	50 - Year	100 - Year
Allowable flow rate (L/s)	33.96	22.29	12.51	8.42
Required Storage (m^3)	12.23	46.64	80.91	102.48

A stormwater storage system will be provided underground for quantity control purpose. The stormwater storage system will provide a total storage volume of approximately 145 m^3. Exact location of the cistern, related pump, piping, and detail of orifice tube will be determined by the mechanical designer during detailed design. It is recommended that the following measures will be included in the mechanical design:

- Backflow check valve on the storm service connection;
- Emergency overflow for the cistern; and
- Maintenance access for the cistern.

5.3 WATER QUALITY CONTROL

Under the post-development conditions, the proposed land use in the development site includes the private laneway, the proposed building, patios, and some landscaped area. The TSS removal efficiencies for different stormwater management measures, listed in **Table 10** and **Table 11**, are based on the City's WWFMG.

Sub-Catchment #1: Proposed Building and Front Yards

This sub-catchment consists of the proposed building, the patios in the front yard, and some soft landscaped areas. Among the proposed land use, the soft landscaped areas shall remove TSS from the rainfall runoff through infiltration. Also, unlike the private laneway or the patio, the building rooftop is not subjected to vehicular traffic and the application of sand and de-icing salt constituents, petroleum hydrocarbons, and heavy metals. Therefore, all the stormwater generated from the building rooftop is considered clean for the purposes of the WWFMG water quality control. To achieve a TSS removal of 80%, a stormwater quality treatment facility (Stormceptor STC750) is proposed. Sizing details are provided in **Appendix C**. Refer to **Dwg. C-01** for details.

Table 10 below provides a preliminary estimate of the TSS removal level of stormwater leaving the site.

Table 10: TSS Removal Assessment - Sub-Catchment #1

Land Use	Area (m^2)	TSS Removal Efficiency (%)	Composite TSS Removal Efficiency (%)
Impervious Roof	2258	80	58.6
At-Grade Landscape Area	381	80	9.9
Oil Grit Separator (SC#2)	3081	80	50
Total	**3081**	**-**	**>80.0**

Sub-Catchment #2: Private Laneway and Back Yard

The proposed land uses include the private laneway paved with permeable pavers, the patios at the backyard, and some landscaped area. Among the proposed land use, the soft landscaped areas and permeable pavement shall remove TSS from the rainfall runoff through infiltration. To achieve a TSS removal of 80%, a stormwater quality treatment facility (Stormceptor STC300i) is proposed. Sizing details are provided in **Appendix C**. Due to the constraints of existing storm and sanitary sewers in the laneway, the location of this treatment facility is provided upstream of EX.MH4. Refer to **Dwg. C-01** for details.

Table 11 provides a preliminary estimate of the TSS removal level of stormwater leaving the site.

Table 11: TSS Removal Assessment - Sub-Catchment #2

Land Use	Area (m^2)	TSS Removal Efficiency (%)	Composite TSS Removal Efficiency (%)
At-Grade Landscape Area	229	80	17.0
At-Grade Pervious Surface	512	80	37.9
Oil Grit Separator (SC#2)	1080	50	50.0
Total	**1080**	**-**	**>80.0**

5.4 EROSION CONTROL

As mentioned in Section 1.4, this development is a small footprint redevelopment. According to the WWFMG, 'For small infill/redevelopment sites < 2.0 ha, erosion control in the form of stormwater detention is normally not required, provided the on-site minimum runoff retention from a small design rainfall event (typically 5mm) is achieved under the Water Balance Criteria.

The total site area for this application is 0.416 ha, which is well below the 2.0 ha guideline, and water balance concerns have been addressed in Section 5.1; therefore, additional measures to address erosion control are not required.

6 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

During site construction, it is recommended that all erosion and sediment control Best Management Practices (BMPs) shall be constructed and maintained in accordance with the Greater Golden Horseshoe Area Conservation Authorities' (GGHA CAs) Erosion & Sediment Control Guidelines for Urban Construction (December 2006). In brief, the measures below are proposed to be provided on site during the entire period of construction:

- Siltation control fence along the perimeter of the construction site before commencement of construction;
- Sediment control measures to prevent silt entry at all the existing catch basins;
- Granular mud-mats at all construction egress locations (see mud-mat details);
- An inspection and monitoring program following the GGHA CA's Erosion and Sediment Control Guidelines for Urban Construction (December 2006).

7 SITE SERVICING

The purpose of this site servicing report is to review the site servicing requirement of the proposed redevelopment, and propose a site servicing plan, including water supply, sanitary and storm services. Refer to **Dwg. C01** - Site Servicing Plan in **Appendix H** for details of the proposed site service connections.

7.1 SANITARY SEWAGE

Based on the survey and City's records, the existing underground sanitary sewers are summarized below:

- A 225 mm concrete sanitary sewer running in a northerly direction on the private laneway;
- A 225 mm sanitary sewer running in a westerly direction on the private laneway; and
- A 225 mm clay sanitary sewer on Bathurst Street.

Design Parameters

The sanitary demands for the proposed site are based on the following municipal design criteria:

- Sanitary demand rate of 450 L/person/day;
- Population densities of 1.4 ppu for 1-bedroom units;
- Population densities of 2.1 ppu for 2-bedroom units;
- Population densities of 3.1 ppu for 3-bedroom units;
- Infiltration Allowance of 0.26 L/s/ha; and
- Peaking Factor of residential – Harmon Equation.

The demand and peaking factors are based on the City of Toronto's Design Criteria for Sewers and Watermain, November 2009.

Sanitary Flows

Based on the site statistics of the 4-storey apartment building provided by the architect, the population is estimated to be 176 persons. Based on the City's design criteria and the population, the sanitary flow generated from the building is estimated to be 3.93 L/s. Details for the sanitary flow calculations are shown in **Appendix D-01**.

A proposed 150 mm sanitary service connection will be installed to discharge sanitary flow to the existing 225 mm sanitary sewer on the west side of Bathurst Street via EX.MH1A.

Analysis of Existing Municipal Sanitary Sewers

The City of Toronto provided copies of the City's sanitary sewer network modeling data (Dorsch Model) for the sanitary sewers on Bathurst Street and in the vicinity of the site. Refer to **Appendix E** for details of the Dorsch model**.**

Table 12 lists the existing hydraulic conditions of the sanitary sewers on Bathurst Street near the site.

Table 12: Dorsch Model Data Summary - Sanitary

Sewer Segment	Pipe Size (mm)	Full Flow Capacity QF (L/s)	Peak Wet Weather Flow QLM (L/s)	Spare Flow Capacity (L/s)
1514	225	108	0	108
1515	225	64	2	62

As shown on **Dwg. C-01** in **Appendix H**, a 150 mm sanitary service is provided for the proposed 4-storey apartment building, discharging to the existing sanitary sewer in the private lane and ultimately connecting to the 225mm clay sanitary sewer on Bathurst Street (Segment No. 1514).

From the Dorsch Model, the existing sanitary sewer on Bathurst Street (Segment No. 1514) has spare flow capacity larger than the sanitary flow of 3.93 L/s from the proposed development. As such, the existing 225 mm sanitary sewer on Bathurst Street and downstream sewers are adequate to support the proposed development.

7.2 STORM DRAINAGE

Base on the survey and City's records, the existing underground storm sewers are summarized below:

- A 375mm diameter storm sewer running in a northerly direction on the private laneway;
- A 375mm diameter storm sewer running in a westerly direction on the private laneway;
- A 300mm diameter clay storm sewer on Bathurst Street; and
- A 1350mm diameter storm sewer along Bathurst Street.

Pre-Development Storm Flow

Under the existing conditions, the development site drains through existing catchbasins and area drains into the storm sewers on the laneway. The runoff coefficient under existing conditions is 0.74, but a coefficient of 0.50 was used in the calculations as per the City of Toronto's Wet Weather Flow Management Guidelines.

Post-Development Storm Flow

As noted in Section 2.3, the allowable discharge rate from the development site is 51.01 L/s, which is the peak runoff rate under pre-development conditions during a 2-year design storm event with a runoff coefficient of 0.50.

Through the implementation of stormwater quantity control devices, the stormwater discharge rate from the site is 51.01 L/s.

Analysis of Existing Municipal Storm Sewers

The City of Toronto provided copies of the City's storm sewer network modeling data (Dorsch Model) for the storm sewers on Bathurst Street and near the site. Refer to **Appendix E** for details of the Dorsch model.

Based on the existing storm sewer network modeling data, **Table 13** below lists the existing hydraulic conditions of storm sewers on Bathurst Street and near the site.

Table 13: Dorsch Model Data Summary - Storm

Sewer Segment	Pipe Size (mm)	Full Flow Capacity QF (L/s)	Peak Wet Weather Flow QLM (L/s)	Spare Flow Capacity (L/s)
4008	1350	1173	3885	-2711
1626	1050	7608	3904	3704

As shown on **Dwg. C-01** in **Appendix H**, a 250 mm storm service is provided for the proposed 4-storey apartment building, discharging to the existing manhole EX.MH1 which is connected to the existing 1350 mm storm sewer on Bathurst Street (Segment No. 4008).

Based on the Dorsch Model, it is evident that, although the existing storm sewer on Bathurst Street (Segment No. 4008) is surcharged under existing conditions, the downstream sewer (Segment No. 1626) has adequate capacity to support the flow of 51.01 L/s from the proposed development. Moreover, given that the actual pre-development runoff coefficient is 0.74, the unadjusted 2-year pre-development storm discharge rate is approximately 75.10 L/s. The flow discharged to the 1350 mm storm sewer on Bathurst Street will decreased by 32.1% under proposed condition. Therefore, the proposed development will not aggravate the existing condition and, thus, will not contravene the Ministry of Environment Procedure F-5-5.

7.3 WATER SUPPLY

Base on the survey and City's records, the existing underground watermain are summarized below:

- A 150mm watermain on the laneway;
- A 300mm watermain on the west side of Bathurst Street.

The existing 300mm watermain on Bathurst Street will be utilized to service the proposed development site via a 200 mm combined water and fire service connection.

Design Parameters

The domestic water demands for the proposed site are based on the following municipal design criteria:

- Water demand rate of 191 L/person/day.
- Population densities of 1.4 ppu for studio and 1-bedroom units.
- Population densities of 2.1 ppu for 2-bedroom units.
- Population densities of 3.1 ppu for 3-bedroom units.
- Peaking Factor of residential – 2.5 (Peak Hour) and 1.3 (Maximum Day).

The demand and peaking factors are based on City of Toronto, *Design Criteria for Sewers and Watermain, November 2009*.

Water Demands

The calculation of the required fire flow using the Fire Underwriters Survey (FUS) method is completed in **Appendix F-01**. A fire flow of 116.67 L/s (or 1,849 USGPM) is required to meet the FUS requirement.

Based on the City's design criteria, the domestic water demand (maximum day) is estimated to be 0.64 L/s, as shown in **Appendix F-02**.

Therefore, the projected water demand from the development is 117.3 L/s (or 1,859.3 USGPM).

Proposed Water Service Connections

Based on the City's design criteria and the proposed height, a 200 mm combined water and fire service connection is proposed to connect to the existing 300 mm watermain along Bathurst Street. A 150 mm domestic water service connection will be installed to service the proposed building and connected to the proposed 200mm fire protection water service connection with a cut-in-tee connection. Refer to **Dwg. C-01** in **Appendix H** for locations of the proposed water service connection.

In order to evaluate the adequacy of the 300 mm watermain located on Bathurst Street, a hydrant flow test will be conducted on the fire hydrants along Bathurst Street. Analysis of the water pressure available will be provided in the next stage of design.

8 CONCLUSIONS

8.1 STORMWATER MANAGEMENT PLAN

- Water Balance: An on-site storage volume of approximately 10.86 m^3 will be provided for retention of the first 5mm rainfall runoff as required to achieve the WWFMG water balance criteria.
- Water Quantity: An on-site storage volume of approximately 102.48 m^3 will be required in order to control the post-development stormwater flows to pre-development levels. An underground stormwater storage system will be provided to satisfy the on-site storage requirement as shown on **Dwg. C-01**.
- Water Quality: In addition to landscaped areas and clean roof, Stormceptor STC750 will be provided to satisfy the water quality control requirement, i.e. 80% of TSS removal, for Sub-Catchment #1. For Sub-Catchment #2, Stormceptor STC300i will be provided to satisfy the water quality control requirement.

8.2 TEMPORARY EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

- Temporary erosion and sediment control measures should be provided before construction and maintained during construction in accordance with the GGHA CA's Erosion & Sediment Control Guidelines for Urban Construction and other requirements.

8.3 SITE SERVICING REQUIREMENT

- Sanitary Service: Sanitary servicing for the proposed development will be provided by the proposed 150 mm sanitary service connection connected to the existing 225mm dia. sanitary sewer on Bathurst Street via EX.MH1A. Based on the sanitary sewer network model, there is sufficient flow capacity within the existing sanitary sewers on Bathurst Street to accommodate the proposed development.
- Storm Service: Due to the existing sewer configuration for Sub-Catchment #2, the existing storm sewer along the private laneway will be reutilized. Storm flow collected from Sub-Catchment #2 will be discharged to the 1350mm storm sewer on Bathurst Street without control. In order for storm flow from the entire property to be discharged at the allowable release rate, the proposed 150 mm storm service connection will discharge storm flow to the 1350mm storm sewer on Bathurst Street at an overcontrolled rate. With the implementation of SWM plan, it is expected to that the existing hydraulic condition will be improved and, therefore, will not contravene the Ministry of Environment Procedure F-5-5.
- Water Services: The proposed development will be fed by the existing 300 mm watermain along the Bathurst Street. New water service for the site will consist of a 200 mm combined domestic water and fire service connection. The total water demand for the development is 117.3 L/s (or 1,859.3 USGPM).

LEA Consulting Ltd.

