Site Servicing and Stormwater Management Report
365 Forest Street, Ottawa, ON

Client:
11061917 Canada Inc.
200-768 St. Joseph Boulevard
Gatineau, QC J8Y 4B8

Submitted for:
Site Plan Control, Zoning By-law Amendment & Official Plan Amendment

Project Name:
365 Forest Street

Project Number:
OTT-00252570-A0

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Date Submitted:
2023-10-30

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1 Introduction

1.1 Overview

EXP Services Inc. (EXP) was retained by 11061917 Canada Inc. to prepare a Site Servicing and Stormwater Management report for the proposed redevelopment of 365 Forest Street in support of Official Plan Amendment, Zoning By-Law Amendment and Site Plan Control applications.

The 0.54 hectare site is situated at the corner of Richmond Road and Forest Street as illustrated in **Figure 1-1** below. The site is within the City of Ottawa urban boundary and situated in Bay Ward. The description of the subject property is noted below:

- Part of Lots 42, 56 and 57, Registered Plan 311, in the City of Ottawa, consisting of:
- PIN 039620357 or 1420 Richmond Road.
- PIN 039620356 or 365 Forest Street.
- PIN 039620352 or 2589 Bond Street.
- PIN 039620390 & PIN 039620391, 2583 Bond Street.

The development will consist of two high-rise buildings. Tower A is a 12-storey high-rise comprised of 168 units and Tower B is 12-storey high-rise and comprised of 223 units. Below the towers, four levels of underground parking will be provided. As part of the development, a road widening will be provided to the City along Richmond Road (18.75 m from centreline), reducing the site area to 0.51 hectares.

This report will discuss the adequacy of the adjacent municipal watermain, sanitary sewers and storm sewers to provide the required water supply, convey the sewage and stormwater flows that will result from the proposed development. This report provides a design brief for submission, along with the engineering drawings, for City approval.

Figure 1-1 - Site Location

2 Existing Conditions

Within the four subject properties, there are two (2) existing buildings. The following summarizes the current land use conditions.

- 1420 Richmond Road — Vacant property, but currently used as gravel parking lot.
- 365 Forest Street — Automobile garage and repair shop including asphalt parking lot.
- 2589 Bond Street — Automobile repair shop and asphalt parking lot.
- 2583 Bond Street — Vacant property.

All four properties are zoned Arterial Mainstreet Zone (AM10).

The topography of the subject site falls in a southerly and easterly direction along Forest Street and Bond Street, with a localized roadway sag condition on Forest Street approximately ±50m south of Richmond Road.

3 Existing Infrastructure

The site includes two commercial buildings that will be removed during the redevelopment of the site.

From review of the sewer and watermain mapping, as-built drawings and Utility Central Registry (UCC) plans, the following summarizes the onsite and adjacent offsite infrastructure:

Within property

- Storm, sanitary and watermain laterals to the two buildings that will be abandoned.

On Bond Street

- 150mm watermain
- 225mm sanitary sewer
- 300mm storm sewer
- 35mm Gas / Bell / Streetlighting/ Hydro

On Forest Street

- 300mm watermain
- 250mm sanitary sewer
- 300mm storm sewer
- Hydro /Bell / Streetlighting / Hydro

On Richmond Road

- 300mm watermain
- 225 mm sanitary sewer
- 525mm storm sewer
- 200mm Gas / Hydro / Bell / Streetlighting

As-built drawings for Bond Street, Forest Street, and Richmond Road were obtained from the City's vault and are included in **Appendix F**.

1.3 Pre-Consultation / Permits / Approvals

A pre-consultation meeting was held with the City prior to design commencement. This meeting outlined the submission requirements and provided information to assist with the development proposal. A copy of pre-consultation correspondence is included in **Appendix E**.

The proposed site is located within the Rideau Valley Conservation Authority (RVCA) jurisdiction, therefore signoff from the RVCA will be required prior to Site Plan approval. The RVCA has been contacted to confirm the stormwater management quality control requirements. A copy of the correspondence with the RCVA is attached in **Appendix E**.

Generally, an Environmental Compliance Approval (ECA) would be obtained from the Ministry of Environment, Conservation and Parks (MECP), formerly the Ministry of the Environment and Climate Change (MOECC), for any onsite private Sewage Works.

The onsite Sewage Works would generally include the onsite stormwater works such as flow controls, associated stormwater detention, and treatment works. However, an Approval Exemption under Ontario Regulation 525/98 can be applied. Under Section 3 of O. Reg 525/98, Section 53 (1) and (3) do not apply to the alteration, extension, replacement or a change to a stormwater management facility that 1) is designed to service one lot or parcel of land, b) discharges into a storm sewer that is not a combined sewer, c) does not service industrial land or a structure located on industrial land, and finally d) is not located on industrial land.

Based on this exemption, if the parcels noted above are merged into one property parcel, then by completing this the Approval Exemptions under O. Reg 525/98, would be satisfied and not require an ECA. Prior to City signoff on the infrastructure design a pre-consultation meeting will be held with the local MECP, to confirm that the site will not require an ECA.

In addition, various design guidelines were referred to in preparing the current report including:

- Bulletin ISDTB-2012-4 (20 June 2012)
  - Technical Bulletin ISDTB-2014-01 (05 February 2014)
  - Technical Bulletin PIEDTB-2016-01 (September 6, 2016)
  - Technical Bulletin ISDTB-2018-01 (21 March 2018)
  - Technical Bulletin ISDTB-2018-04 (27 June 2018)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
  - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
  - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 1999.
- Ontario Building Code 2012, Ministry of Municipal Affairs and Housing.
- Stormwater Management Guidelines for the Pinecrest Creek/Westboro Area Final Report by JFSA
- Stormwater Management Design Criteria for Pinecrest Creek/Westboro Area, City of Ottawa Final – May 2020

4 Water Servicing

4.1 Existing Water Servicing

The subject site is within the City of Ottawa 1W pressure zone. The site is currently serviced by the existing 300mm watermain on Forest Street and the 150mm watermain on Bond Street. The two existing buildings are serviced by laterals that will be blanked at the main to satisfaction of the City's Sewer Operations prior to shoring and excavating of the building.

4.2 Water Servicing Proposal

The proposed development will consist of two high-rise buildings. Tower A is a 12-storey high-rise comprised of 168 units and Tower B is 12 storeys and comprised of 223 units. Architectural plans and rendering of the proposed building along with building statistics are provided in **Appendix H.**

Water supply for the site will be provided by twin 200mm watermains supplied from the existing watermain on Forest Street. The need for a twin watermain is the result of the average day water demands exceeding 50 m^3/day. The watermain feeds from the underground parking level and will connect directly to the existing 300mm watermain on Forest Street and will have an isolation valve between them, consistent with City of Ottawa Water Design Guidelines.

The buildings will be protected by automatic sprinkler systems. A fire department connection (or siamese) will be located within 45 metres of an adjacent municipally owned fire hydrant. In order to achieve this, a new hydrant will be installed off the existing 300mm watermain within Forest Street. Detailed layout of the proposed water services is provided in drawing C100 of **Appendix H.**

4.3 Water Servicing Design

The water servicing requirements for the proposed building is designed in accordance with the City Design Guidelines (July 2010). The following steps indicate the basic methodology that was used in our analysis:

- Estimated water demands under average day, maximum day and peak hour conditions. As the total population estimate was greater than 500, standard residential peaking factors were used, rather than based on MECP Table 3-3 which would be necessary when the design population is less than 500 persons.
- Estimated the required fire flow (RFF) based on the Fire Underwriters Survey (FUS).
- Obtained hydraulic boundary conditions (HGL) from the City, based on the above water demands and required fire flows.
- Boundary condition data and water demands were used to estimate the pressure at the proposed building, and this was compared to the City's design criteria.

Since the average day demand exceed 50 m^3 per day, two watermain feeds to the building will be necessary as per Section 4.31 of the WDG001. **Table B-1** in **Appendix B** provides detailed calculations of the total water demands.

A review of the estimated watermain pressures at the building connection, based on the boundary conditions provided, was completed based on using two watermains. **Table B-5** in **Appendix B** provides a comparison of anticipated pressures at the building connection based on using a single or double watermain feed. A single watermain analysis was completed to determined if the water pressure still met the City requirement during either the maximum day plus fire flow or peak hour condition, if one of the laterals was out of service.

Based on results, the use of two 150mm watermains would result in a pressure of ±50.1 psi at the building, while the use of two 200mm watermains would improve the pressure to ±52.4 psi under maximum day plus fire flow conditions. The minimal

difference in pressure is the result of the short length of the water service lateral. In the event one of the watermains are down for service, the pressure at the building using only a single 150mm or 200mm watermain would be ±42.1 psi or ±50.3 psi respectively.

Under peak hour conditions, there is little difference using a 150mm or 200mm watermain, with anticipated pressure at the building of ±52.2 psi.

Based on the results, the installation of two 200mm watermains with a shut-off valve between them is proposed. Detailed calculations of the anticipated water pressures, based on City of Ottawa boundary conditions, is provided in **Table B-5**.

No pressure reducing measures are required as operating pressures are within 50 psi and 80 psi.

4.4 Water Servicing Design Criteria

Table 4-1 below summarizes the Design Criteria that was used to establish the water demands and the required fire flows, based on the proposed building uses. The design parameters that apply to this project and used for calculations are identified below in **Table 4-1**.

Table 4-1 - Summary of Water Supply Design Criteria

Design Parameter	Value	Applies
Population Density – Single-family Home	**3.4 persons/unit**	
Population Density – Semi-detached Home	**2.7 persons/unit**	
Population Density – Townhome or Terrace Flat	**1.8 persons/unit**	
Population Density – Bachelor Apartment	**1.4 persons/unit**	✓
Population Density – Bachelor + Den Apartment	**1.4 persons/unit**	
Population Density – One Bedroom Apartment	**1.4 persons/unit**	✓
Population Density – One Bedroom plus Den Apartment	**1.4 persons/unit**	✓
Population Density – Two Bedroom Apartment	**2.1 persons/unit**	✓
Population Density – Two Bedroom plus Den Apartment	**2.1 persons/unit**	
Average Day Demands – Residential	**350 L/person/day**	✓
Average Day Demands – Commercial / Institutional	**28,000 L/gross ha/day**	✓
Average Day Demands – Light Industrial / Heavy Industrial	**35,000 or 55,000 L/gross ha/day**	
Maximum Day Demands – Residential	**2.5 x Average Day Demands**	✓
Maximum Day Demands – Commercial / Institutional	**1.5 x Average Day Demands**	✓
Peak Hour Demands – Residential	**2.2 x Maximum Day Demands**	✓
Peak Hour Demands – Commercial / Institutional	**1.8 x Maximum Day Demands**	✓
Fire Flow Requirements Calculation	**FUS**	✓
Depth of Cover Required	**2.4m**	✓
Maximum Allowable Pressure	**551.6 kPa (80 psi)**	✓
Minimum Allowable Pressure	**275.8 kPa (40 psi)**	✓
Minimum Allowable Pressure during fire flow conditions	**137.9 kPa (20 psi)**	✓

4.5 Estimated Water Demands

The following **Table 4-2** below summarizes the anticipated water demands for the proposed development based on following:

- Tower A having 168 units and estimated population of 264.6 persons.
- Tower B having 223 units and estimated population of 342.3 persons.

Table 4-2 : Water Demand Summary

Water Demand Conditions	Tower A - Water Demands (L/sec)	Tower B - Water Demands (L/sec)	Total Water Demands (L/sec)
Average Day	**1.1**	**1.4**	**2.5**
Max Day	**2.7**	**3.5**	**6.2**
Peak Hour	**5.9**	**7.6**	**13.6**

4.6 Boundary Conditions

Hydraulic Grade Line (HGL) boundary conditions were obtained from the City for design purposes. A copy of the correspondence received from the City is provided in **Appendix E**.

The following hydraulic grade line (HGL) boundary conditions were provided:

- Minimum HGL = 108.3 m
- Maximum HGL = 115.4 m
- Max Day + Fire Flow (133L/sec) = 109.8 m
- Max Day + Fire Flow (183L/sec) = 109.2 m

4.7 Fire Flow Requirements

Water for fire protection will be available utilizing the proposed fire hydrants located along the adjacent roadways: Bond Street, Forest Street, Croydon Avenue, and Richmond Road. The required fire flows for the proposed buildings were calculated based on typical values as established by the Fire Underwriters Survey 1999 (FUS).

The following equation from the Fire Underwriters document "Water Supply for Public Fire Protection", 1991, was used for calculation of the on-site supply rates required to be supplied by the hydrants:

$F = 200 * C * \sqrt{(A)}$

where:

F	=	Required Fire flow in Litres per minute
C	=	Coefficient related to type of Construction
A	=	Total Floor Area in square metres

The proceeding **Table 4-3** summarizes the parameters used for estimating the Required Fire Flows (RFF) based on the Fire Underwriters Survey (FUS) and the latest City of Ottawa Technical Bulletins. The RFFs were estimated in accordance with ISTB-2018-02, and based on floor areas provided by the architect, which are illustrated in **Appendix H.**

The following summarizes the parameters used for both proposed buildings.

- Type of Construction Non-combustible
- Occupancy Limited combustible
- Sprinkler Protection Fully Supervised Automatic Sprinkler

Table 4-3 - Summary of Design Parameters Used in Calculating Required Fire Flows (RFF) Using FUS

Design Parameter	Value
Coefficient Related to type of Construction C	**0.80 (Towers A, Tower B)**
Total Floor Area (m2)	**7,175 (Tower A) 9,480 (Tower B)**
Fire Flow prior to reduction (L/min)	**14,908 (Tower A) 17,136 (Tower B)**
Reduction Due to Occupancy Non-combustible (-25%), Limited Combustible (-15%), Combustible (0%), Free Burning (+15%), Rapid Burning (+25%)	**-15% (Tower A) -15% (Tower B)**
Reduction due to Sprinkler (Max 50%) Sprinkler Conforming to NFPA 13 (-30%), Standard Water Supply (-10%), Fully Supervised Sprinkler (-10%)	**-50% (Tower A) -50% (Tower B)**
Exposures	**+25% (Tower A) +46% (Tower B)**

The estimated required fire flows (RFF) based on the FUS methods is: 133 L/sec for Tower A, and 183 L/sec for Tower B.

4.8 Review of Hydrant Spacing

A review of the hydrant spacing was completed to ensure compliance with Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001) and Appendix I of Technical Bulletin ISTB-2018-02. To meet the fire hydrant spacing guidelines of 90m for apartments and high-density areas, an additional fire hydrant is proposed on Bond Street, approximately 25m east of Forest Street. An additional fire hydrant is proposed on Forest Avenue to be within 45m of the fire department connection on each building.

As per Section 3 of Appendix I of Technical Bulletin ISTB-2018-02, all hydrants within 150 metres were reviewed to assess the total possible available flow from these contributing hydrants. For each hydrant the distance to the proposed building was determined to arrive at the contribution of fire flow from each. All hydrants are expected to be of Class AA as per Section 5.1 of Appendix I. For each hydrant the straight-line distance, distance measured along a fire route or roadway, whether its location is accessible, and its contribution to the required fire flow was established. **Figure A-3 in Appendix A** illustrates the hydrant locations in proximity to the site.

Table 4-4 – Required Fire Flows

Building	Required Fire Flow (L/min)	Available Fire flow Based on Hydrant Spacing as per ISTB-2018-02 (L/min)
Tower A	**8,000 (or 133 L/sec)**	**22,800**
Tower B	**11,000 (or 183 L/sec)**	**34,200**

The total available contribution of flow from hydrants was estimated at ±22,800 L/min and ±34,200 L/min for Towers A and B, whereas the required fire flows (RFF) for each building is only 8,000 L/min and 11,000 L/min. Therefore, the available flows from hydrants exceed each building's fire flow requirements as identified in Appendix I of Technical Bulletin ISTB-2018-02. Additional information on the available flows from hydrants is provided in **Table B-4**.

5 Sewage Servicing

5.1 Existing Sewage Conditions

The subject property is located within the Pinecrest Collector Sewershed, which then discharges to the West Nepean Collector. From the property sewage is discharged:

- Southerly on Forest Street (±45m of 250mm pipe),
- Easterly on Bond Street (130m of 225mm and 250mm pipe)
- Northerly on Croydon Avenue (±180m of 225mm pipe)
- Easterly on Richmond Road (±625m of 300mm pipe) to Pinecrest Collector
- Northerly on Transitway (±460m of 900mm pipe) to West Nepean Collector

Table 5-1 below summarizes the sewage flow from the existing properties.

Table 5-1 – Summary of Existing Sewage Flows

Sewage Condition	Sanitary Sewage Flow (L/sec)
Average Day Sewage Flow	**0.26**
Infiltration Flow (at 0.33 L/ha/sec)	**0.18**
Peak Wet Weather Sewage Flow	**0.44**

5.2 Proposed Sewage Conditions

It is proposed to provide one single sanitary sewer connection from the subject property to the existing sanitary sewer. Tower A having a connection on Forest Street and Tower B having a connection on Bond St. Each tower will have a separate building lateral which will discharge to a sanitary manhole. The sanitary manhole for Tower A will be installed at the connection from the sanitary lateral and the sanitary sewer on Forest St. The sanitary manhole for Tower B will be installed at the connection from the sanitary lateral and the sanitary sewer on Bond St. The sanitary sewer system was designed based on a population flow with an area-based infiltration allowance. A 250mm diameter sanitary sewer is proposed with a minimum 2% slope, having a capacity of 87.7 L/sec based on Manning's Equation under full flow conditions. Based on the OBC, the maximum permitted hydraulic load for a 250mm at 2% is 4,500 fixture units. **Table 5-2** below summarizes the design parameters used.

Table 5-2 – Summary of Wastewater Design Criteria / Parameters

Design Parameter	Value	Applies
Population Density – Single-family Home	3.4 persons/unit	
Population Density – Semi-detached Home	2.7 persons/unit	
Population Density – Duplex	2.3 persons/unit	
Population Density – Townhome (row)	2.7 persons/unit	
Population Density – Bachelor Apartment	1.4 persons/unit	✓
Population Density – Bachelor + Den Apartment	1.4 persons/unit	
Population Density – One Bedroom Apartment	1.4 persons/unit	✓
Population Density – One Bedroom plus Den Apartment	1.4 persons/unit	✓
Population Density – Two Bedroom Apartment	2.1 persons/unit	✓
Population Density – Two Bedroom plus Den Apartment	2.1 persons/unit	
Average Daily Residential Sewage Flow	280 L/person/day	
Average Daily Commercial / Intuitional Flow	28,000 L/gross ha/day	✓
Average Light / Heavy Industrial Daily Flow	35,000 / 55,000 L/gross ha/day	
Residential Peaking Factor – Harmon Formula (Min = 2.0, Max =4.0, with K=0.8)	$M = 1 + \frac{14}{4 + P^{0.5}} * k$	✓
Commercial Peaking Factor	1.0	✓
Institutional Peaking Factor	1.5	
Industrial Peaking Factor	As per Table 4-B (SDG002)	
Unit of Peak Extraneous Flow (Dry Weather / Wet Weather)	0.05 or 0.28 L/s/gross ha	
Unit of Peak Extraneous Flow (Total I/I)	0.33 L/s/gross ha	✓

The estimated peak sanitary flow rate from the proposed property at 365 Forest Street is **6.76 L/sec** based on City Design Guidelines. Sewage rates below include a total infiltration allowance of 0.18 L/ha/sec based on the total gross site area. Refer to **Appendix C** for detailed calculations.

Sewage Flows within the property were estimated in order to compare with developed conditons. **Table 5-3** below summarizes the approximate sewage flows generated from the existing properties, based on a commerical flow and infiltration allowance.

Table 5-3 – Summary of Anticipated Sewage Rates

Sewage Condition	Sanitary Sewage Flow (L/sec)
Peak Residential / Commercial Flow	**6.58**
Infiltration Flow	**0.18**
Peak Design Flow	**6.76**

A review of the downstream sanitary sewer capacity was completed. The minimum sewer capacity of the last sewer run on Croydon Street (with a slope of 0.36%) has a calculated full flow capacity of 27 L/sec. It is anticipated that the increase in peak sewage flows up to 6.76 L/sec can be accommodated in the downstream sanitary sewer system.

6 Storm Servicing & Stormwater Management

Since the subject properties are located within the Ottawa River East subwatershed, stormwater works are therefore subject to both the Rideau Valley Conservation Authority (RVCA) and City of Ottawa (COO) approval.

In November 2020, after receipt of the comments from RVCA and pre-consultation with the City of Ottawa in 2019, the City of Ottawa Council approved the "Stormwater Management Design Criteria for the Pinecrest Creek/Westboro Area" (herein referred to as the Pinecrest/Westboro Criteria). The subject site falls within the Pinecrest Study Area identified on Figure 1 of the Pinecrest/Westboro Criteria and discharges directly to the Ottawa River. After multiple calls with the City of Ottawa, it was determined that the site would be required to adhere to the quality and quantity control guidelines of the Pinecrest/Westboro Criteria's. EXP met with the City of Ottawa to confirm runoff from the site discharges to the Ottawa River and the requirements based on the Pinecrest/Westboro Criteria as it relates to the subject development. Email correspondence is provided in **Appendix E**.

6.1 Design Criteria

The proposed stormwater system is designed in conformance with the latest version of the City of Ottawa Design Guidelines (October 2012). Section 5 "Storm and Combined Sewer Design" and Section 8 "Stormwater Management". A summary of the design criteria that relates to this design report is in the proceeding sections below.

The requirements related to stormwater quantity control were noted in the pre-consultation meeting as follows:

- *Stormwater quantity control criteria – control the quantity to the 5-year pre-development/existing level for all storms up to and including the 100-year storm.*
- *When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the storage requirement prior to the 1: 100-year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.*

The stormwater management criteria identified for Site Plan Approval of sites within Pinecrest Creek Study Area draining to the Ottawa River are provided on Table 1: SWM Design Criteria for the Pinecrest Creek / Westboro Study Area of the Pinecrest/Westboro Criteria as follows:

- *Runoff Volume Reduction – Minimum on-site retention of the 10 mm design storm.*
- *Water Quality – 80% TSS removal, some of which may be achieved by on-site retention of first 10 mm of rainfall.*
- *Water Quantity – As per the City of Ottawa Sewer Design Guideline.*
- *Erosion Control – Not applicable.*

6.2 Runoff Volume Reduction

The reduction of flow from the site following development is provided through retention of the 10 mm design storm as follows:

- Amended topsoil in all landscaped areas.
- Calculation of the 10 mm storm volume based on the site proposed development.

- Capture and retention of the 10 mm storm volume in two cisterns in the underground parking lot to store for use on-site irrigation and maintenance. Location and details of the cistern are provided on the Mechanical Plans in **Appendix H**.

6.3 Water Quality

- An oil grit separator (OGS) structure designed to remove 80% total suspended solids will be in the underground parking lot. Refer to Mechanical Plans in **Appendix H**.
- Runoff from the at grade driveway area will be collected by area drains, conveyed to the mechanical plumbing within the underground parking garage that discharges to the OGS for treatment prior to leaving the site. Details of the Oil Grit Separator are provided in **Appendix H**.

6.4 Minor System Design Criteria

- The storm sewer was sized based on the Rational Method and Manning's Equation under free flow conditions for the 2-year storm using a 10-minute inlet time.
- Since a detailed site plan was available for the site, including building footprints, calculations of the average runoff coefficients for each drainage area were completed.
- Minimum sewer slopes to be based on minimum velocities for storm sewers of 0.80 m/sec.

6.5 Major System Design Criteria

- The major system has been designed to accommodate on-site detention with sufficient capacity to attenuate the 100-year design storm. On-site storage is calculated based on the 100-year design storm with on-site detention storage provided on the roof and within the underground parking structure (stormwater cistern).
- On site storage is provided and calculated for up to the 100-year design storm. There is no surface ponding proposed on the ground surface.
- Overland flow routes are provided.
- The vertical distance from the spill elevation on the street and the ground elevation at the buildings is at least 15cm.
- The emergency overflow spill elevation is at least 30 cm below the lowest building opening.

Table 6-1 – Spillway Elevations

Building	Spillway Elevation	Lowest building opening Elevation	Lowest Ground Elevation at Building
Tower A (Richmond Road)	**74.85**	**75.60**	**75.40**
Tower B (Bond St./Croydon Ave.)	**74.08**	**74.40**	**74.40**

6.6 Runoff Coefficients

Runoff coefficients used for were based on actual areas taken from CAD. Runoff coefficients for impervious surfaces (roofs, asphalt, and concrete) were taken as 0.90, whereas those for pervious surfaces (grass/landscaping) were taken as 0.20. Average runoff coefficients were calculated for subcatchments (or drainage areas) using the area-weighting routine in PCSWMM. The runoff coefficients for pre-development and post-development catchments are provided in **Appendix D**, with a summary provided in **Table 6-2** below.

Table 6-2 – Summary of Runoff Coefficients

Location	Area (hectares)	Pre-Development Runoff Coefficient, C_{AVG}	Post-Development Runoff Coefficient, C_{AVG}
Entire Site	0.5126	0.75	0.81

6.7 Time of Concentration

A minimum time of concentration of 10-minutes was used for both pre-development and post-development subcatchments.

6.8 Pre-Development Conditions

Under current conditions stormwater runoff from the 0.5126 hectare site is divided into two drainage areas. Stormwater runoff discharges: 1) in a northwestern direction towards Richmond Road / Forest Street and 2) in a southern direction towards Bond Street. **Figure A-1** illustrates these pre-development drainage areas. These drainage areas (or subcatchments) are derived from PCSWMM using the Watershed Delineation Tool.

Table 6-3 – Summary of Pre-Development Flows

Return Period Storm	Peak Flows to Richmond Road / Forest Street Storm Sewers (L/sec)	Peak Flows to Bond Street Storm Sewers (L/sec)	Total Peak Flows (L/sec)
2-year	21.7	60.9	82.6
5-year	29.5	82.6	112.1
100-year	63.1	176.9	240.0

6.9 Allowable Release Rate

Rather than meeting pre-development release rates, the City of Ottawa imposes a more restrictive stormwater release rate as noted in Section 8.3.7.3 of the SDG002. The allowable discharge release rate from the site was established using the peak flows derived based on a 5-year return period storm, a maximum runoff coefficient of 0.50 and a standard time of concentration of 10 minutes.

The allowable release rate of 74.3 L/sec from the proposed site will be based on a 5-year storm event. **Table D-9** provides detailed calculations on the total allowable peak flow, and the distribution to each outfall. In summary, the allowable release rate of 74.3 L/sec is comprised of 19.9 L/sec to Forest Street and 54.4 L/sec to Bond Street.

Table 6-4 – Summary of Allowable Release Rates

Area (onsite)	Area (ha)	Storm = 2 Year Q_{2ALLOW} (L/sec)	Storm = 5 Year Q_{5ALLOW} (L/sec)
Pre-1	0.1375	14.7	19.9
Pre-2	0.3751	40.0	54.4
Totals	0.5126	54.7	74.3

6.10 Proposed Stormwater System

Stormwater runoff from the proposed site will drain from a combination of controlled and uncontrolled areas. As a result of the changes onsite the overall post-development runoff coefficient will change over pre-development conditions. This increase / decrease in runoff is the result of changes due to site development (i.e. additional hard surfaces, roof areas and hard landscaping).

A storm drainage plan is illustrated on **Figure A-2**. A total five (5) subcatchments (or drainage areas) within the development site are shown on this drawing with average runoff coefficients calculated for each drainage area. As the entire site property contains an underground parking structure, the stormwater works shall consist of the following elements:

- The proposed grading for the site will generally meet the existing drainage pattern sloping from the west at Richmond Road and Forest Street southerly/easterly to Bond Street.
- Roof drainage and landscape/hard surfaces to have separate 250mm storm lateral connections to the municipal storm sewer system with the roof drainage being conveyed to Forest Street storm sewer and the remainder of the site being conveyed to Bond Street storm sewer.
- Flow-control roof drains for Towers A & B discharging to internal storm plumbing to stormwater cistern 1, retaining the 10 mm storm volume prior to the excess flows discharging to the municipal sewer on Forest Street. The 10mm storm volume will be retained in the cistern and reused for irrigation of the landscaped areas.
- Landscaped areas will have existing native fill removed 0.3m deep and replaced with 0.3m deep + 10% of pre-mixed amended topsoil to achieve additional infiltration. Amended topsoil will allow rainfall in a minor event to infiltrate and prevent runoff into cistern 2.
- Amended topsoil to be installed as per from the Draft Implementation Guide is provided in Appendix F (Brief summary to follow). Amendment material shall be obtained from a Compost Quality Assurance (CQA) licensed and OMOE/ CCME approved facility and shall comply with the Category “A” compost designation. The amendment material must contain:
  - pH of 6.0 to 8.0
  - 8-15% organic matter by dry- weight (equals 8-15% organic matter Loss-on-ignition test (LOI) per the most current version of ASTM D2974, MOE E3139 or TMECC 05.07A or equivalent.
  - No uncomposted manure or other organic materials, sphagnum peat or organic amendments that contain sphagnum peat (see General Requirement No. 5).

  Place imported pre-mixed amended topsoil in 150mm lifts, lightly roll or smooth using machinery bucket and repeat. Adjust layer quantities to ensure a settled amended topsoil depth of 300m and compliance with site grading. Amended topsoil should be wetted after application, allowed to settle for a minimum of one (1) week and grades adjusted as required.
- Runoff from surface areas will be collected by area drains, pass through an oil grit separator and discharge to underground storage (2.0 m x 5.0 m x 6.0 m stormwater cistern 2) located in the underground parking structure on P2 that will detain the runoff from the site to meet allowable rates. This in turn will be conveyed by the internal storm plumbing ultimately discharging to the storm lateral outletting from Tower B to STMMH 101 at the allowable rate. Water from hard surfaces passing through the oil grit separator will not be reused for irrigation due to salt dissolved in water being potentially detrimental to plants.
- Remaining drainage areas along frontage of Forest Street and Bond Street to flow uncontrolled overland to the right-of-way.

A summary of the proposed storm and foundation infrastructure is provided in **Table 6-5** below.

Table 6-5 – Summary of Proposed Storm System

<table>
<tr><th>Storm Laterals</th><th>Rooftops</th><th>Foundation Drainage</th><th>Catchbasins</th><th>Area Drains</th></tr>
<tr><td>Storm Outlet #1
250mm from Underground Parking Garage to existing 300 mm Storm Sewer on Forest Street (STMMH 101).</td><td>Tower A & B roofs to drain through storm outlet #1 (STMMH101)</td><td></td><td rowspan="2">CBE1
CB1
CBE2</td><td rowspan="2">AD1 through AD13</td></tr>
<tr><td rowspan="2">Storm Outlet #2
250 mm from Underground Parking Garage to existing 250 mm Storm Sewer on Bond Street (STMMH 100)</td><td rowspan="2"></td><td rowspan="2">Foundation drains to outlet through storm outlet #2
(STMMH 100)</td></tr>
<tr><td colspan="2">Above CBs and ADs drain to cistern 2 at East side in Parking Garage with controlled flow through outlet #2 to the 300mm existing storm sewer on Bond Street (STMMH 100).</td></tr>
</table>

A summary of the post-development flows is provided in **Table 6-6** below.

Table 6-6 – Summary of Post-Development Flows

Return Period Storm	Peak Flows to Richmond Road / Forest Street Storm Sewers (L/sec)	Peak Flows to Bond Street Storm Sewers (L/sec)	Total Peak Flows (L/sec)	Allowable Peak Flows (L/sec)
2-year	**7.6**	**12.8**	**20.4**	**74.3**
5-year	**15.0**	**17.3**	**32.3**	
100-year	**20.5**	**36.7**	**57.2**	
Allowable to Forest / Richmond =				**19.9**
Allowable to Bond =				**54.4**

To achieve the quantity control requirements and meet the allowable discharge rates as noted in **Section 6.9**, the roof drains on both Towers will require flow-controlled weirs. Based on the roof areas, an estimate of the number of roof drains required was completed. WATTS ACCUTROL weirs were used to determine the total discharge rates from the roof areas based on the number of drains. In addition, the total cumulative prism volumes on the roofs were calculated at a maximum permitted depth of 150mm. Additional information on the estimated 100-year volumes is provided in **Section 6.11**.

It is noted that the post-development flow to Richmond Road/ Forest St (20.5 L/s) is slightly in excess of the pre-development flow to Richmond Road / Forest St (19.9 L/s), however the overall flow from the site following development, **57.2 L/s** is less than the allowable flow of 74.3 L/s with the two systems (from Richmond and Bond St storm sewers) joining immediately downstream at Croydon Ave and Richmond Road intersection. The proposed flow from the development is a 23% reduction of the pre-development flow, which results in a significant reduction in flow to the City sewers.

6.11 Flow Attenuation

Stormwater flow attenuation will be achieved by utilizing roof storage and two stormwater storage cisterns in the underground parking structure. Using the allowable release rates, the Modified Rational Method was used to determine the 2-year, 5-year, and 100-year volumes that will occur for corresponding release rates.

Table D-12, Table D-13 and **Table D-14** provide the storage volumes required on the roof and in the two cisterns in the underground parking structure to attenuate the controlled release rates. **Table D-11** summarizes the combined controlled and uncontrolled flows leaving the subject site. A summary of release rates, storage volume requirements, and provided storage volumes are identified in

Table 6-**7** below and calculated in **Appendix D**.

Table 6-7 – Summary of Post-Development Storage

Area No.	Outlet	Release Rate (L/s)			Storage Required (m^3) (MRM)			Storage Provided (m^3)		Control Method
		2-yr	5-yr	100-yr	2-yr	5-yr	100-yr	Roof	Cistern	
Tower A Roof	**Richmond / Forest**	**2.4**	**5.7**	**6.3**	**20.8**	**22.9**	**53.3**	**67.1**		**Flow Controlled Roof Drains with Weir (Set 3-1/4 open)**
Surface - Uncontrolled		**2.7**	**3.7**	**7.8**						**None**
Tower B Roof		**2.5**	**5.6**	**6.4**	**26.8**	**29.5**	**67.6**	**80.7**		**Flow Controlled Roof Drains with Weir (Set 3-1/4 open)**
Surface - Controlled	**Bond St**	**11.4**	**15.4**	**33.0**	**8.3**	**11.2**	**39.1**		**60.0**	**Pump Rate from Cistern**
Surface - Uncontrolled		**1.4**	**1.9**	**3.7**						**none**
Totals =		**20.4**	**32.3**	**57.2**	**55.9**	**63.6**	**160.0**	**147.8**	**60.0**	

For the building roofs flow-controlled drains are necessary. An estimate of the controlled release rate and associated 100-year storage requirements was completed for the flat roof areas. **Table 6-7** provides the estimated 5-year and 100-year storage requirements for the entire site based on the Modified Rational Method. A combined 100-year storage of 160.0 m^3 is required based on the allowable discharge rate of 74.3 L/s. The combination of controlled release from the roofs (7 drains on each roof with weir open 3-1/4) and cistern pump along with the uncontrolled flow result in an overall release rate of 57.2 L/s. Roof catchment areas and drains are shown on **Figure A-4** in **Appendix A**. For each tower (A & B). **Table 6-8** below summarizes the estimated water depths on the roof during the 100-year event. Detailed calculations are provided in **Appendix D, Table D-15 and D-16**.

Table 6-8 – Summary of Ponding Storage Depths on Roof

Storm	Tower A	Tower B
2-year	Not calculated	Not calculated
5-year	94-110	98-109
100-year	127-144	132-144

The roof top terraces on Level 11 of each building will have roof drains uncontrolled to allow for sufficient drainage with no ponding of water. The uncontrolled flow is accounted for as shown in **Appendix D, Table D-15 and D-16**.

Refer to Mechanical Plans in **Appendix H** for cistern details.

6.12 Quality Control Measures

The site is located within the Pinecrest Creek subcatchment. As this area discharges to the Ottawa River the following summarizes the specific additional quality control requirements as per the Pinecrest / Westboro Criteria.

- Runoff Volume Reduction: On-site retention of 10 mm storm.
- Water Quality: 80% TSS removal.

As total suspended solids (TSS) removal efficiency of 80% is required it is proposed to provide an oil grit separator for quality control. Following discussions with the City, only the runoff from the driveway and surrounding pathways require treatment. This area is 0.1124 ha. The Mechanical Design Drawing Details and sizing calculations for the quality control structure are provided in **Appendix H**.

To provide the necessary 10mm of volume reduction, the method outlined on Page 2 of Appendix B of the "SWM Guidelines for Pinecrest Creek/Westboro Area" report by JFSA was used. Approximately **38.9 m^3** of the stormwater runoff from the 10 mm storm is required to be retained on site. A summary of the calculations from the methodology are shown below:

Landscaped Area Runoff Volume = 0.085 ha * (10mm – 4.67mm) * 10 m3/ha*mm
= 4.5 m^3

Hard Surface Runoff Volume = 0.1124 ha * (10mm – 1.57mm) * 10 m3/ha*mm
= 9.5 m^3

Roof Area Runoff Volume = 0.2953 ha * (10mm – 1.57mm) * 10 m3/ha*mm
= 24.9 m^3

4.5 m^3 is required from the landscaped areas and will be captured and retained by amended topsoil. Runoff will be drained from the rooftop to the cistern located at the west side of Tower B and stored water will be used for irrigation purposes. The required 10 mm storm volume for the two buildings and driveway area is +/- 34.4 m^3. This volume of water will be collected from the roofs only, to allow runoff from the driveway area to be treated in the OGS before outletting to the storm sewer on Bond St. This area will not be retained for irrigation due to the dissolved salt in the water being potentially detrimental to plants. The remainder of the site, approximately 199 m^2, requiring approximately 2 m^3 retention of 10 mm storm, is located along the

perimeter of the site adjacent to Forest and Bond Street right of way. This area drains uncontrolled via surface flow to the municipal right of way. As per discussions with the City, the allowance for the uncontrolled flow from these areas is acceptable.

The potential for LID infiltration methods were reviewed but determined impractical due to the required extent of the development and underground parking garage.

7 Erosion & Sediment Control

During all construction activities, erosion and sedimentation shall be controlled by the following techniques:

- Filter cloth shall be installed between the frame and cover of all adjacent catch basins and catch basin manhole structures.
- Heavy duty silt fencing will be used to control runoff around the construction area. Silt fencing locations are identified on the site grading and erosion control plan.
- A mud mat will be installed at the construction entrance to help avoid mud from being transported to offsite roads.
- Visual inspection shall be completed daily on sediment control barriers and any damage repaired immediately. Care will be taken to prevent damage during construction operations.
- In some cases, barriers may be removed temporarily to accommodate the construction operations. The affected barriers will be reinstated at night when construction is completed.
- Sediment control devices will be cleaned of accumulated silt as required. The deposits will be disposed of as per the requirements of the contract.
- During the course of construction, if the engineer believes that additional prevention methods are required to control erosion and sedimentation, the contractor will install additional silt fences or other methods as required to the satisfaction of the engineer.
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) OPSS 805 and City of Ottawa specifications.

8 Conclusions and Recommendations

This Functional Servicing & Stormwater Report outlines the rationale which will be used to service the proposed development. The following summarizes the servicing requirements for the site:

Water

- Two parallel 200mm watermains are proposed to service the residential Towers A and B, as the average day demands exceed 50 m^3 per day, which is mandatory as per Section 4.31 of the WDG001.
- Two new hydrants are proposed; one located on Bond Street to meet spacing requirements of 90m for apartments and high-density areas as per WDG001 and the other located on Forest Street within 45m from the proposed fire department connections.
- The Required Fire Flows (RFFs) were estimated at **8,000 L/min** (133 L/sec) for Tower A, and **11,000 L/min** (183 L/sec) for Tower B. The total minimum available flows for firefighting purposes, based on the contribution from hydrants, was estimated at **22,800 L/min**.
- Based on hydraulic boundary conditions (HGL) provided by the City of Ottawa, a system pressure of **±52.2 psi** under peak hourly demands is anticipated at the proposed building. This exceeds the City's guideline of 20 psi.
- Domestic water booster and fire pump will be provided in the mechanical room at P1 parking level.

Sewage

- Estimated peak sewage flows of **6.76 L/sec** are anticipated. This exceeds the estimated current sewage flows of **0.44 L/sec** under existing conditions. An initial review of the downstream sanitary sewer system from the site and the Pinecrest Collector indicates minimum pipe capacity of 27 L/sec for a sewer run on Croydon Ave.

Stormwater

- For the stormwater system, the allowable capture rate from the entire site was calculated based on a runoff coefficient of 0.50, time of concentration of 10 minutes for a 5-year storm event. The allowable release rate for the entire site was calculated to be **74.3 L/sec**. Runoff in excess of this will be detained onsite for up to the 100-year storm.
- Two minor surface drainage areas will flow uncontrolled to the right-of-way. The 100-year peak flows from these two areas were accounted for (ie. subtracted) from the total runoff rate to establish the allowable rate.
- In order to meet the allowable release rate, a total retention volume of **±160.0 m^3** is required.
- Runoff on the building roofs will be controlled using flow-controlled roof drains. For each roof-drain is equipped with WATTS ACCUTROL weirs and set at the ¼ OPEN position are proposed. Each drain having maximum discharge rate of 30 gpm at 150mm depth. A maximum release rate of **6.3 L/sec from Tower A** and **6.4 L/sec from Tower B** was established for the 100-year event.
- A total 100-year storage volume requirements on the roofs of Tower A and Tower B was estimated as **120.9 m^3** (53.3 m^3 and 67.6 m^3 respectively), based on the above release rates, using the Modified Rational Method. The volumes available on the roofs are **147.8 m^3** (67.1 m^3 and 80.7 m^3 respectively), therefore exceeding the required volumes.
- Runoff from the surface areas above the parking structure will be collected and detained in an underground stormwater chamber (cistern) located in the parking structure. The allowable discharge rate of **16.5 L/sec** (50% of 33 L/s) from cistern 2 will be met using an equal pump rate. The volume necessary to detain the 100-year event, is **59.0 m^3**, based on using 50% of the allowable release rate as required by the City of Ottawa. The stormwater tank (cistern 2) will be sized to hold a minimum volume of approximately **60.0 m^3.**
- Retention of the 10 mm storm is captured within the site through amended topsoil in the landscaped areas and **29.5 m^3** in cistern 1 (from the rooftops) located in the parking garage.
- Quality control is provided via an oil grit separator within the underground parking garage collecting runoff from the driveway area and conveyed to cistern 2 prior to discharge to the municipal sewer. It is designed to remove 80% TSS from stormwater runoff from the driveway and surrounding area. The 10mm storm from the hard surfaces will not be retained due to dissolved salts in the water being potentially detrimental to plants.

Erosion & Sediment Control

- Erosion and sediment control methods will be used during construction to limit erosion potential.

9 Legal Notification

This report was prepared by EXP Services Inc. for the account of 11061917 Canada Inc.

