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Revision: 1

July 23, 2019

Site Servicing Report

Walkley Road Apartment
2270 Walkley Road

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Value through service and commitment

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1.0 INTRODUCTION

LS GP Inc. recently retained the services of J.L. Richards & Associates Limited (JLR) to prepare a Site Servicing Report and detailed design of municipal infrastructure for the construction of an apartment building sited at 2270 Walkley Road, in the City of Ottawa. The project is herein referred to as the 2270 Walkley Road Apartment. A copy of the proposed Site Plan is included in Appendix A.

This Site Servicing Report has been prepared for the purpose of rezoning as well as to outline the design objectives and criteria, servicing constraints and strategies for developing the subject lands with water, wastewater, storm and stormwater management services in accordance with: i) the November 2009 Servicing Study Guidelines for Development Applications in the City of Ottawa (City), ii) the Ottawa Sewer Design Guidelines (2012) and associated Technical Bulletins, as well as iii) the directive provided during the pre-consultation meeting.

1.1 Site Description and Background

The subject property is located within the urban limits of the City of Ottawa in the northwest quadrant of the Walkley Road and Halifax Drive intersection (refer to FIG 1 for Location Plan). As illustrated on Figure 1 below, the subject site currently consists of a large residential property that includes; two (2) high-rise towers, five (5) townhouse blocks, an elevated parking area as well as other at-grade parking areas. The ownership of these existing residential buildings as well as this proposed 17-storey apartment has now been transferred to a single owner, namely LS GP Inc.. As depicted on FIG 1, the subject site is bounded by Walkley Road to the south, by Halifax Drive to the east, by the Canterbury High School lands to the west and by residential units to the north.

FIG 1: Site Location

Based on the review of the 2017 aerial photo (GeoOttawa), the overall property includes a significant portion of hard surfaces consisting of roofs, concrete and asphalt surfaces with some

small strips of grass bounding Walkley Road, Halifax Drive, and around the five (5) townhouse blocks.

Topography of the subject property slopes easterly towards Halifax Drive. Currently, surface runoff generated by the 2270 Walkley Road property sheet flows towards two (2) separate outlet sewers; 1) the Halifax Drive trunk storm sewer system provides the outlet for most of the property while 2) the Walkley Road trunk storm sewer system provides an outlet for a small strip of land bounding the Walkley Road right-of-away (ROW).

Surface runoff tributary to the Halifax Drive trunk storm sewer system is captured by a series of on-site catch basins that collect and convey the captured flows to one of the four (4) on-site storm sewer systems, which all outlet to the Halifax Drive 1500 mm diameter trunk storm sewer system. Once captured, storm flows conveyed by the Halifax Drive 1500 mm diameter trunk storm sewer discharge to the nearby Walkley Road 1650 mm diameter trunk storm sewer system which eventually outlets to the Ottawa River via man-made ditches, reaches of Ramsey Creek and Green's Creek. Runoff from the small area bounding the Walkley Road ROW sheet flows towards Walkley Road where it is captured by the roadway's catch basins.

Topography shows that the majority of the subject lands (disturbed surfaces) is tributary to on-site storm sewers, ranging between 300 mm diameter to 450 mm diameter, that outlets to the Halifax Drive 1500 mm diameter trunk storm sewer. A copy of the original Site Plan prepared by J.L. Richards & Associates (1968) is included in Appendix B. However, there is a small part of the disturbed lands that is tributary to the Walkley Road trunk storm sewer system. This strip of land consists of grass and pavement (access road) leading to the existing parking structure.

1.2 Proposed Site Plan, Building Configuration and Zoning

LS GP Inc. wishes to redevelop part of the above-noted property into an apartment building complete with access roads, an underground parking structure and green podium. Based on the proposed Site Plan (Appendix A), the area that is to be disturbed for the construction of the apartment building, access road and podium accounts for ±0.644 ha (6,440 m^2). Additional details in regard to the proposed disturbed surface is included in Section 4.3 in the allowable peak flow calculation.

The subject property is currently zoned Residential Fifth Density Subzone B, which allows for a maximum building height of 39 m [R5B H(39)]. The Applicant now wishes to undertake a Zoning By-law Amendment to allow the construction of a 17-storey + penthouse high residential building.

1.3 Existing Infrastructure

This Report was prepared to demonstrate that the site redevelopment can be supported by the existing municipal infrastructure. The 2270 Walkley Road property is bounded by existing municipal infrastructure as illustrated below on FIG 2, which consists of the following (refer to Appendix B for copy of the Background Drawings):

Watermain

- Existing 305 mm diameter CI watermain located along Halifax Drive;
- Existing on-site 152 mm diameter watermain; and
- Existing 406 mm diameter CI watermain along Walkley Road.

Sanitary

- Existing 450 mm diameter CONC sanitary sewer along Halifax Drive; and
- Existing 525 mm diameter CONC sanitary sewer along Walkley Drive.