Prepared By:

LICENSED PROFESSIONAL ENGINEER
D. K. Y. POON
100508213
Dec. 16, 2019
PROVINCE OF ONTARIO

Dorothy Poon, P.Eng.
Project Engineer

Reviewed By:

Bey Husika, P.Eng.
Civil Sector Manager

APPENDIX A

Stormwater Peak Flow and Storage Calculations – Site Area

LEA Consulting Ltd. Consulting Engineers and Planners	Land Use			
	Prepared:	D.P.	Page No.	A-01
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	Dec.11/19		

EXISTING CONDITIONS:

Existing Land Use	Area (m^2)
Site Area	
3-Storey Brick Apartments	1507.0
Paved Area	1605.0
Landscape Area	1049.0
Total Site Area:	**4161.0**

PROPOSED DEVELOPMENT:

Proposed Land Use	Area (m^2)
Sub-Catchment #1	
Building	1784.0
Landscaped Area	381.0
Green Roof	474.0
Pavement	442.0
Sub-Catchement #1 Area	**3081.0**
Sub-Catchment #2	
Permeable Pavement	512.0
Paved Area	339.0
Landscaped Area	229.0
Sub-Catchement #2 Area	**1080.0**
Total Site Area	**4161.0**

LEA Consulting Ltd. Consulting Engineers and Planners	Composite "C" Calculation			
	Prepared:	D.P.	Page No.	A-02
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Pre-Development Composite Runoff Coefficient "C"

Location	Area (ha)	C	Composite "C"	
3-Storey Brick Apartments	0.151	0.90		
Paved Area	0.161	0.90		
Landscape Area	0.105	0.25		
Total Site Area:	**0.416**		**0.74**	
			0.50	max. allowable by City of Toronto
Imperviousness Percent:			**74.8**	

Post-Development Composite Runoff Coefficient "C"

Sub-Catchment Area #1

Location	Area (ha)	C	Composite "C"
Building	0.178	0.90	
Pavement	0.044	0.90	
Landscaped Area	0.038	0.25	
Green Roof	0.047	0.25	
Sub-Catchement #1 Area	**0.308**		**0.72**
Imperviousness Percent:			**72.2**

Sub-Catchment Area #2

Location	Area (ha)	C	Composite "C"
Permeable Pavement	0.051	0.40	
Paved Area	0.034	0.90	
Landscaped Area	0.023	0.25	
Sub-Catchement #2 Area	**0.108**		**0.53**
Imperviousness Percent:			**31.4**

Total Site Area

Location	Area (ha)	C	Composite "C"
Building	0.178	0.90	
Landscaped Area	0.061	0.25	
Permeable Pavement	0.051	0.40	
Paved Area	0.078	0.90	
Green Roof	0.047	0.25	
Total Site Area	**0.416**		**0.67**
Imperviousness Percent:			**61.6**

LEA Consulting Ltd. Consulting Engineers and Planners	**Pre-Development Peak Flow Rates Calculation**			
	Prepared:	D.P.	Page No.	A-03
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Rational Formulae: Q = 2.78 CIA (L/s)

Site Area:	0.416	ha
Time of Concentration	10	minutes as per WWFM Guidelines
Runoff Coefficient :	0.50	Pre-development condition

Rainfall Intensity: $I = aT^c$ (City of Toronto Design Criteria for Sewers and Watermains)

Return Period:	2-yr	10-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	88.19	162.27	224.32	250.32

Peak Flow Rate (L/s):

Return Period:	2-yr	10-yr	50-yr	100-yr
Under existing site conditions (L/s):	51.01	93.85	129.74	144.78

Allowable discharge rate into municipal storm sewer: 51.01 L/s

Since the stormwater from the sub-catchment #2 is not controlled due to the site constraint, the stormwater discharge from Sub-Catchment #1 will be overcontrolled, i.e. allowable discharge flow rates from two catchments areas:

Sub-Catchment #1 (overcontrolled): 11.57 L/s
Sub-Catchment #2 (100-year storm): 39.44 L/s

Based on McClymont & Rak Engineers Geohydrology Assessment, groundwater is suitable for discharge into the municipal storm sewer system. Hence, groundwater will be released through the storm control manhole.

Peak groundwater discharge rate: 3.15 L/s

Overcontrolled discharge rate from cistern into municipal storm sewer:
8.42 L/s

LEA Consulting Ltd. Consulting Engineers and Planners	Post-Development Peak Flow Rates Calculation (Uncontrolled)			
	Prepared:	D.P.	Page No.	A-04
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Rational Formulae: Q = 2.78 CIA (L/s)

Total Site Area:	0.416	ha
Runoff Coefficient :	0.67	Post-development
Time of Concentration:	10	minutes as per WWFM Guidelines
Sub-Catchment #1 Area:	0.308	ha
Runoff Coefficient :	0.72	Post-development
Sub-Catchment #2 Area:	0.108	ha
Runoff Coefficient :	0.53	Post-development

Rainfall Intensity: $I = aT^c$ (City of Toronto Design Criteria for Sewers and Watermains)

Return Period:	2-yr	10-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	88.19	162.27	224.32	250.32

Sub-Catchment #1 Peak Flow Rate (L/s):

Return Period:	2-yr	10-yr	50-yr	100-yr
Post-development storm flows (L/s):	54.36	100.02	138.27	154.29

Sub-Catchment #2 Peak Flow Rate (L/s):

Return Period:	2-yr	10-yr	50-yr	100-yr
Post-development storm flows (L/s):	13.89	25.57	35.34	39.44

LEA Consulting Ltd. Consulting Engineers and Planners	**5mm Rainfall Retention Volume (Water Balance)**			
	Prepared:	D.P.	Page No.	A-05
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

According to the WWFM Guidelines, in order to achieve the water balance target, it is required to retain all runoff from a small event - typically 5mm (in Toronto, storms with 24 hour volumes of 5mm or less contribute about 50% of the total average annual rainfall volume) through infiltration, evapotranspiration & rainwater reuse.

Site Area:	0.416	ha
Runoff Coefficient :	0.67	Post-development site conditions

Runoff volume from 5mm rainfall event on site:

V = 0.416 x 10 x 5 =20.81 m^3

Initial Abstraction:

Building and Paved Area:	2123 x 1 mm /1000	=2.12	m^3
Landscaped Area and Permeable Pavement:	1564 x 5 mm /1000	=7.82	m^3

Required on-site retention volume for 5mm rainfall event: 10.86 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	**On-Site Storage Calculation (2-Year Storm)**			
	Prepared:	D.P.	Page No.	A-06
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Sub-Catchment #1 Drainage Area (ha)	=	0.308	ha
Sub-Catchment #1 Composite C	=	0.72	
Allowable Overcontrolled Release Rate	=	33.96	L/s
Return Period	=	2	Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
10	88.19	54.36	32.61	33.96	20.38	12.23
12	76.50	47.15	33.95	33.96	24.45	9.50
14	67.83	41.81	35.12	33.96	28.53	6.59
16	61.12	37.67	36.17	33.96	32.60	3.57
18	55.76	34.37	37.12	33.96	36.68	0.44
20	51.36	31.66	37.99	33.96	40.75	-2.76
22	47.68	29.39	38.79	33.96	44.83	-6.04
24	44.55	27.46	39.54	33.96	48.91	-9.37
26	41.85	25.80	40.24	33.96	52.98	-12.74
28	39.50	24.35	40.91	33.96	57.06	-16.15
30	37.43	23.07	41.53	33.96	61.13	-19.60
32	35.60	21.94	42.12	33.96	65.21	-23.09
34	33.95	20.93	42.69	33.96	69.28	-26.59
36	32.47	20.01	43.23	33.96	73.36	-30.13
38	31.13	19.19	43.75	33.96	77.43	-33.68
40	29.91	18.44	44.24	33.96	81.51	-37.27
42	28.79	17.75	44.72	33.96	85.58	-40.86
44	27.77	17.11	45.18	33.96	89.66	-44.48
46	26.82	16.53	45.63	33.96	93.74	-48.11
48	25.94	15.99	46.06	33.96	97.81	-51.75

Required Storage Volume = 12.23 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (10-Year Storm)			
	Prepared:	D.P.	Page No.	A-07
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Sub-Catchment #1 Drainage Area (ha) = 0.308 ha
Sub-Catchment #1 Composite C = 0.72
Allowable Overcontrolled Release Rate = 22.29 L/s
Return Period = 10 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
10	162.27	100.02	60.01	22.29	13.37	46.64
12	140.24	86.44	62.24	22.29	16.05	46.19
14	123.97	76.41	64.19	22.29	18.72	45.47
16	111.41	68.67	65.92	22.29	21.40	44.52
18	101.39	62.50	67.50	22.29	24.07	43.43
20	93.20	57.44	68.93	22.29	26.75	42.18
22	86.36	53.23	70.26	22.29	29.42	40.84
24	80.55	49.65	71.49	22.29	32.10	39.39
26	75.55	46.57	72.65	22.29	34.77	37.88
28	71.20	43.89	73.73	22.29	37.45	36.28
30	67.38	41.53	74.76	22.29	40.12	34.64
32	63.99	39.44	75.73	22.29	42.80	32.93
34	60.96	37.57	76.65	22.29	45.47	31.18
36	58.24	35.89	77.53	22.29	48.15	29.38
38	55.77	34.38	78.38	22.29	50.82	27.56
40	53.53	32.99	79.18	22.29	53.50	25.68
42	51.48	31.73	79.96	22.29	56.17	23.79
44	49.60	30.57	80.71	22.29	58.85	21.86
46	47.87	29.50	81.43	22.29	61.52	19.91
48	46.26	28.52	82.12	22.29	64.20	17.92

Required Storage Volume = 46.64 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation **(50-Year Storm)**			
	Prepared:	D.P.	Page No.	A-08
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Sub-Catchment #1 Drainage Area (ha) = 0.308 ha
Sub-Catchment #1 Composite C = 0.72
Allowable Overcontrolled Release Rate = 12.51 L/s
Return Period = 50 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
10	224.32	138.27	82.96	12.51	7.51	75.45
12	193.88	119.50	86.04	12.51	9.01	77.03
14	171.38	105.64	88.73	12.51	10.51	78.22
16	154.02	94.93	91.14	12.51	12.01	79.13
18	140.17	86.40	93.31	12.51	13.51	79.80
20	128.84	79.41	95.30	12.51	15.02	80.28
22	119.38	73.58	97.13	12.51	16.52	80.61
24	111.35	68.64	98.83	12.51	18.02	80.81
26	104.45	64.38	100.43	12.51	19.52	80.91
28	98.43	60.67	101.93	12.51	21.02	80.91
30	93.15	57.41	103.35	12.51	22.52	80.83
32	88.46	54.52	104.69	12.51	24.03	80.66
34	84.27	51.94	105.96	12.51	25.53	80.43
36	80.51	49.62	107.18	12.51	27.03	80.15
38	77.10	47.52	108.35	12.51	28.53	79.82
40	74.00	45.61	109.47	12.51	30.03	79.44
42	71.17	43.86	110.54	12.51	31.53	79.01
44	68.57	42.26	111.57	12.51	33.04	78.53
46	66.17	40.79	112.57	12.51	34.54	78.03
48	63.96	39.42	113.53	12.51	36.04	77.49

Required Storage Volume = 80.91 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (100-Year Storm)			
	Prepared:	D.P.	Page No.	A-09
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Sub-Catchment #1 Drainage Area (ha) = 0.308 ha
Sub-Catchment #1 Composite C = 0.72
Allowable Overcontrolled Release Rate = 8.42 L/s
Return Period = 100 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
10	250.32	154.29	92.57	8.42	5.05	87.52
15	180.98	111.55	100.39	8.42	7.58	92.81
20	143.77	88.62	106.34	8.42	10.10	96.24
25	120.27	74.13	111.19	8.42	12.63	98.56
30	103.94	64.07	115.32	8.42	15.15	100.17
35	91.88	56.63	118.93	8.42	17.68	101.25
40	82.57	50.90	122.15	8.42	20.20	101.95
45	75.15	46.32	125.06	8.42	22.73	102.33
50	69.07	42.58	127.73	8.42	25.25	102.48
55	64.00	39.45	130.18	8.42	27.78	102.40
60	59.70	36.80	132.47	8.42	30.30	102.17
65	56.00	34.51	134.61	8.42	32.83	101.78
70	52.77	32.53	136.62	8.42	35.35	101.27
75	49.94	30.78	138.52	8.42	37.88	100.64
80	47.43	29.23	140.32	8.42	40.40	99.92
85	45.18	27.85	142.03	8.42	42.93	99.10
90	43.16	26.60	143.66	8.42	45.46	98.20
95	41.33	25.48	145.22	8.42	47.98	97.24
100	39.67	24.45	146.72	8.42	50.51	96.21
105	38.15	23.52	148.16	8.42	53.03	95.13

Required Storage Volume = 102.48 m^3

212, 214 King Street West
Toronto, ON. M5H 3S6
t. 647.352.1166

December 10th, 2019

Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
Metro Hall
55 John Street, 16th Floor
Toronto, ON M5V 3C6

Cc: General Manager, Toronto Water
c/o Manager, Environmental Monitoring and Protection Unit
30 Dee Ave, Toronto, ON. M9N 1S9

Subject: 1637-1645 Bathurst St Project - Private Water Discharge Permit Application

Dear Sir or Madam:

This letter is to confirm that groundwater from the Private Water Drainage System for the 1637-1645 Bathurst St project will be collected and discharged into the storm system control manhole of the Site located at 1637-1645 Bathurst St.

Based on the maximum groundwater peak flowrate of 91m^3/day or 1.07L/s provided by McClymont&Rack Engineers in their Hydrogeological Assessment Report, ref G5168 date December 2019, the groundwater sump pumps will be sized at 3.15 L/s and are expected to run approximately 8.1 hours per day.

This peak flow rate will be used for assessing capacity for the peak discharge flow into the City's storm sewer system.

The ground water will be collected to a central sump pit located at the lowest level of the building structure. The water will then be pumped to the storm system on the basement Level. The ground water will be provided with a monitoring port constructed to city standards. The flow meter will be specified to be a 50mm dia. (2" model) Neptune Tru-Flo Compound Water Meter complete with e-coders. The installation will be as per city standards.

Once the proposed groundwater peak flow rate of 3.15 L/s is approved by Engineering Construction Services (ECS), City of Toronto at the site plan approval stage, the property owner will not be allowed to amend this flow rate in the future. Should there be any amendment to the peak flow rate of 3.15 L/s in future, the property owner shall re-submit either the updated pump schedule or a revised letter to ECS. In addition, the sewer capacity will need to be re-assessed.

If you require any additional clarification, please do not hesitate to contact us.

