Stormwater Management and Functional Servicing Report (SWM/FSR)

Yonge & Birch Condos, Toronto, ON

Prepared for Birch Equities Limited
by IBI Group
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Table of Contents

1 Introduction 1
1.1 Background 1
1.2 Site Description 2

2 Site Proposal 3

3 Terms of Reference and Methodology 3
3.1 Terms of Reference 3
3.2 Methodology: Stormwater Drainage and Management 3
3.3 Methodology: Sanitary Discharge 4
3.4 Methodology: Water Usage 4

4 Groundwater Impacts 5
4.1 Groundwater Impacts Post-Construction 5
4.2 Groundwater Impacts During Construction 5

5 Stormwater Management and Drainage 6
5.1 Design Criteria 6
5.2 Existing Conditions 7
5.3 Stormwater Management 9
5.3.1 Water Balance 9
5.3.2 Quantity Controls 10
5.3.3 Underground Storage Tank 10
5.3.4 Quality Controls 11
5.4 Proposed Storm Connection 11
5.5 Erosion and Sediment Control 12

6 Sanitary Drainage System 13
6.1 Existing Sanitary Drainage System 13
6.2 Existing Sanitary Flows 13
6.3 Proposed Sanitary Flows 13
6.4 Compliance to MOECP Procedure F-5-5 14
6.5 Proposed Sanitary Connection 15

7 Water Supply System 15
7.1 Existing System 15
7.2 Proposed Water Supply Requirements 15
7.3 Hydrant Coverage 16

7.4 Proposed Watermain Connections 16

8 Site Grading 16

8.1 Existing Grades 16

8.2 Proposed Grades 16

9 Site Access 16

10 Utilities 16

11 Conclusions and Recommendations 17

List of Tables

Table 3.1 Sanitary Flows 4

Table 3.2 Water Usage 4

Table 4-1 Hydrogeology Summary – Post-Construction 5

Table 5.1 Target Input Parameters 7

Table 5.2 Target Peak Flows 7

Table 5.3 Target Peak Flows 8

Table 5.4 Existing Condition Input Parameters 8

Table 5.5 Existing Peak Flows 8

Table 5.6 Post-Development Input Parameters 9

Table 5.7 Post-Development Quantity Control as per City Requirements 10

Table 5.8 Stormwater Management Summary Table 11

Table 5.10 Erosion and Sediment Control Sequencing 12

Table 6.1 Equivalent Population Calculations 13

Table 6.2 Comparison of Discharge to Combined Sewer – Existing and Proposed 14

List of Figures

FIG 1 Site Location Plan ..... Following Report

DAP-1 Pre-Development Storm Drainage Plan ..... Appendix C

DAP-2 Post-Development Storm Drainage Plan ..... Appendix C

SDP-1 Existing Sanitary Drainage Plan ..... Appendix D

List of Drawings

SS-01 Site Servicing Plan..... Appendix F
SG-01 Site Grading Plan..... Appendix F
DD-02 Cross Sections..... Appendix F

Appendices

Appendix A Background Information
Appendix B Groundwater Impacts
Appendix C Stormwater Data Analysis
Appendix D Sanitary Data Analysis
Appendix E Water Data Analysis
Appendix F Engineering Plans
Appendix G Statement of Limiting Conditions and Assumptions

1 Introduction

1.1 Background

IBI Group (IBI) was retained by Birch Equities Limited (the "Owner"), to prepare a Stormwater Management and Functional Servicing Report in support of a Zoning By-Law Amendment and Site Plan application for a proposed high-rise residential development at 1196-1210 Yonge Street, in the City of Toronto (the "City"). The purpose of this report is to provide site-specific information for the City's review with respect to infrastructure required to support the proposed development regarding storm drainage, sanitary sewers and water supply.

More specifically, the report will present the following:

- Evaluate the impacts of groundwater on the proposed development, including:
    - Summarize the groundwater uptake quantity and quality from the Hydrogeological Report;
    - Evaluate suitable methods to manage groundwater post-construction as well as during construction; and,
    - Develop a strategy to manage groundwater post-construction to comply with the City's Discharge By-Law criteria.
- Evaluate on a preliminary basis the Stormwater Management (SWM) opportunities and constraints, including:
    - Calculate allowable and proposed runoff rates for the development;
    - Evaluate suitable methods for attenuation and treatment of stormwater runoff;
    - Develop and propose on-site control measures and examine theoretical performance; and,
    - Demonstrate compliance of the proposed stormwater control measures with the City's Wet Weather Flow Management Guidelines (WWFMG).
- Identify sanitary servicing opportunities and constraints, including:
    - Calculate existing and proposed sanitary flows;
    - Evaluate the capacity of the existing combined sewer; and,
    - Ensure that there is enough capacity on the receiving municipal sewers to accommodate the additional sanitary flows from the proposed development.
- Evaluate the existing municipal water system, including:
    - Calculate the proposed domestic water and firefighting supply needs; and,
    - Confirm that it has adequate flow to meet the additional required domestic and fire flow demands for the proposed development.

Coordination with the City's Engineering Records Department was carried out to obtain existing information in preparation of this report.

The following documents were available for our review:

- Plan and profile drawing of egg-shaped combined sewers on Yonge Street, north of Price Street, south of Alcorn Avenue, City of Toronto, Drawing No. Y-15;
- Plan and profile drawing of circular combined sewers on Yonge Street, north of Crescent Road, south of Health Street, City of Toronto, Drawing No. Y-16;
- Plan and profile drawing of storm sewers on Yonge Street, north of Macpherson Avenue, South of Health Street West, City of Toronto, Drawing No. Y-41;
- Plan and profile drawing of combined sewers on Birch Avenue, east of Gange Avenue, west of Yonge Street, City of Toronto, Drawing No. B-24;
- Plan and profile drawing of storm sewers on Birch Avenue, east of Gange Avenue, west of Yonge Street, City of Toronto, Drawing No. B-309;
- DMOG (Digital Map Owners Group) mapping;
- Architectural plans prepared by KPMB Architects, dated January 2021;
- Site Stats prepared by KPMB Architects, dated May 2021; and,
- Hydrogeological Report by Terraprobe, dated November 5th, 2021.

1.2 Site Description

The existing 1069 m^2 (0.11 ha) site is located on 1202 Yonge Street, north of Birch Avenue, west of Yonge Street in the City of Toronto. The legal description is as follows: Part of Lots 1 and 2, Registered Plan 308 Yorkville, City of Toronto. The site spans over seven municipal addresses: 1196, 1198, 1202, 1204, 1206, 1208 and 1210 Yonge Street. Refer to Boundary Plan in **Appendix A**. The site location is also identified in **Figure FIG 1** location plan following the report.

The existing site is comprised of one 4-storey building, one 2-storey buildings facing Yonge Street, and another 2-storey building facing Birch Avenue. Based on the site location and municipal address, the subject site is mostly covered by the buildings and hard surface. The existing storm drainage generally drains southerly to Birch Avenue, then towards easterly to Yonge Street. (Refer to J.D.Barnes Topographical Survey Plan, dated on Sep 19, 2019 in **Appendix A**). This report confirms that the majority of the storm flows from the roof will go to the storm tank which is located in the P1 level. A storm service connection will be connected to the existing storm sewer which is located at Yonge Street. No stormwater quality controls were identified within the site because there is no need for the treatment of the roof drainage. Stormwater management and sanitary flow details will be provided in **Section 5** and **6** of this report.

The entire City of Toronto is declared an area for basement flooding studies and systematic Environmental Assessments (EA). The subject site is in study area 44. The EA study for study area 44 is in progress and is expected to be completed 2024. Refer to **Appendix A**.

The site is located in an area of the City that is well established and serviced by a network of municipal infrastructure including roads, sewers, watermains, and other services and utilities.

2 Site Proposal

The proposed development area of 1069 m^2 (0.11 ha) will include a 14-storey residential building with a total of 67 residential units fronting onto Birch Avenue. The development will be serviced by three underground levels. The vehicular access to the site is proposed off the Municipal road north of Birch Avenue. Refer to **Appendix A** for the proposed site statistics and Site Plan prepared by KPMB Architects.

3 Terms of Reference and Methodology

3.1 Terms of Reference

The Terms of Reference used for the scope of this report was based on the City's Development Guide Servicing Report Terms of Reference, December 2007, the January 2021 Second Edition of the City's Design Criteria for Sewers and Watermain, and the November 2006 WWFMG.

3.2 Methodology: Stormwater Drainage and Management

The report provides a detailed SWM review of the pre- and post-development conditions and comments on opportunities to reduce peak flows. Other requirements set by the WWFMG will also be discussed. Additionally, as the proposed development is mainly residential with a small floor plate, and with a total site area smaller than 5.0 ha (Table 7, Section 2, WWFMG), the following SWM criteria are to be applied.

Water Quantity

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 percent 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 0.50.

Water Balance

As required by the City's WWFMG and TGS Version 3 Tier 1,The criteria provided in the City's WWFMG outline that controls should be in place, such that the runoff resulting from a 5 mm rainfall event can be retained on-site through the use of infiltration, evapotranspiration and/or water reuse measures.

Water Quality

Long-term average removal of 80% of the total suspended solids (TSS) on an annual loading basis must be achieved. TSS removal efficiency is to be based on 100% of the runoff leaving the site from all storm events that occurs in an average year.

3.3 Methodology: Sanitary Discharge

The estimated sanitary discharge flows from the existing site as well as the proposed site will be calculated based on the criteria shown in **Table 3.1** below.

Table 3.1 Sanitary Flows

USAGE	DESIGN FLOW	UNITS	PERSONS
Proposed Residential	450	Litres/Person/Day	1 Bedroom Unit = 1.4 ppu 2 Bedroom Unit = 2.1 ppu 3 Bedroom Unit = 3.1 ppu
Retail	250	Litres/Person/Day	1.1 person / 100 m² of GFA
Commercial	250	Litres/Person/Day	1.1 person / 100 m² of GFA
School/Church	250	Litres/Person/Day	86 persons/ha
Existing Residential (Number of Units Unknown)	240	Litres/Person/Day	Apartment: 400 Persons / ha Medium Density: 270 Persons / ha
Existing Residential (Number of Units Known)	240	Litres/Person/Day	1 Bedroom Unit = 1.4 ppu 2 Bedroom Unit = 2.1 ppu 3 Bedroom Unit = 3.1 ppu Townhouse/Semi-Detached = 2.7 ppu Single Family Dwelling = 3.5 ppu

Based on the calculated peak flows, the adequacy of the existing infrastructure to support the proposed development will be discussed.

3.4 Methodology: Water Usage

The domestic water usage will be calculated based on the City's and Ontario Building Code's design criteria as outlined in **Table 3.2** below.

Table 3.2 Water Usage

USAGE	WATER DEMAND	UNITS
Multi-Family Dwelling	190	Litres/Capita/Day
Commercial or Retail	250	Litres/Capita/Day

Pressure and flow testing to determine the adequacy of the existing watermain to support the development with fire suppression in accordance with the Fire Underwriters Survey (FUS) Guidelines will be discussed in the subsequent **Section 7 Water Supply System.**

4 Groundwater Impacts

4.1 Groundwater Impacts Post-Construction

A Hydrogeological Investigation is required at the re-zoning stage to determine the impacts of groundwater and potential permanent discharge to the municipal sewer systems as it relates to flow rate and quality of the groundwater. It is noted that three levels of underground structure is proposed for this development. A Hydrogeological Investigation Report was completed for the site by Terraprobe Inc, dated November 5th, 2021 (Refer to an excerpt from report in **Appendix B**).

The initial findings are summarized in **Table 4-1** below.

Table 4-1 Hydrogeology Summary – Post-Construction

CRITERIA	RECOMMENDATION	NOTES
Permanent Discharge Quantity	N/A	The foundation walls and the lowest basement slab of the proposed development will be constructed to be watertight and impermeable; therefore, direct or indirect groundwater discharge to the local municipal sewers is not expected. Refer to the confirmation letters by Mechanical Engineer, Structural Engineer, and ownership in **Appendix B.**
Quality of Groundwater	See **Section 4.2** write-up	N/A

Information from this section is also summarized in the City of Toronto's Servicing Report Groundwater Summary provided in **Appendix B**.

4.2 Groundwater Impacts During Construction

Dewatering by considering the conveyance of storm water from a 100-year storm event is expected to be 596,000 L/day (6.9 L/s). Dewatering by considering the typical 2-year design storm event is estimated to be approximately 521,500 L/day (6.0 L/s). Construction dewatering will be discharged to the existing 375mm combined sewer on Birch Avenue. **Table 4.2** below summarizes the recommendations for groundwater discharge during construction. The temporary construction dewatering rate of 6.9 L/s under 100-year storm event and 6.0 L/s under 2-year storm event do not exceed the total net reduction in combined sewer flow of 9.86 L/s, since the roof storm drainage will be redirected to storm sewer on Yonge Street. Refer to SDP-1 in **Appendix E**. As such, there will be sufficient capacity in the combined sewer system to support the temporary construction dewatering.

Table 4.2 Hydrogeology Summary – During Construction

CRITERIA	RECOMMENDATION	NOTES
During-Construction Discharge	6.9 L/s under 100-year storm event and 6.0 L/s under 2-year storm event to be discharged via pump to the existing 375 mm Ø combined sewer on Birch Avenue.	A dewatering system shall be designed by Dewatering Contractor to ensure that the construction dewatering flows discharged to the existing 375mm comb. There is capacity in the existing sewer as the additional flows do not exceed the total net reduction in combined sewer flow of 9.86 L/s.
Quality of Groundwater	The groundwater must meet the sanitary discharge By-Law.	The hydrogeological investigation report by TerraProbe Inc indicates that the groundwater quality currently exceeds the sanitary sewer discharge criteria. The pre-treatment and filtration system is to be designed by a Dewatering Consultant.

5 Stormwater Management and Drainage

5.1 Design Criteria

The proposed development will be designed to meet the City's WWFMG and the standards of the Province of Ontario as set out in the Ministry of the Environment and Climate Change (MOECC) 2003 Stormwater Management Planning and Design (SWMPD) Manual.

The following design criteria will be reviewed:

- Post-development peak flow for the 100-year from the site to be controlled to the 2-year target flow with a runoff coefficient of 0.50;
- Stormwater should be treated to Enhanced Protection levels as defined in the MOECC 2003 SWMPD Manual;
- Adhere to the guidelines set by the MOECC Procedure F-5-5;
- A specified rainfall depth of 5 mm is to be retained on-site as required by the WWFMG; and,
- The City's Intensity-Duration-Frequency (IDF) data to be used for analysis.

5.2 Existing Conditions

The site is currently comprised of a 14-storey residential building facing Birch Avenue.

According to the existing site condition, the overland flow is from the north to the south, then towards easterly to Yonge Street. All roof storm water drainage of 1202, 1204, 1206, 1208 Yonge Street connects to 750x1125 combined sewer on Yonge Street. All roof storm water drainage of 8 Birch Avenue connects to existing 375mm combined sewer. Refer to Aquaflow Storm and Combined Sewer Investigation & Dye Test Report in **Appendix D**.

Area A1 pre represents the effective study area of 0.11 ha of the site draining off of the site. Refer to **Figure DAP-1** in **Appendix C**. The subject site is surrounded by the existing buildings and parking lot on which the storm drainage is captured by themselves. There are no known external drainage areas that drain onto the site. Although the existing site is mainly impervious, the WWFMG requires target flow calculations to be based on a run-off coefficient of 0.50. **Table 5.1** below shows the input parameters which are illustrated on the pre-development drainage area plan on **Figure DAP-1** in **Appendix C**.

Table 5.1 Target Input Parameters

CATCHMENT	DRAINAGE AREA (HA)	C	TC (MIN.)
A1 Pre	0.11	0.50	10

The City's minimum Time of Concentration (Tc) of 10 minutes was used. Peak flows calculated for the existing conditions are shown in **Table 5.2** below. The corresponding detailed calculations can be found in **Appendix C**.

Table 5.2 Target Peak Flows

CATCHMENT	PEAK FLOW RATIONAL METHOD (L/S)		
	2-YEAR	5-YEAR	100-YEAR
A1 Pre	13.0	19.5	36.9

As shown in **Table 5.2** and in accordance with the WWFMG, the post-development flows would typically need to be controlled to the target flow of 13.0 L/s. Due to existing service condition, the proposed storm connection will be made to the existing 1350mm Ø storm sewer on Yonge Street. As a result of this the flows discharged to the existing 1350 mm Ø storm sewer must not exceed the flows generated to that sewer during a 2-year storm in the existing condition. See **Table 5.3** below for details.

Table 5.3 Target Peak Flows

CATCHMENT	OUTLET POINT	PEAK FLOW RATIONAL METHOD (L/S)	
		2-YEAR	100-YEAR
A1	1350mm Ø storm sewer on Yonge Street	13.0	36.9
TARGET	**13.0 L/s**		

As shown in **Table 5.3,** the post-development flows will need to be controlled to the 2-year target flow generated by area A1, which is responsible for all existing site drainage to the 1350mm Ø storm sewer on Yonge Street. See **DAP-1** in **Appendix C** for Pre-Development Storm Drainage Plan.

As noted in the site description above, the existing site is occupied entirely of a 14-storey residential building. Control 100-year post development flow to 2-year pre-development drainage (2 year existing) generally conforms with the City's requirements. For the purpose of this report, the existing condition (A1 Existing) was modeled to compare the existing pre-development flows to the target flows. **Table 5.4** below shows the input parameters for existing conditions.

Table 5.4 Existing Condition Input Parameters

CATCHMENT	DRAINAGE AREA (HA)	C	TC (MIN.)
A1 Existing	0.11	0.90	10

Peak flows calculated for the existing site, A1 Existing are shown in **Table 5.5** below. The corresponding detailed calculations can be found in **Appendix C**.

Table 5.5 Existing Peak Flows

CATCHMENT	PEAK FLOW RATIONAL METHOD (L/S)		
	2-YEAR	5-YEAR	100-YEAR
A1 Existing	23.4	35.0	66.5

The peak flows showing on **Table 5.5** are provided for comparison purposes only as the City's WWFMG must be followed. The target release rate of 13.0 L/s must be achieved in the post-development scenario.

5.3 Stormwater Management

Under post-development conditions, the entire site–a total drainage area of 0.11ha is to be controlled. In order to meet the City's WWFMG criteria, the post-development flow rate is to be controlled to the 2-year target flow for drainage area A1 established in **Section 5.2**. All storm drainage from the property is proposed to discharge to the existing 1350 mm Ø storm sewer on Yonge Street. A1 Post delineates the post-development drainage area that is to be controlled via underground storm tank and orifice. Refer to **Figure DAP-2** in **Appendix C**.

The post-development drainage areas and runoff coefficients are illustrated on **Figure DAP-2** in **Appendix C**. The relevant drainage parameters of the post-development drainage areas are provided in **Table 5.6** below.

Table 5.6 Post-Development Input Parameters

DRAINAGE AREA	DRAINAGE AREA (HA)	C	TC (MIN.)
A1 Post (The entire site is covered by roof)	0.11	0.84	10

5.3.1 Water Balance

As required by the City's WWFMG and TGS Version 3 Tier 1, a rainfall depth of 5 mm must be retained over the entire site area. The post development area is 0.11 ha, which equates to a required water balance volume of 5.31 m³. Based on the initial abstraction values, the site will provide 1.66 m³ of initial abstraction under post-development conditions. Therefore, a remainder of **3.65 m³** will need to be retained on site. Refer to the initial abstraction calculations in **Appendix C**. A sump with a depth of 0.30 m below the tank outlet is proposed which will retain a volume of 15.9 m³. The stormwater for water balance will be retained in this sump.

Rainwater reuse will be the primary means used to meet the site water balance requirement. The proposed storm tank will store water below the orifice outlet, which will be pumped to the appropriate locations for reuse such as landscape and green roof areas. The details for the water re-use strategy shall be provided by the landscape and irrigation consultant at the site plan approval stage.

5.3.2 Quantity Controls

Using the City's IDF data, modified rational method calculations were undertaken to determine the maximum storage required during each storm event. Results for the 2-, 5- and 100-year storm events are provided in **Table 5.7** below. The detailed post-development quantity control calculations are provided in **Appendix C**.

Table 5.7 Post-Development Quantity Control as per City Requirements

STORM EVENT	TARGET FLOW (L/S)	TOTAL UNDERGROUND STORAGE REQUIRED (M^3)	TANK RELEASE RATE (L/S)	UNCONTROLLED FLOW (L/S)	TOTAL SITE RELEASE RATE (L/S)
2-Year	13.0	9.5	6.0	0	6.0
5-Year		14.9	7.8	0	7.8
100-Year		30.2	11.5	0	11.5

As shown in **Table 5.7**, in order to control post-development flows to 2-year pre-development conditions, a target flow of 13.0 L/s is to be satisfied. A proposed Orifice Plate will be used to control the total post-development flow to below allowable 13.0 L/s for 2-, 5- and 100-year storm events. As the target flow is achieved, the proposed development will not have adverse impacts on the existing storm sewer system. Refer to **Appendix C** for detailed orifice calculations.

5.3.3 Underground Storage Tank

An underground storage tank with an internal area of 52.88 m^2 is proposed to meet the quantity control requirements set forth by the City's WWFMG and will have an available volume of 77.3 m^3. A orifice plate is proposed to meet the target flow. The water surface elevation within the storm tank is anticipated to reach a maximum active depth of 0.58 m with a controlled flow of 11.5 L/s outletting to the municipal storm sewer under a 100-year storm event. Under a 2-year storm event, the water surface elevation will reach a maximum depth of 0.18 m with a controlled flow of 6.0 L/s outletting to the municipal sewer. A perforated stormwater tank access hatch will be provided and will double as an emergency overflow outlet if ever the storm event is greater than the 100-year storm or if the orifice plate is blocked. See **Table 5.8** below for a summary of important stormwater management characteristics under 100-year event for the subject site.

Table 5.8 Stormwater Management Summary Table

STORMWATER CHARACTERISTIC	PROJECT CONDITION
Allowable Release Rate	13.0 L/s
Tank Release Rate	11.5 L/s
Uncontrolled Release Rate	0 L/s
Required Storage Volume	30.2 m^3
Provided Storage Volume	77.3 m^3 (based on P1 clear height)
Roof Storage Provided (if applicable)	N/A
Orifice Size and Type of Orifice Control	orifice tube, 75 mm Ø
Water Balance Required After IA	3.65 m^3
Water Balance Provided	15.9 m^3

5.3.4 Quality Controls

As per City standards, stormwater should be treated to the MOECC Enhanced Level protection and the removal of 80% TSS is required. It is noted that the entire site area will be covered by roof. As per City standards, the runoff from the roof area is naturally considered clean (at a TSS removal rate of 80%). As a result, no additional quality control devices are required for this site.

5.4 Proposed Storm Connection

The proposed development will connect to the existing 1350 mm Ø storm sewer on Yonge Street via a proposed 200 mm Ø storm sewer service connection with a 2.0% slope will have sufficient capacity to convey the maximum total site discharge of 11.5 L/s during the 100-year storm. Refer to **Drawing SS-01** in **Appendix F** for connection details.

5.5 Erosion and Sediment Control

Details for erosion and sedimentation control during construction will be subject to the City's approval prior to issuance of Building Permit for the individual phases. During the site grading and servicing works, there is potential for sediment-laden runoff to be directed toward the adjoining properties and municipal streets. Therefore, measures to mitigate this potential must be installed.

Prior to any construction activity, siltation control fencing must be installed along the site perimeter. Additional measures will include construction of an entrance "mud-mat' on any access to be used during construction, to minimize mud tracking offsite. Material stockpiles are to be located in appropriate locations. Catchbasin siltation control devices will also be used on existing catchbasins in municipal right- of-ways that may be affected by the construction of this site.

The sequencing of the implementation of the above and additional Erosion and Sediment Control measures is summarized in **Table 5.10** below.

Table 5.9 Erosion and Sediment Control Sequencing

ACTIVITY	EROSION CONTROL PRACTICE
Area Grading	• Construct and maintain entrance "mud-mat"; • Construct and maintain silt fencing around the downstream perimeter of the site; and, • Locate stockpiles away from sensitive areas.
Servicing and Asphalt Works	• Limit open trench lengths to minimize erosion potential of excavated material; • Prevent erosion of material stockpiles; • During work stoppages or inclement weather, plug ends of open sewers to prevent downstream sedimentation; and, • Protect catchbasin inlets with filter cloth wrapping.
Maintenance	• Remove accumulated sediments when depth exceeds 0.30 m; • Maintain and repair siltation control fencing as required; and, • Maintain and repair catchbasin sediment controls as required.

6 Sanitary Drainage System

6.1 Existing Sanitary Drainage System

According to the reviewed information, the existing buildings on the site is supposed to be serviced by the existing combined sewers on Yonge Street and Birch Avenue.

6.2 Existing Sanitary Flows

The existing site is comprised of one 4-storey building, one 2-storey buildings facing Yonge Street, and another 2-storey building facing Birch Avenue. All sanitary drainage from 1202, 1204, 1206, 1208 Yonge Street connects to 750mm x 1125mm combined sewer on Yonge Street. Refer to Aquaflow Storm and Combined Sewer Investigation & Dye Test Report in **Appendix D**.

6.3 Proposed Sanitary Flows

The anticipated sanitary discharge flows for the proposed site were calculated based on City of Toronto and Ontario Building Code guidelines outlined in **Table 3.1**, along with the proposed site statistics found in **Appendix A**. The number of proposed residential units was used to calculate an estimated population for this analysis in order to evaluate the adequacy of the existing municipal infrastructure. The design inputs for the residential units are shown in **Table 6.1** below.

Table 6.1 Equivalent Population Calculations

UNIT SIZE	NUMBER OF UNITS	PERSONS PER UNIT (PPU)	TOTAL PERSONS
Studio Units	3	1.4	4.2
1 / 1 + Den Bedroom Units	13	1.4	18.2
2 / 2 + Den Bedroom Units	41	2.1	86.1
3 Bedroom Units	10	3.1	31
Retail Unit	201 m^2	1.1p/100m^2	2.2
TOTAL			**142**

The proposed sanitary load increase induced by the development is 1.84L/s. Refer to **Appendix D** for detailed calculations.

6.4 Compliance to MOECP Procedure F-5-5

According to the reviewed City Records, the existing property is serviced by an existing 375 mm Ø combined sewer and an existing 500 mm Ø storm sewer on Birch Avenue. The existing property is also serviced by an existing 750 mm Ø x 1125 mm Ø E.S.BR. combined sewer, an existing 1275 mm Ø circular combined sewer, and an existing 1350 mm Ø storm sewer on Yonge Street.

To confirm the above assumption, a dye test was conducted on September 22nd, 2021, confirming the outlet locations of the existing buildings on 1198-1201 Yonge Street and 2-8 Birch Avenue. The dye test clearly showed that the storm water drainage and sanitary drainage from 1202, 1204, 1206, and 1208 Yonge Street connects to the existing 750 mm Ø x 1125 mm Ø E.S.BR. combined sewer along Yonge Street. The dye test also showed that the storm water drainage and sanitary drainage from 8 Birch Avenue connects to the existing 375 mm Ø combined sewer along Birch Avenue. Based on the foregoing, the storm drainage in the pre-development condition is draining into the existing combined sewers and storm sewers along Birch Avenue and Yonge Street. Refer to the dye test results prepared by Aquaflow Technology in **Appendix D.**

Since storm drainage in the pre-development condition drains to the existing combined sewers, 2-year storm discharge and sanitary loading in the post-development were analyzed for compliance with MOECP Procedure F-5-5. **Table 6.2** summarizes the pre-development and post-development discharge to the municipal combined sewer system.

Table 6.2 Comparison of Discharge to Combined Sewer – Existing and Proposed

	SANITARY DISCHARGE (L/S)	2-YEAR STORM DISCHARGE (L/S)	GROUNDWATER PUMPING RATE (L/S)	TOTAL (L/S)
Existing Site	-0.2	-11.5*	0.0	-11.7
Proposed Site	1.84	0.0	0.0	1.84
DIFFERENCE	**1.64**	**-11.5**	**0.0**	**-9.86**

*The 2-year storm discharge value for the existing site can be found in **Appendix D**.

As shown in **Table 6.2**, the total reduction of induced loading is 9.86 L/s and does not exceed the pre-development conditions.

Based on the results shown in **Table 6.2**, the sanitary loading has increased in the post-development condition. However, the 2-year post storm discharge flows have been reduced to 0.0 L/s due to the redirection of the storm flows to the existing combined and storm sewers along Birch Avenue and Yonge Street. This overall net reduction of induced loading will not adversely impact the capacity of the existing combined sewer system. As such, the sewer discharge from the proposed development to the combined sewers along Birch Avenue and Yonge Street complies with the MOECP Procedure F-5-5 requirements and that there will be no adverse impact to the capacity of the existing combined sewers on Birch Avenue and Yonge Street as a result of the proposed development.

