

Report  
Project: 135883-6.04.01

# ADEQUACY OF PUBLIC SERVICES REPORT 255 RICHMOND ROAD

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Prepared for Y Street Capital C/O Vince Colizza Architects  
by IBI Group  
April 6, 2022

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# 1 INTRODUCTION

IBI Group has been retained by Y Street Capital c/o Vince Colizza Architects to prepare a conceptual servicing of an assembly of parcels of land comprised of 249-255 Richmond Road and 372 Tweedsmuir Ave. to support the proposed Zoning Bylaw Amendment for the subject parcel.

The subject parcel is approximately 0.21 ha and is bounded by Tweedsmuir Ave to the east, and Richmond Road to the south, as well as existing commercial lands to the west and residential lands to the north. Refer to **Figure 1** in **Appendix A** for site location.

The proposed development consists of one mixed use multi-storey building consisting of 87 residential units, retail on the first floor fronting Richmond Road, and underground parking to support the proposed building. A copy of the proposed Site Plan, prepared by Vince Colizza Architects is included in **Appendix A**. The plan illustrates the building occupying most of the parcel and vehicular access to the site is provided from Tweedsmuir Ave.

This report reviews whether the existing municipal water, sanitary and storm infrastructure is capable of servicing the proposed development to support the owner's application for a Zoning Bylaw Amendment. A pre-consultation meeting was held with the City and the meeting notes are included in **Appendix A**.

# 2 WATER DISTRIBUTION

## 2.1 Existing Conditions

The proposed development is located within the City of Ottawa pressure zone 1W. There is a 300 mm diameter watermain along Richmond Road and a 150mm diameter watermain along Tweedsmuir Ave, both mains service the existing buildings within the subject parcel. Existing services within the project site will be disconnected and abandoned per City of Ottawa Standards. A survey of the subject parcel was completed by Farley, Smith, Denis Surveying Ltd. and is included in **Appendix B** the survey illustrates the location of the existing water plant adjacent to the site.

## 2.2 Design Criteria

### 2.2.1 Water Demands

The proposed development plan includes 87 residential units, as well as some commercial space on the first floor. Water demands have been calculated for the full development. Per unit population density and consumption rates are taken from Tables 4.1 and 4.2 at the Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- ICI Average Day Demand 2500 l/m<sup>2</sup>/day
- ICI Peak Daily Demand 3750 l/m<sup>2</sup>/day
- ICI Peak Hour Demand 6750 l/m<sup>2</sup>/day
- Residential Average Day Demand 280 l/cap/day
- Residential Peak Daily Demand 700 l/cap/day

- Residential Peak Hour Demand 1540 l/cap/day

A watermain demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

- Average Day 0.70 l/s
- Maximum Day 1.55 l/s
- Peak Hour 3.28 l/s

The watermain demand calculation was forwarded to the city to determine the boundary conditions at the site, copy of the boundary conditions is included in **Appendix B** and summarized below.

	Richmond Connection	Tweedsmuir Connection
Minimum HGL	108.7	108.7
Maximum HGL	114.9	114.9
Max Day + FireFlow (133.3 L/s)	110.0	104.4

### 2.2.2 System Pressures

The 2010 City of Ottawa Water Distribution Guidelines states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

- Minimum Pressure Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi).
- Fire Flow During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
- Maximum Pressure Maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code the maximum pressure should not exceed 552 kPa (80 psi) in occupied areas. Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

### 2.2.3 Fire Flow Rate

The Fire Underwriters Survey (FUS) method of calculating fire flow requirements is to be used in accordance with the Ottawa Design Guidelines – Water Distribution. Results of the analysis provides a maximum fire flow rate of 8,000 l/min or 133.3l/s is required which is used in the hydraulic analysis. A copy of the FUS calculations are included in **Appendix B**.

## 2.3 Conceptual Water Plan

A conceptual servicing plan **Figure 2.1** in **Appendix B** illustrates the conceptual layout of the water services to support the proposed development. Two proposed 150mm diameter water

services will connect the building to the municipal system. It is proposed to provide a connection to both Tweedsmuir and Richmond mains for redundancy purposes. Two existing fire hydrants are expected to provide fire flow coverage for the site, as can be seen in **Figure 2.2** in **Appendix B**. For the purposes of this report, assuming a minimal loss within the service connection the pressures within the site can be estimated as follows:

Minimum Pressure (Peak Hour) – The minimum peak hour pressure on the site can be estimated as HGL 108.7m – meter elevation (assumed to be 1m above level P1) 63.06m = 45.64m or 447.46 kPa which exceeds the minimum requirement of 276 kPa. The pressure on the top floor can be estimated as 108.7m – 92.58m = 16.12m or 158.1 KPa which is below the minimum of 276 kPa and will require a water pump.

Fire Flow – On Richmond Rd, the max day plus fire flow can be estimated as HGL 110.0 – ground floor 67.47 = 42.53m or 417.2 KPa which exceeds the minimum of 140kPa. On Tweedsmuir Ave, the max day plus fire flow can be estimated as HGL 104.4 – 67.47 = 36.93m or 362.3 KPa which also exceeds the minimum of 140kPa.

Max HGL (High Pressure Check) – The high-pressure check can be estimated as HGL 114.9 – lowest level) 55.66 = 59.24m or 580.8 KPa which exceeds the maximum of 552 kPa, therefore a pressure reducing valve is required.

The above results indicate the municipal infrastructure can support the proposed development.

## 3 WASTEWATER SYSTEM

### 3.1 Existing Conditions

Municipal sanitary sewers abut the property along both Richmond Road and Tweedsmuir Ave, which provide servicing to the existing properties. A survey of the subject parcel was completed by Farley, Smith, Denis Surveying Ltd. and is included in **Appendix B** the survey illustrates the location of the existing sanitary sewers adjacent to the site.

### 3.2 Design Criteria

The sanitary flows for the development are based on the City of Ottawa design criteria which includes, but it not limited to the following criteria:

- Average Residential Flow 280 l/p/d
- Average Population density 1.8 PPU for apartments
- Residential Peaking Factor Harmon Formula [max = 4.0, min. = 2.0]
- Retail Flow 5 l/m<sup>2</sup>/d
- Restaurant Flow 125 l/seat/d
- ICI Peaking factor 1.5 if ICI in contributing area >20%  
1.0 if ICI in contributing area <20%
- Infiltration allowance 0.33 l/s/ha
- Velocities 0.60 m/s min. to 3.0 m/s max.

### 3.3 Conceptual Wastewater Plan

The conceptual servicing plan **Figure 2.1** in **Appendix B** illustrates the conceptual layout of the sanitary sewers to service the development. It is proposed to abandon the existing services for 372 Tweedsmuir, and 249-255 Richmond, in accordance with City of Ottawa specifications. A conceptual sewer design sheet in **Appendix C** confirms the proposed service lateral to service the proposed building has sufficient capacity to accommodate the development.

The proposed development is a mixed use development designed to provide a higher density meet this City objective of more intensification to maximize use of existing infrastructure. The following reviews the impact of increased density on the volume of wastewater to be generated from the proposed development. The existing municipal sanitary sewer system that services these parcels would have been designed based on commercial sewage loading of 50,000l/Ha/d and infiltration allowance of 0.28l/s/Ha, for the 0.21 Ha site would result in an average flow of 0.185l/s.

Avg commercial flow:  $50,000\text{l/Ha/d} \times 0.216\text{Ha} = 10,800\text{l/d} = 0.125\text{ l/s}$

Infiltration allowance:  $0.216\text{Ha} \times 0.28\text{l/s/Ha} = 0.060\text{ l/s}$ ,

Original avg. design flow,  $0.125 + 0.060 = 0.185\text{ l/s}$

The proposed mixed-use development includes residential and commercial uses. Based on the previously noted flow rates of 280 l/p/d for residential, 5 l/m<sup>2</sup>/d for retail, and 125 l/seat/d for the restaurant portion, the average waste water flow plus infiltration allowance calculates to 0.71l/s, as noted below:

Avg pop flow:  $153\text{ (43 units @ 1.4ppu \& 44 units @ 2.1ppu)} \times 280\text{ l/p/d} = 42,840\text{ l/d} = 0.50\text{ l/s}$

plus  $5\text{ l/m}^2\text{/d} \times 407\text{m}^2 = 2,035\text{ l/d} = 0.024\text{ l/s}$ ,

and  $125\text{ l/seat/d} \times 60\text{ seats} = 7500\text{ l/d} = 0.087\text{ l/s}$

avg flow =  $0.50 + 0.024 + 0.087 = 0.611\text{ l/s}$

Infiltration allowance:  $0.216\text{Ha} \times 0.33\text{l/s/Ha} = 0.071\text{ l/s}$ ,

Rezoned avg flow,  $0.611 + 0.071 = 0.682\text{ l/s}$

The proposed redevelopment results in a theoretical increase in average flow to the downstream system of  $0.682 - 0.185 = 0.497\text{ l/s}$ . The sanitary service connection is to an existing 375mm dia sanitary sewer which discharges into the 1500 mm dia West Nepean Collector at the end of Tweedsmuir Ave, and we anticipate that given the size of these sewers that there is ample available capacity to accommodate the proposed redevelopment. The conceptual design will be refined based on stakeholder input and the onsite sewers will be designed to meet City of Ottawa and MOE requirements.

## 4 STORMWATER MANAGEMENT

### 4.1 Existing Conditions

During the Pre-consult with the City no infrastructure concerns were noted, and follow-up memo was provided by the City along with the preconsult meeting notes, the stormwater infrastructure comments are summarized below:

*Available Infrastructure:*

*Tweedsmuir Avenue, Storm: 1200mm Conc (Install 2002)*

*Richmond Road, Storm: 375mm PVC (Install 2004)*

*Stormwater Management:*

*Coefficient (C) of runoff determined as per existing conditions but in no case more than 0.5*

*TC = To be calculated, minimum 10 minutes*

*Any storm events greater than 2 year, up to 100 year, and including 100-year storm event must be detained on site.*

*Foundation drains are to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.*

*Roof drains are to be connected downstream of any incorporated ICD within the SWM system.*

*Stormwater management criteria (Quality Control):*

*Include a section in the SWM report concerning quality control requirements. It is the consultant's responsibility to check with the relevant Conservation Authority for quality control issues and include this information in the SWM report.*

As noted above there is a 1200 mm diameter storm sewer along Tweedsmuir Ave and a 375mm diameter storm sewer along Richmond Road, both sewers service the existing buildings within the subject parcel. Existing services within the project site will be disconnected and abandoned per City of Ottawa Standards. A survey of the subject parcel was completed by Farley, Smith, Denis Surveying Ltd. and is included in **Appendix B** the survey illustrates the location of the existing storm sewers adjacent to the site.