Sincerely,
Doug Reinbold, P.Eng.
Principal, Reinbold Engineering

LICENSED PROFESSIONAL ENGINEER
D.J. REINBOLD
PROVINCE OF ONTARIO

Signature Stamp

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APPENDIX B

Stormwater Peak Flow Calculations – External Drainage Area

LEA Consulting Ltd. Consulting Engineers and Planners	Land Use			
	Prepared:	D.P.	Page No.	B-01
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	Dec.11/19		

EXISTING CONDITIONS:

Existing Land Use	Area (m^2)
Paved Area	290.0
Total Site Area:	**290.0**

PROPOSED DEVELOPMENT:

Proposed Land Use	Area (m^2)
Permeable Pavement	290.0
Total Site Area	**290.0**

LEA Consulting Ltd. Consulting Engineers and Planners	Composite "C" Calculation			
	Prepared:	D.P.	Page No.	B-02
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Pre-Development Composite Runoff Coefficient "C"

Location	Area (ha)	C	Composite "C"	
Paved Area	0.029	0.90		
Total Site Area:	**0.029**		**0.90**	
			0.50	max. allowable by City of Toronto
Imperviousness Percent:			**100.0**	

Post-Development Composite Runoff Coefficient "C"

Location	Area (ha)	C	Composite "C"
Permeable Pavement	0.029	0.40	
Total Site Area	**0.029**		**0.40**
Imperviousness Percent:			**0.0**

LEA Consulting Ltd. Consulting Engineers and Planners	**Pre-Development Peak Flow Rates Calculation**			
	Prepared:	D.P.	Page No.	B-03
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Rational Formulae: Q = 2.78 CIA (L/s)

Site Area:	0.029	ha
Time of Concentration	10	minutes as per WWFM Guidelines
Runoff Coefficient :	0.50	Pre-development condition

Rainfall Intensity: $I = aT^c$ (City of Toronto Design Criteria for Sewers and Watermains)

Return Period:	2-yr	10-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	88.19	162.27	224.32	250.32

Peak Flow Rate (L/s):

Return Period:	2-yr	10-yr	50-yr	100-yr
Under existing site conditions (L/s):	3.55	6.54	9.04	10.09

LEA Consulting Ltd. Consulting Engineers and Planners	Post-Development Peak Flow Rates Calculation (Uncontrolled)			
	Prepared:	D.P.	Page No.	B-04
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	11-Dec-19		

Rational Formulae: Q = 2.78 CIA (L/s)

Total Site Area:	0.029	ha
Runoff Coefficient :	0.40	Post-development
Time of Concentration:	10	minutes as per WWFM Guidelines

Rainfall Intensity: $I = aT^c$ (City of Toronto Design Criteria for Sewers and Watermains)

Return Period:	2-yr	10-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	88.19	162.27	224.32	250.32

Peak Flow Rate (L/s):

Return Period:	2-yr	10-yr	50-yr	100-yr
Post-development storm flows (L/s):	2.84	5.23	7.23	8.07

APPENDIX C

Storm Water Treatment Systems Details and Sizing

Brief Stormceptor Sizing Report - 1637 Bathurst Street - SC#1

Project Information & Location			
Project Name	1637 Bathurst Street	**Project Number**	20284
City	Toronto	**State/ Province**	Ontario
Country	Canada	**Date**	11/14/2019
Designer Information		**EOR Information (optional)**	
Name	Dorothy Poon	**Name**	
Company	LEA Consulting	**Company**	
Phone #	905-470-0015	**Phone #**	
Email	dpoon@lea.ca	**Email**	

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	1637 Bathurst Street - SC#1
Target TSS Removal (%)	80
TSS Removal (%) Provided	86
Recommended Stormceptor Model	STC 750

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 300	78
STC 750	86
STC 1000	87
STC 1500	88
STC 2000	90
STC 3000	91
STC 4000	93
STC 5000	94
STC 6000	95
STC 9000	96
STC 10000	96
STC 14000	97
StormceptorMAX	Custom

Stormceptor® FORTERRA™

Sizing Details

Drainage Area	
Total Area (ha)	0.308
Imperviousness %	72.20

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Rainfall	
Station Name	TORONTO CENTRAL
State/Province	Ontario
Station ID #	0100
Years of Records	18
Latitude	43°37'N
Longitude	79°23'W

Up Stream Storage	
Storage (ha-m)	Discharge (cms)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

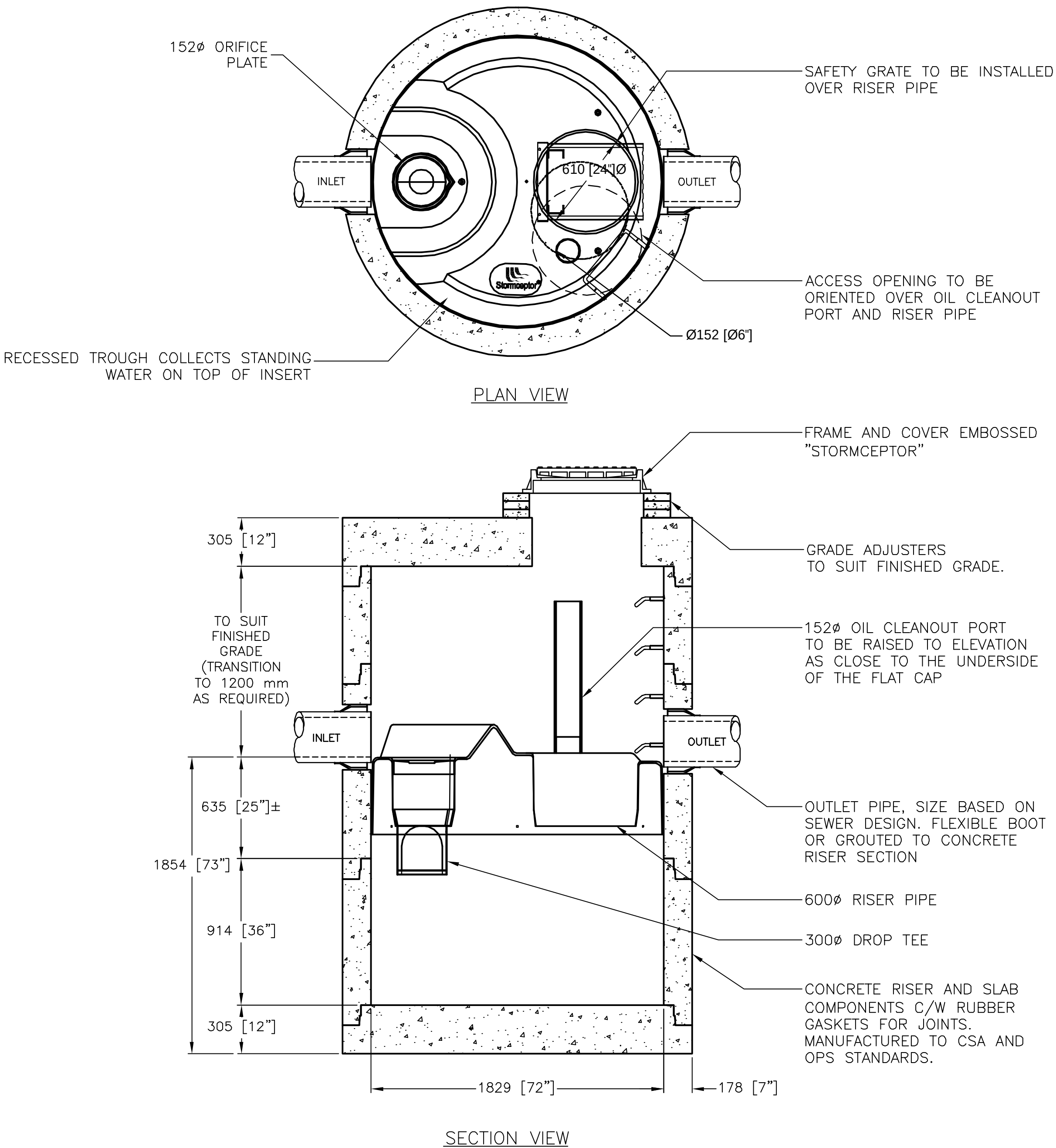
Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
- For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
http://www.imbriumsystems.com/technical-specifications

DRAWING NOT TO BE USED FOR CONSTRUCTION

THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS:
United States Patent No. 5,753,115 • 5,849,181 • 6,068,765 • 6,371,690 • 7,582,216 • 7,666,303 | Australia Patent No. 693,164 • 707,133 • 729,096 • 779,401 • 289,647 • 2008,279,378 • 2008,288,900 | Canadian Patent No. 2,009,280 • 2,137,942 • 2,175,277 • 2,180,305 • 2,180,383 • 2,206,338 • 2,327,768 | Indonesian Patent No. 007058 | Japan Patent No. 3581233 • 9-11476 | Korea Patent No. 10-1451593 • 0519212 | Malaysia Patent No. 118987 | New Zealand Patent No. 314,646 • 583,583 • 583,008 | South African Patent No. 2010/00683 • 2010/01796 |



Stormceptor®

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STC 750
STANDARD MODEL
####

REV #	DATE	REVISION DESCRIPTION	BY

SHEET NUMBER 1 OF 1

DATE:######## | SCALE: 40 | PROJECT No.: ##### | DRAWN: ### | CHECKED: ###

Brief Stormceptor Sizing Report - 1637 Bathurst Street - SC#2

Project Information & Location			
Project Name	1637 Bathurst Street	**Project Number**	20284
City	Toronto	**State/ Province**	Ontario
Country	Canada	**Date**	11/14/2019
Designer Information		**EOR Information (optional)**	
Name	Dorothy Poon	**Name**	
Company	LEA Consulting	**Company**	
Phone #	905-470-0015	**Phone #**	
Email	dpoon@lea.ca	**Email**	

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	1637 Bathurst Street - SC#2
Target TSS Removal (%)	80
TSS Removal (%) Provided	92
Recommended Stormceptor Model	STC 300

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 300	92
STC 750	96
STC 1000	97
STC 1500	97
STC 2000	98
STC 3000	98
STC 4000	99
STC 5000	99
STC 6000	99
STC 9000	99
STC 10000	99
STC 14000	100
StormceptorMAX	Custom

Sizing Details

Drainage Area

Total Area (ha)	0.108
Imperviousness %	31.40

Rainfall

Station Name	TORONTO CENTRAL
State/Province	Ontario
Station ID #	0100
Years of Records	18
Latitude	43°37'N
Longitude	79°23'W

Water Quality Objective

TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Up Stream Storage

Storage (ha-m)	Discharge (cms)
0.000	0.000

Up Stream Flow Diversion

Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

Fine Distribution

Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
http://www.imbriumsystems.com/technical-specifications

DRAWING NOT TO BE USED FOR CONSTRUCTION

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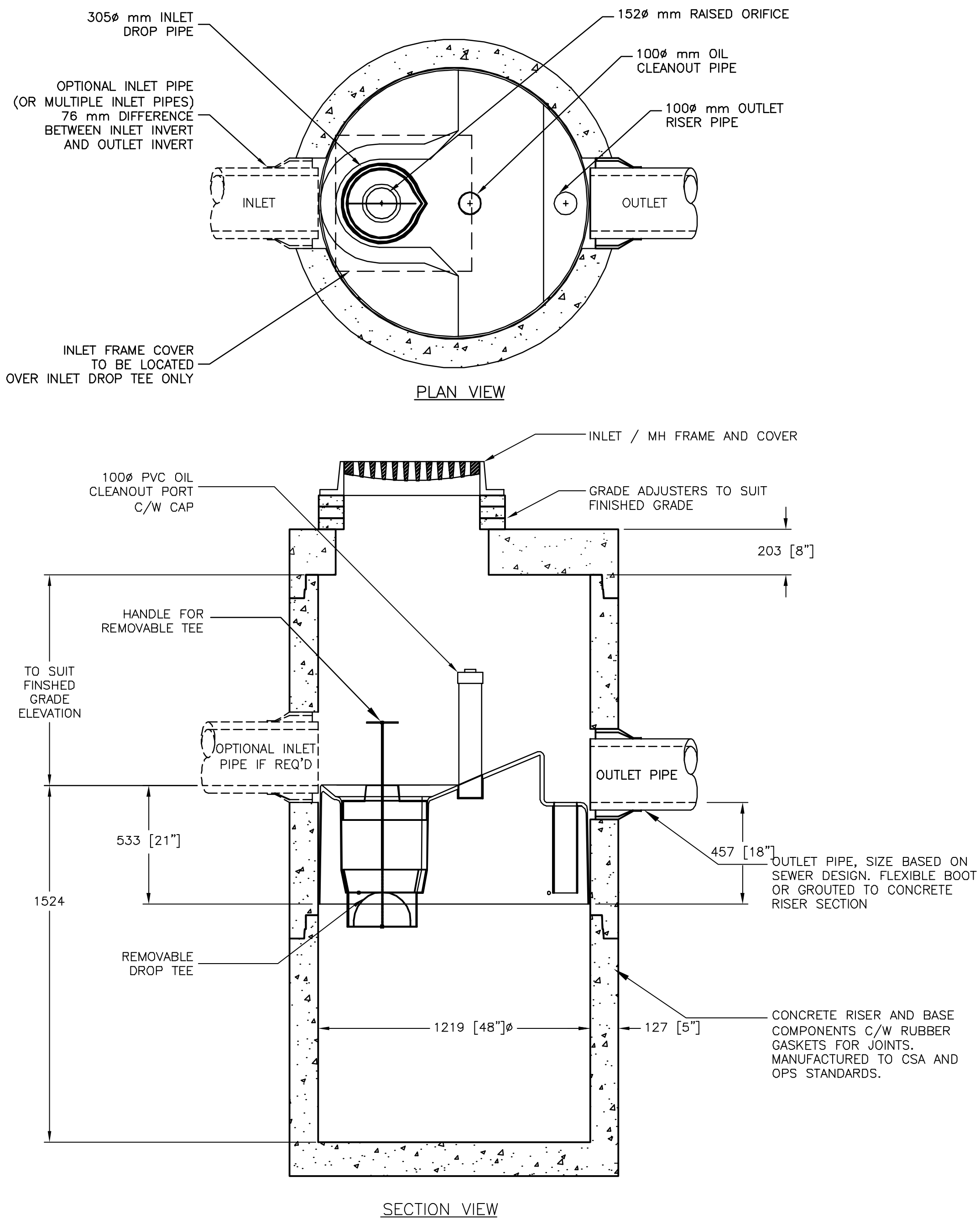

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STC 300i
STANDARD MODEL

####

REV #	DATE	REVISION DESCRIPTION	BY

SHEET NUMBER 1 OF 1

DATE: ######## | SCALE: 30 | PROJECT No.: ##### | DRAWN: ### | CHECKED: ###

I:\IMBRIUM\PRODUCTS\STORMCEPTOR\STORMCEPTOR STC\40 DRAWINGS & DETAILS\STANDARD DETAILS\METRIC\STC 300I.DWG 4/12/2019 1:21 PM

APPENDIX D

Sanitary Discharge Calculations

LEA Consulting Ltd. Consulting Engineers and Planners	**Sanitary Flow Rate Calculation**			
	Prepared:	D.P.	Page No.	D-01
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	Dec.11/19		

4-STOREY RESIDENTIAL BUILDING

POPULATION CALCULATION

(Based on the Architect Statistics dated November 28, 2019)

Site Area	4161.0 m^2
Proposed Total GFA	8503.0 m^2
Proposed Above Grade GFA	8455.0 m^3

Proposed Land Use		**Density**		**Population**
Type	Unit	p.p.u.		
1 Bedroom	20.0	1.4		28
2 Bedroom	26.0	2.1		55
3 Bedroom	29.0	3.1		90
Total Units	75.0			

Proposed Land Use		**Density**		**Population**
Type	GFA (m^2)			
Amenity	300.0	1.1	person/100m^2	3