6.5 Proposed Sanitary Connection

Sanitary flow from the site will discharge through one sanitary connection to the municipal combined sewer. A 200 mm Ø sanitary sewer service connection at a minimum slope of 2.0% will be provided as the connection to the 375 mm Ø combined sewer on Birch Avenue. Flows from the site are calculated as 1.84 L/s in the post-development. Refer to **Drawing SS-01** in **Appendix F** and Site Sanitary Discharge calculation sheets (Table D-0 Site Parameters) in **Appendix D**.

7 Water Supply System

7.1 Existing System

There are existing 300 mm Ø watermain and 900 mm Ø watermain on Yonge Street and Birch Avenue. Based on the reviewed information, each of the existing buildings is supposed to be serviced by 300mm Ø watermain or 900 mm Ø watermain either from Yonge Street or Birch Avenue. For the purpose of confirming general water supply and water pressures in the vicinity of the site, a hydrant flow test was conducted on the existing 300/900 mm Ø municipal watermain on Birch Avenue on November 15, 2019. The test was conducted from the fire hydrants located at the Southwest corner of Yonge St and Birch Ave (for Flow), and in front of municipal address 16 Birch Avenue (for Residual Pressure). The hydrant flow test revealed adequate flows and pressures within the existing adjacent municipal water distribution system, with a static pressure of 82 PSI for the 300 mm Ø municipal watermain on Birch Avenue. Refer to **Appendix E** for the hydrant test results.

7.2 Proposed Water Supply Requirements

The estimated water consumption for the residential units was calculated based on the occupancy rates shown in **Table 3.2** in **Section 3.4**, based on the City's Design Criteria for Sewers and Watermains, revised in January 2021 and the Ontario Building Code. The Water Supply for Public Fire Protection was calculated based on the guidelines provided by the FUS, to demonstrate that the existing flows and pressure are adequate to meet the minimum requirement for fire suppression outlined in the FUS. It is anticipated that in order to service the residential units with domestic water, an average consumption of approximately 27,480 L/d (0.32 L/s), a maximum daily consumption of 41,020 L/d, a minimum hourly demand of 916.83 L/hr and a peak hourly demand of 2,554.38 L/hr will be required. Detailed calculations are found in **Appendix E**.

A minimum fire suppression flow of approximately 6000 L/min (1590 USGPM) at a pressure of 140 kPa (20 PSI) will be required for the proposed development. Refer to the detailed calculations found in **Appendix E**. At the desired residual pressure of 20 PSI (or 140 kPa) for the firefighting scenario, the above noted existing Birch Avenue municipal watermain has an average, available flows of approximately 3,235 US GPM (or 12,246 L/min) based on the hydrant test completed on November 15, 2019.

Therefore, based on the hydrant flow test and in accordance with the Fire Underwriters Survey (FUS), fire flows for the existing watermain which services the subject site will not be less than 6,000 L/min for a 2 hour duration in addition to the maximum daily domestic demand, delivered with a residual pressure of not less than 140 kPa.

7.3 Hydrant Coverage

There is one existing fire hydrant in the immediate vicinity of the proposed development. The fire hydrant is located on the north side of Birch Avenue, 30m from the south of the development site. This hydrant will provide the necessary coverage for the proposed development. Two Siamese connections are proposed side by side near the Birch Avenue entrance of the proposed building at less than 45 m away from this hydrant.

7.4 Proposed Watermain Connections

The proposed development will be serviced by one water connection. A 200 mm Ø fire line will connect to the existing 300 mm Ø watermain on Yonge Street via tapping sleeve and valve. A 150 mm Ø domestic line is proposed to branch off of the fire line. A valve and box will be installed on the service at the property line. Refer to **Drawings SS-01 and XS-01** in **Appendix F**.

8 Site Grading

8.1 Existing Grades

Under pre-development conditions, the drainage within the site is conveyed to catch basins on Birch Avenue then towards east to Yonge Street.

8.2 Proposed Grades

The proposed grades will be maintained along property lines to the extent practical, and the emergency overland flow will be directed to the adjacent municipal street and roadway, south and east of the site, respectively. Refer to drawing **SG-01** in **Appendix F** for proposed site grading.

9 Site Access

According to the architectural plans provided, vehicular access to the proposed development will be made off of north of Birch Avenue.

10 Utilities

As this development is within an urbanized area of the City, all utilities, including telephone, cable, and electricity and gas are readily available to service the subject property.

11 Conclusions and Recommendations

Groundwater Discharge

Underground structures of the proposed build will be built completely watertight without any direct or indirect connection to the City sewer for the discharge of ground water, refer to **Appendix B**, the letter from Lam & Associates Ltd., dated on August 12, 2021. It indicates that no groundwater uptake will be discharged from the site in post-construction conditions. The Hydrogeological Investigation Report also indicates that there will be 6.9 L/s under 100-year event and 6.0 L/s under 2-year event of groundwater uptake during construction which is below the total net reduction of 9.86L/s to the combined sewer on Birch Avenue and Yonge Street during construction.

Storm Drainage

Peak runoff rates for the proposed development will be controlled to be below the two (2) year target flow rate of 13 L/s. An underground storage tank in combination with an orifice plate control will meet the target flow. 5mm water balance will be met by reusing stormwater water that is stored within the sump which is below the orifice in the storm storage tank. The entire site is covered by roof. Water quality for the site will be achieved since the rooftop inherently has 80% TSS removal.

Combined Sewers

The site will discharge sanitary flow to the existing 375 mm Ø combined sewer on Birch Avenue which is intercepted by existing 750mmx1125mm egg shaped combined running on Yonge Street. The proposed development will generate a sanitary loading of 1.84 L/s. In the post-development condition, a total net reduction of 9.86 L/s will be achieved via removal of existing storm flow from the existing combined sewer system. As such, F-5-5 requirement is satisfied.

Water Supply

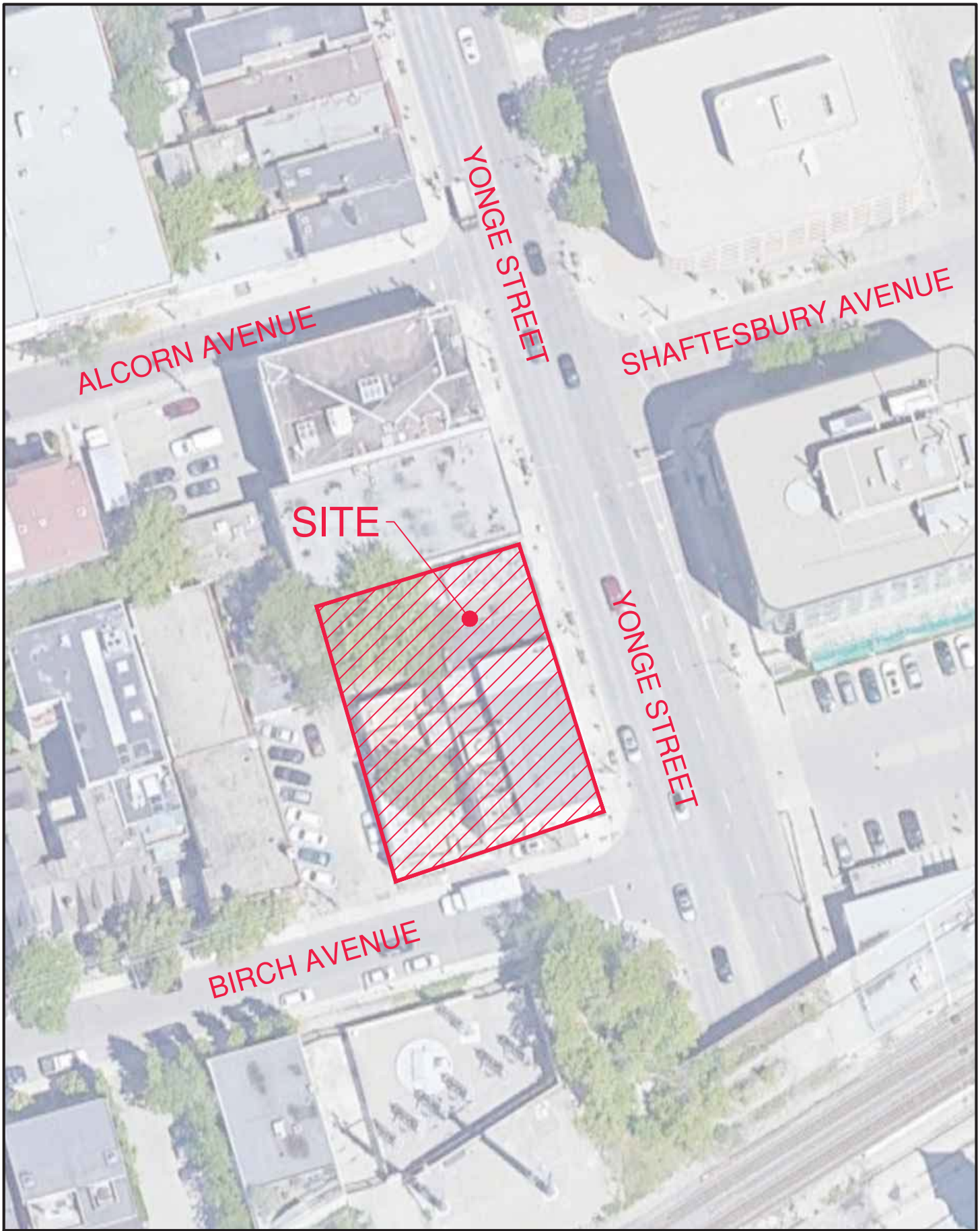
Water supply for the site will be provided by a connection made to the existing 300 mm Ø watermain on Yonge Street. The average domestic water consumption rates anticipated to be drawn from the existing 300 mm Ø watermain is approximately 27,480 L/d (0.32 L/s), a maximum daily consumption of 41,020 L/d, a minimum hourly demand of 916.83 L/hr and a peak hourly demand of 2,554.38 L/hr will be required. The site requires a minimum flow rate of 6000 L/min (1590 USGPM) at a pressure of 140 kPa (20 PSI) to account for both fire and domestic flows. With an available flow of 3235 USGPM, the existing 300 mm watermain on Yonge Street is adequate to service the proposed development.

The existing hydrant is located within 45 m of the two proposed Siamese connections and will provide the necessary firefighting coverage for the proposed re-development.

Site Grading

The proposed grading of the site will match the existing grades where possible. To the extent practical, site flows will be accommodated by the SWM system up to and including the 100-year design event. Emergency overland flow will be directed to the adjacent municipal road.
Under pre-development condition, there is no external drainage to the site. The existing drainage patterns will be maintained during the post-development condition.

In summary, the site and the proposed re-development can be adequately serviced in respect to stormwater drainage, sanitary drainage, and water supply. The stormwater quantity and quality controls can be implemented in accordance to the City's WWFMG. Accordingly, we hereby recommend the adoption of this report as it relates to the provision of servicing works, and for the purposes of Zoning By-law Amendment and Site Plan Application approval.



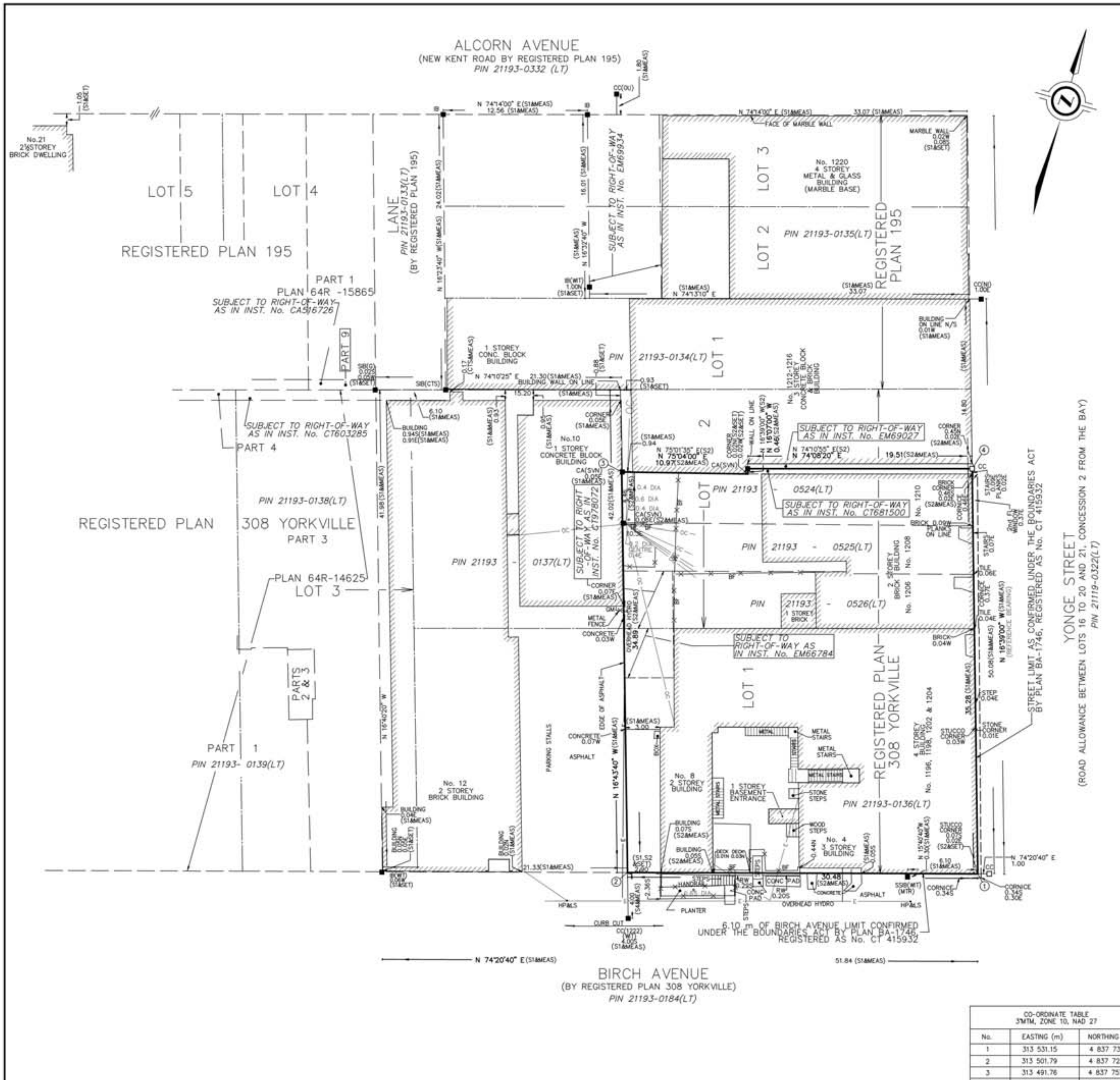
IBI GROUP
8133 Warden Ave, Unit 300
Markham, ON L6G 1B3 Canada
tel 905 754 8060 fax 905 940 2064
ibigroup.com

LOCATION PLAN

1198 - 1210 YONGE STREET AND
2-8 BIRCH AVENUE, TORONTO,
ONTARIO

DATE:	MAY 2021	PROJECT No.:	00134059
SCALE:	N.T.S.	FIGURE No.:	FIG 1

Appendix A
Background Information



PLAN OF SURVEY OF
PART OF LOTS 1 AND 2 REGISTERED PLAN 308 YORKVILLE CITY OF TORONTO

TO BE READ IN CONJUCTION WITH THE SURVEYOR'S REAL PROPERTY REPORT, DATED: SEPT. 19, 2019.

SCALE 1 : 200

5 0 5 10 metres

J. D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

BEARINGS ARE GRID AND ARE REFERRED TO THE WESTERLY LIMIT OF YONGE STREET, HAVING A BEARING OF N 16°39'00"W IN ACCORDANCE WITH PLAN BA-1746.

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
SIB	DENOTES	STANDARD IRON BAR
IB	DENOTES	IRON BAR
OU	DENOTES	ORIGIN UNKNOWN
1222	DENOTES	C.E. DOTTERILL O.L.S.
597	DENOTES	H.C.G. WHEELER O.L.S.
CTS	DENOTES	CITY OF TORONTO SURVEYS
G	DENOTES	W.S.GIBSON, O.L.S.
MTR	DENOTES	METRO TORONTO ROADS AND TRAFFIC
SVN	DENOTES	SPEIGHT, VAN NOSTRAND, WARD & ANDERSON
S1	DENOTES	PLAN OF SURVEY BY JD BARNES LTD., DATED FEBRUARY 20, 2015
S2	DENOTES	PLAN OF SURVEY BY C.E. DOTTERILL LTD., DATED FEBRUARY 2, 2005
BLDG	DENOTES	BUILDING
RW	DENOTES	RETAINING WALL
• P	DENOTES	TELEPHONE POLE

SITE AREA: 1 070.3 (Sq.m.)

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2093103

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29(3)

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON SEPTEMBER 16, 2019.

SEPTEMBER 19, 2019
DATE

COLIN B. BOGUE
ONTARIO LAND SURVEYOR

CO-ORDINATE TABLE
3°MTM, ZONE 10, NAD 27

No.	EASTING (m)	NORTHING (m)
1	313 531.15	4 837 731.86
2	313 501.79	4 837 723.64
3	313 491.76	4 837 757.05
4	313 521.04	4 837 765.66

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
411 RICHMOND ST. EAST, SUITE 107, TORONTO, ON M5A 3S5
T: (416) 368-3737 F: (416) 368-5308 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
MYP/AS/BE	CBB/MN/TRR	91-22-856-09

FILE: G:\91-22-856\09\Drawing\91-22-856-09(PS).dgn | DATED: SEPT 19/19

PLOTTED: 9/19/19

GENERAL NOTES:
1. Drawings are not to be scaled. Contractor will verify all existing conditions and dimensions required to perform the Work and will report any discrepancies with the Contract Documents to the Architect before commencing work.
2. The Architectural Drawings are to be read in conjunction with all other Contract Documents including the Project Manuals and the Structural, Mechanical and Electrical Drawings. In cases of difference between the Consultants' documents with respect to the quantity, sizes or scope of work, the greater shall apply.
3. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located will be located as directed by the Architect.
4. Dimensions indicated are taken between the faces of finished surfaces unless otherwise noted.
5. The architect has not been retained for supervision of construction and assumes no responsibility for means, methods and techniques of construction.
6. These documents are not to be used for construction unless specifically noted for such purpose.

Rev. Date Issued

KPMB
KPMB Architects
322 King St W, 3rd Fl
Toronto, ON, Canada M5V 1J2
416 977 5104

Woodcliffe

YONGE AND BIRCH CONDOS

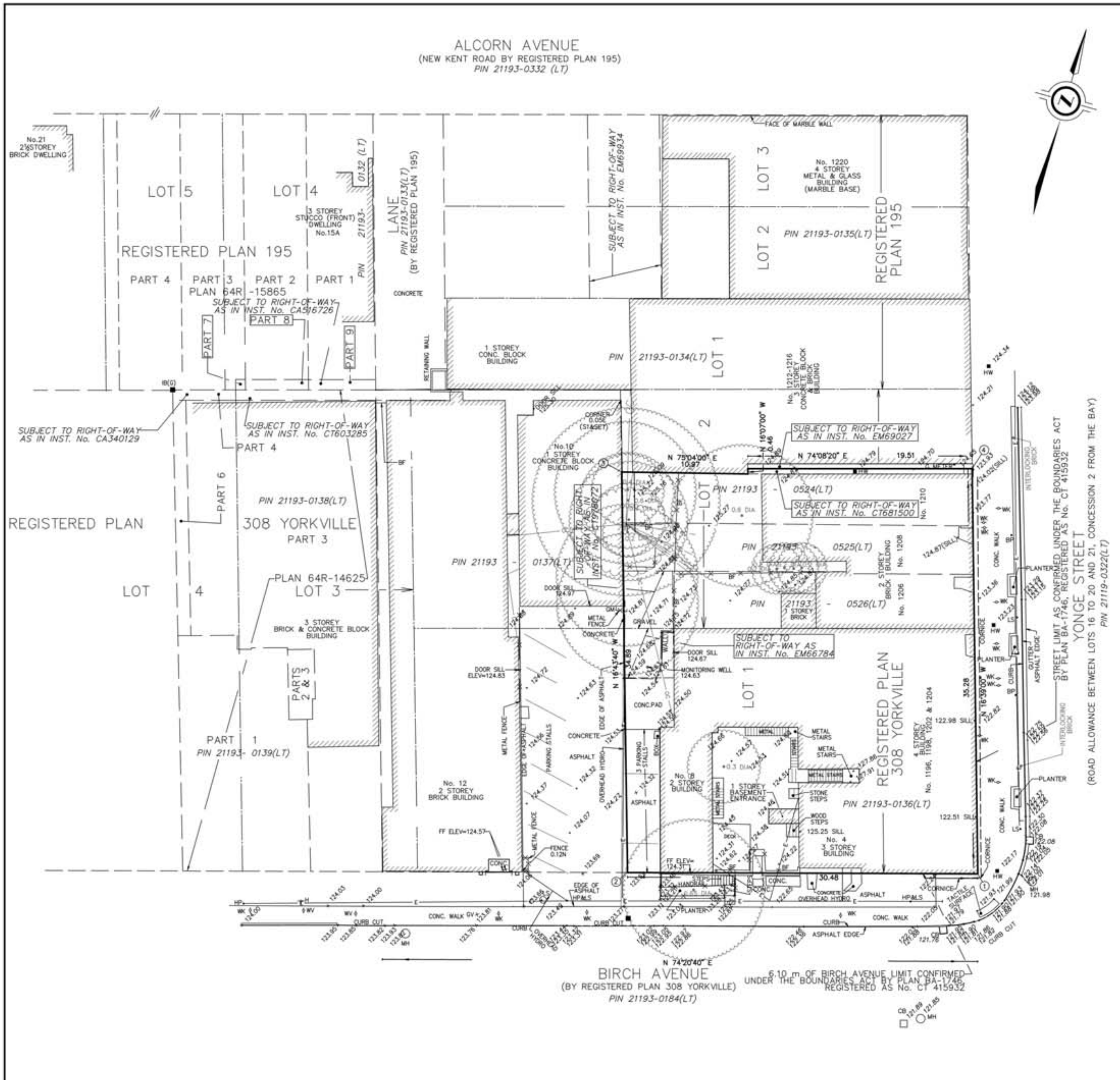
DRAFT

Project North True North

SCALE
PROJECT NO. 1714
ISSUE DATE 29.01.21

BOUNDARY PLAN

A1.000



COMPILED PLAN SHOWING TOPOGRAPHY OF

PART OF LOTS 1 AND 2 REGISTERED PLAN 308 YORKVILLE

CITY OF TORONTO

SCALE 1 : 200

5 0 5 10 metres

J. D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

BEARINGS ARE GRID AND ARE REFERRED TO THE WESTERLY LIMIT OF YONGE STREET, HAVING A BEARING OF N 16°39'00"W IN ACCORDANCE WITH PLAN BA-1746.

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM CITY OF TORONTO BENCHMARK No. 12219740315, HAVING A PUBLISHED ELEVATION OF 122.897 METRES.

LEGEND

□ CB	DENOTES SINGLE CATCHBASIN
+ GV	DENOTES GAS VALVE
○ HMH	DENOTES HYDRO MANHOLE
○ MH	DENOTES MANHOLE
TMH	DENOTES TELEPHONE MANHOLE
• BOL	DENOTES BOLLARD
• HP	DENOTES HYDRO POLE
• LS	DENOTES LIGHT STANDARD
• PLR	DENOTES PILLAR
• P	DENOTES POLE
• POST	DENOTES POST
SIGN	DENOTES SIGN
PED	DENOTES TELEPHONE PEDESTAL
H	DENOTES FIRE HYDRANT
WK	DENOTES WATER KEY
WV	DENOTES WATER VALVE
■ HHW	DENOTES HYDRO HAND WELL
• BP	DENOTES BIKE POST
MB	DENOTES MAIL BOX
• TP	DENOTES TELEPHONE POLE
BF	DENOTES BOARD FENCE
• G METER	DENOTES GAS METER
■ HW	DENOTES HANDWELL

THE FIELD WORK WAS COMPLETED ON AUGUST 30, 2019.

J.D.BARNES LIMITED
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LAND INFORMATION SPECIALISTS
411 RICHMOND ST. EAST, SUITE 107, TORONTO, ON M5A 3S5
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DRAWN BY:	CHECKED BY:	REFERENCE NO.:
MYP/AS/BE	CBB/MN/TRR	05-22-368-04
FILE: G:\91-22-856\09\Drawing\91-22-856-09(Topo).dgn		DATED: SEPT 19/19

PLOTTED: 9/19/19

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Woodcliffe

YONGE AND BIRCH CONDOS

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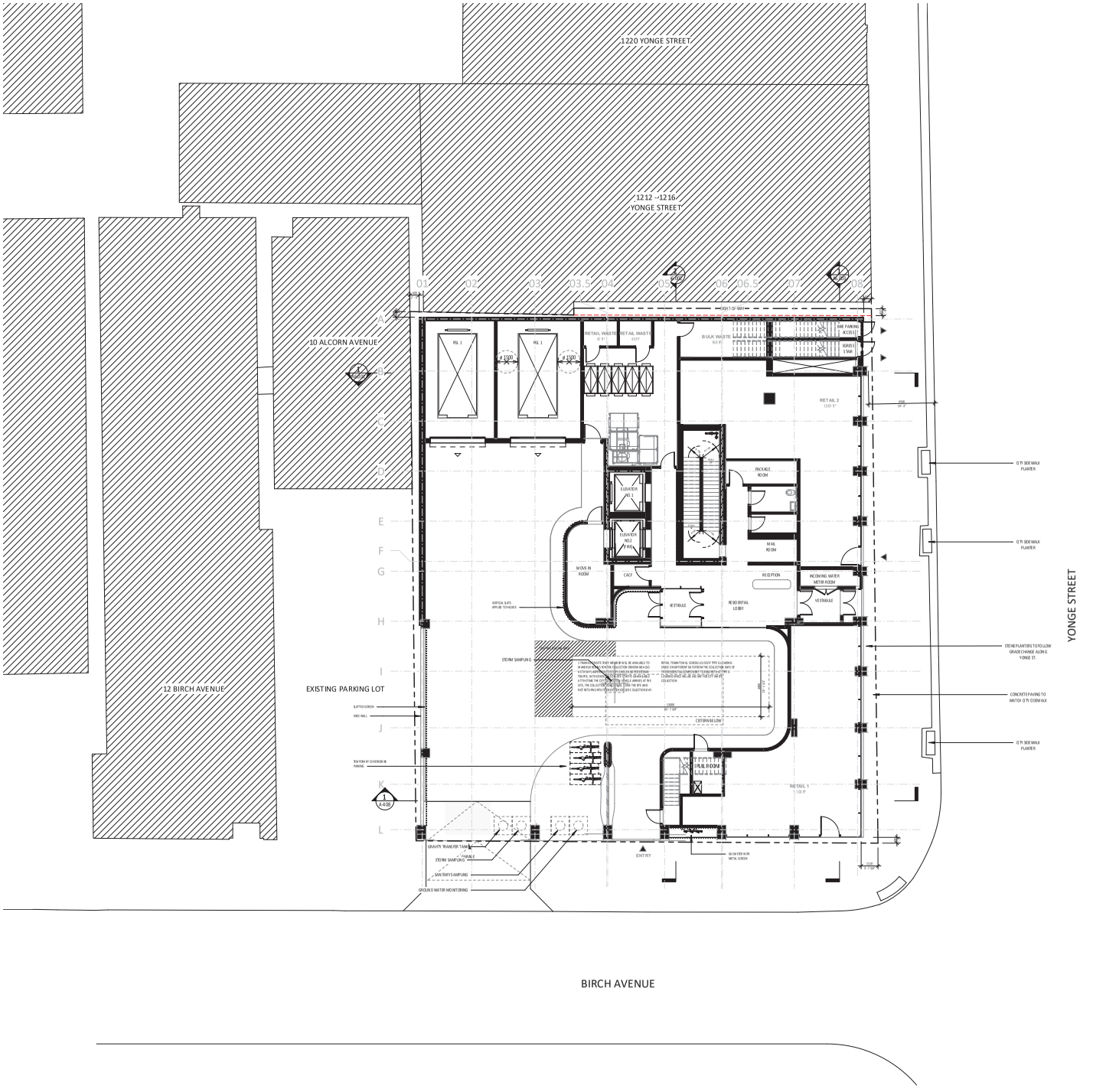
Project North True North

SCALE
PROJECT NO. 1714
ISSUE DATE 29.01.21

TOPOGRAPHICAL SURVEY

A1.001



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Rev.	Date	Issue

KPMB
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Woodcliffe

1196-1210 YONGE ST.