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. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

Appendix A - Figures

Figure A-1 - Pre-Development Drainage Areas

Figure A-2 - Post-Development Drainage Areas

Figure A-3 – Hydrant Location Plan

Figure A-4 – Roof Catchments

Figure A-5 – Fire Flow Distance Plan

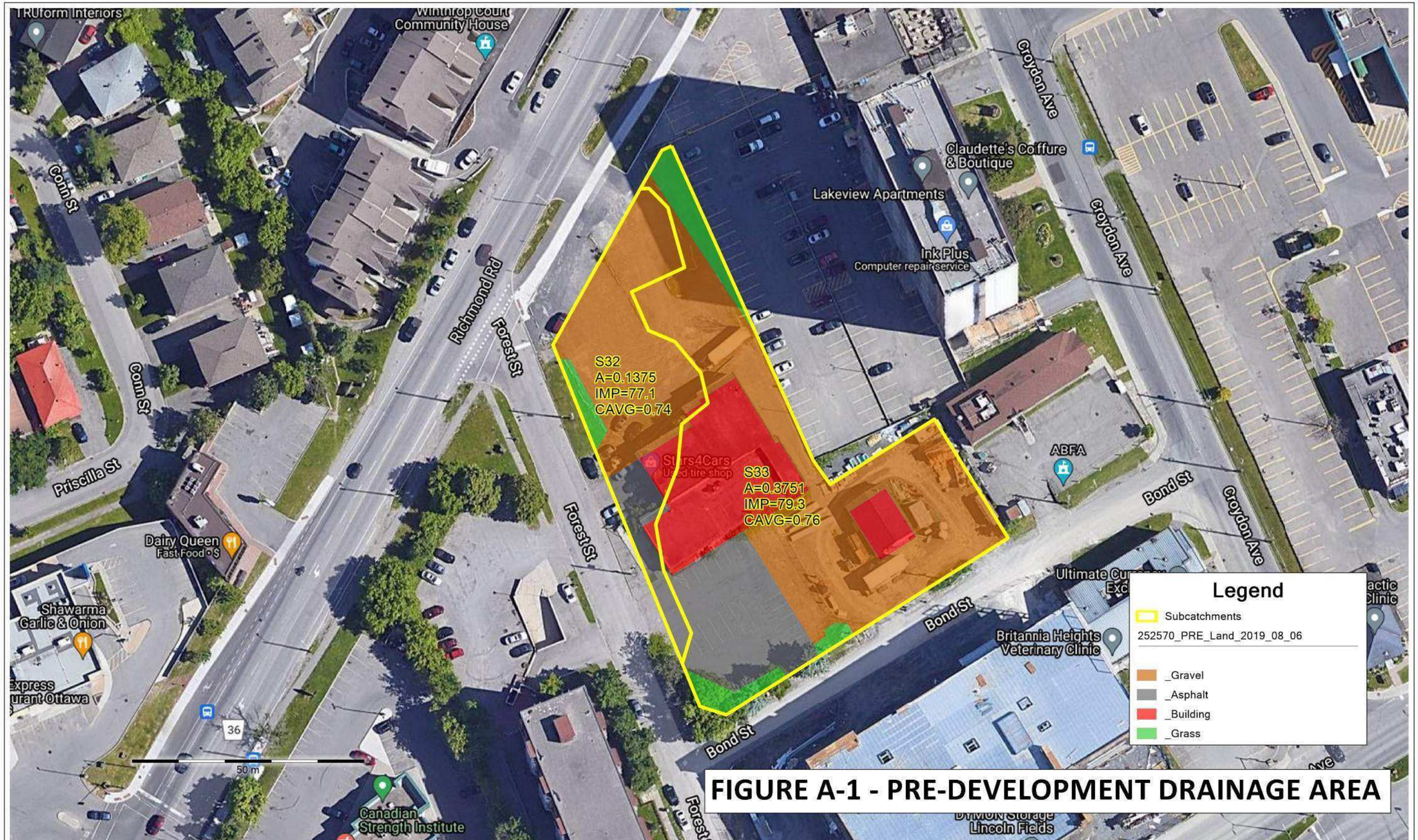
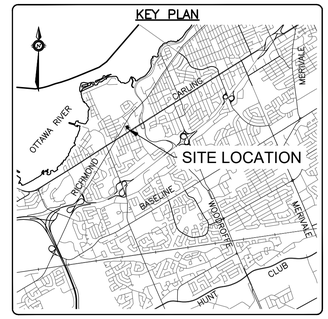


FIGURE A-1 - PRE-DEVELOPMENT DRAINAGE AREA

FIGURE A-2 POST DEVELOPMENT DRAINAGE AREAS

KEY PLAN



LEGEND

- SITE BOUNDARIES
- 0m OFFSET FROM BUILDING
- 75m OFFSET FROM BUILDING
- 150m OFFSET FROM BUILDING
- JUNCTIONS

CAUTION

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

REV	REVISION DESCRIPTION	DATE	BY	APPD
5	4TH CITY SUBMISSION	15/07/22	AC	BMT
4	REVISED PER CITY COMMENTS	10/12/21	AC	JD
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2	ISSUED FOR REZONING APPLICATION	27/01/20	MZG	BMT
1	ISSUED FOR REVIEW	12/09/19	SAB	BMT

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PROJECT MANAGER	BMT
APPROVED	BMT

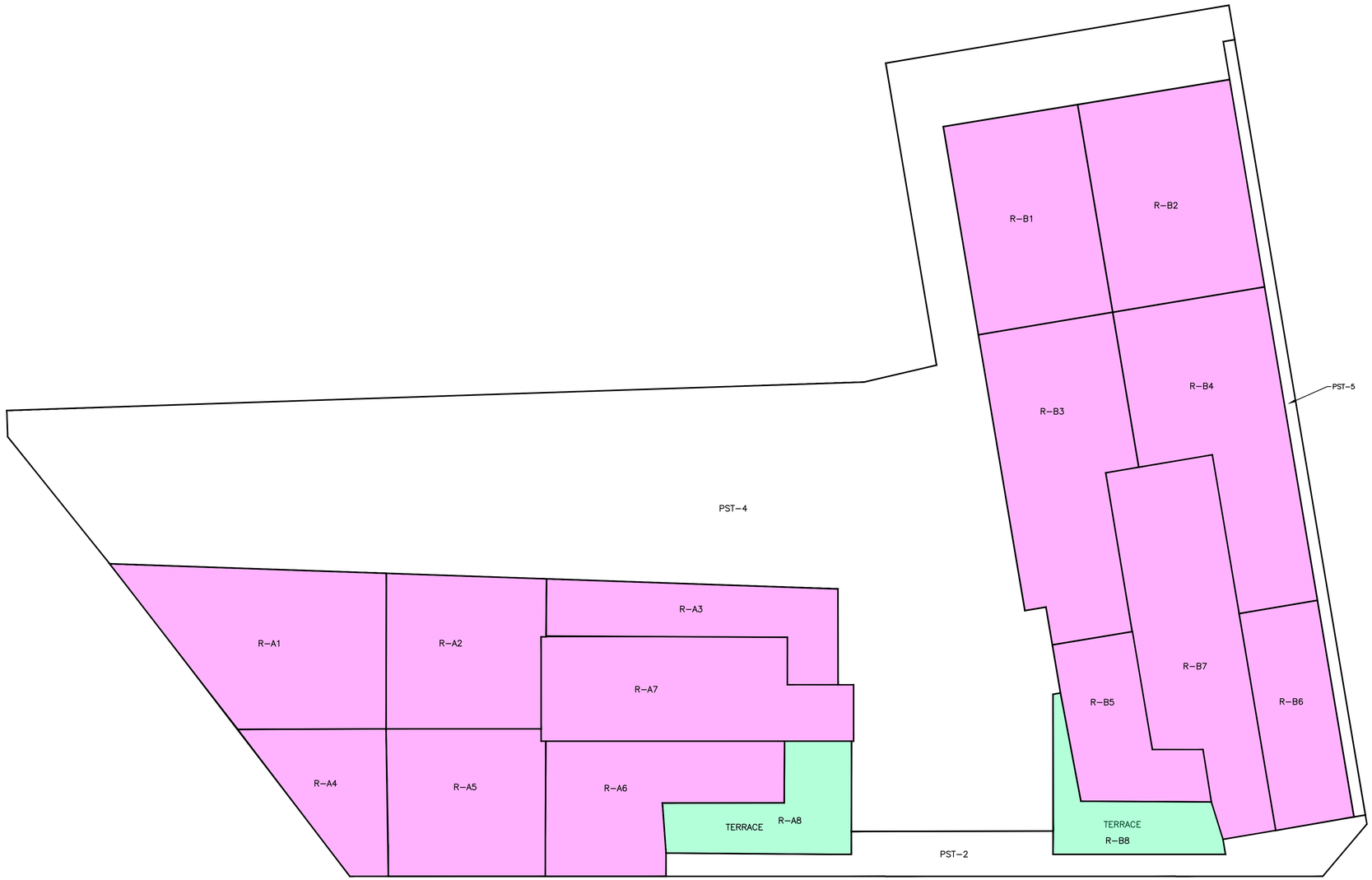
PROJECT
11061917 CANADA INC
RESIDENTIAL DEVELOPMENT
365 FOREST STREET
OTTAWA, ONTARIO.

TITLE
HYDRANT LOCATION PLAN

PROJECT No.	OTT–252570–A0
SURVEY	AOV
DATE	JAN 2020
DRAWING No.	FIG A–3

DO7-12-20-0041

#18191



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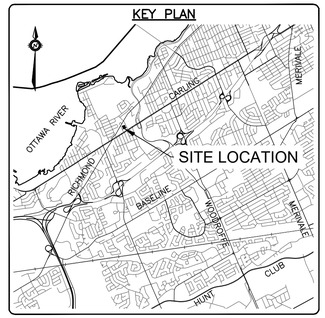

LEGEND

- ROOF FLOOR
- TERRACE (12TH FLOOR)

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9	REVISED PER ARCH PLAN	11/08/23	AC	BMT
8	REVISED PER CITY COMMENTS	06/06/23	AC	BMT
7	REVISED PER CITY COMMENTS	09/12/22	SAB	BMT
6	REVISED PER CITY COMMENTS	17/11/22	AC	BMT
5	REVISED PER CITY COMMENTS	15/09/22	AC	BMT
4	REVISED PER CITY COMMENTS	10/12/21	AC	JD
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1	ISSUED FOR REVIEW	12/09/19	SAB	BMT

SCALE: 0 2m 4m 8m — HORIZONTAL 1:200

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CHECKED: BMT
CAD: SAB
PROJECT MANAGER: BMT
APPROVED: BMT

PROJECT
11061917 CANADA INC
RESIDENTIAL DEVELOPMENT
365 FOREST STREET
OTTAWA, ONTARIO.

TITLE
ROOF CATCHMENTS

PROJECT No.: OTT–252570–A0
SURVEY: AOV
DATE: JAN 2020
DRAWING No.: FIG A–4

DO7-12-20-0041

#18191

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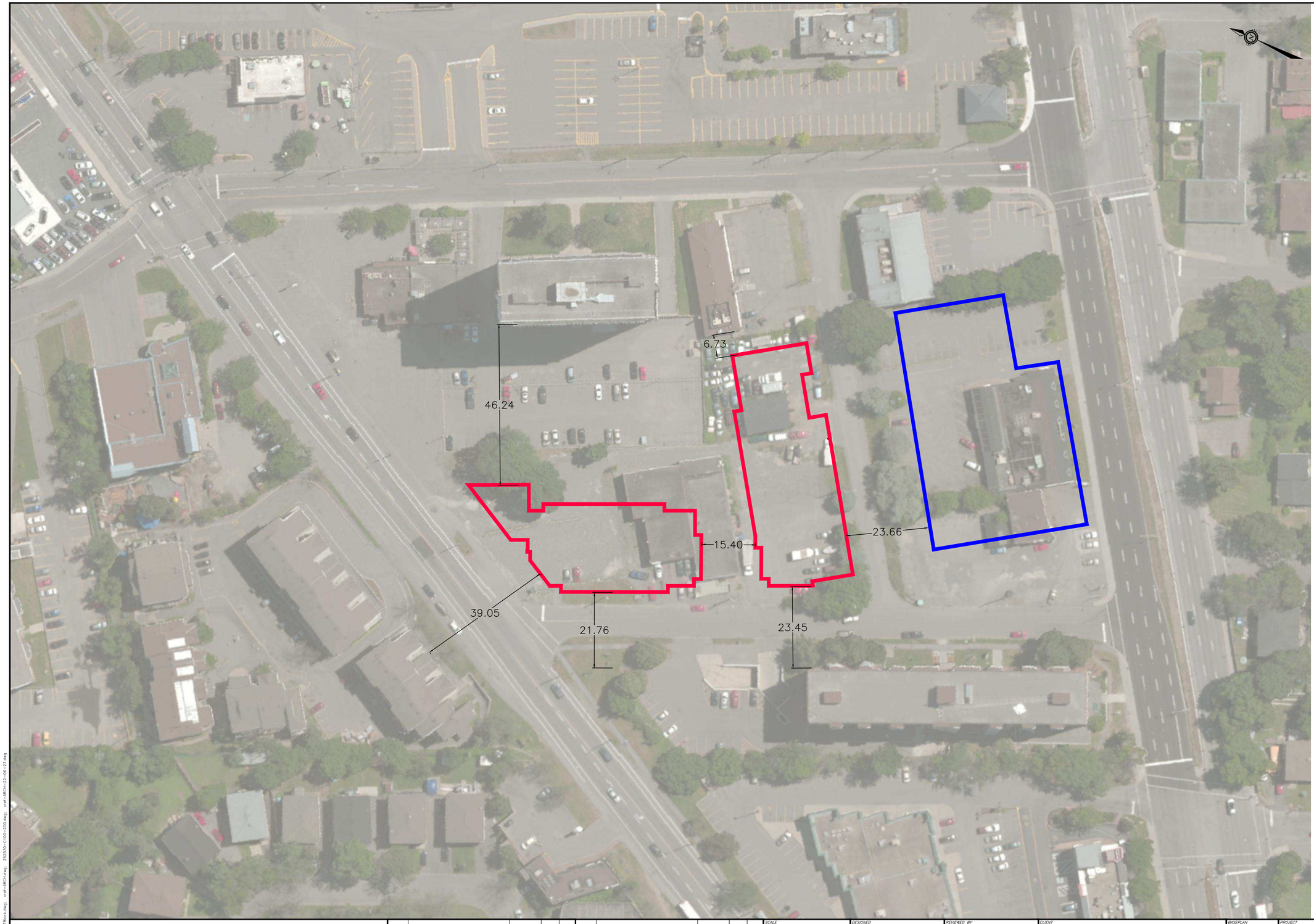
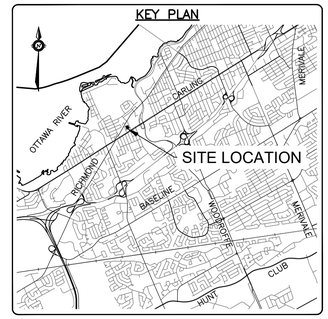


KEY PLAN



LEGEND

- BUILDING FOOTPRINT
- OFF-SITE NEW BUILDING
- 20.00 — DISTANCE BETWEEN PROPOSED TOWERS AND EXISTING SURROUNDING BUILDINGS

CAUTION

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PROJECT MANAGER	BMT
APPROVED	BMT

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OTTAWA, ONTARIO.

TITLE
FIRE FLOW DISTANCE PLAN

PROJECT No.	OTT-252570-A0
SURVEY	AOV
DATE	JAN 2020
DRAWING No.	FIG A-5

DO7-12-20-0041

#18191

Appendix B – Water Servicing Tables

Table B-1 – Water Demand Chart

Table B-2 – Fire Flow Requirements Based on Fire Underwriters Survey (FUS) – Tower A

Table B-3 – Fire Flow Requirements Based on Fire Underwriters Survey (FUS) – Tower B

Table B-4 – Available Fire Flows Based on Hydrant Spacing

Table B-5 – Estimated Water Pressure at Proposed Building

Table B-1

Water Demand Chart

Building	No. of Units											Residential Demands					Commercial						Total Demands in (L/sec)		
	Singles/Semis/Towns				Apartments														Peaking Factors (x Avg Day)							
	Single Familty	Semi	Duplex	Townhome	Bachelor	1-Bed Apt	1-Bed +Den Apt	2 Bed Apt	2-Bed +Den Apt	3 Bed Apt	Total Pop	Avg Day Demand (L/day)	Max Day Peaking Factor	Max Hour Peaking Factor	Max Day Demand (L/day)	Peak Hourly Demand (L/day)	Area (ha)	Avg Demand (L/day)	Max Day	Peak Hour	Max Day Demand (L/day)	Peak Hour Demand (L/day)	Avg Day (L/s)	Max Day (L/s)	Peak Hour (L/s)
Tower A					11	13	102	42			264.6	92,610	2.5	2.2	231,525	509,355	0.0338	946	1.5	1.8	1419.6	2555.3	1.08	2.70	5.92
Tower B					23	12	145	43			342.3	119,805	2.5	2.2	299,513	658,928	0.0092	257.6	1.5	1.8	386.4	463.7	1.39	3.47	7.63
Totals =					34	25	247	85			606.9	212,415			531,038	1,168,283	0.0430	1,204			1,806.0	3,019.0	2.47	6.17	13.56

Unit Densities	Persons/Unit
Singles	3.4
Semi-Detached	2.7
Duplex	2.3
Townhome	2.7
Bachelor Apt Unit	1.4
1-Bed Apt Unit	1.4
1-Bed + Den Apt Unit	1.4
2-Bed Apt Unit	2.1
2-Bed + Den Apt Unit	2.1
3-Bed Apt Unit	3.1

Residential	
Residential Consumption (L/pers/day) =	350
Max Day Peaking Factor (* avg day) =	2.5
Peak Hour Factor (* max day) =	2.2

Industrial/Commercial/Institutional Water Consumption	
Light Industrial (L/gross ha/day) =	35,000
Heavy Industrial (L/gross ha/day) =	55,000
Commer/Instit (L/gross ha/day) =	28,000
Max Day Peaking Factor (* avg day) =	1.5
Peak Hour Factor (* max day) =	1.8

Project:	
365 Forest Street	
Designed:	Location:
J Diaz, P.Eng.	Ottawa, Ontario
Checked:	
B. Thomas, P.Eng.	
File Reference:	Page No:
252570 Water - Demand Chart, Sept 1, 2022.xlsx	1 of 1

TABLE B-2
FIRE FLOW REQUIREMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 1999 FOR TOWER A

An estimate of the Fire Flow required for a given fire area may be estimated by:

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

where: F = required fire flow in litres per minute
A = total floor area in m^2 (including all storeys, but excluding basements at least 50% below grade)
C = coefficient related to the type of construction

Task	Options	Multiplier	Input				Value Used	Fire Flow Total (L/min)
Choose Building Frame (C)	Wood Frame	1.5	Non-combustible Construction				0.8	
	Ordinary Construction	1						
	Non-combustible Construction	0.8						
	Fire Resistive Construction	0.6						
Input Building Floor Areas (A)			Area	% Used	Area Used			
	Floor 12		1,186	0%	0	2 largest adjoining floors+ 50% of floors above (up to eight)		
	Floor 11		1,193	0%	0			
	Floor 10		1,193	50%	597			
	Floor 9		1,193	50%	597			
	Floor 8		1,193	50%	597			
	Floor 7		1,158	50%	579			
	Floor 6		1,210	50%	605			
	Floor 5		1,210	50%	605			
	Floor 4		1,210	50%	605			
	Floor 3		1,210	50%	605			
	Floor 2		1,193	100%	1,193			
	Floor 1 (Ground)		1,193	100%	1,193			
	Basement (At least 50% below grade, not included)		0					
Fire Flow (F)	F = 220 * C * SQRT(A)							14,908
Fire Flow (F)	Rounded to nearest 1,000							**15,000**

Reductions/Increases Due to Factors Effecting Burning

Task	Options	Multiplier	Input	Value Used	Fire Flow Change (L/min)	Fire Flow Total (L/min)
Choose Combustibility of Building Contents	Non-combustible	-25%	Limited Combustible	-15%	-2,250	12,750
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	Adequate Sprinkler Conforms to NFPA13	-30%	-3,825	8,925
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	-1,275	7,650
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Fully Supervised Sprinkler System	-10%	-1,275	6,375
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance	Exposures	Separation Dist (m)	Cond	Separation Conditon	Exposed Wall type	Exposed Wall Length: Length (m)	No of Storeys	Lenth-height Factor	Sub-Conditon	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	
	Side 1 (west)	22	4	20.1 to 30	Type B	43	9	387	4E	10%	25%	1,594	7,969
	Side 2 (east)	46	6	> 45.1	Type B	46	19	874	6	0%			
	Front (north)	39	5	30.1 to 45	Type B	62	2	124	5E	5%			
	Back (south)	15	3	10.1 to 20	Type B	15	12	30	3A	10%			
Obtain Required Fire Flow										Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =			**8,000**
										Total Required Fire Flow, L/s =			**133**

Exposure Charges for Exposing Walls of Wood Frame Construciton (from Table G5)

Type A	Wood-Frame or non-conbustible
Type B	Ordinary or fire-resisitve with unprotected openings
Type C	Ordinary or fire-resisitve with semi-protected openings
Type D	Ordinary or fire-resisitve with blank wall

Conditons for Separation

Separation Dist	Condition
0m to 3m	1
3.1m to 10m	2
10.1m to 20m	3
20.1m to 30m	4
30.1m to 45m	5
> 45.1m	6

TABLE B-3
FIRE FLOW REQUIREMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 1999 FOR TOWER B

An estimate of the Fire Flow required for a given fire area may be estimated by:

$$F = 220 * C * SQRT(A)$$

where: F = required fire flow in litres per minute
A = total floor area in m^2 (including all storeys, but excluding basements at least 50% below grade)
C = coefficient related to the type of construction

Task	Options	Multiplier	Input	Value Used	Fire Flow Total (L/min)
Choose Building Frame (C)	Wood Frame	1.5	Non-combustible Construction	0.8	
	Ordinary Construction	1			
	Non-combustible Construction	0.8			
	Fire Resistive Construction	0.6			

Input Building Floor Areas (A)	Area	% Used	Area Used			
Floor 12	1,507	50%	754	2 largest adjoining floors+ 50% of floors above (up to eight)		
Floor 11	1,518	50%	759			
Floor 10	1,518	50%	759			
Floor 9	1,518	50%	759			
Floor 8	1,518	50%	759			
Floor 7	1,468	50%	734			
Floor 6	1,652	50%	826			
Floor 5	1,652	50%	826			
Floor 4	1,652	100%	1,652			
Floor 3	1,652	100%	1,652			
Floor 2	1,500	0%	0			
Floor 1 (Ground)	1,470	0%	0			
Basement (At least 50% below grade, not included)	0					

Fire Flow (F)	F = 220 * C * SQRT(A)	17,136
Fire Flow (F)	Rounded to nearest 1,000	**17,000**

Reductions/Increases Due to Factors Effecting Burning

Task	Options	Multiplier	Input	Value Used	Fire Flow Change (L/min)	Fire Flow Total (L/min)
Choose Combustibility of Building Contents	Non-combustible	-25%	Limited Combustible	-15%	-2,550	14,450
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	Adequate Sprinkler Conforms to NFPA13	-30%	-4,335	10,115
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	-1,445	8,670
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Fully Supervised Sprinkler System	-10%	-1,445	7,225
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance	Exposures	Separ-ation Dist (m)	Cond	Separation Conditon	Exposed Wall type	Exposed Wall Length: Length (m)	No of Storeys	Lenth-height Factor	Sub-Conditon	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	
	Side 1 (west)	23	4	20.1 to 30	Type B	19	8	152	4E	10%	46%	3,324	10,549
	Side 2 (east)	7	2	3.1 to 10	Type B	11	1	11	2A	15%			
	Front (north)	15	3	10.1 to 20	Type B	22	12	264	3E	15%			
	Back (south)	24	4	20.1 to 30	Type B	69	5	30	4A	6%			

Obtain Required Fire Flow	Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =	**11,000**
	Total Required Fire Flow, L/s =	**183**

Exposure Charges for Exposing Walls of Wood Frame Construciton (from Table G5)

Type A	Wood-Frame or non-conbustible
Type B	Ordinary or fire-resisitve with unprotected openings
Type C	Ordinary or fire-resisitve with semi-protected openings
Type D	Ordinary or fire-resisitve with blank wall

Conditons for Separation

Separation Dist	Condition
0m to 3m	1
3.1m to 10m	2
10.1m to 20m	3
20.1m to 30m	4
30.1m to 45m	5
> 45.1m	6

TABLE B-4

AVAILABLE FIRE FLOWS BASED ON HYDRANT SPACING

Hydrant #	Location	Tower A		Tower B	
		[1]Distance (m)	[2]Fire Flow Contribution (L/min)	Distance (m)	Fire Flow Contribution (L/min)
New FH-1	Forest Street	8	5,700	32	5,700
New FH-2	Bond Street	82	3,800	56	5,700
360024H013	Forest Steet at Richmond Rd	37	5,700	62	5,700
360024H038	Forest Steet at Carling Ave	116	3,800	98	3,800
360024H039	Forest Steet at Carling Ave	161	0	144	3,800
360024HP120	Forest Steet near Bond St	76	3,800	52	5,700
360024H041	Bond Street at Croydon Ave	170	0	145	3,800
Total (L/min)			22,800		34,200
FUS RFF in L/min or (L/sec)			8,000 (133)		11,000 (183)
Meets Requreiment (Yes/No)			Yes		Yes

Notes:

[1]Distance is measured along a road or fire route.

[2]Fire Flow Contribution for Class AA Hydrant from Table 1 of Appendix I, ISTB-2018-02

TABLE B-5

ESTIMATED WATER PRESSURE AT PROPOSED BUILDING

Description	From	To	Demand (L/sec)	Pipe Length (m)	Pipe Dia (mm)	Dia (m)	Q (m3/sec)	Area (m2)	C	Vel (m/s)	Slope of HGL (m/m)	Head Loss (m)	Elev From (m)	Elev To (m)	*Elev Diff (m)	Pressure From kPa	(psi)	Pressure To kPa	(psi)	Pressure Drop (psi)
Avg Day Conditons																				
Single 200mm watermain	Main	Building	2.5	11 m	204	0.204	0.0025	0.032685	110	0.0756	6E-05	0.0007	74.85	71.80	3.1	328.1	(47.6)	358.1	(51.9)	-4.3
Double 200mm watermain	Main	Building	1.2	11 m	204	0.204	0.0012	0.032685	110	0.0378	1.7E-05	0.0002	74.85	71.80	3.1	328.1	(47.6)	358.1	(51.9)	-4.3
Max Day Conditons																				
Single 200mm watermain	Main	Building	6.2	11 m	204	0.204	0.0062	0.032685	110	0.1885	0.00033	0.0036	74.85	71.80	3.1	397.8	(57.7)	427.7	(62.0)	-4.3
Double 200mm watermain	Main	Building	3.1	11 m	204	0.204	0.0031	0.032685	110	0.0942	9.1E-05	0.001	74.85	71.80	3.1	397.8	(57.7)	427.7	(62.0)	-4.3
Peak Hour Conditons																				
Single 200mm watermain	Main	Building	13.6	11 m	204	0.204	0.0136	0.032685	110	0.4146	0.00141	0.0155	74.85	71.80	3.1	330.1	(47.9)	359.9	(52.2)	-4.3
Double 200mm watermain	Main	Building	6.8	11 m	204	0.204	0.0068	0.032685	110	0.2073	0.00039	0.0043	74.85	71.80	3.1	330.1	(47.9)	360.0	(52.2)	-4.3
Max Day Plus Fireflow Conditons																				
Single 200mm watermain	Main	Building	189.2	11 m	204	0.204	0.1892	0.032685	110	5.7873	0.18628	2.0491	74.85	71.80	3.1	337.0	(48.9)	346.8	(50.3)	-1.4
Double 200mm watermain	Main	Building	94.6	11 m	204	0.204	0.0946	0.032685	110	2.8937	0.0516	0.5676	74.85	71.80	3.1	337.0	(48.9)	361.3	(52.4)	-3.5
Peak Hour Conditons (Review of 150mm)																				
Single 150mm watermain	Main	Building	13.6	11 m	155	0.155	0.0136	0.018869	110	0.7181	0.00538	0.0592	74.85	71.80	3.1	330.1	(47.9)	359.4	(52.1)	-4.3
Double 150mm watermain	Main	Building	6.8	11 m	155	0.155	0.0068	0.018869	110	0.3591	0.00149	0.0164	74.85	71.80	3.1	330.1	(47.9)	359.9	(52.2)	-4.3
Max Day Plus Fireflow (Review of 150mm)																				
Single 150mm watermain	Main	Building	189.2	11 m	155	0.155	0.1892	0.018869	110	10.025	0.70982	7.808	74.85	71.80	3.1	337.0	(48.9)	290.3	(42.1)	6.8
Double 150mm watermain	Main	Building	94.6	11 m	155	0.155	0.0946	0.018869	110	5.0124	0.19663	2.1629	74.85	71.80	3.1	337.0	(48.9)	345.7	(50.1)	-1.3

Water Demand Info

Average Demand =	2.47	L/sec
Max Day Demand =	6.16	L/sec
Peak Hr Deamand =	13.55	L/sec
Fireflow Requirement =	183	L/sec
Max Day Plus FF Demand =	189.2	L/sec

Pipe Lengths

From watermain to building =	11 m
Hazen Williams C Factor for Friction Loss in Pipe, C=	110

Boundary Conditon

	Min HGL	Max HGL	Peak Hr	Max Day + Fireflow	
HGL (m)	108.3	115.4	108.5	109.2	(From City of Ottawa)
Approx Ground Elev (m) =	74.85	74.85	74.85	74.85	
Approx Mech Room FF Elev (m) =	71.80	71.80	71.80	71.80	
Pressure (m) =	33.45	40.55	33.65	34.35	
Pressure (Pa) =	328,145	397,796	330,107	336,974	
Pressure (psi) =	47.6	57.7	47.9	48.9	

Appendix C – Sanitary Servicing Tables

Table C-6 – Sanitary Sewer Design Sheet

Table C-6

SANITARY SEWER CALCULATION SHEET

LOCATION			RESIDENTIAL AREAS AND POPULAITONS												COMMERCIAL				INFILTRATION				SEWER DATA						
				NUMBER OF UNITS							POPULATION				AREA (ha)				AREA (ha)										
Street	U/S MH	D/S MH	Area (ha)	Single	Semi	1-Bed Apt.	1-Bed + Den Apt	2-Bed Apt.	2-Bed + Den Apt	3-Bed Apt.	INDIV	ACCU	Peak Factor	Peak Flow (L/sec)	INDIV	ACCU	Peak Factor	Peak Flow (L/sec)	INDIV	ACCU	INFILT FLOW (L/s)	TOTAL FLOW (L/s)	Nom Dia (mm)	Actual Dia (mm)	Slope (%)	Length (m)	Capacity (L/sec)	Q/Q_{CAP} (%)	Full Velocity (m/s)
Forest	Tower A	MH 200	0.2717			24	102	42			264.6	264.6	4.00	3.43	0.0256	0.0256	1.0	0.008	0.2717	0.2717	0.09	3.53	250	251.46	2.0	6.1	85.4	4%	1.72
	Tower B	MH 200	0.2717			35	145	43			342.3	342.3	4.00	4.44	0.0092	0.0092	1.0	0.003	0.2717	0.2717	0.09	4.53	250	251.46	2.0	1.0	85.4	5%	1.72
	MH 200	MH 201										606.9	3.34	6.57		0.0348	1.0	0.011		0.5434	0.18	6.76	250	251.46	2.0	9.7	85.4	8%	1.72
			0.543			**59**	**247**	**85**			**607**								**0.543**										

Residential Avg. Daily Flow, q (L/p/day) =	280	Commercial Peak Factor =	1.5	(when area >20%)		Unit Type	Ppu	
Commercial Avg. Daily Flow (L/gross ha/day) =	28,000		1.0	(when area <20%)	Peak Population Flow, (L/sec)	Singles =	3.4	J. Diaz, P.Eng.
or L/gross ha/sec =	0.324				= P*q*M/86.4	Semi-Detached =	2.7	
Institutianal Avg. Daily Flow (L/s/ha) =	28,000	Institutional Peak Factor =	1.5	(when area >20%)	Peak Extraneous Flow, (L/sec)	1-bed Apt	1.4	Checked:
or L/gross ha/sec =	0.324		1.0	(when area <20%)	= I*Ac	1-bed + Den Apt	1.4	
Light Industrial Flow (L/gross ha/day) =	35,000				Residential Peaking Factor, M	2-bed Apt. Unit =	2.1	B. Thomas, P.Eng.
or L/gross ha/sec =	0.4051	Residential Correction Factor, K =	0.80		= 1 + (14/(4+P^0.5)) * K	2-bed + Den Apt	2.1	
Light Industrial Flow (L/gross ha/day) =	55,000	Manning N =	0.013		Sewer Capacity, Qcap (L/sec)	3-bed Apt. Unit =	3.1	File Reference:
or L/gross ha/sec =	0.637	Peak extraneous flow, I (L/s/ha) =	0.33	(Total I/I)	= $1/N \; S1^{/2} \; R^{2/3} \; A_c$			252570 Sanitary - Sewer Design Sheet, Sept 1, 2022.xlsx

Designed:	Project:
J. Diaz, P.Eng.	365 Forest Street
Checked:	Location:
B. Thomas, P.Eng.	Ottawa, Ontario
File Reference:	Page No:
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Appendix D – Stormwater Servicing Tables

Table D-7 – Average Runoff Coefficients for Pre-Development

Table D-8 – Estimation of Pre-Development Peak Flows

Table D-9 – Estimation of Allowable Peak Flows (Based on Max C=0.50 with Tc=10mins)

Table D-10 – Average Runoff Coefficients for Post-Development

Table D-11 – Summary of Post-Development Peak Flows (Uncontrolled and Controlled)

Table D-12 – Storage Volumes for 2-year, 5-year and 100-Year Storms (Area PST-1)

Table D-13 – Storage Volumes for 2-year, 5-year and 100-Year Storms (Area PST-3)

Table D-14 – Storage Volumes for 2-year, 5-year and 100-Year Storms (Area PST-4)

Table D-15 –Roof Design Sheet - Tower A

Table D-16 – Roof Design Sheet - Tower B

Table D-7 AVERAGE RUNOFF COEFFICIENTS FOR PRE-DEVELOPMENT

Runoff Coeffients		C_{GRAVEL} =	0.73	C_{ROOF} =	0.90	C_{GRASS} =	0.20	$C_{Asphalt}$ =	0.90
Area No.	Gravel Areas (m^2)	A * C_{ASPH}	Roof Areas (m^2)	A * C_{ROOF}	Grassed Areas (m^2)	A * C_{GRASS}	Sum AC	Total Area (m^2)	C_{AVG} (see note)
PRE-1								1375.0	0.74
PRE-2								3751.0	0.76

Notes
1) Cavg derived with area-weighting command in PCSWMM

Table D-8 ESTIMATION OF PRE-DEVELOPMENT PEAK FLOWS

Catchment No.	Area (ha)	Outlet Location	Time of Conc, Tc (min)	Storm = 2 yr			Storm = 5 yr			Storm = 100 yr		
				I_2 (mm/hr)	Cavg	Q_{2PRE} (L/sec)	I_5 (mm/hr)	Cavg	Q_{5PRE} (L/sec)	I_{100} (mm/hr)	Cavg	Q_{100PRE} (L/sec)
PRE-1	0.1375	To Richmond / Forest	10.0	76.81	0.74	21.7	104.29	0.74	29.5	178.56	0.93	63.1
PRE-2	0.3751	To Bond St	10.0	76.81	0.76	60.9	104.29	0.76	82.6	178.56	0.95	176.9
Totals	0.5126					82.6			112.1			240.0

Notes
1) Intensity, I = $732.951/(Tc+6.199)^{0.810}$ (2-year, City of 0ttawa)
2) Intensity, I = $998.071/(Tc+6.035)^{0.814}$ (5-year, City of 0ttawa)
3) Intensity, I = $1735.688/(Tc+6.014)^{0.820}$ (100-year, City of Ottawa)
4) Cavg for 100-year is increased by 25% to a maximum of 1.0

Table D-9 ESTIMATION OF ALLOWABLE PEAK FLOWS (Based on Max C=0.50 with Tc=10mins)

Area (onsite)	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr			Storm = 5 yr		
			I_5 (mm/hr)	Cavg	Q_{5ALLOW} (L/sec)	I_5 (mm/hr)	Cavg	Q_{5ALLOW} (L/sec)
PRE-1	0.1375	10	76.81	0.50	14.7	104.29	0.50	19.9
PRE-2	0.3751	10	76.81	0.50	40.0	104.29	0.50	54.4
Totals	0.5126				**54.7**			**74.3**

Notes
1) Allowable Capture Rate is based on 5-year storm at Tc=10 minutes.
2) Intensity, I5 = 998.071/(Tc+6.035)^0.814 (5-year, City of 0ttawa)

Allowable Discharge (based on 5-yr storm)

Table D-10 AVERAGE RUNOFF COEFFICIENTS FOR POST-DEVELOPMENT

Runoff Coeffients $C_{ASPH/CONC}$ = 0.90 C_{ROOF} = 0.90 C_{GRASS} = 0.20

Area No.	Outlet Location	Asphalt & Conc Areas (m^2)	A * C_{ASPH}	Roof Areas (m^2)	A * C_{ROOF}	Grassed Areas (m^2)	A * C_{GRASS}	Sum AC	Total Area (m^2)	C_{AVG} (see note)	Comment
PST-1	To Richmond / Forest								1340	0.90	Tower A Roof
PST-2									173	0.73	Surface - Uncontrolled
PST-3									1613	0.90	Tower B Roof
PST-4	To Bond St								1926	0.61	Surface - Controlled
PST-5									74	0.90	Surface - Uncontrolled
Totals									5,126		

Notes
1) Cavg derived with area-weighting command in PCSWMM

Table D-11 SUMMARY OF POST-DEVELOPMENT PEAK FLOWS (Uncontrolled and Controlled)

Area No	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr				Storm = 5 yr				Storm = 100 yr				Outlet	Comments
			C_{AVG}	I_2 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_5 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_{100} (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)		
PST-1	0.1340	10	0.90	76.81	25.7	**(2.4)**	0.90	104.19	34.9	**(3.3)**	1.00	178.56	66.5	**(6.3)**	To Richmond / Forest	Tower A Roof
PST-2	0.0173	10	0.73	76.81	2.7	**(2.7)**	0.73	104.19	3.7	**3.7**	0.91	178.56	7.8	**7.8**		Surface - Uncontrolled
PST-3	0.1613	10	0.90	76.81	31.0	**(2.5)**	0.90	104.19	42.0	**(3.4)**	1.00	178.56	80.1	**(6.4)**		Tower B Roof
PST-4	0.1926	10	0.61	76.81	25.1	**(11.4)**	0.61	104.19	34.0	**(15.4)**	0.76	178.56	72.9	**(33.0)**	To Bond St	Surface - Controlled
PST-5	0.0074	10	0.90	76.81	1.4	**1.4**	0.90	104.19	1.9	**1.9**	1.00	178.56	3.7	**3.7**		Surface - Uncontrolled
Totals	0.5126				85.9	**20.4**			116.5	**27.7**			231.0	**57.3**		

Notes
2-yr Storm Intensity, I = 732.951/(Tc+6.199)^0.810 (City of Ottawa)
5-yr Storm Intensity, I = 998.071/(Tc+6.035)^0.814 (City of Ottawa)
100-yr Storm Intensity, I = 1735.688/(Tc+6.014)&^0.820 (City of Ottawa)
Time of Concentration (min), Tc = ***10***
For Flows under column Qcap which are shown in brackets ***(0.0)*** *, denotes flows that are controlled*

Table D-12 Storage Volumes for 2-year, 5-Year and 100-Year Storms Area: PST-1

Area No: PST-1
C_{AVG} = 0.90 (2-yr)
C_{AVG} = 0.90 (5-yr)
C_{AVG} = 1.00 (100-yr, Max 1.0)
Time Interval = 5.000 (mins)
Drainage Area = 0.1340 (hectares)

Duration (min)	Release Rate = 2.4 (L/sec); Return Period = 2 (years); IDF Parameters, A = 732.951, B = 0.810, C = 6.199; (I = A/(T_c+C)					Release Rate = 3.3 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.071, B = 0.814, C = 6.053; (I = A/(T_c+C)					Release Rate = 6.3 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.688, B = 0.820, C = 6.014; (I = A/(T_c+C)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	55.9	2.45	53.5	0.00	230.5	77.1	3.322	73.8	0.00	398.6	148.5	6.340	142.2	0.00
5	103.6	34.6	2.45	32.2	9.66	141.2	47.2	3.322	43.9	13.17	242.7	90.4	6.340	84.1	25.22
10	76.8	25.7	2.45	23.2	13.95	104.2	34.9	3.322	31.5	18.92	178.6	66.5	6.340	60.2	36.11
15	61.8	20.7	2.45	18.2	16.39	83.6	28.0	3.322	24.6	22.17	142.9	53.2	6.340	46.9	42.20
20	52.0	17.4	2.45	15.0	17.95	70.3	23.5	3.322	20.2	24.21	120.0	44.7	6.340	38.3	46.01
25	45.2	15.1	2.45	12.7	18.99	60.9	20.4	3.322	17.0	25.57	103.8	38.7	6.340	32.3	48.52
30	40.0	13.4	2.45	10.9	19.70	53.9	18.0	3.322	14.7	26.49	91.9	34.2	6.340	27.9	50.19
35	36.1	12.1	2.45	9.6	20.19	48.5	16.2	3.322	12.9	27.11	82.6	30.8	6.340	24.4	51.29
40	32.9	11.0	2.45	8.5	20.51	44.2	14.8	3.322	11.5	27.50	75.1	28.0	6.340	21.7	51.97
45	30.2	10.1	2.45	7.7	20.70	40.6	13.6	3.322	10.3	27.73	69.1	25.7	6.340	19.4	52.33
50	28.0	9.4	2.45	6.9	20.79	37.7	12.6	3.322	9.3	27.82	64.0	23.8	6.340	17.5	52.45
55	26.2	8.8	2.45	6.3	20.81	35.1	11.7	3.322	8.4	27.81	59.6	22.2	6.340	15.9	52.37
60	24.6	8.2	2.45	5.8	20.76	32.9	11.0	3.322	7.7	27.71	55.9	20.8	6.340	14.5	52.13
65	23.2	7.7	2.45	5.3	20.65	31.0	10.4	3.322	7.1	27.54	52.6	19.6	6.340	13.3	51.76
70	21.9	7.3	2.45	4.9	20.50	29.4	9.8	3.322	6.5	27.31	49.8	18.5	6.340	12.2	51.27
75	20.8	7.0	2.45	4.5	20.31	27.9	9.3	3.322	6.0	27.03	47.3	17.6	6.340	11.3	50.69
80	19.8	6.6	2.45	4.2	20.09	26.6	8.9	3.322	5.6	26.70	45.0	16.8	6.340	10.4	50.02
85	18.9	6.3	2.45	3.9	19.83	25.4	8.5	3.322	5.2	26.34	43.0	16.0	6.340	9.7	49.27
90	18.1	6.1	2.45	3.6	19.55	24.3	8.1	3.322	4.8	25.94	41.1	15.3	6.340	9.0	48.46
95	17.4	5.8	2.45	3.4	19.24	23.3	7.8	3.322	4.5	25.50	39.4	14.7	6.340	8.4	47.60
100	16.7	5.6	2.45	3.2	18.92	22.4	7.5	3.322	4.2	25.04	37.9	14.1	6.340	7.8	46.68
Max =					**20.81**					**27.82**					**52.45**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

Table D-13 Storage Volumes for 2-year, 5-Year and 100-Year Storms Area: PST-3

Area No: PST-3
C_{AVG} = 0.90 (2-yr)
C_{AVG} = 0.90 (5-yr)
C_{AVG} = 1.00 (100-yr, Max 1.0)
Time Interval = 5.00 (mins)
Drainage Area = 0.1613 (hectares)

Duration (min)	Release Rate = 2.5 (L/sec); Return Period = 2 (years); IDF Parameters, A = 732.951, B = 0.810, C = 6.199; (I = A/(T_c+C)					Release Rate = 3.4 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.071, B = 0.814, C = 6.053; (I = A/(T_c+C)					Release Rate = 6.4 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.688, B = 0.820, C = 6.014; (I = A/(T_c+C)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	67.5	2.49	65.0	0.00	230.5	93.0	3.372	89.6	0.00	398.6	178.7	6.420	172.3	0.00
5	103.6	41.8	2.49	39.3	11.79	141.2	57.0	3.372	53.6	16.08	242.7	108.8	6.420	102.4	30.72
10	76.8	31.0	2.49	28.5	17.11	104.2	42.0	3.372	38.7	23.21	178.6	80.1	6.420	73.6	44.19
15	61.8	24.9	2.49	22.4	20.20	83.6	33.7	3.372	30.3	27.31	142.9	64.1	6.420	57.7	51.89
20	52.0	21.0	2.49	18.5	22.22	70.3	28.4	3.372	25.0	29.98	120.0	53.8	6.420	47.4	56.84
25	45.2	18.2	2.49	15.7	23.61	60.9	24.6	3.372	21.2	31.81	103.8	46.6	6.420	40.1	60.22
30	40.0	16.2	2.49	13.7	24.62	53.9	21.8	3.372	18.4	33.11	91.9	41.2	6.420	34.8	62.59
35	36.1	14.6	2.49	12.1	25.34	48.5	19.6	3.372	16.2	34.04	82.6	37.0	6.420	30.6	64.28
40	32.9	13.3	2.49	10.8	25.87	44.2	17.8	3.372	14.5	34.70	75.1	33.7	6.420	27.3	65.46
45	30.2	12.2	2.49	9.7	26.24	40.6	16.4	3.372	13.0	35.17	69.1	31.0	6.420	24.5	66.27
50	28.0	11.3	2.49	8.8	26.49	37.7	15.2	3.372	11.8	35.47	64.0	28.7	6.420	22.3	66.77
55	26.2	10.6	2.49	8.1	26.65	35.1	14.2	3.372	10.8	35.65	59.6	26.7	6.420	20.3	67.04
60	24.6	9.9	2.49	7.4	26.73	32.9	13.3	3.372	9.9	35.72	55.9	25.1	6.420	18.6	67.12
65	23.2	9.3	2.49	6.9	26.75	31.0	12.5	3.372	9.2	35.71	52.6	23.6	6.420	17.2	67.03
70	21.9	8.8	2.49	6.4	26.70	29.4	11.9	3.372	8.5	35.62	49.8	22.3	6.420	15.9	66.81
75	20.8	8.4	2.49	5.9	26.61	27.9	11.3	3.372	7.9	35.48	47.3	21.2	6.420	14.8	66.47
80	19.8	8.0	2.49	5.5	26.48	26.6	10.7	3.372	7.3	35.27	45.0	20.2	6.420	13.8	66.02
85	18.9	7.6	2.49	5.2	26.32	25.4	10.2	3.372	6.9	35.02	43.0	19.3	6.420	12.8	65.49
90	18.1	7.3	2.49	4.8	26.12	24.3	9.8	3.372	6.4	34.72	41.1	18.4	6.420	12.0	64.88
95	17.4	7.0	2.49	4.5	25.89	23.3	9.4	3.372	6.0	34.39	39.4	17.7	6.420	11.3	64.20
100	16.7	6.8	2.49	4.3	25.64	22.4	9.0	3.372	5.7	34.03	37.9	17.0	6.420	10.6	63.46
Max =					**26.75**					**35.72**					**67.12**

Notes
1) Peak flow is equal to the product of 2.78 x C x I x A
2) Rainfall Intensity, $I = A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Duration x Storage Rate
6) Maximium Storage = Max Storage Over Duration
7) Parameters a,b,c are for City of Ottawa

Table D-14 Storage Volumes for 2-year, 5-Year and 100-Year Storms Area: PST-4

Area No: PST-4

C_{AVG} = 0.61 (2-yr)

C_{AVG} = 0.61 (5-yr)

C_{AVG} = 0.76 (100-yr, Max 1.0)

Time Interval = 2.00 (mins)

Drainage Area = 0.1926 (hectares)