Total Population **176**

SANITARY FLOW CALCULATION

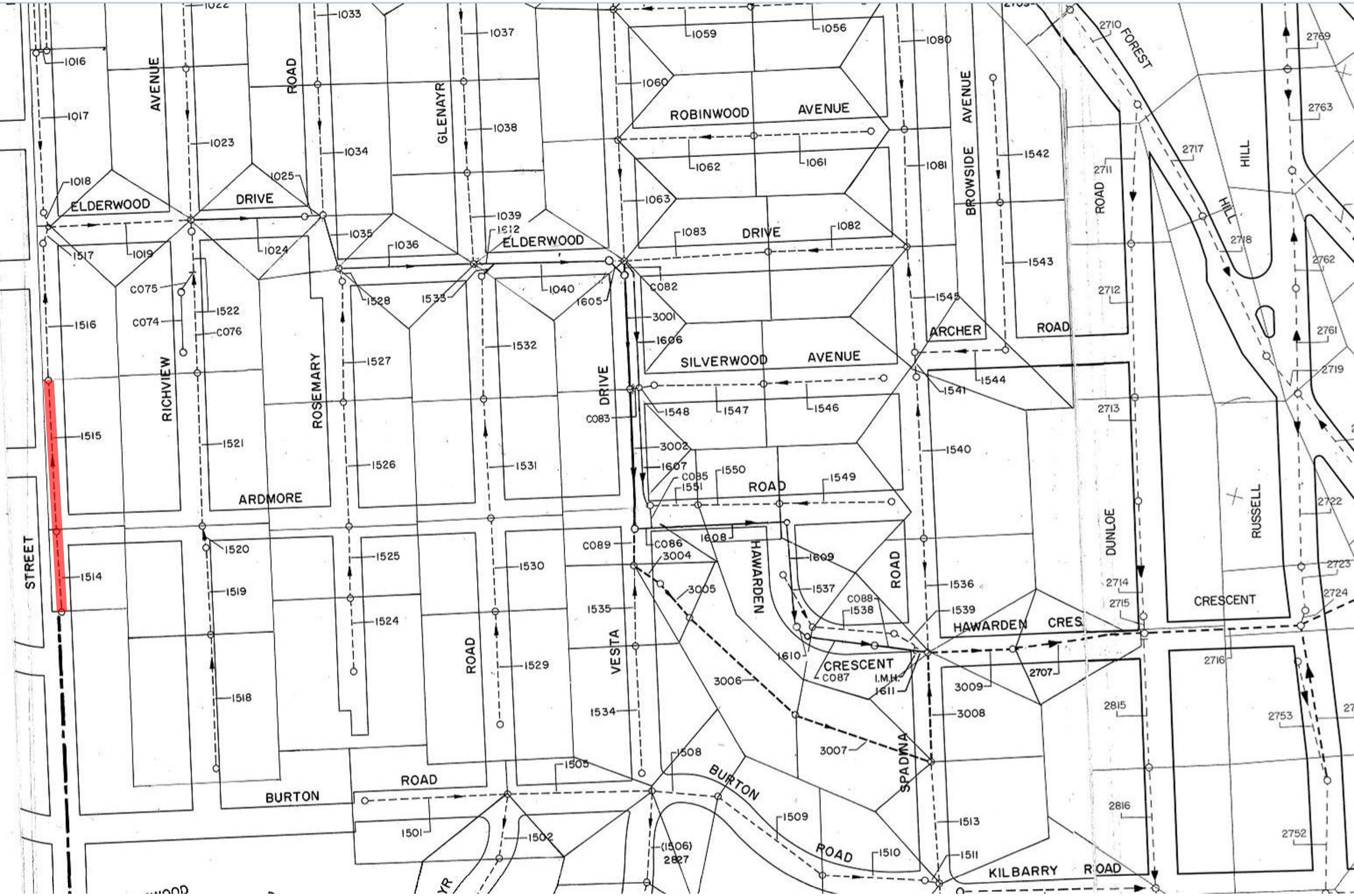
Harmon Peaking Factor: $M=1+14/(4+(P/1000)^{0.5})$

Peaking Factor	4.17
Average Daily Wastewater Flow	450 L/cap/day
Total Domestic Flow	3.82 L/sec
Infiltration Allowance (@ 0.26 L/sec/ha)	0.11 L/sec
Design Flow	**3.93** L/sec

APPENDIX E

Existing Sewer Network Plans and Dorsch Model Data

SANITARY SEWER MODEL OUTPUT



TORONTO SEWER SYSTEM STUDY AREA 8
FOREST HILL SANITARY & STORM

```
1019  CIRCULAR          0.30/0.30  INFLOW  1018  1517         OUTFLOW  1024         B.NO.  27790                EXIST. SAN.    1019
      YU 159.654  YL 156.990  QF   170  DQ        6  QDLM   35  VNIGHT1.03  DUC  -0.08  DLC  -0.07   QLM     146   CAP      24
      SU 164.232  SL 160.944  AF 0.071  DQD     0.2  HDLM 0.11  HNIGHT0.04  DUS  -4.36  DLS  -3.73   RAIN   FOR.   QLM/QF 0.86
      RES    975  A      0.02  VF  2.41  GAMMA 1.00  VDLM 1.92  VNORM 0.0   HUM   0.22  HLM   0.23   QRQLM   104   DY     2.66
      IW     0.0  L      85.6  S 1/  32  N   0.0130  SCOD FH11  DWB   0.02  YUM 159.87  YLM 157.22   VLM    2.59   DH    -0.01

1024  CIRCULAR          0.60/0.60  INFLOW  1019  1023  1522   OUTFLOW  1025         B.NO.  27780                EXIST. SAN.    1024
      YU 156.990  YL 156.440  QF   490  DQ        0  QDLM   39  VNIGHT0.58  DUC  -0.37  DLC  -0.36   QLM     166   CAP     324
      SU 161.180  SL 160.070  AF 0.282  DQD     0.0  HDLM 0.11  HNIGHT0.04  DUS  -3.96  DLS  -3.39   RAIN   FOR.   QLM/QF 0.34
      RES      0  A      0.0   VF  1.74  GAMMA 0.0   VDLM 1.06  VNORM 0.0   HUM   0.23  HLM   0.24   QRQLM   116   DY     0.55
      IW     0.0  L      86.0  S 1/ 156  N   0.0130  SCOD  DWF  DWB   0.0   YUM 157.22  YLM 156.68   VLM    1.58   DH    -0.01

1025  CIRCULAR          0.60/0.60  INFLOW  1024               OUTFLOW  1035         B.NO.  27780                EXIST. SAN.    1025
      YU 156.430  YL 156.360  QF   476  DQ        0  QDLM   39  VNIGHT0.56  DUC  -0.36  DLC  -0.36   QLM     167   CAP     309
      SU 160.070  SL 159.850  AF 0.282  DQD     0.0  HDLM 0.11  HNIGHT0.04  DUS  -3.40  DLS  -3.25   RAIN   FOR.   QLM/QF 0.35
      RES      0  A      0.0   VF  1.69  GAMMA 0.0   VDLM 1.04  VNORM 0.0   HUM   0.24  HLM   0.24   QRQLM   117   DY     0.07
      IW     0.0  L      11.6  S 1/ 166  N   0.0130  SCOD  DWF  DWB   0.0   YUM 156.67  YLM 156.60   VLM    1.54   DH     0.00

1035  CIRCULAR          0.68/0.68  INFLOW  1025  1034         OUTFLOW  1036         B.NO. 763                   EXIST. SAN.    1035
      YU 156.280  YL 156.200  QF   402  DQ        0  QDLM   43  VNIGHT0.40  DUC  -0.36  DLC  -0.34   QLM     180   CAP     222
      SU 159.850  SL 159.220  AF 0.357  DQD     0.0  HDLM 0.15  HNIGHT0.05  DUS  -3.25  DLS  -2.69   RAIN   FOR.   QLM/QF 0.45
      RES      0  A      0.0   VF  1.13  GAMMA 0.0   VDLM 0.75  VNORM 0.0   HUM   0.32  HLM   0.33   QRQLM   124   DY     0.08
      IW     0.0  L      34.8  S 1/ 435  N   0.0130  SCOD 400   DWB   0.0   YUM 156.60  YLM 156.53   VLM    1.10   DH    -0.02

1036  CIRCULAR          0.68/0.68  INFLOW  1035  1528         OUTFLOW  1612         B.NO.  27770                EXIST. SAN.    1036
      YU 156.180  YL 156.000  QF   365  DQ        0  QDLM   45  VNIGHT0.38  DUC  -0.32  DLC  -0.24   QLM     188   CAP     177
      SU 159.210  SL 158.670  AF 0.357  DQD     0.0  HDLM 0.16  HNIGHT0.05  DUS  -2.68  DLS  -2.23   RAIN   FOR.   QLM/QF 0.51
      RES      0  A      0.0   VF  1.02  GAMMA 0.0   VDLM 0.71  VNORM 0.0   HUM   0.35  HLM   0.44   QRQLM   128   DY     0.18
      IW     0.0  L      95.0  S 1/ 528  N   0.0130  SCOD  DWF  DWB   0.0   YUM 156.53  YLM 156.44   VLM    1.02   DH    -0.08

1040  CIRCULAR          0.68/0.68  INFLOW  1612  1533         OUTFLOW  1605         B.NO.  27760                EXIST. SAN.    1040
      YU 155.970  YL 155.810  QF   364  DQ        0  QDLM   47  VNIGHT0.39  DUC  -0.21  DLC  -0.10   QLM     210   CAP     154
      SU 158.610  SL 158.720  AF 0.357  DQD     0.0  HDLM 0.17  HNIGHT0.05  DUS  -2.17  DLS  -2.33   RAIN   FOR.   QLM/QF 0.58
      RES      0  A      0.0   VF  1.02  GAMMA 0.0   VDLM 0.72  VNORM 0.0   HUM   0.47  HLM   0.58   QRQLM   143   DY     0.16
      IW     0.0  L      84.8  S 1/ 530  N   0.0130  SCOD FH11  DWB   0.00  YUM 156.44  YLM 156.39   VLM    1.00   DH    -0.11

1514  CIRCULAR          0.23/0.23  INFLOW                     OUTFLOW  1515         B.NO.   5140                EXIST. SAN.    1514
      YU 164.836  YL 161.940  QF   108  DQ        0  QDLM    0  VNIGHT0.41  DUC  -0.22  DLC  -0.22   QLM       0   CAP     108
      SU 168.661  SL 166.015  AF 0.041  DQD     0.2  HDLM 0.01  HNIGHT0.00  DUS  -3.81  DLS  -4.07   RAIN   FOR.   QLM/QF 0.00
      RES     52  A      0.29  VF  2.61  GAMMA 0.74  VDLM 0.55  VNORM 0.0   HUM   0.01  HLM   0.01   QRQLM     0   DY     2.90
      IW     0.0  L      55.8  S 1/  19  N   0.0130  SCOD  DWF  DWB   0.00  YUM 164.85  YLM 161.95   VLM    0.57   DH     0.00

1515  CIRCULAR          0.23/0.23  INFLOW  1514               OUTFLOW  1516         B.NO.   5150                EXIST. SAN.    1515
      YU 161.940  YL 160.020  QF    64  DQ        0  QDLM    0  VNIGHT0.25  DUC  -0.22  DLC  -0.20   QLM       2   CAP      62
      SU 166.015  SL 162.974  AF 0.041  DQD     0.3  HDLM 0.02  HNIGHT0.01  DUS  -4.06  DLS  -2.93   RAIN   FOR.   QLM/QF 0.03
      RES     52  A      0.53  VF  1.54  GAMMA 0.49  VDLM 0.49  VNORM 0.0   HUM   0.01  HLM   0.03   QRQLM     0   DY     1.92
      IW     0.0  L     106.7  S 1/  56  N   0.0130  SCOD  DWF  DWB   0.01  YUM 161.95  YLM 160.05   VLM    0.72   DH    -0.02

1516  CIRCULAR          0.23/0.23  INFLOW  1515               OUTFLOW  1517         B.NO.   5150                EXIST. SAN.    1516
      YU 160.020  YL 159.715  QF    26  DQ        9  QDLM    1  VNIGHT0.16  DUC  -0.19  DLC  -0.05   QLM       8   CAP      17
      SU 162.974  SL 164.232  AF 0.041  DQD     0.3  HDLM 0.03  HNIGHT0.01  DUS  -2.91  DLS  -4.33   RAIN   FOR.   QLM/QF 0.33
      RES    938  A      0.03  VF  0.62  GAMMA 1.00  VDLM 0.29  VNORM 0.0   HUM   0.04  HLM   0.18   QRQLM     8   DY     0.31
      IW     0.0  L     103.6  S 1/ 340  N   0.0130  SCOD FH11  DWB   0.00  YUM 160.06  YLM 159.90   VLM    0.45   DH    -0.14

1517  CIRCULAR          0.30/0.30  INFLOW  1516               OUTFLOW  1019         B.NO.   5150                EXIST. SAN.    1517
      YU 159.715  YL 159.685  QF    91  DQ        0  QDLM    1  VNIGHT0.23  DUC  -0.12  DLC  -0.09   QLM       9   CAP      83
      SU 164.232  SL 164.232  AF 0.071  DQD     0.0  HDLM 0.06  HNIGHT0.01  DUS  -4.33  DLS  -4.33   RAIN   FOR.   QLM/QF 0.09
      RES     52  A      0.0   VF  1.29  GAMMA 0.49  VDLM 0.08  VNORM 0.43  HUM   0.18  HLM   0.21   QRQLM     8   DY     0.03
      IW     0.0  L       3.4  S 1/ 112  N   0.0130  SCOD  DWF  DWB   0.04  YUM 159.90  YLM 159.90   VLM    0.27   DH    -0.03
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```
      YU 155.140  YL 155.080   QF   393   DQ       0   QDLM   61  VNIGHT0.35   DUC   0.25   DLC   0.28    QLM     338   CAP      55
      SU 161.600  SL 162.200   AF 0.441   DQD    0.0   HDLM 0.30  HNIGHT0.07   DUS  -5.46   DLS  -6.09    RAIN   FOR.   QLM/QF 0.86
      RES      0  A     0.0    VF  0.89   GAMMA 0.0    VDLM 0.36  VNORM 0.66   HUM   1.00   HLM   1.03    QRQLM   266   DY      0.06
      IW     0.0  L     48.0   S 1/ 800   N   0.0130   SCOD 400   DWB   0.11   YUM 156.14   YLM 156.11    VLM    0.77   DH     -0.02

C088  CIRCULAR          0.75/0.75  INFLOW  C087              OUTFLOW  1611        B.NO. 822                 EXIST. SAN.    3088
      YU 155.070  YL 155.030   QF   372   DQ       0   QDLM   61  VNIGHT0.16   DUC   0.29   DLC   0.30    QLM     338   CAP      35
      SU 162.200  SL 161.995   AF 0.441   DQD    0.0   HDLM 0.35  HNIGHT0.12   DUS  -6.09   DLS  -5.92    RAIN   FOR.   QLM/QF 0.91
      RES      0  A     0.0    VF  0.84   GAMMA 0.0    VDLM 0.30  VNORM 0.63   HUM   1.04   HLM   1.05    QRQLM   261   DY      0.04
      IW     0.0  L     35.6   S 1/ 890   N   0.0130   SCOD 400   DWB   0.14   YUM 156.11   YLM 156.08    VLM    0.77   DH     -0.01

*********************************

3092  CIRCULAR          0.30/0.30  INFLOW                    OUTFLOW  3093        B.NO.  514                EXIST. STORM   3092
      YU 165.293  YL 162.397   QF   220   DQ      56   QDLM    0  VNIGHT0.49   DUC  -0.25   DLC  -0.20    QLM      55   CAP     164
      SU 168.661  SL 166.015   AF 0.071   DQD    0.1   HDLM 0.01  HNIGHT0.00   DUS  -3.32   DLS  -3.52    RAIN   8MS2   QLM/QF 0.25
      RES     52  A     0.25   VF  3.11   GAMMA 0.74   VDLM 0.49  VNORM 0.0    HUM   0.05   HLM   0.10    QRQLM    55   DY      2.90
      IW     0.0  L     55.8   S 1/  19   N   0.0130   SCOD FH01  DWB   0.0    YUM 165.34   YLM 162.50    VLM    2.61   DH     -0.05

3093  CIRCULAR          0.30/0.30  INFLOW  3092              OUTFLOW  3094        B.NO.  515                EXIST. STORM   3093
      YU 161.407  YL 159.487   QF   129   DQ      70   QDLM    0  VNIGHT0.29   DUC  -0.16   DLC  -0.03    QLM     119   CAP      10
      SU 166.015  SL 162.974   AF 0.071   DQD    0.3   HDLM 0.01  HNIGHT0.00   DUS  -4.47   DLS  -3.22    RAIN   8MS2   QLM/QF 0.92
      RES     52  A     0.48   VF  1.83   GAMMA 0.49   VDLM 0.45  VNORM 0.0    HUM   0.14   HLM   0.27    QRQLM   118   DY      1.92
      IW     0.0  L    106.7   S 1/  56   N   0.0130   SCOD FH02  DWB   0.0    YUM 161.54   YLM 159.75    VLM    1.93   DH     -0.13

3094  CIRCULAR          0.46/0.46  INFLOW  3093              OUTFLOW  4010        B.NO.  515                EXIST. STORM   3094
      YU 159.410  YL 159.106   QF   164   DQ      60   QDLM    1  VNIGHT0.15   DUC  -0.12   DLC  -0.05    QLM     159   CAP       4
      SU 162.974  SL 164.269   AF 0.166   DQD    0.2   HDLM 0.02  HNIGHT0.01   DUS  -3.22   DLS  -4.75    RAIN   8MS2   QLM/QF 0.97
      RES     52  A     0.41   VF  0.99   GAMMA 0.49   VDLM 0.26  VNORM 0.0    HUM   0.34   HLM   0.41    QRQLM   159   DY      0.30
      IW     0.0  L    103.3   S 1/ 340   N   0.0130   SCOD FH02  DWB   0.0    YUM 159.75   YLM 159.52    VLM    1.05   DH     -0.07

4010  CIRCULAR          1.07/1.07  INFLOW  3094              OUTFLOW  4011        B.NO.  2779               EXIST. STORM   4010
      YU 158.466  YL 155.844   QF  5001   DQ      49   QDLM    1  VNIGHT0.87   DUC  -0.94   DLC  -0.78    QLM     197   CAP    4805
      SU 164.269  SL 161.056   AF 0.898   DQD    0.2   HDLM 0.02  HNIGHT0.00   DUS  -5.68   DLS  -4.92    RAIN   8MS2   QLM/QF 0.04
      RES     52  A     0.42   VF  5.57   GAMMA 0.39   VDLM 0.87  VNORM 0.0    HUM   0.13   HLM   0.29    QRQLM   195   DY      2.62
      IW     0.0  L     85.9   S 1/  33   N   0.0130   SCOD FH02  DWB   0.01   YUM 158.59   YLM 156.13    VLM    1.00   DH     -0.16

4011  CIRCULAR          1.22/1.22  INFLOW  3017  3099  4010  OUTFLOW  4012        B.NO.  2778               EXIST. STORM   4011
      YU 155.844  YL 155.521   QF  2372   DQ      33   QDLM    1  VNIGHT0.32   DUC  -0.93   DLC  -0.76    QLM     304   CAP    2067
      SU 161.056  SL 159.770   AF 1.167   DQD    0.2   HDLM 0.03  HNIGHT0.00   DUS  -4.92   DLS  -3.79    RAIN   8MS2   QLM/QF 0.13
      RES     52  A     0.32   VF  2.03   GAMMA 0.34   VDLM 0.32  VNORM 0.0    HUM   0.29   HLM   0.46    QRQLM   303   DY      0.32
      IW     0.0  L     94.8   S 1/ 293   N   0.0130   SCOD FH02  DWB   0.01   YUM 156.14   YLM 155.98    VLM    0.77   DH     -0.16

4012  CIRCULAR          1.22/1.22  INFLOW  4011  3027        OUTFLOW  4013        B.NO.  2778               EXIST. STORM   4012
      YU 155.521  YL 155.421   QF  1995   DQ      16   QDLM    2  VNIGHT0.27   DUC  -0.76   DLC  -0.71    QLM     443   CAP    1552
      SU 159.770  SL 159.148   AF 1.167   DQD    0.1   HDLM 0.03  HNIGHT0.01   DUS  -3.79   DLS  -3.21    RAIN   8MS2   QLM/QF 0.22
      RES     52  A     0.20   VF  1.71   GAMMA 0.26   VDLM 0.33  VNORM 0.0    HUM   0.46   HLM   0.51    QRQLM   440   DY      0.10
      IW     0.0  L     41.4   S 1/ 415   N   0.0130   SCOD FH02  DWB   0.01   YUM 155.98   YLM 155.93    VLM    0.97   DH     -0.06
```