## 4.2 Design Criteria

As noted in the preconsult memo the City of Ottawa requires the site to follow the following design criteria;

- Storm sewers designed to a 2 year level of service
- Site to be designed to limit the 100 year post development flow to a maximum of the 2 year rate with C=0.5.

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

- Design Storm 1:2 year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration 10 minutes
- Runoff Coefficients
  - Landscaped Areas C = 0.25
  - Asphalt/Concrete C = 0.90
  - Roof C = 0.90



- Pipe Velocities 0.80 m/s to 6.0 m/s
- Minimum Pipe Size 250 mm diameter

### 4.3 Proposed Minor System

Using the above-noted criteria, the proposed storm service lateral was sized accordingly. A conceptual storm sewer design sheet and the associated conceptual storm sewer drainage area plan are included in **Appendix D**. The current conceptual servicing drawing in **Appendix B** illustrates the proposed building above grade outline, and where the underground structure extends beyond the above grade building. All of the decks, and roof drains will be routed inside the building via the mechanical plumbing systems and directed to the building cistern located adjacent to the north east corner of the building. Two landscaped areas will be serviced by rear yard catchbasins, these catchbasins will discharge into the building plumbing system and will be directed to the building cistern. The cistern will be equipped with duplex storm pumps to control the flow rate of the storm water runoff from the site directed to the municipal storm sewer system. The pumps will discharge to a storm sewer lateral which will also service as a outlet for the building foundation drain.

### 4.4 Stormwater Management

The subject site will be limited to a release rate established using the criteria described in section 4.2. This will be achieved through a duplex storm pump system set to discharge at the identified release rate. When rainfall events generate flows that are more than the site’s allowable release rate excess volume will be stored within the cistern.

At certain locations within the site, the opportunity to capture runoff is limited due to grading constraints and building geometry. These locations are generally located at the perimeter of the site where it is necessary to tie into public boulevards and adjacent properties, and it is not always feasible to capture stormwater runoff, these “uncontrolled” areas total 0.012 hectares. The runoff from the remaining site will be collected and discharged into the cistern, sized to accommodate inflow during the 1:100-year event with no overflow leaving the site.

The restricted release rate for the 0.218 Ha site as noted previously is limited to the 2yr flow with C=0.5

$$Q_{\text{restricted}} = 2.78 \times C \times i_{2\text{yr}} \times A \text{ where:}$$

$$C = 0.5$$

$$i_{2\text{yr}} = \text{Intensity of 2-year storm event (mm/hr)}$$

$$= 732.951 \times (T_c + 6.119)^{0.810} = 78.61 \text{ mm/hr; where } T_c = 10 \text{ minutes}$$

$$Q_{\text{restricted}} = 23.28 \text{ l/s}$$

As noted above, a portion of the site will be left to discharge to the surrounding boulevards and roadways uncontrolled.

Based on a 1:100 year event, the flow from the three uncontrolled areas can be determined as:

$$Q_{\text{uncontrolled}} = 2.78 \times C \times i_{100\text{yr}} \times A \text{ where:}$$

$$C = \text{Average runoff coefficient of uncontrolled area}$$

$i_{100yr}$  = Intensity of 100-year storm event (mm/hr)  
 =  $1735.688 \times (T_c + 6.014)^{0.820} = 178.56$  mm/hr; where  $T_c = 10$  minutes

$A_1$  = Uncontrolled Area = 0.007 Ha,  $C_{100} = 1.0$ ,  $Q_1 = 3.47$  l/s  
 $A_2$  = Uncontrolled Area = 0.005 Ha,  $C_{100} = 0.25$ ,  $Q_2 = 0.97$  l/s

Therefore, the uncontrolled release rate can be determined as:

$Q_{uncontrolled} = 3.47 + 0.97 = 4.27$  L/s

The maximum allowable release rate from the remainder of the site can then be determined as:

$Q_{max\ allowable} = Q_{restricted} - Q_{uncontrolled}$   
 =  $23.28$  L/s -  $4.27$  L/s = **19.02 L/s**

As noted in the preconsult notes any excess storm water runoff up to the 100-year event is to be stored on-site, in order to not surcharge the downstream municipal storm sewer system. For this site a building cistern will be used, no roof top or surface storage will be employed. A duplex storm pump will be designed to limit discharge from the tank to meet the maximum allowable release rate to the storm sewer system. The Modified Rational Method was used to identify the required storage, the MRM spreadsheet in **Appendix D** identifies the required storage to accommodate the 1:100yr and 1:2yr events. The following table summarizes the on-site storage requirements during both the events.

AREA	TRIBUTARY AREA	AVAILABLE STORAGE (M <sup>3</sup> )	100-YEAR STORM		2-YEAR STORM	
			RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M <sup>3</sup> )	RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M <sup>3</sup> )
Roof & Deck	0.206	70	19.02	60.8	19.02	12.35
Unrestricted	0.012		4.27		3.40	
<b>TOTAL</b>	<b>1.555</b>	<b>70</b>	<b>23.28</b>	<b>60.80</b>	<b>22.42</b>	<b>12.35</b>

In all instances the required storage is met with the building cistern.

As demonstrated above, the proposed site controls will restrict the 100 year storm event runoff from the site into the existing storm sewer system to 23.28 l/s. Restricted stormwater will be contained onsite by the building cistern. Should a more extreme event occur, or should a roof inlet become blocked, scuppers will provide for overflow to the street. In the unlikely event the duplex pump system fails or the storm service lateral is blocked, an emergency overflow from the building cistern to the street will be provided.

The conceptual SWM system noted above illustrates a conceptual layout of the storm service to service the site. The storm sewer and SWM facility size and location are conceptual and at detail design stage will be designed to meet City of Ottawa and MOE requirements for SPA.

## 5 SOURCE CONTROLS

### 5.1 General

The existing municipal storm sewer system collects and conveys storm runoff to the Ottawa river without any end of pipe quality treatment for captured stormwater. On site level or source control management of runoff will be provided. The proposed building configuration consists of a podium covering most of the site and no onsite surface parking or exposed drive lanes are proposed. Surface runoff will be collected and controlled by a cistern and duplex pump system. It is proposed to include a sump within the cistern. The sump will trap pollutants such as sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. The underground garage extends beyond the above grade building at the cistern location allowing for a maintenance hole exterior to the building to facilitate the use of a vacuum truck to clean out any debris/sediment from the tank as needed.

## 6 SEDIMENT AND EROSION CONTROL PLAN

### 6.1 General

During construction, existing conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- Installation of filter cloths on open surface structures such as maintenance holes and catchbasins during building construction.
- Installation of silt fence on the site perimeter, where practical.

The conceptual Erosion and Sedimentation control measures are detailed in **Figure 6.1** in **Appendix E**.

### 6.2 Trench Dewatering

Although little groundwater is expected during construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

### 6.3 Surface Structure Filters

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures should be covered in some fashion to prevent sediment from entering the minor storm sewer system. Until landscaped areas are sodded or until drive isles and parking lots are asphalted and curbed, catchbasins and manholes will be constructed with geotextile filter bags or a geotextile filter fabric located between the structure frame and cover respectively. These will stay in place and be maintained during construction and build until it is appropriate to remove.

## 7 SOILS and GRADING

Paterson Group was retained to prepare a geotechnical investigation for the proposed development. The objectives of the investigation were to prepare a report to:

- Determine the subsoil and groundwater conditions at the site by means of test holes.
- To provide geotechnical recommendations pertaining to design of the proposed development including construction considerations.

The geotechnical report PG5946-1 rev 2, “Geotechnical Investigation 249, 255 Richmond Road and 372 Tweedsmuir Ave.” dated September 24, 2021. A copy of the report has been included with the ZBA application. The report contains recommendations for building construction and site services, which include but are not limited to the following for site servicing:

- At least 300 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe, should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to 99% of the material’s standard Proctor maximum dry density.
- The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material’s SPMDD
- Long term groundwater level is expected to range between 5 to 7m below grade
- No Grade raise restrictions were noted.

MATERIAL	Layer Thickness
• <b>Access Lanes</b>	
• Asphalt Wearing Course (Superpave 12.5)	• 40 mm
• Asphalt Binder Course (Superpave 19.0)	• 50 mm
• Well Graded Granular Base Course (Granular ‘A’)	• 150 mm
• Well Graded Granular Sub-Base Course (Granular ‘B’ Type II)	• 300 mm

A topographic survey of the subject parcel was completed by Farley, Smith, Denis Surveying Ltd. and is included in **Appendix B** the survey illustrates spot elevations within and along the perimeter of the site. The topo survey reveals the high point on the site is where the property lines along Richmond Road and Tweedsmuir Ave. intersect. Along the Richmond Road frontage, the elevation drops 0.28m across the 61m frontage for an average slope of 0.46%, along Tweedsmuir Ave frontage, the elevation drops 2.05m across 57m frontage for an average slope of 3.6%. To take advantage of the drop in elevation along Tweedsmuir the ramp to the underground parking was located along that frontage. To deal with the elevation drop across Tweedsmuir Ave. and provide barrier free access at the various entrances the ground floor Finished Floor elevation drops from 67.47 for the retail entrances along Richmond Road, to 66.47 for the tower lobby, and 66.30 for the low rise entrance. A conceptual grading plan **Figure 7.1** is provided in **Appendix E** and demonstrates how the site can be graded to suit the existing topography. A full grading plan will be provided at detail design stage to support the Site Plan Application.

## 8 RECOMMENDATIONS

Municipal water, wastewater and stormwater systems required to develop the proposed site plan are available. The conceptual servicing provided in this report demonstrate the onsite servicing can be designed in accordance with MOE and City of Ottawa's current level of service requirements. In addition, the report confirms the existing water distribution system and storm sewer system can support the proposed development. It is assumed based on the size of the connecting sewer and proximity of the collector that the existing downstream sanitary sewer system can accommodate the proposed development, City confirmation would be required prior to SPA.

Incorporating into the detail design lot level controls and conveyance controls will result in effective treatment of surface stormwater runoff from the site.