Storm

- Existing 1500 mm diameter CONC trunk storm sewer along Halifax Drive;
- Existing 1500 mm diameter CON trunk storm sewer along Walkley Road.

A topographical survey was completed by Fairhall Moffatt & Woodland Limited compiled on May 24, 2018 (refer to Appendix A).

FIG 2: Existing Infrastructure

1.4 Pre-Consultation, Permits and Approvals

A pre-consultation meeting was held between the Owner's representatives and staff from the City on January 17th, 2018. A copy of the pre-consultation meeting notes has been provided in Appendix C. As per the consultation notes, the Rideau Valley Conservation Authority (RVCA) was consulted to determine the stormwater quality criterion. Relevant comments are listed below:

The stormwater criteria is to be based on the following:

- The storm intensities (1:2 year, 1:5 year and 1:100 year) shall be set in accordance with the Ottawa Sewer Design Guidelines;
- Off-site sewers along Halifax Drive and Walkley Road were designed based on a 1:2 year storm;
- Pre-development runoff coefficient (C-Factor) to be set based on the lesser of either the current C-Factor and shall not exceed 0.5;
- The calculated time of concentration shall not be less than 10 minutes;
- Storm flows in excess of the 1:5 year to the 1:100 year must be detained on-site; and
- The RVCA has requested that the site discharge meet a total suspended solids (TSS) removal of 80%.

Should this Site Servicing Report be approved for the purpose of rezoning, the redevelopment of the above-referenced property will be subject to the municipal site plan control approval process with the City of Ottawa. At such time, the City of Ottawa Development Servicing Study Checklist will be prepared.

1.5 Engineering Drawings

Engineering Drawings have been prepared in support of rezoning for the development of the 2270 Walkley Road property. The following three (3) drawings are included at the back of the Report:

- Site Servicing Plan (Drawing S)
- Grading Plan (Drawing G); and
- Drainage and Ponding Plan (Drawing SWM).

Should this Report be approved for rezoning, a Removals and Erosion & Sediment Control Plan will be prepared as part of Site Plan Control; however, potential erosion and sedimentation measures have been listed in Section 5.0

2.0 WATER SERVICING

2.1 Design Criteria

A Hydraulic Network Analysis (HNA) was carried out for the proposed 2270 Walkely Road Apartment Site to confirm that the existing watermain and proposed water service can provide adequate supply while complying with both the Ottawa Design Guidelines (ODG) for Water Distribution (July 2010), and Technical Bulletins ISDTB-2014-02 and ISTB-2018-02. These documents have been referred to in this section as the ODG.

The ODG requires that a water supply system be designed to satisfy the following demand criteria:

- maximum day demand plus fire flow; and
- maximum hourly demand (peak hour demand).

Given the Site usage as a residential high-rise, fire flow requirements within this private property must comply with the Ontario Building Code (OBC). On this basis, fire flows within 2270

Walkley Road must be calculated based on Section 11.2.2 of the National Fire Protection Association (NFPA) 13, more particularly with Tables 11.2.2.1 (Water Supply Requirements for Pipe Schedule Sprinkler Systems) and Table 11.2.3.1.2 (Hose Stream Allowance and Water Supply Duration Requirements for Hydraulically Calculated Systems.

2.2 System Pressures

Section 4.2.2 of the ODG requires that new development additions to the public water distribution system be designed such that the minimum and maximum water pressures, as well as flow rates, conform to the following:

i. Under maximum hourly demand conditions (peak hour), the pressures shall not fall below 276 kPa (40 psi).

ii. During periods of simultaneous maximum day and fire flow demand, the residual pressure at any point in the distribution system shall not be less than 140 kPa (20 psi).

iii. In accordance with the Ontario Code & Guide for Plumbing, the static pressure at any fixture shall not exceed 552 kPa (80 psi) in areas that may be occupied.

iv. The maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi) in unoccupied areas.

v. Feedermains, which have been provided primarily for the purpose of redundancy, shall meet, at a minimum, the basic day plus fire flow demand. This criterion is irrelevant to this HNA as there are no feedermains proposed.

The HNA was carried out to fulfill the above watermain pressure and demand objectives.

2.3 Water Demands

To assess the performance of the existing water distribution system (refer to Drawing S at the back of the Report), the above-noted water demand scenarios were developed and evaluated against the pressure criteria listed in Section 2.2 using the WaterCAD® software platform.

The theoretical domestic demand for the 2270 Walkley Road Apartment was calculated based on the information provided by the Owner. A total of 202 apartments is proposed consisting of 138 x 1-bedroom, 32 x 2-bedroom and 32 x 3-bedroom apartments. Based on densities of 1.4 (1-bedroom), 2.1 (2-bedroom) and 3.1 (3-bedroom) persons per unit (Table 4.1 of the ODG – Water Distribution), a total population of 360 was calculated (Appendix D1). Table 1 summarizes the overall water demands used in the HNA based on a population of 360 using either the ODG and MOE Design Guidelines for populations less than 500 (Table 3-3).