Contractions used in HVM output...

1st line: pipe number, cross-section, pipe size...width/height(m), inflow and outflow pipes, block number, sewer type, pipe no.

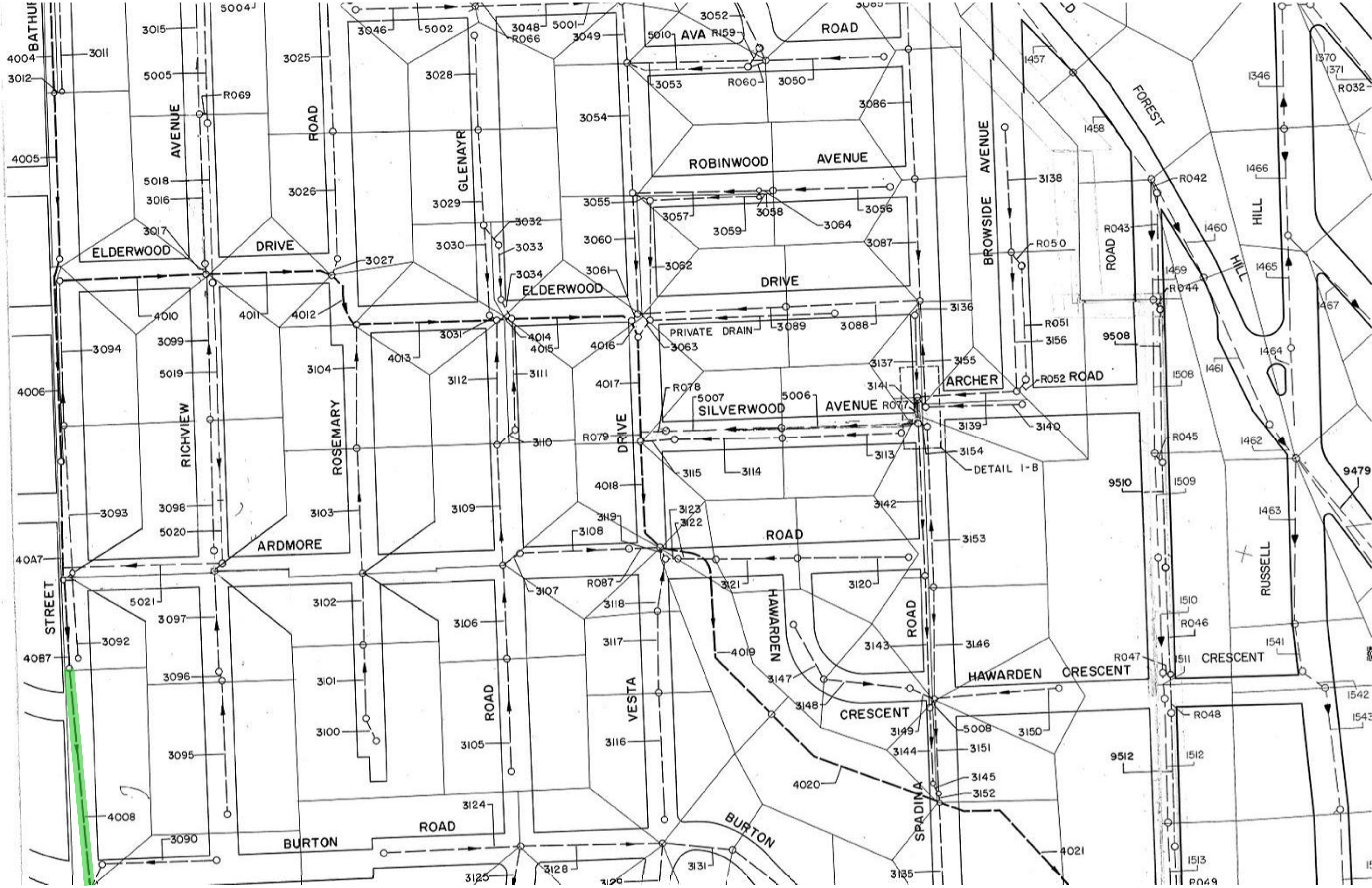
2nd line: YU, YL = upper and lower invert elevations (m)
QF = full flow capacity (L/sec)
DQ = maximum storm runoff from tributary area (L/sec)
QDLM = peak DWF at lower end (L/sec)
VNIGHT = night DWF velocity (m/sec)
DUC, DLC = difference between maximum HGL elevation and section crown elevation at upper and lower ends (m)
(-ve means partial fill)
QLM = maximum flow rate at lower end (L/sec) under a 2yr storm
CAP = free capacity at lower end when loaded by QLM

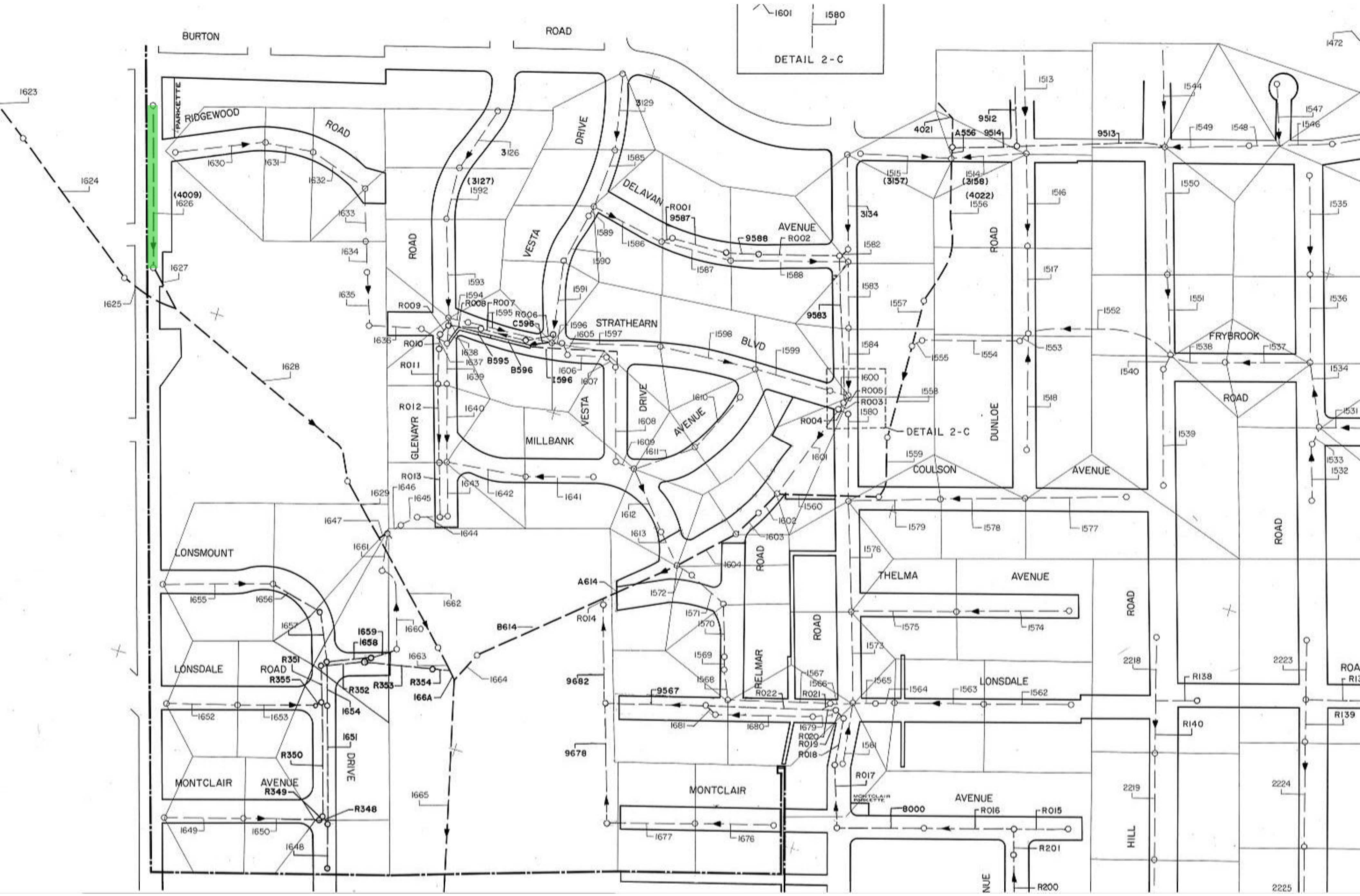
```
3rd line: SU, SL = upper and lower surface elevations (m)
          AF = cross-sectional area (m2)
          DQD = DWF from tributary area (L/sec)
          HDLM = flow depth corresponding to QDLM (m)
          HNIGHT = night DWF depth (m)
          RAIN = storm corresponding to QLM... 8MS2 = 8th Study Area, 2yr model storm
          QLM/QF = ratio of maximum flow rate at lower end to full-flow capacity

4th line: RES = population density (residents/ha)
          A = tributary area (ha)
          VF = flow velocity corresponding to QF (m/sec)
          GAMMA = imperviousness ratio
          VDLM = flow velocity corresponding to QDLM (m/sec)
          VNORM = normal flow velocity for QDLM (m/sec)
          HUM, HLM = maximum flow depths above invert at upper and lower ends
          QRQLM = portion of strom flow within QLM (L/sec)
          DY = difference between upper and lower invert elevations (m)

5th line: IW = industrial/large water inflow (L/sec)
          L = segment length (m)
          S = slope of pipe
          N = Manning's n
          SCOD = surface code of tributary area
          DWB = backwater build-up under QDLM (m)
          YUM, YLM = maximum HGL elevations at upper and lower ends
          VLM = flow velocity corresponding to QLM (m/sec)
          DH = indicator whether HGL is steeper or flatter than pipe slope
             = (YUM-YLM) - DY
```