Actual Release Rate (L/sec) = 33.0

Percentage of Actual Rate (City of Ottawa requirement) 50%

Release Rate Used for Estimation of 100-year Storage (L/sec) = 16.5

Duration (min)	Release Rate = 11.4 (L/sec), Return Period = 2 (years), IDF Parameters, A = 732.951, B = 0.810, C = 6.199 (I = A/(Tc+C)					Release Rate = 15.4 (L/sec), Return Period = 5 (years), IDF Parameters, A = 998.071, B = 0.814, C = 6.053 (I = A/(Tc+C)					Release Rate = 16.5 (L/sec), Return Period = 100 (years), IDF Parameters, A = 1735.688, B = 0.820, C = 6.014 (I = A/(Tc+C)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	54.6	11.36	43.3	0.00	230.5	75.3	15.405	59.9	0.00	398.6	162.7	16.5	146.2	0.00
2	133.3	43.5	11.36	32.2	3.86	182.7	59.7	15.405	44.3	5.31	315.0	128.6	16.5	112.1	13.45
4	111.7	36.5	11.36	25.1	6.03	152.5	49.8	15.405	34.4	8.26	262.4	107.1	16.5	90.6	21.75
6	96.6	31.6	11.36	20.2	7.27	131.6	43.0	15.405	27.6	9.92	226.0	92.3	16.5	75.8	27.28
8	85.5	27.9	11.36	16.6	7.95	116.1	37.9	15.405	22.5	10.81	199.2	81.3	16.5	64.8	31.12
10	76.8	25.1	11.36	13.7	8.24	104.2	34.0	15.405	18.6	11.18	178.6	72.9	16.5	56.4	33.84
12	69.9	22.8	11.36	11.5	8.26	94.7	30.9	15.405	15.5	11.18	162.1	66.2	16.5	49.7	35.78
14	64.2	21.0	11.36	9.6	8.08	86.9	28.4	15.405	13.0	10.91	148.7	60.7	16.5	44.2	37.14
16	59.5	19.4	11.36	8.1	7.76	80.5	26.3	15.405	10.9	10.44	137.5	56.2	16.5	39.7	38.07
18	55.5	18.1	11.36	6.8	7.31	75.0	24.5	15.405	9.1	9.81	128.1	52.3	16.5	35.8	38.65
20	52.0	17.0	11.36	5.6	6.77	70.3	22.9	15.405	7.5	9.05	120.0	49.0	16.5	32.5	38.97
22	49.0	16.0	11.36	4.7	6.14	66.1	21.6	15.405	6.2	8.18	112.9	46.1	16.5	29.6	39.05
24	46.4	15.1	11.36	3.8	5.46	62.5	20.4	15.405	5.0	7.23	106.7	43.6	16.5	27.1	38.95
26	44.0	14.4	11.36	3.0	4.72	59.3	19.4	15.405	4.0	6.21	101.2	41.3	16.5	24.8	38.70
28	41.9	13.7	11.36	2.3	3.93	56.5	18.5	15.405	3.0	5.12	96.3	39.3	16.5	22.8	38.31
30	40.0	13.1	11.36	1.7	3.10	53.9	17.6	15.405	2.2	3.98	91.9	37.5	16.5	21.0	37.81
32	38.3	12.5	11.36	1.2	2.24	51.6	16.9	15.405	1.5	2.79	87.9	35.9	16.5	19.4	37.21
34	36.8	12.0	11.36	0.7	1.34	49.5	16.2	15.405	0.8	1.56	84.3	34.4	16.5	17.9	36.52
36	35.4	11.6	11.36	0.2	0.42	47.6	15.5	15.405	0.1	0.29	81.0	33.1	16.5	16.6	35.76
38	34.1	11.1	11.36	-0.2	-0.52	45.8	15.0	15.405	-0.4	-1.01	77.9	31.8	16.5	15.3	34.92
40	32.9	10.7	11.36	-0.6	-1.49	44.2	14.4	15.405	-1.0	-2.34	75.1	30.7	16.5	14.2	34.03
Max =					**8.26**					**11.18**					**39.05**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, $I = A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

7) Parameters a,b,c are for City of Ottawa

Table D15: 5-year & 100-year Roof Design Sheet - For Roof Drains on Tower A using Flow Controlled Roof Drains

Project: 365 Forest Street
Location: City of Ottawa
Date:July 2022

Area #	Drain Type	Roof Drain Type	No Drains per Area	No of Weirs per Drain	Weir Position	Runoff Coeff (Cavg)		Drainage Area		5-year Event						100-year Event						Storage Required *(MRM)*		Maximium Storage Provided at Spill Elevation			
						5-year	100-year	m^2	ha	Runoff Rate (L/sec)	5yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	Runoff Rate (L/sec)	100yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	5-year (m^3)	100-year (m^3)	Area Available for Storage (m^2)	Max Prism Depth (mm)	Max Prisim Volume (m^3)	Total Volume (m3)
R-A1	RD	RD1	1	1	3-1/4 open	0.90	1.00	251	0.0251	6.543	108	12.9	12.9	0.814	0.814	12.459	142	14.6	14.6	0.921	0.921	4.71	10.73	251	150	12.6	12.55
R-A2	RD	RD1	1	1	3-1/4 open	0.90	1.00	181	0.0181	4.719	103	12.6	12.6	0.797	0.797	8.985	137	14.4	14.4	0.905	0.905	2.96	6.94	181	150	9.1	9.05
R-A3	RD	RD1	1	1	3-1/4 open	0.90	1.00	141	0.0141	3.676	99	12.5	12.5	0.785	0.785	6.999	133	14.2	14.2	0.893	0.893	2.04	4.93	141	150	7.1	7.05
R-A4	RD	RD1	1	1	3-1/4 open	0.90	1.00	102	0.0102	2.659	94	12.2	12.2	0.770	0.770	5.063	127	13.9	13.9	0.874	0.874	1.23	3.11	102	150	5.1	5.10
R-A5	RD	RD1	1	1	3-1/4 open	0.90	1.00	171	0.0171	4.458	102	12.6	12.6	0.795	0.795	8.488	136	14.3	14.3	0.902	0.902	2.72	6.43	171	150	8.6	8.55
R-A6	RD	RD1	1	1	3-1/4 open	0.90	1.00	277	0.0277	7.221	110	13.0	13.0	0.820	0.820	13.750	144	14.7	14.7	0.927	0.927	5.39	12.21	277	150	13.9	13.85
R-A7	RD	RD1	1	1	3-1/4 open	0.90	1.00	218	0.0218	5.683	106	12.8	12.8	0.808	0.808	10.821	140	14.5	14.5	0.915	0.915	3.86	8.91	218	150	10.9	10.90
Totals						0.9	1	**1,341**	**0.1341**	34.959		**88.59**		**5.59**	**5.59**	**66.57**		**100.45**		**6.34**	**6.34**	**22.91**	**53.25**	**1341**		**67.1**	**67.1**
Min											**94**						**127**										
Max											**110**						**144**										

Runoff Based on the Following:

Storm Frequency (years) =	5	100
Time of Conc (mins) =	10	10
Storm Intensity (mm/hr) =	104.2	178.6

Qyr(cont) = 4.2
V2yr = 17.2

Roof Drain Types

Drain Type =	RD1	RD2
Max Overflow Depth (mm	150 mm	150 mm
Flow Controlled (Yes/No)	Yes	No
Ponding	Yes	No
Weir Desc	Accutrol	n/a
No. Weirs	1	n/a

Roof Drains have Following Flow Rates: WATTS Flow Conttolled Drain

Weir Position		Flow (gpm) per depth							Max Flow Rate per Weir
		0	25	50	75	100	125	150	
		0	0.025	0.05	0.075	0.1	0.125	0.15	
1-None		0	0	0	0	0	0	0	0.000
2-Closed		0	5	5	5	5	5	5	0.315
3-1/4 open		0	5	10	11	13	14	15	0.946
4-1/2 open		0	5	10	12	15	18	20	1.262
5-3/4 open		0	5	10	14	18	21	25	1.577
6-Full		0	5	10	15	20	25	30	1.893

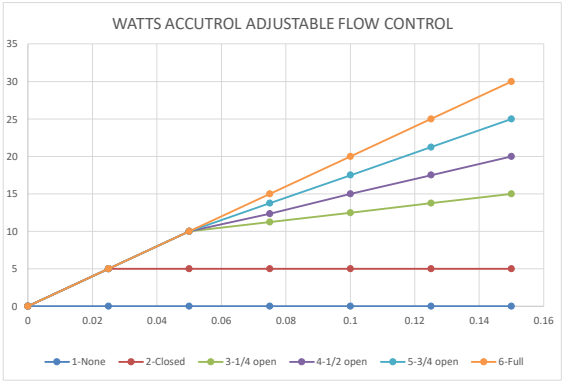


Table D16: 5-year & 100-year Roof Design Sheet - For Roof Drains on Tower B using Flow Controlled Roof Drains

Project: 365 Forest Street
Location: City of Ottawa
Date:July 2022

Area #	Drain Type	Roof Drain Type	No Drains per Area	No of Weirs per Drain	Weir Position	Runoff Coeff (Cavg)		Drainage Area		5-year Event						100-year Event						Storage Required *(MRM)*		Maximium Storage Provided at Spill Elevation			
						5-year	100-year	m^2	ha	Runoff Rate (L/sec)	5yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	Runoff Rate (L/sec)	100yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	5-year (m^3)	100-year (m^3)	Area Available for Storage (m^2)	Max Prism Depth (mm)	Max Prisim Volume (m^3)	Total Volume (m3)
R-B1	RD	RD1	1	1	3-1/4 open	0.90	1.00	217	0.0217	5.657	106	12.8	12.8	0.808	0.808	10.772	140	14.5	14.5	0.915	0.915	3.84	8.85	217	150	10.9	10.85
R-B2	RD	RD1	1	1	3-1/4 open	0.90	1.00	245	0.0245	6.387	108	12.9	12.9	0.814	0.814	12.162	142	14.6	14.6	0.921	0.921	4.55	10.39	245	150	12.3	12.25
R-B3	RD	RD1	1	1	3-1/4 open	0.90	1.00	276	0.0276	7.195	109	13.0	13.0	0.817	0.817	13.700	144	14.7	14.7	0.927	0.927	5.37	12.15	276	150	13.8	13.80
R-B4	RD	RD1	1	1	3-1/4 open	0.90	1.00	275	0.0275	7.169	109	13.0	13.0	0.817	0.817	13.651	144	14.7	14.7	0.927	0.927	5.34	12.09	275	150	13.8	13.75
R-B5	RD	RD1	1	1	3-1/4 open	0.90	1.00	197	0.0197	5.136	104	12.7	12.7	0.801	0.801	9.779	139	14.5	14.5	0.912	0.912	3.34	7.77	197	150	9.9	9.85
R-B6	RD	RD1	1	1	3-1/4 open	0.90	1.00	132	0.0132	3.441	98	12.4	12.4	0.782	0.782	6.552	132	14.1	14.1	0.890	0.890	1.85	4.50	132	150	6.6	6.60
R-B7	RD	RD1	1	1	3-1/4 open	0.90	1.00	271	0.0271	7.065	109	13.0	13.0	0.817	0.817	13.452	143	14.7	14.7	0.924	0.924	5.23	11.87	271	150	13.6	13.55
Totals						0.9	1	**1,613**	**0.1613**	42.049		**89.65**		**5.66**	**5.66**	**80.07**		**101.70**		**6.42**	**6.42**	**29.51**	**67.63**	**1613**		**80.7**	**80.7**
Min											**98**						**132**										
Max											**109**						**144**										

Runoff Based on the Following:

Storm Frequency (years) =	5	100
Time of Conc (mins) =	10	10
Storm Intensity (mm/hr) =	104.2	178.6

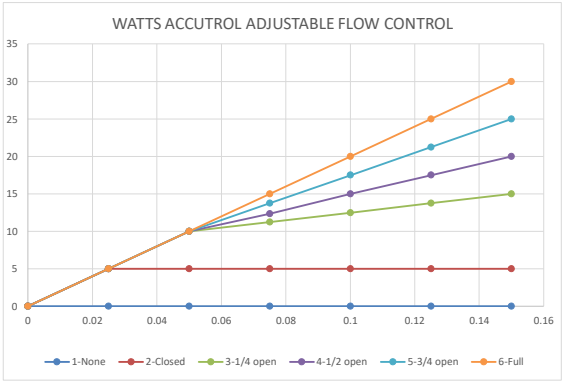
Qyr(cont) = 4.2
V2yr = 22.1

Roof Drain Types

Drain Type =	RD1	RD2
Max Overflow Depth (mm	150 mm	150 mm
Flow Controlled (Yes/No)	Yes	No
Ponding	Yes	No
Weir Desc	Accutrol	n/a
No. Weirs	1	n/a

Roof Drains have Following Flow Rates: WATTS Flow Conttolled Drain

Weir Position		Flow (gpm) per depth							Max Flow Rate per Weir
		0	25	50	75	100	125	150	
		0	0.025	0.05	0.075	0.1	0.125	0.15	
1-None		0	0	0	0	0	0	0	0.000
2-Closed		0	5	5	5	5	5	5	0.315
3-1/4 open		0	5	10	11	13	14	15	0.946
4-1/2 open		0	5	10	12	15	18	20	1.262
5-3/4 open		0	5	10	14	18	21	25	1.577
6-Full		0	5	10	15	20	25	30	1.893



Appendix E – Consultation / Correspondence

Pre-consultation meeting minutes

Email on Water System Boundary Conditions

Email Sent to RCVA on Stormwater Management Requirements

Email Received from RCVA on Stormwater Management Requirements

Email Correspondence with City of Ottawa re SWM requirements for Pinecrest Creek/Westboro

365 Forest Street, 1420 Richmond Road & 2583-2589 Bond Street
Pre-Consultation Meeting Minutes

Location: Room 4103E, City Hall
Date: May 28, 2pm to 3pm

Attendee	Role	Organization
Mary Dickinson	Planner	City of Ottawa
Santosh Kuruvilla	Project Manager (Infrastructure)	
Melanie Knight	Planner (Urban Design)	
Samantha Gatchene	Planning Assistant	
Jamie Posen	Planner	FoTenn
Steve Heafey	Owner's Representative	Heafey Group
Carmine Zayoun	Owner's Representative	
Shawn Vandette	Owner	
Mathieu LaPalm	Architect	LaPalm Rheault Architects

Comments from Applicant

1. The applicant is proposing the development two 12-storey high rise buildings at 365 Forest Street, 1420 Richmond Road, and 2583-2589 Bond Street. The buildings would be residential in nature with 333 units total. Currently, no commercial uses at grade are proposed.
2. Underground parking and surface vehicle parking would be provided as well as bicycle parking.
3. The current two access points off Richmond Road and Forest Street are proposed to be maintained.

Planning Comments

1. A Zoning By-law Amendment and an Official Plan Amendment would be required to permit the 12-storey building option, in accordance with the settlement of Official Plan Amendment 150 (OPA 150). The amendment to Section 3.6.3 maintains that up to 9-storeys is permitted on Arterial Mainstreets unless stated in a secondary plan or if the building is located at a qualifying node defined as a location that is:

    a. within 400 metres walking distance of a Rapid Transit Station on Schedule D of this Plan; or
    b. directly abutting an intersection of the Mainstreet with another Mainstreet or a Transit Priority Corridor on Schedule D of this Plan; or

c. directly abutting a Major Urban Facility.

2. Under OPA 150, the site is not considered a node and would require an OPA. Information regarding the settlement of OPA 150 building height and design appeals can be found in the April 24th Planning Committee Report.

3. The City is in the early stages of creating a secondary plan for the area. This process is scheduled to begin in late 2019/early 2020. City staff strongly encourage the applicant to participate in that process.

4. Cash-in-lieu of parkland and associated appraisal fee will be required as a condition of approval as per the Parkland Dedication By-law. For commercial and industrial purposes, parkland is calculated as 2% of the gross land area of the site being developed.

5. Building A should include a main front entrance directly from Richmond Road, or at the corner where Richmond Road and Forest Street meet. This is in accordance with the current AM10 zoning requirements. Please refer to the development standards in this zone for all other provisions including minimum glazing, minimum ceiling heights for the first storey etc.

Urban Design Comments

1. Site design:

   - All vehicular access should be off of Forest and/or Bond. Preference would be for all vehicular access off of Bond. Bond Street should be treated as a 'laneway' to the site where access to underground parking and any loading or servicing can be located.

   - There are hydro lines along Forest and Bond, which requires minimum building setbacks. If the hydro lines are to be buried, the building should still be set back to allow for enough space for street trees along Forest and Bond.

   - A sidewalk should be provided along Forest to connect to the sidewalk recently built along Forest towards Carling (Dymon Storage site).

   - All parking should be located underground. This would significantly improve the immediate area, which is dominated by surface parking lots.

   - There is an opportunity at the corner of Richmond and Forest to create a plaza space either as a POPS (privately owned public spaces) or a patio space associated with a commercial use

2. Built form/building design:

- The building separation in the current design between Building A and B should be maintained to break up the façade along Forest.

- The long frontage along Forest needs to be designed well to ensure that there is permeability to the site and the buildings do not negatively dominate the streetscape.

3. Building A (12 storeys)

   - With vehicular access from Richmond removed, the building fronting onto Richmond Road can be designed as a complete perimetre corner building with design emphasis on the corner of Richmond and Forest.

   - Main pedestrian entrances should be located off of Richmond with a corner entrance/plaza space at the corner of Richmond and Forest.

   - The building should be designed with consideration for the City's High Rise Design Guidelines specifically with respect to built form (chapter 2).

   - Consider the shadowing impacts to the low-rise residential homes on the north side of Richmond Road with the shaping of Building A

4. Building B (12 storeys)

   - At 12 storeys, the mass of Building B dominates the site and Bond Street. A reduced building footprint and a reduced height down to 9 storeys is recommended. Please refer to Chapter 2 in the High Rise Design Guidelines for guidance on the appropriateness, mass and height of a bar building.

   - This building should create a transition from the newly constructed building at 2599 Carling Avenue.

   - The roof top amenity space could be realigned north/south to take better advantage of sun exposure and provide relief between the Building A and B.

   - The building should be designed with consideration for the City's High Rise Design Guidelines specifically with respect to built form (Chapter 2).

5. General comments:

   - This site presents an opportunity for redevelopment which can improve the existing context that is dominated by surface parking lots and oversized (high rise) bar buildings.

   - With frontage on three streets, there is an opportunity to make a significant contribution to the public realm. Please refer to the City's High Rise Design

Guidelines (chapter 3) for more direction on the design of the pedestrian realm.

Engineering Comments

1. Stormwater quantity control criteria – control the quantity to the 5-year pre-development/existing level for all storms up to and including the 100-year storm.

2. When calculating the existing composite runoff coefficient (C) for the site, please provide a drawing showing the individual area and its runoff coefficient.

3. It appears that the subject site consists of more than one parcel. Therefore, MECP ECA is required. All parcels can be merged into one to avoid MECP ECA requirement.

4. Stormwater quality control – Consult with the Conservation Authority (RVCA) for their requirements. Include the correspondence with RVCA in the stormwater/site servicing report.

5. Show the existing storm and sanitary lateral service connections on the site servicing plan.

6. When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the storage requirement prior to the 1: 100-year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.

7. Engineering plans are to be submitted on standard A1 size (594mm x 841mm) sheets.

8. Provide the following information for water main boundary conditions:
    a. Location map with water service connection location
    b. Average daily demand (l/s)
    c. Maximum daily demand (l/s)
    d. Maximum hourly demand
    e. Fire flow demand (provide fire detailed flow calculations based on the fire underwriters survey method)
    f. If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light

fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.

Transportation Comments

1. Please revise your screening form to indicate that the property is located on a Spine Bicycle Network (Richmond)

2. Follow Traffic Impact Assessment Guidelines
    a. Traffic Impact Assessment will be required.
    b. Start this process asap.
    c. Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).

3. ROW protection on Richmond between HWY 417 and Ottawa River Parkway is 37.5m even (18.75 metres from centreline of road).

4. Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following location on the final plan will be required:
    a. Local Road to Local Road: 3 metre x 3 metres
    b. Local Road to Arterial Road: 5 metre x 5 metres

5. Noise Impact Studies required for the following:
    a. Road
    b. Stationary (due to the proximity to neighbouring exposed mechanical equipment) and/or (if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses)

6. Clear throat requirements on an arterial (Richmond) are as follows:

Apartments	Unit Count	Length (m)
	<100 units	15
	100-200 units	25
	>200 units	40

**Please note that vehicular access from Richmond Road is not our desired configuration.

7. On site plan:
    a. Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    b. Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    c. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    d. Show lane/aisle widths.
    e. Sidewalk and cycle tracks are to be continuous across access as per City Specification 7.1.
    f. Grey out any area that will not be impacted by this application.

Requested Plans and Studies

1. A list of required plans and studies required for a complete combined Official Plan Amendment, Zoning By-law Amendment and Site Plan Control application have been attached.

Process

1. This is a pre-consultation to determine the nature of the application and the requirements for a complete application.

    a. For an Official Plan Amendment application, subject to Public Consultation, the application form, timeline, and fees can be found here.

    b. For a Major Zoning By-law Amendment application, Manager Approval, subject to Public Consultation, the application form, timeline, and fees can be found here.

2. This proposal will trigger a Site Plan Control application, Manager Approval, subject to Public Consultation. The proposal would fall under the 'complex' category as per the Site Plan Control Subtype Threholds. The application form, timeline and fees can be found here.

3. The applicant will be required to present their proposal to the Urban Design Review Panel (UDRP). The site is in a Design Priority Area and a pre-consultation is recommended. The next UDRP meeting is scheduled for Friday, July 12th and the submission deadline is Friday, June 28. Information regarding the review process and timelines can be found here.

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please contact me at mary.dickinson@ottawa.ca or at 613-580-2424 extension 13923 if you have any questions.

Sincerely,

Mary Dickinson MCIP RPP
Planner II
Development Review - West

Jennifer Diaz

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Wednesday, June 2, 2021 1:56 PM
To: Bruce Thomas; Jennifer Diaz
Cc: Jason Fitzpatrick
Subject: RE: Request for Boundary Conditions - 365 Forest Street
Attachments: 365 Forest May 2021 - 2nd Submission.pdf

Hi Bruce,

The following are boundary conditions, HGL, for hydraulic analysis at 365 Forest (zone 1W) assumed to be connected to the 305 mm on Forest Street (see attached PDF for location).

Minimum HGL = 108.3 m

Maximum HGL = 115.4 m

MaxDay + FireFlow (133L/s) = 109.8 m

MaxDay + FireFlow (183L/s) = 109.2 m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Thanks,

Santhosh

From: Kuruvilla, Santhosh
Sent: May 31, 2021 11:33 AM
To: Bruce Thomas <bruce.thomas@exp.com>; Jennifer Diaz <jennifer.diaz@exp.com>
Cc: Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Subject: RE: Request for Boundary Conditions - 365 Forest Street

Ok, thanks Bruce.

Santhosh

From: Bruce Thomas <bruce.thomas@exp.com>
Sent: May 31, 2021 11:16 AM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>; Jennifer Diaz <jennifer.diaz@exp.com>
Cc: Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Subject: RE: Request for Boundary Conditions - 365 Forest Street

Hi Santhosh,

A double feed is proposed from the location on Forest with a valve in between the two proposed connections.

Bruce Thomas, P.Eng.
EXP | Senior Project Manager
t : +1.613.688.1899 | m : +1.613.852.8753 | e : bruce.thomas@exp.com

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From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Monday, May 31, 2021 10:55 AM
To: Jennifer Diaz <jennifer.diaz@exp.com>
Cc: Jason Fitzpatrick <jason.fitzpatrick@exp.com>; Bruce Thomas <bruce.thomas@exp.com>
Subject: RE: Request for Boundary Conditions - 365 Forest Street

Hi Jennifer,

We noticed that the previous boundary conditions that you requested for this site required two connections. Now there is only being requested but the demands require 2 connections (see section 4.3 of the Ottawa Water Distribution Design Guideline).

Please update your map showing both connection points and send us a copy.

Thanks,

Santhosh

From: Jennifer Diaz <jennifer.diaz@exp.com>
Sent: May 26, 2021 4:54 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Jason Fitzpatrick <jason.fitzpatrick@exp.com>; Bruce Thomas <Bruce.Thomas@exp.com>
Subject: RE: Request for Boundary Conditions - 365 Forest Street

Hi Santhosh,

Please see the attached requested information and summary of the water demand below:
Average Day: 2.5 L/sec
Max Day: 6.2 L/sec
Peak Hour: 13.6 L/sec
Fire flow (RFF): Tower A: 133 L/sec, Tower B: 183 L/sec (based on FUS method)
Max Day + FF: 189.2 L/sec.

Please advise if you require anything else.

Thank you

Jennifer Diaz, P.Eng.
EXP | Branch Manager
t : +1.613.542.1253, 122 | m : +1.613.484.2286 | e : jennifer.diaz@exp.com

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From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Friday, May 21, 2021 3:23 PM
To: Jennifer Diaz <jennifer.diaz@exp.com>
Subject: RE: Request for Boundary Conditions - 365 Forest Street

Hi Jennifer,

Please provide the following information for water boundary condition request.

- Provide the following information for water main boundary conditions:
    1. Location map with water service connection location(s).
    2. Average daily demand (l/s).
    3. Maximum daily demand (l/s).
    4. Maximum hourly demand (l/s).
    5. Fire flow demand (provide detailed fire flow calculations based on Fire Underwriters survey (FUS) Water Supply for Public Fire Protection). Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).

6. Hydrant capacity shall be assessed to demonstrate the RFF can be achieved. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Please ensure all information listed above must be provided in the same email.

Thanks,

Santhosh

From: Jennifer Diaz <jennifer.diaz@exp.com>
Sent: May 20, 2021 8:50 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Subject: RE: Request for Boundary Conditions - 365 Forest Street

Good evening,
Further to our request there have been minor changes to the design of the proposed development at the subject address. We have since completed additional calculations and estimate the following demands and flow requirements:

Average Day: 2.5 L/sec
Max Day: 6.2 L/sec
Peak Hour: 13.6 L/sec
Fire flow (RFF): Tower A: 133 L/sec, Tower B: 183 L/sec (based on FUS method)
Max Day + FF: 189.2 L/sec.

Please provide the updated hydraulic boundary conditions based on our estimated values.

Thank you!

Jennifer Diaz, P.Eng.
EXP | Branch Manager
t : +1.613.542.1253, 122 | m : +1.613.484.2286 | e : jennifer.diaz@exp.com

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From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Wednesday, July 24, 2019 9:42 AM
To: Dickinson, Mary <mary.dickinson@ottawa.ca>; Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Subject: RE: Request for Boundary Conditions - 365 Forest Street

Hi Jason,

Here is the boundary conditions for the subject application. Please see attached for the connection locations.

The following are boundary conditions, HGL, for hydraulic analysis at 365 Forest (zone 1W) assumed to be connected to the 305mm on Forest and 305mm on Richmond (see attached PDF for location).

Minimum HGL = 108.5m, same at both connections

Maximum HGL = 115.7m, same at both connections

MaxDay + FireFlow (150L/s) = 107.0m, Forest connection

MaxDay + FireFlow (150L/s) = 109.0m, Richmond connection

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Santhosh

From: Dickinson, Mary
Sent: July 10, 2019 3:58 PM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>; jason.fitzpatrick@exp.com
Subject: FW: Request for Boundary Conditions - 365 Forest Street

Hi Jason,

I'm forwarding your request to Santhosh Kuruvilla who will be able to make the request for the boundary conditions.

Thank you,
Mary

Mary Dickinson, MCIP, RPP
Planner
Development Review West
Urbaniste
Examen des demandes d'aménagement ouest

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 13923
ottawa.ca/planning / ottawa.ca/urbanisme

From: Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Sent: July 10, 2019 3:32 PM
To: Dickinson, Mary <mary.dickinson@ottawa.ca>
Cc: Bruce Thomas <bruce.thomas@exp.com>; Moe Ghadban <Moe.Ghadban@exp.com>
Subject: Request for Boundary Conditions - 365 Forest Street

Hi Mary,

We are working with the Heafey Group on a site plan application for 365 Forest Street, and would appreciate if you could arrange for IAD/water Resources to provide hydraulic boundary conditions that we will need for the watermain design. I have attached a sketch of the site and the approximate boundary condition locations. We are requesting boundary conditions at locations at this time to evaluate the best connection location within the right of way.

The following is a summary of the demands and the required fire flows (RFF) we have estimated. We would appreciate the hydraulic boundary conditions based on our estimated water demands and required fire flows as noted below:

Average Day: 2.4 L/sec
Max Day: 6.0 L/sec
Peak Hour: 13.2 L/sec
Fire flow (RFF): Tower A: 100 L/sec, Tower B: 150 L/sec (worst case). (based on FUS method)
Max Day + FF: 156.0 L/sec.

In the event you require confirmation of the above demands and the RFF, I've attached the design tables for reference.

Regards,

Jason Fitzpatrick, P.Eng.
EXP | Project Engineer
t : +1.613.688.1899 | m : +1.613.302.7441 | e : jason.fitzpatrick@exp.com
2650 Queensview Drive
Suite 100
Ottawa, ON K2B 8H6
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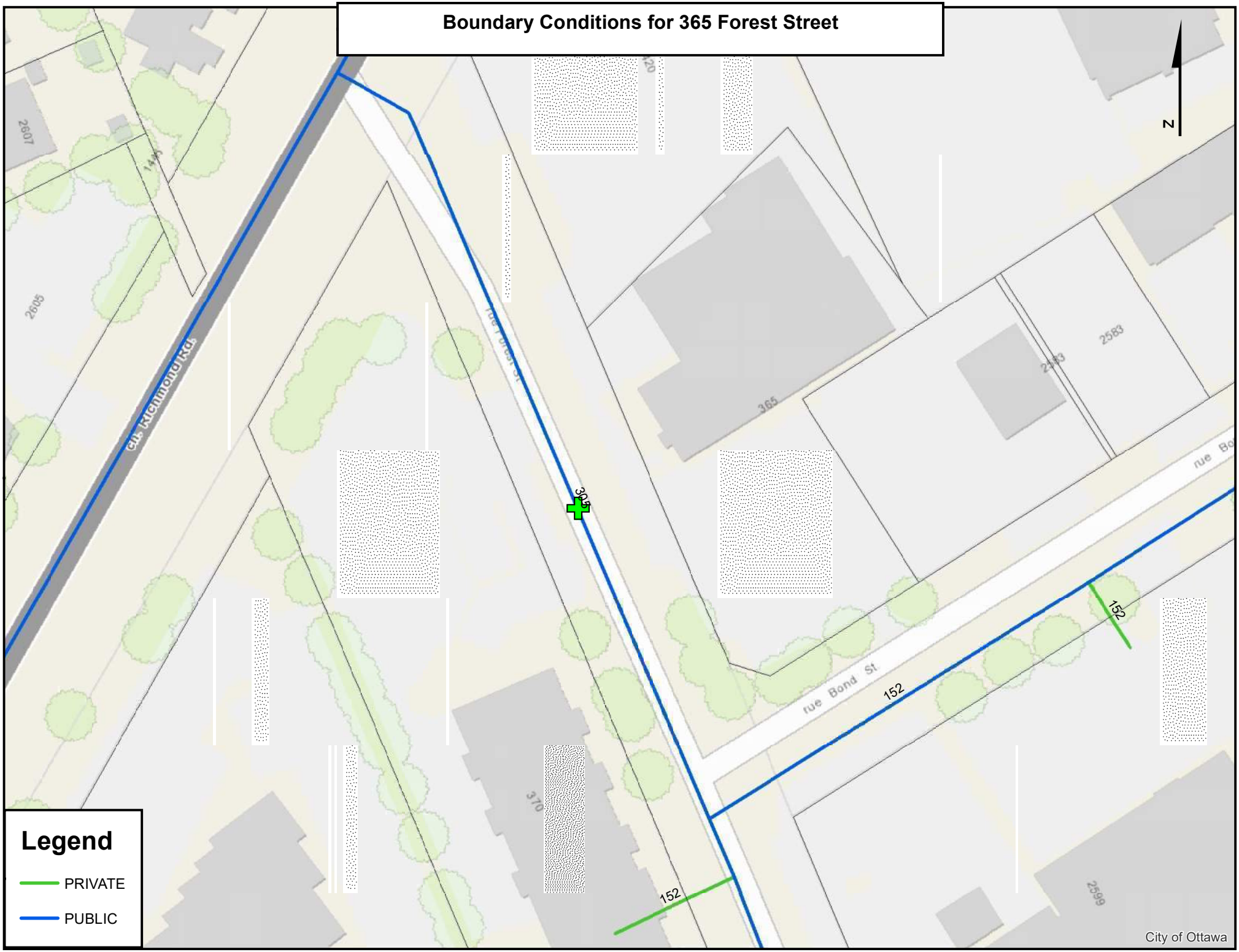
Boundary Conditions for 365 Forest Street



Jennifer Diaz

From: Miliu, Ghislaine <ghislaine.miliu@ottawa.ca>
Sent: Wednesday, October 13, 2021 11:17 AM
To: Bruce Thomas
Cc: Jennifer Diaz
Subject: RE: 365 Forest -Stormwater Management Criteria

Hi Bruce,

Please find some responses embedded in two of your emails below.

Please let me know if you have any other questions.

Kind regards,

Ghislaine

Ghislaine Miliu, P.Eng
Project Manager – Infrastructure Planning
Asset Management Branch
City of Ottawa | Ville d'Ottawa

From: Bruce Thomas <bruce.thomas@exp.com>
Sent: October 12, 2021 12:06 PM
To: Miliu, Ghislaine <ghislaine.miliu@ottawa.ca>
Cc: Jennifer Diaz <jennifer.diaz@exp.com>
Subject: RE: 365 Forest -Stormwater Management Criteria

Hi Ghislaine,

Hope you had a great Thanksgiving weekend. Thanks for your response below.

Yes, we wish to exclude the uncontrolled drainage areas from the 10mm retention requirement, as it is would be very difficult collect the runoff.

For the larger events we would be ok with over controlling the release rate from other areas of the site, to account for the uncontrolled areas.

RESPONSE: Yes, for this project (given the outlet of the STM sewers system to Ottawa River), the small area of uncontrolled drainage may be excluded from meeting the 10 mm retention.

Please let us know when you discuss with your colleagues.

Thanks,

Bruce

Bruce Thomas, P.Eng.
EXP | Senior Project Manager
t : +1.613.688.1899 | m : +1.613.852.8753 | e : bruce.thomas@exp.com

exp.com | legal disclaimer
keep it green, read from the screen

From: Miliu, Ghislaine <ghislaine.miliu@ottawa.ca>
Sent: Thursday, October 7, 2021 3:39 PM
To: Bruce Thomas <bruce.thomas@exp.com>
Cc: Jennifer Diaz <jennifer.diaz@exp.com>
Subject: RE: 365 Forest -Stormwater Management Criteria

Hi Bruce (and Jennifer),

Re the uncontrolled drainage areas: is your question whether these areas be excluded from the 10 mm retention requirement **OR** are you asking if they can be excluded from the 10 mm retention requirement **AND** if runoff from these areas not contribute towards allowable release rate?

Once I hear back from you then I will reach out to my colleagues.

Thanks.
Ghislaine

From: Bruce Thomas <bruce.thomas@exp.com>
Sent: October 07, 2021 3:18 PM
To: Miliu, Ghislaine <ghislaine.miliu@ottawa.ca>
Cc: Jennifer Diaz <jennifer.diaz@exp.com>; Carmine Zayoun <carmine@zayoungroup.com>; rakrawi@groupeheafey.com; Christian Rheault <C.Rheault@lrarch.ca>; Angel Rangel <arangel@quadrantengineering.ca>; B. L. A. Mike Lennox (ml@jbla.ca) <ml@jbla.ca>
Subject: 365 Forest -Stormwater Management Criteria

Hi Ghislaine,

Thank you for meeting with us to provide guidance on the requirements provided within the "Stormwater Management Guidelines for the Pinecrest/Westboro Area Final Report" as they relate to the planned development at 365 Forest Street.

As per our discussion, we request further clarification on the following:

1. The referenced SWM guidelines states that the 10 mm design storm is to be retained. Please confirm whether it would be acceptable to provide measures for excess retention in one area to account for areas with uncontrolled flow. i.e. capture +/- first 20mm on the roof. Is it possible to have a very restrictive release rate for the site/portion of the site that would drain the 10mm storm over a longer time frame of say a few days?

   RESPONSE: Yes, for this project (given the outlet of the STM sewers system to Ottawa River) we will accept the provision for excess retention in one area to account for areas with uncontrolled flow. Similar to the Feedmill Creek retention criteria, please account for initial abstraction contributing towards the retention target.

2. Our current design for quantity control allows for overcontrol of the runoff from the roof area to account for small uncontrolled areas adjacent to the City right of way (Forest St and Bond St). Due to limitations on grading, location, size and existing conditions, would the City be agreeable to these areas remaining uncontrolled? i.e. not retaining the 10 mm storm at these locations?

   RESPONSE: Please see October 12, 2021 clarification and City response.

3. Could you provide City contacts in the Buildings Department for our team to discuss the City's preferred/acceptable methods for reuse of the captured stormwater (watering, maintenance/cleaning, reuse as greywater, etc.).

   RESPONSE: For this project (given the outlet of the STM sewers system to Ottawa River), please identify as many opportunities to retain the first 10 mm onsite (where it makes sense). Unfortunately, the City does not have guidelines specific to water re-use systems (especially within the building). If infiltrating does not make sense (i.e subsurface infiltration LID on top of the parking garage), then please consider simple surface type LID that provide opportunities for evapotranspiration (designed to not cause nuisances like mosquito breeding grounds) or re-use systems that make sense for the site (i.e. water re-use for landscape irrigation). If 10 mm cannot be achieved on the entire site (excluding the small uncontrolled areas) then justify why not.

4. During pre-consultation with the City and Conservation Authority for this project, it was noted that quality control for the site was not required. The above noted guidelines require 80% TSS removal. There is limited area on site for vehicle use (lane and turning circle). Please verify quality control requirements.

   RESPONSE: Please provide enhanced quality control (to treat runoff from surfaces with vehicular traffic). The sizing of the unit may be based on the area draining to the unit. If Rooftop runoff is not directed to the OGS then the Rooftop area can be excluded from the sizing of the OGS unit. If landscape runoff is not directed to the OGS unit then the OGS unit does not need to be sized including landscape area.

Thank you, we look forward to your reply.

Regards,

Bruce Thomas, P.Eng.
EXP | Senior Project Manager
t : +1.613.688.1899 | m : +1.613.852.8753 | e : bruce.thomas@exp.com
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Suite 100
Ottawa, ON K2B 8H6
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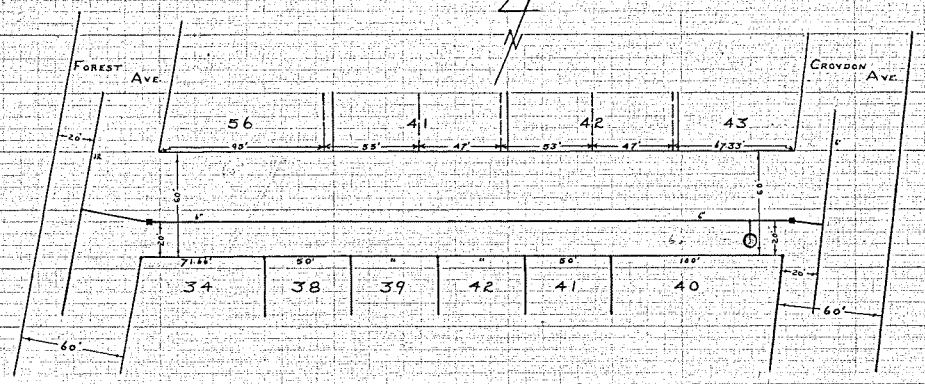
Appendix F – Background Information

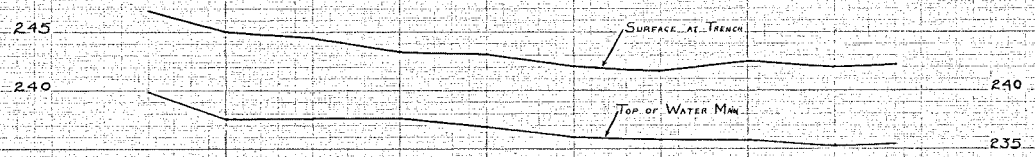
City of Ottawa Vault Drawings (Plan and Profiles)

WATTS ACCUTROL Weir for Roof Drains

Excerpt page (pages 7-18) from Implementation Guide for the Pinecrest Creek / Westboro SWM Guidelines: Development Requiring a Building Permit Only. (Draft) Aquafor Beach, June 21, 2013.

BOND ST.





0+45 - 6"x12" SDR @ FOREST
0+84 - 6" VALVE
1+00
1+00
2+00
3+00
3+40 - HYD 11 OFF 6"WM
3+64 - 6" VALVE
3+85 - 6"x6" SDR @ CROYDON

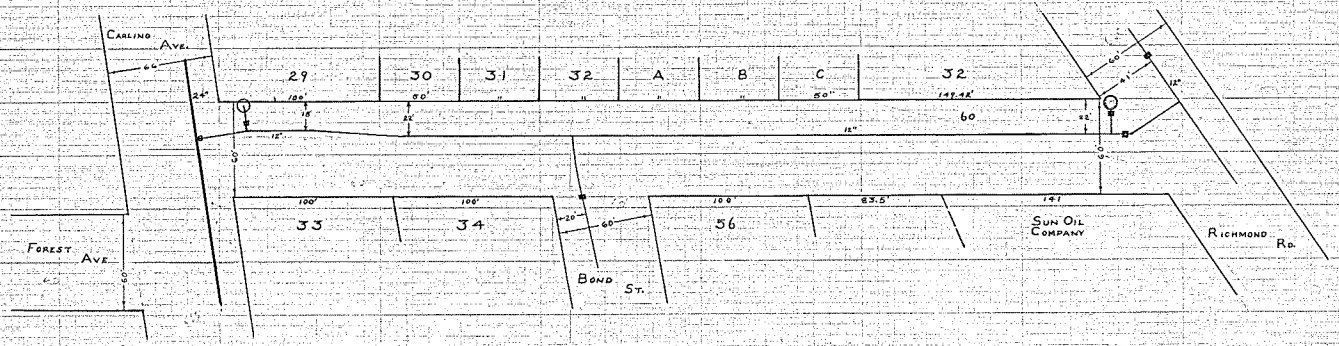
CITY OF OTTAWA
WATER WORKS DEPARTMENT

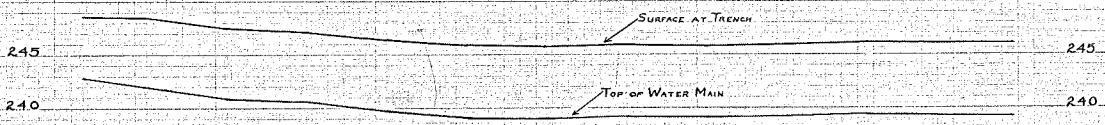
6" W.M. INSTALLED ON BOND ST.
FROM FOREST AVE.
TO CROYDON AVE.

DWN BY L. A. Irvine — DATE: JAN. 29/60
ENGINEER — SCALE: HOR. 1"=40' VERT. 1"=5'
DEPUTY COMMISSIONER — INSTALLED: SEPT. 1959
COMMISSIONER OF WATER WORKS — BOOK NO. 170

6114

FOREST AVE.

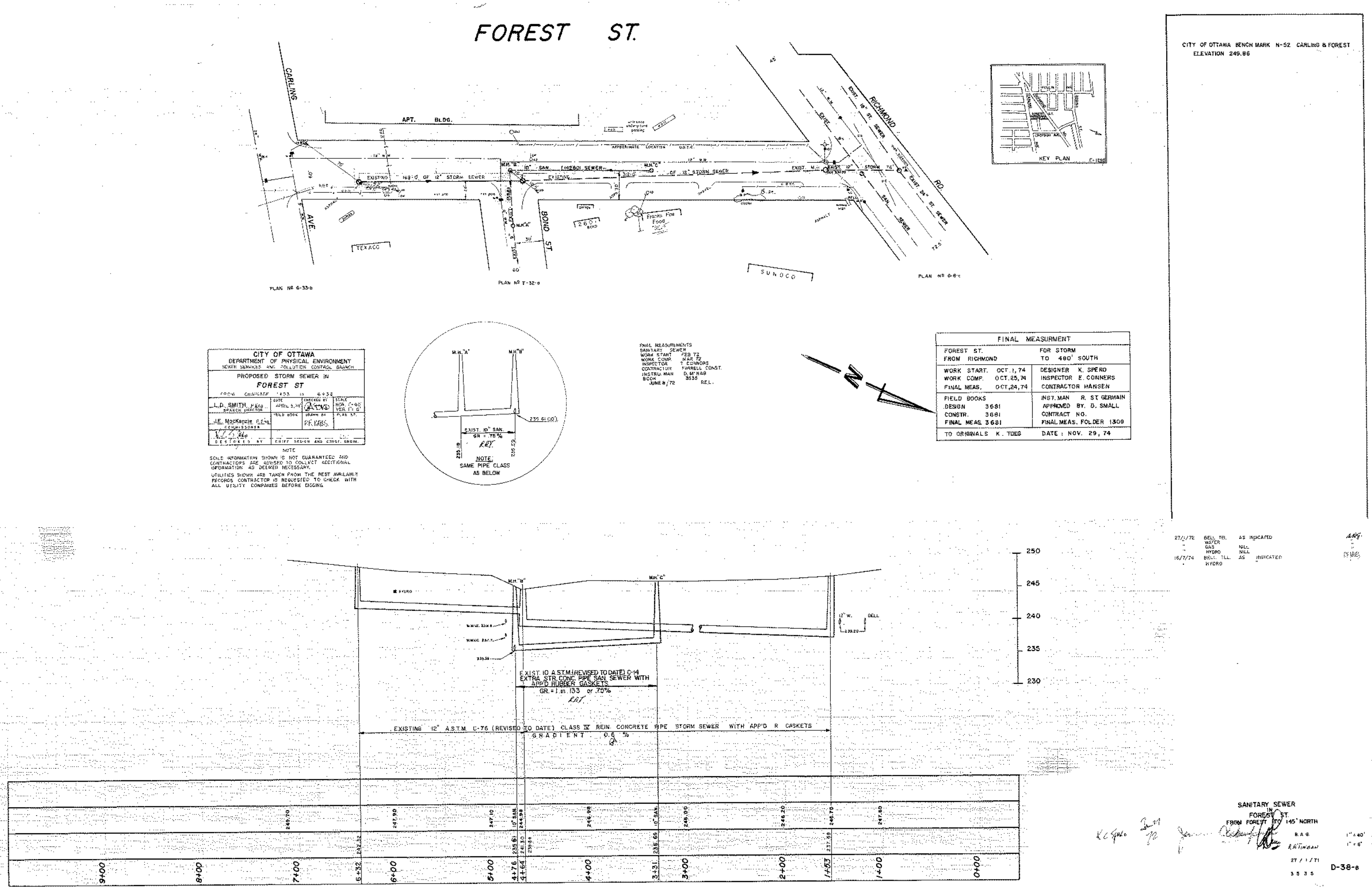




0+00 - EXISTING ON FOR. HYD
0+10 - EXISTING ON FOR. HYD
1+00
2+00
2+35 - 6"x12" SDR BOND ST
3+00
4+00
5+00
5+50 - 6"x12" HOFF & WM.
5+78 - 12" VALVE
5+92 - 12" DI PIPE
5+92 - 12"x12" SDR RICHMOND RD.