Final detail design will be subject to governmental approval prior to construction, including but not limited to the following:

- SPA: City of Ottawa
- Commence Work Order: City of Ottawa
- ECA (sewers): MOE
- Watermain Approval: City of Ottawa
- Commence Work Order (utilities): City of Ottawa

Report prepared by:



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Director



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# **APPENDIX A**

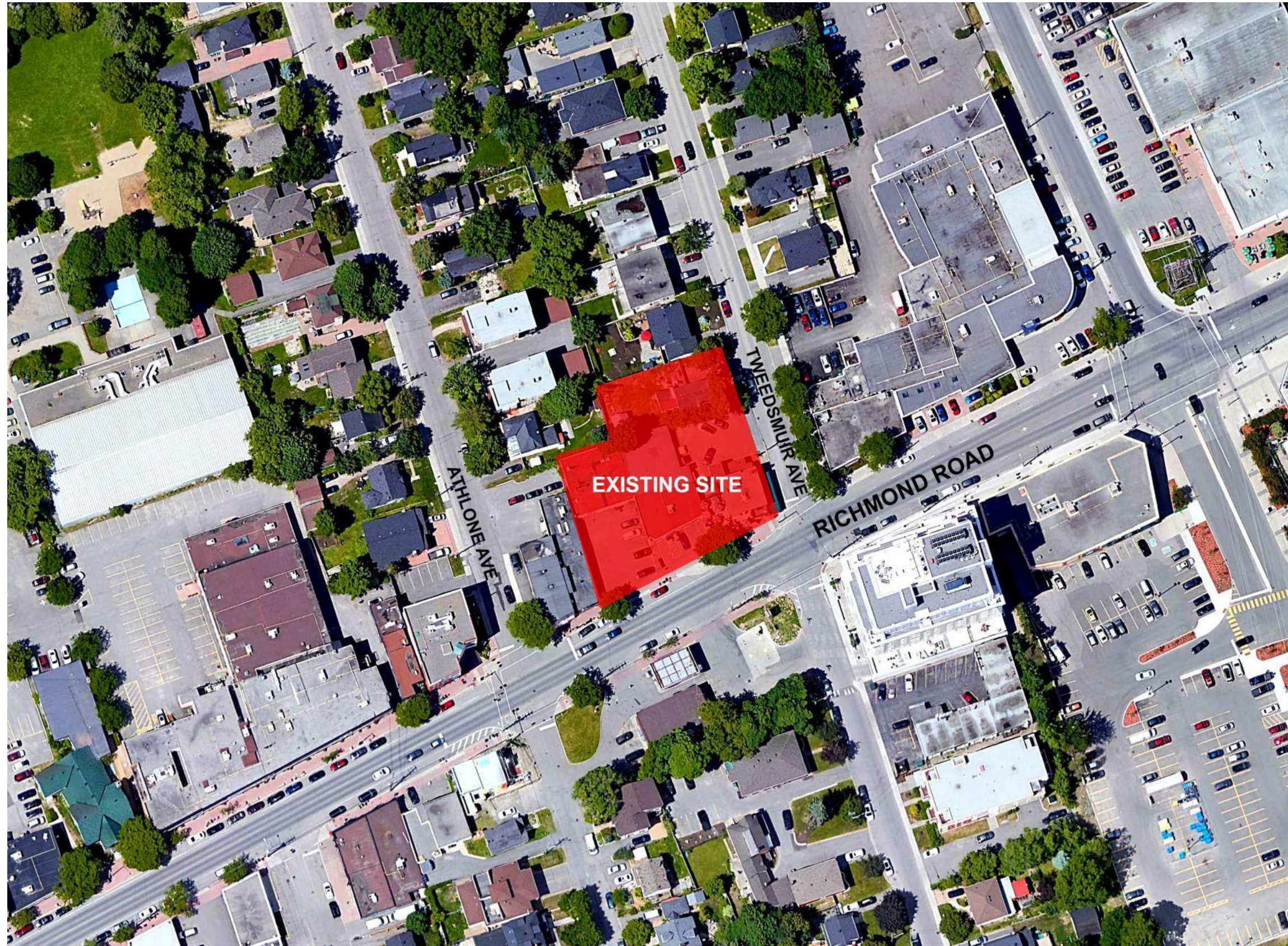
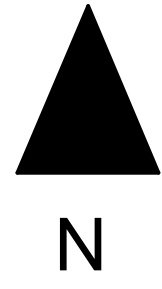
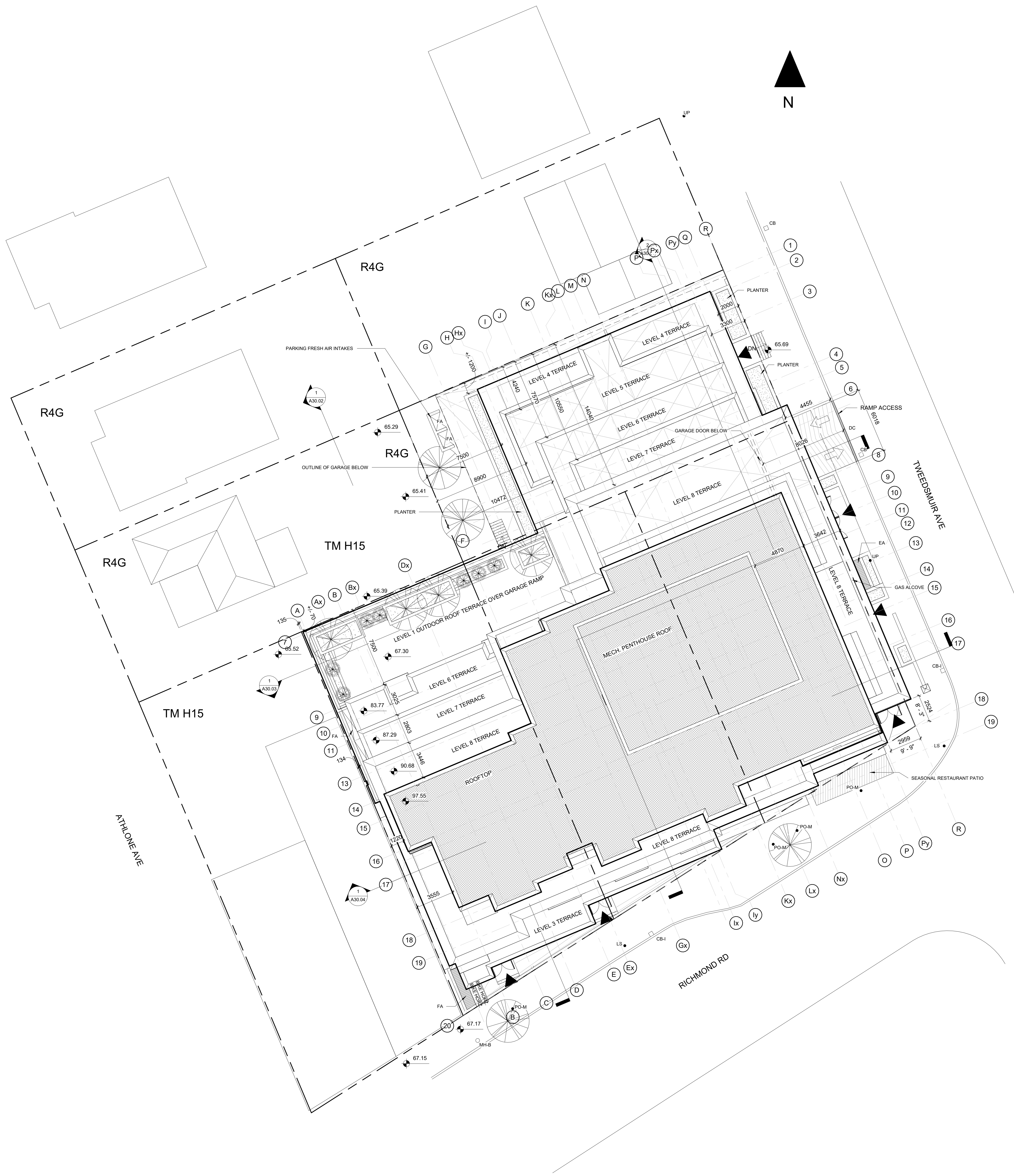


Figure 1

255 Richmond Road



**ZONING INFORMATION**

**ZONE DESIGNATION**

TM H(15)

**ZONING REQUIREMENTS**

NOTE:

MIN. LOT WIDTH REQUIRED:	NO MINIMUM
LOT WIDTH PROVIDED (NORTH PROPERTY LINE):	48.6M
LOT WIDTH PROVIDED (SOUTH PROPERTY LINE):	49.6M
MIN. LOT AREA REQUIRED (M <sup>2</sup> ):	NO MINIMUM
LOT AREA PROVIDED:	2151.2M <sup>2</sup>
MAX BUILDING HEIGHT:	15.0M
BUILDING HEIGHT FROM AVG GRADE:	31.0M
MAX FRONT YARD SETBACK:	2M
FRONT YARD SETBACK (RETAIL) (VARIES AT GRADE):	9M
FRONT YARD SETBACK (RESIDENTIAL, AT L2):	1.1M
MIN. REAR YARD SETBACK:	7.5M
REAR YARD SETBACK (FORMER R4 ZONE):	1.2M
REAR YARD SETBACK (AMENITY AREAS):	0.070M
REAR YARD SETBACK (BUILDING ABOVE GRADE):	7.5M
MAX INTERIOR SIDE YARD SETBACK:	3M
INTERIOR SIDE YARD SETBACK (FORMER R4 ZONE):	7.5M
INTERIOR SIDE YARD SETBACK (TM ZONE):	0.135M
INTERIOR SIDE YARD SETBACK (WEST):	1.2M
MIN. CORNER YARD SETBACK (EAST):	3M
MIN. CORNER YARD SETBACK (ABOVE 15M):	2M
CORNER YARD SETBACK (EAST) PROVIDED:	0M
CORNER YARD SETBACK (ABOVE 15M) PROVIDED:	2.9M
MIN. DRIVEWAY AISLE WIDTH:	6.7M
DRIVEWAY AISLE WIDTH:	9M

**DEVELOPMENT INFORMATION**

**PROPOSED:**

GROUND FLOOR G.F.A. (RETAIL/RESIDENTIAL LOBBY/RAMP):	1661.64M <sup>2</sup>
SECOND FLOOR G.F.A.:	1640.02M <sup>2</sup>
THIRD FLOOR G.F.A.:	1550.32M <sup>2</sup>
FOURTH FLOOR G.F.A.:	1470.34M <sup>2</sup>
FIFTH FLOOR G.F.A.:	1394.36M <sup>2</sup>
SIXTH FLOOR G.F.A.:	1288.20M <sup>2</sup>
SEVENTH FLOOR G.F.A.:	1180.68M <sup>2</sup>
EIGHTH FLOOR G.F.A.:	854.94M <sup>2</sup>
NINTH FLOOR G.F.A.:	854.68M <sup>2</sup>
TOTAL G.F.A. (RETAIL/LOBBY/RAMP):	1661.64M <sup>2</sup>
TOTAL G.F.A. (RESIDENTIAL):	16287.56M <sup>2</sup>
TOTAL BUILDING G.F.A.:	17949.20M <sup>2</sup>
PROPOSED # UNIT (RETAIL):	3 UNITS
PROPOSED # UNITS (RESIDENTIAL):	87 UNITS