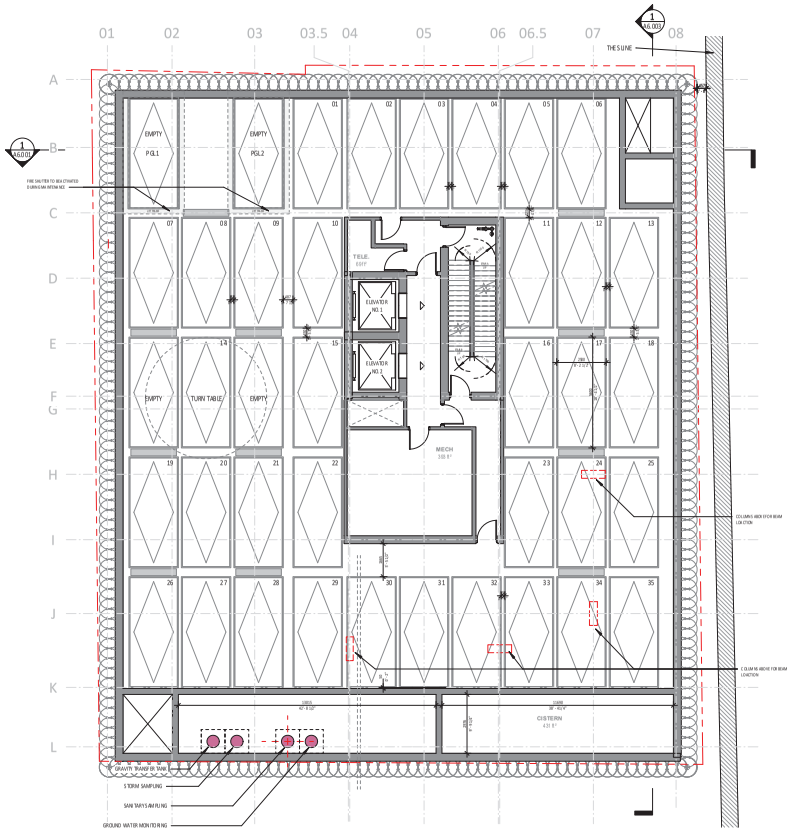
DRAFT

Project North | True North

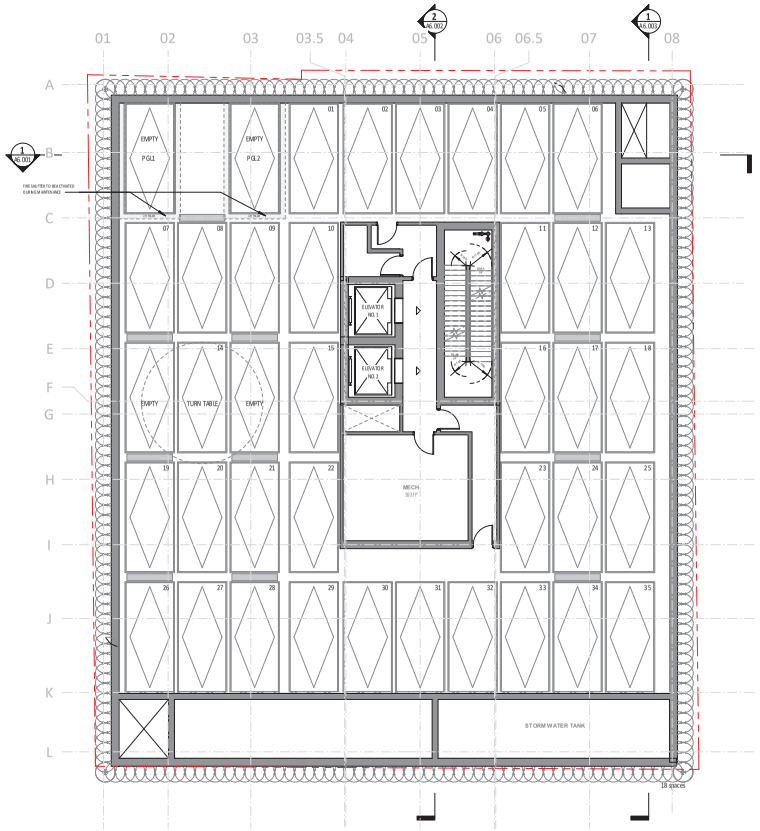
SCALE 1 : 100
PROJECT NO. 17144
ISSUE DATE 29.01.21

SITE PLAN

A1.002



1 P1 PARKING PLAN



2 P2 PARKING PLAN

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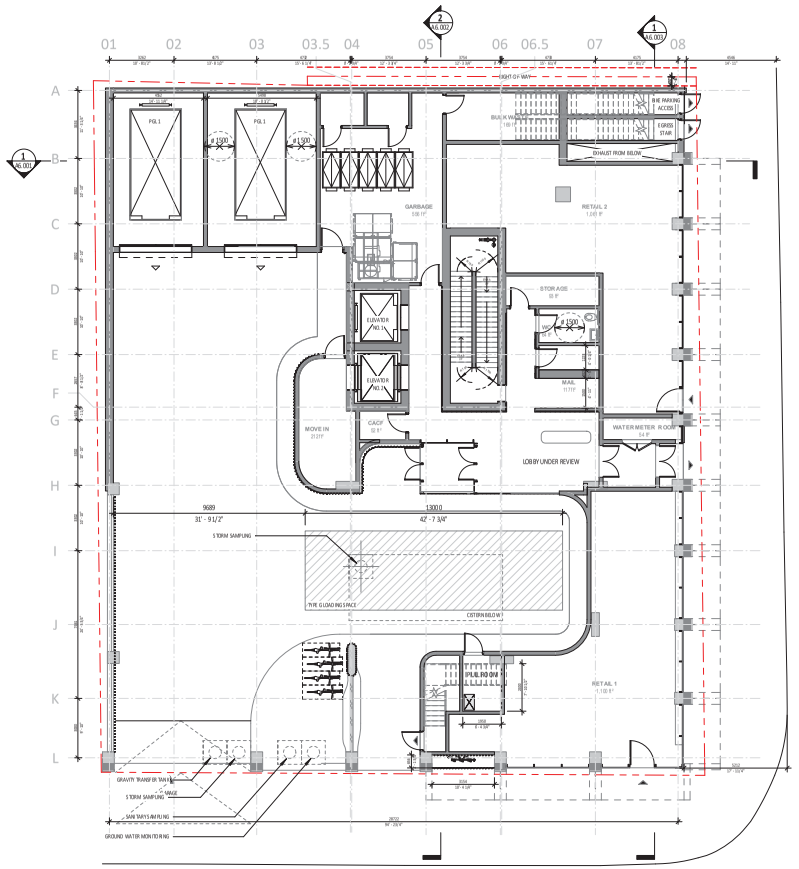
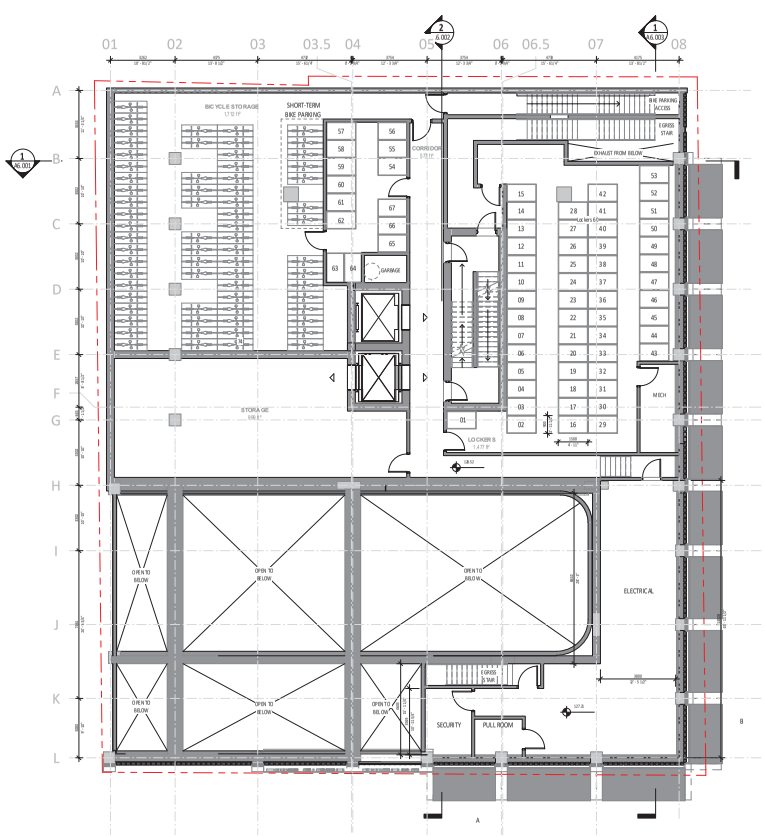
SCALE 1 : 100
PROJECT NO. 1714
ISSUE DATE 29.01.21

P1AND P2 PARKING PLAN

A2.002



1 LEVEL 1



2 MEZZANINE LEVEL

GENERAL NOTES:

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Woodcliffe
1196-1210 YONGE ST.

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Project North | True North

SCALE 1 : 100
PROJECT NO. 1714
ISSUE DATE 29.01.21

GROUND PLAN AND MEZZANINE

A2.003

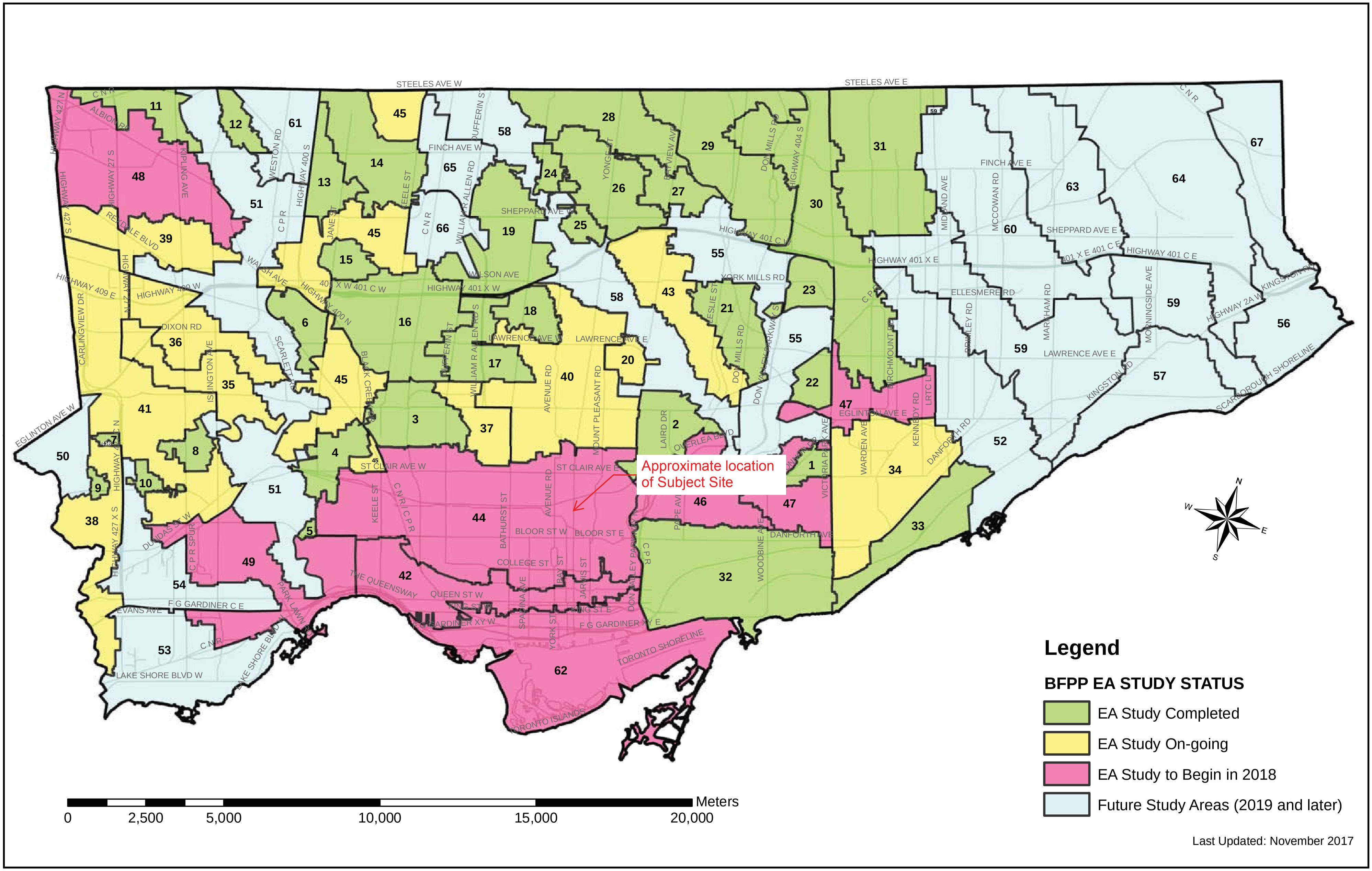
YONGE & BIRCH: 2 UPDATED MASSING - *67 units* *2021.10.20*

Floor	Retail Area (Rentable Area)	Residential Suite Area (Saleable Area)	Rental Suite Area (Rentable Area)	Common/Service Area (All Non-sellable Areas*)	GFA (Total of Retail, Suite & Common/Service Areas)	Balcony Area	Total Construction Area (Total of GFA and Balcony Areas)	Number of units by floor (*Does not include Guest Suite)	Amenity Area (Included in Common/Service Area)	BOH Area (Included in Common/Service Area)
P3	/	/	/	11,044	/	/	11,044	/	/	/
P2	/	/	/	11,044	/	/	11,044	/	/	/
P1	/	/	/	11,044	/	/	11,044	/	/	/
Subtotal:				33,132			33,132			
1	2,161	0	0	3,288	5,449	0	10,037	0	0	2,739
2	0	0	0	7,147	7,147	0	7,147	0	0	7,147
3	0	0	8,478	989	9,467	1,295	10,762	8	0	0
4	0	6,131	0	2,671	8,802	605	9,407	6	1,682	0
5	0	8,148	0	916	9,064	535	9,599	7	0	0
6	0	7,785	0	923	8,708	855	9,563	7	0	0
7	0	7,459	0	919	8,378	967	9,345	7	0	0
8	0	7,416	0	916	8,332	953	9,285	6	0	0
9	0	7,279	0	916	8,195	995	9,190	5	0	0
10	0	7,181	0	916	8,097	945	9,042	5	0	0
11	0	7,495	0	916	8,411	963	9,374	5	0	0
12	0	7,411	0	882	8,293	958	9,251	4	0	0
13	0	6,597	0	879	7,476	1,099	8,575	3	0	0
14	0	5,475	0	878	6,353	1,365	7,718	2	0	0
15	0	4,677	0	878	5,555	1,394	6,949	2	0	0
Mech.	0	0	0	6,862	6,862	0	6,862	0	2,729	3,608
Subtotal:	2,161	83,054	8,478	30,895	124,588	12,929	142,106	67	**4,411**	**13,493**
Total:	**2,161**	**83,054**	**8,478**	**64,027**	**124,588**	**12,929**	**175,238**	**67**	**4,411**	**13,493**

** Including stairs, elevators, shafts, amenity spaces, mech & elec rooms, lockers, service rooms, lobby, corridors etc.*

Land Area: 11,438

All numbers are ft^2


Approximate location of Subject Site
Legend
BFPP EA STUDY STATUS
EA Study Completed
EA Study On-going
EA Study to Begin in 2018
Future Study Areas (2019 and later)
Last Updated: November 2017
Meters
0
2,500
5,000
10,000
15,000
20,000
N
E
S
W
STEELES AVE W
STEELES AVE E
FINCH AVE W
FINCH AVE E
SHEPPARD AVE W
SHEPPARD AVE E
HIGHWAY 401 X W
HIGHWAY 401 C E
LAWRENCE AVE W
LAWRENCE AVE E
EGLINTON AVE W
EGLINTON AVE E
ST CLAIR AVE W
ST CLAIR AVE E
BLOOR ST W
BLOOR ST E
COLLEGE ST
QUEEN ST W
DANFORTH AVE
THE QUEENSWAY
F G GARDINER C E
LAKE SHORE BLVD W
TORONTO SHORELINE
TORONTO ISLANDS
SCARBOROUGH SHORELINE
KINGSTON RD
VICTORIA PARK AVE
WARDEN AVE
KENNEDY RD
MIDLAND AVE
MCCOWAN RD
MARKHAM RD
MORNINGSIDE AVE
ELLESMERE RD
BRIMLEY RD
BIRCHMOUNT RD
DANFORTH RD
WOODBINE AVE
LAIRD DR
DON MILLS RD
LESLIE ST
BAYVIEW AVE
YONGE ST
MOUNT PLEASANT RD
AVENUE RD
BATHURST ST
SPADINA AVE
YORK ST
BAY ST
JARVIS ST
KEELE ST
JANE ST
DUFFERIN ST
WILSON AVE
BLACK CREEK DR
SCARLETT RD
WESTON RD
ISLINGTON AVE
KIPLING AVE
DIXON RD
CARLINGVIEW DR
REXDALE BLVD
ALBION RD
DUNDAS ST W
PARK LAWN RD
EVANS AVE
HIGHWAY 427 S
HIGHWAY 409 E
HIGHWAY 400 S
HIGHWAY 404 S
HIGHWAY 2A W
C P R
C N R
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Appendix B
Groundwater Impacts

Blackwell
Structural Engineers

19 October 2021

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

cc: General Manager, Toronto Water
c/o Manager, Environmental Monitoring and Protection Unit
30 Dee Avenue
Toronto, Ontario M9N 1S9

Re: 1198-1210 Yonge Street Redevelopment, our project 190459

Dear Sir or Madam:

I, Christian Bellini, confirm that all buildings on the subject lands 1198-1210 Yonge Street can be constructed completely water-tight below grade in a manner that will resist hydrostatic pressure without any necessity for Private Water Drainage System (subsurface drainage system) consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer.

Christian Bellini, P,Eng.
Name (printed)

Professional Engineer – Structural, Principal - Blackwell
Professional Title

cbellini@blackwell.ca
Email

Signature

Stamp

WOODCLIFFE
LANDMARK PROPERTIES

August 13, 2021

Attention: Executive Director, Engineering and Construction Services c/o Manager, Development Engineering 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

Dear Sir or Madam,

I Paul Dydula, confirm and undertake that I will construct and maintain all building(s) on the subject lands (***1196-1210 Yonge Street and 2-8 Birch Ave)*** in a manner which shall be completely water-tight below grade and resistant to hydrostatic pressure without any necessity for Private Water Drainage System (subsurface drainage system) consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer.

Paul Dydula

Paul Dydula, Director of Development
pdydula@woodcliffe.ca

Lam & Associates Ltd.
Mechanical / Electrical Engineers
160 Applewood Crescent, Unit 25, Concord, Ontario, Canada L4K 4H2
Tel: (905) 660-7670

August 12, 2021

Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
1196-1210 Yonge Street and 2-8 Birch avenue

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

Dear Sir or Madam,

I Stefan Lafarciola, confirm that all building(s) on the subject lands (**1196-1210 Yonge Street and 2-8 Birch Avenue**) will be designed and constructed below grade in a manner without any necessity for Private Water Drainage System (subsurface drainage system) consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer. Underground structure(s) of the proposed building(s) will be built completely watertight without any direct or indirect connection to the City sewer for the discharge of groundwater (from a PWDS or floor drain or other infrastructure).

I understand that a Private Water Drainage System as an emergency back up system is not permitted, as part of this proposal.

If you have any questions, do not hesitate to contact our office.

Yours very truly,

Stefan La Farciola
P. Eng, LEED Green Assoc.
Stef.Lam@bell.net
Lam & Associates Ltd.

TORONTO

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

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

For City Staff Use Only:	
Name of ECS Case Manager (please print)	
Date Review Summary provided to to TW	

A. SITE INFORMAITON		**Included in SR (reference page number)**	**Report Includes this information City staff (Check)**
Date Servicing Report was prepared:	November 2021	Cover Page	
Title of Servicing Report:	Functional Servicing and Stormwater Management Report	Cover Page	
Name of Consulting Firm that prepared Servicing Report:	IB Group (IBI)	Cover Page	
Site Address	1196-1210 Yonge Street Toronto, Ontario	Section 1.1 pg 1	
Postal Code	To be determined	TBD	
Property Owner (identified on planning request for comments memo)	Woodcliffe Landmark Properties	Section 1.1 pg 1	
Proposed description of the project (ex. number of point towers, number of podiums, etc.)	14-storey residential building	Section 2 pg 3	
Land Use (ex. commercial, residential, mixed, industrial, institutional) as defined by the Planning Act	Commercial and residential	Appendix A	
Number of below grade levels	3 levels of underground parking	Section 2 pg 3	

TORONTO

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

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

TORONTO

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

****If there is more than one sump they must ALL be included in the letters along with a combined flow****			
Is it proposed that the groundwater from the development site will be discharged to the sanitary, combined or storm sewer?	☐ Sanitary Sewer ☐ Combined Sewer ☐ Storm Sewer	Not applicable	
Will the proposed PWDS discharge from the site go to the Western Beaches Tunnel (WBT)? *Reference attached WBT drainage map*	☐ YES ☐ NO **If Yes, private water discharge fees will apply and site requires a sanitary discharge agreement.**		
What is the street name where the receiving sewer is located?	Not applicable. Long term strategy is a water tight foundation.	Not applicable	
What is the diameter of the receiving sewer?	Not applicable. Long term strategy is a water tight foundation.	Not applicable	
Is there capacity in the proposed local sewer system? ☐ YES ☐ NO	Are there any improvements required to the sewer system? If yes, identify them below and refer to the section and page number of the FSR where this information can be found. If a sewer upgrade is required, the owner is required to enter into an Agreement with the City to improve the infrastructure? ☐ YES	Not applicable	
Total allowable peak flow rate during a 100 year storm event (L/sec) to storm sewer When groundwater is to be discharged to the storm sewer the total groundwater and stormwater discharge shall not exceed the permissible peak flow rate during a 2 year pre development storm event, as per the City's	13.0 L/sec Not applicable. Long term strategy is a water tight foundation.	Not applicable	

SERVICING REPORT GROUNDWATER SUMMARY

Wet Weather Flow Management Guidelines, dated 2006			
Short-Term Groundwater Discharge Provide proposed total flow rate to the sanitary/combined sewer in post-development scenario Total Flow (L/sec) = sanitary flow + peak short-term groundwater flow rate	The temporary construction dewatering rate of 6.9 L/s under wet weather conditions and 6.0 L/s under normal conditions of groundwater to be discharged to the combined sewer system on Birch Avenue. The flow is to be treated prior to discharge. 8.74 L/sec	Section 4.2 pg 5	
Long-Tem Groundwater Discharge Provide proposed total flow rate to the sanitary/combined sewer in post-development scenario Total Flow (L/sec) = sanitary flow + peak long-term groundwater flow rate	1.84 L/sec	Section 6.3 pg 11	
Does the water quality meet the receiving sewer Bylaw limits? ☐ YES ☑ NO	If the water quality does not meet the applicable receiving sewer Bylaw limits and the applicant is proposing a treatment system the applicant will need to include a letter stating that a treatment system will be installed and the details of the treatment system will be included in the private water discharge application that will be submitted to TW EM&P.	Section 4.2 pg 5	
C. ON-SITE GROUNDWATER CONTAINMENT		**Included in SR (reference page number)**	**Report Includes this information City Staff (Check)**
How is the site proposing to manage the groundwater discharge on site?	Not applicable.	Not applicable.	

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

Has the above proposal been approved by:	◯ TW-WIM And ◯ TW-EM&P And ◯ ECS		
If the site is proposing a groundwater infiltration gallery, has it been stated that the groundwater infiltration gallery will not be connected to the municipal sewer? A connection between the infiltration gallery/dry well and the municipal sewer is not permitted Please be advised if an infiltration gallery/dry well on site is not connected to the municipal sewer, the site **must** submit two letters using the templates in Schedule B and Schedule C.	☐ YES ☐ NO	Not applicable.	
Confirm that the infiltration gallery can infiltrate 100% of the expected peak groundwater flow year round, ensure that the top of the infiltration trench is below the frost line (1.8m depth), not less than 5 m from the building foundation, bottom of the trench 1m above the seasonally high water table, and located so that the drainage is away from the building.		Not applicable.	
D. WATER TIGHT REQUIREMENTS		**Included in SR (reference page number)**	**Report Includes this information City Staff**

SERVICING REPORT GROUNDWATER SUMMARY

		(Check)
If the site is proposing a water tight structure: 1. The owner must submit a letter using the template in Schedule D. 2. A Professional Engineer (Structural), licensed to practice in Ontario and qualified in the subject must submit a letter using the template in Schedule E.	Section 4.1 pg 5 Appendix B	

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

Consulting Firm that prepared Servicing Report: IBI Group (IBI)

Professional Engineer who completed the report summary: Jacky Lee
Print Name

Professional Engineer who completed the report summary: _____
Signature

Date & Stamp

Schedule A: Template Letter from Mechanical Consultant confirming peak groundwater flow rate

[Mechanical Consultant Company Letterhead]
[Company Name]
[Company Address and Contact Information]

[Date]
Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
[ADDRESS]

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

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

Dear Sir or Madam,

This letter is to confirm that groundwater from the Private Water Drainage System [Description] will be collected and discharged into the [SANITARY OR STORM] control manhole, at a maximum peak flow rate of [XX L/sec] (groundwater peak flow rate).

The groundwater sump pumps will be sized at [XX L/sec] and are expected to run approximately [XX hours per day].

This peak flow rate will be used for assessing capacity for the peak discharge flow into the City's [SANITARY OR STORM] sewer system.

Once the proposed groundwater peak flow rate of [XX L/sec] is approved by Engineering Construction Services (ECS), City of Toronto at the [ZONING/RE-ZONING] stage, the property owner will not be allowed to amend this flow rate in future. Should there be any amendment to the peak flow rate of [XX L/sec] 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.

_____
Name (printed)

_____ _____
Signature Stamp

Schedule B: Template Letter from the Property Owner confirming that infiltration gallery/dry well is not connected to the municipal sewer

[Company Letterhead]

[Company Name]

[Property Owner Name and Contact Information]

[Date DD/MMM/YYYY]

Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
[ADDRESS]

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

SERVICING REPORT GROUNDWATER SUMMARY

Dear Sir or Madam,

I _____, confirm and undertake that I will maintain all building(s) on the subject lands (MUNICIPAL ADDRESS) in a manner which will not discharge, directly or indirectly, any private water collected from subsurface drainage system consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer. All the water collected in the sub-drainage collection system will be managed onsite all time via infiltration gallery/dry well. There will be no direct or indirect discharge of private water to City's sewer.

I am aware of MOECC and OBC requirements regarding infiltration gallery/dry well.

_____
Name (printed) and Title

_____
Email

_____
Signature

I, [PRINT NAME], have the authority to bind the corporation.

Schedule C: Template Letter from a Professional (P.Eng or P.Geo) confirming that infiltration gallery/dry well is not connected to the municipal sewer

[Company Letterhead]

[Company Name]

[Property Owner Name and Contact Information]

[Date DD/MMM/YYYY]

Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
[ADDRESS]

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

SERVICING REPORT GROUNDWATER SUMMARY

Dear Sir or Madam,

I _____, confirm that all building(s) on the subject lands (MUNICIPAL ADDRESS) has been constructed in a manner that will not discharge, directly or indirectly, any private water collected from subsurface drainage system consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer. All the water collected in the sub-drainage collection system will be managed onsite all time via infiltration gallery/dry well. There will be no direct or indirect discharge of private water to City's sewer.

I am aware of MOECC and OBC requirements regarding infiltration gallery/dry well.

_____
Name (printed)

_____
Professional Title [P.Geo or P.Eng (specify which discipline)]

_____
Email

_____ _____
Signature Stamp

Schedule D: Template Letter from the Property Owner confirming water tight structure

[Company Letterhead]

[Company Name]

[Property Owner Name and Contact Information]

[Date DD/MMM/YYYY]

Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
[ADDRESS]

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

Dear Sir or Madam,

SERVICING REPORT GROUNDWATER SUMMARY

I _____, confirm and undertake that I will construct and maintain all building(s) on the subject lands (MUNICIPAL ADDRESS) in a manner which shall be completely water-tight below grade and resistant to hydrostatic pressure without any necessity for Private Water Drainage System (subsurface drainage system) consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer.