CITY OF OTTAWA WATER WORKS DEPARTMENT	
12" W.M. INSTALLED ON FOREST AVE. FROM CARLING AVE. TO RICHMOND RD.	
DWN BY: L. D. Irvine	DATE: FEB. 1/60
ENGINEER W.	SCALE HOR.: 1"=40' VERT.: 1"=4'
DEPUTY COMMISSIONER	INSTALLED: SEPT. 1959
COMMISSIONER OF WATER WORKS	BOOK NO.: 170

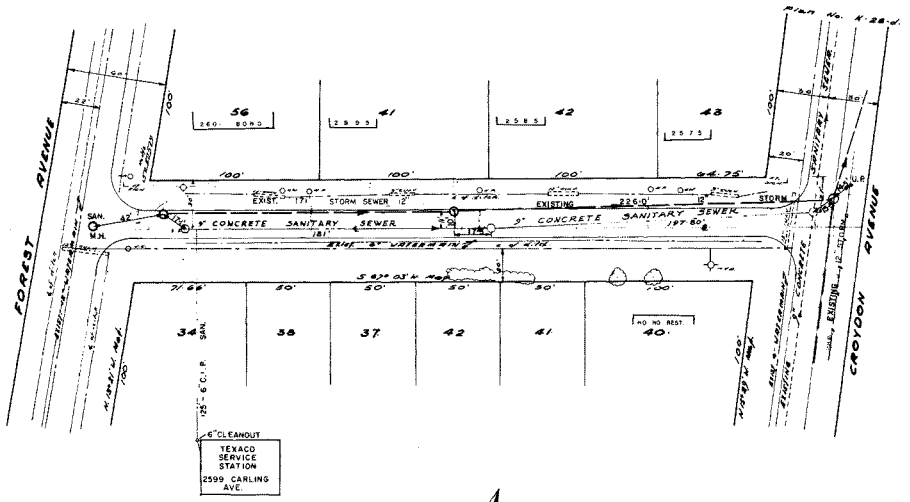
6114



D38c

FOREST ST. CARLING TO RICHMOND

BOND STREET



NOTE
UTILITIES SHOWN ARE TAKEN FROM THE BEST AVAILABLE RECORDS. CONTRACTORS ARE REQUESTED TO CHECK WITH ALL UTILITY COMPANIES BEFORE DIGGING.

SOILS INFORMATION SHOWN IS NOT GUARANTEED AND CONTRACTORS ARE ADVISED TO COLLECT ADDITIONAL SOILS INFORMATION AS DEEMED NECESSARY.

NOTES

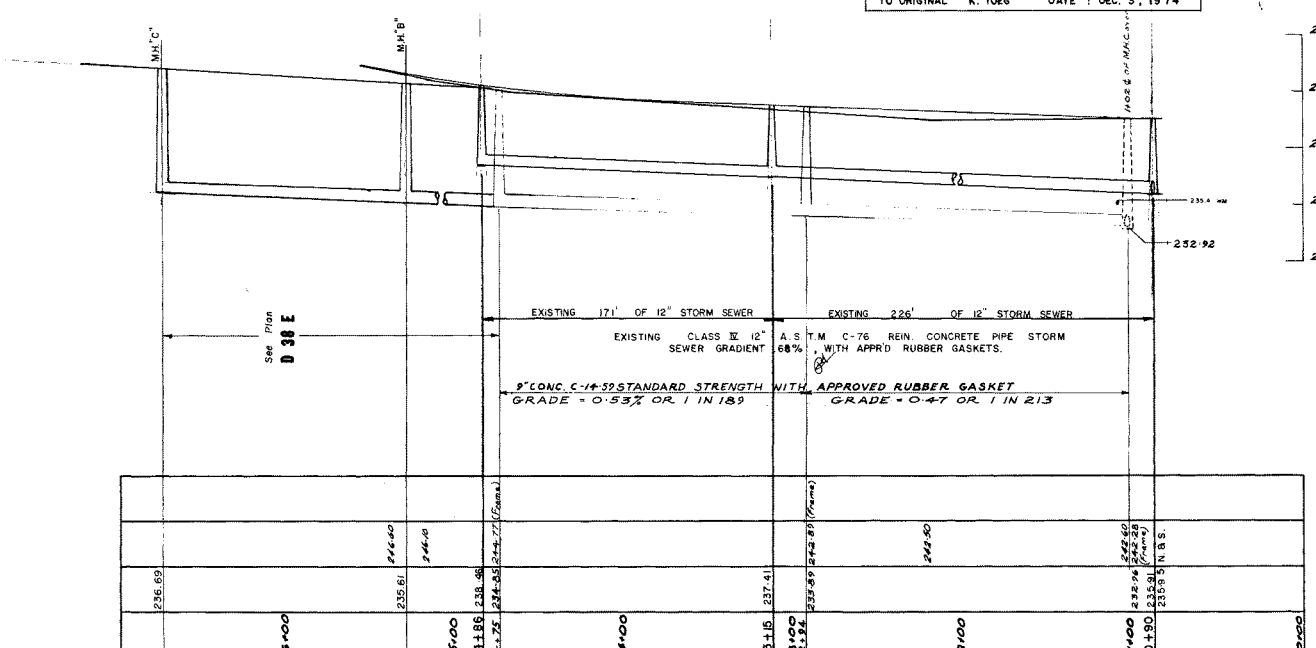
REG'D PLAN N° : 511 & 548.
AYDELOTT - 1967/68 P.E. HAYES.

FINAL MEASURMENT	
BOND STREET FROM CROYDON AVE.	FOR STORM SEWER TO FOREST AVE.
WORK START. OCT. 1, 74	DESIGNER K. SPERO
WORK COMP. OCT. 25, 74	CONTRACTOR HANBEN
FINAL MEAS. OCT. 24, 74	INSPECTOR E. CONNERS
FIELD BOOKS	INST. MAN R. ST GERMAIN
DESIGN 3681	APPROVED BY D. SMALL
CONSTR, 3681	
FINAL MEAS. 3681	F. M. FOLDER 1309
TO ORIGINAL K. TOEG	DATE : DEC. 3, 1974

CITY OF OTTAWA
DEPARTMENT OF PHYSICAL ENVIRONMENT
SEWER SERVICES AND POLLUTION CONTROL BRANCH
STORM SEWER
BOND STREET

K.C. SPERO DESIGNED BY	DRAWN BY P.E. HAYES	SCALE HOR. 1"=40' VER. 1"=5'
L.D. SMITH, P. ENG. DIRECTOR	CHECKED BY	DATE APRIL, 3/74
J.E. MCKENZIE, P. ENG. COMMISSIONER		
CHIEF DESIGN AND CONST. ENGINEER	FIELD BOOK 3681	PLAN N°

REVISIONS			
DATE:	DESCRIPTION	DRN. BY	APP'D BY
	SANITARY SEWER Work Commenced Nov. 1961 Work Completed Nov. 1961 Contractor Sparling Const. Inspector A. Shields Final Measurments Dec. 12/61 Book 307a Page 22 Instrumentman D.R. McNab		



HOUSE CONNECTIONS

HOUSE	LENGTH	LOCATION
2583	33'	13' E/M.H. 2+94
2595	33'	88' W/M.H. 2+74
2601	33'	5' E/M.H. 4+75

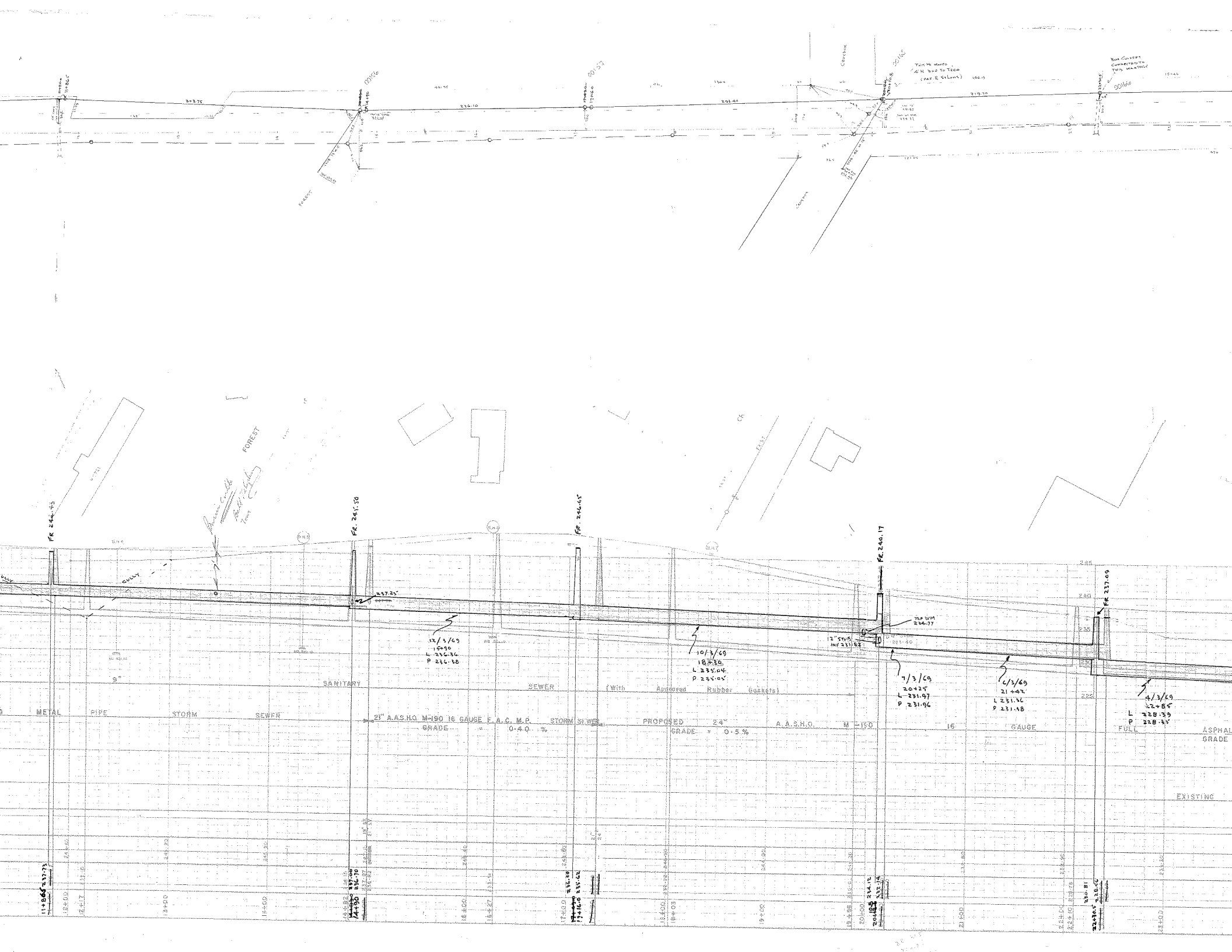
DESIGN BY	DATE
ROAD GRADE	
SAN. SEWER C.McCoomb	July 20/61
STORM SEWER K.C.Spero	

CITY OF OTTAWA
PLANNING AND WORKS DEPARTMENT
SEWERAGE AND DRAINAGE

BOND STREET
CROYDON AVE. to FOREST AVENUE.

	DRAWN BY: P. H.D.	SCALE: Hor: 1"=40' Ver: 1"=5'
	CHECKED BY: C.M.	DATE: PLAN N°
P.E. AYERS ASSN.	AUGUST 1961	E-32-a.

P.32a


FR 244.43
FR. 241.50
FR. 240.65
FR. 240.17
FR 237.09
237.25"
12/3/69
15+90
L 236.36
P 236.28
10/3/69
18+30
L 235.04
P 235.05
7/3/69
20+25
L 231.97
P 231.96
6/3/69
21+42
L 231.36
P 231.48
4/3/69
22+85
L 228.39
P 228.31
12" STUB
INV 231.62
TEE WM
234.77
SANITARY SEWER (With Approved Rubber Gaskets)
METAL PIPE STORM SEWER
21" A.A.S.H.O. M-190 16 GAUGE F.A.C. M.P. STORM SEWER
GRADE = 0.40 %
PROPOSED 24" A.A.S.H.O. M-190 16 GAUGE
GRADE = 0.5 %
FULL
ASPHAL
GRADE
EXISTING
FOREST
CREEK
CHANNEL
DITCH
Box Culvert
Connects to
This Manhole
Twin 36" RCPP
45° Bend To Face
(Mar & St Louis)

WATTS®	Adjustable Accutrol Weir Tag: _____	Adjustable Flow Control for Roof Drains

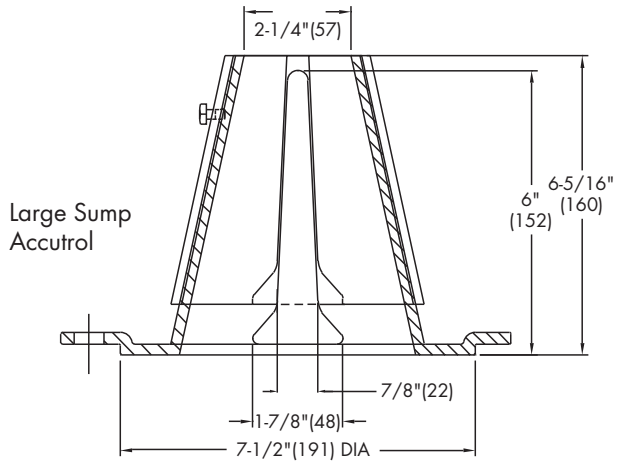
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

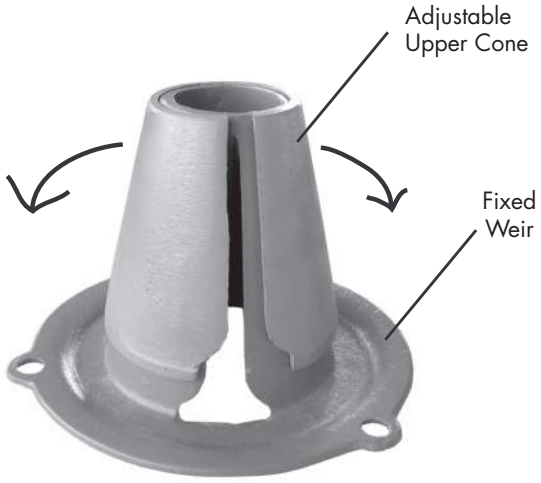
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

WATTS®
A Watts Water Technologies Company

Excerpt page (pages 7-18) from Implementation Guide for the Pinecrest Creek / Westboro SWM Guidelines: Development Requiring a Building Permit Only. (Draft) Aquafor Beach, June 21, 2013.
(total 12 pages)

3.0 Post Construction Topsoil Amendment: General Requirements

Amended topsoil shall be considered in compliance with Section 3.4 of the JFSA, 2012 report, pursuant to the following general requirements.

1. Post Construction Topsoil Amendment shall be defined as
    a. Decompaction activities (subsoil scarification, tilling and or ripping) followed by the placement of 300mm of amended topsoil

    b. At project completion all landscaped areas (front and rear yard) shall have a minimum depth of 300mm of amended topsoil containing organic matter primarily leaf, yard and bark waste compost of 8-15% by dry weight, or 30-40% by volume and a pH of 6.0 to 8.0 per the recommendations of the Low Impact Development Stormwater Management Planning and Design Guide (TRCA/CVC 2010 Version 1.0).

2. Front and rear yard grading should be limited to a maximum of 2%, if possible while still meeting the surrounding existing grades. Grading shall conform to City standards and by-laws.

3. Organic matter shall be measured using a standard Loss-On-Ignition Test (ASTM D2974, MOE E3139 or TMECC 05.07A or equivalent)

4. The source of the organic content shall conform to the following guidelines which regulates the quality and use of compost in the province (Appendix B):
    - The Guidelines for the Production and Use of Aerobic Compost in Ontario (2004), Ministry of the Environment (OMOE)
    - Guidelines for Compost Quality (2005), Canadian Council of Ministers of the Environment (CCME)

5. Organic matter shall not contain uncomposted manure or other organic materials, sphagnum peat or organic amendments that contain sphagnum peat

6. Decompaction activities (subsoil scarification, tilling and or ripping) as well as amendment shall not be undertaken on wet or frozen soils

7. Decompaction activities shall not be undertaken within 3m of building foundations to limit the risk of water infiltration into basements (Figure 2)

8. Standard tree protection shall be mandatory per the Standard Tree Protection Forestry By-law 2006-279 and Special Provision No. F-5651. Decompaction activities and soil amendment shall not be undertaken within the critical root zone or dripline of existing trees (See Figure 2) per City of Ottawa Definition of Critical Root Zone (Forestry By-law 2006-279). The dripline shall be defined as the area of land within a radius of ten (10) cm from the trunk of a tree for every one (1) cm of trunk diameter measured from the ground surface at a height of:
    - one-hundred and twenty (120) cm for trees fifteen (15) cm in diameter or greater
    - thirty (30) cm for trees of less than fifteen (15) cm in diameter

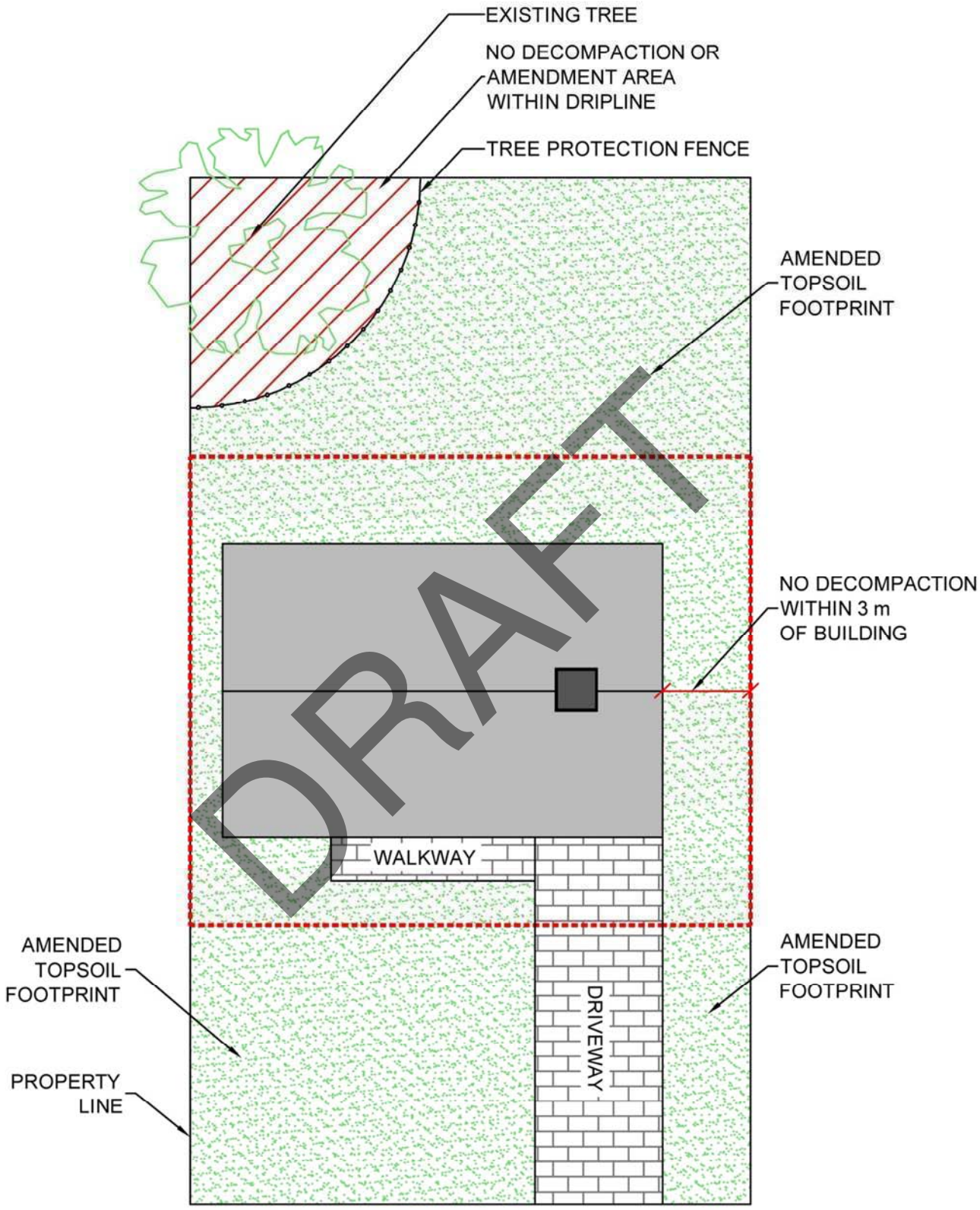


Figure 2 Site requirements for Pinecrest Creek and Westboro Area for Development Requiring a Building Permit Only

4.0 Compliance Pathways

The following sections outline the three (3) compliance pathways (see Figure 4.0) per the SWM requirements for Pinecrest Creek/Westboro Area For Development Requiring a Building Permit Only outlined in Table 1 pursuant to the general requirement detailed in Section 3.0. The three (3) compliance pathways include:

1. Amend existing topsoil using the default ratio of 3:1 (topsoil: amended materials)
2. Amend existing topsoil using a custom calculated ratio (laboratory testing required, must be submitted with building permit and certified by architect or engineer)
3. Import & replace existing topsoil with pre-mixed amended topsoil

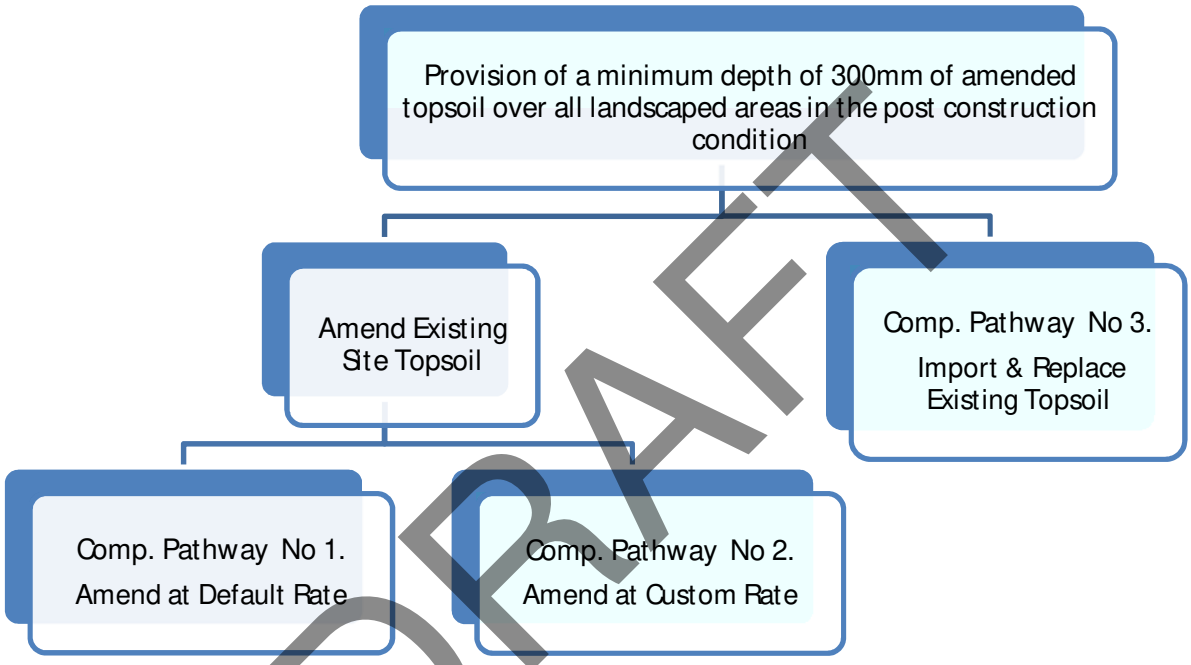


Figure 4.0 SWM Compliance Pathway Flowchart – Topsoil Amendment

It should be noted that composting facilities in Ontario (municipal and private) must perform standard laboratory testing in order to comply with the aforementioned regulations (see Section 3.0) and ensure that compost that is sold or given away is a consistent, high quality product that is safe for all uses. As such, suppliers in the Ontario, including in the Ottawa area generally do not sell 'raw compost' directly to the public or development industry, but instead mix composted material into secondary products. These secondary products or mixes (hereto referred to as amendment materials) do not fall within the OMOE (2004) or CCME (2005) regulations and can be sold directly to the public and development industry. These mixes are largely proprietary, and are sold under a variety of names and products types. Amendment Materials products generally consist of a mix of one or more of the following:

- Leaf and yard waste compost,
- Aged bark compost,
- Mushroom compost
- Black peat moss
- Topsoil and sands

It is not important what proprietary mix is used provided it meets the general requirements as detailed within Section 3.0 and the material specification requirements as detailed within the relevant options (Section 4.1 – 4.3).

It should be further noted that as a conservative estimate, organic matter content will decrease by 25% after the first growing season as plant materials become established. Options 1, 2 and 3 in the following sections take into account this anticipated decline.

4.1 Option 1 - Amend Existing Topsoil Using Default Ratio

If the default amendment material ratio is used, laboratory testing of in-situ pre-construction topsoil and custom calculations are not required.

General Actions

Strip, stockpile and preserve topsoil during construction and replace and amend per the general requirements detailed in Section 3.0.

Steps to Compliance

1. Remove existing topsoil and preserve on-site as stockpile to be re-instated after construction. Stockpiled material shall be free of large woody materials, construction waste and debris.

2. Where possible, stockpile height is recommended not to exceed 1.3m in height. On small sites stockpile height is recommended not to exceed 3m (ASHTO, 2011) in height. This is to preserve soil structure and prevent the loss of beneficial soil organisms.

3. Stockpiled areas shall have appropriate erosion and sediment controls per the relevant City policies and by-laws. As a minimum they shall be encircled with a light duty silt fence barrier in accordance with OPSD 219.110, sediment filter sock or equivalent.

4. Following construction, native sub-soil shall be decompacted at a depth of 100-200mm. Decompaction activities shall be undertaken using a perpendicular pattern (north–south, followed by east-west) ensuring full site coverage. No decompaction within tree protection areas or within 3m of building foundations - see exception under general requirements). The following methods for decompaction may be used :
    - Rototiller of appropriate size capable of decompacting the required minimum depth
    - Skid steer, mini-excavator or small backhoe – utilize bucket teeth to decompact to the required minimum depth
    - Small subsoiler or chisel plough (typically for larger infill sites)

5. Amendment material shall be obtained from a Compost Quality Assurance (CQA) licensed and OMOE/ CCME approved facility and shall comply with the Category "A" compost designation. The amendment material must contain:
    - 20- 30% organic matter by dry-weight (equals 20-30% organic matter Loss-on-ignition test (LOI) per the most current version of ASTM D2974, MOE E3139 or TMECC 05.07A or equivalent.
    - pH of 6.0 to 8.0
    - No uncomposted manure or other organic materials, sphagnum peat or organic amendments that contain sphagnum peat (see General Requirement No. 5).

    Note: Site Owner must retain delivery tickets, receipts and specifications detailing the delivery address, quantities and product description and sources for verification by City inspectors. Suppliers must provide owner with documentation regarding typical particle size distribution, soil texture classification, bulk density and organic matter content. Delivery address is to be listed and must correspond to the property/site being inspected. Site without proper documentation may be subject to additional verification procedures including laboratory testing at the expense of the owner.

6. Amend existing site topsoil to meet post construction soil amendment requirements using 3:1 ratio by volume (topsoil: amendment material).

   Two (2) methods for amending the existing soils in place are acceptable:

   Method No.1 - Layer and Incorporate

   i. Apply 100mm of existing site topsoil followed by 50mm of amendment material and incorporate amended material through tilling using decompaction methods outlined in Step 4.
   ii. Lightly roll or smooth using the back of the machinery bucket.
   iii. Repeat i. and ii.
   iv. Adjust layer quantities to ensure a settled amended topsoil depth of 300m and compliance with site grading

   Method No.2 – Mechanical or Bucket Mix

   i. Successively add, mix and pile one (1) unit of amendment material with three (3) unit of existing site topsoil.
   ii. Thoroughly mix
   iii. Repeat i. and ii.
   iv. Place 150mm of amended topsoil, lightly roll or smooth using the back of the machinery bucket
   v. Repeat iv.
   vi. Adjust layer quantities to ensure a settled amended topsoil depth of 300m and compliance with site grading

   Amended topsoil should be wetted after application, allowed to settle for a minimum of one (1) week and grades adjusted as required prior to installation of turf.

4.2 Option 2 - Amend Existing Topsoil Using a Custom Calculated Rate

Default amendment material rates are not used. Custom amendment raio and volume are calculated, using the Custom Amendment Material Application Ratio Equations or Excel Spreadsheet Calculator (Appendix C). Calculations must be submitted as an attachment to the building permit, prior to undertaking site works.

Note: Accredited laboratory testing of existing topsoil is required prior to submission of building permit. Collect soil samples from three (3) locations evenly distributed across the site. Combine and mix thoroughly to produce one (1) composite sample of approximately 2L or 600gram. Store in a sealed, labelled container and submit to a local accredited laboratory. Check with the laboratory for specific instruction and quantities of sample required. Submit the sample for analysis for the following parameters:

- Bulk density (g/cm^3)
- Existing soil organic matter content (%) as determined by Loss-On-Ignition Test (see General Requirements No. 3)
- pH
- Particle size distribution (i.e. % sand, % silt and % clay)

The supplier of the amendment material is to provide the following specification/results as determined by an accredited laboratory.

- Amendment materials bulk density (g/cm^3)
- Amendment materials Organic Matter Content (%) as determined by Loss-On-Ignition Test (see General Requirements No. 3)

General Actions

Strip, stockpile and preserve topsoil during construction and replace and amend per custom rates calculated prior to building permit submission.

Steps to Compliance

1. Remove existing topsoil and preserve on-site as stockpile to be re-instated after construction. Stockpiled material shall be free of large woody materials, construction waste and debris.

2. Where possible, stockpile height is recommended not to exceed 1.3m in height. On small sites stockpile height is recommended not to exceed 3m (ASHTO, 2011) in height. This is to preserve soil structure and prevent the loss of beneficial soil organisms.

3. Stockpiled areas shall have appropriate erosion and sediment controls per the relevant City policies and by-laws. As a minimum they shall be encircled with a light duty silt fence barrier in accordance with OPSD 219.110, sediment filter sock or equivalent.

1. Following construction, native sub-soil shall be decompacted at depth of 100-200mm. Decompaction activities shall be undertaken using a perpendicular pattern (north–south, followed by east-west) ensuring full site coverage. No decompaction within tree protection areas or within 3m of building foundations - see exception under general requirements). The following methods for decompaction may be used :
    - Rototiller of appropriate size capable of deompacting the required minimum depth

- Skid steer, mini-excavator or small backhoe – utilize bucket teeth to decompact to the required minimum depth
- Small subsoiler or chisel plough (typically for larger infill sites)

4. Amendment material shall be obtained from a Compost Quality Assurance (CQA) licensed and OMOE/ CCME approved facility and shall comply with the Category "A" compost designation. The amendment material must have a pH of 6.0 to 8.0 and contain no uncomposted manure or other organic materials, sphagnum peat or organic amendments that contain sphagnum peat (see General Requirement No. 5).

   Note: Site Owner must retain delivery tickets, receipts and specifications detailing the delivery address, quantities and product description and sources for verification by City inspectors. Suppliers must provide owner with documentation regarding typical particle size distribution, soil texture classification, bulk density and organic matter content. Delivery address is to be listed and must correspond to the property/site being inspected. Site without proper documentation may be subject to additional verification procedures including laboratory testing at the expense of the owner.

7. Amend existing site topsoil to meet post construction soil amendment requirements per the custom amendment rate and volume as submitted with the respective building permit.

   Two (2) methods for amending the existing soils in place:

   <u>Method No.1 - Layer and Incorporate</u>

   i. Apply 100mm of existing site topsoil followed by 50mm of custom amendment material and incorporate amended material through tilling using decompaction methods outlined in Step 4.
   ii. Lightly roll or smooth using the back of the machinery bucket
   iii. Repeat i. and ii.
   iv. Adjust layer quantities to ensure a settled amended topsoil depth of 300m and compliance with site grading

   <u>Method No.2 – Mechanical or Bucket Mix</u>

   i. Successively add, mix and pile custom amendment material and existing site topsoil per the calculated ratio.
   ii. Thoroughly mix
   iii. Repeat i. and ii.
   iv. Place 150mm of amended topsoil, lightly roll or smooth using the back of the machinery bucket
   v. Repeat iv.
   vi. Adjust layer quantities to ensure a settled amended topsoil depth of 300m and compliance with site grading

   Amended topsoil should be wetted after application, allowed to settle for a minimum of one (1) week and grades adjusted as required prior to installation of turf.

4.3 Option 3 – Import & Replace Existing Topsoil with Pre-Mixed Amended Topsoil

General Actions

Replace existing site topsoil with imported pre-mixed amended topsoil per the general requirements detailed in Section 3.0.

Steps to Compliance

1. Remove existing site topsoil and dispose off-site accordance with OPSS 206 and OPSS 180, O. Reg. 153/06, the Environmental Protection Act or municipal by-laws and policies, whichever governs.

2. Following construction, native sub-soil shall be decompacted at depth of 100-200mm. Decompaction activities shall be undertaken using a perpendicular pattern (north–south, followed by east-west) ensuring full site coverage. No decompaction within tree protection areas or within 3m of building foundations - see exception under general requirements). The following methods for decompaction may be used :
    - Rototiller of appropriate size capable of deompacting the required minimum depth
    - Skid steer, mini-excavator or small backhoe – utilize bucket teeth to decompact to the required minimum depth
    - Small subsoiler or chisel plough (typically for larger infill sites)

2. Import pre-mixed amended topsoil in sufficient quantity (amendment area (m^2) x 0.3m required depth + 10% for settlement) to achieve settled amended topsoil depth of 300m with the following characteristics in accordance with the General requirements detailed in Section 3.0.

    Amendment material shall be obtained from a Compost Quality Assurance (CQA) licensed and OMOE/ CCME approved facility and shall comply with the Category "A" compost designation. The amendment material must contain:
    - 8-15% organic matter by dry-weight (equals 8-15% organic matter Loss-on-ignition test (LOI) per the most current version of ASTM D2974, MOE E3139 or TMECC 05.07A or equivalent.
    - pH of 6.0 to 8.0
    - No uncomposted manure or other organic materials, sphagnum peat or organic amendments that contain sphagnum peat (see General Requirement No. 5).

    Note: Site Owner must retain delivery tickets, receipts and specifications detailing the delivery address, quantities and product description and sources for verification by City inspectors. Suppliers must provide owner with documentation regarding typical particle size distribution, soil texture classification, bulk density and organic matter content. Delivery address is to be listed and must correspond to the property/site being inspected. Site without proper documentation may be subject to additional verification procedures including laboratory testing at the expense of the owner.

3. Place imported pre-mixed amended topsoil in 150mm lifts, lightly roll or smooth using machinery bucket and repeat. Adjust layer quantities to ensure a settled amended topsoil depth of 300m and compliance with site grading

Amended topsoil should be wetted after application, allowed to settle for a minimum of one (1) week and grades adjusted as required prior to installation of turf.

5.0 Verification Requirements

Verification by municipal staff shall be a critical component of the Stormwater Management Guidelines for Pinecrest Creek/Westboro Area for Development Requiring a Building Permit Only. Verification will confirm:

1. Amended soil quality
2. Amended soil depth
3. Compliance with site grading and
4. Disconnection of redirection to pervious areas

Verification Timing

Verification may occur after the minimum one (1) week settlement period and after grades have been adjusted, but may occur before or after the installation of turf. If non-compliance is confirmed, the contractor/owners shall be responsible for rectification including replacement of turf as required. As such, verification is suggested prior to turf placement.

Documentation Verification - Amended Soil Quality

As part of verification, the owners shall produce delivery tickets, receipts and specifications detailing the delivery address, quantities and product description and sources for verification by City inspectors. Delivery address is to be listed and must correspond to the property/site being inspected. Sites without proper documentation may be subject to additional verification procedures including laboratory testing at the expense of the owner.

Amended Soil Depth Verification

At random, the site inspector shall dig at least one (1) test hole within the amended topsoil area to verify amended topsoil depth and uncompacted soil depths. Test holes can be dug using a common garden spade or a small diameter coring unit (i.e. Ogeechee corer©) see inset photo. Test holes may be up to 30cm in diameter and shall extend a minimum of 400mm.

Requirements:

1. Amended topsoil layer shall be easily dug using only the inspector's weight or cored without other mechanical assistance.

2. The amended topsoil layer shall be darker in color than the unamended- decompacted subsoil and particles of organic matter should be easily visible.

3. Measured amended topsoil depths shall be deemed to be in conformance based on the following:
   - Using a common garden spade, the measured depth of amended topsoil is greater than or equal to ±25mm of the required 300mm depth (see Figure 5.0)

   - Using a small diameter coring unit, the measured core depth of amended topsoil shall be equal to ±50mm of the required 300mm depth (see Figure 5.1)

Note: ± accounts for minor compaction resulting from various testing methods. A field inspection form is provided in Appendix D.

Figure 5.0 – Field Verification of Topsoil Depths using Common Garden Spade (Aquafor Beech, 2011)

Figure 5.1 – Field Verification of Topsoil Depths using Small Diameter Coring Unit
(3 cm diameter core is displayed)
(Aquafor Beech, 2011)

Verification of Downspouts Redirection to Pervious Areas and Site Grading Compliance
The City inspector shall verify that:

- Proper direction of the downspouts/ roof drainage to landscaped area to minimize runoff has been competed
- Where possible, a minimum flow path length of 5m across a pervious surface before flowing onto an impervious surface, or into a storm sewer system has been included.
- All discharge locations have a minimum of 3m from building foundations and directed to pervious surface. If no pervious surface is available, downspouts may be run subsurface and discharged as a `pop-up` outlet to nearest pervious surface (see Figure 5.2).

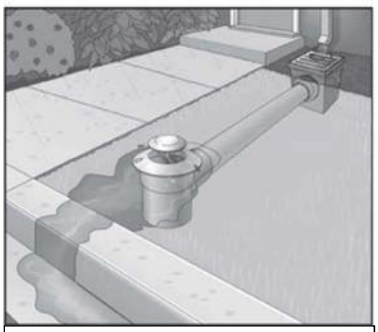


Figure 5.2 Pop-up emitter
(source NDS, 2011)

- Wherever possible, front and rear yard grading has been limited to a maximum of 2%, while still meeting the surrounding existing grades. Grading shall conform to other City standards and by-laws.

Non-compliant Sites and Disputes

If a site is deemed by the inspector as non-compliant with the aforementioned requirements the site inspector shall:

- Notify the owner of what steps are needed to comply and provide guidance or clarification as required.

When results are disputed and cannot be resolved between the owner and the City, an independent consultant shall be contracted to conduct verification and sampling for submission for laboratory analysis and may include:

- Bulk density (g/cm^3)
- organic matter content (%) as determined by Loss-On-Ignition Test (see General Requirements No. 3)
- pH
- Particle size distribution (i.e. % sand, % silt and % clay)

Qualified consultants include soil scientists, landscape architects, or professional engineers.

Appendix G – Checklist

GENERAL CONTENT		RESPONSE
☐	Executive Summary (for larger reports only).	Not included
☒	Date and revision number of the report.	Date of report provided
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Page 1 and Appendix G
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 2 of report
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	In Appendix E
☐	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	No Master Servicing Studies.
☒	Statement of objectives and servicing criteria.	Section 1 of report
☒	Identification of existing and proposed infrastructure available in the immediate area.	Section 2 & 3 of report
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Not applicable
☐	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Not applicable
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	Not applicable
☐	Proposed phasing of the development, if applicable.	Not applicable
☐	Reference to geotechnical studies and recommendations concerning servicing.	Not applicable
☒	All preliminary and formal site plan submissions should have the following information: Metric scale North arrow (including construction North) Key plan name and contact information of applicant and property owner Property limits including bearings and dimensions Existing and proposed structures and parking areas Easements, road widening and rights-of-way Adjacent street names	Functional Report, Civil and Architectural Plans provided all this information.
DEVELOPMENT SERVICING REPORT: WATER		**RESPONSE**
☐	Confirm consistency with Master Servicing Study, if available Availability of public infrastructure to service proposed development Identification of system constraints	Not applicable
☒	Identify boundary conditions	Section 4.6
☒	Confirmation of adequate domestic supply and pressure	Section 4.3
☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 4.7
☒	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Section 4.6 & Table B-5 Appendix B
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	Not applicable
☒	Address reliability requirements such as appropriate location of shut-off valves Check on the necessity of a pressure zone boundary modification.	Section 4.3
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 4.5 & Table B-1 Appendix B
☒	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Section 4.2

☐	Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	Not applicable
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Table B-1 Appendix B
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Not applicable
DEVELOPMENT SERVICING REPORT: WASTEWATER		**RESPONSE**
☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 5.1
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Not applicable
☒	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	Section 5.2
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 5.2
☐	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Not applicable
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Table C-6 in Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	Not applicable
☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	Not applicable
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	Not applicable
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	Not applicable
☐	Special considerations such as contamination, corrosive environment etc.	Not applicable
DEVELOPMENT SERVICING REPORT: STORMWATER CHECKLIST		**RESPONSE**
☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 6
☐	Analysis of available capacity in existing public infrastructure.	Not applicable
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Figure A-1 & A-2
☐	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Not Applicable
☐	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Not Applicable
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.2 & 6.3
☐	Set-back from private sewage disposal systems. Watercourse and hazard lands setbacks.	Not Applicable
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix E
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Not Applicable
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 6.9 & Table D12-D16 of Appendix D

☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Not Applicable
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 6.6, 6.8 & Table D-8 & D11 of Appendix D
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	Not Applicable
☒	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.8
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	Not Applicable
☐	Identification of potential impacts to receiving watercourses Identification of municipal drains and related approval requirements.	Not Applicable
☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 6.9
☒	100-year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Grading Plan
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	Not Applicable
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	Not Applicable – No requirements from Conservation Authority
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	See geotechnical report
☒	The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:	Appendix E
☐	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in theAct.	Not Applicable
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	Not Applicable
☐	Changes to Municipal Drains.	Not Applicable
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Not Applicable
CONCLUSION CHECKLIST		**RESPONSE**
☒	Clearly stated conclusions and recommendations	In Section 8
☒	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	Appendix E
☒	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	Signed and stamped

Appendix H – Drawings

Site Plan, Renderings, and Architectural Plans

Civil Engineering Design Drawings by EXP (separate)

Landscape Plan

Mechanical Plans and Details of Oil Grit Separator

GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

LAPALME RHEAULT
ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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D07-12-20-0041 1887-2303-19

REVISION 00	2020-04-06
REVISION 01	2020-12-18
REVISION 02	2022-08-29
REVISION 03	2022-12-09
REVISION 04	2023-08-03
REVISION 05	2023-10-18

GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

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GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

SITE PLAN

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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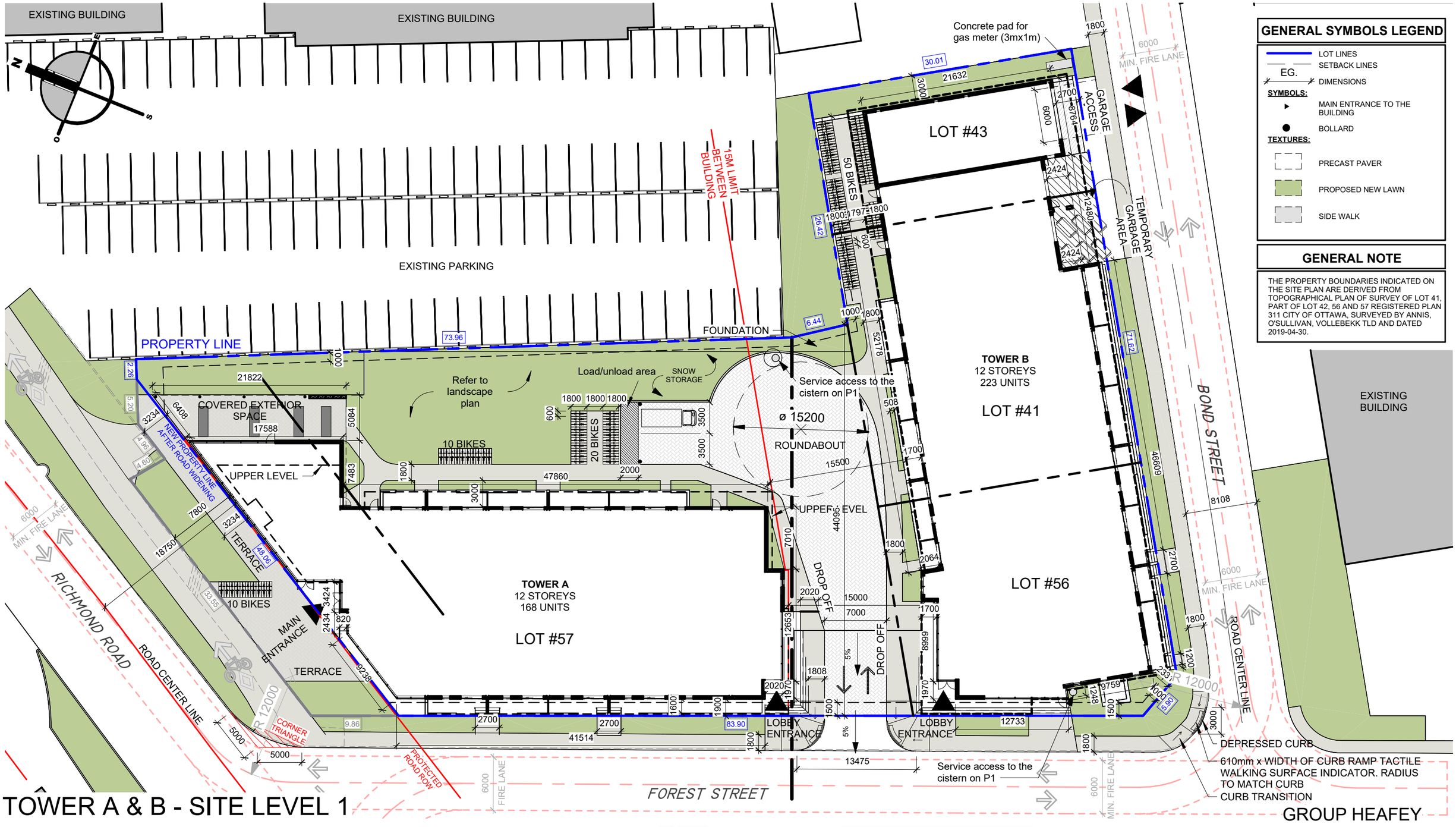

GENERAL SYMBOLS LEGEND

- LOT LINES
- SETBACK LINES
- EG. DIMENSIONS

SYMBOLS:

- MAIN ENTRANCE TO THE BUILDING
- BOLLARD

TEXTURES:

- PRECAST PAVER
- PROPOSED NEW LAWN
- SIDE WALK

GENERAL NOTE

THE PROPERTY BOUNDARIES INDICATED ON THE SITE PLAN ARE DERIVED FROM TOPOGRAPHICAL PLAN OF SURVEY OF LOT 41, PART OF LOT 42, 56 AND 57 REGISTERED PLAN 311 CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN, VOLLEBEKK TLD AND DATED 2019-04-30.