**PARKING REQUIREMENTS**

NOTE:

MIN. RESIDENT PARKING STALLS REQUIRED: (STALLS/DWELLING UNIT)	0.5
MIN. VISITOR PARKING STALLS REQUIRED: (STALLS/DWELLING UNIT)	0.1
MIN. REQUIRED PARKING STALLS @ 87 UNITS:	52

**PROPOSED PARKING**

DRIVE AISLE WIDTH (RETAIL AND VISITOR PARKING SHARED):	6.0M
PINCH POINT IN GARAGE:	5.2M
PROPOSED RETAIL PARKING:	1
PROPOSED RESIDENTIAL PARKING (@ 1/UNIT):	87
PROPOSED VISITOR PARKING (@ 0.1/UNIT):	8
SUBTOTAL OF PROPOSED PARKING:	96

**PROPOSED BICYCLE PARKING**

REQUIRED RETAIL BICYCLE PARKING:	2
REQUIRED RESIDENTIAL BICYCLE PARKING (@ 1/UNIT):	87
SUB-TOTAL OF REQUIRED BICYCLE PARKING:	89
PROVIDED RESIDENTIAL BICYCLE PARKING:	2.2/SUITE
BICYCLE PARKING PROVIDED (UNDERGROUND):	194
BICYCLE PARKING PROVIDED (EXTERIOR):	2
BICYCLE PARKING PROVIDED (TOTAL):	196

**AMENITY AREA CALCULATIONS - PROPOSED**

NOTE: CALCULATIONS DONE IN ACCORDANCE WITH CITY OF OTTAWA BY-LAW 2008-250, SECTION 137 - AMENITY AREA

RESIDENTIAL TOTAL REQUIRED AMENITY AREA (MIN.): (87 UNITS @ 6.0M <sup>2</sup> /UNIT)	522.0M <sup>2</sup>
COMMUNAL AREA (MIN.): (50% OF REQ'D TOTAL AMENITY AREA)	261.0M <sup>2</sup>
<b>TOTAL RESIDENTIAL AMENITY AREA REQUIRED:</b>	<b>783.0M<sup>2</sup></b>
TOTAL AMENITY AREA PROVIDED:	
BALCONY AREA (87 UNITS):	944.9M <sup>2</sup>
INDOOR AMENITY AREA (COMMUNAL):	497.3M <sup>2</sup>
OUTDOOR AMENITY AREA (COMMUNAL):	367.9M <sup>2</sup>
<b>TOTAL RESIDENTIAL AMENITY AREA PROVIDED:</b>	<b>1,810.1M<sup>2</sup></b>
LANDSCAPED AREA REQUIRED:	NON MINIMUM
LANDSCAPED AREA PROVIDED:	471.2M <sup>2</sup>
MINIMUM WIDTH OF LANDSCAPE AREA ABUTTING A RESIDENTIAL ZONE:	1.0M WITH FENCE
WIDTH OF LANDSCAPE AREA PROVIDED ABUTTING RESIDENTIAL ZONE (FORMER R4 REAR YARD):	1.2M WITH FENCE
WIDTH OF LANDSCAPE AREA PROVIDED ABUTTING RESIDENTIAL ZONE (FORMER R4 SIDE YARD):	7.5M
WIDTH OF LANDSCAPE AREA PROVIDED ABUTTING RESIDENTIAL ZONE (TM ZONE REAR YARD):	0.070M
WIDTH OF LANDSCAPE AREA PROVIDED ABUTTING RESIDENTIAL ZONE (TM ZONE ABOVE GARAGE RAMP):	7.5M

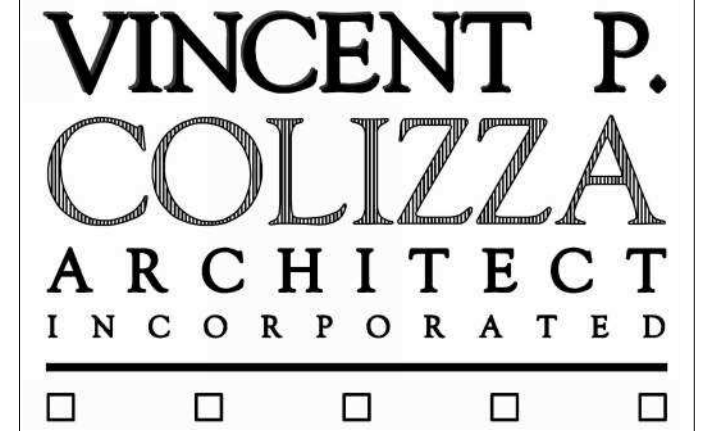
No.	DESCRIPTION	DATE	CHD

**REVISIONS**

CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY OMISSIONS OR DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.

**DO NOT SCALE THE DRAWINGS**

THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL SIGNED BY THE ARCHITECT	
DATE	02/25/22
DRAWN	SH
DATE	02/25/22
CHECKED	VPC
DATE PRINTED	2022-03-04 2:54:02 PM



255 Richmond Road

Ottawa, ON

DWG. TITLE  
Site Plan

SCALE	DWG. NO.
As indicated	A01.00
PROJ. NO.	2219



## 255 Richmond Road – Infrastructure Notes

### Available Infrastructure:

Tweedsmuir Avenue:

Sanitary: 375mm PVC (Install 2002)

Storm: 1200mm Conc (Install 2002)

Water: 150mm PVC (Install 2001)

Richmond Road

Storm: 375mm PVC (Install 2004)

Water: 300mm PVC (Install 2004)

### Water Boundary Conditions:

Will be provided at request of consultant. Requests must include the location of the service and the expected loads required by the proposed development. Please provide the following and submit Fire Flow Calculation Sheet per FUS method with the request:

- Location of service
- Type of development and amount of required fire flow (per FUS method – include FUS calculation sheet with request)
- Average Daily Demand (l/s)
- Maximum Hourly Demand (l/s)
- Maximum Daily Demand (l/s)
- Water Supply Redundancy – Fire Flow:  
Applicant to ensure that a second service with an inline valve chamber be provided where the average daily demand exceeds 50 m<sup>3</sup> / day (0.5787 l/s per day)

Water services larger than 19 mm require a Water Data Card. Please complete card and submit.

### Stormwater Management:

- Coefficient (C) of runoff determined **as per existing conditions** but in no case more than 0.5
- TC = To be calculated, minimum 10 minutes
- Any storm events greater than 2 year, up to 100 year, and including 100-year storm event must be detained on site.
- Foundation drains are to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.
- Roof drains are to be connected downstream of any incorporated ICD within the SWM system.

### Stormwater management criteria (Quality Control)

Include a section in the SWM report concerning quality control requirements. It is the consultant's responsibility to check with the relevant Conservation Authority for quality control issues and include this information in the SWM report.

### Noise Study:

- Noise study required – property fronts an Arterial Road (Richmond Road).

### Phase I and Phase II ESA:

- Phase I ESA is required; Phase II ESA may be required depending on the results of the Phase I ESA. Phase I ESA must include an EcoLog ERIS Report.
- Phase I ESA and Phase II ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

### Required Studies

- Servicing and Stormwater Management Report
- Geotechnical Study
- Phase I ESA
- Phase II ESA (depends on outcome of Phase I)
- Noise Study

### Required Plans

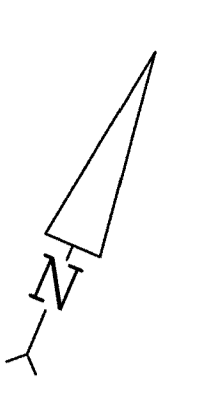
- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan (Can be combined with grading plan)

### Relevant information

1. The Servicing Study Guidelines for Development Applications are available at the following address: <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications>
2. Servicing and site works shall be in accordance with the following documents:
  - ⇒ Ottawa Sewer Design Guidelines (October 2012)
  - ⇒ Ottawa Design Guidelines – Water Distribution (2010)
  - ⇒ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
  - ⇒ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
  - ⇒ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
  - ⇒ City of Ottawa Park and Pathway Development Manual (2012)
  - ⇒ City of Ottawa Accessibility Design Standards (2012)
  - ⇒ Ottawa Standard Tender Documents (latest version)
  - ⇒ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at [InformationCentre@ottawa.ca](mailto:InformationCentre@ottawa.ca) or by phone at (613) 580-2424 x.44455).
4. Any proposed work in utility easements requires written consent of easement owner.

# **APPENDIX B**



TOPOGRAPHIC PLAN OF SURVEY OF  
PART OF LOT 4  
AND ALL OF LOTS 5, 6 & 2  
REGISTERED PLAN 263  
CITY OF OTTAWA  
FARLEY, SMITH & DENIS SURVEYING LTD. 2020

**Metric Note**  
Distances and coordinates on this plan are in metres and can be converted to feet by multiplying by 0.3048.  
Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.99956.

**Bearing Note**  
Bearings are referred to the Eastern limit of Athlone Avenue having a Central Meridian of NAD 83 Zone 9 (76530 West Longitude) NAD 83 (DTG 93).

**Elevation Notes**  
1. Elevations shown are geoidic and are referred to Geoidetic Datum CGVD-1928 (-1978) (FSD File 246-16)  
2. It is the responsibility of the user of this information to verify that the job description agrees with the information shown on this drawing.