STORM SEWER MODEL OUTPUT





BURTON ROAD
DETAIL 2-C
PARKETTE
RIDGEWOOD ROAD
DELAVAN AVENUE
VESTA DRIVE
ROAD
STRATHEARN BLVD
GLENAYR
MILLBANK
VESTA
DRIVE
AVENUE
DUNLOE
ROAD
COULSON
AVENUE
FRYBROOK ROAD
ROAD
LONSMOUNT
LONSDALE ROAD
MONTCLAIR AVENUE
DRIVE
THELMA AVENUE
RELMAR ROAD
ROAD
LONSDALE
MONTCLAIR
MONTCLAIR PARKETTE
AVENUE
ROAD
HILL
DETAIL 2-C

TORONTO SEWER SYSTEM STUDY AREA 8 - FOREST HILL INDEPENDENT STORM

```
40A7  CIRCULAR           1.37/1.37  INFLOW  4006                OUTFLOW  40B7          B.NO.   515                    EXIST. STORM   40A7
      YU 156.500  YL 155.850   QF  4928   DQ        6   QDLM     3  VNIGHT0.52   DUC    0.62   DLC    1.10    QLM    2505   CAP    2423
      SU 163.162  SL 166.238   AF 1.472   DQD     0.0   HDLM 0.07  HNIGHT0.02   DUS   -4.67   DLS   -7.91    RAIN   8MS2   QLM/QF 0.51
      RES     52  A       0.04   VF  3.35   GAMMA 0.49   VDLM 0.10  VNORM 0.52   HUM    1.99   HLM    2.47    QRQLM  2501   DY     0.65
      IW     0.0  L       82.0   S 1/ 126   N   0.0130   SCOD FH02  DWB    0.05   YUM 158.49   YLM 158.32    VLM    1.70   DH    -0.48

40B7  CIRCULAR           1.37/1.37  INFLOW  40A7  5021          OUTFLOW  4008                                        EXIST. STORM   40B7
      YU 155.850  YL 155.780   QF  1876   DQ        6   QDLM    10  VNIGHT0.20   DUC    0.91   DLC    0.69    QLM    3802   CAP   -1925
      SU 166.238  SL 168.914   AF 1.472   DQD     0.0   HDLM 0.09  HNIGHT0.03   DUS   -8.11   DLS -11.08    RAIN   8MS2   QLM/QF 2.03
      RES      0  A       0.04   VF  1.27   GAMMA 0.49   VDLM 0.38  VNORM 0.0    HUM    2.28   HLM    2.06    QRQLM  3787   DY     0.07
      IW     0.0  L       61.0   S 1/ 871   N   0.0130   SCOD FH02  DWB    0.02   YUM 158.13   YLM 157.84    VLM    2.58   DH     0.22

4008  CIRCULAR           1.37/1.37  INFLOW  40B7                OUTFLOW  1626          B.NO.   514                    EXIST. STORM   4008
      YU 155.780  YL 155.710   QF  1173   DQ      174   QDLM    11  VNIGHT0.15   DUC    0.69   DLC    0.0     QLM    3885   CAP   -2711
      SU 168.914  SL 168.996   AF 1.472   DQD     0.5   HDLM 0.09  HNIGHT0.03   DUS -11.08   DLS -11.92    RAIN   8MS2   QLM/QF 3.31
      RES     52  A       0.79   VF  0.80   GAMMA 0.74   VDLM 0.27  VNORM 0.0    HUM    2.06   HLM    1.37    QRQLM  3864   DY     0.07
      IW     0.0  L      155.7   S 1/2225   N   0.0130   SCOD FH02  DWB    0.0    YUM 157.84   YLM 157.08    VLM    2.64   DH     0.69

1626  CIRCULAR           1.07/1.07  INFLOW  4008  3091          OUTFLOW  1627          B.NO.  05125                   EXIST. STORM   1626
      YU 155.690  YL 144.070   QF  7608   DQ        0   QDLM    11  VNIGHT1.32   DUC   -0.52   DLC   -0.52    QLM    3904   CAP    3704
      SU 168.990  SL 147.390   AF 0.898   DQD     0.0   HDLM 0.03  HNIGHT0.00   DUS -12.75   DLS   -2.77    RAIN   8MS2   QLM/QF 0.51
      RES      0  A       0.0    VF  8.48   GAMMA 0.0    VDLM 1.75  VNORM 0.0    HUM    0.55   HLM    0.55    QRQLM  3880   DY    11.62
      IW     0.0  L      164.6   S 1/  14   N   0.0130   SCOD 313   DWB    0.0    YUM 156.24   YLM 144.62    VLM    8.50   DH     0.00

1627  CIRCULAR           1.37/1.37  INFLOW  1626                OUTFLOW  1628          B.NO.   5125                   EXIST. STORM   1627
      YU 140.340  YL 139.660   QF  7424   DQ        0   QDLM    11  VNIGHT0.79   DUC   -0.66   DLC   -0.55    QLM    3872   CAP    3552
      SU 147.390  SL 144.480   AF 1.472   DQD     0.0   HDLM 0.04  HNIGHT0.01   DUS   -6.34   DLS   -4.00    RAIN   8MS2   QLM/QF 0.52
      RES      0  A       0.0    VF  5.04   GAMMA 0.0    VDLM 1.05  VNORM 0.0    HUM    0.71   HLM    0.82    QRQLM  3847   DY     0.68
      IW     0.0  L       37.8   S 1/  56   N   0.0130   SCOD 319   DWB    0.0    YUM 141.05   YLM 140.48    VLM    4.84   DH    -0.11

1628  STRAIGHT SIDE      3.20/3.81  INFLOW  1625  1627          OUTFLOW  1629          B.NO.  9100                    EXIST. STORM   1628
      YU 138.820  YL 138.010   QF 39661   DQ        0   QDLM    11  VNIGHT0.63   DUC   -2.15   DLC   -2.16    QLM   15792   CAP   23869
      SU 144.480  SL 144.170   AF 9.605   DQD     0.0   HDLM 0.03  HNIGHT0.00   DUS   -4.00   DLS   -4.51    RAIN   8MS2   QLM/QF 0.40
      RES      0  A       0.0    VF  4.13   GAMMA 0.0    VDLM 0.63  VNORM 0.0    HUM    1.66   HLM    1.65    QRQLM 15763   DY     0.81
      IW     0.0  L      231.6   S 1/ 286   N   0.0130   SCOD 319   DWB    0.0    YUM 140.48   YLM 139.66    VLM    3.93   DH     0.01

1629  STRAIGHT SIDE      3.20/3.81  INFLOW  1628                OUTFLOW  1662          B.NO.  9100                    EXIST. STORM   1629
      YU 138.010  YL 137.230   QF 56947   DQ        0   QDLM    11  VNIGHT0.90   DUC   -2.48   DLC   -2.48    QLM   15713   CAP   41235
      SU 144.170  SL 144.180   AF 9.605   DQD     0.0   HDLM 0.02  HNIGHT0.00   DUS   -4.83   DLS   -5.62    RAIN   8MS2   QLM/QF 0.28
      RES      0  A       0.0    VF  5.93   GAMMA 0.0    VDLM 0.90  VNORM 0.0    HUM    1.33   HLM    1.33    QRQLM 15681   DY     0.78
      IW     0.0  L      108.2   S 1/ 139   N   0.0130   SCOD 319   DWB    0.0    YUM 139.34   YLM 138.56    VLM    5.16   DH     0.00

1662  STRAIGHT SIDE      3.20/3.81  INFLOW  1629  1647          OUTFLOW  1663          B.NO.  9100                    EXIST. STORM   1662
      YU 137.230  YL 135.090   QF 86718   DQ        0   QDLM    11  VNIGHT1.38   DUC   -2.73   DLC   -2.36    QLM   16286   CAP   70432
      SU 144.180  SL 142.190   AF 9.605   DQD     0.0   HDLM 0.02  HNIGHT0.00   DUS   -5.87   DLS   -5.65    RAIN   8MS2   QLM/QF 0.19
      RES      0  A       0.0    VF  9.03   GAMMA 0.0    VDLM 1.38  VNORM 0.0    HUM    1.08   HLM    1.45    QRQLM 16252   DY     2.14
      IW     0.0  L      128.0   S 1/  60   N   0.0130   SCOD 319   DWB    0.00   YUM 138.31   YLM 136.54    VLM    4.84   DH    -0.37

1663  CIRCULAR           3.81/3.81  INFLOW  1662                OUTFLOW  166A          B.NO.  9100                    EXIST. STORM   1663
      YU 135.090  YL 134.980   QF 66570   DQ        0   QDLM    11  VNIGHT0.91   DUC   -2.36   DLC   -2.32    QLM   16275   CAP   50295
      SU 142.190  SL 140.970   AF11.382   DQD     0.0   HDLM 0.03  HNIGHT0.00   DUS   -5.65   DLS   -4.50    RAIN   8MS2   QLM/QF 0.24
      RES      0  A       0.0    VF  5.85   GAMMA 0.0    VDLM 0.91  VNORM 0.0    HUM    1.45   HLM    1.49    QRQLM 16241   DY     0.11
      IW     0.0  L       17.8   S 1/ 162   N   0.0130   SCOD 319   DWB    0.01   YUM 136.54   YLM 136.47    VLM    4.00   DH    -0.05

166A  CIRCULAR           3.81/3.81  INFLOW  1663  R354          OUTFLOW  1665          B.NO.  9100                    EXIST. STORM   166A
      YU 134.980  YL 134.960   QF169271   DQ        0   QDLM    11  VNIGHT2.32   DUC   -2.32   DLC   -2.30    QLM   16483   CAP  152788
      SU 140.970  SL 140.970   AF11.382   DQD     0.0   HDLM 0.05  HNIGHT0.01   DUS   -4.50   DLS   -4.50    RAIN   8MS2   QLM/QF 0.10
      RES      0  A       0.0    VF 14.87   GAMMA 0.0    VDLM 0.34  VNORM 2.32   HUM    1.49   HLM    1.51    QRQLM 16448   DY     0.02
      IW     0.0  L        0.5   S 1/  25   N   0.0130   SCOD 319   DWB    0.04   YUM 136.47   YLM 136.47    VLM    3.98   DH    -0.02

1665  CIRCULAR           3.81/3.81  INFLOW  166A  1664          OUTFLOW  1666          B.NO.    91                    EXIST. STORM   1665
      YU 134.960  YL 133.340   QF 71602   DQ        0   QDLM    33  VNIGHT0.98   DUC   -2.30   DLC   -2.30    QLM   23793   CAP   47809
```

```
SU 140.970  SL 155.450   AF11.382   DQD    0.0   HDLM 0.05  HNIGHT0.01   DUS  -4.50   DLS -20.60    RAIN   8MS2   QLM/QF 0.33
RES      0  A     0.0    VF  6.29   GAMMA 0.0    VDLM 0.98  VNORM 0.0    HUM   1.51   HLM   1.51    QRQLM 23727   DY      1.62
IW     0.0  L    226.5   S 1/ 140   N   0.0130   SCOD 319   DWB   0.0    YUM 136.47   YLM 134.85    VLM    5.68   DH      0.01
```

Contractions used in HVM output...

1st line: pipe number, cross-section, pipe size...width/height(m), inflow and outflow pipes, block number, sewer type, pipe no.

2nd line: YU, YL = upper and lower invert elevations (m)
QF = full flow capacity (L/sec)
DQ = maximum storm runoff from tributary area (L/sec)
QDLM = peak DWF at lower end (L/sec)
VNIGHT = night DWF velocity (m/sec)
DUC, DLC = difference between maximum HGL elevation and section crown elevation at upper and lower ends (m)
(-ve means partial fill)
QLM = maximum flow rate at lower end (L/sec) under a 2yr storm
CAP = free capacity at lower end when loaded by QLM

3rd line: SU, SL = upper and lower surface elevations (m)
AF = cross-sectional area (m2)
DQD = DWF from tributary area (L/sec)
HDLM = flow depth corresponding to QDLM (m)
HNIGHT = night DWF depth (m)
RAIN = storm corresponding to QLM... 8MS2 = 8th Study Area, 2yr model storm
QLM/QF = ratio of maximum flow rate at lower end to full-flow capacity

4th line: RES = population density (residents/ha)
A = tributary area (ha)
VF = flow velocity corresponding to QF (m/sec)
GAMMA = imperviousness ratio
VDLM = flow velocity corresponding to QDLM (m/sec)
VNORM = normal flow velocity for QDLM (m/sec)
HUM, HLM = maximum flow depths above invert at upper and lower ends
QRQLM = portion of strom flow within QLM (L/sec)
DY = difference between upper and lower invert elevations (m)

5th line: IW = industrial/large water inflow (L/sec)
L = segment length (m)
S = slope of pipe
N = Manning's n
SCOD = surface code of tributary area
DWB = backwater build-up under QDLM (m)
YUM, YLM = maximum HGL elevations at upper and lower ends
VLM = flow velocity corresponding to QLM (m/sec)
DH = indicator whether HGL is steeper or flatter than pipe slope
= (YUM-YLM) - DY

APPENDIX F

Water Demand Calculations

LEA Consulting Ltd. Consulting Engineers and Planners	Water Demand Calculation			
	Prepared:	D.P.	Page No.	F-01
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	Dec.11/19		

1637 Bathurst Street (Residential Building)

This calculation is following the "Water Supply for Public Fire Protection" by Fire Underwriters Survey. The proposed building will be constructed fire resistive.

Formula: $F = 220C\sqrt{A}$

where F = the required fire flow in litres per minute

C = coefficient related to the type of construction.

= 0.6 for fire-resistive construction

A = Area oflargest floor plus 25 percent of each of the two immediately adjoingin floors for vertical opening and exterior vertical communications that are properly protected with one hour rating.