TOWER A & B - SITE LEVEL 1

GROUP HEAFEY

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As indicated

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REVISION 03	2022-12-09
REVISION 04	2023-08-03
REVISION 05	2023-10-18

AM10[2865] S473	Requirements	Provided	Meets Standard
Minimum lot area Table 185(a)	No minimum	5134 m^2	Yes
Minimum lot width Table 185(b)	No minimum	41.49 m	Yes
Minimum front yard setback Richmond Rd S473	0 m	0 m	Yes
Minimum corner side yard setback (Forest St) S473	0 m	0 m	Yes
Building frontage for front and corner side yard s. 185(10)(b)(i)	At least 50% of the frontage along the front lot line and corner side lot line must be occupied by building walls located within: / Residential building: 4.5 m of the frontage / Mixed-use building: 3.0 m of the frontage	Tower A (mixed-use): 50% of frontage is occupied within 3.0 m of front and corner side lot line Tower B (residential): at least 50% of frontage is occupied within 4.5 m of corner side lot line	Yes
Minimum interior side yard S473	No minimum	2.7 m	Yes
Minimum rear yard setback for a residential use building (Bond St) S473	0.6 m	0.6 m	Yes
Minimum building height [2865] / S473	Minimum building height: 7.5 m and 2 storeys	41 m 12 storeys	Yes
Maximum building height S473	41 m / 12 storeys	41 m / 12 storeys	Yes
Ground floor façade s. 185(10)(g)	The ground floor façade facing a public street of a building located within 4.5m of the front lot line or corner lot line must include: / A minimum of one active entrance from each individual occupancy located immediately adjacent to the front lot line or corner side lot line in the case of non-residential uses; and / A minimum of one active entrance in the case of a residential use building; Where an active entrance is angled on the corner of the building, such that it faces the intersection of the arterial mainstreet and a side street intersecting the arterial mainstreet, it is deemed to face both streets	Active entrances face both the front and corner lot lines, within 4.5 m of the lot line. Entrances provided for retail and residential uses.	Yes
Transparent glazing s. 185(10)(h)	A minimum of 50% of the surface area of the ground floor façade, measured from the average grade up to a height of 4.5 metres, facing a public street must be comprised of transparent glazing	Ground floor façade is comprised of at least 50% glazing	Yes
Amenity Area s. 135	6 m^2 per dwelling unit: (391 units)*(6m^2) = 2,346 m^2	Private: 1,436 m^2 Communal: 2,075 m^2 Total: 3,511 m^2	Yes
	50% of which must be communal: 2,346 m^2 x 50% = 1,173 m^2	2,075 m^2	Yes
	At least one amenity area must be aggregated into an area with a minimum of 54m^2	Towers A & B common areas, level 1: 903 m^2 Tower A common area, level 12: 152 m^2	Yes
Parking Provisions			
Minimum Parking Rate Area Z of Schedule 1A	No off-street motor vehicle parking is required to be provided under this section.	383 resident parking spaces provided	Yes
Minimum Visitor Parking Space Rate	0.1 spaces/ dwelling unit, less the first 12 units, and no more than 30 required Tower A: (168 units–12) * (0.1) = 16 visitor parking spaces Tower B: (223 units–12) * (0.1) = 21 visitor parking spaces Total: 37 parking spaces	37 parking spaces	Yes
Maximum Parking Spaces s. 103(1), Table 103 Area B of Schedule 1 Site is within 600 m of Lincoln Fields Station	1.75 per dwelling unit (combined total of resident and visitor parking) Tower A: 294 parking spaces Tower B: 390 parking spaces Combined: 684 parking spaces	420 parking spaces	Yes
	Min.	**Max.**	Yes

ZONING TABLE

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Author
Conçu par : Designer

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REVISION 05	2023-10-18

AM10[2865] S473	Requirements			Provided	Meets Standard
Parking Space Dimensions s. 106(1)	**Width**	2.6 m	3.1 m	Parking spaces are 2.6 x 5.2 m	
	Length	5.2 m	--		
Parking Space Dimensions, Small Car/ Reduced Size s. 106(3) and (4)	Up to 50% of the parking spaces in a parking lot or parking garage may be reduced to a minimum of 4.6m long and 2.4m wide, provided that any such space: / Is visibly identified as being for a compact car / Is not a visitor parking space required under Section 102 / Is not abutting or near a wall, column or similar surface that obstructs the opening of the doors of a parked vehicle or limits access to a parking space, in which case the minimum width is 2.6 metres.			No reduced size parking spaces	**Yes**
	Up to 5% of the parking spaces in a parking lot or parking garage may have a minimum width of 1.3m and a minimum length of 3m, provided any such space / Is not a required parking space under Section 101 / Is not a required visitor parking space under Section 102 / Is visibly identified as being for a motorcycle, cargo bicycle or similar vehicle.			No reduced size parking spaces	**Yes**
Minimum Driveway Width s. 107(1)(a)(iii)	A driveway providing access to a parking garage must have a minimum width of 6.0 m for a double traffic lane			6.0 m	**Yes**
Minimum Aisle Width, Mixed-Use Building Table 107	Minimum width for an aisle providing access to a parking space between 71° and 90°: 6.7 m			6.7 m	**Yes**
Minimum Bicycle Parking s. 111	0.50 per dwelling unit (391 dwelling units)*(0.5) = 196 bicycle parking spaces			250 bicycle parking spaces	**Yes**
Minimum Bicycle Parking Space Dimensions Table 111B		**Width**	**Length**	Bicycle parking spaces comply	**Yes**
	Horizontal	0.6 m	1.8 m		
	Vertical	0.5 m	1.5 m		
	Stacked	0.37 m	--		

AM10[2865] S473	Requirements	Provided	Meets Standard
Location of Bicycle Parking s. 111(7)	A maximum of 50% (98) of the required bicycle parking spaces or 15 spaces, whichever is greater, may be located in a landscaped area: A maximum of 98 bicycle parking spaces may be located in landscaped area	80 located in landscaped area	**Yes**
Minimum Aisle Width, Bicycle Parking s. 111(9)	A bicycle parking space must have access from an aisle having a minimum width of 1.5 metres.	1.5 m	
Parking Space Orientation s. 111(10)	A minimum of 50% (98 bicycle parking spaces) of the bicycle parking spaces required by this by-law must be horizontal spaces at ground level.	98 horizontal bicycle parking spaces: 8 indoors + 90 outdoors	**Yes**
Location of Bicycle Parking s. 111(12)	Where the number of bicycle parking spaces required for a single office or residential building exceeds fifty 50 spaces, a minimum of 25% (49) of that required total must be located within: / a building or structure; / a secure area such as a supervised parking lot or enclosure with secure entrance; or / bicycle lockers.	Over 25% of the required bicycle parking spaces are located indoors – 160 bicycle parking spaces are provided indoors	**Yes**

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Conçu par : Designer

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

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GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

SUMMARY STATISTICS FOR TOWER A & B

GREEN AREA : 798 m²

RESIDENTIAL TOTAL NET AREA

TOWER A (12 LEVELS) :	(168 UNITS) 11 565 m²
TOWER B (12 LEVELS) :	(223 UNITS) 15 585 m²
TOTAL :	(391 UNITS) 27 150 m²

COMMERCIAL TOTAL NET AREA

TOWER A :	224 m²
TOWER B :	0 m²

UNDERGROUND PARKING TOTAL GROSS AREA

PER LEVEL AREA **:** 4833 m²

NUMBER OF INTERIOR PARKING (4 LEVELS)
REQUIRED MINIMUM 1.1 PER UNITS : 431 PARKINGS (MINIMUM)
NUMBER OF PARKING PROPOSED : 420 PARKINGS

NUMBER OF BIKES (50% OF NUMBER UNITS)
TOWER A & B P1 LEVEL (EXTRA)
INTERIOR : 52

TOWER A (84 MINIMUM REQUIRED)
INTERIOR (42 MIN.) : 52
EXTERIOR (42 MIN.) : 40

TOWER B (112 MINIMUM REQUIRED)
INTERIOR (56 MIN.) : 56
EXTERIOR (56 MIN.) : 50

NOTE ON THE SITE PLAN
THE PROPERTY BOUNDARIES INDICATED ON THE SITE PLAN ARE DERIVED FROM TOPOGRAPHICAL PLAN OF SURVEY OF LOT 41, PART OF LOT 42, 56 AND 57 REGISTERED PLAN 311 CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN, VOLLEBEKK TLD AND DATED 2019-04-30.

TOWER A - GROSS AREA PER LEVEL

GROSS AREA LEVEL 1 :	1217.94 m²	
GROSS AREA LEVEL 2 :	1217.94 m²	
GROSS AREA LEVEL 3 TO 6 :	1246.10 m²	x 4
GROSS AREA LEVEL 7 :	1146.39 m²	
GROSS AREA LEVEL 8 TO 11 :	1188.44 m²	x 4
GROSS AREA LEVEL 12 :	1044.76 m²	
TOTAL GROSS AREA :	**14365.19 m²**	

TOWER B - GROSS AREA PER LEVEL

GROSS AREA LEVEL 1 :	1466.78 m²	
GROSS AREA LEVEL 2 :	1497.04 m²	
GROSS AREA LEVEL 3 TO 6 :	1629.32 m²	x 4
GROSS AREA LEVEL 7 :	1465.16 m²	
GROSS AREA LEVEL 8 TO 11 :	1513.39 m²	x 4
GROSS AREA LEVEL 12 :	1390.80 m²	
TOTAL GROSS AREA :	**18390.62 m²**	

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GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

UNDERGROUND PARKINGS

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P1 PARKING
NUMBER OF PARKING : 87 SPACES

P2 PARKING
NUMBER OF PARKING : 111 SPACES

P3 PARKING
NUMBER OF PARKING : 111 SPACES

P4 PARKING
NUMBER OF PARKING : 111 SPACES

TOTAL : 420 SPACES
(REQUIRED MINIMUM 431 SPACES)

SPECIFIC TYPE OF PARKING :

STANDARD :	357
VISITOR :	37
UNIVERSAL :	11
ELECTRIC :	15

P1 BICYCLE PARKING
HORIZONTAL PARKING : 8 SPACES
VERTICAL PARKING: 44 SPACES

GROUND LEVEL BICYCLE PARKING
INDOOR VERTICAL PARKING: 108 SPACES
OUTDOOR HORIZONTAL PARKING: 90 SPACES

TOTAL : 250 SPACES
(REQUIRED MINIMUM 196 SPACES)


OUTDOOR BIKE RACK DESIGN


INDOOR VERTICAL BIKE RACK DESIGN


INDOOR HORIZONTAL BIKE RACK DESIGN

TOWER A & B - PARKING LEVEL P1

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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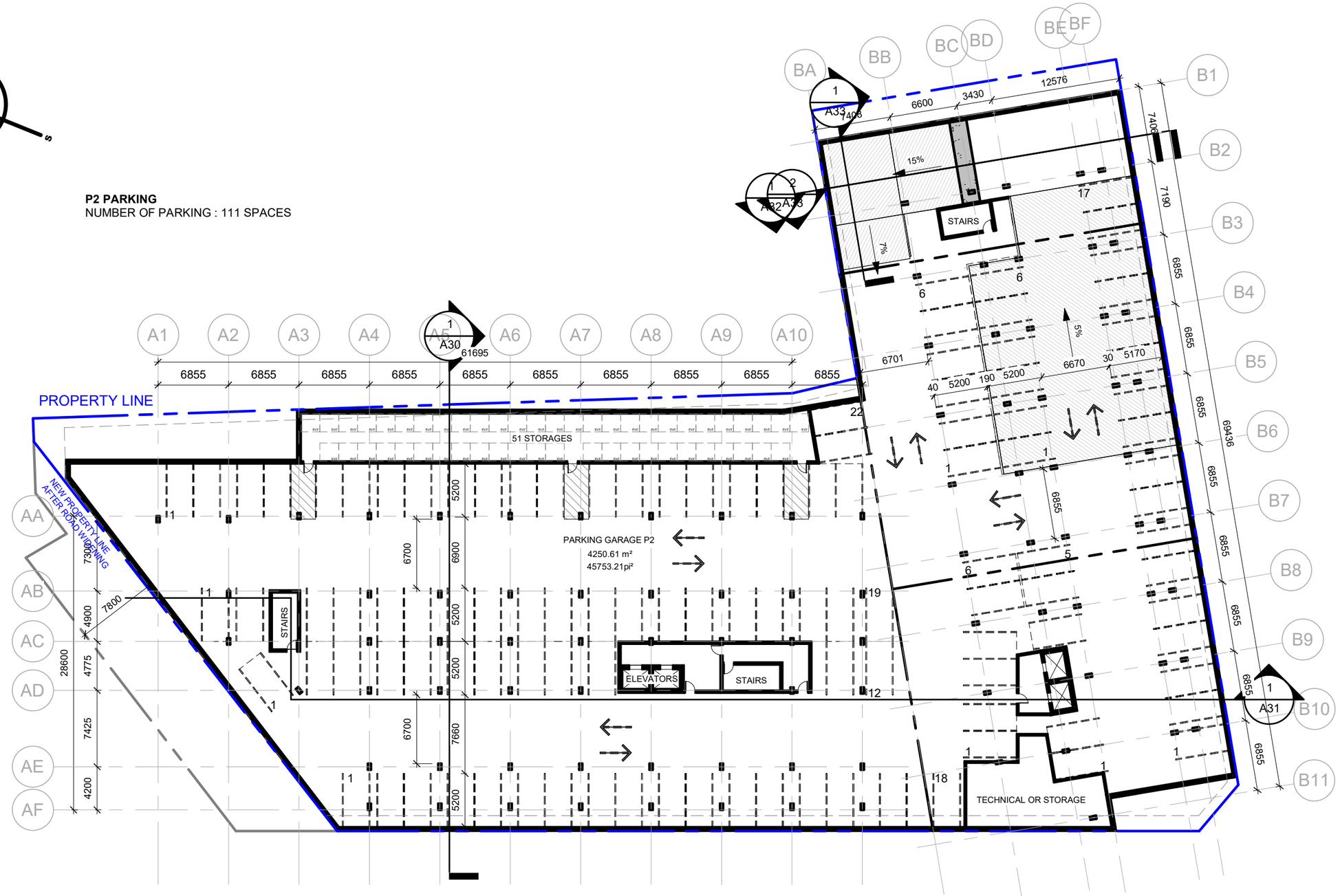
P2 PARKING
NUMBER OF PARKING : 111 SPACES



TOWER A & B - PARKING LEVEL P2

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 400

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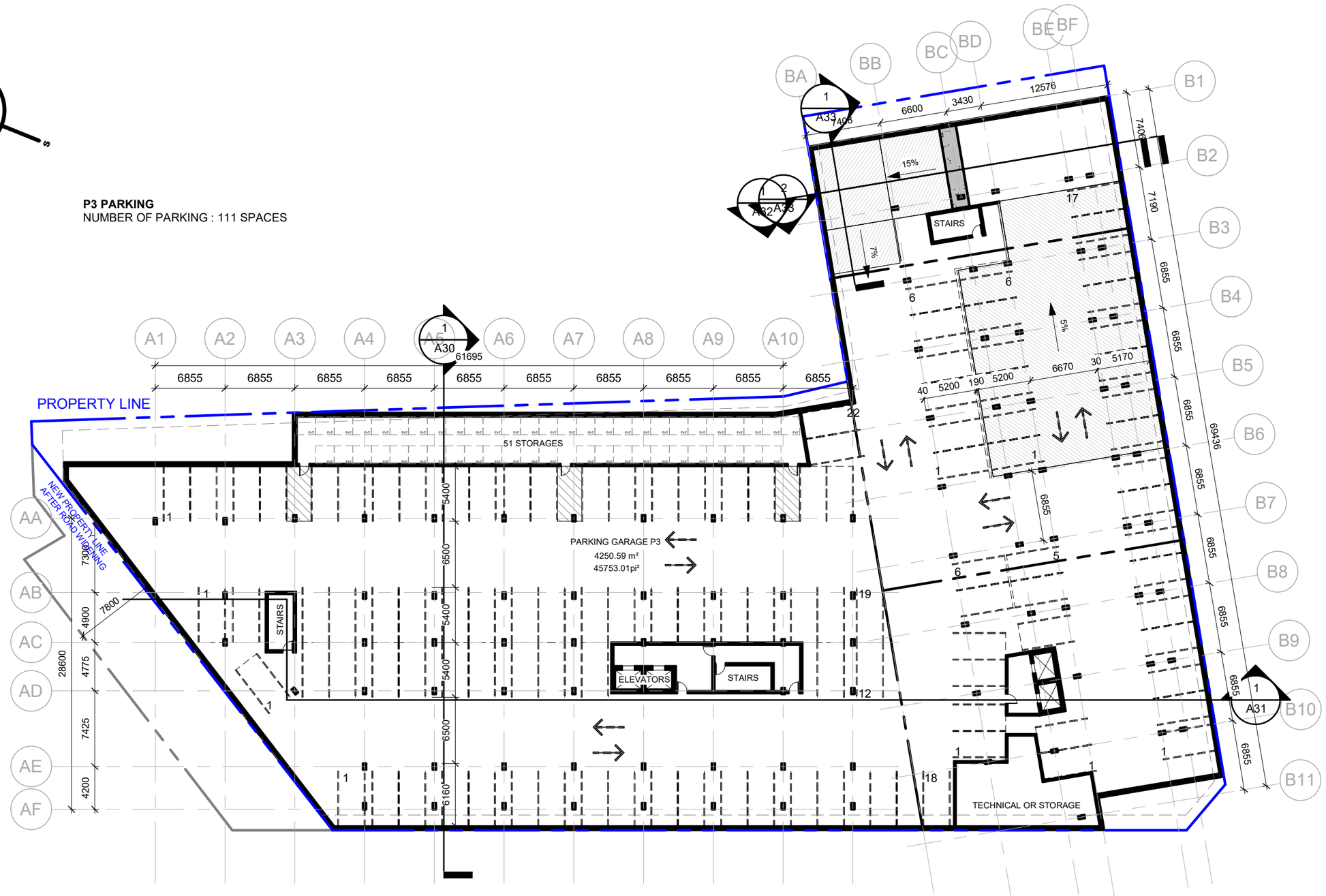
P3 PARKING
NUMBER OF PARKING : 111 SPACES



TOWER A & B - PARKING LEVEL P3

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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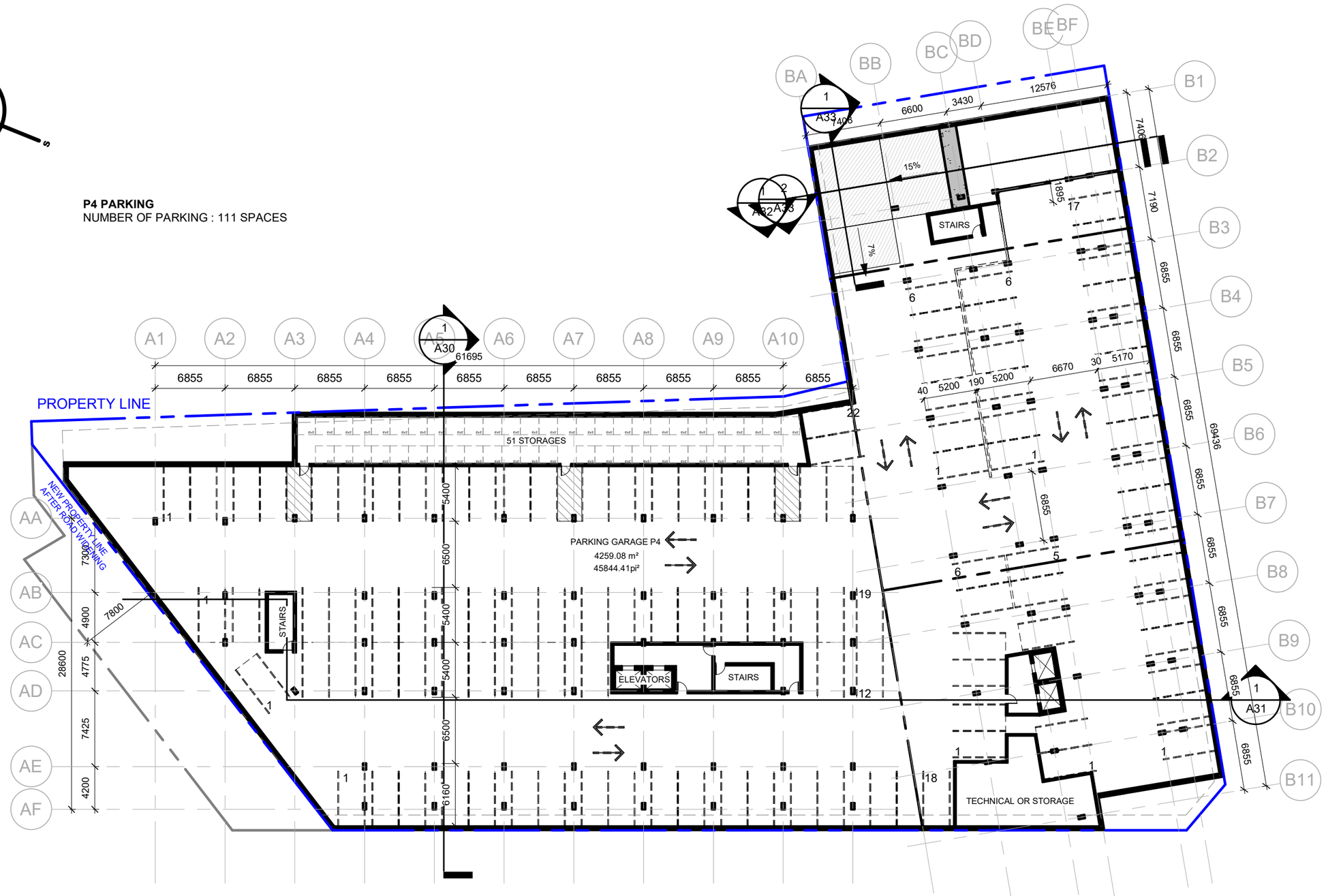
P4 PARKING
NUMBER OF PARKING : 111 SPACES



TOWER A & B - PARKING LEVEL P4

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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1 : 400

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TOWER A

GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

LAPALME RHEAULT
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PMA ARCHITECTES

GROUPE Heafey GROUP

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GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BIKE | COMMERCIAL | GROUND LOBBY | SERVICE | STAIRS

TOWER A - LEVEL 1

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | BACHELOR | COMMERCIAL | STAIRS

TOWER A - LEVEL 2

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GROUPE Heafey GROUP

GROUP HEAFEY
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1 : 200
ESQUISSE
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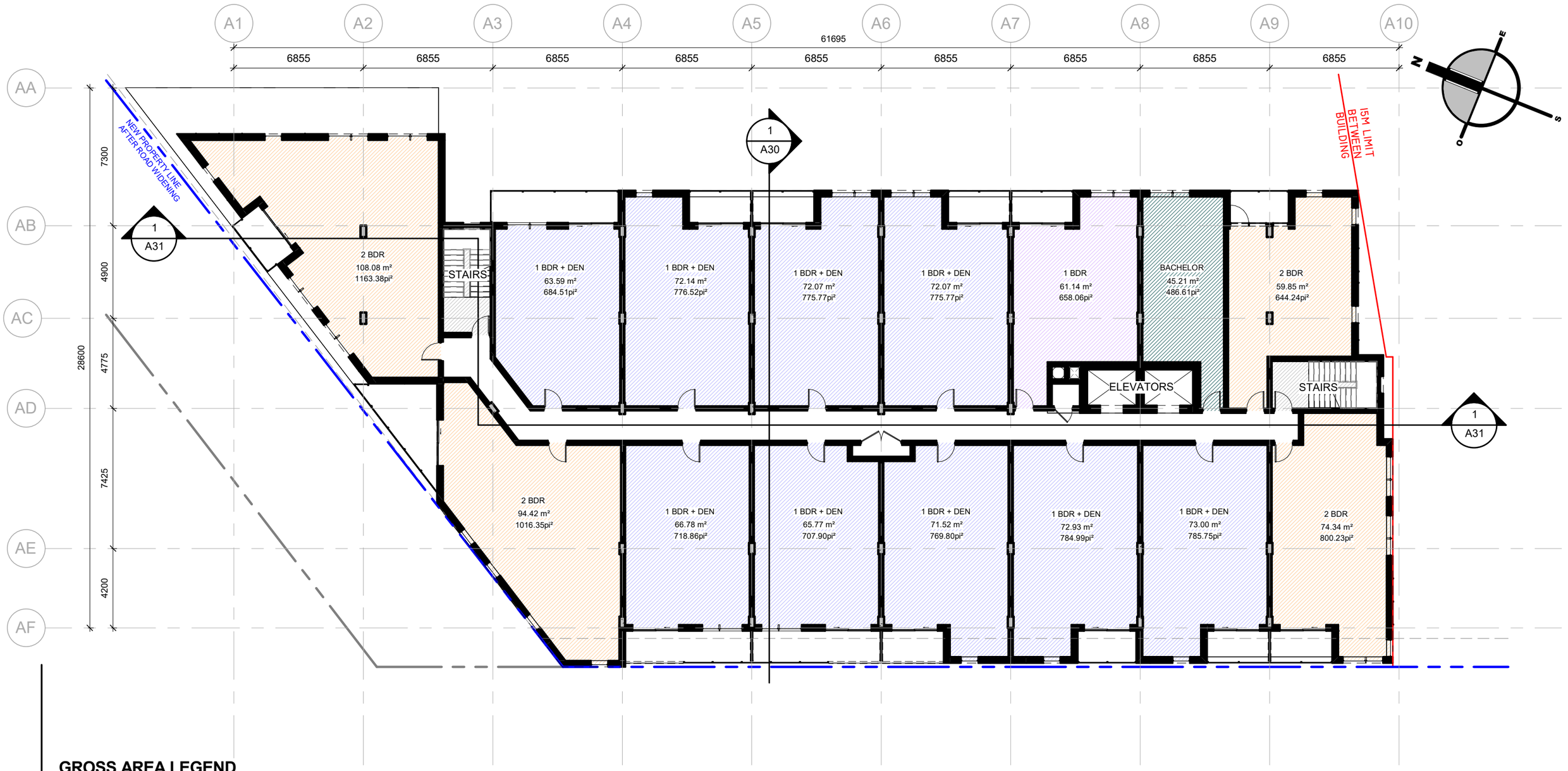

GROSS AREA LEGEND

- 1 BDR
- 1 BDR + DEN
- 2 BDR
- BACHELOR
- STAIRS

TOWER A - LEVEL 3 TO 6

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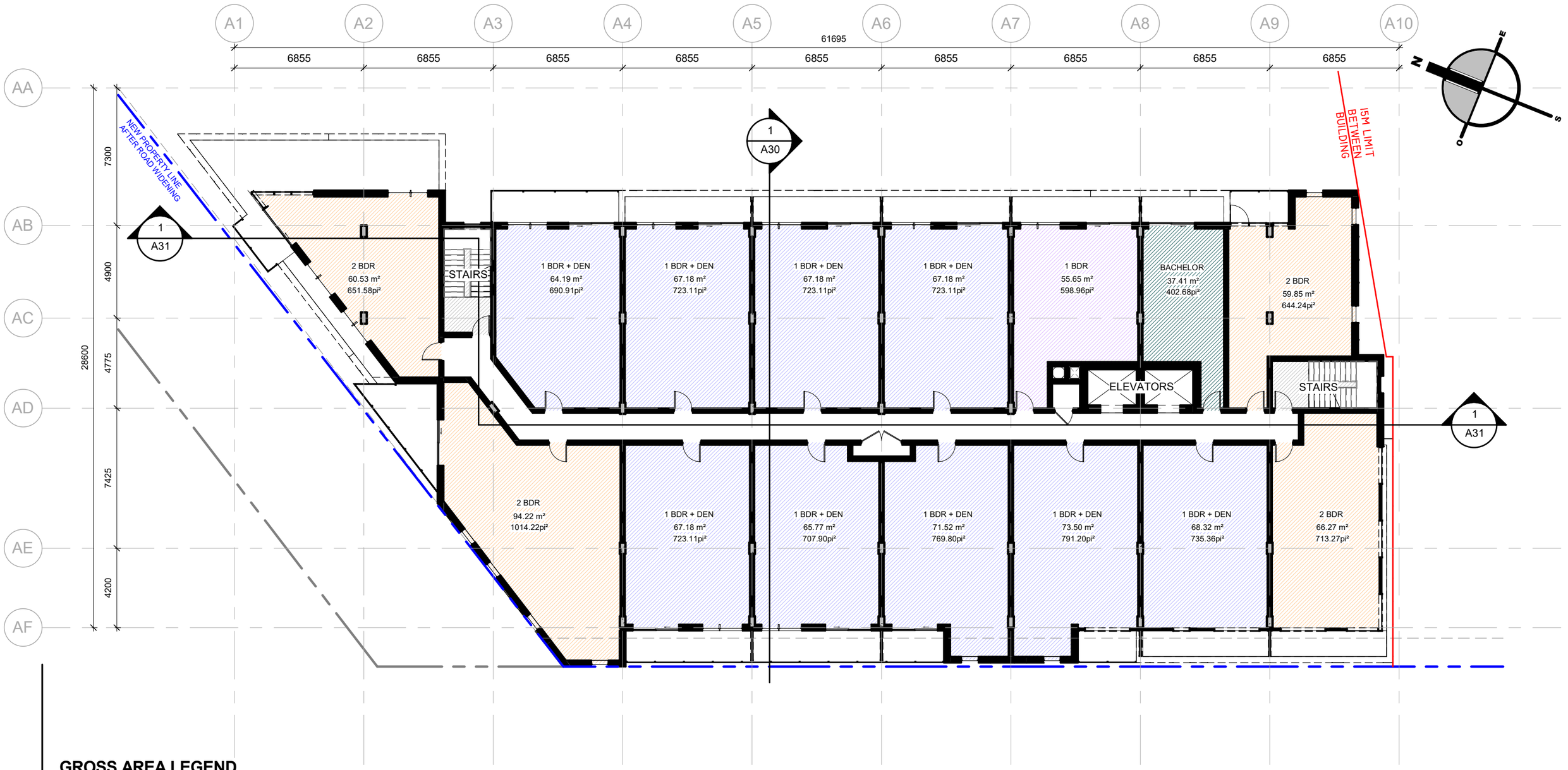

GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | STAIRS

TOWER A - LEVEL 7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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1 : 200

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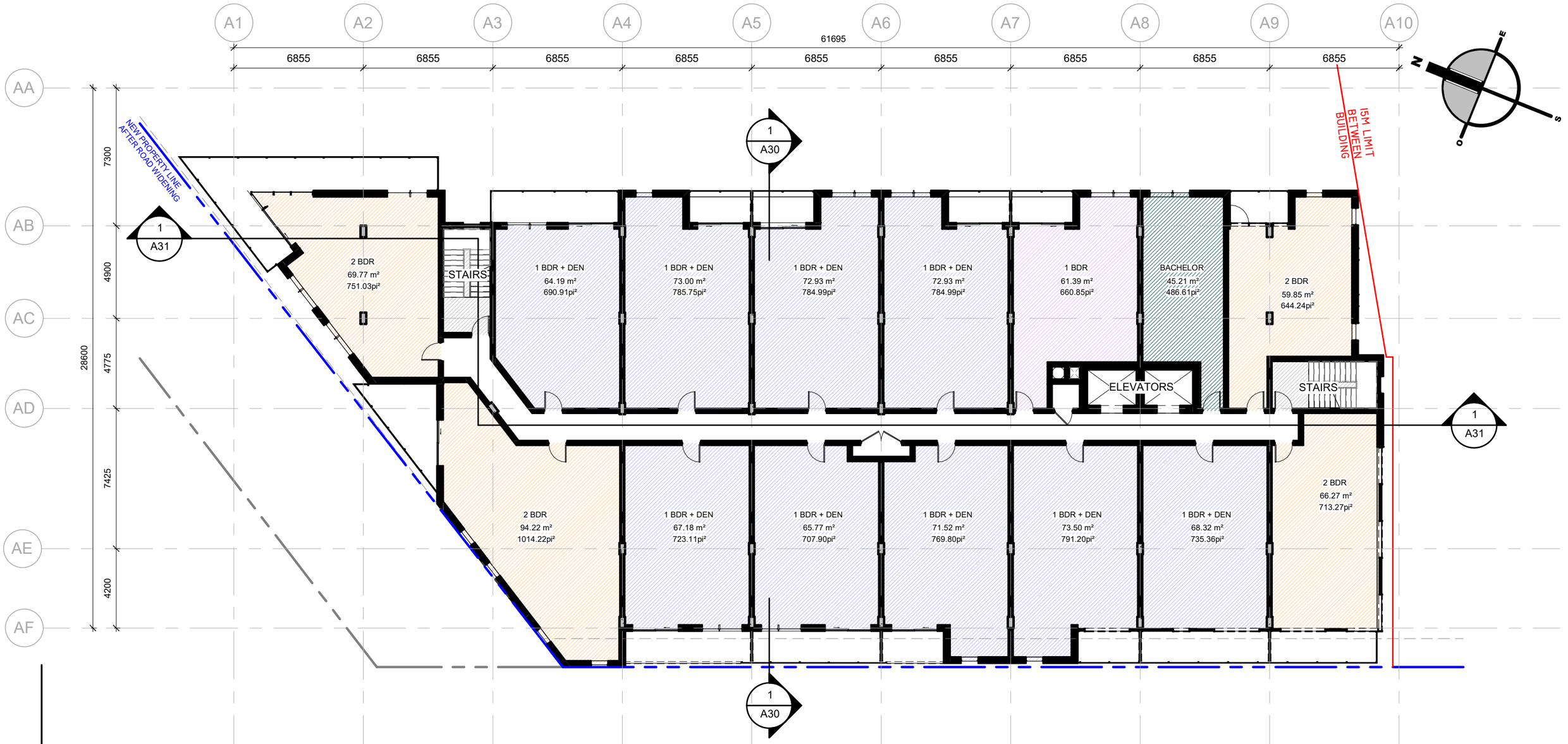

GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | STAIRS

TOWER A - LEVEL 8 TO 11

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1 : 200

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GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | MULTI PROPOSE | STAIRS | TERRACE

TOWER A - LEVEL 12

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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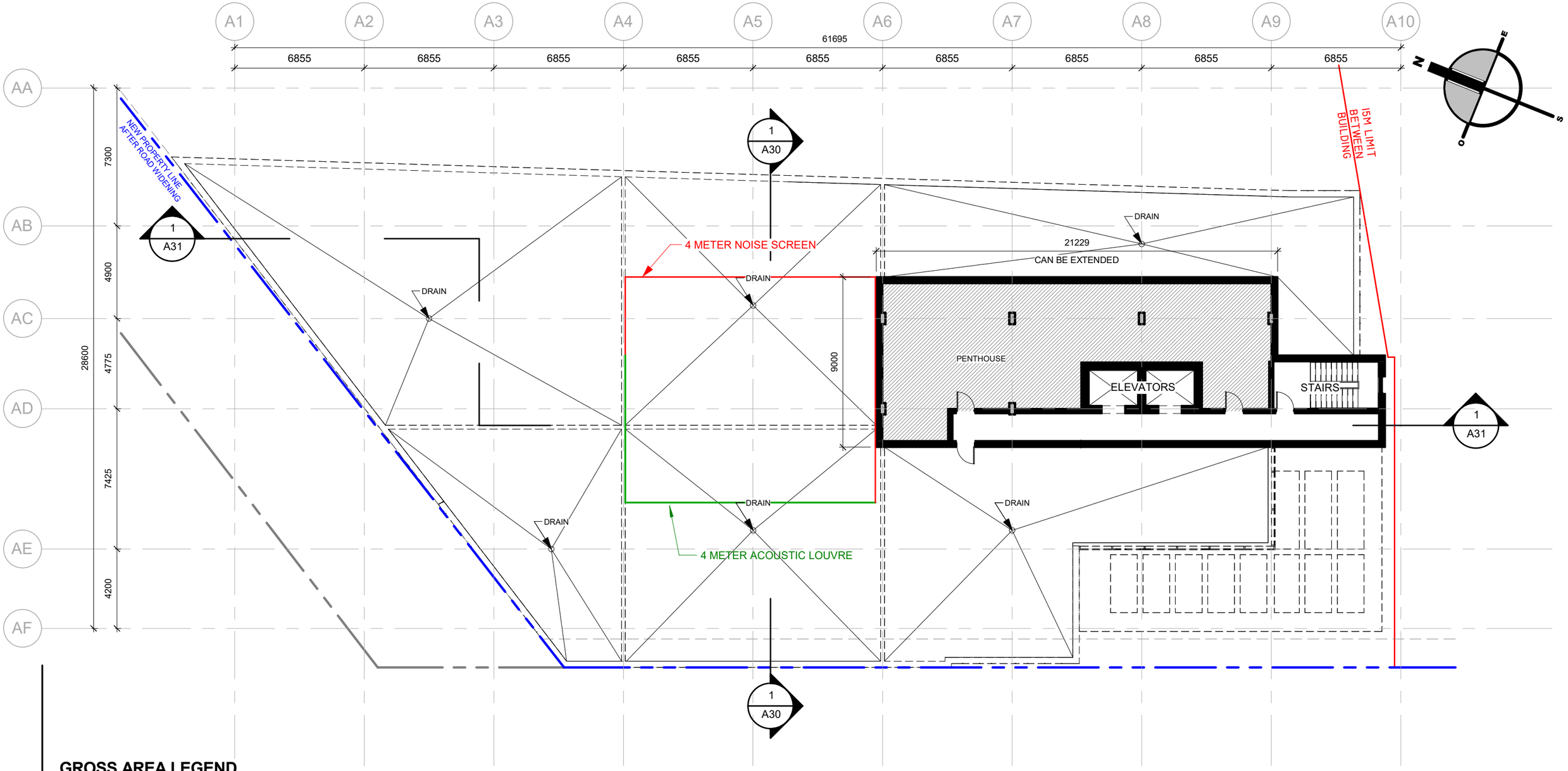

GROSS AREA LEGEND

PENTHOUSE

TOWER A - LEVEL PENTHOUSE

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GROUPE Heafey GROUP

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1 : 200

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ROOM TYPOLOGY - TOWER A

LEVEL	NAME	QTY
LEVEL 1	1 BDR	1
LEVEL 1	1 BDR + DEN	6
LEVEL 1	2 BDR	2
LEVEL 2	1 BDR	2
LEVEL 2	1 BDR + DEN	9
LEVEL 2	BACHELOR	1
LEVEL 3	1 BDR	1
LEVEL 3	1 BDR + DEN	9
LEVEL 3	2 BDR	4
LEVEL 3	BACHELOR	1
LEVEL 4	1 BDR	1
LEVEL 4	1 BDR + DEN	9
LEVEL 4	2 BDR	4
LEVEL 4	BACHELOR	1
LEVEL 5	1 BDR	1
LEVEL 5	1 BDR + DEN	9
LEVEL 5	2 BDR	4
LEVEL 5	BACHELOR	1
LEVEL 6	1 BDR	1
LEVEL 6	1 BDR + DEN	9
LEVEL 6	2 BDR	4
LEVEL 6	BACHELOR	1
LEVEL 7	1 BDR	1
LEVEL 7	1 BDR + DEN	9
LEVEL 7	2 BDR	4
LEVEL 7	BACHELOR	1
LEVEL 8	1 BDR	1
LEVEL 8	1 BDR + DEN	9
LEVEL 8	2 BDR	4
LEVEL 8	BACHELOR	1
LEVEL 9	1 BDR	1
LEVEL 9	1 BDR + DEN	9
LEVEL 9	2 BDR	4
LEVEL 9	BACHELOR	1
LEVEL 10	1 BDR	1
LEVEL 10	1 BDR + DEN	9
LEVEL 10	2 BDR	4
LEVEL 10	BACHELOR	1
LEVEL 11	1 BDR	1
LEVEL 11	1 BDR + DEN	9
LEVEL 11	2 BDR	4
LEVEL 11	BACHELOR	1
LEVEL 12	1 BDR	1
LEVEL 12	1 BDR + DEN	6
LEVEL 12	2 BDR	4
LEVEL 12	BACHELOR	1
TOTAL UNITS: 168		

1 BDR - TOWER A

NIVEAU	NOM	NOMBRE
LEVEL 1	1 BDR	1
LEVEL 2	1 BDR	2
LEVEL 3	1 BDR	1
LEVEL 4	1 BDR	1
LEVEL 5	1 BDR	1
LEVEL 6	1 BDR	1
LEVEL 7	1 BDR	1
LEVEL 8	1 BDR	1
LEVEL 9	1 BDR	1
LEVEL 10	1 BDR	1
LEVEL 11	1 BDR	1
LEVEL 12	1 BDR	1
TOTAL: 13		

1 BDR + DEN - TOWER A

NIVEAU	NOM	NOMBRE
LEVEL 1	1 BDR + DEN	6
LEVEL 2	1 BDR + DEN	9
LEVEL 3	1 BDR + DEN	9
LEVEL 4	1 BDR + DEN	9
LEVEL 5	1 BDR + DEN	9
LEVEL 6	1 BDR + DEN	9
LEVEL 7	1 BDR + DEN	9
LEVEL 8	1 BDR + DEN	9
LEVEL 9	1 BDR + DEN	9
LEVEL 10	1 BDR + DEN	9
LEVEL 11	1 BDR + DEN	9
LEVEL 12	1 BDR + DEN	6
TOTAL: 102		

2 BDR - TOWER A

NIVEAU	NOM	NOMBRE
LEVEL 1	2 BDR	2
LEVEL 3	2 BDR	4
LEVEL 4	2 BDR	4
LEVEL 5	2 BDR	4
LEVEL 6	2 BDR	4
LEVEL 7	2 BDR	4
LEVEL 8	2 BDR	4
LEVEL 9	2 BDR	4
LEVEL 10	2 BDR	4
LEVEL 11	2 BDR	4
LEVEL 12	2 BDR	4
TOTAL: 42		