**Utility Notes**  
1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for  
2. Only visible surface utilities were located.  
3. Underground utility data derived from City of Ottawa utility sheet references:  
E-04-15, 337898-02 & 136598-02.  
4. Sanitary and storm sewer gages and inverts were compiled from: Field  
5. A field center of City of Ottawa plans, the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

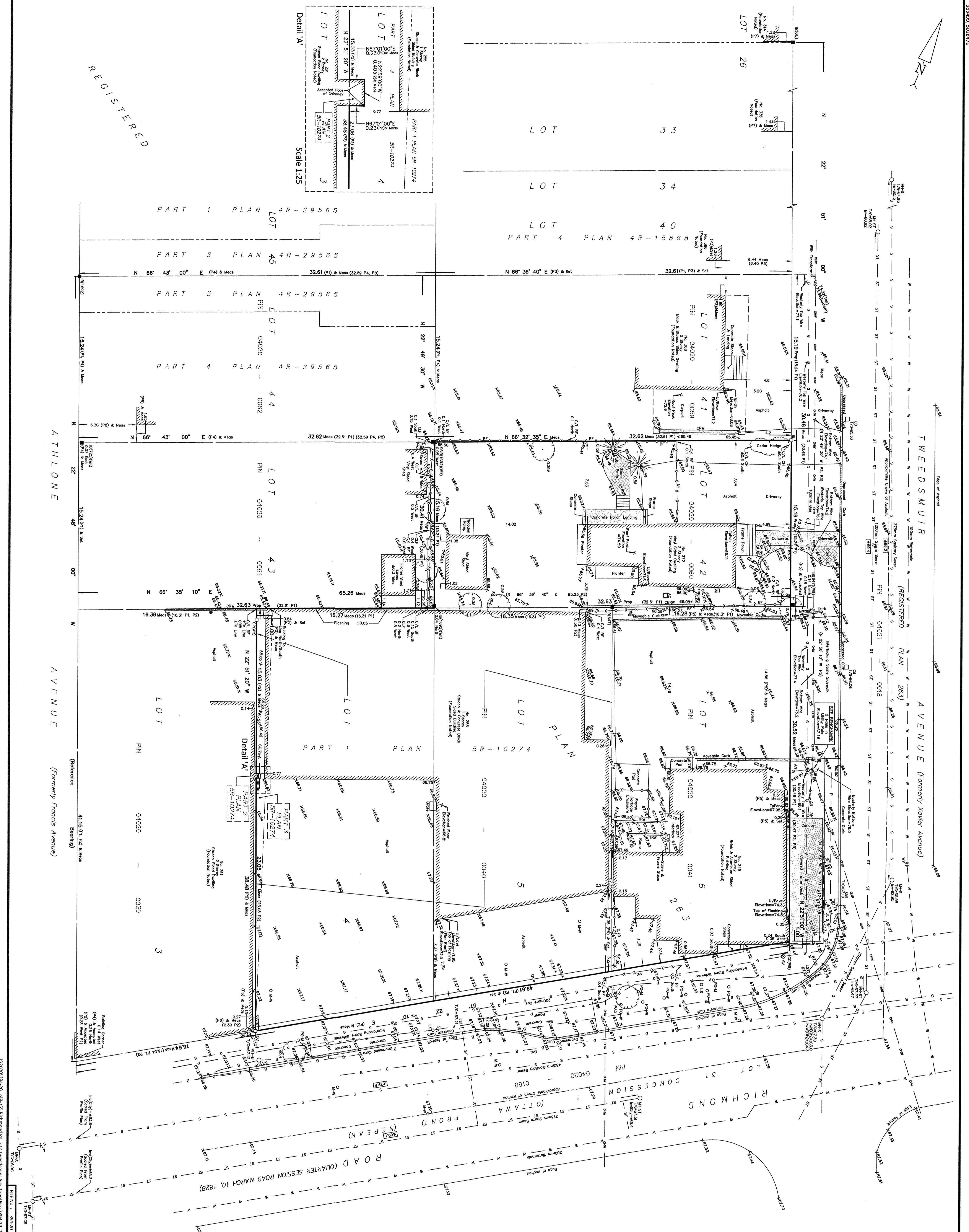
**Notes & Legend**

DITCHES

- Survey Monument Planted
- Standard Iron Round
- Short Standard Iron Bar
- Iron Bar
- CC
- Concrete Cross
- Cut Cross
- Concrete Pin
- Measured
- Registered Plan 263
- Plan SR-10274
- Plan SR-10274
- Plan by (657) dated April 22, 1965
- Plan by (692) dated January 9, 2019 (File No. 272-18)
- Plan by (692) dated August 27, 2014 (File No. 160-14)
- Maintenance Hole (Summit)
- Manhole (Summit)
- Valve Chamber (Watermain)
- Underground Storm Sewer
- Underground Water
- Underground Power
- Overhead Power
- Overhead Wires
- Utility Pole
- Light Standard
- Catch Basin Inlet
- Water Valve
- Water Stand Post
- Gas Meter
- Gas Valve
- A.S.
- O.M.W.
- O.M.W.
- Chimney
- Chain Link Fence
- Board Fence
- Picket Fence
- Timber Retaining Wall
- Invert from City of Ottawa Plans
- Top of Foundation
- Top of Gate
- U/Eave
- T/S
- In (Ch)
- In (C/W)

Confederous Tree

**Scale 1:150**



**SURVEYOR'S CERTIFICATE**

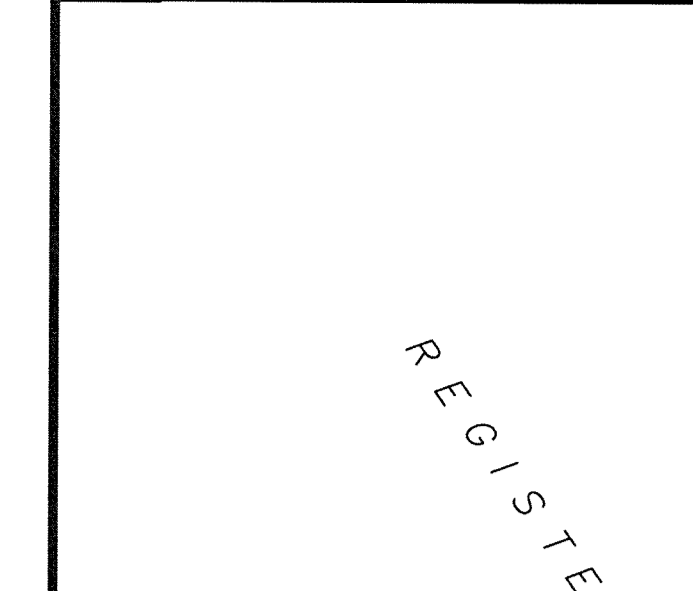
I, the undersigned, being a duly qualified and practicing Surveyor, do hereby certify that the foregoing is a true and correct copy of the plan as shown to me by the client, and that the same has been approved by me.

*Farley, Smith & Denis*  
Farley, Smith & Denis Surveying Ltd.  
Ottawa Land Surveyor

**ASSOCIATION OF ONTARIO LAND SURVEYORS**  
PLAN 2130264  
2130264

**THE HANSKNOT VALDESS REGISTERED PROFESSIONAL ENGINEER**  
In accordance with Regulation 1975, Section 31(3)

190 COLONNADE ROAD OTTAWA, ONTARIO K2E 7J5  
TEL: (613) 777-8226 FAX: (613) 777-1826



REGISTERED  
ATHLONE AVENUE  
(Formerly Francis Avenue)



IBI GROUP  
333 PRESTON STREET  
OTTAWA, ON  
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : 255 Richmond Road  
LOCATION : 255 Richmond Road  
DEVELOPER :

FILE: 135883.6.04  
DATE PRINTED: 17-Mar-22  
DESIGN: SEL  
PAGE : 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND			FIRE DEMAND (l/s)
	UNITS			POP'N	INDTRL (ha.)	INST. (ha.)	COMM. (m <sup>2</sup> )	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total	
	1BD	2BD	3BD														
Site	43	44		153			645	0.49	0.21	0.70	1.24	0.31	1.55	2.72	0.56	3.28	133.3

ASSUMPTIONS					
RESIDENTIAL DENSITIES		AVG. DAILY DEMAND		MAX. HOURLY DEMAND	
1 Bedroom Apartment	1.4 persons/unit	Residential	280 l / cap / day	Residential	1,540 l / cap / day
2 Bedroom Apartment	2.1 persons/unit	Commercial	28,000 l / ha / day	Commercial	75,600 l / ha / day
3 Bedroom Apartment	3.1 persons/unit				
		MAX. DAILY DEMAND		FIRE FLOW	
		Residential	700 l / cap / day	Site	8,000 l / min
		Commercial	42,000 l / ha / day		

## Samantha Labadie

---

**From:** Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>  
**Sent:** Thursday, October 7, 2021 1:41 PM  
**To:** Samantha Labadie  
**Subject:** RE: 255 Richmond - Boundary Conditions Request  
**Attachments:** 255 Richmond Road October 2021.pdf

Hi Samantha,

The following are boundary conditions, HGL, for hydraulic analysis at 255 Richmond Road (zone 1W) assumed to be connected to the 305 mm watermain on Richmond Road and the 152 mm on Tweedsmuir Street (see attached PDF for location).

### Both Connections

Minimum HGL: 108.7 m

Maximum HGL: 114.9 m

Max Day + FF (133.3 L/s): 110.0 m (Richmond) 104.4 m (Tweedsmuir)

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.*

Best Regards,

### **Mohammed Fawzi, E.I.T.**

Project Manager

Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique

Development Review - Central Branch

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1

613.580.2424 ext./poste 20120, [Mohammed.Fawzi@ottawa.ca](mailto:Mohammed.Fawzi@ottawa.ca)

**\*\*Please note that due to the current situation, I am working remotely. Email is currently the best way to contact me\*\***

---

**From:** Fawzi, Mohammed

**Sent:** October 04, 2021 11:25 AM

# Boundary Conditions for 255 Richmond Road





## Fire Flow Requirement from Fire Underwriters Survey

### Building - 9 Storey Residential

Building Floor Area (2 largest adjoining floors plus 50% of floors above up to eight)

Floors 1-2	3,302 m <sup>2</sup>
50% Floors 3-8	<u>3,875</u>
Total	7,177 m <sup>2</sup>

### Fire Flow

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

C	0.6	C =	1.5 wood frame
A	7,177 m <sup>2</sup>		1.0 ordinary
F	11,182 l/min		0.8 non-combustile
Use	11,000 l/min		0.6 fire-resistive

### Occupancy Adjustment

Use	0%	-25% non-combustile
		-15% limited combustile
		0% combustile
		+15% free burning
Adjustment	0 l/min	+25% rapid burning
Fire flow	11,000 l/min	

### Sprinkler Adjustment

Use	-30%	-30% system conforming to NFPA 13
		-50% complete automatic system
Adjustment	-3300 l/min	

### Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	

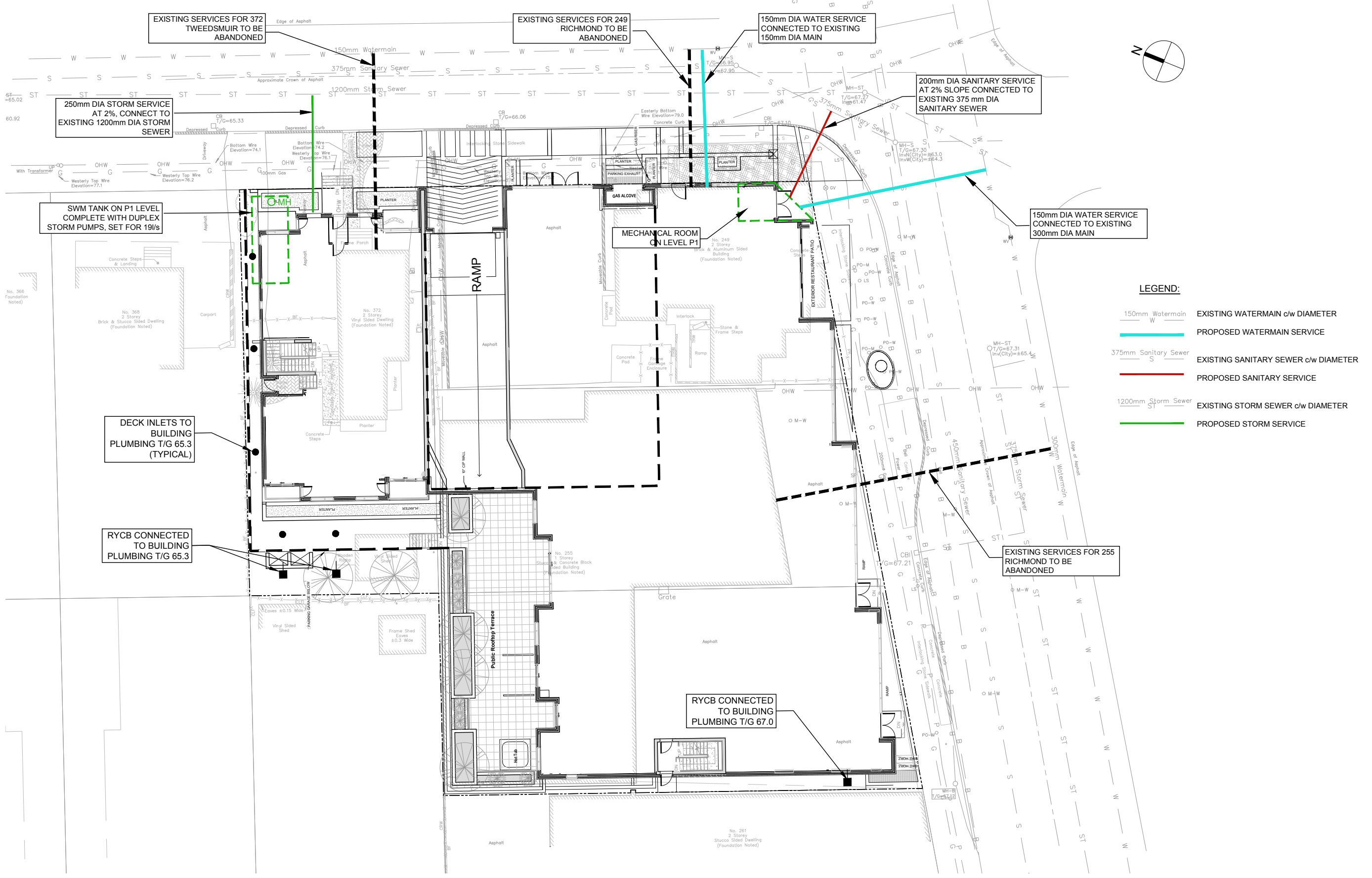
north	2.1	Lower elevation	0%
east	19	Lower elevation	0%
south	31	Lower elevation	0%
west	1.3	Lower elevation	0%

Total 0%

Adjustment - l/min

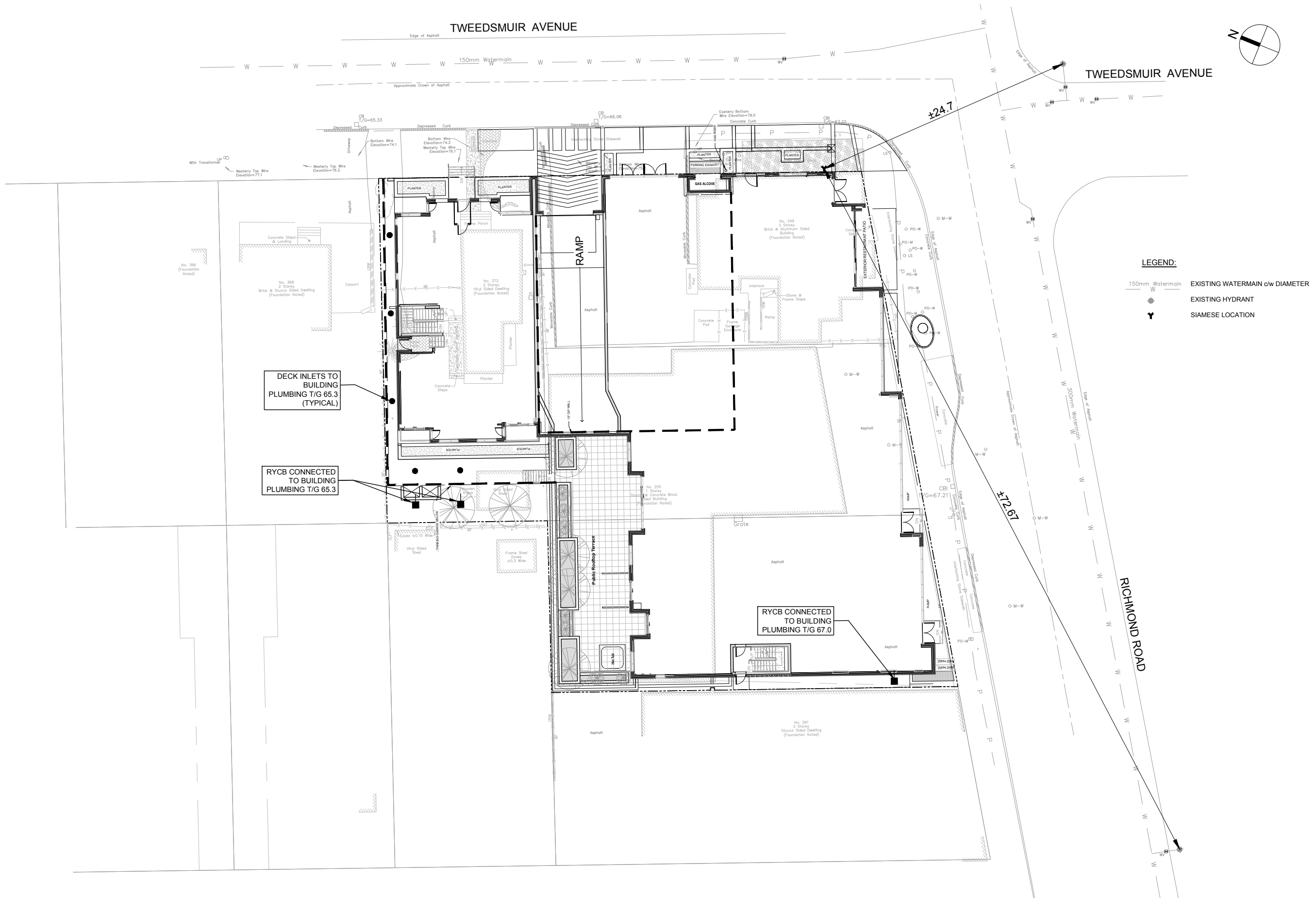
### Required Fire Flow

Total adjustments	<u>(3,300) l/min</u>
Fire flow	7,700 l/min
<b>Use</b>	<b>8,000 l/min</b>
	<b>133.3 l/s</b>



A:\15884\_255\_Richmond\1.2\_Production\1.2\_Design\1.2\_01\_Design\1.2\_01\_Conceptual\_Servicing.dwg Printed At: 4/2/2022 1:53 PM Last Saved By: diana.lant Saved At: Mar. 15. 22

J:\158861\_255\_Richmond\172\_Production\172\_Production\172\_Design\04\_CAD\172\_Lines\Mapcopy Report\Sheet Set\Figure 2.2 HYDRANT COVERAGE.dwg Printed At: 4/7/2022 10:49 AM Last Saved By: salinas Last Saved At: Apr. 6, 22



**LEGEND:**

150mm Watermain ——— EXISTING WATERMAIN c/w DIAMETER

○ PO-W EXISTING HYDRANT

Y SIAMESE LOCATION

DECK INLETS TO BUILDING PLUMBING T/G 65.3 (TYPICAL)

RYCB CONNECTED TO BUILDING PLUMBING T/G 65.3

RYCB CONNECTED TO BUILDING PLUMBING T/G 67.0



Scale  
N.T.S.