According the building stats,

		Area (m2)
UG	adjoining	2083
2nd Floor	largest	2145
3rd Floor	adjoining	1856
A		3130

Therefore, F = 7000 **l/min**

Occupancy reduction:

For occupancies with a low contents fire hazard, the reduction rate is 25%,

Therefore: F = 5250 l/min

Reduction for sprinkler protection:

Using the NFPA sprinkler system, a reduction rate of 30% is used.

Therefore: F = 3675 l/min

Separation charge:

Charge for the separations on each side:

Separation	Charge	
0 to 3m	25%	South
3.1 to 10 m	20%	North
30.1 to 45 m	5%	West
10.1 to 20 m	15%	East

Total charge in % 65%

Total charge in l/min 3412.5

Required Fire Flow: 7000 l/min

or 116.67 l/s

or 1849 US GPM

LEA Consulting Ltd. Consulting Engineers and Planners	Water Demand Calculation			
	Prepared:	D.P.	Page No.	F-02
	Checked:	B.H.		
Project: 1637 Bathurst Street	Proj. #	20284		
	Date:	Dec.11/19		

1637 Bathurst Street (Residential Building)

Total Population: **176** (See Page B-01)

Peak Hour Demand Calculation:

Residential Per Capita Demand (multi-unit)	191	L/cap/day
Peaking Factor Residential)	2.48	
Peak Hour Demand	**0.96**	L/sec

Maximum Day Demand Calculation:

Residential Per Capita Demand (multi-unit)	191	L/cap/day
Peaking Factor (Residential)	1.65	
Maximum Day Demand	**0.64**	L/sec
Fire Flow for High Rise Residential:	116.7	L/sec
Max. Day Demand plus Fire Flow:	**117.3**	L/sec
Design Water Demand	**117.3**	L/sec
	1859.3	**US GPM**

APPENDIX G

Hydrant Flow Test Data and Watermain Adequacy Assessment Data

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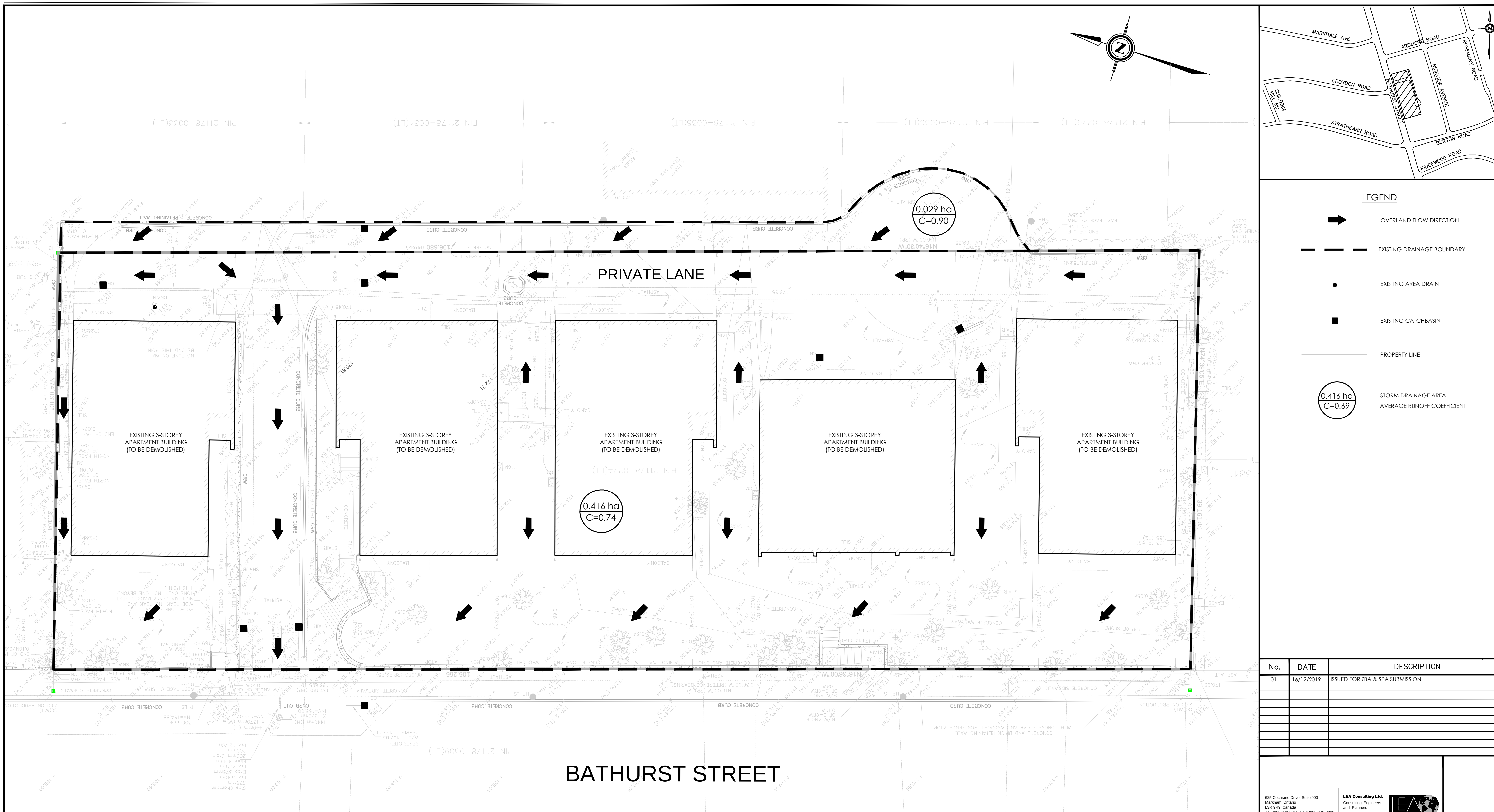
HYDRANT FLOW TEST DATA WILL BE PROVIDED IN THE NEXT STAGE OF DESIGN

APPENDIX H

Figures and Drawings



LEGEND

(arrow)	OVERLAND FLOW DIRECTION
(dashed line)	EXISTING DRAINAGE BOUNDARY
(dot)	EXISTING AREA DRAIN
(square)	EXISTING CATCHBASIN
(line)	PROPERTY LINE
0.416 ha C=0.69	STORM DRAINAGE AREA AVERAGE RUNOFF COEFFICIENT

No.	DATE	DESCRIPTION
01	16/12/2019	ISSUED FOR ZBA & SPA SUBMISSION

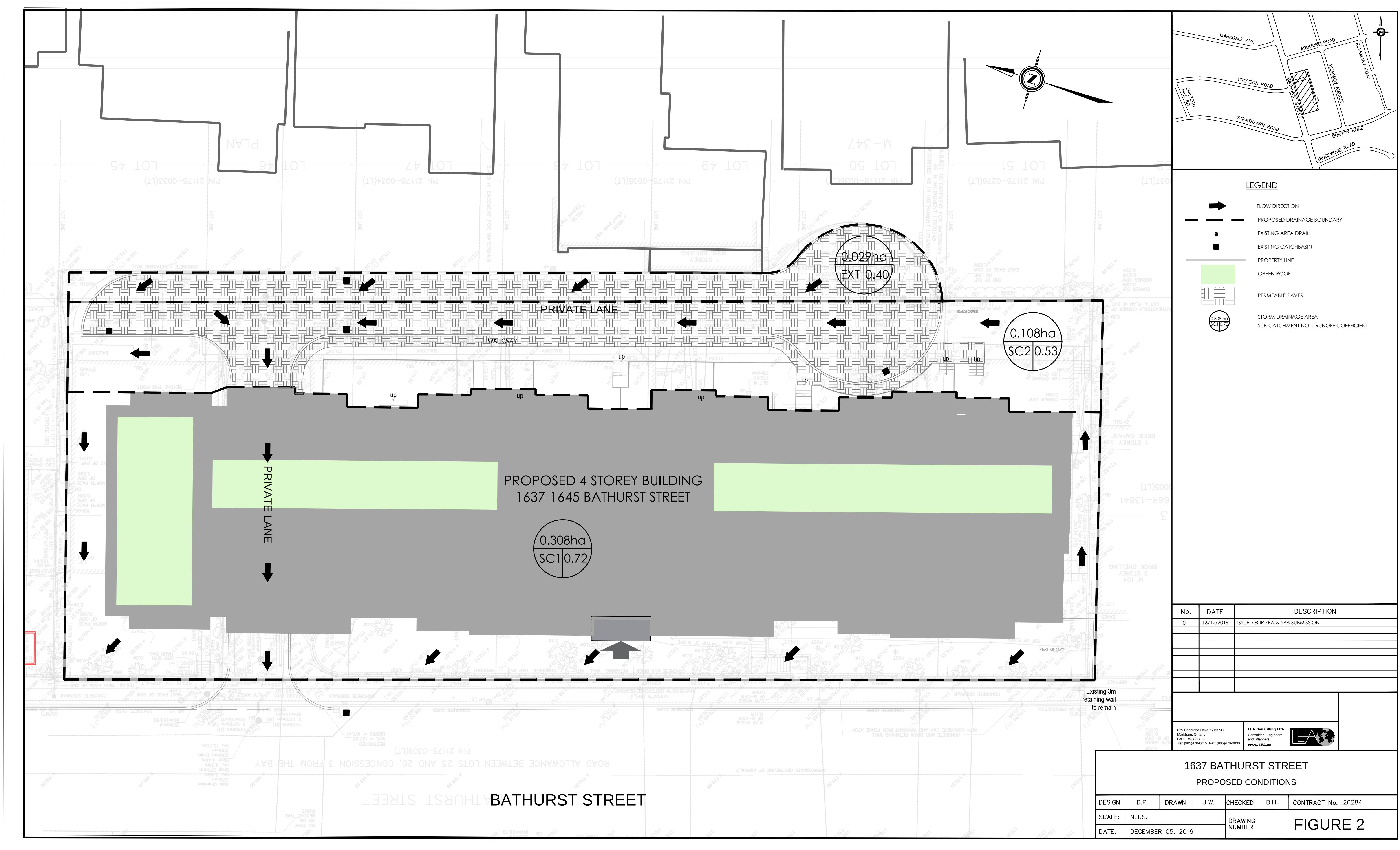
625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015. Fax: (905)470-0030

LEA Consulting Ltd.
Consulting Engineers and Planners
www.LEA.ca

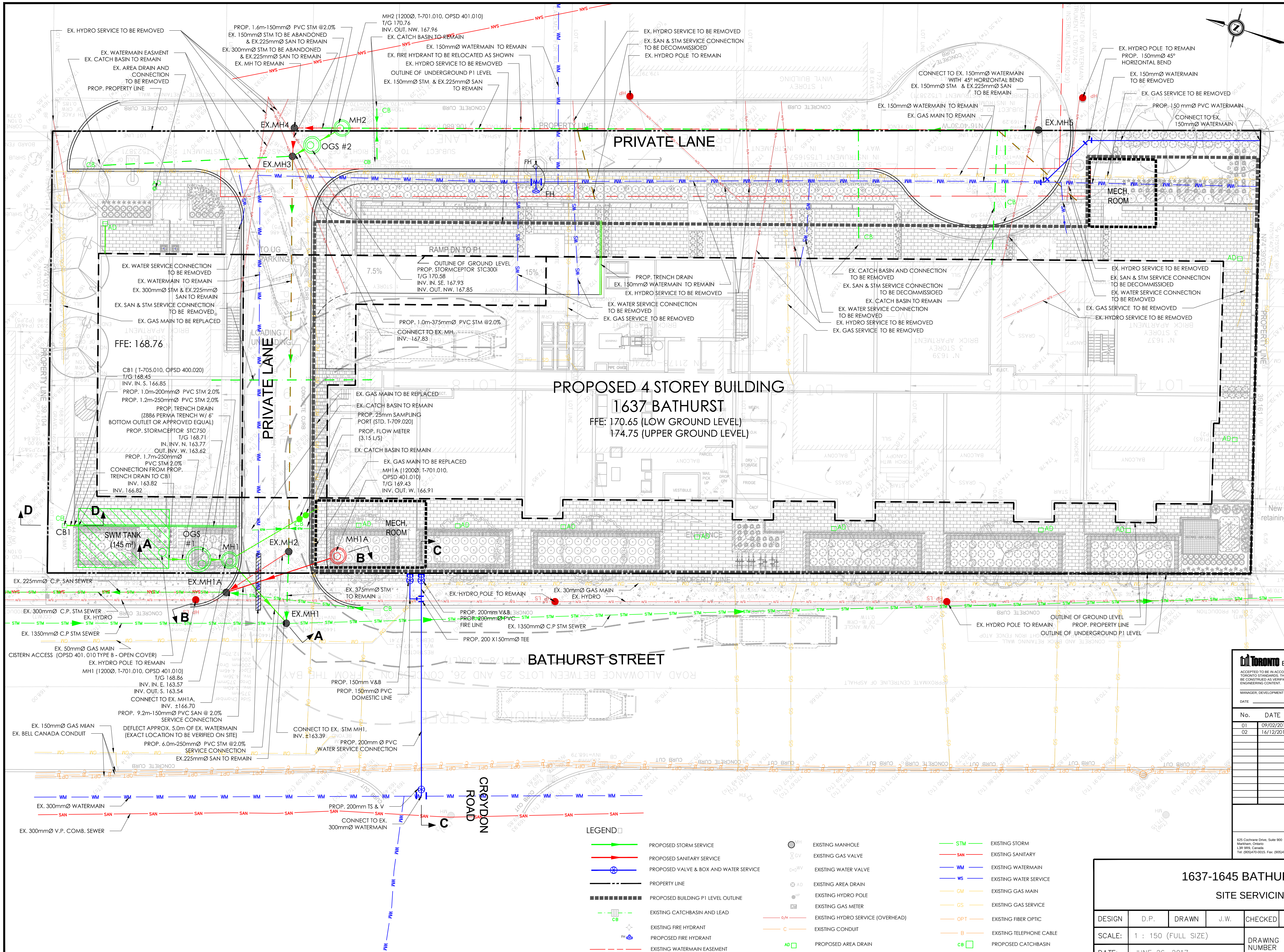
1637-1645 BATHURST STREET

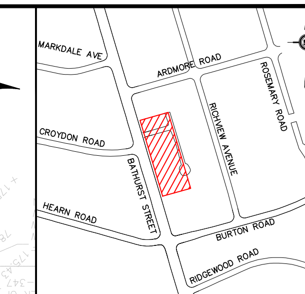
EXISTING CONDITIONS

DESIGN	D.P.	DRAWN	J.W.	CHECKED	B.H.	CONTRACT No. 20284
SCALE:	N.T.S.			DRAWING NUMBER	FIGURE 01	
DATE:	DECEMBER 05, 2019					



PRIVATE LANE
WALKWAY
0.029ha
EXT 0.40
0.108ha
SC2 0.53
0.308ha
SC1 0.72
PROPOSED 4 STOREY BUILDING
1637-1645 BATHURST STREET
PRIVATE LANE
Existing 3m retaining wall to remain
BATHURST STREET
MARKDALE AVE
ARDMORE ROAD
ROSEMARY ROAD
CROYDON ROAD
BATHURST STREET
RICHVIEW AVENUE
STRATHEARN ROAD
BURTON ROAD
RIDGEWOOD ROAD
LEGEND
FLOW DIRECTION
PROPOSED DRAINAGE BOUNDARY
EXISTING AREA DRAIN
EXISTING CATCHBASIN
PROPERTY LINE
GREEN ROOF
PERMEABLE PAVER
STORM DRAINAGE AREA
SUB-CATCHMENT NO. | RUNOFF COEFFICIENT
No.
DATE
DESCRIPTION
01
16/12/2019
ISSUED FOR ZBA & SPA SUBMISSION
LEA Consulting Ltd.
Consulting Engineers and Planners
www.LEA.ca
1637 BATHURST STREET
PROPOSED CONDITIONS
DESIGN D.P.
DRAWN J.W.
CHECKED B.H.
CONTRACT No. 20284
SCALE: N.T.S.
DATE: DECEMBER 05, 2019
DRAWING NUMBER
FIGURE 2