_____
Name (printed) and Title

_____
Email

_____
Signature

I, [PRINT NAME], have the authority to bind the corporation.

Schedule E: Template Letter from a Professional Engineer (Structural) confirming water tight structure

[Company Letterhead]

[Company Name]

[Property Owner Name and Contact Information]

[Date DD/MMM/YYYY]

Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
[ADDRESS]

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

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

Dear Sir or Madam,

I _____, confirm that all buildings on the subject lands (MUNICIPAL ADDRESS) can be constructed completely water-tight below grade in a manner that will resist hydrostatic pressure without any necessity for Private Water Drainage System (subsurface drainage system) consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer.

_____
Name (printed)

_____
Professional Title [P.Eng (Structural)]

_____
Email

_____ _____
Signature Stamp

Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

Geotechnical Investigation, Engineering, & Design

Shoring Design & Earth Retention Systems

Pavement Evaluation & Design

Environmental Assessment & Remediation Services

Hydrogeology

Building Systems & Sciences

Construction Materials Engineering Inspection & Testing

Earthworks, Design, Inspection & Compaction Testing

CCIL Certified Concrete Testing

CCIL Certified Aggregates & Asphalt Testing

CWB Certified Welding & Structural Steel

File No. 1-19-0603-46.1 (Rev. 1)
Brampton Office

November 5, 2021

Birch Equities Limited
1133 Yonge Street, Suite 601
Toronto, Ontario
M4T 2Y7

Attention: Mr. Jeff Corossing

RE: HYDROGEOLOGICAL REVIEW SUMMARY AND REPORT
1196-1210 YONGE STREET AND 2-8 BIRCH AVENUE
TORONTO, ONTARIO

Dear Mr. Jeff Corossing:

Terraprobe Inc. is pleased to provide Birch Equities Limited with the result of the hydrogeological assessment for 1196-1210 Yonge Street and 2-8 Birch Avenue, Toronto, Ontario. The following documents are provided as part of this package:

- City of Toronto Hydrogeological Review Summary Form
- Hydrogeological Assessment Report

The hydrogeological assessment report prepared to address the City of Toronto Terms of Reference (ToR) dated August 2018. It includes findings for groundwater monitoring program, groundwater quality assessment, and short-term construction dewatering flow rate estimation.

Further, the Toronto Water required that the water quality data must be collected within nine (9) months prior to the date of submission. If the submission is nine (9) months after the sample collection date noted in the report, new groundwater samples will have to be collected prior to submission.

If you have any questions or concerns regarding either of the documents, please do not hesitate to contact the undersigned.

Yours truly,
Terraprobe Inc.

Kossay Makhzoumi, BASc., EIT
Project Manager

Narjes Alijani, M.Sc., P.Geo.
Senior Hydrogeologist

TORONTO

August 2018

HYDROLOGICAL REVIEW SUMMARY

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

Refer to the Terms of Reference, Hydrological Review:
Link to Terms of Reference Hydrological Review

For City Staff Use Only:	
Name of ECS Case Manager (Please print)	
Date Review Summary provided to to TW, EM&P	

IF ANY OF THE REQUIREMENTS LISTED BELOW HAVE NOT BEEN INLCUDED IN THE HYDROLOGICAL REVIEW, THE REVIEW WILL BE CONSIDERED INCOMPLETE.
THE GREY SHADED BOXES WILL REQUIRE A CONSISTANCY CHECK BY THE ECS CASE MANAGER.

Summary of Key Information:

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Site Address	2-8 Birch Avenue, and 1196-1210 Yonge Street, Toronto, Ontario	Cover Page, Exec. Sum. pg. ii, Sec. 1.1 pg. 1	
Postal Code	M4T 1W1 and M4V 1C8	Cover Page	
Property Owner (on request for comments memo)	Birch Equities Limited	Exec. Sum. pg. ii, Sec. 1.1 pg. 1	
Proposed description of the project (if applicable) (point towers, number of podiums)	Developing a 14-storey building with 3 level underground structure.	Exec. Sum. pg. ii, Sec.1.1 page 1, Sec. 7.1 pg. 20.	
Land Use (ex. commercial, residential, mixed, institutional, industrial)	Residential and Commercial	Exec. Sum. pg. ii, Sec. 1.1 pg 1.	
Number of below grade levels for the proposed structure	3 levels.	Exec. Sum. pg. ii, Sec. 1.1 pg. 1, Sec. 7.1 pg. 20.	
HYDROLOGICAL REVIEW INFORMATION			
Date Hydrological Review was prepared:	November 5, 2021	Cover Page	
Who Performed the Hydrological Review (Consulting Firm)	Terraprobe Inc.	Exec. Sum. pg. ii, Sec. 1.1, pg. 1.	
Name of Author of Hydrological Review	Narjes Alijani, M.Sc., P.Geo. Kossay Makhzoumi, BASc., EIT	Sec. 9, pg. 25.	

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Check the directories on the website for Professional Geoscientists and/or Professional Engineers of Ontario been checked to ensure that the Hydrological Report has been prepared by a qualified person who is a licensed Professional Geoscientist as set out in the Professional Geoscientist Act of Ontario or a Professional Engineer? PEO: Professional Engineers of Ontario APGO: Association of Professional Geoscientists of Ontario	✓ Yes	N/A	
Has the Hydrological Review been prepared in accordance with all the following: • Ontario Water Resources Act • Ontario Regulation 387/04 • Toronto Municipal Code Chapter 681-Sewers	✓ Yes	Section 1.2 page 3	
		Page # & Section # of every occurrence in the Review	**Review Includes this Information City Staff (Check)**

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **with safety factor included**	What safety factor was used? 2(Storm event is not included): 494,000 L/day Total Dewatering flow rate including groundwater seepage and storm event: 521,500 L/day	Executive Summary page iii Table VI, Section 7.4 page 21-22, Section 8 page 24.	
Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **without safety factor included**	247,000 L/day (Storm event is not included)	Section 7.4 page 21-22, Section 8 page 24.	
Total Volume (L/day) Long Term drainage of groundwater (from foundation drainage, weeping tiles, sub slab drainage) **with safety factor included** If the development is part of a multiple tower complex, include total volume for each separate tower	A water-tight structure is proposed for post-development site. As such, long-term foundation drainage flow is not anticipated.	Executive Summary page iii Table VI, Section 7.5 page 22, Section 8 page 24.	
List the nearest surface water (river, creek, lake)	Yellow Creek is located approximately 650 m to the east of the Site.	Section 4.5 page 11	

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
Lowest basement elevation	113.32 masl	Executive Summary page ii, Section 7.1, page 20, Section 7.4, page 21.	
Foundation elevation	112.12 masl	Executive Summary page ii Table II, Section 7.3 page 20.	
Ground elevation	122.66 masl	Section 7.1 page 20.	
STUDY AREA MAP		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Study area map(s) have been included in the report.	✓**Yes**	Figures 1-8	
Study area map(s) been prepared according to the Hydrological Review Terms of Reference.	✓**Yes**	Figures 1-8	
WATER LEVEL AND WELLS		**Page # & Section # of every occurrence**	**Review Includes this Information (City Staff Initial)**

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
		in the Review	
The groundwater level has been monitored using all wells located on site (within property boundary).	✓**Yes**	Section 6.1 page 16, Appendix C.	
The static water level measurements have been monitored at all monitoring wells for a minimum of 3 months with samples taken every 2 weeks for a minimum of 6 samples. The intent is for the qualified professional to use professional judgement to estimate the seasonally high groundwater level.	✓**Yes**	Section 6.1 page 16, Appendix C.	
All water levels in the wells have been measured with respect to masl.	✓**Yes**	Section 6.1 page 16, Appendix C.	
A table of geology/soil stratigraphy for the property has been included.	✓**Yes**	Executive Summary page ii Table II.	
GEOLOGY AND PHYSICAL HYDROLOGY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information (City Staff Initial)**
The review has made reference to the soil materials including thickness, composition and texture, and bedrock environments.	✓**Yes**	Executive Summary page ii, Section 5, pages 14-15, Appendix A.	
Key aquifers and the site's proximity to nearby surface water has been identified.	✓**Yes**	Section 4.5 page 11 , Section 6.1, page 16.	

TORONTO

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
PUMP TEST/SLUG TEST/DRAWDOWN ANALYSIS		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
A summary of the pumping test data and analysis is included in the review.	A pumping test was not conducted.	N/A	
The pump test been carried out for at least 24 hours if possible. If not, has a slug test been conducted?	A pump test was not conducted. In-situ hydraulic conductivity tests were conducted.	Executive Summary page ii, Table II, Section 6.3.1 page 17, Appendix D.	
Have the monitoring well(s) have been monitored using digital devices? If yes how frequently?	No. Water level measurements have been taken manually.	Section 6.1 page 16, Appendix C.	
If a slug or pump test has been conducted has the static groundwater level been monitored at all monitoring well(s) multiple times to measure recovery? -prior to the slug or pumping test(s)? -post slug or pumping test(s)?	✓**Yes** ✓**Yes** ✓**Yes**	Section 3.4 page 8, Section 6.3.1 page 17, Appendix D.	N/A
The above noted slug or pump tests have been included in the report.	✓**Yes**	Section 6.3.1 page 17, Appendix D.	
WATER QUALITY		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**

TORONTO

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
The report includes baseline water quality samples from a laboratory. The water quality must be analyzed for all parameters listed in Tables 1 and 2 of Chapter 681 Sewers of the Toronto Municipal Code (found in Appendix A) and the samples must have to be taken unfiltered within 9 months of the date of submission.	✓**Yes**	Executive Summary page iii Table V, Section 6.4 page 18, Appendix F	
The water quality data templates in Appendix A have been completed for each sample taken for both sanitary/combined and storm sewer limits.	For sanitary discharge- See the sanitary/combined sewer parameter limit template For storm discharge- See the storm sewer parameter limit template		
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the sanitary/combined Bylaw limits **If there are any sample parameter Exceedances the groundwater can't be discharged as is.**	Sanitary Sewer By-law: - No Exceedances	Executive summary page iii Table V, Section 6.4 page 18-19, Appendix F	
Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the storm Bylaw limits. **If there are any sample parameter exceedances the groundwater can't be discharged as is.**	Storm Sewer By-law: - Total Suspended Solid (the result is 21.4 mg/L, the limit is 15 mg/L) - Total Manganese (the result is 0.320 mg/L and the limit is 0.05 mg/L)	Section 6.4 page 18-19, Appendix F	
The water quality samples have been analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and/or Canadian Association for Laboratory Accreditation.	✓**Yes**	Section 3.6 page 9, Section 6.4 page 18-19.	N/A

TORONTO

August 2018

HYDROLOGICAL REVIEW SUMMARY

SITE INFORMATION		Page # & Section # of Review	Review Includes this Information City Staff (Check)
List of Canadian accredited laboratories: Standards Council of Canada			
A chain of custody record for the samples is included with the report.	✓**Yes**	Appendix F	
Has the chain of custody reference any filtered sample? If yes, the report has to be amended and re-submitted to include only non-filtered samples.	⊗No	Appendix F	
List any of the sample parameters that exceed the Bylaw limits with the reporting detection limit (RDL) included.	Sanitary Sewer By-law: - No Exceedances were observed. Storm Sewer By-law: - Total Suspended Solid (the result is 21.4 mg/L, the limit is 15 mg/L and the RDL is 3 mg/L) - Total Manganese (the result is 0.0320 mg/L, the limit is 0.05 mg/L and the RDL is 0.0050 mg/L)	Appendix F	
A true copy of the Certificate of Analysis report, is included with the report.	✓**Yes**	Appendix F	
EVALUATION OF IMPACT		**Page # & Section # of every occurrence in the Review**	**Review Includes this Information City Staff (Check)**
Does the report recommend a back-up system or relief safety valve(s)? Does the associated Geotechnical report recommend a back-up system or relief safety valve(s)?	◯ **Yes** ⊗No ✓**Yes** ◯ No	N/A Geotecnical investigation report, Terraprobe, Oct. 21, 2021, Sec. 5.2 page 10-11.	
The taking and discharging of groundwater on site has been analyzed to ensure that no negative	✓**Yes**	Section 6.4, page 18, Section 7-7	N/A

impacts will occur to: the City sewage works in terms of quality and quantity (including existing infrastructure), the natural environment, and settlement issues.		page 22-23.	
Has it been determined that there will be a negative impact to the natural environment, City sewage works, or surrounding properties has the study identified the following: the extent of the negative impact, the detail of the precondition state of all the infrastructure, City sewage works, and natural environment within the effected zone and the proposed remediation and monitoring plan?	✓**Yes** **If yes, identify impact:** Groundwater quality exceeds the City's Storm Sewer Use By-Law.	Section 6.4, page 18, Section 7.7.1-7.7.5 page 22-23.	

Summary of Additional Information and Key Items (if applicable):

Appendix A:

SANITARY/COMBINED **Sample Location: Monitoring well BH2**

Inorganics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
BOD	300	3.9	3.9-2.0	300,000
Fluoride	10	<0.2	<0.2-0.2	10,000
TKN	100	0.70	0.70-0.50	100,000
pH	6.0 - 11.5	7.59	7.59-0.10	6.0 - 11.5
Phenolics 4AAP	1	0.0026	0.0026-0.0010	1,000
TSS	350	21.4	21.4-3.0	350,000
Total Cyanide	2	<0.002	<0.002-0.0020	2,000
Metals				
Chromium Hexavalent	2	<0.00050	<0.00050-0.00050	2,000
Mercury	0.01	<0.0000050	<0.0000050-0.0000050	10
Total Aluminum	50	0.868	0.868-0.050	50,000
Total Antimony	5	<0.0010	<0.0010-0.0010	5,000
Total Arsenic	1	<0.001	<0.001-0.0010	1,000
Total Cadmium	0.7	<0.000050	<0.000050-0.000050	700
Total Chromium	4	<0.0050	<0.0050-0.0050	4,000
Total Cobalt	5	<0.0010	<0.0010-0.0010	5,000
Total Copper	2	<0.0050	<0.0050-0.0050	2,000
Total Lead	1	0.00083	0.00083-0.00050	1,000
Total Manganese	5	0.320	0.320-0.0050	5,000
Total Molybdenum	5	0.00202	0.00202-0.00050	5,000
Total Nickel	2	<0.0050	<0.0050-0.0050	2,000
Total Phosphorus	10	0.050	0.050-0.030	10,000
Total Selenium	1	<0.00050	<0.00050-0.00050	1,000
Total Silver	5	<0.00050	<0.00050-0.00050	5,000
Total Tin	5	<0.0010	<0.0010-0.0010	5,000
Total Titanium	5	0.0063	0.0063-0.0030	5,000
Total Zinc	2	<0.03	<0.030-0.030	2,000
Animal/Vegetable Oil & Grease	150	<5.0	<5.0-5.0	150,000
Mineral/Synthetic Oil & Grease	15	<2.5	<2.5-2.5	15,000

HYDROLOGICAL REVIEW SUMMARY

Volatile Organics		**Sample Result**	**Sample Result with upper RDL included**	
Parameter	**mg/L**			**ug/L**
Benzene	0.01	<0.50	<0.50-0.50	10
Chloroform	0.04	<0.10	<0.10-0.10	40
1,2-Dichlorobenzene	0.05	<0.50	<0.50-0.50	50
1,4-Dichlorobenzene	0.08	<0.50	<0.50-0.50	80
Cis-1,2-Dichloroethylene	4	<0.50	<0.50-0.50	4,000
Trans-1,3-Dichloropropylene	0.14	<0.50	<0.50-0.50	140
Ethyl Benzene	0.16	<0.50	<0.50-0.50	160
Methylene Chloride	2	<0.20	<0.20-0.20	2,000
1,1,2,2-Tetrachloroethane	1.4	<0.50	<0.50-0.50	1,400
Tetrachloroethylene	1	<0.50	<0.50-0.50	1,000
Toluene	0.016	<0.50	<0.50-0.50	16
Trichloroethylene	0.4	<0.50	<0.50-0.50	400
Total Xylenes	1.4	<1.1	<1.1-1.1	1,400
Semi-Volatile **Organics**				
Di-n-butyl Phthalate	0.08	<1.0	<1.0-1.0	80
Bis (2-ethylhexyl) Phthalate	0.012	<2.0	<2.0-2.0	12
3,3'-Dichlorobenzidine	0.002	<0.40	<0.4-0.4	2
Pentachlorophenol	0.005	<0.50	<0.50-0.50	5
Total PAHs	0.005	<1.7	<1.7-1.7	5
Misc **Parameters**				
Nonylphenols	0.02	<1.0	<1.0-1.0	20
Nonylphenol Ethoxylates	0.2	<2.0	<2.0-2.0	200

Sample Collected: October 26, 2021
Temperature:10.6° C

HYDROLOGICAL REVIEW SUMMARY

STORM **Sample Location: Monitoring well BH2**

Inorganics		Sample Result	Sample Result with upper RDL included	
Parameter	mg/L			ug/L
pH	6.0 - 9.5	7.59	7.59-0.10	
BOD	15	3.9	3.9-2.0	15,000
Phenolics 4AAP	0.008	0.0026	0.0026-0.0010	8
TSS	15	21.4	21.4-3.0	15,000
Total Cyanide	0.02	<0.0020	<0.0020-0.0020	20
Metals				
Total Arsenic	0.02	<0.001	<0.001-0.0010	20
Total Cadmium	0.008	<0.000050	<0.000050-0.000050	8
Total Chromium	0.08	<0.0050	<0.0050-0.0050	80
Chromium Hexavalent	0.04	<0.00050	<0.00050-0.00050	40
Total Copper	0.04	<0.0050	<0.0050-0.0050	40
Total Lead	0.12	0.00083	0.00083-0.00050	120
Total Manganese	0.05	0.320	0.320-0.0050	50
Total Mercury	0.0004	<0.0000050	<0.0000050-0.0000050	0.4
Total Nickel	0.08	<0.0050	<0.0050-0.0050	80
Total Phosphorus	0.4	0.050	0.050-0.030	400
Total Selenium	0.02	<0.00050	<0.00050-0.00050	20
Total Silver	0.12	<0.00050	<0.00050-0.00050	120
Total Zinc	0.04	<0.03	<0.030-0.030	40
Microbiology				
E.coli	200	0	-	200,000
Volatile Organics				
Parameter	mg/L			ug/L
Benzene	0.002	<0.50	<0.50-0.50	2
Chloroform	0.002	<0.10	<0.10-0.10	2
1,2-Dichlorobenzene	0.0056	<0.50	<0.50-0.50	6
1,4-Dichlorobenzene	0.0068	<0.50	<0.50-0.50	7
Cis-1,2-Dichloroethylene	0.0056	<0.50	<0.50-0.50	6
Trans-1,3-Dichloropropylene	0.0056	<0.50	<0.50-0.50	6
Ethyl Benzene	0.002	<0.50	<0.50-0.50	2
Methylene Chloride	0.0052	<0.20	<0.20-0.20	5
1,1,2,2-Tetrachloroethane	0.017	<0.50	<0.50-0.50	17
Tetrachloroethylene	0.0044	<0.50	<0.50-0.50	4
Toluene	0.002	<0.50	<0.50-0.50	2
Trichloroethylene	0.0076	<0.50	<0.50-0.50	8
Total Xylenes	0.0044	<1.1	<1.1-1.1	4

TORONTO

August 2018

HYDROLOGICAL REVIEW SUMMARY

Semi-Volatile Organics		Sample Result	Sample Result with upper RDL included	
Di-n-butyl Phthalate	0.015	<1.0	<1.0-1.0	5
Bis (2-ethylhexyl) Phthalate	0.0088	<2.0	<2.0-2.0	8.8
3,3'-Dichlorobenzidine	0.0008	<0.40	<0.4-0.4	0.8
Pentachlorophenol	0.002	<0.50	<0.50-0.50	2
Total PAHs	0.002	<1.7	<1.7-1.0	2
PCBs	0.0004	<0.040	<0.040-0.040	0.4
Misc Parameters				
Nonylphenols	0.001	<1.0	<1.0-1.0	1
Nonylphenol Ethoxylates	0.01	<2.0	<2.0-2.0	10

Sample Collected: October 26, 2021
Temperature: 10.6° C

Consulting Firm that prepared Hydrological Report: Terraprobe Inc.

Qualified Professional who completed the report summary: Narjes Alijani, M. Sc., P.Geo.
Print Name

Qualified Professional who completed the report summary:
Signature

Date & Stamp

Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

HYDROGEOLOGICAL STUDY
1196 – 1210 YONGE STREET AND
2 – 8 BIRCH AVENUE
TORONTO, ONTARIO
M4T 1W1 and M4V 1C8

Prepared For: Birch Equities Limited
1133 Yonge Street, Suite 601
Toronto, Ontario
M4T 2Y7

File No. 1-19-0603-46.1 (REV.1)
November 5, 2021

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EXECUTIVE SUMMARY

Terraprobe Inc. (Terraprobe) was retained by Birch Equities Limited to conduct a Hydrogeological Study for the Site located at 1196 – 1210 Yonge Street and 2 – 8 Birch Avenue, Toronto, Ontario (referred to collectively as the Site). A summary of Terraprobe's investigation's findings is as follows.

The Site is currently occupied with commercial and residential buildings. Surrounding land use includes commercial buildings to the north and west, Birch Street and commercial properties to the south, and Yonge Street and commercial properties to the east. **Table I** summarizes the existing conditions at the Site.

Table I: Existing Buildings Conditions

Current Development			
Buildings	**Land Use**	**Above Grade Levels**	**Below Grade Levels**
2-6 Birch Avenue	Residential	3	1 level Basement
8 Birch Avenue	Residential	2	No Basement
1196-1204 Yonge Street	Commercial and Residential	4	No Basement
1206-1210	Commercial and Residential	2	1 level Basement

Terraprobe understands that the future development of the Site will include a 14-storey residential and commercial building including mezzanine and mechanical penthouse, with 3 levels of underground parking. The proposed development details are summarized in **Table II.**

Table II: Proposed Development Details

Proposed Development						
Development Phase	**Above Grade Levels**	**Below Grade Levels**				**The Highest Groundwater Level Elevation (masl)**
		Underground Structure	**Lowest Finished Floor**		**Approximate Base of Footings (masl)**	
			Depth (m)	**Elevation (masl)**		
Mixed Use Residential and Commercial Building	14	3	9.34	113.32	112.12*	118.86

*Assuming 1.2 m below FFE of the proposed underground parking level 3.

In general, three (3) main local stratigraphic units were encountered beneath the Site. A summary of the units and the estimated hydraulic conductivity for each unite are summarized in **Table III**.

Table II: Summary of Subsoil Profile beneath the Site and estimated hydraulic conductivity

Stratum/Formation	**Depth Range (mbgs)**	**Elevation Range (masl)**	**Hydraulic Conductivity (m/s)**
Fill Material	0.8 to 2.3 m	122.2 to 123.4	$1.0 \times 10^{-6*}$
Silty Sand Till	2.3 to 6.1	118.1 to 119.0	$2.25 \times 10^{-6**}$
Sand and Silt to Silty Sand	6.1 to at least 23	118.1 to at least 101.4	1.20×10^{-5}

*Indicates conductivity was estimated using typical published values from Freeze and Cherry (1979)
**Indicates conductivity was calculated using Hazen equation

The groundwater elevation considered for the current short-term dewatering flow rate estimation and the anticipated conceptual zone of influence are presented in **Table IV**.

Table IV: Summary of Groundwater Conditions

The Highest Groundwater Elevation (masl)	118.86 (5.44 ± m below existing grade)
Zone of Influence (m)	The zone of influence for dewatering will be limited to the excavation box considering the impermeable shoring.

Details of the groundwater exceedances in comparison to the City of Toronto Sewer Use By-law limits are presented in **Table V**.

Table V: Summary of Groundwater Exceedances to the City of Toronto Sewer Use By-law limits

Sample ID	Untreated Sample (Yes/No)	Sample Collection Date	Sample Expiry Date	City of Toronto Storm Sewer Use By-Law Limits	City of Toronto Sanitary and Combined Sewer Use By-Law Limits
BH2	Yes	October 26, 2021	July 26, 2022	Exceeds for TSS and total manganese	No exceedances

Short-term construction dewatering flow rates were estimated considering the Site plans. The findings along with the anticipated requirements are summarized in **Table VI**.

Table VI: The water taking requirements for groundwater control

Groundwater Quantity: Short Term (Construction)						
Caisson Wall (Impermeable Shoring)	**Groundwater Seepage (Safety Factor of 2.0)**		**25mm Design Rainfall Event**		**Total Volume**	
	L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
Mixed-Use Residential and Commercial Building	494,000	343.1	27,500	19.1	**521,500**	**362.2**
Groundwater Quantity: Long Term (Post-Construction)						
A water-tight structure is proposed for the future development. Long-term foundation drainage is not anticipated.						
Regulatory Requirements						
Environmental Activity and Sector Registry (EASR) Posting			Not Required			
Short-Term Permit to Take Water (PTTW)			Required			
Long-Term Permit to Take Water (PTTW)			Not Required (water-tight structure)			
Short-Term Discharge Agreement City of Toronto			Required			
Long-Term Discharge Agreement City of Toronto			Not Required (water-tight structure)			

TABLE OF CONTENTS

SECTION PAGE (S)

EXECUTIVE SUMMARY II

1.0 INTRODUCTION 1

1.1 Site Location and Project Description 1
1.2 Scope of Work 2

2.0 APPLICABLE REGULATION AND AGENCIES 4

2.1 TRCA Policies and Regulations (O.Reg. 166/06) 4
2.2 City of Toronto Official Plan 4
2.3 Permit To Take Water (PTTW) Section 34 of the Ontario Water Resource Act 5
2.4 Clean Water Act 5
2.5 City of Toronto Requirements for Hydrogeological Study (August 2018) 5

3.0 METHODOLOGY 7

3.1 Borehole Advancement and Monitoring Well Installation 7
3.2 Groundwater Monitoring 8
3.3 MECP Water Well Records Review 8
3.4 In-Situ Hydraulic Conductivity Testing 8
3.5 Hydraulic Conductivity Based on Grain Size Distribution Graphs 8
3.6 Groundwater Quality Assessment 9
3.7 Review of Regional Data and Available Reports for the Site 9

4.0 REGIONAL AND LOCAL SITE SETTING 10

4.1 Regional Geology 10
4.2 Regional Physiography 11
4.3 Regional Topography and Drainage 11
4.4 Watershed Setting 11
4.5 Local Surface Water and Natural Heritage Features 11
4.6 Ground Water Resources (MECP Well Records) 12
4.7 Active Permit to Take Water Records Review 12

5.0 LOCAL GEOLOGY AND SUBSURFACE INVESTIGATION 14

5.1 Surficial Layer 14
5.2 Earth Fill 14
5.3 Silty Sand Till 14

5.4 SAND AND SILT TO SILTY SAND 15
5.5 BEDROCK 15

6.0 LOCAL HYDROGEOLOGICAL STUDY 16

6.1 MONITORING WELL DEVELOPMENT AND GROUND WATER LEVEL MONITORING 16
6.2 GROUNDWATER FLOW PATTERN 17
6.3 HYDRAULIC CONDUCTIVITY TESTING 17
6.3.1 IN-SITU HYDRAULIC CONDUCTIVITY TESTS 17
6.3.2 HYDRAULIC CONDUCTIVITY USING GRAIN SIZE DISTRIBUTION GRAPHS 17
6.4 GROUNDWATER QUALITY ASSESSMENT 18

7.0 DEWATERING FLOW RATE ESTIMATION 20

7.1 SITE PLAN REVIEW 20
7.2 REVIEW OF THE GEOTECHNICAL REPORT 20
7.3 SUMMARY OF HYDROGEOLOGICAL CONDITIONS OF SITE DEVELOPMENT 20
7.4 SHORT-TERM GROUNDWATER CONTROL REQUIREMENTS (CONSTRUCTION DEWATERING) 21
7.5 LONG-TERM GROUNDWATER CONTROL REQUIREMENTS (POST-CONSTRUCTION) 22
7.6 ZONE OF INFLUENCE (ZOI) GROUNDWATER 22
7.7 POTENTIAL DEWATERING IMPACTS AND MITIGATION PLAN 22
7.7.1 SHORT-TERM DISCHARGE OF PUMPED GROUNDWATER (CONSTRUCTION DEWATERING) 22
7.7.2 GROUND SETTLEMENT 23
7.7.3 SURFACE WATER, WETLANDS AND AREAS OF NATURAL SIGNIFICANCE 23
7.7.4 WATER SUPPLY WELLS AND ZONE OF INFLUENCE 23
7.7.5 CONTAMINATION SOURCES 23

8.0 CONCLUSIONS AND RECOMMENDATIONS 24

9.0 CLOSURE 25

10.0 REFERENCES 26

11.0 LIMITATIONS OF LIABILITY 27

FIGURES:

Figure 1 – Site Location Plan
Figure 2 – Borehole and Monitoring Well Location Plan
Figure 3 – Surficial Geology Map
Figure 4 – Regional Physiography Map
Figure 5 – Topography Map
Figure 6 – Natural Heritage Feature Map
Figure 7 – MECP Water Well Record Map
Figure 8 – Groundwater Flow Pattern

APPENDICES:

Appendix A – Borehole Logs
Appendix B – MECP Water Well Records
Appendix C – Groundwater Monitoring Details
Appendix D – Hydraulic Conductivity Testing Details
Appendix E – Grain Size Distribution Graphs
Appendix F – Groundwater Quality Test Results
Appendix G – FEM Modelling

TABLES:

Table 3-1- Monitoring Well Installation Details 7
Table 4-1- MECP Well Record Summary 12
Table 4-2- Active PTTW Record Summary 13
Table 6-1- Summary of Groundwater Monitoring 16
Table 6-2- Summary of Rising Head Hydraulic Conductivity Test 17
Table 6-3 - Summary of Hydraulic Conductivity Using Hazen Equation 18
Table 6-4- Exceedance Table and Groundwater Quality Results 19
Table 7-1- Summary of Site Dimensions 21

1.0 INTRODUCTION

1.1 Site Location and Project Description

Terraprobe Inc. was retained by Birch Equities Limited, to conduct a Hydrogeological Study at the property located at 1196 – 1210 Yonge Street and 2 – 8 Birch Avenue, Toronto, Ontario (the Site).