2 BDR + DEN - TOWER A

NIVEAU	NOM	NOMBRE

TYPOLOGY - TOWER A

NOM	NOMBRE	%
1 BDR	13	7%
1 BDR + DEN	102	61%
2 BDR	42	28%
BACHELOR	11	4%
TOTAL DE LOGEMENTS: 168		100%

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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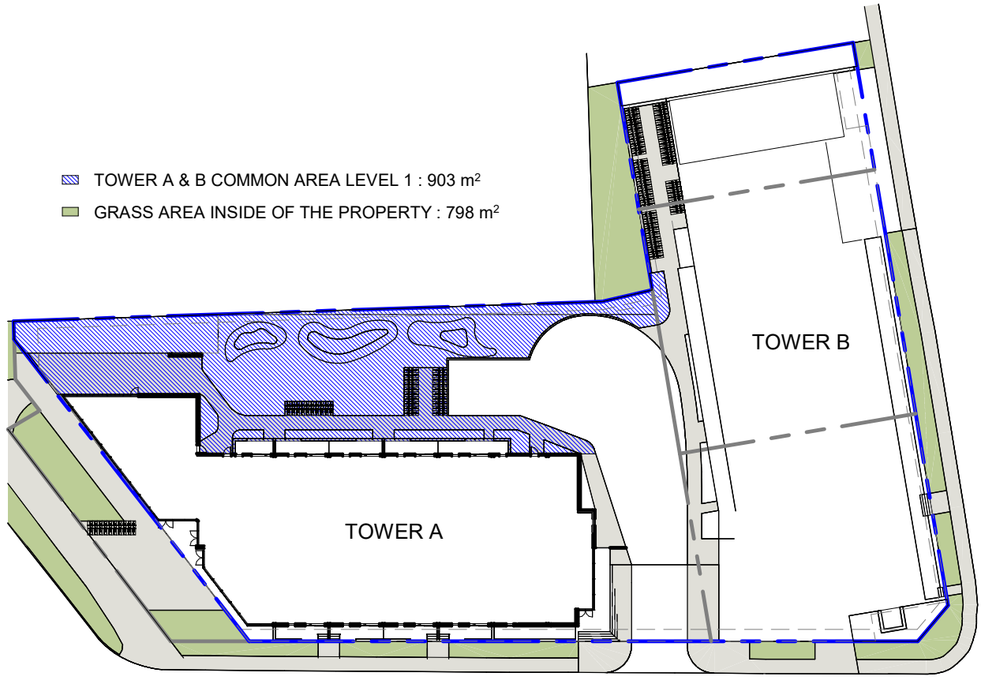
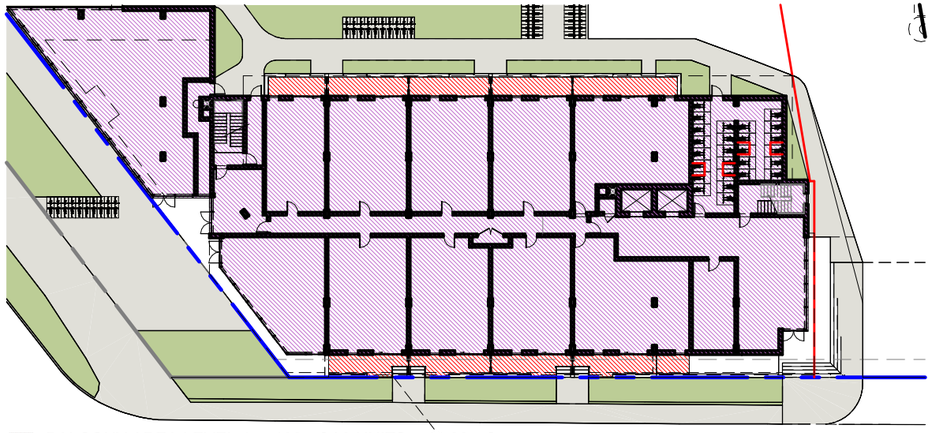


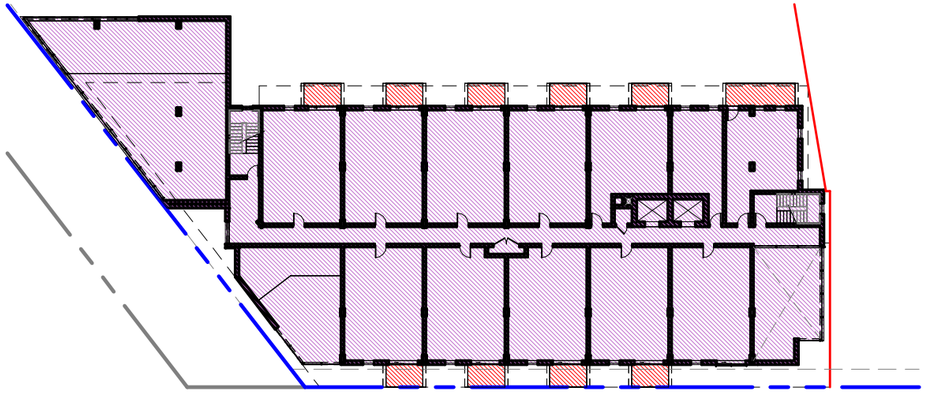
SITE PLAN - AMENITIES AREA
LEVEL 1



BALCONY AREA LEVEL 1 : 102 m² / 9 UNITS = 11.33 m²

GROSS AREA LEVEL 1 : 1217.94 m²

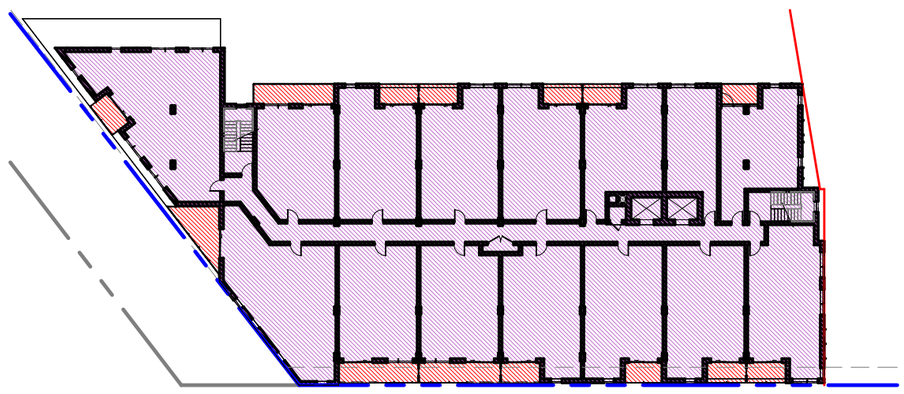
TOWER A - AMENITIES AREA
LEVEL 1



BALCONY AREA LEVEL 2 : 64 m² / 12 UNITS = 5.33 m²

GROSS AREA LEVEL 2 : 1217.94 m²

TOWER A - AMENITIES AREA
LEVEL 2



BALCONY AREA LEVEL 3 : 103 m² / 15 UNITS = 6.87 m²

GROSS AREA LEVEL 3 TO 6 : 1246.10 m²

TOWER A - AMENITIES AREA
LEVEL 3 TO 6

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

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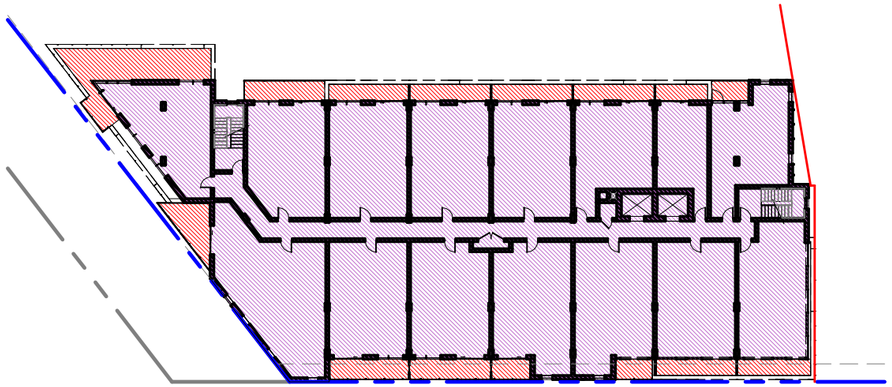
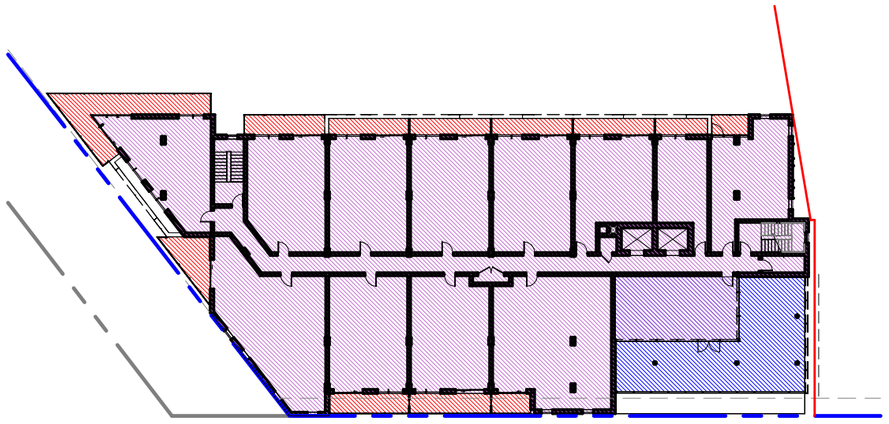


BALCONY AREA LEVEL 7 : 164 m² / 15 UNITS = 10.93 m²

GROSS AREA LEVEL 7 : 1146.39 m²

TOWER A - AMENITIES AREA LEVEL 7

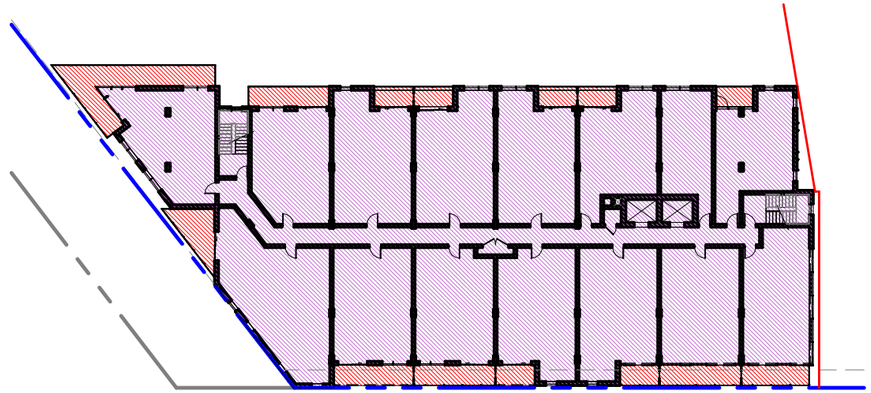


BALCONY AREA LEVEL 12 : 134 m² / 12 UNITS = 11.17 m²

GROSS AREA LEVEL 12 : 1044.76 m²

TOWER A COMMON AREA LEVEL 12 : 152 m²

TOWER A - AMENITIES AREA LEVEL 12



BALCONY AREA LEVEL 8 : 140 m² / 15 UNITS = 9.33 m²

GROSS AREA LEVEL 8 TO 11 : 1188.44 m²

TOWER A - AMENITIES AREA LEVEL 8 TO 11

PRIVATE AMENITIES AREA

BALCONY AREA LEVEL 1 : 102 m² / 9 UNITS = 11.33 m²
BALCONY AREA LEVEL 2 : 64 m² / 12 UNITS = 5.33 m²
BALCONY AREA LEVEL 3 : 103 m² / 15 UNITS = 6.87 m²
BALCONY AREA LEVEL 4 : 103 m² / 15 UNITS = 6.87 m²
BALCONY AREA LEVEL 5 : 103 m² / 15 UNITS = 6.87 m²
BALCONY AREA LEVEL 6 : 103 m² / 15 UNITS = 6.87 m²
BALCONY AREA LEVEL 7 : 164 m² / 15 UNITS = 10.93 m²
BALCONY AREA LEVEL 8 : 140 m² / 15 UNITS = 9.33 m²
BALCONY AREA LEVEL 9 : 140 m² / 15 UNITS = 9.33 m²
BALCONY AREA LEVEL 10 : 140 m² / 15 UNITS = 9.33 m²
BALCONY AREA LEVEL 11 : 140 m² / 15 UNITS = 9.33 m²
BALCONY AREA LEVEL 12 : 134 m² / 12 UNITS = 11.17 m²

TOTAL PRIVATE AREA : 1436 m² / 168 UNITS = 8.55 m²
REQUIRED 6 m²/ UNITS

COMMON AMENITIES AREA

TOWER A & B COMMON AREA LEVEL 1 : 903 m²

TOWER A COMMON AREA LEVEL 12 : 152 m²

TOWER B COMMON AREA TOTAL : 222 m²

GRASS AREA INSIDE OF THE PROPERTY : 798 m²

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

As indicated

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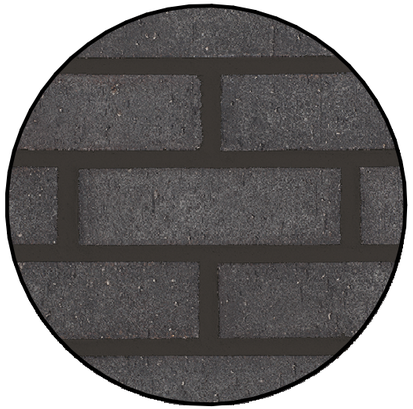
REVISION 05	2023-10-18



1

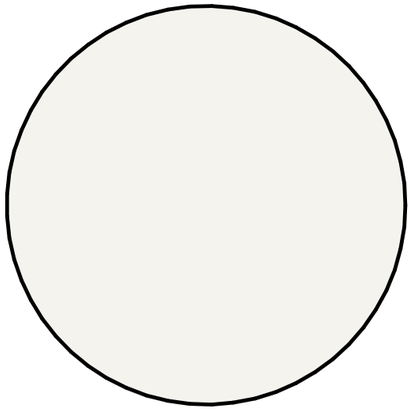
MASONRY
GLEN-GERY
COLOR VINTAGE
BLACK VELOUR

2

MASONRY
GLEN-GERY
COLOR REVERE
PEWTER VELOUR

3

ALUMINIUM SIDING
ALUPLANK
COLOR ACADIA
AXOTIC HONEY



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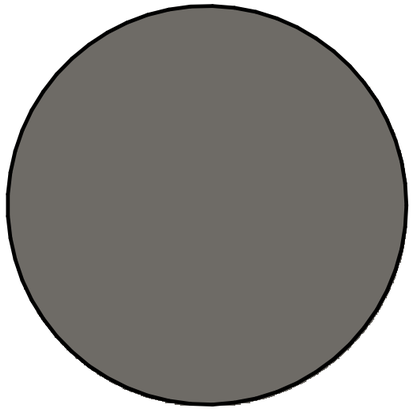
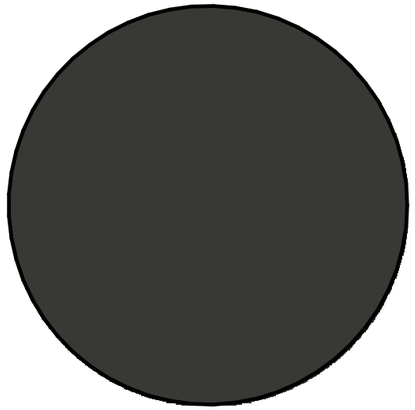
ALUMINIUM PANELS
ALUTECH
SICO COLOR NATURAL
WHITE 6000-11



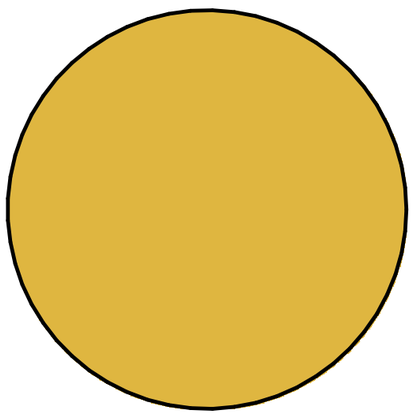
5

ALUMINIUM PANELS
ALUTECH
SICO COLOR NIGHT
OWL 6183-63



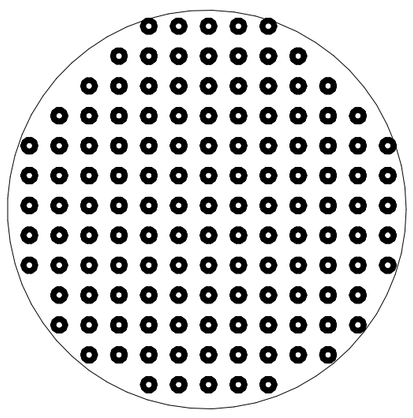
6

ALUMINIUM PANELS
ALUTECH
SICO COLOR BLACK
PEPPER 6182-83



7

ALUMINIUM PANELS
ALUTECH
SICO COLOR GREEN
TOMATO RELISH
6097-64



8

BIRD SAFETY WINDOW FILM
DOTS WITH MAXIMUM SPACING OF 50 MM BY 50 MM, MINIMUM OF 4 MM DIAMETER. TO BE APPLY ON THE GLASS BALCONIES FOR THE FIRST 4 FLOORS.

NOTE : COLORS SHOWN MAY VARY DUE TO SCREEN RESOLUTION. PLEASE SEE ACTUAL PRODUCTS SAMPLE FOR TRUE COLOR.

EXTERIOR MATERIALS

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

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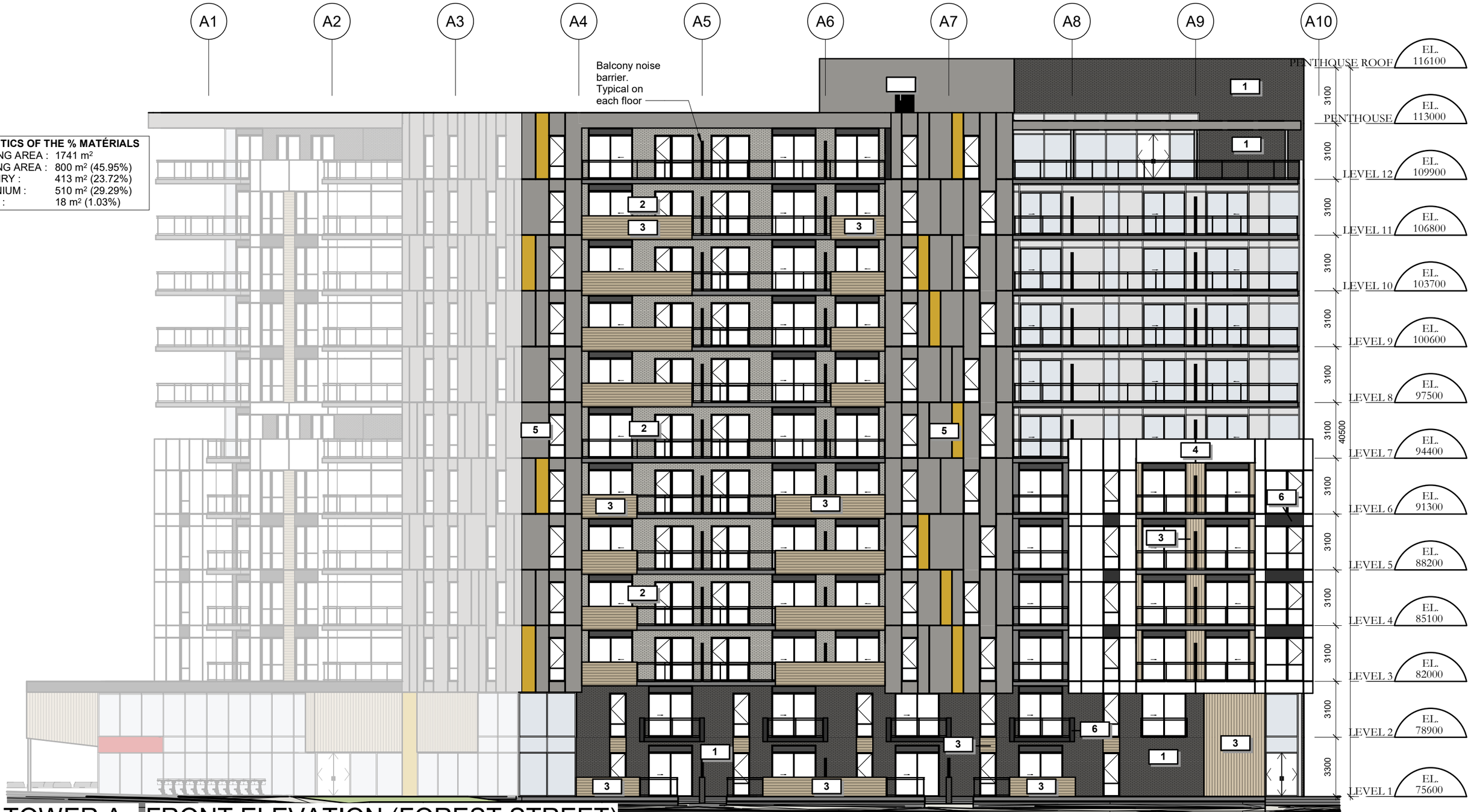

STATISTICS OF THE % MATÉRIALS

BUILDING AREA :	1741 m²
OPENING AREA :	800 m² (45.95%)
MASONRY :	413 m² (23.72%)
ALUMINIUM :	510 m² (29.29%)
OTHER :	18 m² (1.03%)

TOWER A - FRONT ELEVATION (FOREST STREET)

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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TOWER A - BACK ELEVATION

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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STATISTICS OF THE % MATERIALS

BUILDING AREA :	1305 m²
OPENING AREA :	450 m² (34.48%)
MASONRY :	51 m² (3.91%)
ALUMINIUM :	777 m² (59.54%)
OTHER :	27 m² (2.07%)

TOWER A - LEFT SIDE ELEVATION (RICHMOND ROAD)

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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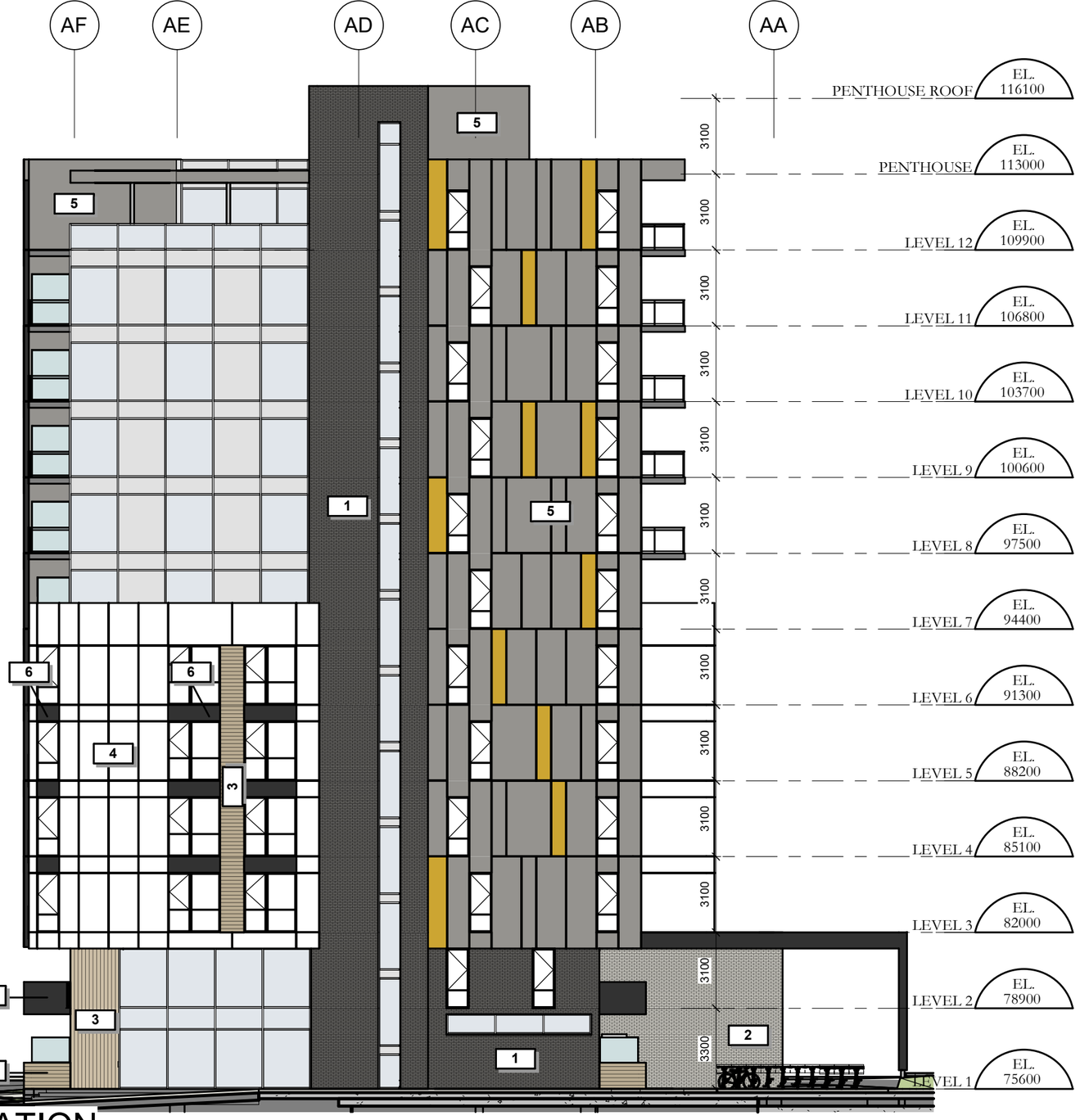
STATISTICS OF THE % MATÉRIALS

BUILDING AREA :	1059 m²
OPENING AREA :	353 m² (33.33%)
MASONRY :	231 m² (21.81%)
ALUMINIUM :	473 m² (44.66%)
OTHER :	2 m² (0.19%)



TOWER A - RIGHT SIDE ELEVATION

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

LAPALME RHEAULT ARCHITECTES I +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

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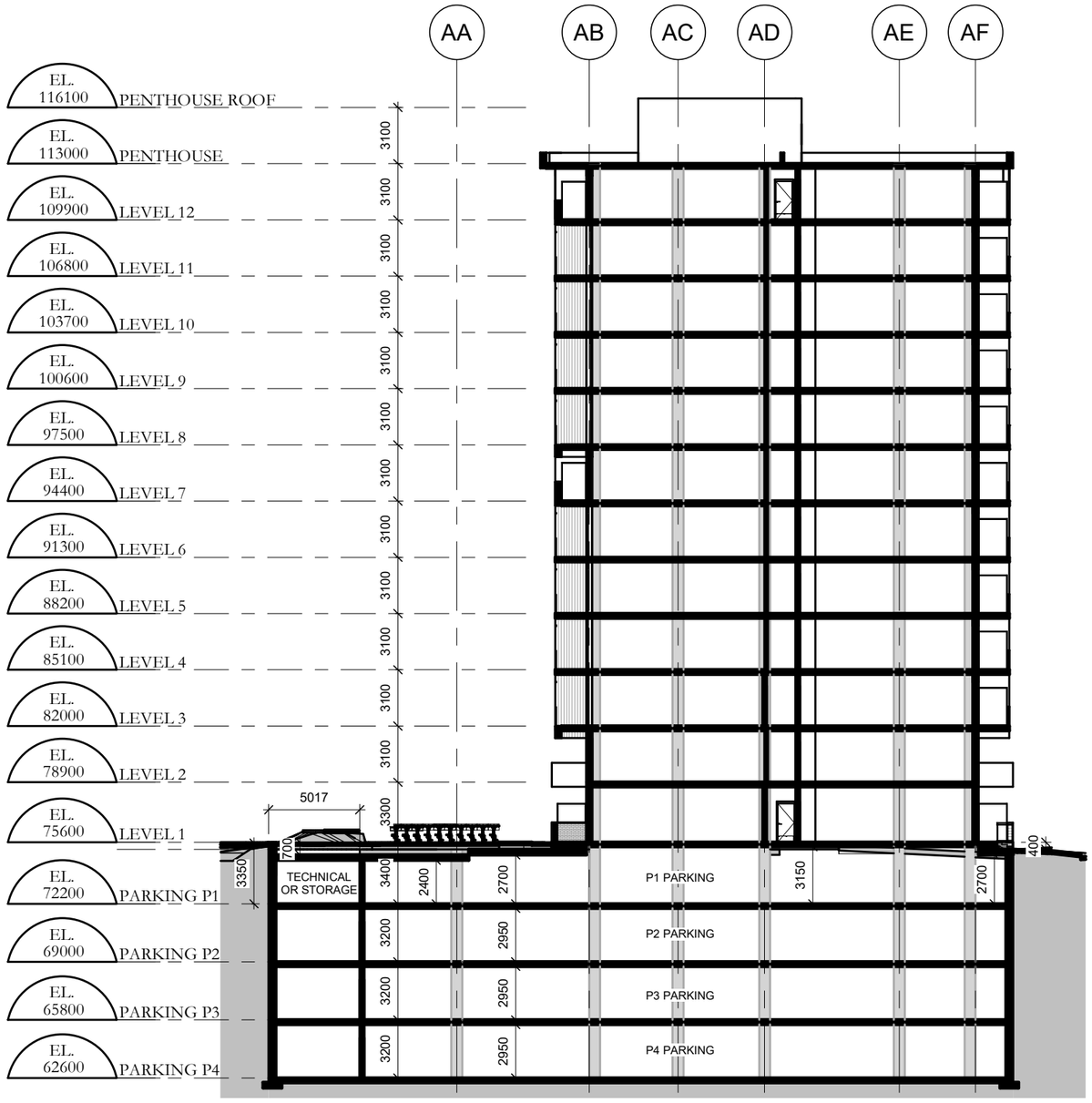

TOWER A - SECTION

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

1 : 300

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TOWER A & B - SECTION

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 300

LAPALME RHEAULT ARCHITECTES + ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

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TOWER B

GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

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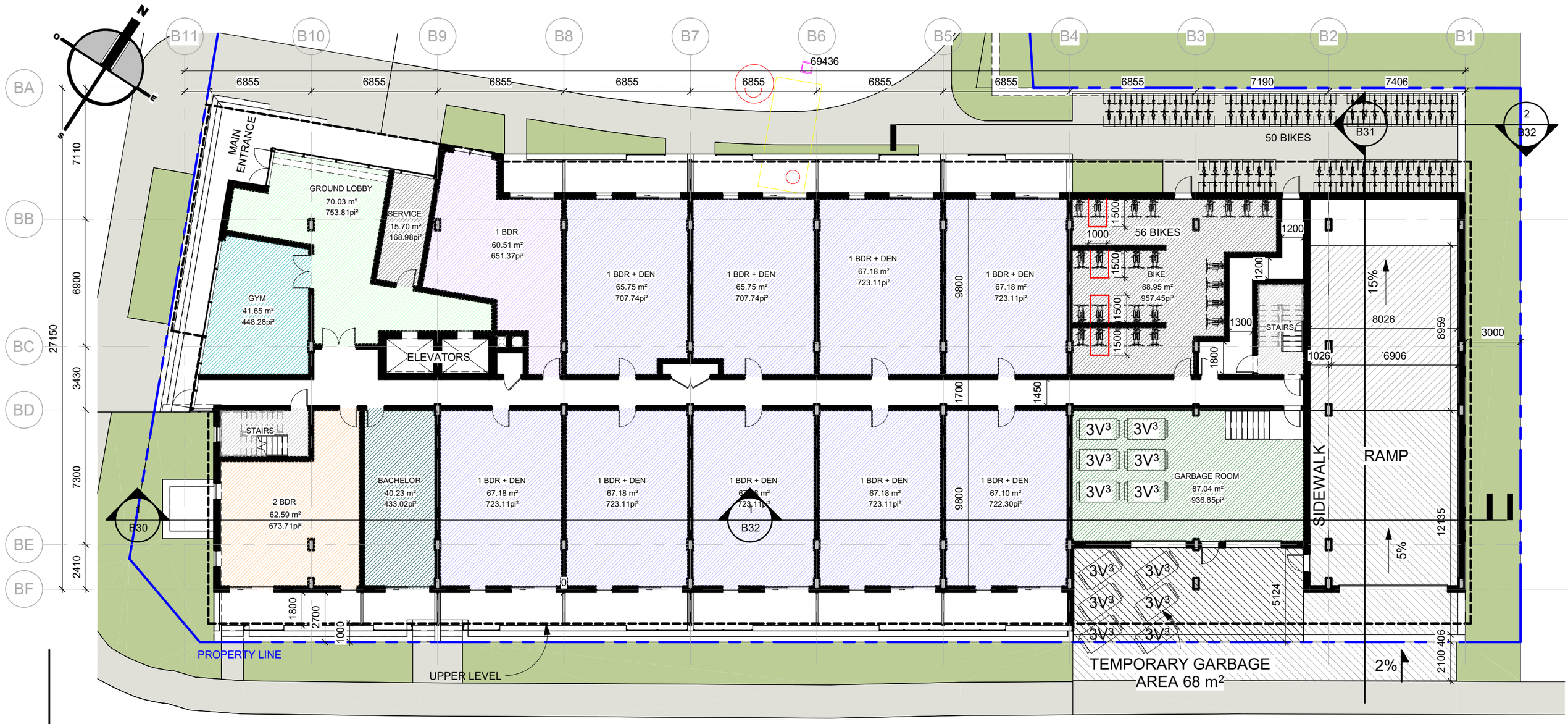

GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | BIKE | GARBAGE ROOM | GROUND LOBBY | GYM | SERVICE | STAIRS

TOWER B - LEVEL 1

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | GYM | STAIRS

TOWER B - LEVEL 2

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | STAIRS

TOWER B - LEVEL 3 TO 6

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | STAIRS

TOWER B - LEVEL 7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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1 : 200

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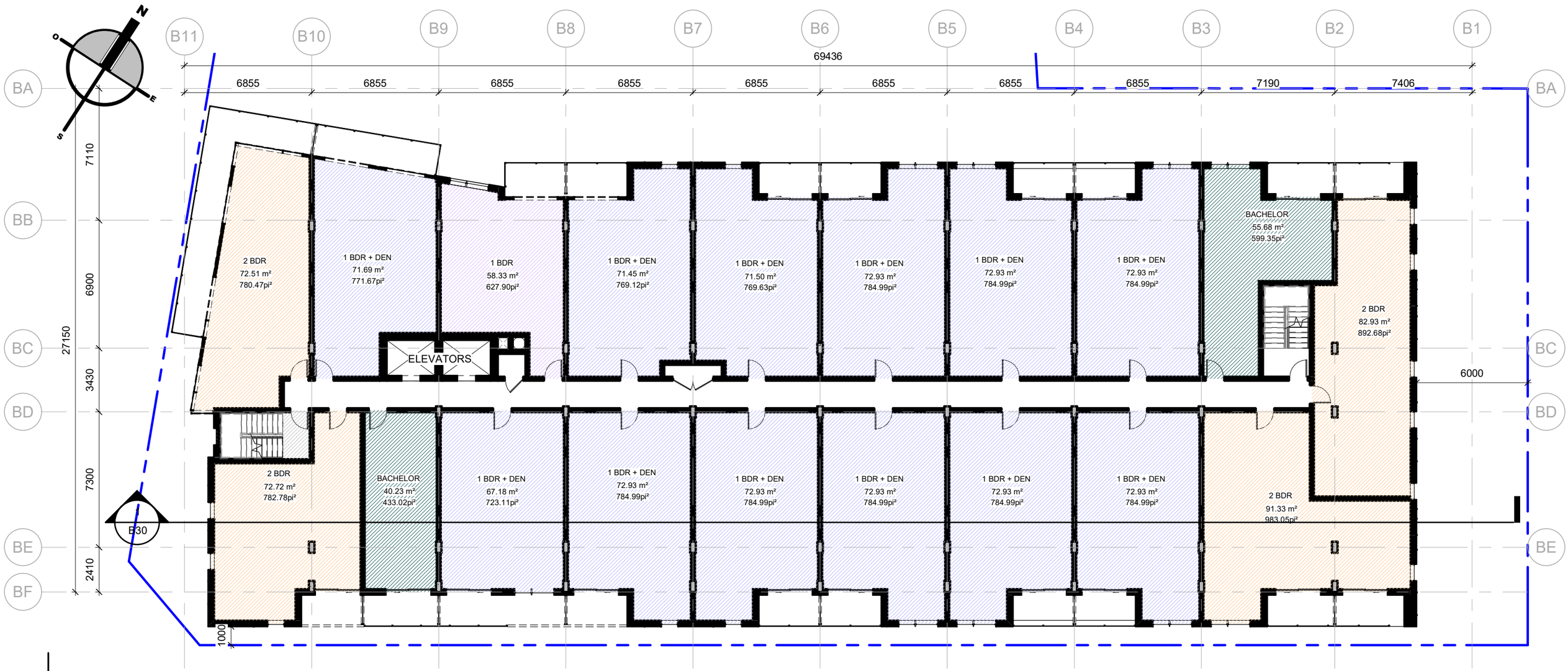

GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | STAIRS

TOWER B - LEVEL 8 TO 11

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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GROSS AREA LEGEND

1 BDR | 1 BDR + DEN | 2 BDR | BACHELOR | MULTI PURPOSE | STAIRS | TERRACE

TOWER B - LEVEL 12

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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1 : 200

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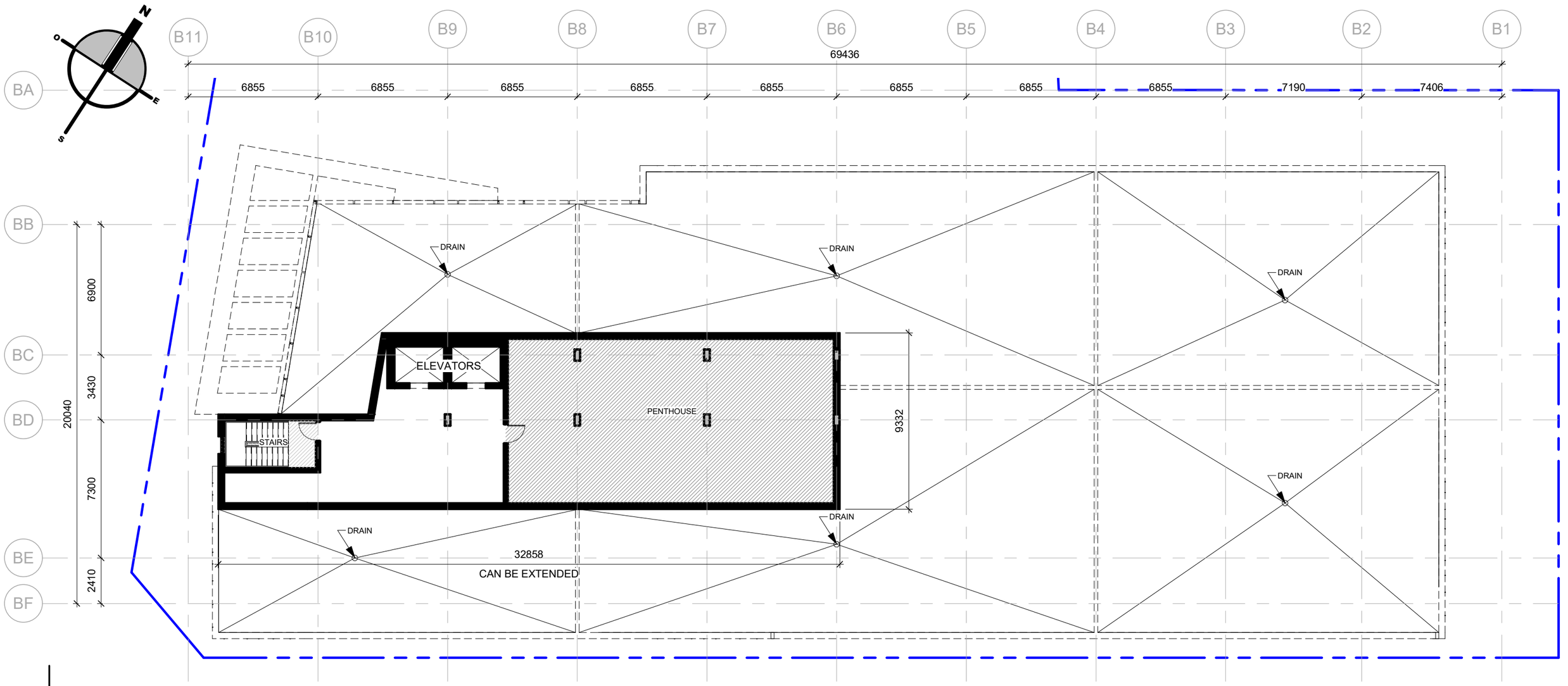

GROSS AREA LEGEND

PENTHOUSE STAIRS

TOWER B - LEVEL PENTHOUSE

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

ROOM TYPOLOGY - TOWER B

LEVEL	NAME	QTY
LEVEL 1	1 BDR	1
LEVEL 1	1 BDR + DEN	9
LEVEL 1	2 BDR	1
LEVEL 1	BACHELOR	1
LEVEL 2	1 BDR	1
LEVEL 2	1 BDR + DEN	13
LEVEL 2	2 BDR	3
LEVEL 2	BACHELOR	2
LEVEL 3	1 BDR	1
LEVEL 3	1 BDR + DEN	13
LEVEL 3	2 BDR	4
LEVEL 3	BACHELOR	2
LEVEL 4	1 BDR	1
LEVEL 4	1 BDR + DEN	13
LEVEL 4	2 BDR	4
LEVEL 4	BACHELOR	2
LEVEL 5	1 BDR	1
LEVEL 5	1 BDR + DEN	13
LEVEL 5	2 BDR	4
LEVEL 5	BACHELOR	2
LEVEL 6	1 BDR	1
LEVEL 6	1 BDR + DEN	13
LEVEL 6	2 BDR	4
LEVEL 6	BACHELOR	2
LEVEL 7	1 BDR	1
LEVEL 7	1 BDR + DEN	12
LEVEL 7	2 BDR	4
LEVEL 7	BACHELOR	2
LEVEL 8	1 BDR	1
LEVEL 8	1 BDR + DEN	12
LEVEL 8	2 BDR	4
LEVEL 8	BACHELOR	2
LEVEL 9	1 BDR	1
LEVEL 9	1 BDR + DEN	12
LEVEL 9	2 BDR	4
LEVEL 9	BACHELOR	2
LEVEL 10	1 BDR	1
LEVEL 10	1 BDR + DEN	12
LEVEL 10	2 BDR	4
LEVEL 10	BACHELOR	2
LEVEL 11	1 BDR	1
LEVEL 11	1 BDR + DEN	12
LEVEL 11	2 BDR	4
LEVEL 11	BACHELOR	2
LEVEL 12	1 BDR	1
LEVEL 12	1 BDR + DEN	11
LEVEL 12	2 BDR	3
LEVEL 12	BACHELOR	2
TOTAL DE LOGEMENTS: 223		

1 BDR - TOWER B

LEVEL	NAME	QTY
LEVEL 1	1 BDR	1
LEVEL 2	1 BDR	1
LEVEL 3	1 BDR	1
LEVEL 4	1 BDR	1
LEVEL 5	1 BDR	1
LEVEL 6	1 BDR	1
LEVEL 7	1 BDR	1
LEVEL 8	1 BDR	1
LEVEL 9	1 BDR	1
LEVEL 10	1 BDR	1
LEVEL 11	1 BDR	1
LEVEL 12	1 BDR	1
TOTAL: 12		

2 BDR - TOWER B

LEVEL	NAME	QTY
LEVEL 1	2 BDR	1
LEVEL 2	2 BDR	3
LEVEL 3	2 BDR	4
LEVEL 4	2 BDR	4
LEVEL 5	2 BDR	4
LEVEL 6	2 BDR	4
LEVEL 7	2 BDR	4
LEVEL 8	2 BDR	4
LEVEL 9	2 BDR	4
LEVEL 10	2 BDR	4
LEVEL 11	2 BDR	4
LEVEL 12	2 BDR	3
TOTAL: 43		

TYPOLOGY - TOWER B

NAME	QTY	%
1 BDR	12	5%
1 BDR + DEN	145	66%
2 BDR	43	22%
BACHELOR	23	7%
TOTAL DE LOGEMENTS: 223		100%

1 BDR + DEN - TOWER B

LEVEL	NAME	QTY
LEVEL 1	1 BDR + DEN	9
LEVEL 2	1 BDR + DEN	13
LEVEL 3	1 BDR + DEN	13
LEVEL 4	1 BDR + DEN	13
LEVEL 5	1 BDR + DEN	13
LEVEL 6	1 BDR + DEN	13
LEVEL 7	1 BDR + DEN	12
LEVEL 8	1 BDR + DEN	12
LEVEL 9	1 BDR + DEN	12
LEVEL 10	1 BDR + DEN	12
LEVEL 11	1 BDR + DEN	12
LEVEL 12	1 BDR + DEN	11
TOTAL: 145		