GENERAL NOTES

1. THE OWNER IS REQUIRED TO INSTALL AND MAINTAIN A PREMISE ISOLATION DEVICE FOR ALL APPLICABLE WATER SERVICES IN ACCORDANCE WITH TORONTO MUNICIPAL CODE, CHAPTER □□1 WATER SUPPLY, THE BUILDING CODE, AND CSA B64 SERIES STANDARDS.
2. THE BUILDING STORM AND SANITARY SYSTEMS SHALL BE DESIGNED TO BE ABLE TO OPERATE UNDER MUNICIPAL SEWER SURCHARGE CONDITIONS.
3. THE METHOD OF INSTALLATION FOR THE PROPOSED SERVICE CONNECTIONS WILL BE AT THE DISCRETION OF TORONTO WATER.
4. EXISTING SERVICE CONNECTIONS NO LONGER IN USE SHALL BE DISCONNECTED BY TORONTO WATER AT THE OWNER'S COST.
5. THE LOCATION OF THE WATER METER SHALL BE TO TORONTO WATER'S SATISFACTION.
6. THE LIMITS OF CONSTRUCTION WITIN THE CITY'S RIGHT-OF-WAY ARE AT THE DISCRETION OF THE CITY INSPECTOR.
7. PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL RIGHT-OF-WAY, THE CONTRACTOR, DEVELOPER, OR CONSULTANT WILL OBTAIN ALL NECESSARY ROAD OCCUPANCY PERMITS FROM THE CITY'S RIGHT-OT-WAY MANAGEMENT UNIT.
8. PER THE INFORMATION PROVIDED TO STAFF BY THE APPLICANT, STAFF HAVE REVIEWED THIS APPLICATION ON THE UNDERSTANDING IT WILL COMPRISE A SINGLE PARCEL OF LAND, UNDER ONE OWNER, UPON COMPLETION. IF ANY PARTY, INCLUDING THE APPLICANT OR ANY SUBSEQUENT OWNER, SUBMITS AN APPLICATION FOR CONDOMINIUM APPROVAL OR ANY OTHER FORM OF LAND DIVISION FOR THIS DEVELOPMENT NOT IN ACCORDANCE WITH THIS ASSUMPTION, DIFFERENT SERVICING CONNECTIONS, INCLUDING ALL ASSOCIATED STORMWATER MANAGEMENT FACILITIES AND ANY NECESSARY REVISED PLANS AND STUDIES, MAY BE REQUIRED BY THE CITY AT THE SOLE COST TO THE CONDOMINIUM APPLICANT.
9. FOR SITE SERVICING SECTION AND MANHOLES INVERT REFER TO DWG. C-03.
10. REFER TO DWG. C-06 FOR NOTES.
11. CONTRACTOR MUST CHECK & VERIFY ALL DIMENSIONS ON THE JOB.
12. DO NOT SCALE DRAWINGS.
13. ALL DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE ARCHITECT AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER.
14. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL SIGNED BY THE ENGINEER.
15. BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE EASTERLY LIMIT OF BATHURST STREET AS SHOWN ON PLAN BA-2115, HAVING A BEARING OF N16° 36' 00"W. ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE RELATED TO CITY OF TORONTO BENCH MARK No. CT13□□ HAVING AN ELEVATION OF 167.729 METRES. DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.304□.
16. ALL EXISTING FEATURE TO REMAIN UNLESS OTHERWISE NOTED.

TORONTO Engineering & Construction Services

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MANAGER, DEVELOPMENT ENGINEERING

DATE

No.	DATE	DESCRIPTION
01	09/02/201□	ISSUED FOR ZBA SUBMISSION
02	16/12/2019	ISSUED FOR ZBA & SPA SUBMISSION

LICENSED PROFESSIONAL ENGINEER D. K. Y. POON 100508213 Dec. 16, 2019 PROVINCE OF ONTARIO

625 Cochrane Drive, Suite 900
Markham, Ontario
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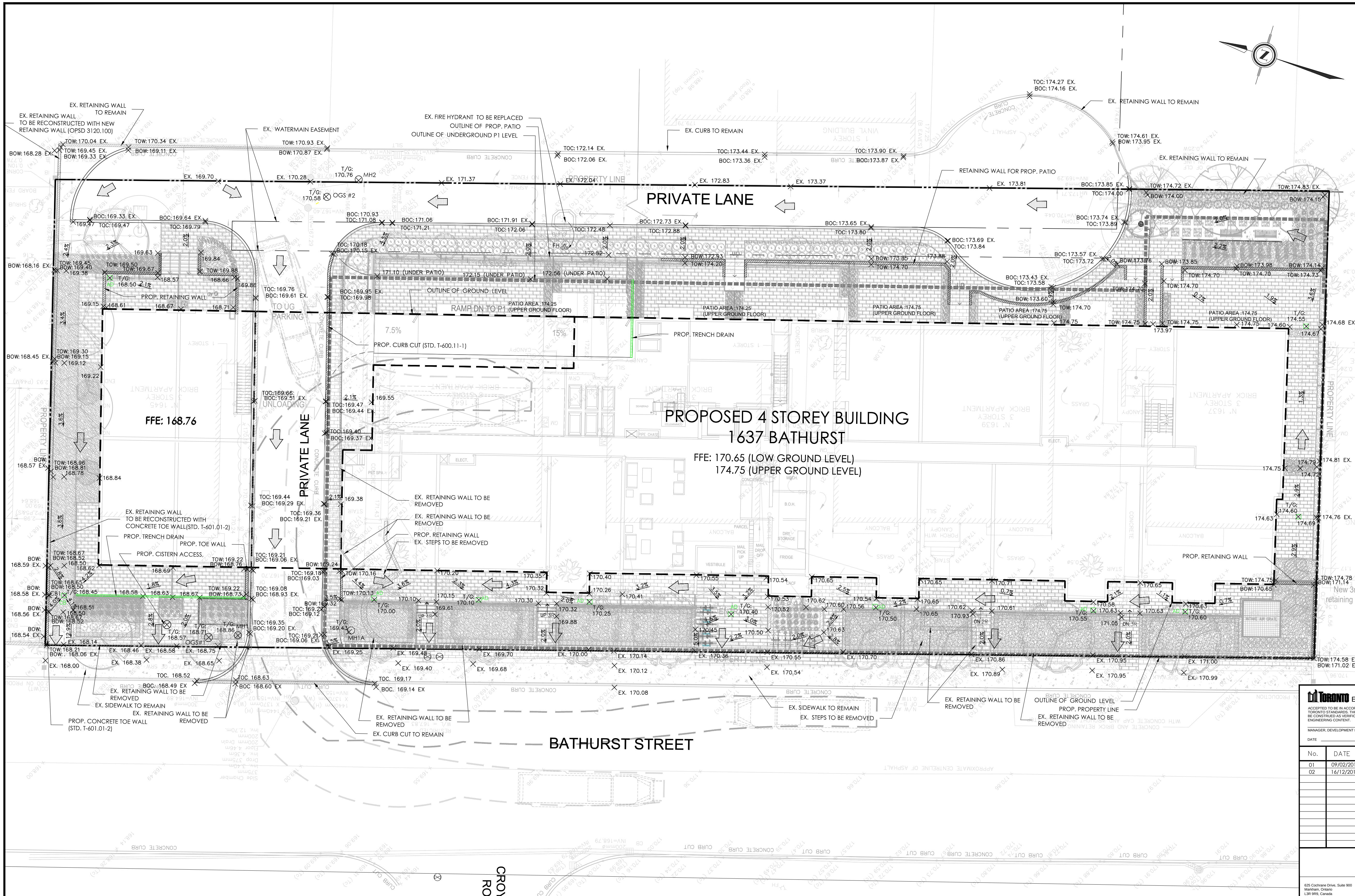
LEA Consulting Ltd.
Consulting Engineers and Planners
www.LEA.ca

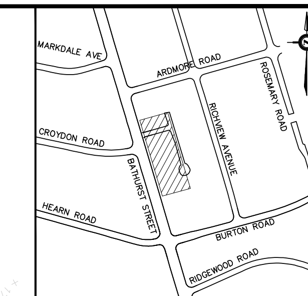
1637-1645 BATHURST STREET

SITE SERVICING PLAN

DESIGN	D.P.	DRAWN	J.W.	CHECKED	B.H.	CONTRACT No.	20284
SCALE:	1 : 150 (FULL SIZE)	DRAWING NUMBER	C-01				
DATE:	JUNE 26, 2017						

DRAWING NAME: C:\Users\jwang\appdata\local\temp\AcPublish_7824\C-01 Site Servicing Plan.dwg Dec 16, 2019–5:55pm





GENERAL NOTES

1. THE OWNER IS REQUIRED TO INSTALL AND MAINTAIN A PREMISE ISOLATION DEVICE FOR ALL APPLICABLE WATER SERVICES IN ACCORDANCE WITH TORONTO MUNICIPAL CODE, CHAPTER 851 WATER SUPPLY, THE BUILDING CODE, AND CSA B64 SERIES STANDARDS.
2. THE BUILDING STORM AND SANITARY SYSTEMS SHALL BE DESIGNED TO BE ABLE TO OPERATE UNDER MUNICIPAL SEWER SURCHARGE CONDITIONS.
3. THE METHOD OF INSTALLATION FOR THE PROPOSED SERVICE CONNECTIONS WILL BE AT THE DISCRETION OF TORONTO WATER.
4. EXISTING SERVICE CONNECTIONS NO LONGER IN USE SHALL BE DISCONNECTED BY TORONTO WATER AT THE OWNER'S COST.
5. THE LOCATION OF THE WATER METER SHALL BE TO TORONTO WATER'S SATISFACTION.
6. THE LIMITS OF CONSTRUCTION WITIN THE CITY'S RIGHT-OF-WAY ARE AT THE DISCRETION OF THE CITY INSPECTOR.
7. PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL RIGHT-OF-WAY, THE CONTRACTOR, DEVELOPER, OR CONSULTANT WILL OBTAIN ALL NECESSARY ROAD OCCUPANCY PERMITS FROM THE CITY'S RIGHT-OT-WAY MANAGEMENT UNIT.
8. PER THE INFORMATION PROVIDED TO STAFF BY THE APPLICANT, STAFF HAVE REVIEWED THIS APPLICATION ON THE UNDERSTANDING IT WILL COMPRISE A SINGLE PARCEL OF LAND, UNDER ONE OWNER, UPON COMPLETION. IF ANY PARTY, INCLUDING THE APPLICANT OR ANY SUBSEQUENT OWNER, SUBMITS AN APPLICATION FOR CONDOMINIUM APPROVAL OR ANY OTHER FORM OF LAND DIVISION FOR THIS DEVELOPMENT NOT IN ACCORDANCE WITH THIS ASSUMPTION, DIFFERENT SERVICING CONNECTIONS, INCLUDING ALL ASSOCIATED STORMWATER MANAGEMENT FACILITIES AND ANY NECESSARY REVISED PLANS AND STUDIES, MAY BE REQUIRED BY THE CITY AT THE SOLE COST TO THE CONDOMINIUM APPLICANT.
9. FOR SITE SERVICING SECTION AND MANHOLES INVERT REFER TO DWG. C-03.
10. REFER TO DWG. C-06 FOR NOTES.
11. CONTRACTOR MUST CHECK & VERIFY ALL DIMENSIONS ON THE JOB.
12. DO NOT SCALE DRAWINGS.
13. ALL DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE ARCHITECT AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER.
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16. ALL EXISTING FEATURE TO REMAIN UNLESS OTHERWISE NOTED.

LEGEND

EXISTING MANHOLE
CB EXISTING CATCHBASIN
UP EXISTING HYDRO / LIGHT POLE
WV EXISTING WATER VALVE
HYD EXISTING FIRE HYDRANT
EXISTING FENCE
PROPERTY LINE
EXISTING TREE
PROPOSED TREE
PROPOSED V&B
MH1 PROPOSED STM MH
MH1A PROPOSED SAN MH
2% FLOW DIRECTION & SLOPE
PROPOSED CURB CUT
EXISTING CURB CUT
TOC:141.50 EX. EXISTING TOP OF CURB ELEVATION TO REMAIN
BOC:141.50 EX. EXISTING BOTTOM OF CURB ELEVATION TO REMAIN
TOC:141.50 PROPOSED TOP OF CURB ELEVATION
BOC:141.50 PROPOSED BOTTOM OF CURB ELEVATION
141.50 EXISTING ELEVATION
141.53 PROPOSED GRADE
EX:141.50 EXISTING GRADE TO REMAIN
TOW:141.50 EX. EXISTING TOP OF WALL ELEVATION TO REMAIN
RIM:141.50 TOP ELEVATION OF PROPOSED MANHOLE
141.50 ELEVATION FROM ARCHITECT
OVERLAND FLOW ROUTE
PROPOSED CATCH BASIN

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MANAGER, DEVELOPMENT ENGINEERING

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D. K. Y. POON
100508213
Dec. 16, 2019
PROVINCE OF ONTARIO

1637 BATHURST STREET

SITE GRADING PLAN

DESIGN	D.P.	DRAWN	J.W.	CHECKED	B.H.	CONTRACT No. 20284
SCALE:	1 : 150 (FULL SIZE)	DRAWING NUMBER	C-02			
DATE:	JUNE 26, 2017					

DRAWING NAME: C:\Users\jwang\appdata\local\temp\AcPublish_7824\C-02 Site Grading Plan.dwg Dec 16, 2019-5:55pm

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