The Site is located approximately 750 m southwest of the main intersection of Yonge Street and St. Clair Avenue West in the City of Toronto. Surrounding land use includes commercial buildings to the north and west, Birch Street and commercial properties to the south, and Yonge Street and commercial properties to the east. The Site is currently occupied with commercial and residential buildings.

It is understood that proposed development will include construction of 14-storey mixed use commercial and residential building including mezzanine and mechanical penthouse with three (3) levels of underground parking structures. Terraprobe understands that the underground structure of the proposed development will be waterproofed in the long-term. The location of the Site and proposed development are shown on **Figure 1**.

It is understood that future development will be serviced by municipal water and sanitary sewer systems. The study was undertaken to assess the hydrogeological conditions of the Site and to provide general information regarding the hydrogeological impact of the Site on the local groundwater function. The report addresses the following areas:

- Identifying the geological and hydrogeological setting of the Site;
- Confirming shallow groundwater level and shallow groundwater flow direction beneath the Site;
- Assessing groundwater quality in comparison with City of Toronto Sewer Use By-law limits;
- Evaluate potential short-term construction dewatering needs for the Site;
- Identifying potential impacts to the nearby groundwater receptors including water supply wells and natural heritage features pertaining the Site;
- Providing mitigation plan on the potential impacts to the groundwater receptors associated with the Site and its vicinity, if applicable;
- Providing recommendations on any needs for applying for a Permit to Take Water (PTTW) or posting on the Environmental Activity and Sector Registry (EASR) with the Ministry of the Environment, Conservation and Parks (MECP); and,

The City of Toronto requires that a hydrogeological assessment be completed in order to assess the potential dewatering needs and associated discharge plans. Additionally, associated potential impacts of the Site to the groundwater system and groundwater receptors should be evaluated.

1.2 Scope of Work

The scope of work for the study consisted of the following:

- Review of Geological and Hydrogeological Setting of the Site: A review of available background geological and Hydrogeological information for the Site was completed using Ontario Geological Survey (OGS) maps, Ministry of Environment Conservation and Parks (MECP), Oak Ridges Moraine Group (ORMGP), and Ministry of Natural Resources and Forestry (MNRF) databases.
- Review of City of Toronto Official Plans and Toronto and Region Conservation Authority (TRCA) Policy Areas: The City of Toronto official plans and TRCA maps were reviewed to understand the location of the Site and the proposed development within the policy areas.
- Site Inspection: A visual inspection of the Site and surrounding areas was conducted to determine local topography and drainage, and an assessment of hydrogeologically significant features.
- Groundwater Level Monitoring and Hydraulic Conductivity Testing: Groundwater level within the monitoring wells installed by Terraprobe were monitored to confirm groundwater level beneath the Site and to satisfy the City of Toronto Terms of Reference (ToR), dated August 2018. Hydraulic conductivity testing was conducted within the monitoring wells to confirm the hydraulic conductivity of the sub-soil profile within the screened intervals.
- Groundwater Quality Testing: Groundwater quality was assessed in comparison with the City of Toronto Sanitary and Combined and Storm Sewer Use By-Law limits to proposed potential short-term and long-term discharge options.
- Review of Proposed Site Development Concept: The proposed site development plans were reviewed to confirm the proposed invert elevation for developing underground structures.
- Construction Dewatering Flow Rate Estimate: Considering the proposed development plans, the construction dewatering flow rate (short-term dewatering) for developing the proposed underground structure was estimated using the stabilized groundwater level and estimated hydraulic conductivity measured at the Site.
- Long-term Foundation Drainage: Considering the proposed development plans, potential long-term foundation drainage was estimated.

- Mitigation Plans for Dewatering: A mitigation plan was recommended to mitigate potential short-term dewatering impacts to the nearby groundwater receptors and structures, if applicable.
- Potential Short-Term Dewatering and Long-Term Foundation Drainage Permits: Considering the estimated short-term construction dewatering flow rates, recommendations were provided on any need for applying for a PTTW or posting on the EASR, if required.

The above scope of work was undertaken in accordance with all of the following: Ontario Water Resources Act, Ontario Regulation 387/04 and Toronto Municipal Code Chapter 681-Sewers.

2.0 APPLICABLE REGULATION AND AGENCIES

The environmental regulations and policies relevant to this hydrogeological study are briefly discussed below.

2.1 TRCA Policies and Regulations (O.Reg. 166/06)

Under Section 28 of the Conservation Authorities Act, local conservation authorities are mandated to protect the health and integrity of the regional greenspace system, and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. The TRCA, through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (O.Reg.) 166/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposal or Site alteration work to shorelines and watercourses within the regulated areas.

The TRCA Regulated Area online map was reviewed of the current assessment on October 17, 2019. It is our understanding that the Site is not located within a TRCA Conceptual Regulated Area. As such, it is anticipated that a permit from the TRCA under O. Reg. 166/06 will not be required for the proposed development.

2.2 City of Toronto Official Plan

The City of Toronto's Official Plan sets up policies that deal with legislative and administrative concerns, guides physical growth, and address social, economic, and environmental concerns. The Official Plan provides land use planning designations and identifies areas of environmental significance where more stringent policies may apply for development applications.

City of Toronto Official Plans were reviewed on October 17, 2019 for the current study with the results summarized below:

- Map 12A (Environmentally Significant Areas) - A review of the map, dated February 2019, indicates that the Site is not located within an area designated as Environmentally Significant Areas.
- Map 12B (Provincially Significant Wetlands (PSW) and Area of Natural and Scientific Interest (ANSI)) - A review of the map, dated February 2019, indicates that the Site is not located within the above mentioned designated areas.
- Map 35 (Secondary Plan Areas) - A review of the map, dated November 2015, indicates that the Site is located within an area designated as Secondary Plan area 6, known as Yonge St. Clair.
- Map 17 (Land Use Plan) - A review of the map, dated February 2019, indicates that the Site is located within an area designated as Mixed Use Areas.

- Map 28 (Site and Area Specific Policies) - A review of the map, dated October 2016, shows that the Site is not located within the specific policies areas.

2.3 Permit To Take Water (PTTW) Section 34 of the Ontario Water Resource Act

For construction dewatering, water takings of more than 50,000 L/day but less than 400,000 L/day may be registered on the Environmental Activity and Sector Registry (EASR), while water takings of more than 400,000 L/day require a PTTW issued by the MECP. If it is identified that an EASR or PTTW is required for the Site, a hydrogeological report will need to be submitted in support of the application. Construction dewatering estimation was completed as a part of the scope of work for the current assessment.

2.4 Clean Water Act

The MECP mandates the protection of existing and future sources of drinking water under the Clean Water Act, 2006 (CWA). Initiatives under the CWA include the delineation of Wellhead Protection Areas (WHPAs), significant groundwater recharge areas (SGRAs) and Highly Vulnerable Aquifers (HVAs) as well as the assessment of drinking water quality and quantity threats within Source Protection Regions. Source Protection Plans are developed under the CWA and include the restriction and prohibition of certain types of activities and land uses within WHPAs.

A review of the Source Water Protection Information Atlas interactive mapping prepared my MECP on October 17, 2019 indicates that the Site is located within an area designated as a HVA.

2.5 City of Toronto Requirements for Hydrogeological Study (August 2018)

The City of Toronto requires a hydrogeological study report, completed in accordance with its August 2018 Terms of Reference (TOR), for zoning bylaw amendment, plans of subdivision, consent to service, and site plan control (Geotechnical Study/Hydrogeological Review).

Based on the TOR, a minimum of five (5) groundwater wells shall be installed at locations that represent the entire proximity of the Site. If the Site is larger than 30 m x 30 m, additional groundwater wells shall be installed and the qualified professional will use professional judgment to determine the number of additional wells required. It is required that the wells be installed with a minimum diameter of 3.8 cm and extend at least 2 meteres below the lowest elevation in the proposed building structure(s). Additionally, one well is to be drilled to a minimum depth of 10 m below the lowest elevation in the proposed building structure(s) or to bedrock, whichever is shallower.

Static groundwater levels should be confirmed and a monitoring program should be completed in accordance with the TOR. Based on the TOR, static groundwater level measurements shall be monitored at all wells located within the property for a minimum of 3 months with measurements taken every 2 weeks for a minimum of 6 measurements. The intent is for the qualified professional to use professional

judgment to estimate the seasonally high groundwater level. Water levels can be measured manually or by using pressure transducers and dataloggers, or similar instrumentation. All water levels shall be presented as geodetic elevations referenced to a City of Toronto or Canadian Geological Survey benchmark.

3.0 METHODOLOGY

3.1 Borehole Advancement and Monitoring Well Installation

Drilling boreholes and the construction of monitoring wells were conducted in conjunction with a geotechnical investigation between October 23 and 28, 2019 and on January 06, 2020 and January 28, 2020. The program consisted of the drilling of seven (7) boreholes (BH) and the installation of seven (7) monitoring wells including one (1) pair of nested monitoring wells; one in each of the boreholes advanced beneath the Site. The locations of the boreholes and monitoring wells are shown on **Figure 2**.

Borehole drilling and monitoring well construction were completed by a licensed water well contractor, Profile Drilling Inc., Land Shark Drilling and Strong Soil Search Inc., under the full-time supervision of a geotechnical technician from Terraprobe, who also logged the soil strata encountered during borehole advancement and collected representative soil samples for textural classification. The boreholes were drilled using continuous flight, hollow-stem augers. Detailed descriptions of the encountered subsoil and groundwater conditions are presented on the borehole log in **Appendix A**.

The monitoring wells were constructed using 50-mm diameter PVC riser pipes and screens, which were and installed in each of the selected geotechnical boreholes in accordance with the requirements of Ontario Regulation (O. Reg.) 903. All of the monitoring wells were provided with steel flush-mount protective casings at ground surface.

Borehole elevations and coordinates are provided relative to geodetic datum (NAD 83). The horizontal coordinates are reported relative to the Universal Transverse Mercator geographic coordinate system (UTM Zone 17T). The boreholes were surveyed for horizontal coordinates and geodetic elevations with a Trimble R10 Receiver connected to the Global Navigation Satellite System and the Can-Net Virtual Reference Station Network. The UTM coordinates and ground surface elevations at the monitoring wells locations, as well as the monitoring well construction details are presented on **Table 3-1**.

Table 3-1- Monitoring Well Installation Details

Well ID	Installation Date	UTM Coordinates (m)		Ground El. (masl)	Monitoring Well Depth (mbgs)	Screen Interval (mbgs)	Casing Dia. (mm)
		Easting	Northing				
BH 1	January 28, 2020	629619.4	4837746.6	123.65	10.60	7.55 - 10.60	50
BH 2	January 06, 2020	629626.4	4837750.1	124.15	13.70	10.65 – 13.70	50
BH 3	October 24, 2019	629618.8	4837748.5	124.30	13.7	10.65 – 13.70	50
BH 4D	October 23, 2019	629615.5	4837760.4	124.41	22.86	19.81 – 22.86	50
BH 4S	October 23, 2019	629615.1	4837761.5	124.40	7.60	4.55 – 7.60	50
BH 5	October 25, 2019	629615.1	4837766.7	124.58	13.70	10.65 – 13.70	50
BH 6	October 28, 2019	629618.7	4837769.0	124.66	13.75	10.70 – 13.75	50

Notes:
mbgs metres below ground surface
masl metres above sea level
S shallow nested monitoring well
D deep nested monitoring well

3.2 Groundwater Monitoring

All seven (7) installed monitoring wells were utilized to measure and monitor groundwater levels. The groundwater monitoring program will confirm the stabilized groundwater level beneath the Site. The groundwater monitoring is completed over six (6) monitoring events every two weeks starting February 7, 2020 so as to satisfy the City of Toronto Terms of Reference. The results are discussed in **Section 6.1**.

3.3 MECP Water Well Records Review

MECP Water Well Records (WWRs) were reviewed for the registered wells located at the Site and within a 500 m radius of the Site boundaries (Study Area). The findings of the MECP well records review are presented in **Section 4.6** of the current report

3.4 In-Situ Hydraulic Conductivity Testing

Monitoring wells BH1, BH2, BH3, BH4D, BH5 and BH6 were utilized to conduct hydraulic conductivity tests. The in-situ tests provide estimated hydraulic conductivities (K) for subsoil strata at the depths of the well screens. The monitoring wells were developed in advance of the test. Well development involves the purging and removal of groundwater from each monitoring well to remove remnants of clay, silt and other debris introduced into the monitoring well during construction, and to induce the flow of formation groundwater through the well screens, thereby improving the transmissivity of the subsoil strata formation at the well screen depths.

In-situ falling head hydraulic conductivity tests were completed for the Site. In-situ falling head tests involve the placement of a slug of known volume into the monitoring well, below the water level, to displace the groundwater level upward. The rate at which the water level recovers to static conditions (falling head) is tracked using a data logger/pressure transducer, and/or manually, using a water level tape. The rate at which the water table recovers to static conditions is used to estimate the K value for the water-bearing strata formation at the well screen depth. The findings for the hydraulic conductivity testing are presented in **Section 6.3.1** of the current report.

3.5 Hydraulic Conductivity Based on Grain Size Distribution Graphs

The Hazen equation estimation method was also used to estimate the hydraulic conductivity (K) for saturated subsoils at selected depths beneath the water table below the subject site. The method provides alternative hydraulic conductivity (K) estimates which are derived from the grain size diameter, whereby 10% by weight of the soil particles are finer and 90% are coarser (Freeze and Cherry, 1979). The soils chosen for Hazen estimation were selected primarily from above the well screen depths. Findings are presented in **Section 6.3.2**.

3.6 Groundwater Quality Assessment

Based on the City of Toronto ToR (August 2018), groundwater quality should be assessed in advance of earth work. As such, one (1) set of groundwater samples were collected from one (1) selected monitoring well (BH2) to characterize its quality for evaluation against the City of Toronto Sewer Use By-Law parameters. This was performed to assess whether any anticipated dewatering effluent can be disposed of into the City of Toronto sewer system during construction, or following site development for any long-term foundation drainage. Based on the results, recommendations for any pre-treatment for any dewatering/drainage effluent can be developed, if required.

The Selected monitoring well BH2 was developed and purged of multiple well casings volumes of groundwater prior to sample collection. The groundwater samples were collected using a Low Flow Sampling procedure, using a Bladder Pump. In accordance with City of Toronto Sewer Use By-law sampling protocols, one complete set of groundwater samples was not filtered during collection, prior to placement in the laboratory sample bottles. Upon sampling, all of the bottles were placed in ice and packed in a cooler at about 10.6 ± Cº for shipment to the analytical laboratory. Sample analysis was performed by ALS Environmental., which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The results of the analysis are discussed in **Section 6.4**.

3.7 Review of Regional Data and Available Reports for the Site

The maps, data, and documents provided by the MECP, Ontario Geological Survey (OGS), Ministry of Natural Resource and Forestry (MNRF), and TRCA were reviewed. Oak Ridges Moraine Group (ORMGP) database was also reviewed for the current assessment. Additionally, available previously issued and concurrent geotechnical, and environment site assessment (ESA) reports were reviewed at the time of preparation of the current hydrogeological report, with the findings are summarized in **Section 4**.

4.0 REGIONAL AND LOCAL SITE SETTING

4.1 Regional Geology

The current understanding of the surface geological setting of the Site is based on scientific work conducted by the OGS (OGS, 2003). The Site and surrounding area are mapped as Unit 9C coarse-textured glaciolacustrine deposits consisting of sand, gravel along with minor silt and clay (OGS, 2003). A shore bluff located approximately 200 m to the north and west of the Site separates Unit 9c coarse-textured glaciolacustrine deposits from Unit 5b Till. **Figure 3** illustrates the mapped surficial geology for the Site and the surrounding area.

ORMGP produced a cross-sectional geological map to aid in the characterization of the general area. Considering the regional cross-section, it is understood that the overburden units prevalent in this area are as follows, with the youngest unit at the top:

- Thorncliffe Formation
- Sunnybrook Drift
- Scarborough Formation

Thorncliffe Formation: The Thorncliffe Formation consists of glaciofluvial and glaciolacustrine sand and silt deposited approximately 30,000 to 50,000 years ago. The Thorncliffe Formation shows a considerable variation in grain size and thickness, both locally and regionally. It acts as a regional aquifer. Based on the ORMGP cross-section, the top of the Thorncliffe Formation was interpreted to be contacted in close proximity to the ground surface with an approximate thickness of 9.0 m beneath the Site.

Sunnybrook Drift: The Sunnybrook Drift consists of silt to silty clay materials deposited 45,000 years ago and acts as a regional aquitard. The thickness of the Sunnybrook Drift is generally less than 10 m to 20 m. Based on the ORMGP cross-section; the surface of the Sunnybrook Drift has an approximate thickness of 4.0 m beneath the Site.

Scarborough Formation: The Scarborough Formation is composed of clay, silt, and sand sediments in a deltaic sequence. It acts as an aquifer of regional extent. This unit is mostly found within bedrock valleys and thins laterally away from the valleys. Based on the ORMGP cross-section, thickness of the Scarborough Formation could reach 20 m beneath the Site.

The underlying bedrock at the Site is the Georgian Bay Formation, which consists of shale and limestone (OGS, 2007). A review of the ORMGP cross-section indicates that the bedrock could be contacted at an approximate depth of 39 mbgs beneath the Site.

4.2 Regional Physiography

The Site is located within the physiographic region of Southern Ontario known as Iroquois the Plain. The Iroquois Plain within the vicinity of the Site consists of sand plains. A shore bluff separating South Slope from Iroquois Plain is located approximately 200 m to the north and west of the Site.

The Iroquois Plain occupies the lowlands around the western part of Lake Ontario, where it covers about a distance of 300.0 km, from the Niagara River to the Trent River. It has a width varying from about 100.0 m to over 10.0 km. When the last glacier (Wisconsin) was receding from Southern Ontario, the area was inundated by a body of water known as Lake Iroquois, which emptied eastward at Rome, New York State (Chapman and Putnam, 1984). **Figure 4** shows the location of the Site within the regional physiography map.

4.3 Regional Topography and Drainage

A review of a surface topography map for the Site and surrounding area indicates that the topography of the Site is located within a flat area. The ground surface elevation ranges from approximately 122 to 124 masl within the Site. Considering the topography map, ground surface at the Site and the vicinity of the Site slopes downwards towards the south. As such, it is anticipated that generated runoff (if it is not managed) will flow southwards. **Figure 5** illustrates the topography of the Site and surrounding area.

4.4 Watershed Setting

The TRCA's interactive watershed map was reviewed. The Site is located within the Lower Don River subwatershed of the Don River watershed, which falls with TRCA jurisdiction. The Don River Watershed covers an area of approximately 36,000 ha, including portions of the City of Toronto, the Cities of Vaughan, Markham, and Town of Richmond Hill in the Regional Municipality of York. The watershed drains southward from its heights along the Oak Ridges Moraine (ORM) in the north (at an elevation of 315) towards Lake Ontario in the south. Three (3) main geological features including the Bedrock Valley System, Oak Ridges Moraine, and areas of in-filling of eroded Quaternary sediments are present within the watershed (TRCA, 2009).

4.5 Local Surface Water and Natural Heritage Features

The MNRF database was reviewed for any natural heritage features including watercourses, bodies of water, wetland features, Area of Natural and Scientific Interest (ANSI) and wooded areas. Yellow Creek, a tributary of Don River West Branch, and associated wooded areas are located approximately 650 m to the east of the Site. Based on the review, there are no records for wetland features and ANSI in close proximity to the Site.

Record review indicates that wetland features, not evaluated as per Ontario Wetland Evaluation System (OWES), are scattered around the Site with the closest record located approximately 600 m to the east of the Site. The wetland feature is located along the tributary of Don River West Branch.

Record review indicates that there are no records for any natural heritage feature within or in close proximity to the Site. **Figure 6** shows the location of the Site and mapped natural heritage features, if applicable.

4.6 Ground Water Resources (MECP Well Records)

The MECP well record database was reviewed for records located within a radius of 500 m from the approximate Site boundary (Study Area). The locations of the well records are presented on **Figure 7** with the details for each well summarized in **Appendix B.** A total of 43 wells were located within the Study Area. A summary of data obtained from the records review is presented in **Table 4-1**.

Table 4-1- MECP Well Record Summary

Number of the Well Records	**43**
Well Type	
Drilled Well	37 (86%)
Dug Well	0 (0.0%)
Unknown	6 (14%)
Water Use (Final Status)	
Observation Well	13 (30%)
Test Hole	6 (14%)
Monitoring/Test Hole	16 (37%)
Unknown	8 (19%)
Reported Static Level	
0 to10 m (0 to 30 ft)	1 (2%)
Unknown	42 (98%)

The above summary indicates that most local wells registered as observation or monitoring/test hole wells. Based on the well records, there are no water supply wells within the Site and 500 m radius of the Site boundary.

The site is situated in a serviced area within the City of Toronto and there are no water supply wells at the Site or within the Study Area. As such, a door to door well survey is not required in advance of, during and after construction.

4.7 Active Permit to Take Water Records Review

The MECP website was reviewed for any active PTTW records within 1.0 km radius of the Site on October 17, 2019. The records review indicates three (3) records exist for the Study Area. Two (2) records are located at the southeast intersection of St. Clair Avenue West and Avenue Road, and one (1) record is

located at the northwest intersection of Davenport Road and Bedford Road. Details for each record are summarized in **Table 4.2**.

Table 4-2- Active PTTW Record Summary

Item	Permit Holder	Purpose	Maximum L/day	Source Type	Distance from the Site (Km)
1	Churchterrace Developments Inc.	Dewatering	500,000	Ground Water	0.55
2	2221 Yonge Holdings Inc.	Construction Dewatering	830,000	Ground Water	0.57
3	City of Toronto	Construction Dewatering	7,100,000	Ground Water	1.0

5.0 LOCAL GEOLOGY AND SUBSURFACE INVESTIGATION

The fieldwork consisted of drilling a total of seven (7) boreholes extending to maximum depth of 23.0 m below existing ground surface. The borehole logs and a geological cross-section are presented in **Appendix A**. The approximate locations of the boreholes are shown on **Figure 2**.

It should be noted that the subsurface conditions are confirmed at the borehole locations only, and may vary between and beyond the borehole locations. The boundaries between the various strata as shown on the logs are based on non-continuous sampling. These boundaries represent an inferred transition between the various strata, rather than a precise plane of geologic change.

The subsurface investigation was completed in conjunction with the geotechnical investigation. Based on the reviewed geotechnical report, the stratigraphy beneath the investigated areas of the property generally consists of the followings:

5.1 Surficial Layer

An asphalt pavement structure, consisting of 50 mm thick asphaltic concrete underlain by 200 mm thick granular base course was encountered in Boreholes 1 and 3 at the ground surface.

A 60 mm concrete paver underlain by 130 mm thick granular base course was encountered in Borehole 2 at the ground surface.

A 600 mm thick gravel surface course was encountered in Borehole 4 at the ground surface.

5.2 Earth Fill

Earth fill materials, consisting of clayey to sandy silt/ silty sand/ sand and gravel/silt, with trace amounts of organics were encountered beneath the surficial layer or at the ground surface in each borehole and extended to about 0.8 to 2.3 metres below ground surface (mbgs). It is very soft to firm in consistency, and the moisture content for the retrieved soil samples ranges from 3 to 19 percent by mass, indicating a moist condition.

5.3 Silty Sand Till

Silty sand till with varying amounts of clay (trace to some) and trace amounts of gravel were encountered beneath the earth fill zone in Boreholes 1, 3, 4 and 6 and beneath the silty sand layer in Borehole 2 and extended to 4.6 and 6.1 mbgs. It is compact to very dense in consistency, and the moisture content for the retrieved soil samples ranges from 5 to 18 percent by mass, indicating a moist condition.

5.4 Sand and Silt to Silty Sand

Sand and silt to silty sand with trace amounts of clay and gravel was encountered beneath the silty sand till deposit in Boreholes 1, 2, 3, 4 and 6 and beneath the earth fill zone in Borehole 5 and extended to the full depth of investigation. The unit is compact to very dense in consistency, and the moisture content for the retrieved soil samples ranges from 5 to 32 percent by mass, indicating a moist to wet condition.

5.5 Bedrock

Bedrock was not observed within the maximum termination depth of investigation at 23.0 mbgs. A nearby water well record report bedrock at a depth of 36 mbgs.

6.0 LOCAL HYDROGEOLOGICAL STUDY

6.1 Monitoring Well Development and Ground Water Level Monitoring

The groundwater monitoring program started on February 07, 2020 extending to mid-April 2020. Observations pertaining to the depth to water and caving were made in the open boreholes immediately after completion of drilling, and are reported on the borehole logs. The measured water levels along with other monitoring wells details and findings are presented in **Appendix C**.

The monitoring wells were developed and the groundwater levels were measured using an interface probe (Solinst Interface Meter Model 122). The following **Table 6-1** provides summary of groundwater level measurements.

Table 6-1- Summary of Groundwater Monitoring

Well ID		February 7, 2020	February 20, 2020	March 4, 2020	March 18, 2020	April 1, 2020	April 16, 2020
BH1	mbgs	4.99	4.96	4.95	4.97	4.97	5.00
	masl	118.66	118.69	118.70	118.68	118.68	118.65
BH2	mbgs	5.93	5.83	5.85	5.84	5.85	5.89
	masl	118.22	118.32	118.30	118.31	118.30	118.26
BH3	mbgs	5.51	5.44	5.44	5.47	5.47	5.49
	masl	118.79	118.86	118.86	118.83	118.83	118.81
BH4D	mbgs	6.99	6.94	6.95	6.97	6.96	7.02
	masl	117.42	117.47	117.46	117.44	117.45	117.39
BH4S	mbgs	5.66	5.67*	5.63	5.60	5.63	5.67
	masl	118.74	118.73	118.77	118.80	118.77	118.73
BH5	mbgs	NA	6.31*	6.17	6.20	6.21	6.25
	masl	NA	118.27	118.41	118.38	118.37	118.33
BH6	mbgs	6.26	6.23*	6.28	6.30	6.31	6.34
	masl	118.40	118.43	118.38	118.36	118.35	11.32

Notes:
mbgs metres below ground surface
masl metres above sea level
*Groundwater level was measured on February 27, 2020 due to snow cover

As shown in above Table, groundwater levels show slight fluctuations over the monitoring program. The highest shallow groundwater level was measured as El. 118.86 masl at monitoring well BH3. Groundwater at BH4D (deep nested monitoring well) is lower than the groundwater level measured at monitoring well BH4S (shallow nested monitoring well), indicating a downward vertical hydraulic gradient. Monitoring well BH4S was installed within the glacial till (Newmarket Till), which is considered as an aquitard, whereas monitoring well BH4D was installed within the sand and silt deposits of the Thorncliffe Formation (aquifer).