2 BDR + DEN - TOWER B

LEVEL	NAME	QTY

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

ESQUISSE
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REVISION 01	2020-12-18
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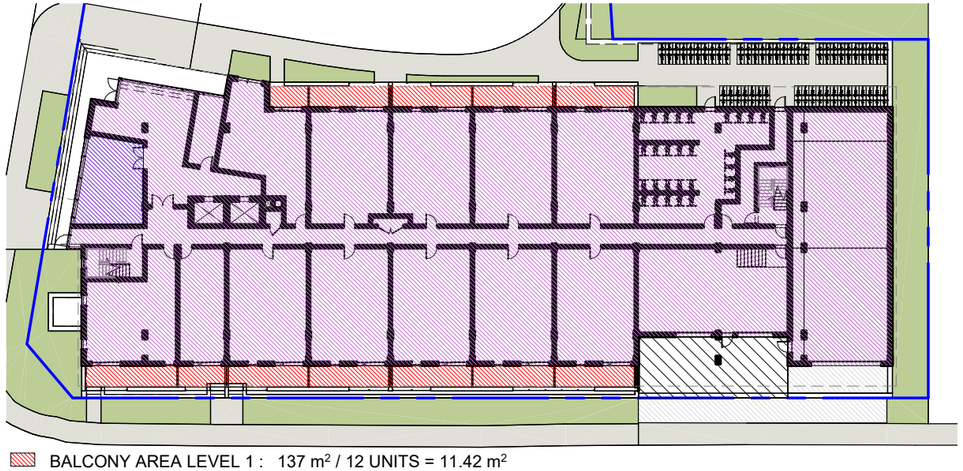
REVISION 04	2023-08-03

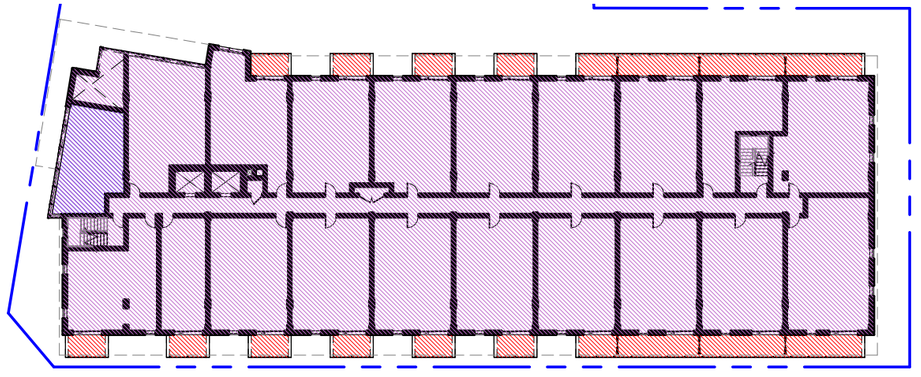


BALCONY AREA LEVEL 1 : 137 m² / 12 UNITS = 11.42 m²

COMMON AREA LEVEL 1 : 37 m²

GROSS AREA LEVEL 1 : 1466.78 m²

TOWER B - AMENITIES AREA
LEVEL 1

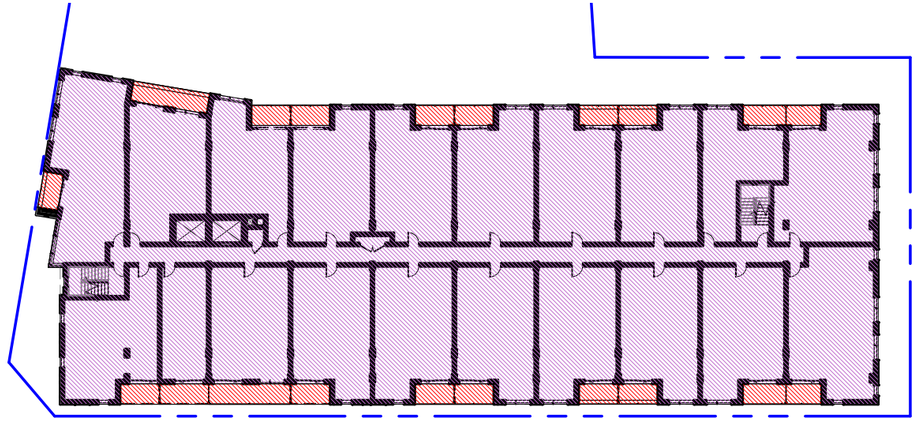


BALCONY AREA LEVEL 2 : 149 m² / 19 UNITS = 7.84 m²

COMMON AREA LEVEL 2 : 45 m²

GROSS AREA LEVEL 2 : 1497.04 m²

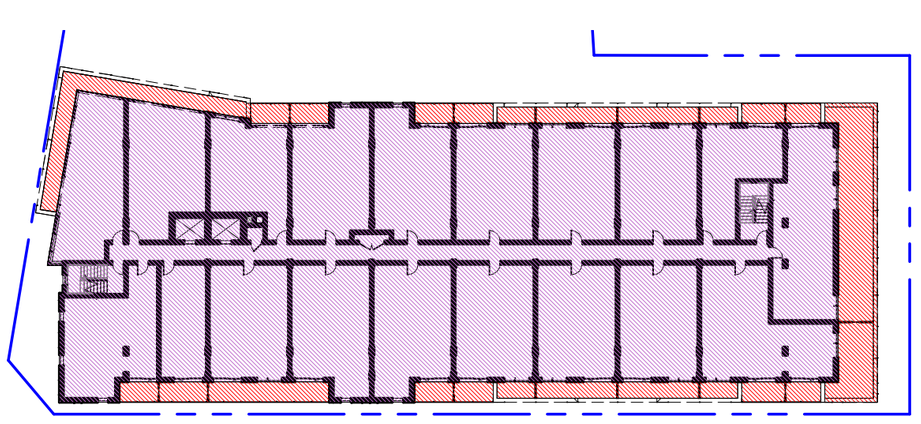
TOWER B - AMENITIES AREA
LEVEL 2



BALCONY AREA LEVEL 3 : 125 m² / 20 UNITS = 6.25 m²

GROSS AREA LEVEL 3 TO 6 : 1629.32 m²

TOWER B - AMENITIES AREA
LEVEL 3 TO 6



BALCONY AREA LEVEL 7 : 264 m² / 19 UNITS = 13.89 m²

GROSS AREA LEVEL 7 : 1465.16 m²

TOWER B - AMENITIES AREA
LEVEL 7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

1 : 500

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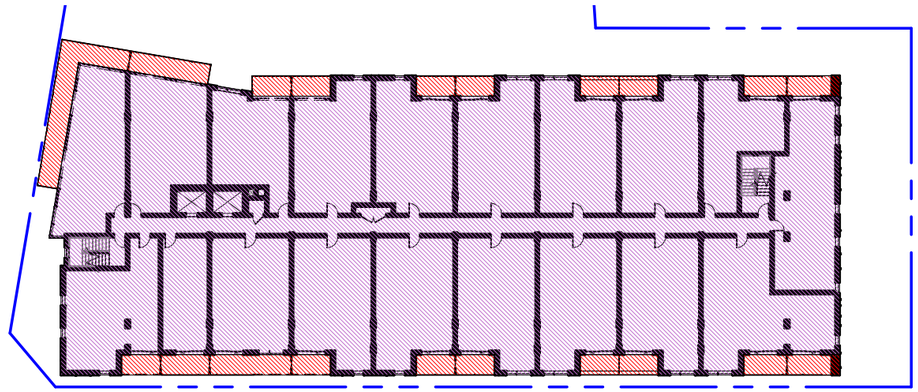
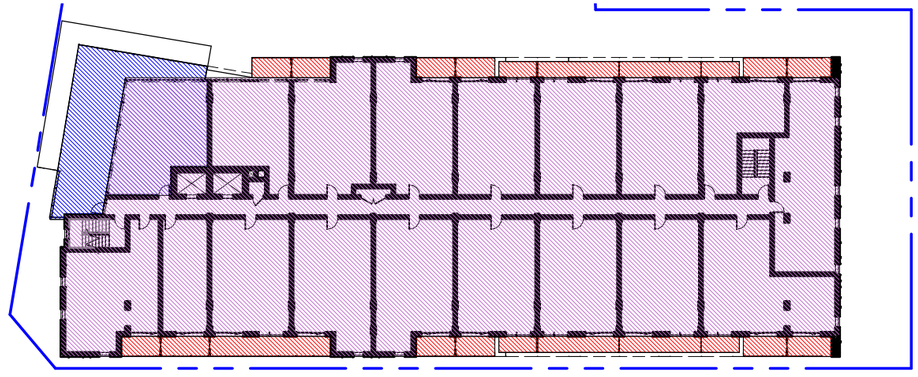


BALCONY AREA LEVEL 8 : 153 m² / 19 UNITS = 8.05 m²

GROSS AREA LEVEL 8 TO 11 : 1513.39 m²

TOWER B - AMENITIES AREA LEVEL 8 TO 11



BALCONY AREA LEVEL 12 : 144 m² / 17 UNITS = 8.47 m²

GROSS AREA LEVEL 12 : 1390.80 m²

COMMON AREA LEVEL 12 : 140 m²

TOWER B - AMENITIES AREA LEVEL 12

PRIVATE AMENITIES AREA

BALCONY AREA LEVEL 1 : 137 m² / 12 UNITS = 11.42 m²
BALCONY AREA LEVEL 2 : 149 m² / 19 UNITS = 7.84 m²
BALCONY AREA LEVEL 3 : 125 m² / 20 UNITS = 6.25 m²
BALCONY AREA LEVEL 4 : 125 m² / 20 UNITS = 6.25 m²
BALCONY AREA LEVEL 5 : 125 m² / 20 UNITS = 6.25 m²
BALCONY AREA LEVEL 6 : 125 m² / 20 UNITS = 6.25 m²
BALCONY AREA LEVEL 7 : 264 m² / 19 UNITS = 13.89 m²
BALCONY AREA LEVEL 8 : 153 m² / 19 UNITS = 8.05 m²
BALCONY AREA LEVEL 9 : 151 m² / 19 UNITS = 7.95 m²
BALCONY AREA LEVEL 10 : 151 m² / 19 UNITS = 7.95 m²
BALCONY AREA LEVEL 11 : 151 m² / 19 UNITS = 7.95 m²
BALCONY AREA LEVEL 12 : 144 m² / 17 UNITS = 8.47 m²

TOTAL PRIVATE AREA : 1800 m² / 223 UNITS = 8.07 m²
REQUIRED 6 m²/ UNITS

COMMON AMENITIES AREA

COMMON AREA LEVEL 1 : 37 m²
COMMON AREA LEVEL 2 : 45 m²
COMMON AREA LEVEL 12 : 140 m²
TOTAL COMMON AREA : 222 m²

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

As indicated

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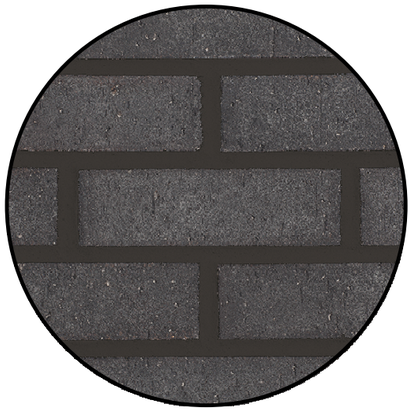


1

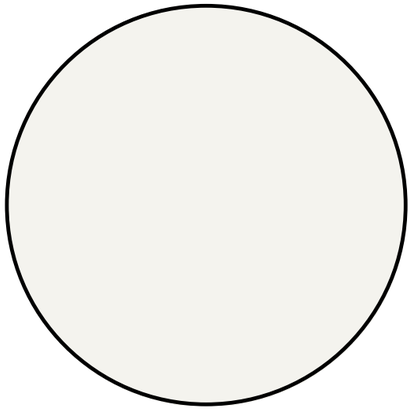
MASONRY
GLEN-GERY
COLOR VINTAGE
BLACK VELOUR

2

MASONRY
GLEN-GERY
COLOR REVERE
PEWTER VELOUR

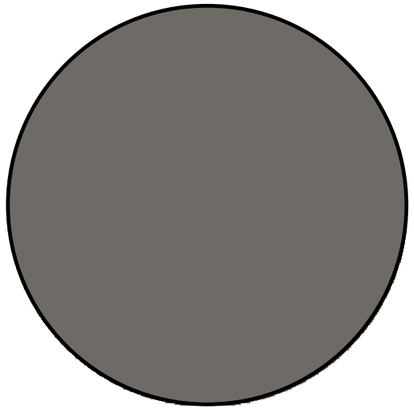
3

ALUMINIUM SIDING
ALUPLANK
COLOR ACADIA
AXOTIC HONEY



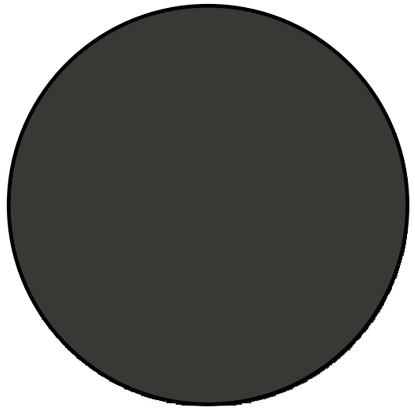
4

ALUMINIUM PANELS
ALUTECH
SICO COLOR NATURAL
WHITE 6000-11



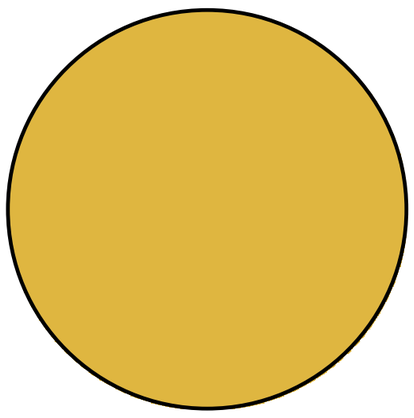
5

ALUMINIUM PANELS
ALUTECH
SICO COLOR NIGHT
OWL 6183-63



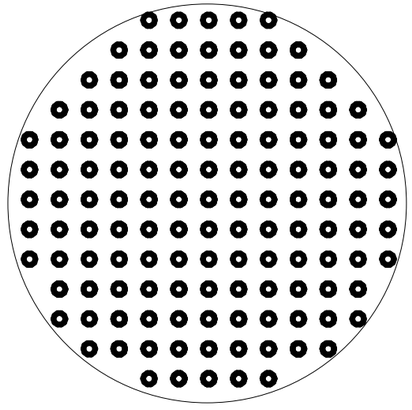
6

ALUMINIUM PANELS
ALUTECH
SICO COLOR BLACK
PEPPER 6182-83



7

ALUMINIUM PANELS
ALUTECH
SICO COLOR GREEN
TOMATO RELISH 6097-64



8

BIRD SAFETY WINDOW FILM
DOTS WITH MAXIMUM SPACING OF 50 MM BY 50 MM, MINIMUM OF 4 MM DIAMETER. TO BE APPLY ON THE GLASS BALCONIES FOR THE FIRST 4 FLOORS.

NOTE : COLORS SHOWN MAY VARY DUE TO SCREEN RESOLUTION. PLEASE SEE ACTUAL PRODUCTS SAMPLE FOR TRUE COLOR.

EXTERIOR MATERIALS

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

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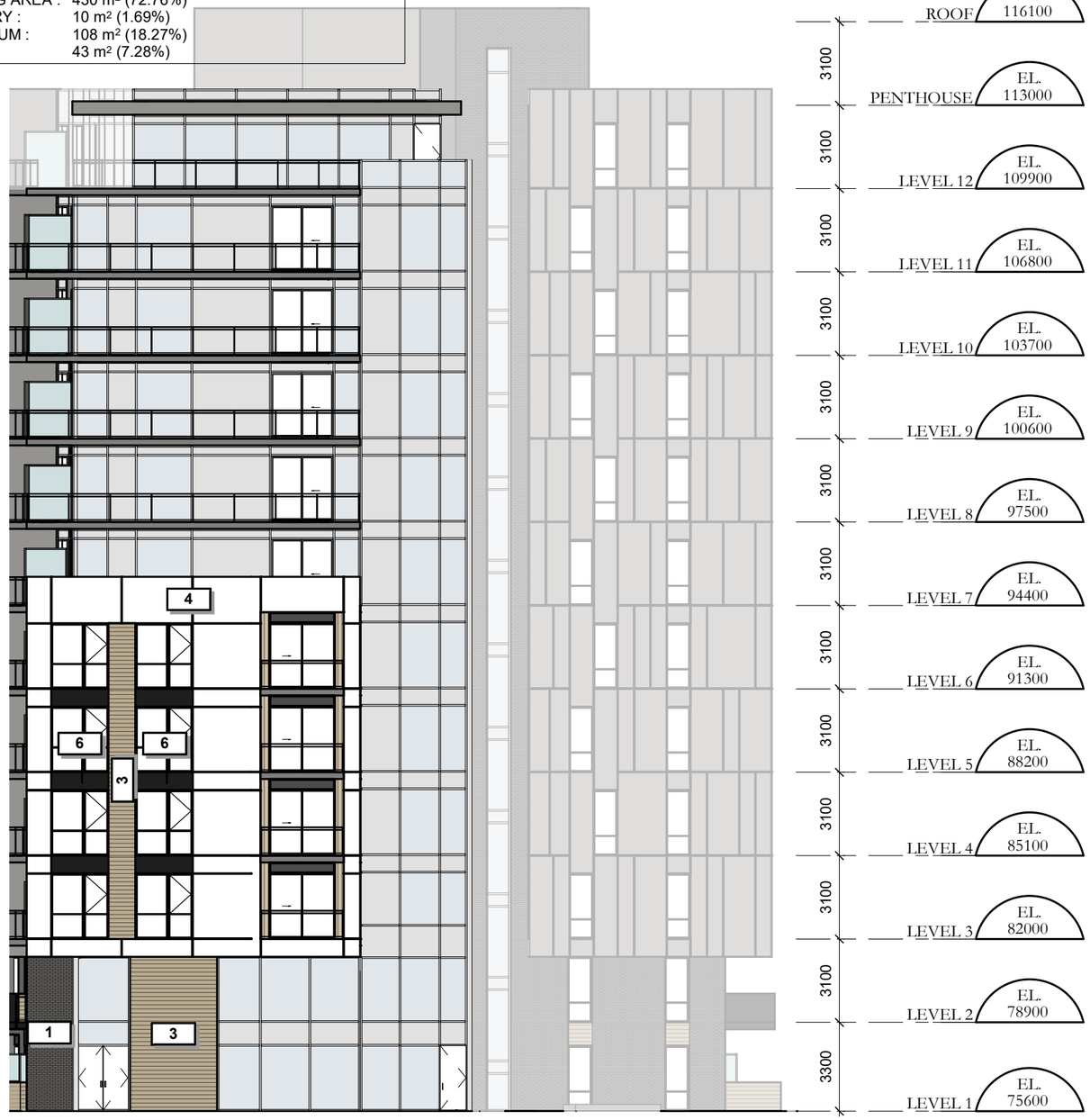
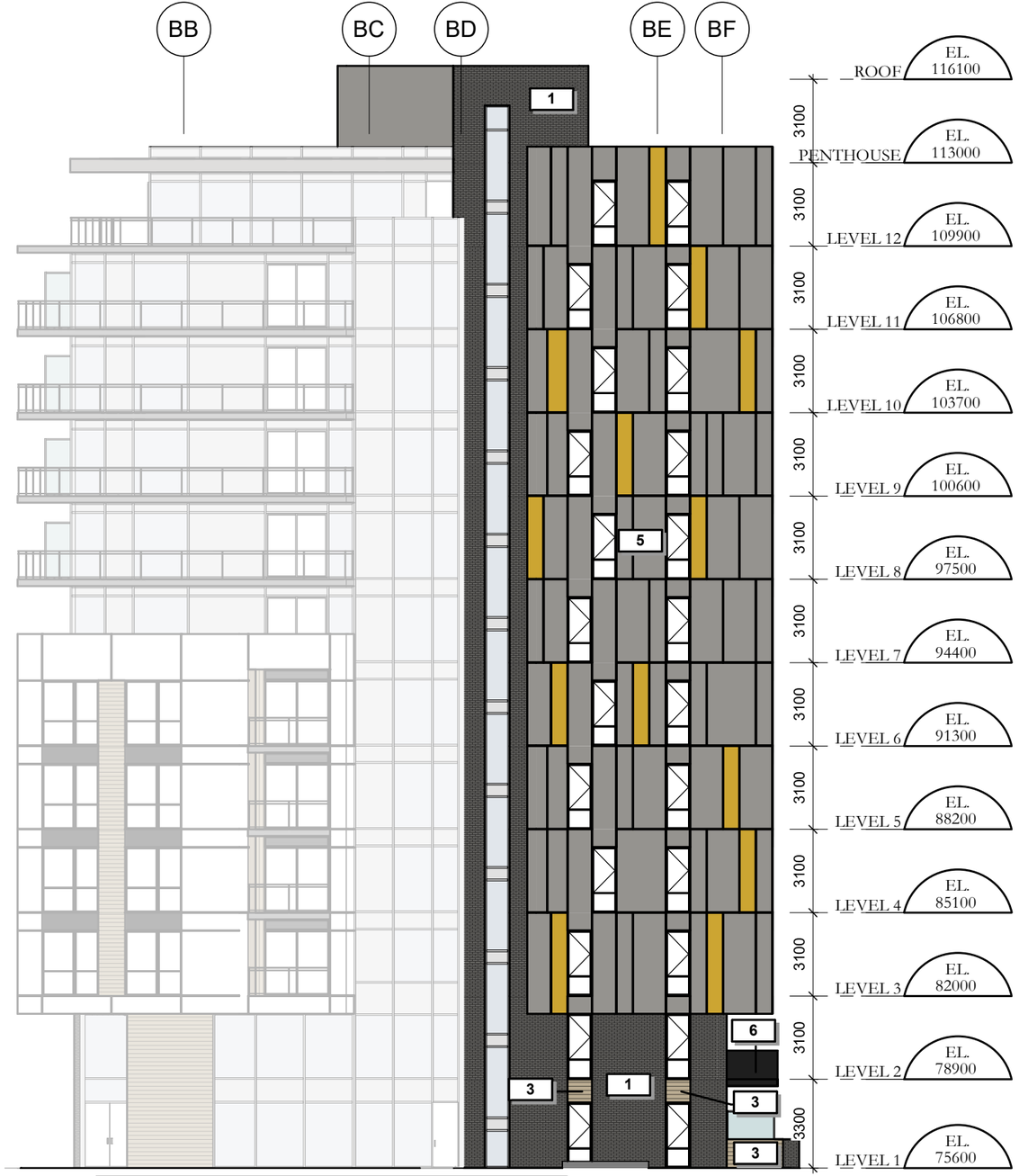
STATISTICS OF THE % MATÉRIALS

BUILDING AREA :	591 m²
OPENING AREA :	430 m² (72.76%)
MASONRY :	10 m² (1.69%)
ALUMINIUM :	108 m² (18.27%)
OTHER :	43 m² (7.28%)





STATISTICS OF THE % MATÉRIALS

BUILDING AREA :	460 m²
OPENING AREA :	90 m² (19.57%)
MASONRY :	103 m² (22.39%)
ALUMINIUM :	267 m² (58.04%)

TOWER B - FRONT ELEVATIONS (FOREST STREET)

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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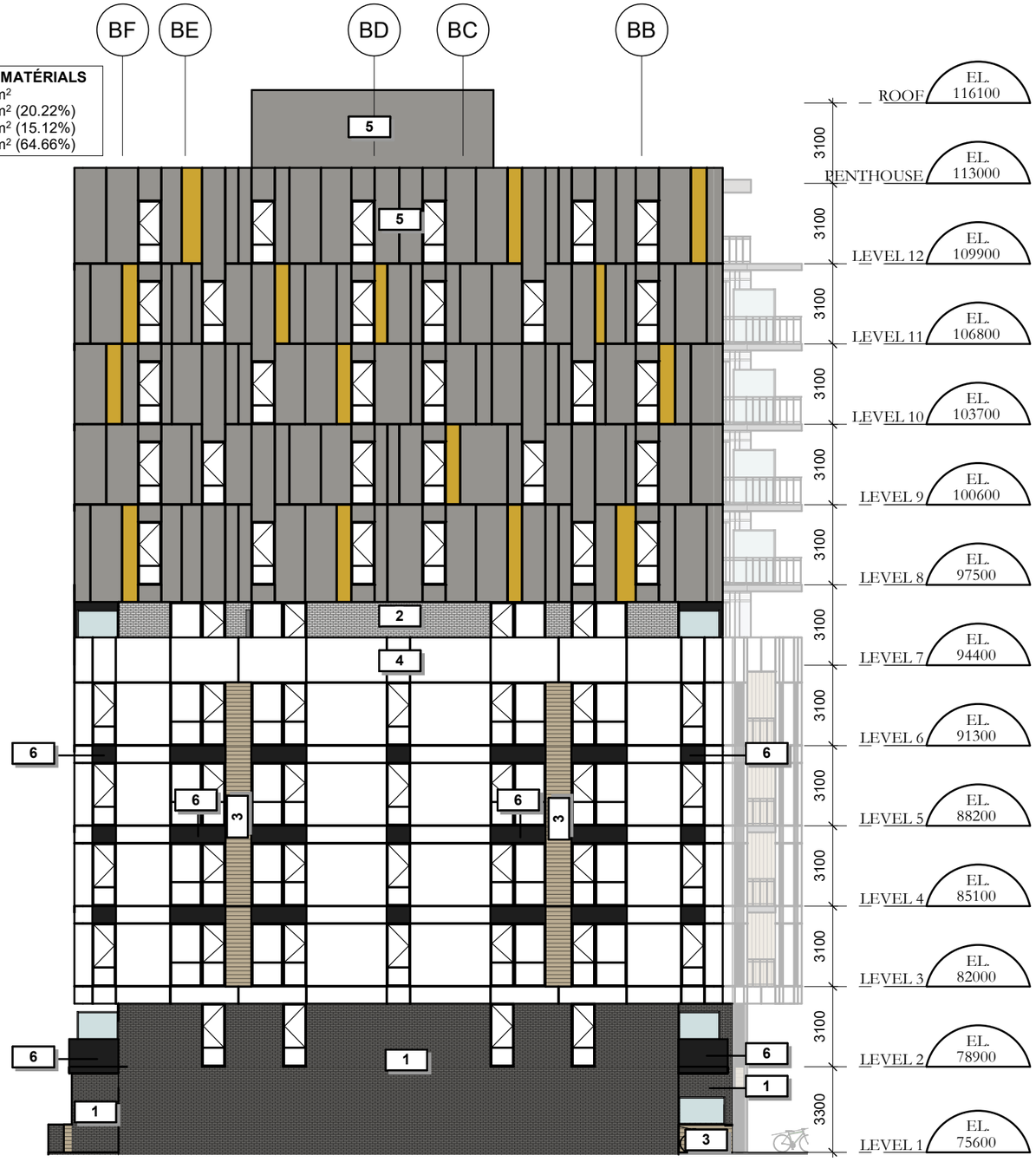
STATISTICS OF THE % MATÉRIALS
BUILDING AREA : 979 m²
OPENING AREA : 198 m² (20.22%)
MASONRY : 148 m² (15.12%)
ALUMINIUM : 633 m² (64.66%)



TOWER B - BACK ELEVATION

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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1 : 200

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TOWER B - LEFT SIDE ELEVATION

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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STATISTICS OF THE % MATÉRIALS

BUILDING AREA :	532 m²
OPENING AREA :	314 m² (59.02%)
MASONRY :	38 m² (7.14%)
ALUMINIUM :	160 m² (30.08%)
OTHER :	20 m² (3.76%)

TOWER B - LEFT SIDE ELEVATION

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

LAPALME RHEAULT ARCHITECTES + ASSOCIÉS

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PMA ARCHITECTES

GROUPE Heafey GROUP

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TOWER B - RIGHT SIDE ELEVATION (BOND STREET)

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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1 : 200

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TOWER B - SECTION

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

1 : 300

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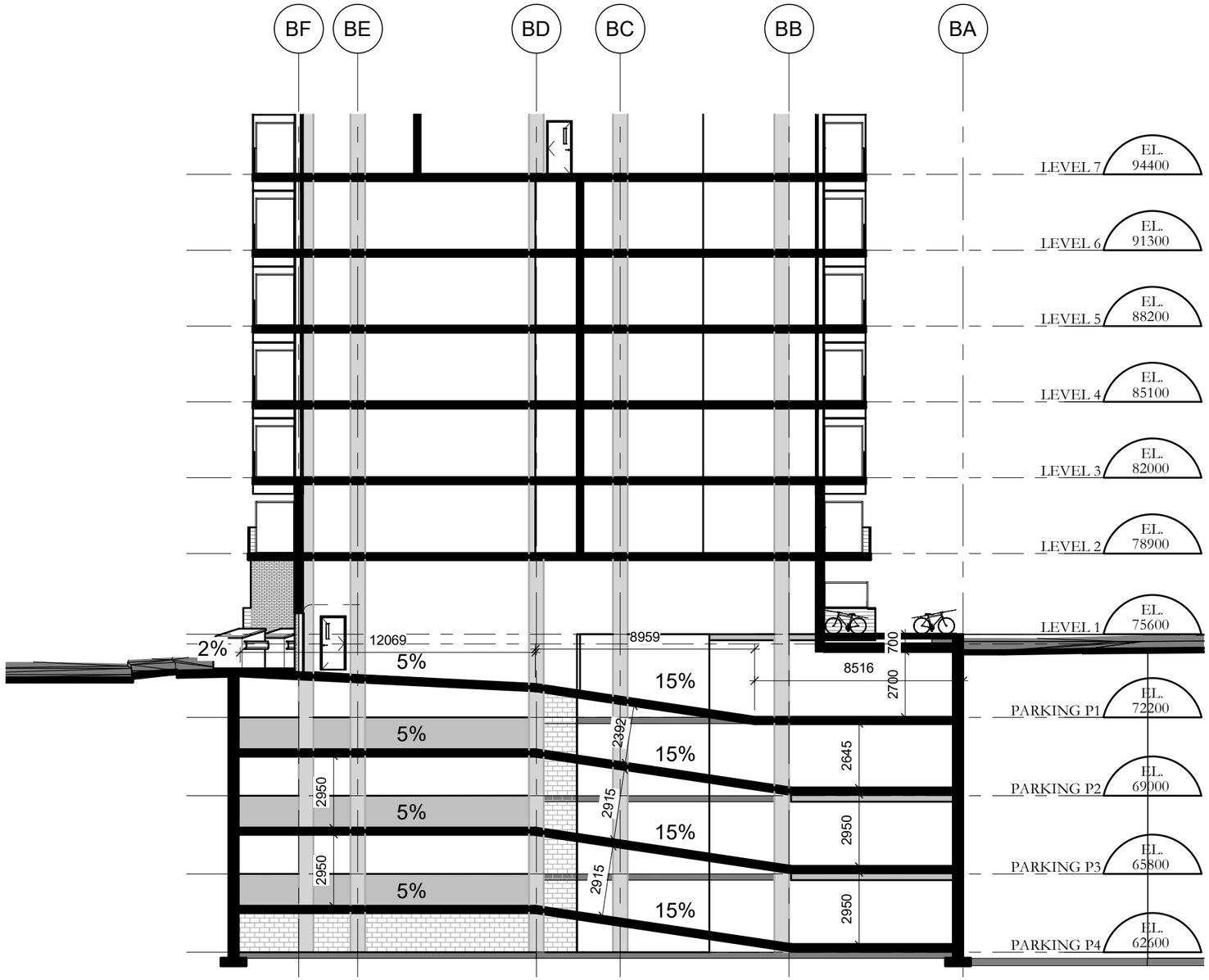

TOWER B - RAMP SECTION

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

1 : 200

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TOWER B - RAMP SECTIONS

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
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GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

SHADOWS STUDY

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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TOWER A & B - AERIAL VIEW FROM FOREST STREET

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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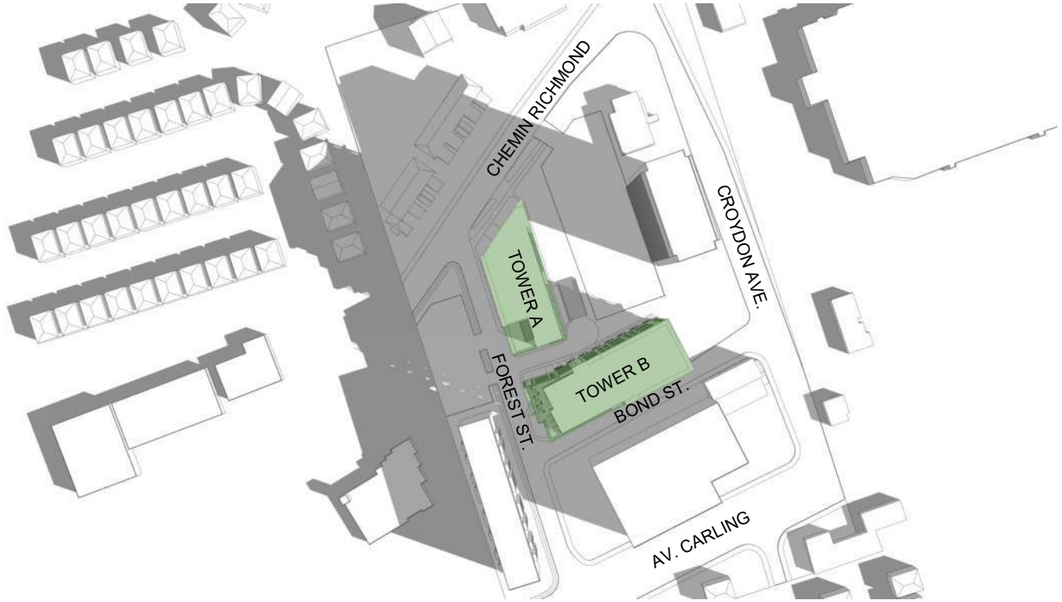
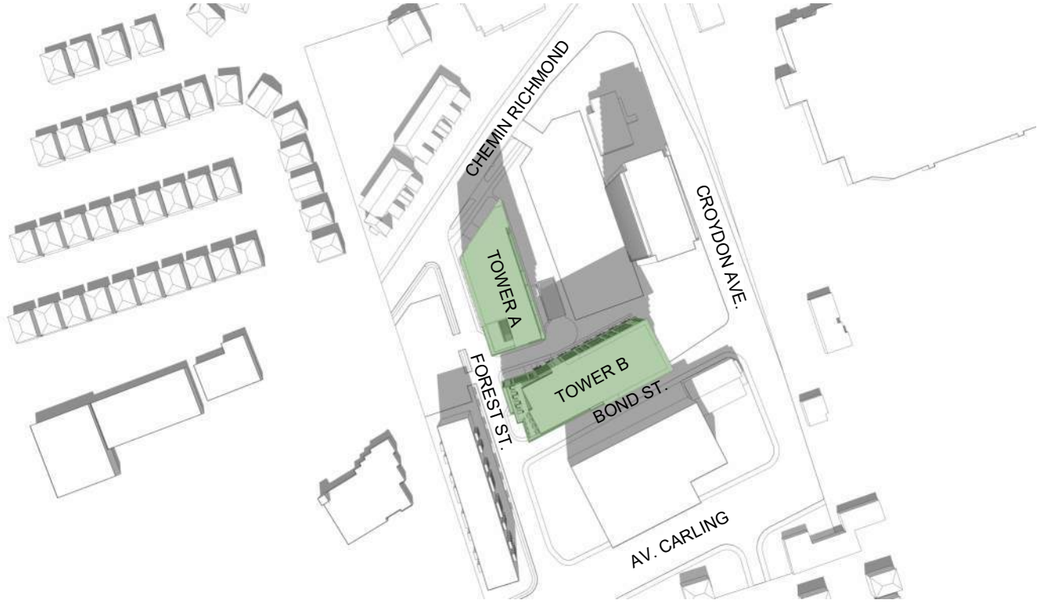
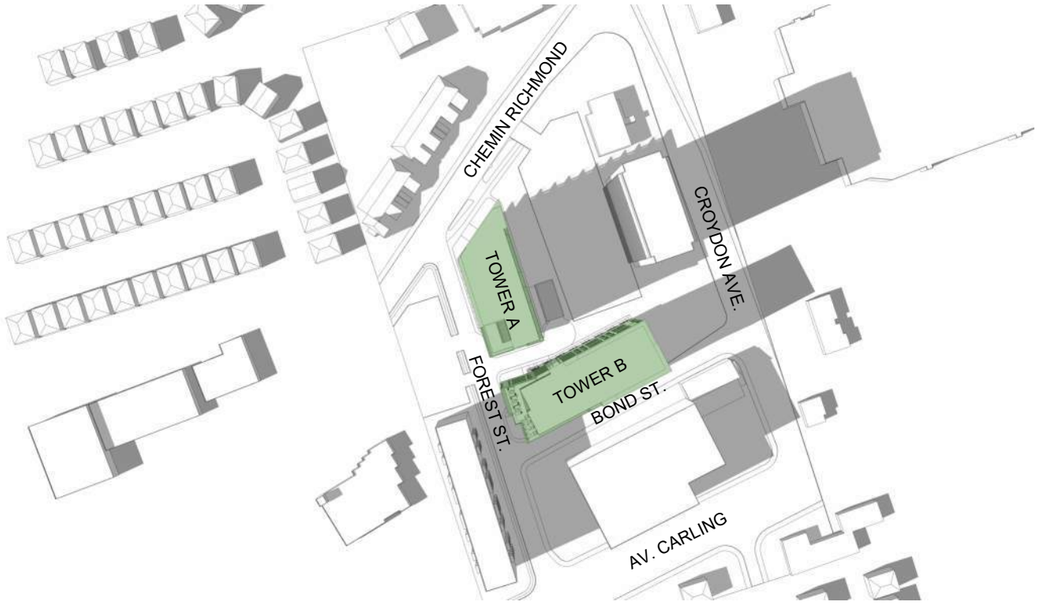
REVISION 05	2023-10-18



MARCH 21 AT 8H00



MARCH 21 AT 12H00



MARCH 21 AT 16H00

SHADOWING STUDY

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

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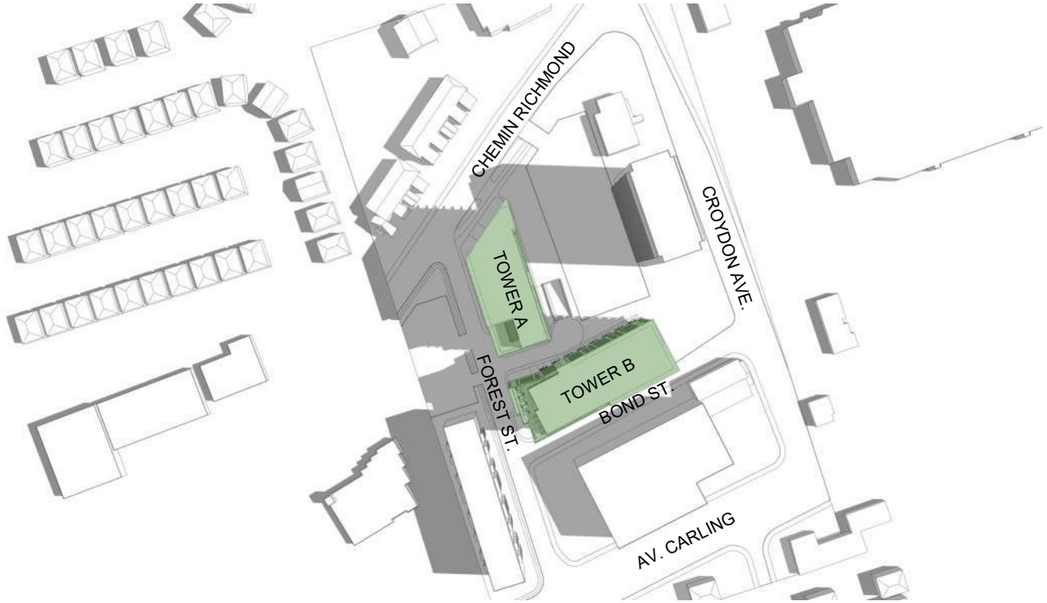
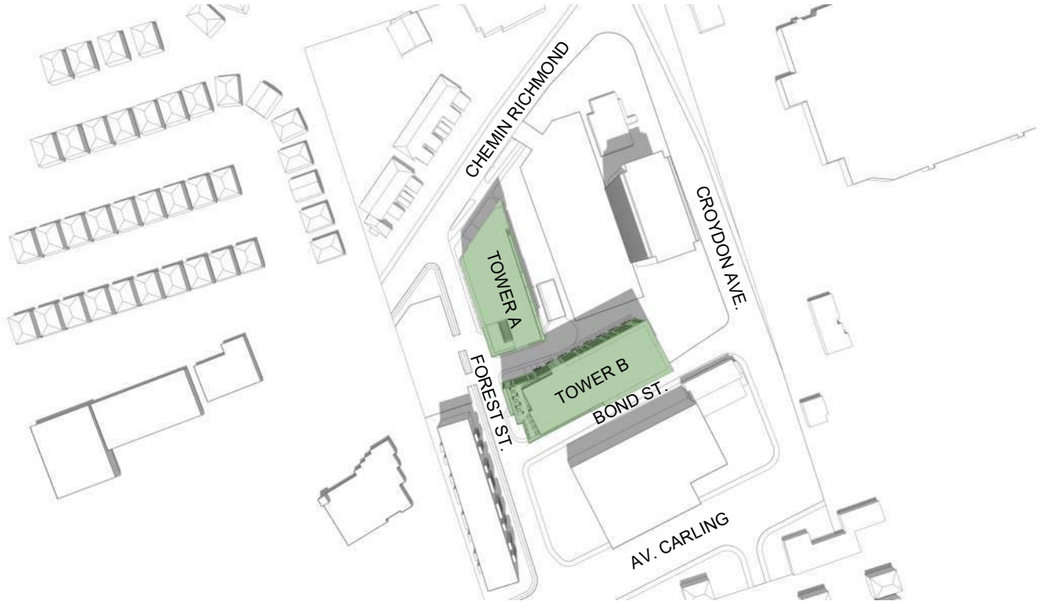
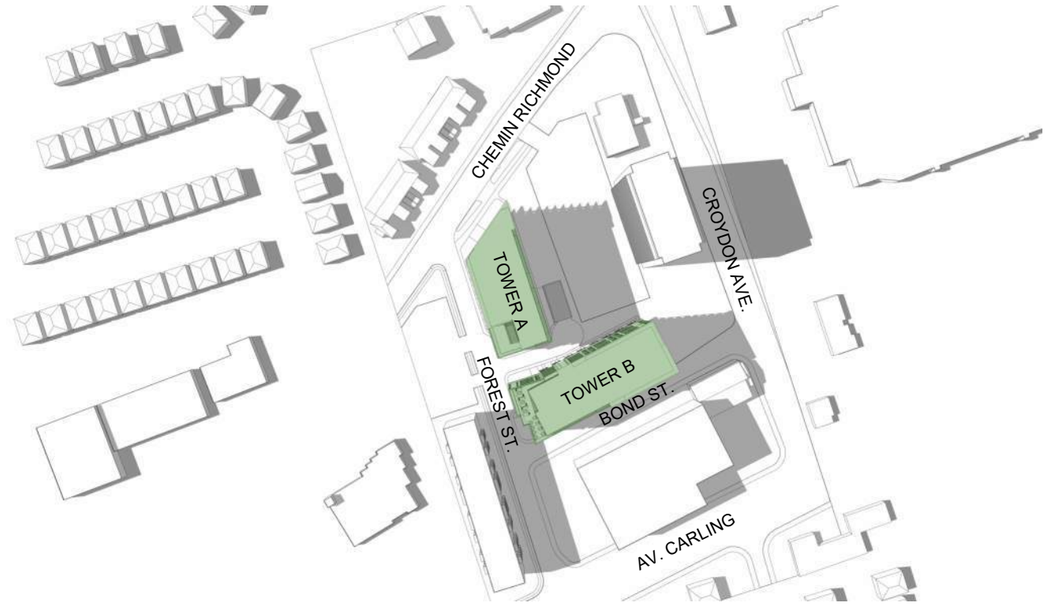
REVISION 05	2023-10-18