Project Title  
255 RICHMOND ROAD

Drawing Title  
HYDRANT COVERAGE

Sheet No.  
Figure 2.2

# **APPENDIX C**

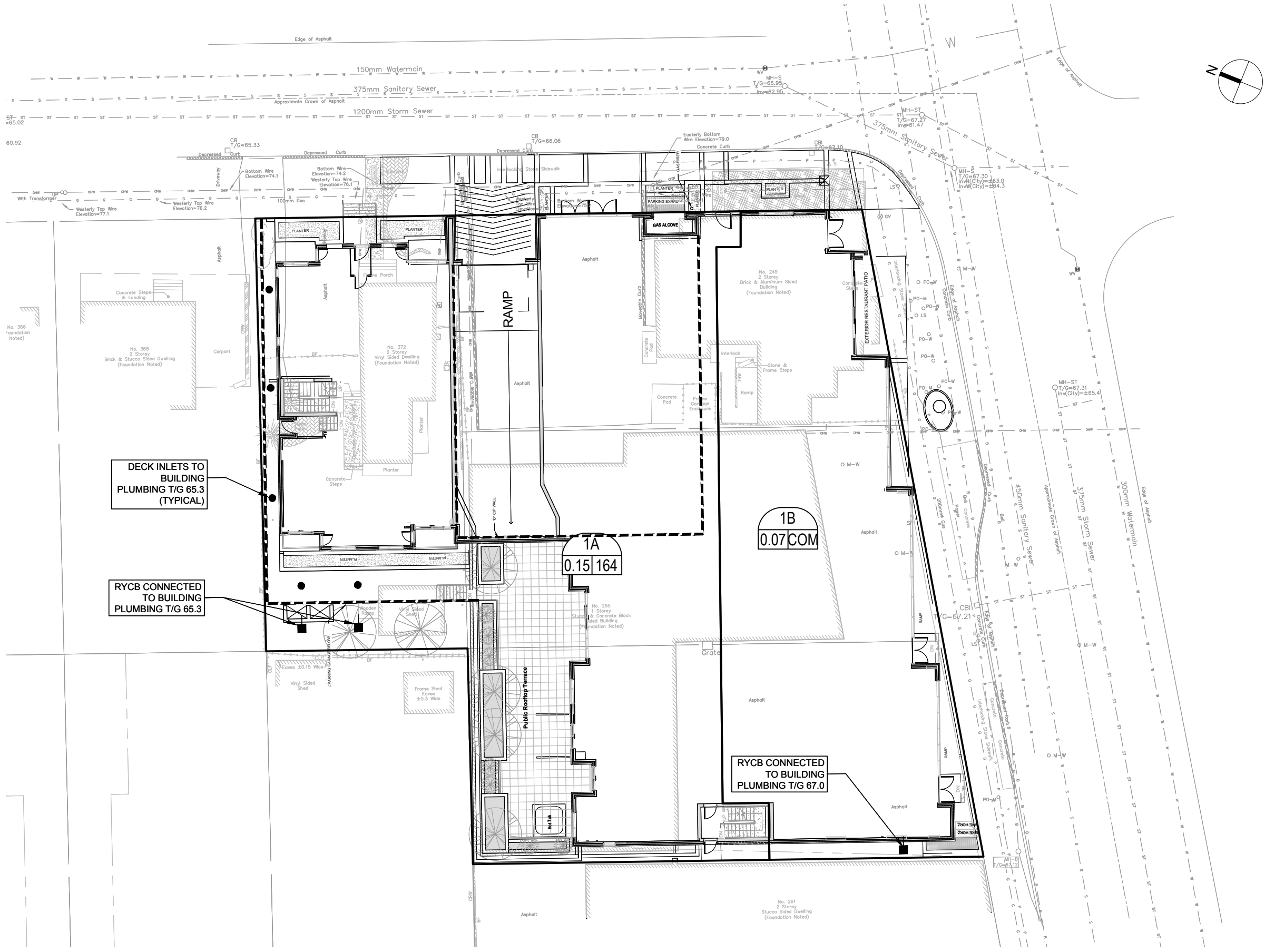


**IBI GROUP**  
 400-333 Preston Street  
 Ottawa, Ontario K1S 5N4 Canada  
 tel 613 225 1311 fax 613 225 9868  
 ibigroup.com

**SANITARY SEWER DESIGN SHEET**

255 Richmond  
 CITY OF OTTAWA  
 Y Street Capital

LOCATION				RESIDENTIAL								ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN					AVAILABLE CAPACITY						
STREET	AREA ID	FROM MH	TO MH	AREA w/ Units (Ha)	UNIT TYPES			AREA w/o Units (Ha)	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	INSTITUTIONAL		RETAIL (m2)		REST. (S)		ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW		IND	CUM	(L/s)	IND	CUM	(L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	CAPACITY	
					1BD	2BD	3BD		IND	CUM			IND	CUM	IND	CUM	IND	CUM			IND	CUM	IND	CUM												L/s	(%)
	Proposed Sanitary			0.15	43	44		153	153	4.00	1.98	0.00	0.00	407	407	60	60	1.50	0.17	0.216	0.216	0.07	0.00	0.00	2.21	48.39	7.40	200	2.00	1.492	46.17	95.42%					
<b>Design Parameters:</b>				<b>Notes:</b>								<b>Designed:</b>				<b>Revision</b>				<b>Date</b>																	
Residential 1BD 1.4 p/p/u 2BD 2.1 p/p/u 3BD 3.1 p/p/u Other 60 p/p/ha				ICI Areas INST 28,000 L/ha/day RETAIL 5 L/m2/day REST. 125 L/seat/day MOE Chart								S.E.L.				No. 1. Adequacy of Public Services Report 2. Adequacy of Public Services Report - Submission 2				2021-10-21		2022-04-06															
				1. Mannings coefficient (n) = 0.013 2. Demand (per capita): 280 L/day 3. Infiltration allowance: 0.33 L/s/ha 4. Residential Peaking Factor: Harmon Formula = $1 + (14 / (4 + (P / 1000)^{0.5}))^{0.8}$ where K = 0.8 Correction Factor 5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0								D.G.Y.								File Reference: 135883.6.04.04		Date: 2022-04-06		Sheet No: 1 of 1													



**LEGEND:**

1A	AREA NUMBER
1.46   92.4	POPULATION
	AREA IN HECTARES

I:\15884\_255\_Richmond\12\_Production\103\_Design\04\_CAD\103\_01\_SANITARY TRIBUTARY AREA PLAN.dwg Printed At: 4/9/2022 1:53 PM Last Saved By: daniel.l.lee At: Oct. 21, 21

# **APPENDIX D**







**IBI GROUP**  
 400-333 Preston Street  
 Ottawa, Ontario K1S 5N4 Canada  
 tel 613 225 1311 fax 613 225 9868  
 ibigroup.com

**PROJECT:** 255 Richmond  
**DATE:** 08/09/2021  
**FILE:** 135883 6.04.04  
**REV #:** 1  
**DESIGNED BY:** A.Z.  
**CHECKED BY:** D.Y.

**STORMWATER MANAGEMENT**

**Formulas and Descriptions**

$i_{2yr} = 1:2 \text{ year Intensity} = 732.951 / (T_c + 6.199)^{0.810}$   
 $i_{100yr} = 1:100 \text{ year Intensity} = 1735.688 / (T_c + 6.014)^{0.820}$   
 $T_c = \text{Time of Concentration (min)}$   
 $C = \text{Average Runoff Coefficient}$   
 $A = \text{Area (Ha)}$   
 $Q = \text{Flow} = 2.78CiA \text{ (L/s)}$

**Maximum Allowable Release Rate**

**Restricted Flowrate (based on  $C=0.50$   $T_c=10min$ )**

$C = 0.5$   
 $T_c = 10 \text{ min}$   
 $i_{2yr} = 76.81 \text{ mm/hr}$   
 $A_{site} = 0.218 \text{ Ha}$

$Q_{restricted} = 23.28 \text{ L/s}$

**Uncontrolled Release ( $Q_{uncontrolled} = 2.78 \cdot C \cdot i_{100yr} \cdot A_{uncontrolled}$ )**

**Grass area**  
 $C = 0.32$   
 $T_c = 10 \text{ min}$   
 $i_{100yr} = 178.56 \text{ mm/hr}$   
 $A_{uncontrolled} = 0.005 \text{ Ha}$

$Q_{uncon\ grass} = 0.79 \text{ L/s}$

**hard surface area**  
 $C = 1.00$   
 $T_c = 10 \text{ min}$   
 $i_{100yr} = 178.56 \text{ mm/hr}$   
 $A_{uncontrolled} = 0.007 \text{ Ha}$

$Q_{uncon\ hard} = 3.47 \text{ L/s}$

$Q_{uncontrolled\ total} = 4.27 \text{ L/s}$

**Maximum Allowable Release Rate ( $Q_{max\ allowable} = Q_{restricted} - Q_{uncontrolled}$ )**

$Q_{max\ allowable} = 19.02 \text{ L/s}$

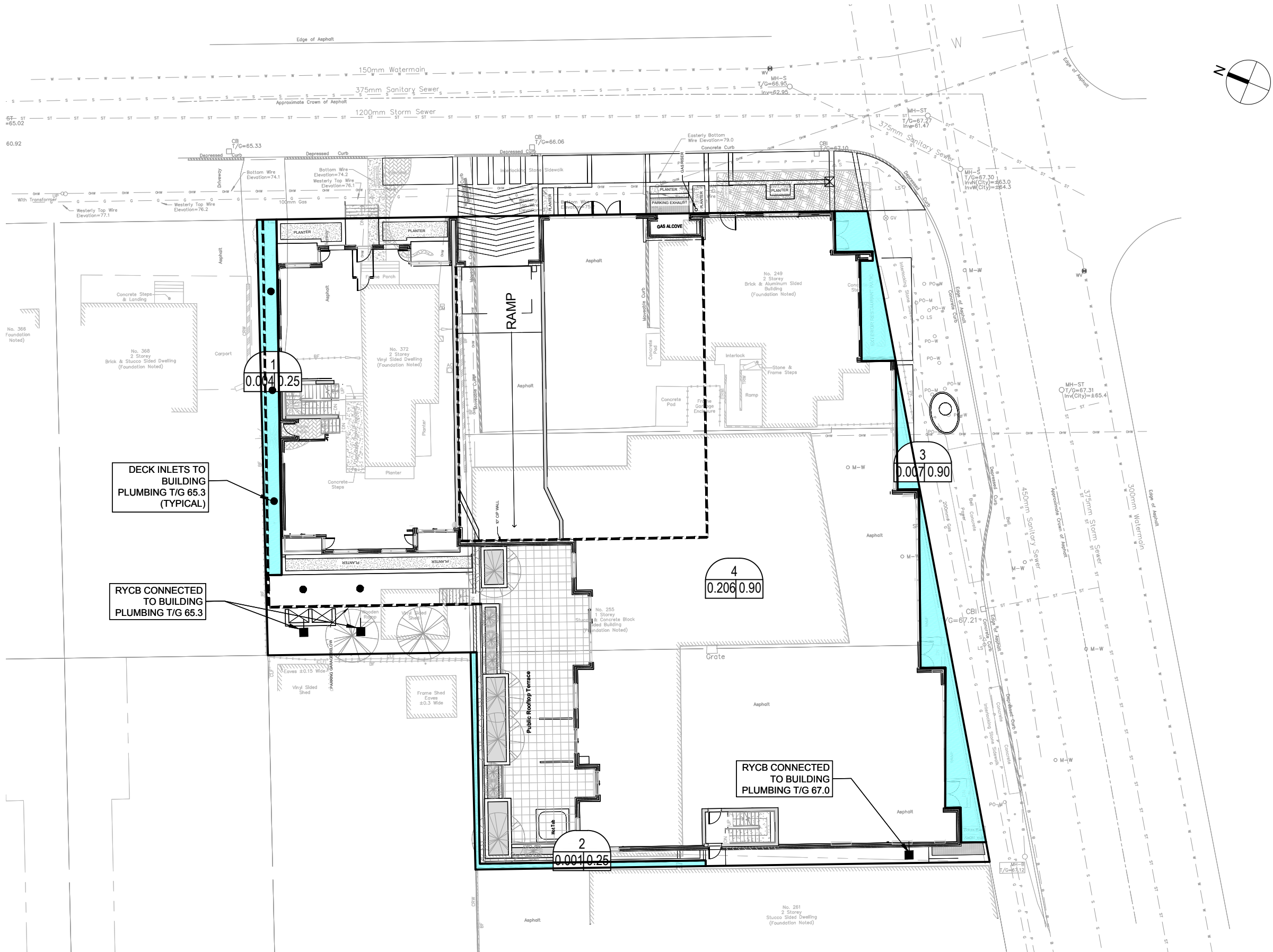
**MODIFIED RATIONAL METHOD (100-Year, & 2-Year Ponding)**