6.2 Groundwater Flow Pattern

The groundwater flow pattern was interpreted using groundwater levels measured on March 4, 2020 at monitoring well BHs 2, 3, 5 and 6. **Figure 8** presents the interpreted groundwater flow pattern. Based on the plan, shallow groundwater flows in a southeasterly direction towards Yellow Creek.

6.3 Hydraulic Conductivity Testing

6.3.1 In-Situ Hydraulic Conductivity Tests

Monitoring wells BH1, BH2, BH3, BH4D, BH5 and BH6 underwent single well response tests (SWRTs) to assess the hydraulic conductivity (K) for saturated shallow aquifer subsoils at the depths of the well screens. Each monitoring well was equipped with a digital pressure transducer to record the fluctuation made to complete the SWRT. The results of the SWRT tests are presented in **Appendix D**, with a summary of the findings provided in **Table 6-2**.

Table 6-2- Summary of Rising Head Hydraulic Conductivity Test

Well ID	Ground El. (masl)	Monitoring Well Depth (mbgs)	Screen Interval (mbgs)	Screened Soil Strata	Hydraulic Conductivity (K) (m/sec)	Test Method
BH1	123.65	10.60	7.55 - 10.60	Silt and Sand to Silty Sand	8.99×10^{-6}	Falling Head Test
BH2	124.15	13.70	10.65 – 13.70	Silt and Sand to Silty Sand	1.60×10^{-6}	Rising Head Test
BH3	124.30	13.7	10.65 – 13.70	Silt and Sand to Silty Sand	9.77×10^{-6}	Falling Head Test
BH4D	124.41	22.86	19.81 – 22.86	Silt and Sand to Silty Sand	1.94×10^{-6}	Falling Head Test
BH5	124.58	13.70	10.65 – 13.70	Silt and Sand to Silty Sand	1.20×10^{-5}	Falling Head Test
BH6	124.66	13.75	10.70 – 13.75	Silt and Sand to Silty Sand	9.78×10^{-6}	Falling Head Test

Notes:
mbgs metres below ground surface
masl metres above sea level

A review of the findings suggests a moderate to high hydraulic conductivity for the subsoil profile within the screened intervals.

6.3.2 Hydraulic Conductivity Using Grain Size Distribution Graphs

The Hazen Equation method was adopted to estimate the hydraulic conductivity (K) for different soil layers which may contain groundwater during the seasonal high water table (spring) period, or if they are not encountered within the screen intervals.

The Hazen Equation method relies on the interrelationship between hydraulic conductivity and effective grain size, d_{10}, in the soil media. This empirical relation predicts a power-law relation with K, as follow:

$$K = Ad_{10}^2$$

where;

d_{10}: Value of the soil grain size gradation curve as determined by sieve analysis, whereby 10% by weight of the soil particles are finer and 90% by weight of the soil particles are coarser.

A: Coefficient; it is equal to 1 when K in cm/sec and d_{10} is in mm

The Hazen Equation estimation provides an indication of the groundwater yield capacity for saturated soil strata at the depths where soils samples were selected for grain size analysis. The grain size distribution graphs prepared for the previous geotechnical investigation were used to the estimate the hydraulic conductivity, with the details are presented in **Appendix E**. The results of the Hazen Equation estimates are provided in **Table 6-3**, below.

Table 6-3 - Summary of Hydraulic Conductivity Using Hazen Equation

Monitoring Well ID	Soil Sample Depth (mbgs)	Soil Sample Elevation (masl)	Soil Strata	Hydraulic Conductivity (m/sec.)
BH1	9.3 (SS9)	114.3	Sand and silt	4.00×10^{-6}
BH2	10.8 (SS10)	113.4	Silty sand till	6.25×10^{-6}
BH3	3.3 (SS5)	121.0	Silty Sand, some gravel	1.00×10^{-6}
BH4	4.9 (SS7)	119.5	Silty sand till	2.25×10^{-6}
BH6	10.9 (SS10)	113.8	Silty sand till	1.00×10^{-6}

Notes:
mbgs metres below ground surface
masl metres above sea level

The K estimates determined using the Hazen method suggests a moderate hydraulic conductivity for the sand and silt and silty sand unit underlying the Site.

6.4 Groundwater Quality Assessment

As per the City of Toronto ToR, August 2018, a groundwater quality assessment should be completed for the Site to confirm groundwater quality in comparison with the City of Toronto Sanitary and Combined, and Storm Sewer Use By-law limits. As such, one (1) set of groundwater samples was collected by Terraprobe on October 26, 2021 and submitted to characterize groundwater quality for evaluation against the City of Toronto Sewer Use By-law limits. Groundwater samples were collected directly from monitoring well BH2.

BH2 was developed and one (1) set of unfiltered groundwater samples was collected in accordance with City of Toronto Sewer Use By-law sampling protocols. Upon sampling, all of the bottles were placed in ice and packed in a cooler at about 10.6° C for shipment to the analytical laboratory. Sample analysis was performed by ALS Environmental, a third party laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA).

The groundwater quality test results and the certificate of analysis are presented in **Appendix F**. The samples were compared to the following:

- City of Toronto Municipal Code Chapter 681 Table 1 – Limits for Sanitary and Combined Sewers Discharge
- City of Toronto Municipal Code Chapter 681 Table 2 – Limits for Storm Sewer Discharge

The exceedances, together with the criteria, are presented in **Table 6-4**.

Table 6-4- Exceedance Table and Groundwater Quality Results

Parameter	BH2 Groundwater Quality Results (mg/L)	City of Toronto Sanitary Sewer Use Limits (mg/L)	City of Toronto Storm Sewer Use Limits (mg/L)
Total Suspended Solids (TSS)	21.4	350	**15**
Total Manganese	0.320	5	**0.05**

As shown above, exceedances were recorded for groundwater samples in comparison with the City of Toronto Sanitary and Combined, and Storm Sewer Use By-law limits. A review of the results shows that groundwater quality at monitoring well BH2 exceeds Storm Sewer Use Limits for Total Suspended Solid (TSS) and total manganese. The results review also indicates no exceedances of the Sanitary and combined Sewer Use Limits at BH2.

A review of the groundwater quality results suggests that short-term dewatering discharge could be directed to the City of Toronto sanitary sewer system. Furthermore, pre-treatment should be considered to treat the elevated TSS and total manganese if discharged groundwater is proposed to be directed to the City of Toronto storm sewer system.

Pre-treatment to lower TSS could involve use of settling weir tanks and/or filter bags during construction. The final design for any dewatering effluent pre-treatment system is the responsibility of the contractors undertaking construction.

7.0 DEWATERING FLOW RATE ESTIMATION

7.1 Site Plan Review

Architectural drawings prepared by KPMB Architects dated January 29, 2021, were reviewed for the current assessment. It is understood that proposed development will include construction of 14-storey mixed use commercial and residential building including mezzanine and mechanical penthouse with three (3) levels of underground parking structures. Based on the building sections (Drawing A6.001), three (3) levels of underground parking are proposed for the future development, where the base of the level 3 underground parking is proposed at a depth od 9.34 mbgs. Plan review also indicates that the ground surface is proposed at El. 122.66 masl. As such, the base of the proposed underground parking level 3 is interpreted at El. 113.32 masl.

A review of architectural drawings also shows that the Site is rectangular in shape and the length and width of the Site are approximately 35.4 m and 30.6 m, respectively; and footprint of the proposed underground parking extends to the entire Site boundary.

7.2 Review of the Geotechnical Report

A review of the geotechnical investigation report prepared by Terraprobe Inc., dated October 21, 2021 (File No. 1-19-0603-01) indicates:

- The water level must be kept at least 1.2 m below the lowest excavation elevation during construction. The installation of a skim coat of lean concrete (mud-slab) is recommended to preserve the subgrade integrity, and to provide a working platform. Additional dewatering activities will be required to remove any accumulated rainfall.
- Impermeable shoring (i.e., a continuous interlocking caisson wall) is to be used to support the excavation. The water table could be lowered before excavation begins or during excavation by advancing deep sumps and pumping water out from the sumps (depending on the flow rates). A caisson wall shoring system would also prevent any sloughing of weak soils and loss of ground during lagging installation.
- The sub-floor drainage system should consist of perforated pipes (minimum 100 mm diameter) located at a spacing of about 3.0 m centre to centre. The subdrain system should be outlet to a suitable discharge point under gravity flow, or connected to a sump located in the lowest level of the basement. The water from the sump must be pumped out to a suitable discharge point/positive outlet.

7.3 Summary of Hydrogeological Conditions of Site Development

The results of the study completed by Terraprobe indicate the following hydrogeological features for the Site.

- Boreholes encountered the earth fill zone beneath the surficial layer or at ground surface extending to 0.8 to 2.3 mbgs, generally underlain by the compact to very dense silty sand till, extending to 4.6 and 6.1 mbgs (El. 118.1 to 119.0 m), which was underlain, in turn, by the dense to very dense sand and silt to silty sand unit extending to the full depth of the investigation.
- The water table for design purposes should be considered to be El. 118.86 ± masl (5.44 mbgs) as measured at monitoring well BH3. As such, base of the excavation was considered at El. 112.35 masl.
- Based on a review of the estimated hydraulic conductivity of the sandy silt and silt unit, in which the excavation and construction will be completed, the hydraulic conductivity of 1.2 x 10^{-5} m/s is considered for dewatering calculations. Additionally, hydraulic conductivities of 2.25 x 10^{-6} m/s and 1.0 x 10^{-6} m/s were considered for the silty sand till and fill zone observed below the pavement structure, respectively.

7.4 Short-Term Groundwater Control Requirements (Construction Dewatering)

A review of the development plans indicates that three (3) levels of underground parking are proposed for the future development. Base of the level 3 underground parking is proposed at El. 113.32 masl. Proposed underground structure will be partially developed below the water level. The assumptions considered for the dewatering flow rate calculations are summarized in **Table 7-1**.

Table 7-1- Summary of Site Dimensions

Proposed Development Phase	Approximate Proposed Width (m)	Approximate Proposed Length (m)	Proposed Invert El. (masl)	Assumed Foundation El. (masl)	Assumed Base of Elevator Pit (masl)	Static Groundwater Level (masl)
16- Story residential and commercial Building	30.6	35.4	113.32	112.12	111.52	118.86

Notes:
mbgs metres below ground surface
masl metres above sea level

A numerical analysis was conducted utilizing computer software (Slide 7.014, released March 30, 2016, developed by Rocscience Inc.), utilizing the Finite Element Modelling (FEM) method. FEM for groundwater seepage indicates the short-term (construction) dewatering requirements as provided below. The finite element model results are presented in **Appendix G**.

Considering the thick layer of silt and sand unit contacted at boreholes locations drilled within the proposed development footprint, in which excavation and construction of the proposed underground parking will be completed, the installation of a caisson wall extending approximately 5 m below the proposed FFE was recommended by the geotechnical investigation team. As such, the construction dewatering flow rate was estimated considering this recommendation.

The estimated construction dewatering flow rate for developing the proposed building with 3-levels of underground structure is summarized below:

- 247,000 L/day, and it could reach to 494,000 L/day of groundwater seepage into the excavation considering a safety factor of 2.0.

- The above estimates do not take into account storm water management from rainfall events. The collection system should also account for a typical 2-year design storm event which will generate approximately 27,500 L/day. As such, the estimated short-term dewatering flow rate could reach to 521,500 L/day. The dewatering system should be designed to take into account removal of rainfall from the excavation. According to O. Reg. 63/16, a plan for discharge must consider the conveyance of storm water from a 100-year storm event, which translates to approximately 102,000 L/day.

The estimated short-term construction dewatering flow rates for construction exceeds the EASR upper threshold limit of 400,000 L/day. As such, applying for a PTTW from the MECP is recommended.

7.5 Long-Term Groundwater Control Requirements (Post-Construction)

It is understood that the proposed building will be water-tight. As such, long-term foundation drainage is not anticipated for the post-development Site.

Considering the proposed water-tight structure, applying for long-term discharge permit with the City of Toronto is not required.

7.6 Zone of Influence (ZOI) Groundwater

It is understood that caisson wall (impermeable shoring) is proposed in advance of construction. As such, it is anticipated that zone of influence for dewatering will be limited to the immediate vicinity of the Site.

7.7 Potential Dewatering Impacts and Mitigation Plan

7.7.1 Short-Term Discharge of Pumped Groundwater (Construction Dewatering)

The dewatering system must be appropriately filtered in order to prevent the pumping of fines and loss of ground during the dewatering activities.

The results of the groundwater quality assessment indicate that the short-term dewatering effluent could be discharged to the City of Toronto sanitary sewer if permission is obtained. The anticipated dewatering effluent will meet the City of Toronto storm sewer limits if pre-treatment to reduce elevated levels of TSS and total manganese is implemented.

7.7.2 Ground Settlement

Considering implementation of impermeable shoring, the estimated conceptual zone of influence for dewatering will be limited to the excavation box. As such, impacts to the nearby structures are not anticipated. However, considering the adjacent structures it is recommended a professional geotechnical engineer is consulted in advance of earthwork.

7.7.3 Surface Water, Wetlands and Areas of Natural Significance

There are no records for any surface water, wetland feature or any natural heritage feature located within the estimated conceptual zone of influence for dewatering. As such, no concern is anticipated regarding the proposed development.

7.7.4 Water Supply Wells and Zone of Influence

The Site is located in a serviced area of Toronto. A review of the MECP well records confirmed there are no records for any water supply wells or municipal wells on the Site or within a 500 m radius of the Site boundary. Additionally, it is assumed that an impermeable shoring system is proposed for excavation and construction on the Site. As such, no concerns are anticipated to groundwater users pertaining to the Site development.

7.7.5 Contamination Sources

Terraprobe is conducting Phase One and Phase Two Environmental Site Assessment reports for the Site. Details will be included in the above-mentioned reports.

8.0 CONCLUSIONS AND RECOMMENDATIONS

- The Site is mainly located within the physiographic region of Southern Ontario known as the Iroquois Plain.
- The Site is located within an area mapped as coarse-textured glaciolacustrine deposits (9c).
- The Site is located within the Don River watershed, which falls within TRCA jurisdiction. There are no records for natural heritage features including wetland, water bodies, watercourses and ANSI within or in close proximity to the Site
- The subsoil profile beneath the pavement structure and fill material consists mainly of silty sand till and, thick silty sand unit extending to the termination depth of investigation of 23 mbgs.
- The highest shallow groundwater level was measured at El. 118.86 masl over the groundwater monitoring program.
- Estimated hydraulic conductivities using single well response tests (SWRT) and the Hazen Equation are 1.20 x 10^{-5} m/s and 2.25 x 10^{-6} m/s for silt and sand, and silty sand till units, respectively.
- Groundwater quality for one (1) set of samples collected from monitoring well BH2 meets the City of Toronto's sanitary and storm sewer use limits, with an exception of exceedances for Total Suspended Solid (TSS) and total manganese compare to the City of Toronto's Storm Sewer Use By-Law limit.
- The short-term construction dewatering flow rate, considering a safety factor of 2.0 and a 2-year storm event, could reach 521,500 L/day. The estimated flow rate is based on considering impermeable shore installed approximately 5 m below proposed FFE.
- Considering the proposed water-tight structure, long-term foundation flow is not anticipated.
- The estimated conceptual zone of influence for dewatering will be limited to the excavation box due to implementation of an impermeable shoring system. As such, impacts to the nearby structures are not anticipated. However, considering the adjacent structures it is recommended a professional geotechnical engineer is consulted in advance of earthwork.

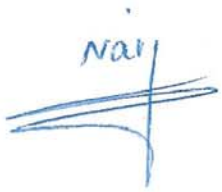
9.0 CLOSURE

We trust that the above-noted information is suitable for your review. If you have any questions regarding this information, please do not hesitate to contact the undersigned.

Yours truly,

Terraprobe Inc.

Kossay Makhzoumi, BASc., EIT
Project Manager



Narjes Alijani, M.Sc., P.Geo.
Senior Hydrogeologist

10.0 REFERENCES

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2. City of Toronto, 2019, Online Official Plans.

3. Freeze, A. and Cherry, J., 1979. Groundwater, Prentice-Hall Inc., New Jersey.

4. Geological Survey. Ontario Geological Survey (OGS), 2003. Surficial Geology of Southern Ontario. Miscellaneous Release – Data 128 – revised.

5. Geological Survey. Ontario Geological Survey (OGS), 2007. Bedrock Geology of Ontario. Miscellaneous Release – MRD 219.

6. Ministry of the Environment, Conservation and Parks, 2019, Source Protection Information Atlas Interactive Map.

7. Terraprobe Inc. "Geotechnical Investigation, 1196-1210 Yonge Street and 2-8 Birch Avenue, Toronto, Ontario", dated October 21, 2021. File No. 1-19-603-01

8. Toronto and Region Conservation Area, 2009, Don River Watershed Plan, Geology and Groundwater Resources- Report on Current Conditions.

9. Toronto and Region Conservation Authority, 2019, Online Regulated Area Map.

11.0 LIMITATIONS OF LIABILITY

This report was prepared at the request of, and for the exclusive use of Birch Equities Limited and its affiliates ("the Intended User") is intended to provide an assessment of the hydrogeological conditions of the Property located at 1196 – 1210 Yonge Street and 2 – 8 Birch Avenue in the City of Toronto, Ontario (the Site). No one other than the Intended User has the right to use and rely on the work without first obtaining the written authorization of Terraprobe Inc. and Birch Equities Limited.

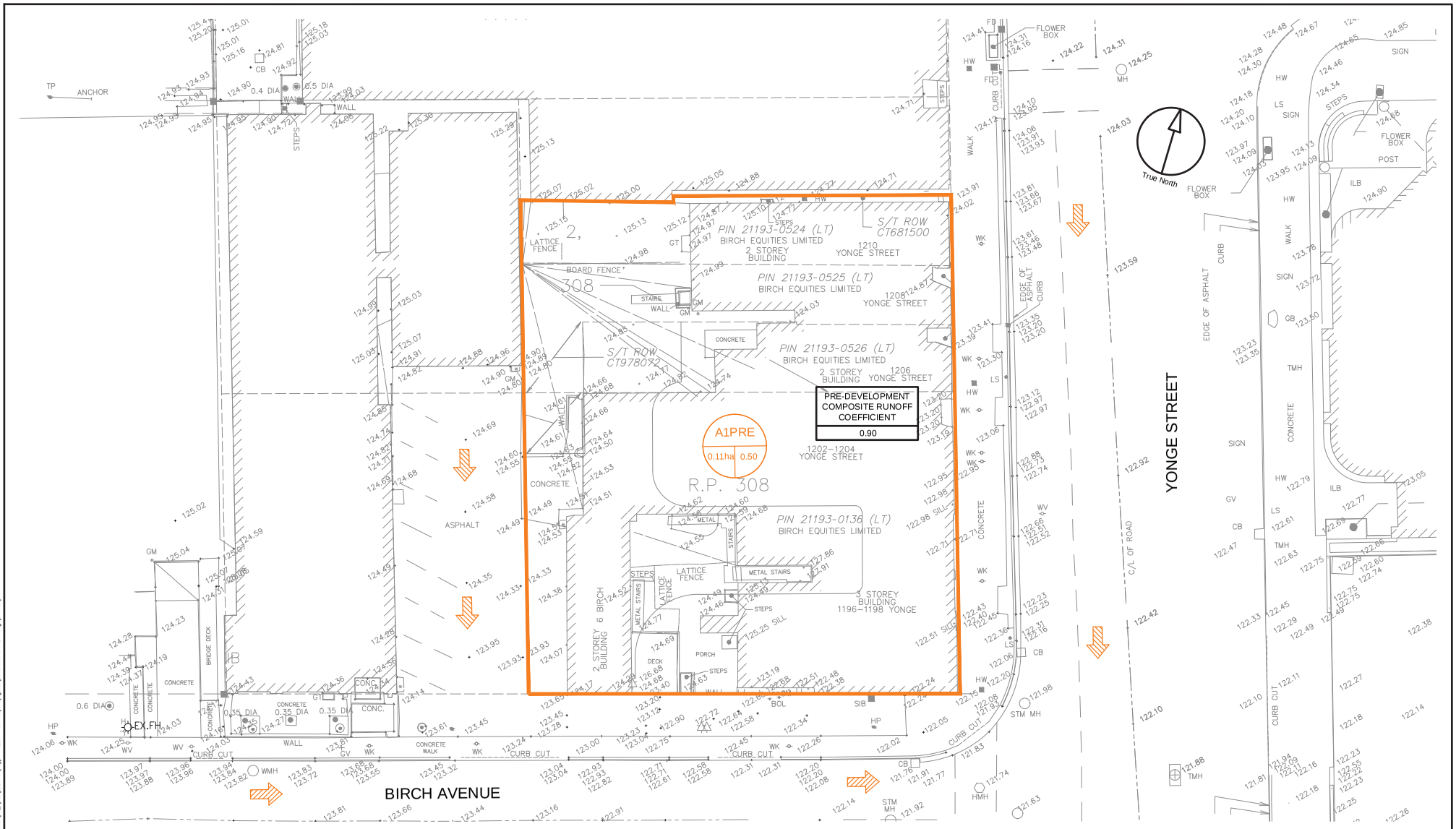
Terraprobe Inc. expressly excludes liability to any party except the Intended User for any use of, and/or reliance upon, the work. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Terraprobe Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report, including consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The assessment should not be considered a comprehensive audit that eliminates all risks of encountering hydrogeological problems. The information presented in this report is based on information collected during the completion of the hydrogeological study by Terraprobe Inc. It was based on the conditions on the Site at the time of the hydrogeological study by a review of historical information and field investigation to assess the hydrogeological conditions of the Site, as reported herein.

There is no warranty expressed or implied by this report regarding the hydrogeological conditions for the Site. Professional judgement was exercised in gathering and analyzing information collected by reviewing previous reports, data provided by government and are open to public and field work investigation. The conclusions presented are the product of professional care and competence, and cannot be construed as an absolute guarantee.

In the event that during future work new information regarding the hydrogeological conditions of the Site is encountered, or in the event that the outstanding responses from the regulatory agencies indicate outstanding issues on file with respect to the Site, Terraprobe Inc. should be notified in order that we may re-evaluate the findings of this assessment and provide amendments, as required.

Appendix C
Stormwater Data Analysis



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LEGEND

- PROPERTY LINE
- EXISTING STORM DRAINAGE AREA BOUNDARY
- EXISTING OVERLAND FLOW DIRECTION

A1PRE (0.30ha | 0.50)
- STORM DRAINAGE AREA NUMBER
- DRAINAGE AREA IN HECTARES
- RUNOFF COEFFICIENT

PRE-DEVELOPMENT STORM DRAINAGE PLAN

CREATE TO
1198-1210 YONGE STREET & 2-8 BIRCH AVENUE
CITY OF TORONTO

DATE: MAY 2021	PROJECT No.: 00134059
SCALE: 1:250	FIGURE No.: DAP-1

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Rational Method
Allowable Flow Calculations

1198-1210 Yonge St & 2-8 Birch Ave
File No. 00134059
Date: November 2021

Time of Concentration Calculation

Area Number	Area (ha)	C	Tc (min.)
A1 pre	0.11	0.50	10
A1 pre (Existing)	0.11	0.90	10

Post Development Allowable Peak Flow	
Storm Event	Peak Flow (L/s)
2	13.0
5	13.0
100	13.0

Rational Method Calculation

Event 2 yr
IDF Data Set City of Toronto
a = 21.80
c = -0.78

Formula:	I = aT^c	
	a,c	Constants
	T	Time of concentration
	I	Rainfall intensity

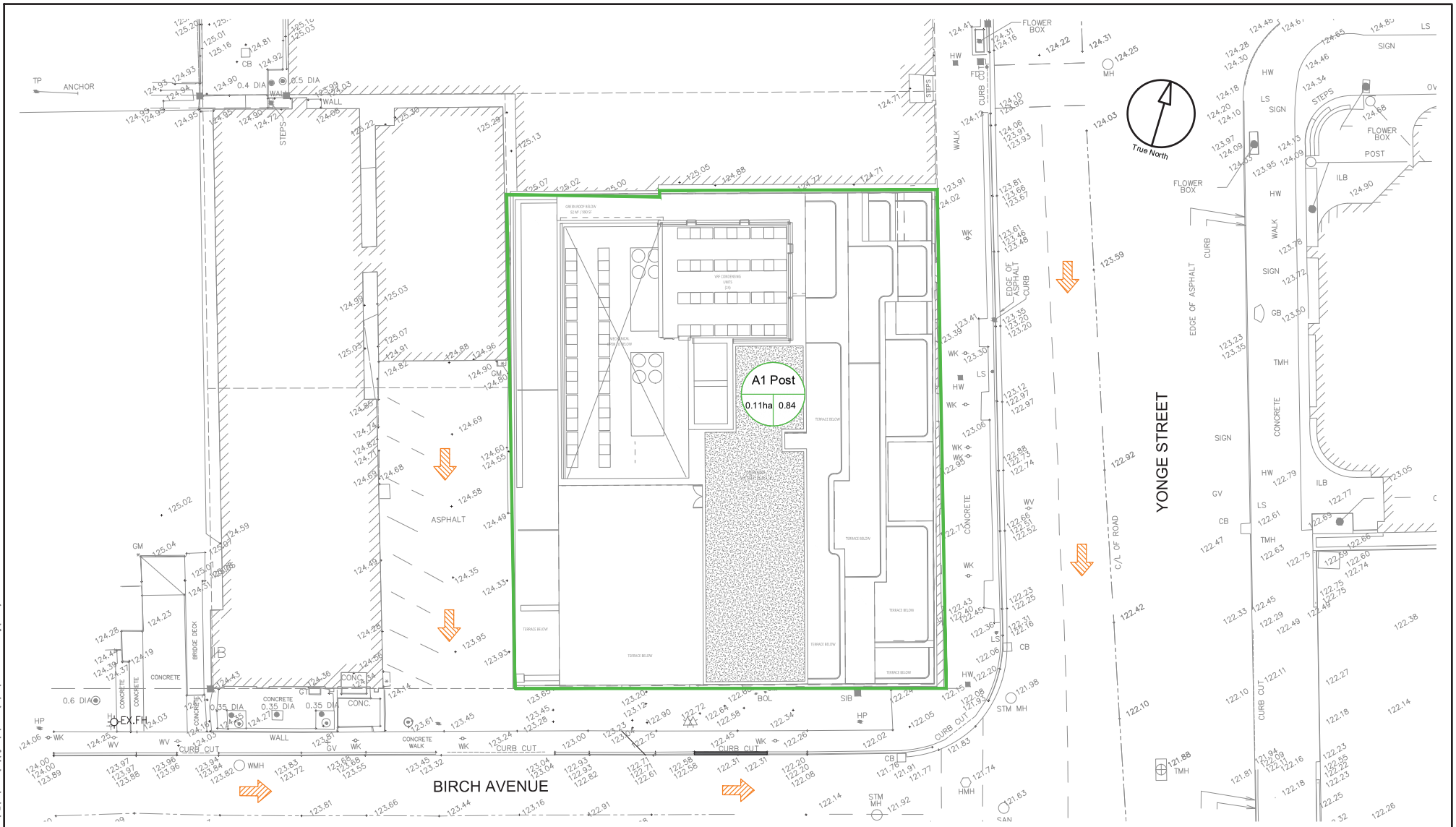
Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre	0.11	0.50	0.05	10	88.2	0.013	13.0
A1 pre (Existing)	0.11	0.90	0.10	10	88.2	0.023	23.4

Event 5 yr
IDF Data Set City of Toronto
a = 32.00
c = -0.79

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre	0.11	0.50	0.05	10	131.8	0.019	19.5
A1 pre (Existing)	0.11	0.90	0.10	10	131.8	0.035	35.0

Event 100 yr
IDF Data Set City of Toronto
a = 59.70
c = -0.80

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre	0.11	0.50	0.05	10	250.3	0.037	36.9
A1 pre (Existing)	0.11	0.90	0.10	10	250.3	0.066	66.5



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LEGEND

- PROPERTY LINE
- PROPOSED STORM DRAINAGE AREA BOUNDARY
- PROPOSED OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW DIRECTION

A1 Post (0.30ha | 0.80)
- DRAINAGE AREA IN HECTARES
- STORM DRAINAGE AREA NUMBER
- RUNOFF COEFFICIENT

POST-DEVELOPMENT STORM DRAINAGE PLAN

CREATE TO
1198-1210 YONGE STREET & 2-8 BIRCH AVENUE
CITY OF TORONTO

DATE: NOVEMBER 2021	PROJECT No.: 00134059
SCALE: 1:250	FIGURE No.: DAP-2

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Post-Development Composite Coefficient