JUNE 21 AT 8H00



JUNE 21 AT 12H00



JUNE 21 AT 16H00

LAPALME RHEAULT
ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

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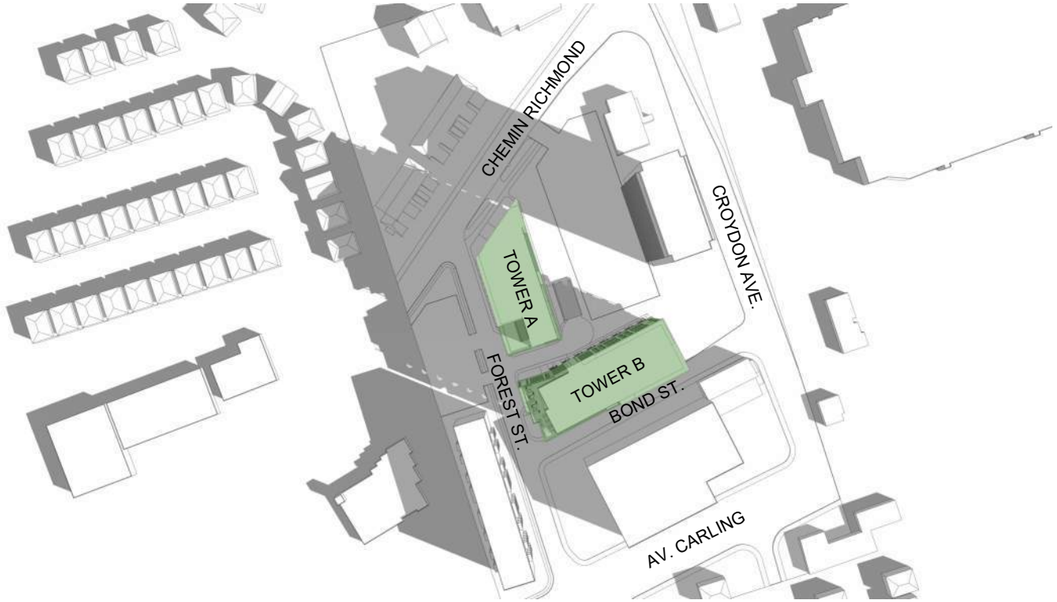
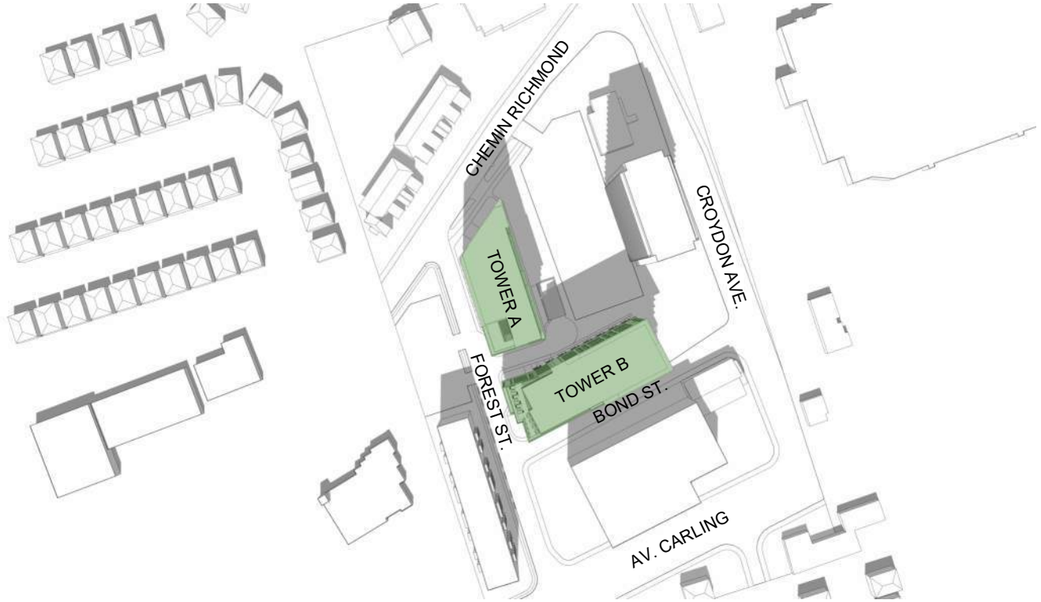
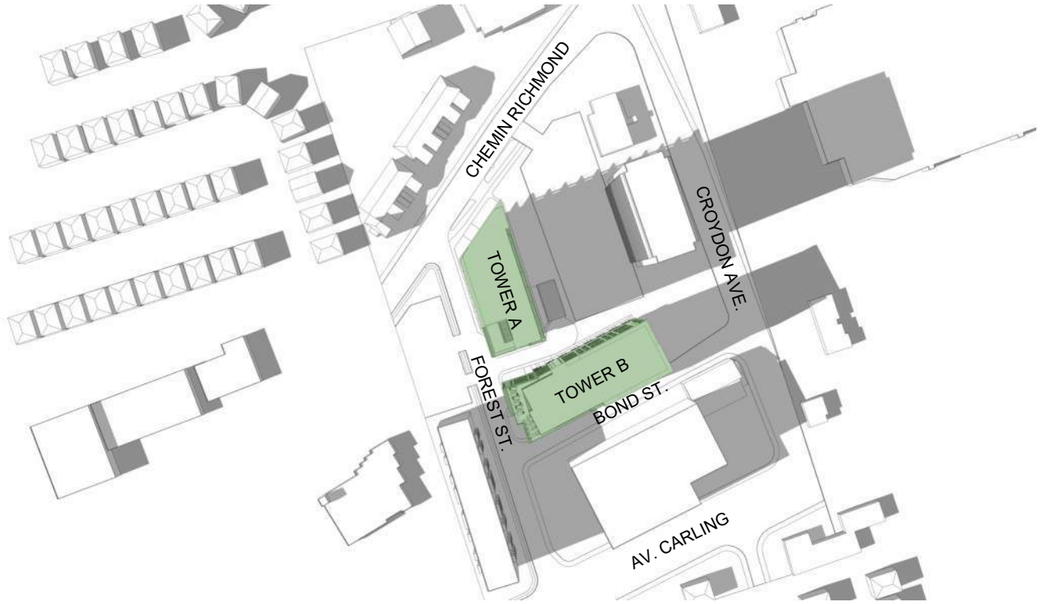


SEPTEMBER 21 AT 8H00



SEPTEMBER 21 AT 12H00



SEPTEMBER 21 AT 16H00

SHADOWING STUDY

LAPALME RHEAULT
ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

D07-12-20-0041 1887-2303-19

REVISION 00	2020-04-06
REVISION 01	2020-12-18
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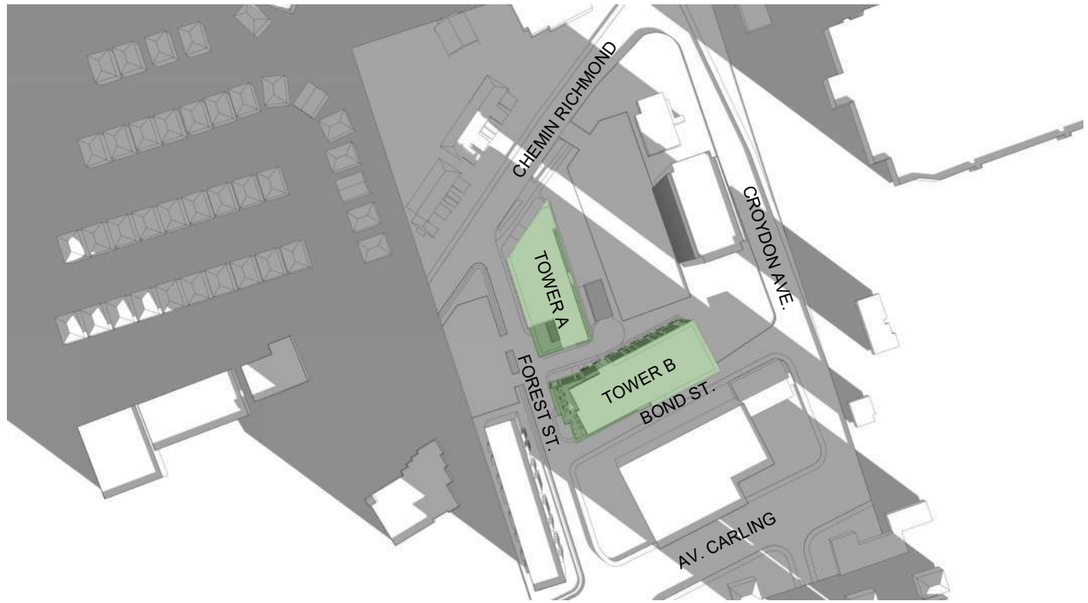
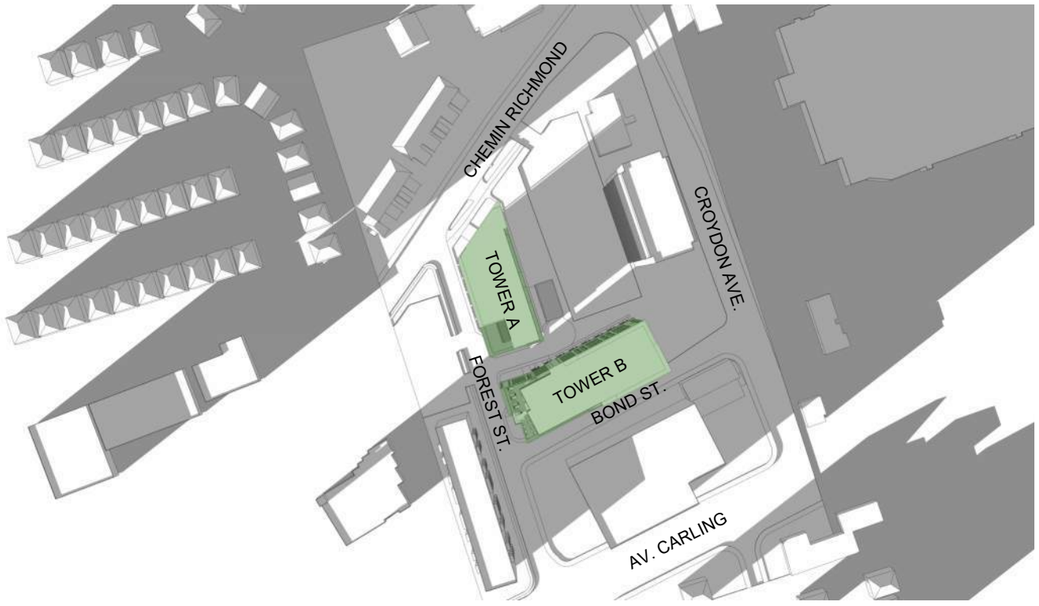
REVISION 04	2023-08-03
REVISION 05	2023-10-18



DECEMBER 21 AT 8H00

DECEMBER 21 AT 12H00



DECEMBER 21 AT 15H00

SHADOWING STUDY

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

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GROUPE HEAFEY

RICHMOND ROAD & FOREST STREET

PROJECT RENDERINGS

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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TOWER A - RICHMOND ROAD ELEVATION

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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REVISION 05	2023-10-18

TOWER A & B - VIEW FROM RICHMOND ROAD

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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Conçu par : Christian Rheault

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TOWER A & B - EAST SIDE VIEW

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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TOWER B - VIEW FROM BOND STREET (PARKING ENTRANCE)

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

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TOWER B - VIEW FROM FOREST AND BOND STREET

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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TOWER A & B - LOBBY ENTRANCE FROM FOREST STREET

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT
ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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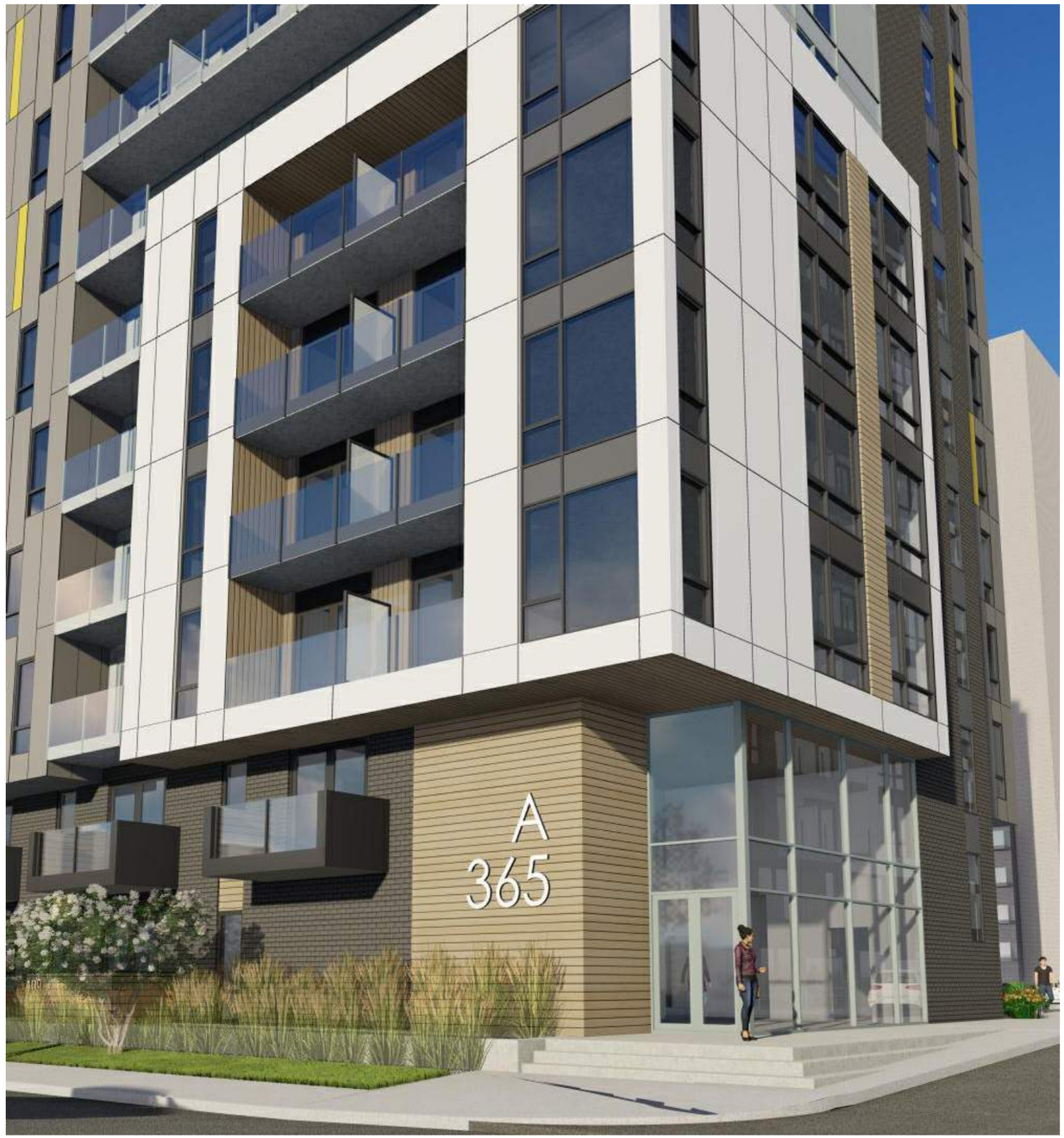

TOWER A - VIEW FROM FOREST STREET LOBBY ENTRANCE

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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TOWER A - VIEW FROM RICHMOND MAIN ENTRANCE

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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Conçu par : Christian Rheault

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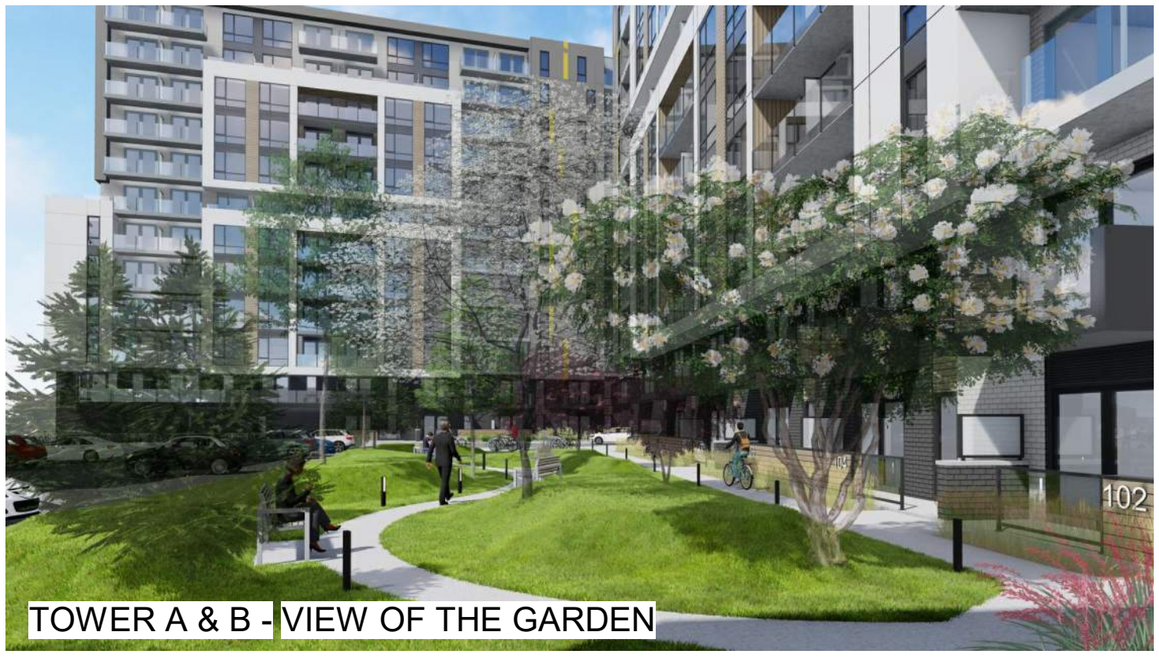
TOWER A - VIEW OF THE COVERED EXTERIOR SPACE

TOWER A - COMMERCIAL VIEW FROM RICHMOND ROAD



TOWER A & B - VIEW OF THE GARDEN

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

Dessiné par : Tanya Nadeau
Conçu par : Christian Rheault

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PMA ARCHITECTES

GROUPE Heafey GROUP

GROUP HEAFEY
365 Forest Street, Ottawa, ON K2B 7Z7

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TOWER A & B - VIEW FROM RICHMOND ROAD AND FOREST STREET (NIGHT)

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

Dessiné par : Tanya Nadeau
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GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT
ARCHITECTES + ASSOCIÉS

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TOWER A - VIEW FROM RICHMOND MAIN ENTRANCE (NIGHT)

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES +ASSOCIÉS

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TOWER A & B - VIEW OF THE GARDEN (NIGHT)

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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TOWER A - COMMERCIAL VIEW FROM RICHMOND ROAD (NIGHT)

GROUP HEAFEY

365 Forest Street, Ottawa, ON K2B 7Z7

LAPALME RHEAULT ARCHITECTES | +ASSOCIÉS

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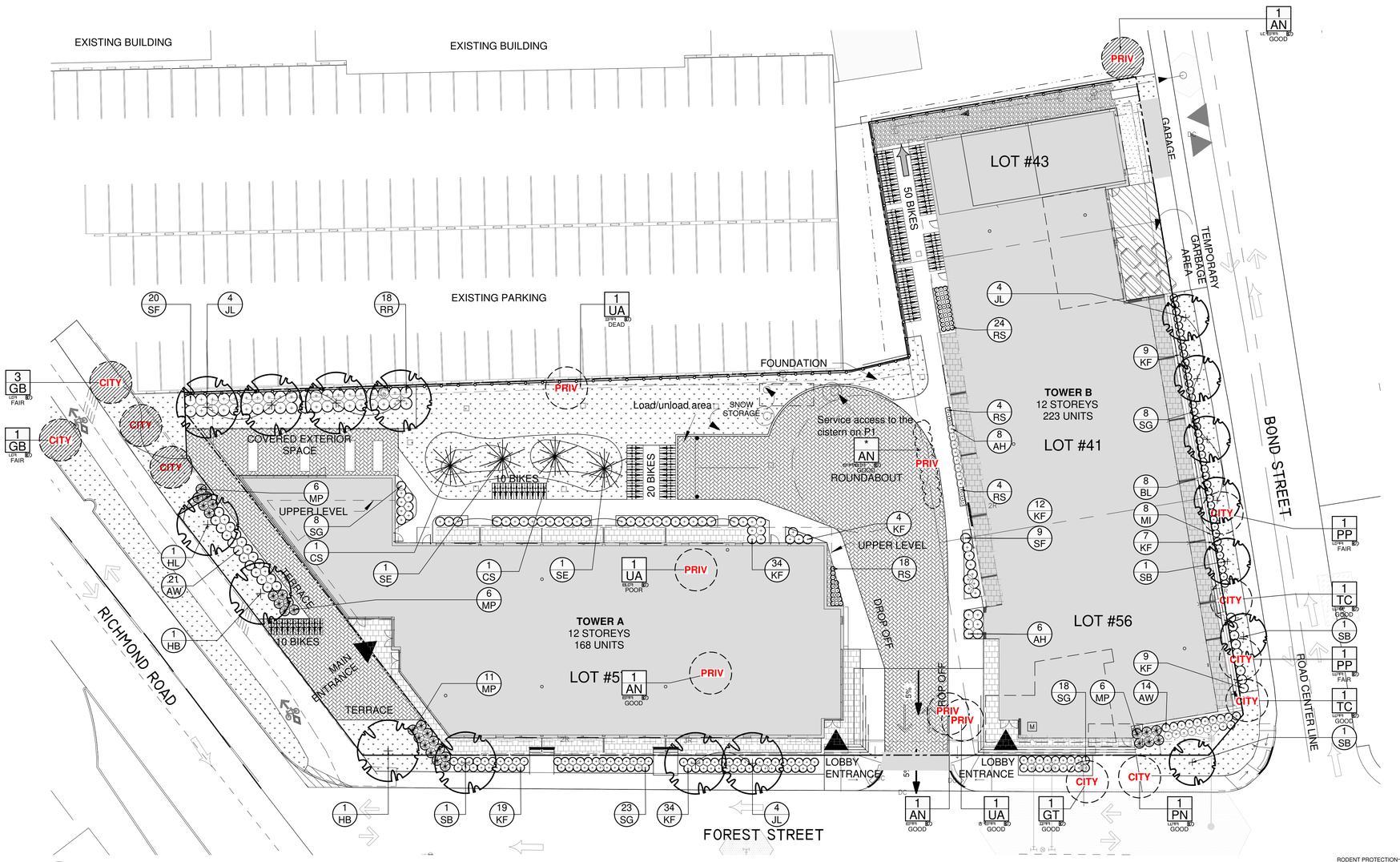


1 L.1 TREE CONSERVATION REPORT & LANDSCAPE PLAN
SCALE 1 : 250

0 2 4 6 8 10m

EXISTING TREE LIST

QTY. KEY SIZE

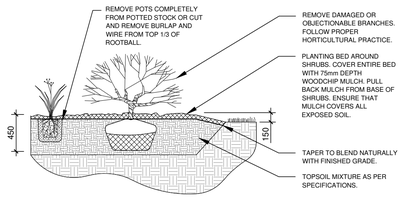
KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION	REMARKS
TREES						
AN	*	Acer negundo	Manitoba Maple	100-150mm DBH	Good	See Plan
GT	1	Gleditsia triacanthos	Honey Locust	200mm DBH	Good	See Plan
PN	1	Pinus nigra	Austrian Pine	400mm DBH	Good	See Plan
PP	2	Picea pungens 'Glauca'	Colorado Blue Spruce	400-500mm DBH	Fair	See Plan
TC	2	Tilia cordata	Littleleaf Linden	400mm DBH	Fair	See Plan
TO	*	Thuja occidentalis	Eastern White Cedar	50-350mm DBH	Dead-Good	See Plan
UA	2	Ulmus americana	American Elm	100-400mm DBH	Dead-Poor	See Plan

*DENOTES NUMEROUS

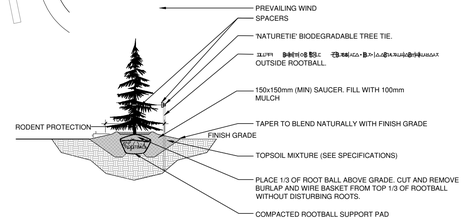
PROPOSED PLANT LIST

QTY. KEY

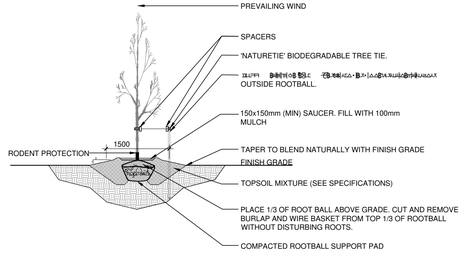
KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION	REMARKS
TREES						
CS	2	Picea pungens	Colorado Spruce	1.8m ht.	B&B	
HB	2	Celtis occidentalis	Hackberry	60mm Ø	B&B	
HL	1	Gleditsia triacanthos	Honey Locust	60mm Ø	B&B	
JL	10	Syringa reticulata	Japanese Tree Lilac	60mm Ø	B&B	Single Leader
SB	4	Amelanchier canadensis	Serviceberry	60mm Ø	B&B	Single Leader
SE	2	Picea omorika	Serbian Spruce	1.8m ht.	B&B	
SHRUBS						
AH	15	Hydrangea arborescens 'Annabelle'	Annabelle Hydrangea	3 gal. pot	Potted	800 mm o.c. See Plan
AW	35	Spiraea japonica 'Anthony Waterer'	Anthony Waterer Spirea	600mm Ht.	Potted	Space 800mm O.C.
MP	29	Pinus mugo 'Pumilio'	Dwarf Mugo Pine	600mm Spr.	Potted	Space 1000mm O.C.
RR	18	Rosa rugosa	Rugosa Rose	800mm Ht.	Potted	Space 1000mm O.C.
SF	29	Sobaria sorbifolia 'Sem'	Sem False Spirea	800mm Ht.	Potted	Space 1000mm O.C.
PERENNIALS / ORNAMENTAL GRASSES						
BL	8	Leymus arenarius	Blue Lyme Grass	250mm Pot.	Potted	Space 800mm O.C.
KF	128	Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass	250mm Pot.	Potted	Space 800mm O.C.
MI	8	Miscanthus sinensis 'Huron Blush'	Huron Blush Grass	250mm Pot.	Potted	Space 400mm O.C.
RS	42	Hemerocallis 'Ruby Stella.'	Ruby Stella D'Oro Daylily	100mm Pot.	Potted	Space 400mm O.C.
SG	57	Panicum virgatum 'Shenandoah'	Shenandoah Switch Grass	250mm Pot.	Potted	Space 800mm O.C.



2 L.1 SHRUB / PERENNIAL / ORNAMENTAL GRASS PLANTING
SCALE: NTS



3 L.1 CONIFEROUS TREE PLANTING
SCALE: NTS



4 L.1 DECIDUOUS TREE PLANTING
SCALE: NTS

LEGEND

- EXISTING CITY OWNED TREE TO REMAIN
- EXISTING CITY OWNED TREE TO BE REMOVED
- EXISTING PRIVATELY OWNED TREE TO REMAIN
- EXISTING PRIVATELY OWNED TREE TO BE REMOVED
- EXISTING GROUP OF PRIVATELY OWNED TREES TO BE REMOVED
- PROPOSED DECIDUOUS TREE
- PROPOSED CONIFEROUS TREE
- PROPOSED SHRUBS / PERENNIALS / ORNAMENTAL GRASSES
- PROPOSED RIVERSTONE MULCH
- PROPOSED SODDED GRASS AREA
- PROPOSED PRECAST CONCRETE PAVERS TYPE 1
- PROPOSED PRECAST CONCRETE PAVERS TYPE 2
- PROPOSED 1.5m Ht. WOOD SCREEN FENCE

CLIENT
GROUPE Heafey GROUP
768 BOUL. ST-JOSEPH, SUITE 100 GATINEAU QC, CANADA J8Y 4B8
(819) 568-1723 bureau@groupeheafey.com

LOCATION PLAN


CONSULTANTS
ARCHITECTS:
LAPALME RHEAULT
ARCHITECTES I ASSOCIÉS
53 BOUL. ST-RAYMOND, SUITE 200-A GATINEAU, QC J8Y 1R8
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SURVEYORS:
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Email: Nepean@aovltd.com

CIVIL ENGINEERS:
exp.
100-2650 QUEENSVIEW DRIVE,
OTTAWA ON, K2B 8H6
Tel.: (613) 688-1899

GENERAL NOTES:
1. IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR OR OFFICIAL TO REPORT ANY ERRORS, OMISSIONS OR DISCREPANCIES ON THIS PLAN WITH ACTUAL SITE CONDITIONS TO THE LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH CONSTRUCTION.

2. THE CONTRACTOR IS TO NOTIFY ALL UTILITY COMPANIES AND AUTHORITIES PRIOR TO ANY EXCAVATION AND ASCERTAIN LOCATIONS OF UNDERGROUND SERVICES.

3. THE CONTRACTOR IS TO REINSTATE ALL AREAS AND ITEMS DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITY.

4. THE CONTRACTOR IS TO COMPLY WITH ALL PERTINENT CODES AND BY-LAWS.

5. THE CONTRACTOR IS TO MAINTAIN A POSITIVE SURFACE RUN-OFF THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD.

6. THE LANDSCAPE ARCHITECT IS NOT RESPONSIBLE FOR SUBSURFACE CONDITIONS.

7. THE CONTRACTOR IS TO IDENTIFY ALL EXISTING TREES TO REMAIN ON SITE WITH THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.

8. THE CONTRACTOR IS TO STAKE THE PROPOSED LOCATION OF ALL PLANT MATERIAL IN CONJUNCTION WITH THE LANDSCAPE ARCHITECT PRIOR TO EXCAVATION.

9. MINIMUM DISTANCES FOR SELECTED DECIDUOUS TREES ARE AS FOLLOWS:
- BUILDING FOUNDATIONS 7.5m
- SIDEWALKS 1.5m
- PUBLIC STREETS 2.5m
- UNDERGROUND INFRASTRUCTURE 2.0m

10. ALL TREES WITHIN 1m OF UNDERGROUND UTILITY TRENCHES ARE TO BE EXCAVATED BY HAND.

11. REMOVE ALL PROTECTIVE WRAPPING FROM TREE TRUNKS AFTER INSTALLATION.

12. STAKING OF TREES SHALL ONLY BE PERFORMED IF NECESSARY.

13. ENSURE THAT MULCH IS PULLED BACK A MIN. DISTANCE OF 75mm FROM BASE OF TREE TRUNK.

No.	Issue	Date MM/DD/YY	DR	CK
12	REVISED PER NEW SITE PLAN	10/20/2023	ML	JL
11	REVISED PER NEW CIVIL DRAWING	31/03/2023	ML	JL
10	REVISED PER NEW SITE PLAN	30/08/2022	ML	JL
9	REVISED PER NEW SITE PLAN	11/09/2021	ML	JL
8	REVISED PER CITY COMMENTS	11/04/2021	ML	JL
7	REVISED PER NEW SITE PLAN	03/23/2021	ML	JL
6	REVISED PER NEW SITE PLAN	02/25/2021	ML	JL
5	REVISED PER CITY COMMENTS	11/24/2020	ML	JL
4	REVISED PER CITY COMMENTS	09/13/2020	ML	JL
3	ISSUED FOR COORDINATION	03/20/2020	ML	JL
2	ISSUED FOR COORDINATION	03/19/2020	ML	JL
1	ISSUED FOR DISCUSSION AND REVIEW	03/11/2020	ML	JL

JAMES B. LENNOX & ASSOCIATES INC.
LANDSCAPE ARCHITECTS
3332 CARLING AVE. OTTAWA, ONTARIO K2H 5A8
Tel. (613) 722-5168 Fax. 1(866) 343-3942

PROJECT
NEW APARTMENT COMPLEX
365 FOREST STREET, OTTAWA ON

DRAWING
TREE CONSERVATION REPORT AND LANDSCAPE PLAN

STAMP
ASSOCIATION OF LANDSCAPE ARCHITECTS JAMES B. LENNOX & ASSOCIATES MEMBER

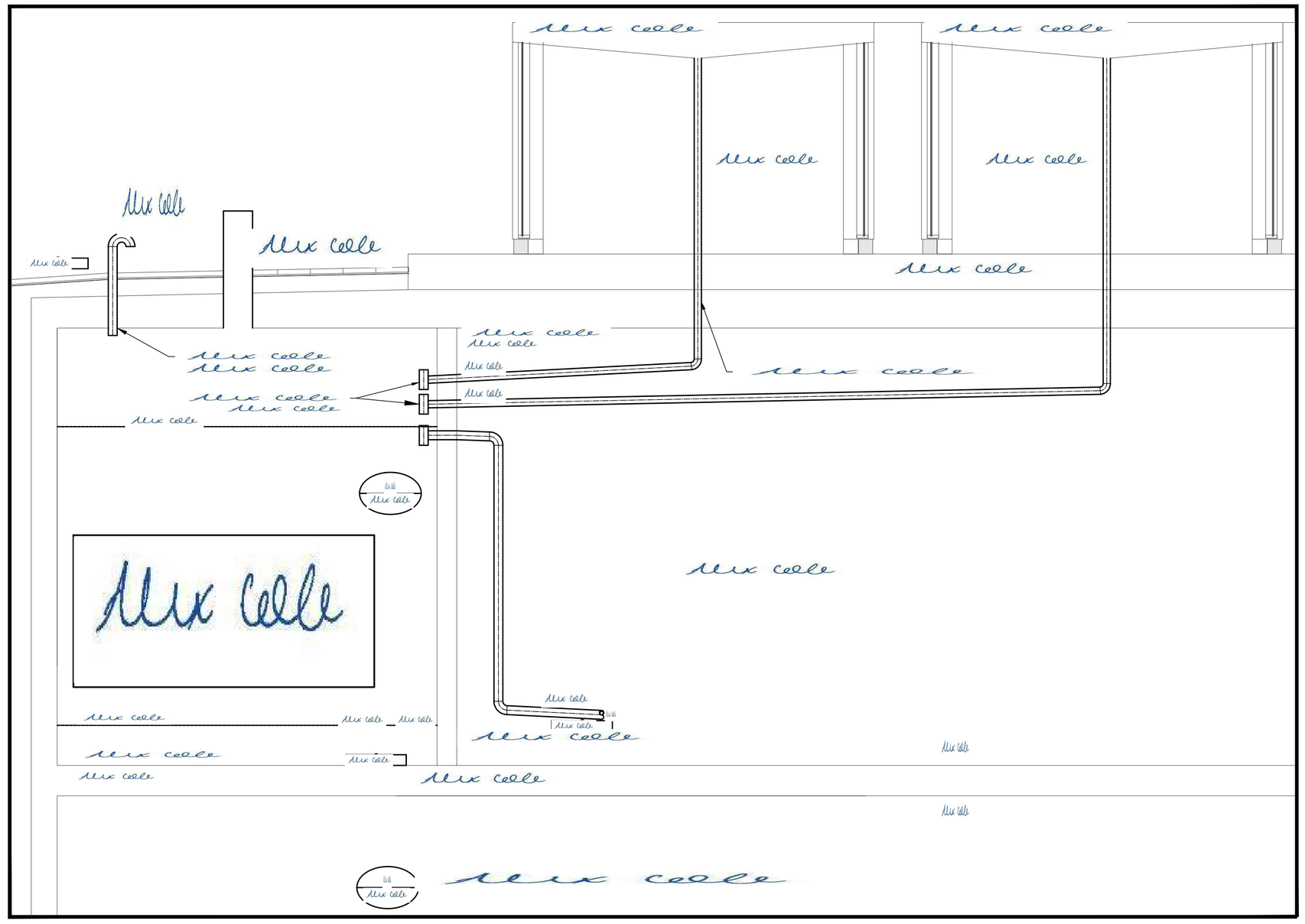
SCALE: AS SHOWN
START DATE: JULY, 2019
PROJECT NO.: 19MIS1969
TRUE NORTH
DRAWING NO.: L.1
PLOT SIZE ARCH-D

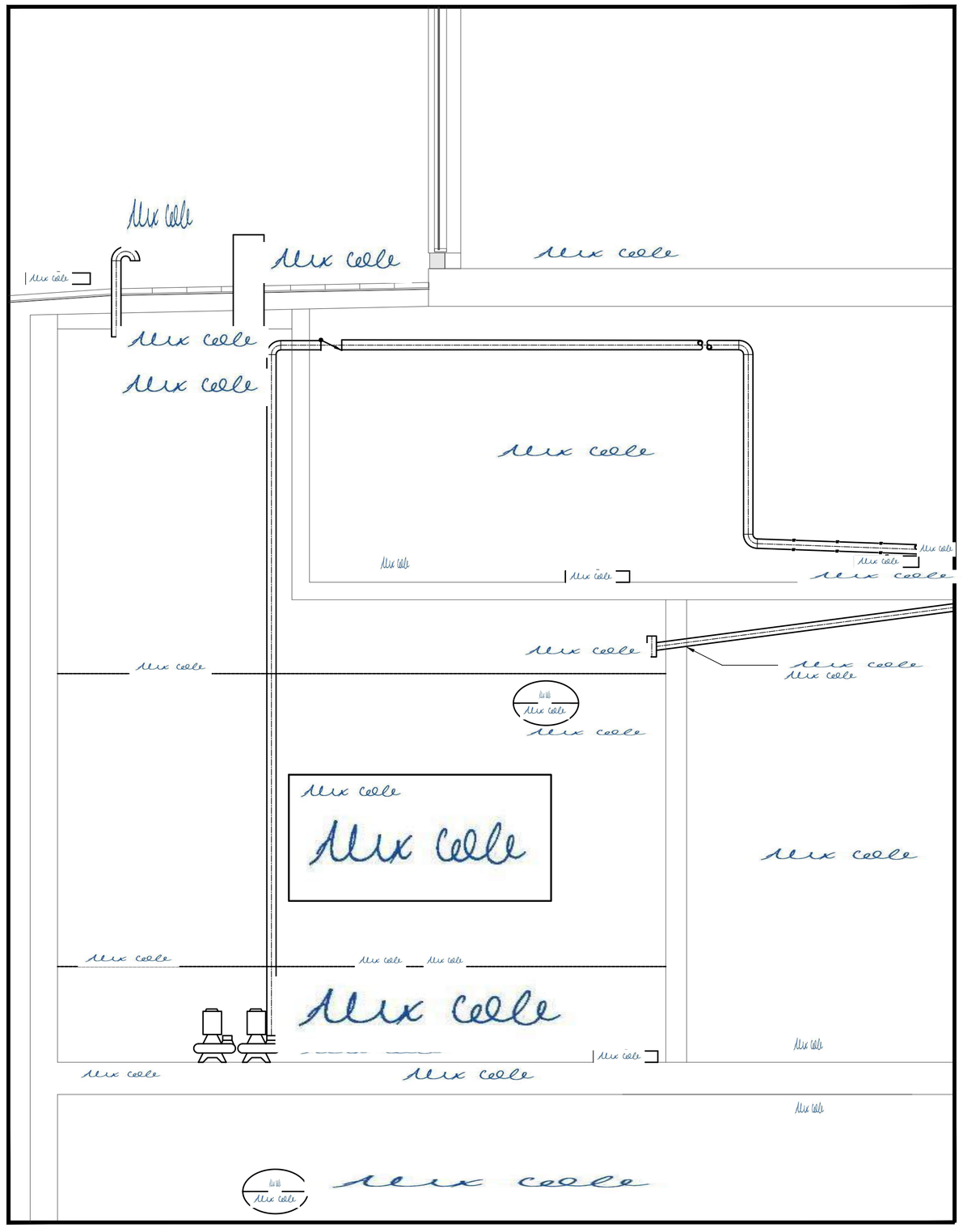
D07-12-20-0041

#18191

Thu, 12 Oct 2023, 15:20

20Q086

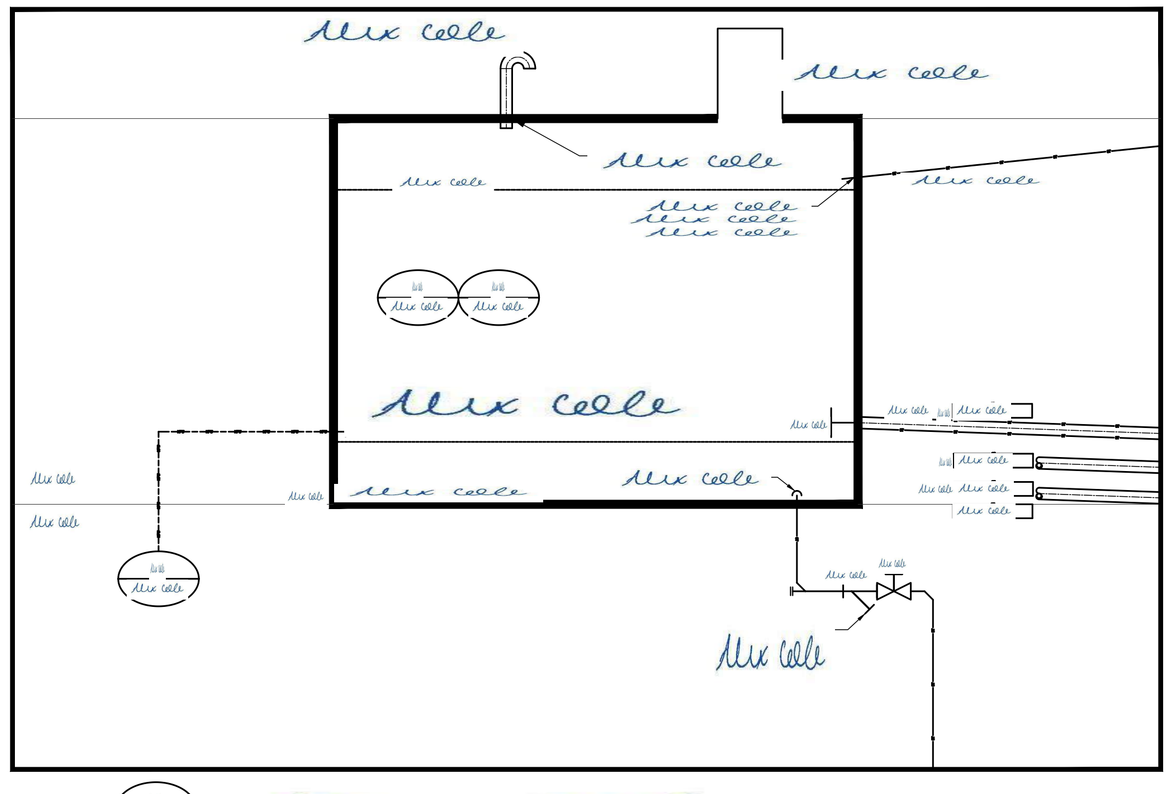


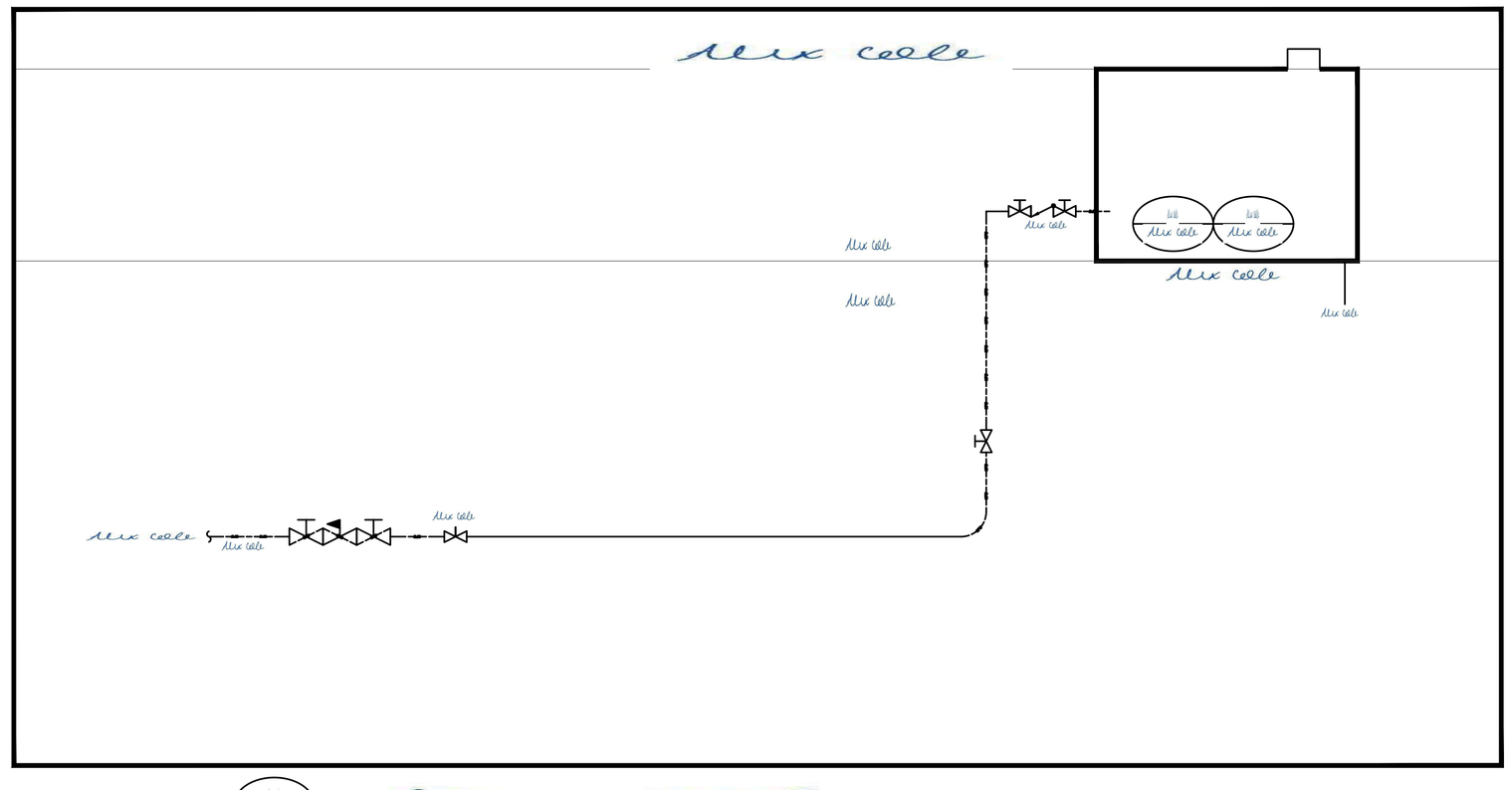


20Q086

CISTERN AND OIL/GRIT SEPARATOR (OGS) SCHEDULE								
TAG	SWM REPORT FIGURE/TABLE	CATCHMENT		RELEASE RATE	STORAGE	10mm STORAGE	TO LEAVING STORM	TO CISTERN
				L/S	CUBIC METER	CUBIC METER		
CIS-01	A-2/D-12 D-13	PST-1 + PST-2		9.2 : 8.5	42.63 : 52.50	29.8	GRAVITY	N/A
CIS-02	A-2/D-14	PST-4		16.5	41.03	0	PUMPED	N/A
			DRAINAGE AREA		TSS REMOVAL	WATER QUAL CAPTURE	OIL/FUEL SPILL RISK	
OGS	A-2/D-11	DRIVEWAY	0.1124 Ha	39.6	97%	>90%	YES	CIS-02

REFERENCE: SITE SERVICING AND STORM WATER MANAGEMENT REPORT 365 FOREST STREET, OTTAWA, ON AS PREPARED BY EXP





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