Drainage Area		Roof & Decks	
Area (Ha)	0.206		
C =	1.00	Restricted Flow $Q_r$ (L/s)=	19.02
100-Year Ponding			
$T_c$ Variable (min)	$i_{100yr}$ (mm/hour)	Peak Flow $Q_p = 2.78 \cdot C \cdot i_{100yr} \cdot A$ (L/s)	Volume 100yr ( $m^3$ )
22	112.88	64.68	60.273
24	106.68	61.12	60.632
26	101.18	57.97	<b>60.772</b>
28	96.27	55.16	60.726
30	91.87	52.64	60.519

Storage ( $m^3$ )				
Overflow	Required	Surface	Sub-surface	Balance
0.00	60.77		70.00	0.00

Drainage Area		Roof & Decks	
Area (Ha)	0.206		
C =	0.90	Restricted Flow $Q_r$ (L/s)=	19.02
2-Year Ponding			
$T_c$ Variable (min)	$i_{2yr}$ (mm/hour)	Peak Flow $Q_p = 2.78 \cdot C \cdot i_{2yr} \cdot A$ (L/s)	Volume 2yr ( $m^3$ )
8	85.46	44.07	12.02
10	76.81	39.61	12.35
11	73.17	37.73	<b>12.35</b>
12	69.89	36.04	12.26
14	64.23	33.12	11.85

Storage ( $m^3$ )				
Overflow	Required	Surface	Sub-surface	Balance
0.00	12.35		70.00	0.00



**LEGEND :**

3	AREA NUMBER
0.007   0.50	RUNOFF COEFFICIENT
	AREA IN HECTARES

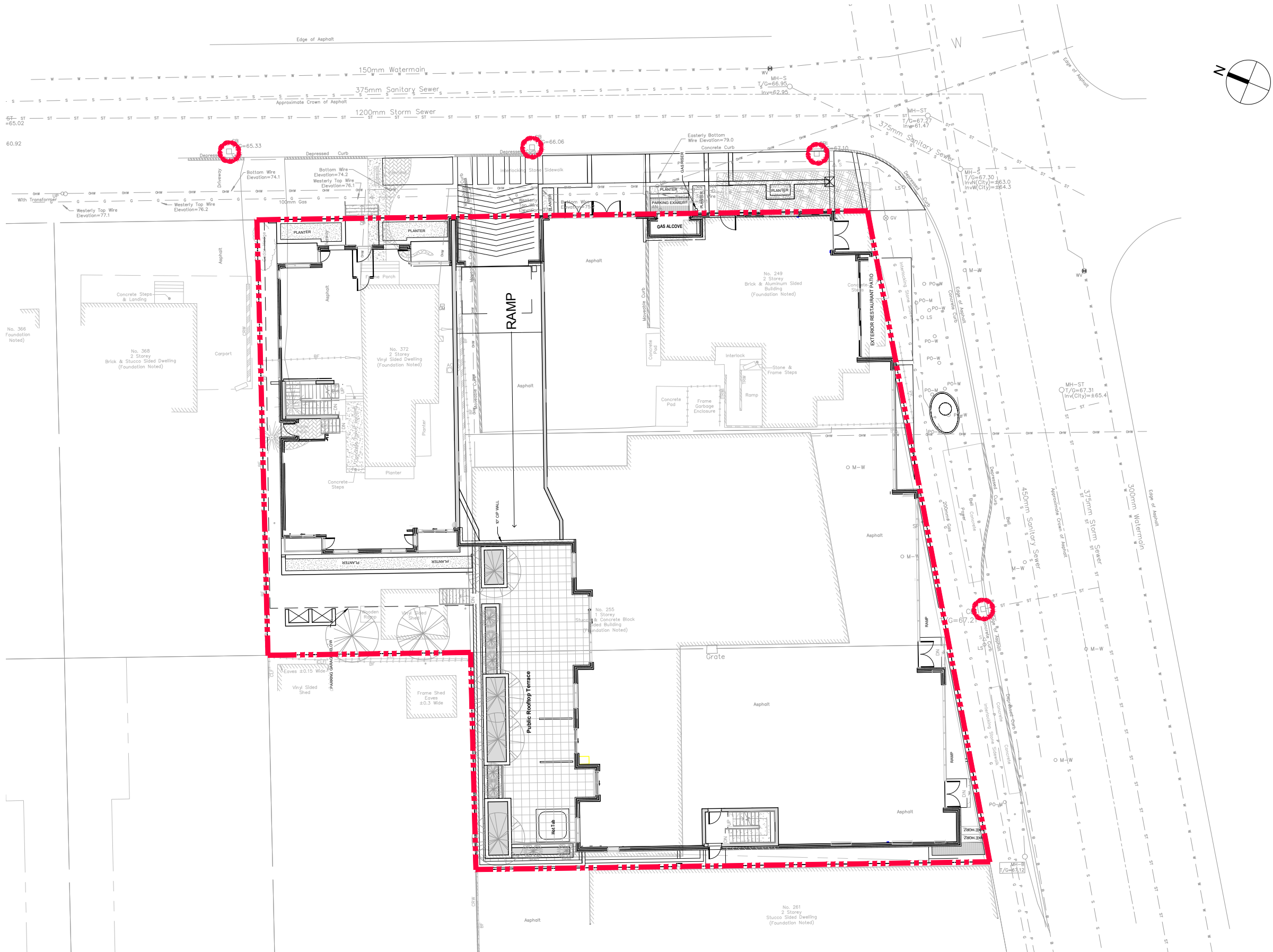
DECK INLETS TO BUILDING PLUMBING T/G 65.3 (TYPICAL)







RYCB CONNECTED TO BUILDING PLUMBING T/G 65.3

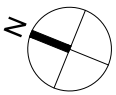
RYCB CONNECTED TO BUILDING PLUMBING T/G 67.0

J:\15884\_255\_Richmond\12\_Production\103\_Design\04\_CAD\1000\Mapcopy Report\Sheet Set\Figure 3.1 CONCEPTUAL STORM TRIBUTARY AREA PLAN.dwg Printed At: 4/2/2022 1:57 PM Last Saved By: sharma Last Saved At: Oct. 21, 21

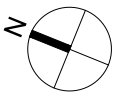
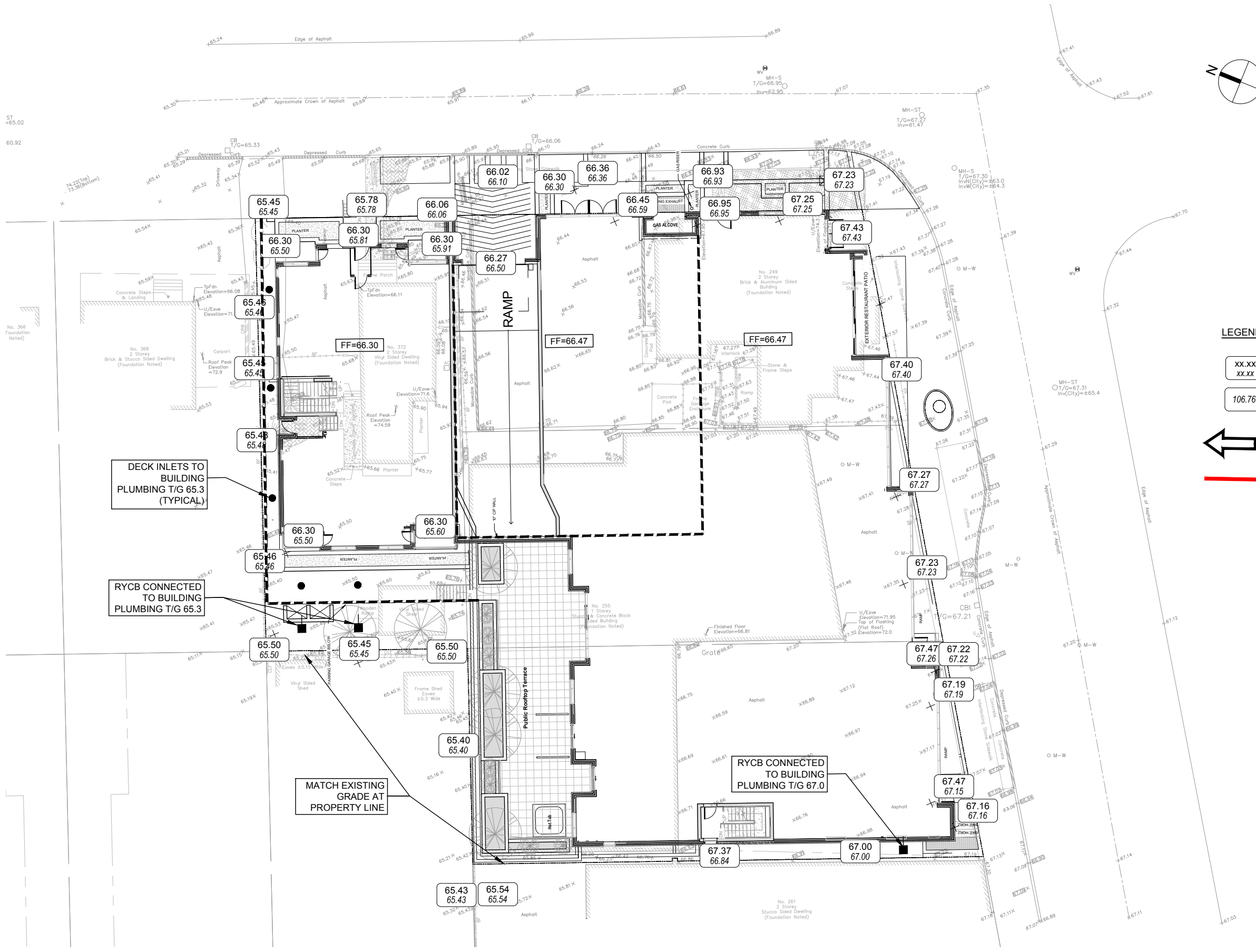
# **APPENDIX E**



- LEGEND:**
-  LIGHT DUTY SILT FENCE AS PER OPSD-219.110
  -  SNOW FENCE
  -  STRAW BALE CHECK DAM AS PER OPSD-219.180
  -  ROCK CHECK DAM AS PER OPSD-219.210
  -  SILT SACK PLACED UNDER EXISTING CB COVER
  -  TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH



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**LEGEND:**

- XX.XX  
XX.XX PROPOSED GRADE AND EXISTING GRADE
- 106.76 EXISTING EXISTING GRADE
- PROPOSED MAJOR OVERLAND FLOW ROUTE
- ANTICIPATED RETAINING WALL

J:\15884\_255\_Richmond\7.1\_Production\7.1\_Design\7.1\_01\_2022\15884\_255\_Richmond.dwg  
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