1198-1210 Yonge St & 2-8 Birch Ave
File No. 00134059
Date: November 2021

A1 Post **Control**

	(ha)		
Total Area:	0.11		
Roof:	0.09	**Coefficient:**	0.90
Green Roof	0.01	**Coefficient:**	0.45
Composite C:	**0.84**		

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Modified Rational Method - Two Year Storm
Site Flow and Storage Summary

1198-1210 Yonge St & 2-8 Birch Ave

File No. 00134059

Date: November 2021

Site: Roof + Underground Control

Drainage Areas	A1 Post	
Total (A1 Post) Area	**0.11**	ha
"C" =	**0.84**	
AC1=	**0.09**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Release Rate (R1) =	**6.0**	L/s
Max.Storage =	**9.5**	m^3

2-Year Design Storm	
a=	21.80
c =	-0.78
I =	aT^c

Total Site Release Rate =	6.0	L/s
Allowable Release Rate =	13.0	L/s

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall Intensity**	**Storm Runoff A1 Post**	**Total Runoff Volume A1 Post**	**Released Volume A1 Post**	**A1 Post Storage Volume Required**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
		(3) =[(2)*AC1] / 360	**(4) = (3)*(1)*60**	**(5) = R1*(1)*60**	**(6) = (5)-(4)**
10.0	88.2	0.022	13.07	3.57	9.49
15.0	64.3	0.016	14.29	5.36	8.93
20.0	51.4	0.013	15.22	7.15	8.07
25.0	43.2	0.011	15.98	8.93	7.05
30.0	37.4	0.009	16.64	10.72	5.92
35.0	33.2	0.008	17.21	12.51	4.71
40.0	29.9	0.007	17.73	14.29	3.43
45.0	27.3	0.007	18.19	16.08	2.11
50.0	25.1	0.006	18.62	17.87	0.75
55.0	23.3	0.006	19.01	19.65	0.00
60.0	21.8	0.005	19.38	21.44	0.00
65.0	20.5	0.005	19.72	23.23	0.00
70.0	19.3	0.005	20.05	25.01	0.00
75.0	18.3	0.005	20.36	26.80	0.00
80.0	17.4	0.004	20.65	28.59	0.00
85.0	16.6	0.004	20.92	30.37	0.00
90.0	15.9	0.004	21.19	32.16	0.00
95.0	15.2	0.004	21.44	33.95	0.00
100.0	14.6	0.004	21.69	35.73	0.00
105.0	14.1	0.003	21.92	37.52	0.00
110.0	13.6	0.003	22.14	39.31	0.00
115.0	13.1	0.003	22.36	41.10	0.00
120.0	12.7	0.003	22.57	42.88	0.00
125.0	12.3	0.003	22.78	44.67	0.00
130.0	11.9	0.003	22.97	46.46	0.00
135.0	11.6	0.003	23.17	48.24	0.00
140.0	11.3	0.003	23.35	50.03	0.00
145.0	11.0	0.003	23.53	51.82	0.00
150.0	10.7	0.003	23.71	53.60	0.00
155.0	10.4	0.003	23.88	55.39	0.00
160.0	10.1	0.003	24.05	57.18	0.00
165.0	9.9	0.002	24.21	58.96	0.00

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Modified Rational Method - Five Year Storm
Site Flow and Storage Summary

1198-1210 Yonge St & 2-8 Birch Ave

File No. 00134059

Date: November 2021

Site: Roof + Underground Control

Drainage Areas	A1 Post	
Total (A1 Post) Area	**0.11**	ha
"C" =	**0.84**	
AC1=	**0.09**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Release Rate (R1) =	**7.8**	L/s
Max.Storage =	**14.9**	m^3

5-Year Design Storm	
a=	32.00
c =	-0.79
I =	aT^c

Total Site Release Rate =	7.8	L/s
Allowable Release Rate =	13.0	L/s

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall**	**Storm Runoff A1 Post**	**Total Runoff Volume A1 Post**	**Released Volume A1 Post**	**A1 Post Storage Volume Required**
(min)	**Intensity (mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
		(3) =[(2)*AC1] / 360	**(4) = (3)*(1)*60**	**(5) = R1*(1)*60**	**(6) = (5)-(4)**
10.0	131.8	0.033	19.53	4.67	14.85
15.0	95.7	0.024	21.26	7.01	14.25
20.0	76.2	0.019	22.59	9.35	13.24
25.0	63.9	0.016	23.67	11.68	11.99
30.0	55.3	0.014	24.59	14.02	10.58
35.0	49.0	0.012	25.40	16.35	9.05
40.0	44.1	0.011	26.13	18.69	7.44
45.0	40.2	0.010	26.78	21.03	5.75
50.0	37.0	0.009	27.38	23.36	4.02
55.0	34.3	0.008	27.93	25.70	2.23
60.0	32.0	0.008	28.45	28.04	0.41
65.0	30.0	0.007	28.93	30.37	0.00
70.0	28.3	0.007	29.38	32.71	0.00
75.0	26.8	0.007	29.81	35.04	0.00
80.0	25.5	0.006	30.22	37.38	0.00
85.0	24.3	0.006	30.61	39.72	0.00
90.0	23.2	0.006	30.98	42.05	0.00
95.0	22.3	0.005	31.33	44.39	0.00
100.0	21.4	0.005	31.67	46.73	0.00
105.0	20.6	0.005	32.00	49.06	0.00
110.0	19.8	0.005	32.31	51.40	0.00
115.0	19.1	0.005	32.61	53.74	0.00
120.0	18.5	0.005	32.91	56.07	0.00
125.0	17.9	0.004	33.19	58.41	0.00
130.0	17.4	0.004	33.46	60.74	0.00
135.0	16.9	0.004	33.73	63.08	0.00
140.0	16.4	0.004	33.99	65.42	0.00
145.0	15.9	0.004	34.24	67.75	0.00
150.0	15.5	0.004	34.48	70.09	0.00
155.0	15.1	0.004	34.72	72.43	0.00
160.0	14.7	0.004	34.95	74.76	0.00
165.0	14.4	0.004	35.18	77.10	0.00

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Modified Rational Method - Hundred Year Storm
Site Flow and Storage Summary

1198-1210 Yonge St & 2-8 Birch Ave

File No. 00134059

Date: November 2021

Site: Roof + Underground Control

Drainage Areas	A1 Post	
Total (A1 Post) Area	**0.11**	ha
"C" =	**0.84**	
AC1=	**0.09**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Release Rate (R1) =	**11.5**	L/s
Max.Storage =	**30.2**	m^3

100-Year Design Storm	
a=	59.70
c =	-0.80
I =	aT^c

Total Site Release Rate =	11.5	L/s
Allowable Release Rate =	13.0	L/s

(1)	(2)	(3)	(4)	(5)	(6)
Time	**Rainfall**	**Storm Runoff A1 Post**	**Total Runoff Volume A1 Post**	**Released Volume A1 Post**	**A1 Post Storage Volume Required**
(min)	**Intensity (mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
		(3) =[(2)*AC1] / 360	**(4) = (3)*(1)*60**	**(5) = R1*(1)*60**	**(6) = (5)-(4)**
10.0	250.3	0.062	37.09	6.91	30.18
15.0	181.0	0.045	40.22	10.36	29.86
20.0	143.8	0.036	42.60	13.82	28.79
25.0	120.3	0.030	44.55	17.27	27.28
30.0	103.9	0.026	46.20	20.73	25.48
35.0	91.9	0.023	47.65	24.18	23.47
40.0	82.6	0.020	48.94	27.63	21.31
45.0	75.1	0.019	50.11	31.09	19.02
50.0	69.1	0.017	51.17	34.54	16.63
55.0	64.0	0.016	52.16	38.00	14.16
60.0	59.7	0.015	53.07	41.45	11.62
65.0	56.0	0.014	53.93	44.90	9.02
70.0	52.8	0.013	54.73	48.36	6.38
75.0	49.9	0.012	55.50	51.81	3.68
80.0	47.4	0.012	56.22	55.27	0.95
85.0	45.2	0.011	56.90	58.72	0.00
90.0	43.2	0.011	57.56	62.18	0.00
95.0	41.3	0.010	58.18	65.63	0.00
100.0	39.7	0.010	58.78	69.08	0.00
105.0	38.2	0.009	59.36	72.54	0.00
110.0	36.8	0.009	59.91	75.99	0.00
115.0	35.5	0.009	60.45	79.45	0.00
120.0	34.3	0.008	60.97	82.90	0.00
125.0	33.2	0.008	61.46	86.36	0.00
130.0	32.2	0.008	61.95	89.81	0.00
135.0	31.2	0.008	62.42	93.26	0.00
140.0	30.3	0.007	62.87	96.72	0.00
145.0	29.5	0.007	63.32	100.17	0.00
150.0	28.7	0.007	63.75	103.63	0.00
155.0	27.9	0.007	64.17	107.08	0.00
160.0	27.2	0.007	64.58	110.53	0.00
165.0	26.6	0.007	64.97	113.99	0.00

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Modified Rational Method
Initial Abstraction / STM Storage Tank and Orifice Calculations

1198-1210 Yonge St & 2-8 Birch Ave
File No. 00134059
Date: November 2021

Initial Abstraction (IA) Calculations

Cover Type	Area (m^2)	IA (mm)	Volume (m^3)
Green Roof	149.7	5.0	0.75
Roof:	912.9	1.0	0.91
Total	**1062.6**		1.66

100 Year STM Storage Calculations

Base Area=	52.88	m^2
Volume Provided=	77.3	m^3
Volume Required=	30.2	m^3
Approx invert at tank outlet=	119.50	m
Approx. Height above orifice =	1.46	m
Ground EL=	122.30	m

Retention Storage for Water Balance

Site Water Balance Required =	5.31	m^3
Volume Required After IA	3.65	m^3
Infiltration Base Area =	**52.9**	m^2
Depth Required =	0.07	m
Depth Provided =	**0.30**	m
Actual Volume Provided =	**15.9**	m^3

Proposed Orifice Tube Design

Inside Diameter =	75	mm
Orifice Area (A) =	0.004	m^2
C =	0.80	
g =	9.81	m/s^2

$$Q = C \times A \times \sqrt{2 \times g \times h}$$

Storm Event (Year)	Maximum Head (h) (m)	Controlled Outflow (Q) (L/s)	Water Elevation (m)
2	0.18	5.96	119.72
5	0.28	7.79	119.82
100	0.58	11.51	120.12

IBI GROUP
8133 Warden Ave, Unit 300
Markham, ON L6G 1B3 Canada
tel 905 754 8060 fax 905 940 2064
ibigroup.com

Water Quality Calculations

1198-1210 Yonge St & 2-8 Birch Ave
File No. 00134059
Date: November 2021

Surface	Method	Effective TSS Removal	Area (Sq.m)	% Area of Site	Overall TSS Removal
Roof	None (Inherent)	80%	1062.6	100%	80%
Landscaping	None (Inherent)	80%	0.0	0%	0%
Total			1062.6	100%	80%

The minimum TSS removal requirement is 80%

Appendix D
Sanitary Data Analysis

AQUAFLOW TECHNOLOGY INC

226 WILKINSON ROAD, BRAMPTON, ONTARIO L6T 4N7
(905) 792-8169

STORM AND COMBINED SEWER INVESTIGATION & DYE TEST REPORT

100 MM TO 1350 MM DIAMETER STORM SEWERS & 100 MM TO 1275 MM DIAMETER COMBINED SEWERS

FOR

1198 - 1201 YONGE STREET & 2 - 8 BIRCH AVENUE

CITY OF TORONTO

CONSULTING ENGINEER: IBI GROUP
CONSULTING ENGINEER'S REPRESENTATIVE: JACKY LEE
DEVELOPER: BIRCH EQUITIES LTD.
DEVELOPER'S REPRESENTATIVE: PAUL DYDULA

WEDNESDAY, SEPTEMBER 22ND, 2021

INDEX:

1. **TITLE PAGE AND INDEX**

2. **SUMMARY REPORT AND CONCLUSIONS**

3. **SKETCH OF SEWERS INSPECTED**

SEWER CLEANING, VIDEO INSPECTION, INSITU REPAIRS & MUNICIPAL ENGINEERING SERVICES

2. SUMMARY REPORT AND CONCLUSIONS:

The investigation of the storm and combined sewer system at 1198 - 1210 Yonge Street and 2 - 8 Birch Avenue was carried out by Steven Lostracco, P.Eng. of Aquaflow Technology, and was authorized by Jacky Lee of IBI Group. The investigation was carried out on Wednesday September 22nd, 2021.

The purpose of this report was to determine of the existing property is connected to the municipal storm or combined sewer system, and if the street catchbasins connect to the storm or combined sewer system.

1. All roof storm water drainage and sanitary drainage from the following properties connects to the 750 x 1125 mm combined sewer on Yonge Street.
- 1208 Yonge
- 1206 Yonge
- 1204 Yonge
- 1202 Yonge
- 8 Birch

2. All roof storm water drainage from the following properties discharges to the ground surface.
- 1210 Yonge
- 1198 Yonge
- Rear small roof extension 1202 Yonge


8


1198


NOTICE


1202


ARTBYDONNASVED.CA
1202


1204
BUSINESS HOURS
A.M.
P.M.
MONDAY
TUESDAY
8: 30
6: 00


JOSEPH'S HAIRSTYLING
Barber Shop
Hair Cut & Shave
OPEN

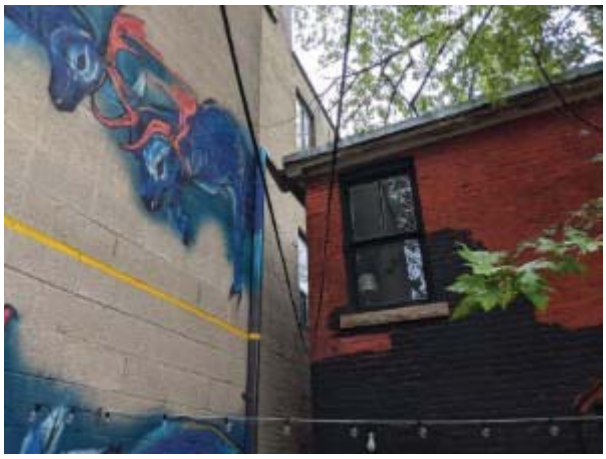

1206


GV&Co


1208


BOXCAR
SOCIAL
CAFE


BOXCAR SOCIAL



Report Prepared by:

Steven Lostracco, P. Eng.

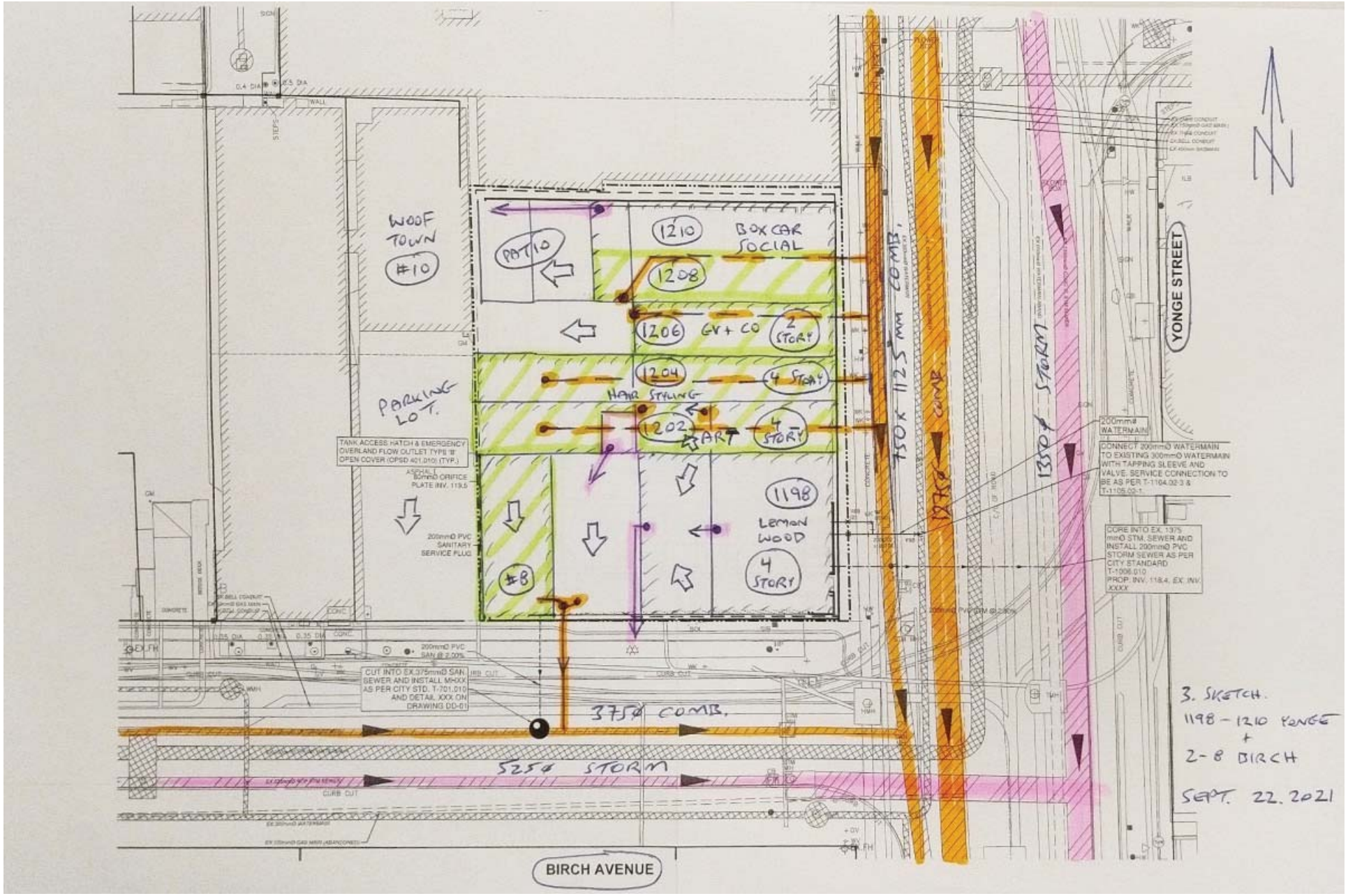

WOOF TOWN #10
PARKING LOT.
PAT 10
1210
BOX CAR SOCIAL
1208
1206
GV + CO
2 STORY
1204
HAIR STYLING
4 STORY
1202
ART
4 STORY
1198
LEMON WOOD
4 STORY
#8
YONGE STREET
BIRCH AVENUE
TANK ACCESS HATCH & EMERGENCY OVERLAND FLOW OUTLET TYPE 'B' OPEN COVER (OPSD 401.010) (TYP.)
200mmØ PVC SANITARY SERVICE PLUG
CUT INTO EX.375mmØ SAN. SEWER AND INSTALL MHXX AS PER CITY STD. T-701.010 AND DETAIL XXX ON DRAWING DD-01
200mmØ PVC SAN @ 2.00%
200mmØ WATERMAIN
CONNECT 200mmØ WATERMAIN TO EXISTING 300mmØ WATERMAIN WITH TAPPING SLEEVE AND VALVE. SERVICE CONNECTION TO BE AS PER T-1104.02-3 & T-1105.02-1
CORE INTO EX. 1375 mmØ STM. SEWER AND INSTALL 200mmØ PVC STORM SEWER AS PER CITY STANDARD T-1006.010 PROP. INV. 118.4, EX. INV. XXXX
3750 COMB.
5250 STORM
1350 STORM
1350 COMB.
1125 mm COMB.
3. SKETCH.
1198 - 1210 YONGE
+
2-8 BIRCH
SEPT. 22. 2021

Table D-0 Site Parameters

Total Site Area Existing	0.110	ha.	Draining to Birch Avenue
Total Site Area Proposed	0.110	ha.	Draining to Birch Avenue

Existing Site Flows

Component	Area(m2)	Rate (p/100m2)	Capita
Existing Buildings	1100	1.1	12
		Total Existing Flow	**0.2** L/s

Peaking Factor	**4.5**	
Flow Gen. Rate	**250**	**L/cap/day**
Peaked DWF	**0**	**L/s**
I-I Rate	0.26	L/s/ha
I-I Flow	0.03	L/s
Total Design Flow	**0.19**	L/s

Proposed Site Flows

Component	Unit Count	Rate (ppu)	Capita
Studio Units	3	1.4	4.2
1 / 1 + Den Bedroom Units	13	1.4	18.2
2 / 2 + Den Bedroom Units	41	2.1	86.1
3 Bedroom Units	10	3.1	31.0
Townhouse	0	2.7	0.0
Retail Unit (m^2)	201	1.1p/100m^2	2.2
Total			142

Sanitary Population Flow		
Flow Generation Rate Residential :	240	L/capita/day
Average Wastewater Flow Residentail :	0.39	L/s
Peaking Factor:	4.20	(Harmon)
Peaked Wastewater Flow:	1.65	L/s
Assumed Ground Water Pump Rate(Basement is watertight)	0.00	L/s
Site Infiltration	0.19	L/s
Total Proposed Flow	**1.84**	L/s

IBI GROUP
8133 Warden Ave, Unit 300
Markham, ON L6G 1B3 Canada
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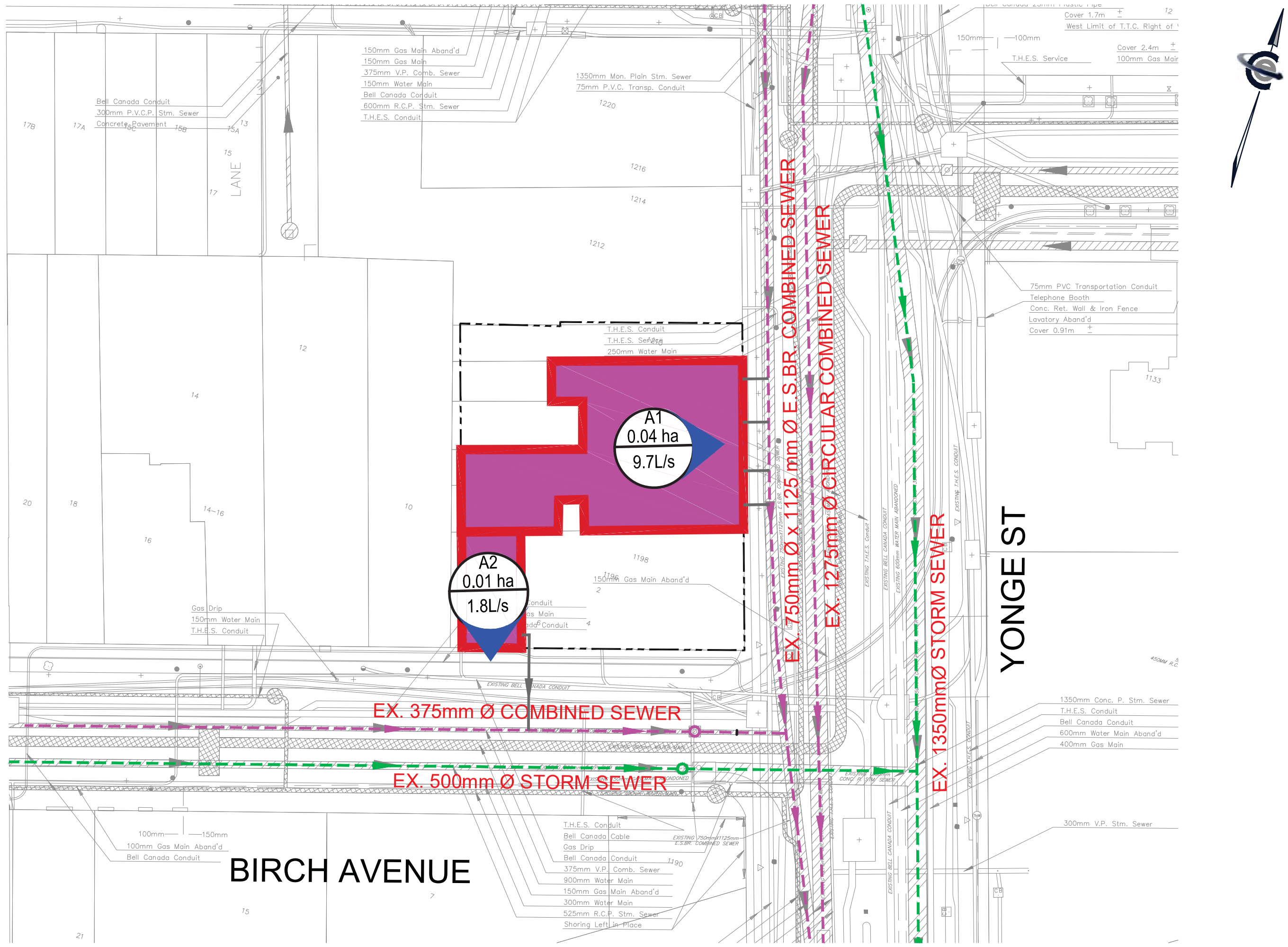

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LEGEND

- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING COMBINED SEWER
- EXISTING COMBINED MANHOLE
- PROPOSED SEWER
- EXISTING AREA`S DISCHARGING TO STORM SEWERS
- EXISTING AREA`S DISCHARGING 2-YEAR STORM INTO COMBINED SEWERS (F-5-5 CONSIDERATION)
- A2 – AREA NUMBER; 0.01 ha – DRAINAGE AREA (ha); 1.8L/s – TOTAL 2-YEAR STORM FLOW (L/s)

PRE - DEVELOPMENT SANITARY DRAINAGE AREA

MIXED USE DEVELOPMENT
1198-1210 YONGE STREET & 2-8 BIRCH AVENUE
TORONTO, ONTARIO

DATE:	SEP 2021	PROJECT No.	2013-4059
SCALE:	1:500	FIGURE No.	SDP-1

Appendix E
Water Data Analysis

IBI GROUP
8133 Warden Ave, Unit 300
Markham, ON L6G 1B3 Canada
tel 905 754 8060 fax 905 940 2064
ibigroup.com

DOMESTIC WATER DEMAND

Project:	1198-1210 Yonge St & 2-8 Birch Ave, Toronto	Proj. #	00134059
Date:	November-2021		
Calc'ed by:	Danielle De Vera		

Note:
Based on the City of Toronto Standards and the Ontario Building Code, Part 8 "Sewage Systems", OBC Table 8.2.1.3.A and 8.2.1.3.B

	Site Component	Site					
Residential Occupancy Data	Studio / 1 / 1+d bed units	16					
	People per unit	*1.4*					
	2 bed units / 2+D	41					
	People per unit	*2.1*					
	3 bed units	10					
	People per unit	*3.1*					
	4 bed units						
	People per unit	*3.7*					
	Townhouse units						
	People per unit	*2.7*					
	Hotel Room						
	Person per room	*1.0*					
Commercial Occupancy Data	Retail GFA (m2)	201 sq m					
	person / 100 m2	*1.1*					
	Office (m2)						
	person / 100 m2						
	blank						
	blank						

Unit Quantity by Site Component	Water Demand	Units	Equivalent Population (persons)					
Residential Occupancies								
Apartments, Condominiums, Other Multi-family Dwellings	190	L/person/day	142	-	-	-	-	-
Not used	-	-	-	-	-	-	-	-
Not used	-	-	-	-	-	-	-	-
Other Occupancies								
Commercial or Retail	250	L/person/day	2	-	-	-	-	-
Office Building	75	L/9.3m2 of floor area/day		-	-	-	-	-
Not used	-	-	-	-	-	-	-	-

Daily Flow Rate (L/d)								
Residential Occupancies								
Apartments, Condominiums, Other Multi-family Dwellings		26,980.00	26980.00	0	0	0	0	0
Not used		0	0	0	0	0	0	0
Not used		0	0	0	0	0	0	0
Other Occupancies								
Commercial or Retail		500.00	500	0	0	0	0	0
Office Building		0	0	0	0	0	0	0
Not used		0	0	0	0	0	0	0
		Total Flow						
Average day (L/d)		**27480.00**	27480.00	0.00	0.00	0.00	0.00	0.00
Average day (L/s)		**0.32**	0.32	0.00	0.00	0.00	0.00	0.00
Max. day (L/d)		**41020.00**	41020.00	0.00	0.00	0.00	0.00	0.00
Min. hour (L/hr)		**916.83**	916.83	0.00	0.00	0.00	0.00	0.00
Peak hour (L/hr)		**2554.38**	2554.38	0.00	0.00	0.00	0.00	0.00
Peak hour (L/s)		**0.71**	0.71	0.00	0.00	0.00	0.00	0.00

Peaking Factors			
Land Use	Minimum Hour	Peak Hour	Maximum Day
Residential	0.8	2.25	1.50
Commercial / Retail	0.84	1.20	1.10

IBI GROUP
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ibigroup.com

FIRE FLOW CALCULATION

Project:	1198-1210 Yonge St & 2-8 Birch Ave, Toronto	Proj. #	00134059
Date:	November-2021		
	Danielle De Vera		

Fire Resistive Construction:	YES	Site Component:	Site					
The following calculations are for the proposed development and are based on the largest floorplate area. The FUS requires that a minimum water supply source 'F' be provided at 150KPa. The minimum flow 'F' can be calculated as such:	**Total Floor Area**	Largest Floor Area (m2)	880					
		Area Above (m2)	818					
		Area Below (m2)	664					
		Total Floor Area (m2)	1250					
$F = 2C\sqrt{A}$	**Flow (F)**	C (dimensionless)	0.6					
		A (m2)	1250					
		F (L/min)	5000					
F = Required fire flow L/min	**Reduction Factor**	F (L/min)	5000					
C = Coefficient related to construction		f_1 (dimensionless)	0.85					
A = Total area in m^2		F' = F x f_f (L/min)	4250					
		f_1 = occupancy factor; ie, Residential, f_1 = 0.85; for Retail or Commercial, f_1 = 1.00						
'Calculations, formulas and factors are as per Fire Underwriter's Survey (FUS) Water Supply for Public Fire Protection	**Sprinkler and Exposure Increase or Decrease**	f_2 (sprinkler factor)	30%					
		North Side	25%					
		East Side	10%					
		South Side	15%					
		West Side	15%					
		f_3	65%					
		f_3 = Exposure factor not to exceed 75%, determined as per FUS Guide Item 4, page 18)						

F' (L/min)	**4250**					
S = F' * f_2*(L/min)*	**1275**					
E = F' * f_3*(L/min)*	**2762.5**					

F''=F'-S+E (L/min) rounded to nearest 1,000	**6000**					
F''(L/s)	**100**					
F''(USGPM)	**1590**					

Table 1

Sprinkler Reduction Factor (f_2)		
No Sprkinkler System	Sprinklered	Sprink. + Supervised
0%	30%	50%

Table 2

Construction Type "C" Factor			
Wood Frame	Ordinary Construction	Non-Combustible	Fire Resistive
1.5	1	0.80	0.60

Table 3

Occupancy Factor (f_1)				
Rapid Burning	Free Burning	Combustible	Limited Combustible	Non-Combust.
25%	15%	0%	-15%	-25%

Table 4

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

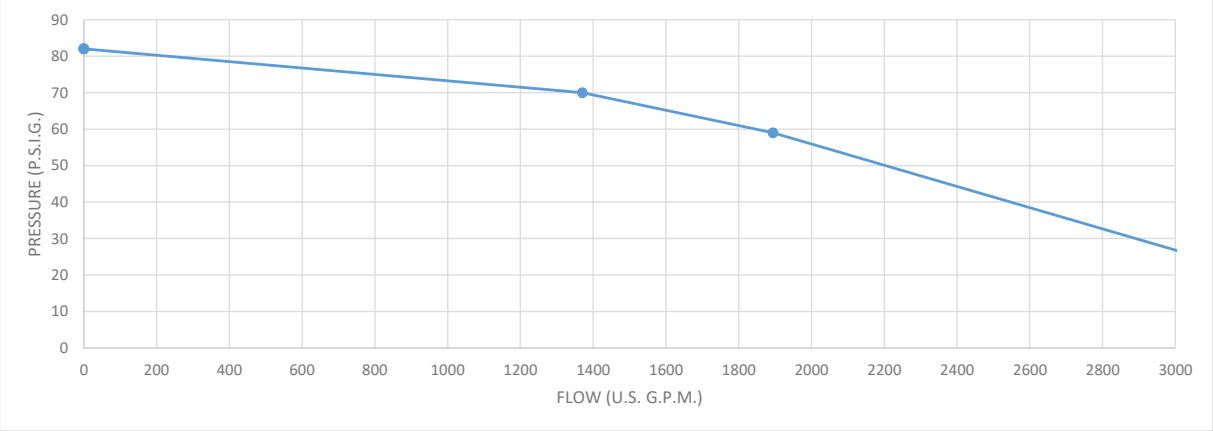
10 Estate Drive
Toronto, Ontario
Canada M1H 2Z1

T 416.282.1665
F 416.282.7702
www.corix.com

FLOW TEST REPORT

Date	NOVEMBER 15TH 2019
Customer	EXP
Job Location	2-8 BIRCH AVENUE, TORONTO ON.
Time of Test	12:40PM
Location of test (flow)	McAVITY 2PORT HYD, S/W CORNER OF YONGE STREET AND BIRCH AVE, TORONTO.
Location of test (residual)	TWW HYD, 16 BIRCH AVENUE, TORONTO
Main Size (mm)	
Static Pressure (psi)	82

	Number of Outlets & Orifice Size	PITOT Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
#1	1 x 1 1/8		0	82
#2	1 x 1 3/4		0	82
#3	1 x 2 1/2	67	1370	70
#4	2 x 2 1/2	32	1894	59
#5			3235	20
Colour code	Blue			



Comments	DUE TO THE FLOW HYDRANT LOCATION THE "PLAYPIPE" COULD NOT BE USED IN ORDER TO OBTAIN THE SMALLER ORIFICE READINGS (VEHICLES TOO CLOSE AND EXISTING BUILDING)
Crew Member	DON KHOE

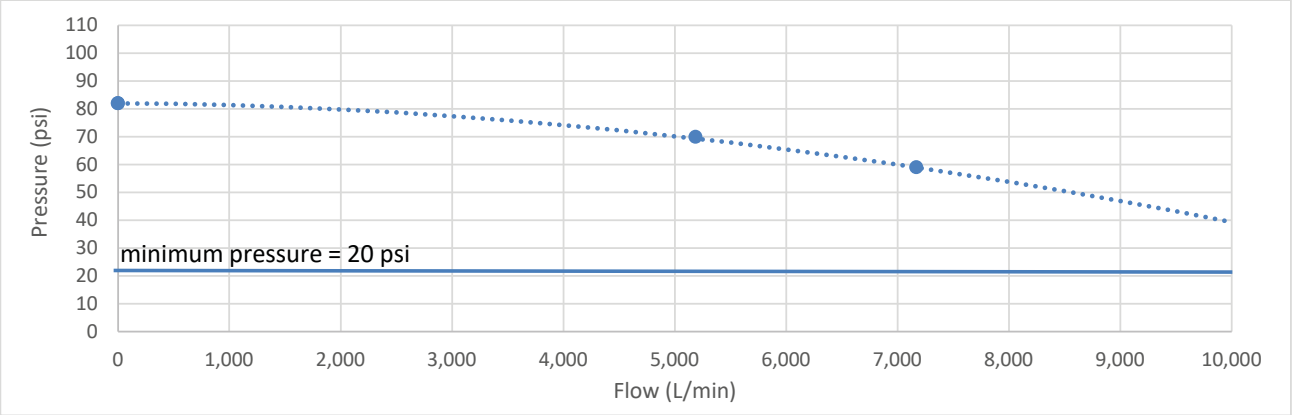
Water System Pressure Calculation Worksheet

1198 - 1210 Yonge St & 2-8 Birch Ave, Toronto

Hydrant Flow Test Results

Flow Test Location: Southwest corner of Yonge St and Birch Ave
Residual Test Location: 16 Birch Ave
Main Size: 150mm Dia.
Test Date: 15-Nov-19
Tested By: Don Khoe

Number of Outlets & Orifice Size	Pilot Pressure (psi)	Flow (US GPM)	Flow (L/min)	Residual Pressure (psi)
1 x 1 1/8"		0	0	82
1 x 1 3/4"		0	0	82
1 x 2 1/2"	67	1,370	5,186	70
2 x 2 1/2"	32	1,894	7,170	59
		3,235	12,246	20



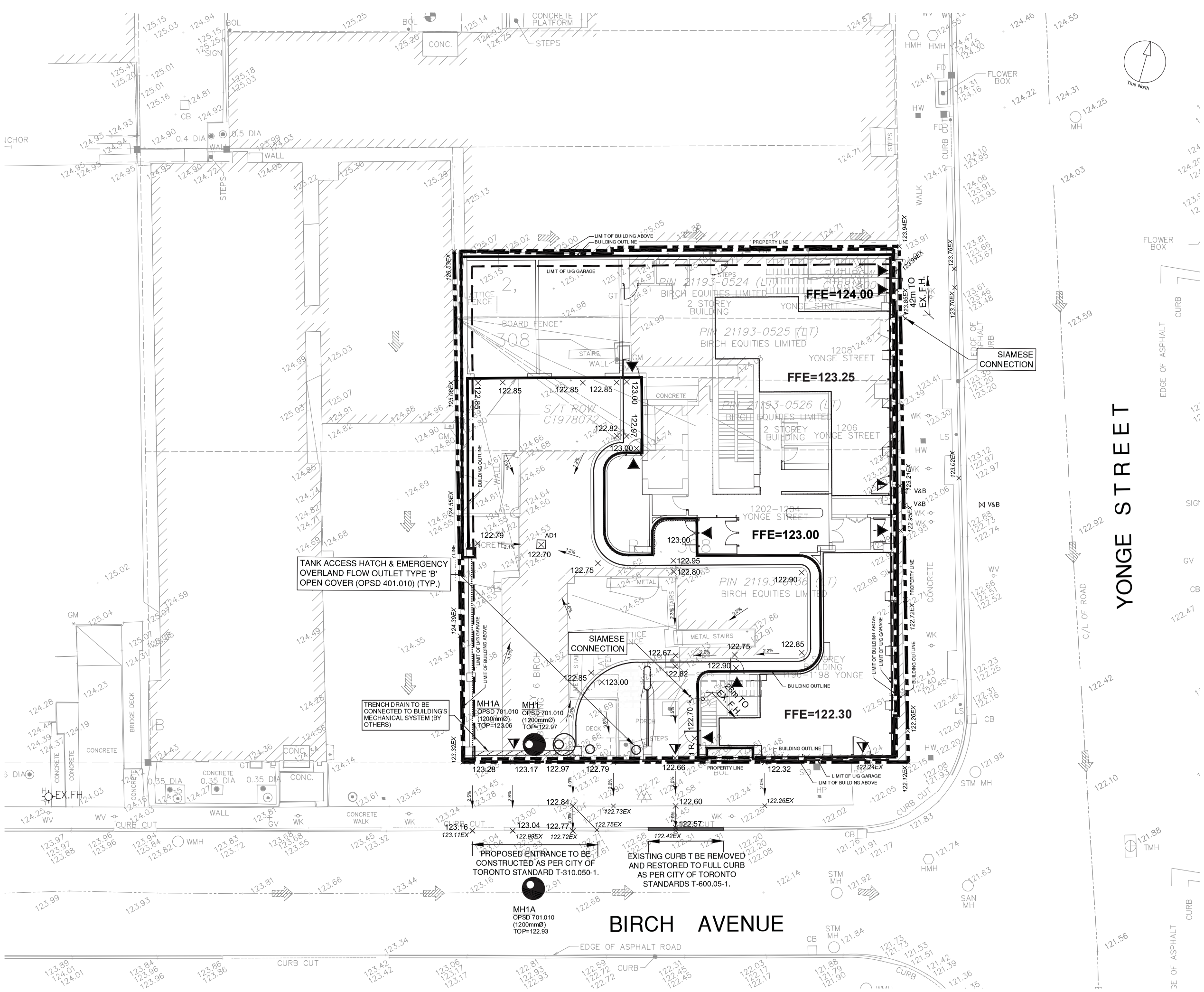
$$Q_R = \mathrm{Q_T}\left(\frac{\mathrm{P_S} - \mathrm{Pr}}{\mathrm{P_S} - \mathrm{Pt}}\right)\text{^}0.54$$

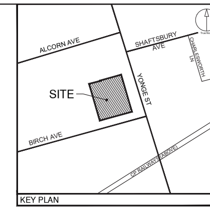
Where,

Q_r = Projected Flow Rate
Q_t = Flow Rate from Flow Test = 12246 L/min
P_s = Static Pressure = 82 psi
P_r = Desired System Pressure
P_t = Residual Presure inTest = 20 psi

Pressure Under Fire Suppression (P_{r1}) =	20.0	psi
Calculated Flow Rate (Q_{r1}) =	12,246	L/min
Pressure Under Normal Operation (P_{r2}) =	40.0	psi
Calculated Flow Rate (Q_{r2}) =	9,923	L/min

Appendix F
Engineering Plans





KEY PLAN

CLIENT
BIRCH EQUITIES LIMITED
1133 YONGE ST, SUITE 601, M4T 2Y7

ISSUES

No.	DESCRIPTION	DATE
01	ISSUED FOR SUBMISSION	NOV 09, 2021

LEGEND

- PROPERTY LINE
- BUILDING OUTLINE
- UNDERGROUND LIMIT
- ROOF OUTLINE
- PROPOSED GRADE ×128.63
- PROPOSED GRADE (TOP OF CURB) ×130.15TC
- PROPOSED GRADE (BOTTOM OF CURB) ×130.00BC
- EXISTING GRADE ×128.53EX
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED VALVE AND BOX V&B
- PROPOSED SIAMESE CONNECTION
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING CATCH BASIN
- EXISTING FIRE HYDRANT
- EMERGENCY OVERLAND FLOW ROUTE
- EXISTING OVERLAND FLOW ROUTE
- FFE (FINISHED FLOOR ELEVATION) FFE=115.05
- PROP. MAIN ENTRANCE / DOOR / O/H DOOR

SEAL

TORONTO ENGINEERING & CONSTRUCTION SERVICES DIVISION

ACCEPTED TO BE IN ACCORDANCE WITH THE CITY OF TORONTO STANDARDS. THIS ACCEPTANCE IS NOT TO BE CONSTRUED AS VERIFICATION OF ENGINEERING CONTENT.

MANAGER, DEVELOPMENT ENGINEERING DATE

IBI GROUP
Unit 300 – 8133 Warden Avenue
Markham ON L6G 1B3 Canada
tel 905 763 2322 fax 905 763 9983
ibigroup.com

PROJECT
1198-1210 YONGE STREET REDEVELOPMENT
1198 - 1210 YONGE ST AND 2-8 BIRCH AVE

LIST OF DRAWINGS
SS-01 (SITE SERVICING PLAN)
SG-01 (SITE GRADING PLAN)
EC-01 (EROSION AND SEDIMENT CONTROL PLAN)
DD-01 (GENERAL NOTES AND DETAILS)
XS-01 (CROSS SECTIONS)

PROJECT NO: 00134059
DRAWN BY: **JL** CHECKED BY: **VJD**
PROJECT MGR: **JL** APPROVED BY: **NS**

SITE PLAN INFORMATION
KPMB ARCHITECTS
351 KING STREET EAST
SUITE 1200
TORONTO, CANADA, M5A 0L6
416 977 5104

SURVEYOR INFORMATION
JD BARNES LIMITED
330-550 QUEEN ST EAST
TORONTO, CANADA, M5A 1V2
416 368 3737
416 368 5308

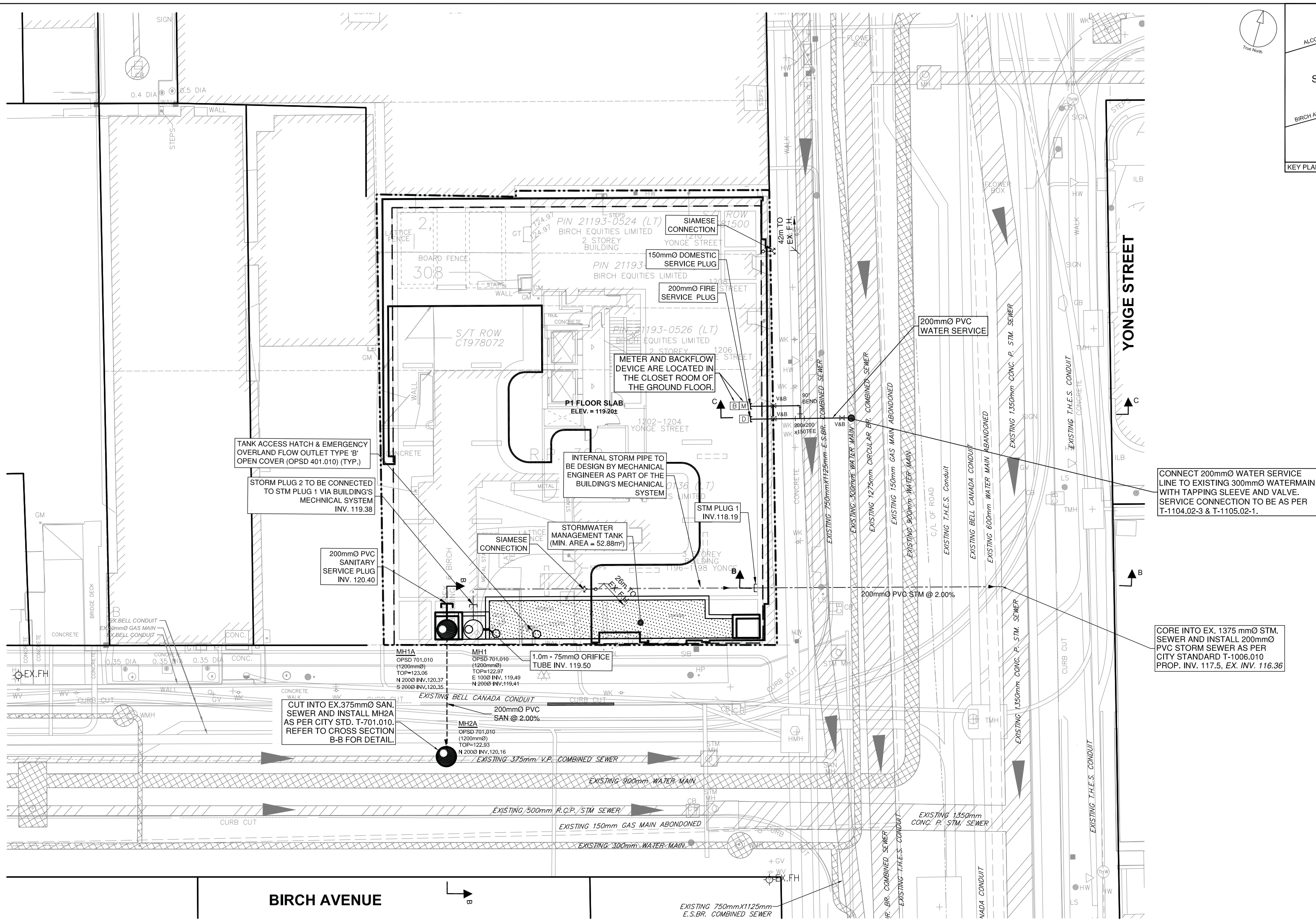
SHEET TITLE
PRELIMINARY SITE GRADING PLAN

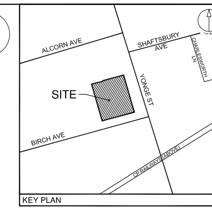
BENCHMARK INFORMATION:
ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE RELATED TO THE CITY OF TORONTO BENCHMARK No. 12219740845, HAVING AN ELEVATION = 122.193m METRES.

SCALE: 1:150

SHEET NUMBER SG-01 ISSUE 01

SCALE CHECK 10mm 1 in





KEY PLAN

CLIENT
BIRCH EQUITIES LIMITED
1133 YONGE ST, SUITE 601, M4T 2Y7

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IBI Group Professional Services (Canada) Inc.
is a member of the IBI Group of companies

ISSUES

No.	DESCRIPTION	DATE
01	ISSUED FOR SUBMISSION	NOV 09, 2021

LEGEND
- PROPERTY LINE
- UNDERGROUND LIMIT
- OUTLINE OF GROUND FLOOR
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED VALVE AND BOX (V&B)
- PROPOSED SIAMESE CONNECTION
- PROPOSED DOMESTIC WATER METER (M)
- PROPOSED BACKFLOW PREVENTER (B)
- PROPOSED DOUBLE CHECK DETECTOR (D)
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING CATCH BASIN (CB)
- EXISTING FIRE HYDRANT (EX.FH)
- PROPOSED FIRE HYDRANT (PROP.FH)
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATER
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATER
- GROUND FLOOR DOOR

SEAL

TORONTO ENGINEERING & CONSTRUCTION SERVICES DIVISION

ACCEPTED TO BE IN ACCORDANCE WITH THE CITY OF TORONTO STANDARDS. THIS ACCEPTANCE IS NOT TO BE CONSTRUED AS VERIFICATION OF ENGINEERING CONTENT.

MANAGER, DEVELOPMENT ENGINEERING DATE

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1198 - 1210 YONGE ST AND 2-8 BIRCH AVE

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416 368 5308

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PRELIMINARY SITE SERVICING PLAN

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SCALE:

SHEET NUMBER: SS-01
ISSUE: 01

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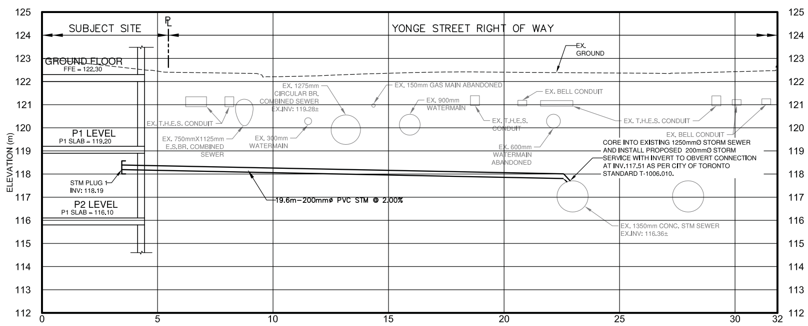
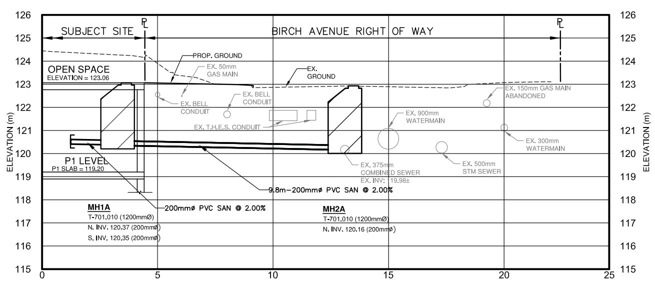


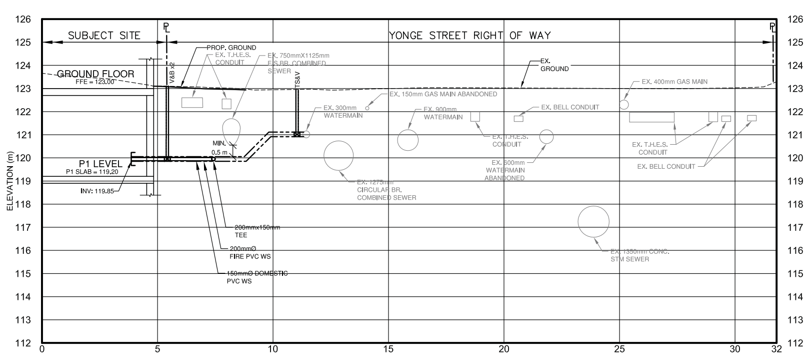
SECTION A-A (STORM CONNECTION)

H 1:100
V 1:100



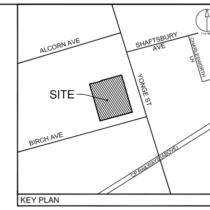
SECTION B-B (SANITARY CONNECTION)

H 1:100
V 1:100



SECTION C-C (WATERMAIN CONNECTION)

H 1:100
V 1:100



KEY PLAN

CLIENT

BIRCH EQUITIES LIMITED

1133 YONGE ST, SUITE 601, M4T 2Y7

ISSUES

No.	DESCRIPTION	DATE
01	ISSUED FOR SUBMISSION	NOV 09, 2021

LEGEND

SEAL

TORONTO ENGINEERING & CONSTRUCTION SERVICES DIVISION

ACCEPTED TO BE IN ACCORDANCE WITH THE CITY OF TORONTO STANDARDS. THIS ACCEPTANCE IS NOT TO BE CONSTRUED AS VERIFICATION OF ENGINEERING CONTENT.

MANAGER, DEVELOPMENT ENGINEERING DATE

IBI GROUP
Unit 300 – 8133 Warden Avenue
Markham ON L6G 1B3 Canada
tel 905 763 2322 fax 905 763 9983
ibigroup.com

PROJECT

1198-1210 YONGE STREET REDEVELOPMENT

1198 - 1210 YONGE ST AND 2-8 BIRCH AVE

LIST OF DRAWINGS
SS-01 (SITE SERVICING PLAN)
SG-01 (SITE GRADING PLAN)
EC-01 (EROSION AND SEDIMENT CONTROL PLAN)
DD-01 (GENERAL NOTES AND DETAILS)
XS-01 (CROSS SECTIONS)

PROJECT NO: 00134059

DRAWN BY: JL	CHECKED BY: VJD
PROJECT MGR: JL	APPROVED BY: NS

SITE PLAN INFORMATION
KPMB ARCHITECTS
351 KING STREET EAST
SUITE 1200
TORONTO, CANADA, M5A 0L6
416 977 5104

SURVEYOR INFORMATION
JD BARNES LIMITED
330-550 QUEEN ST EAST
TORONTO, CANADA, M5A 1V2
416 368 3737
416 368 5308

BENCHMARK INFORMATION:
ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE RELATED TO THE CITY OF TORONTO BENCHMARK No. 12219740845, HAVING AN ELEVATION = 122.193m METRES.

SCALE: 1:100

SHEET TITLE

CONCEPTUAL SECTION DRAWINGS

SHEET NUMBER XS-01

ISSUE 01

Appendix G
Statement of Limiting Conditions and Assumptions

Statement of Limiting Conditions and Assumptions

1. This Report/Study (the "Work") has been prepared at the request of, and for the exclusive use of, the Owner, and its affiliates (the "Intended Users"). No one other than the Intended Users has the right to use and rely on the Work without first obtaining the written authorization of IBI Group Professional Services (Canada) Inc. (IBI Group) and its Owner.

2. IBI Group expressly excludes liability to any party except the Intended Users for any use of, and/or reliance upon, the Work.

3. IBI Group notes that the following assumptions were made in completing the Work:

    a) the land use description(s) supplied to us are correct;
    b) the surveys and data supplied to IBI Group by the Owner are accurate;
    c) market timing, approval delivery and secondary source information is within the control of Parties other than IBI Group; and,
    d) there are no encroachments, leases, covenants, binding agreements, restrictions, pledges, charges, liens or special assessments outstanding, or encumbrances which would significantly affect the use or servicing.

    Investigations have not been carried out to verify these assumptions. IBI Group deems the sources of data and statistical information contained herein to be reliable, but we extend no guarantee of accuracy in these respects.

4. IBI Group accepts no responsibility for legal interpretations, questions of survey, opinion of title, hidden or inconspicuous conditions of the property, toxic wastes or contaminated materials, soil or sub-soil conditions, environmental, engineering or other factual and technical matters disclosed by the Owner, the Client, or any public agency, which by their nature, may change the outcome of the Work. Such factors, beyond the scope of this Work, could affect the findings, conclusions and opinions rendered in the Work. We have made disclosure of related potential problems that have come to our attention. Responsibility for diligence with respect to all matters of fact reported herein rests with the Intended Users.

5. IBI Group practices engineering in the general areas of infrastructure and transportation. It is not qualified to and is not providing legal or planning advice in this Work.

6. The legal description of the property and the area of the site were based upon surveys and data supplied to us by the Owner. The plans, photographs, and sketches contained in this report are included solely to aide in visualizing the location of the property, the configuration and boundaries of the site, and the relative position of the improvements on the said lands.

7. We have made investigations from secondary sources as documented in the Work, but we have not checked for compliance with by-laws, codes, agency and governmental regulations, etc., unless specifically noted in the Work.

8. Because conditions, including capacity, allocation, economic, social, and political factors change rapidly and, on occasion, without notice or warning, the findings of the Work expressed herein, are as of the date of the Work and cannot necessarily be relied upon as of any other date without subsequent advice from IBI Group.

9. The value of proposed improvements should be applied only with regard to the purpose and function of the Work, as outlined in the body of this Work. Any cost estimates set out in the Work are based on construction averages and subject to change.

10. Neither possession of the Work, nor a copy of it, carries the right of publication. All copyright in the Work is reserved to IBI Group. The Work shall not be disclosed, produced or reproduced, quoted from, or referred to, in whole or in part, or published in any manner, without the express written consent of IBI Group and the Owner.

11. The Work is only valid if it bears the professional engineer's seal and original signature of the author, and if considered in its entirety. Responsibility for unauthorized alteration to the Work is denied.