Table 1: Calculated Water Demands

Water Demand	Ottawa Design Guidelines (Table 4.1)	MOE Design Guidelines (Table 3-3)
Average Day (L/s)	1.46	1.46
Maximum Day (L/s)	3.21 (avg x 2.2)	4.96 (avg x 3.4)
Peak Hour (L/s)	8.03 (avg x 5.5)	7.44 (avg x 5.1)

Hydraulic boundary conditions were obtained from the City (Appendix D3) based on domestic demands of 5.38 L/s (maximum day) and 11.83 L/s (peak hour) which exceed either of the above-noted demands.

2.4 Simulation of Fire Flows

Various guidelines are used throughout North America to establish fire flow requirements for different types of buildings. The following two (2) guidelines speaks about the required fire flow (RFF):

Private Sites:

The RFF within private sites shall be calculated based on the Ontario Building Code (OBC), which in turn is based on NFPA 13. Based on Table 11.2.2.1 (Water Supply Requirements for Pipe Schedule Sprinkler Systems) and Table 11.2.3.1.2 (Hose Stream Allowance and Water Supply Duration Requirements for Hydraulically Calculated Systems) of NFPA 13, the RFF within the property shall be 4,150 L/min (69.2 L/s) consisting of 3,200 L/min (53.3 L/s) for the fire suppression system and 950 L/min (15.8 L/s) for the total combined hose allowance for ordinary hazard (refer to Appendix D2).

Municipal Right-Of-Way (ROW):

The RFF along the City of Ottawa ROW must comply with the Guidelines entitled “Water Supply for Public Fire Protection (1999)” developed by the Fire Underwriters Survey (FUS). The FUS Guidelines govern fire flow protection requirements within ROW within the City of Ottawa as well as Technical Bulletins TB-2014-02 and TB-2018-02. Based on these documents, the RFF that shall be available along the ROW was estimated at 10,000 L/min (167 L/s) as per TB-2018-02. The hydraulic boundary condition provided by the City was based on 10,000 L/min (refer to Appendix C.

Given the above, the RFF for this private property is 4,150 L/min (53.3 L/s) while the fire flow availability from nearby hydrants (in accordance with ISTB-2018-02) and fire suppression system should total 10,000 L/min (167 L/s).

2.5 Watermain Sizing and Roughness Coefficients

The existing and proposed watermain layout for 2270 Walkley Road is shown on the Site Servicing Plan (Drawing S) at the back of the Report. The site water servicing consists of the following components:

- Domestic supply to the proposed mechanical room will be provided by a single 200 mm diameter water service lateral that is connected to the Walkley Road 406 mm diameter feedermain. The proposed 200 mm diameter water service lateral will branch out in the mechanical room into a domestic and fire suppression feed that will be sized by the mechanical engineer. Based on NFPA 13, the fire suppression system will require 3,200 L/min (53.3 L/s).

- In terms of fire protection, the fire suppression system will be supplemented by a proposed hydrant at the edge of the ROW along with an existing hydrant less than 150

m. Based on ISTB-2018-02, these hydrants will provide 9,500 L/min (5,700 L/min + 3,800 L/min) which combined to the fire suppression system, could provide a fire flow demand of 12,700 L/min.

- The siamese connection will be located on the southern face of the building in close proximity of the mechanical room and proposed hydrant.

The WaterCAD® schematic has been included in Appendix D1 for reference. The watermain roughness coefficients for the proposed 200 mm diameter and 150 mm diameter watermains are 110 and 100, respectively (Section 4.2.12 of the ODG) and 120 for the Walkley Road 400 mm diameter feedermain.

2.6 Hydraulic Boundary Conditions

The HNA was carried out based on hydraulic boundary conditions provided by the City under various water demand conditions as described in Section 2.3 and 2.4 (refer to Appendix D3 for copy of the E-mail correspondence). Boundary conditions were requested based on a single feed connection which will be connected to the mechanical room of 2270 Walkley Road where it will branched into two (2) services to be determined by the mechanical engineer. Boundary conditions received from the City are summarized in Table 2 below.

Table 2: Hydraulic Boundary Conditions

Water Demands	Industrial Avenue HGL (m)
Peak Hour	124.4
Maximum Day + Fire Flow	124.0
Maximum HGL	130.3

The overall fire flow requirement along the Walkley Road ROW was estimated at 167 L/s (10,000 L/min) using the approach described in TB-2018-04 while the fire flow within the property was estimated at 4,150 L/min (69.2 L/s) based on NFPA 13 as described in Section 2.4 and Appendix D2.

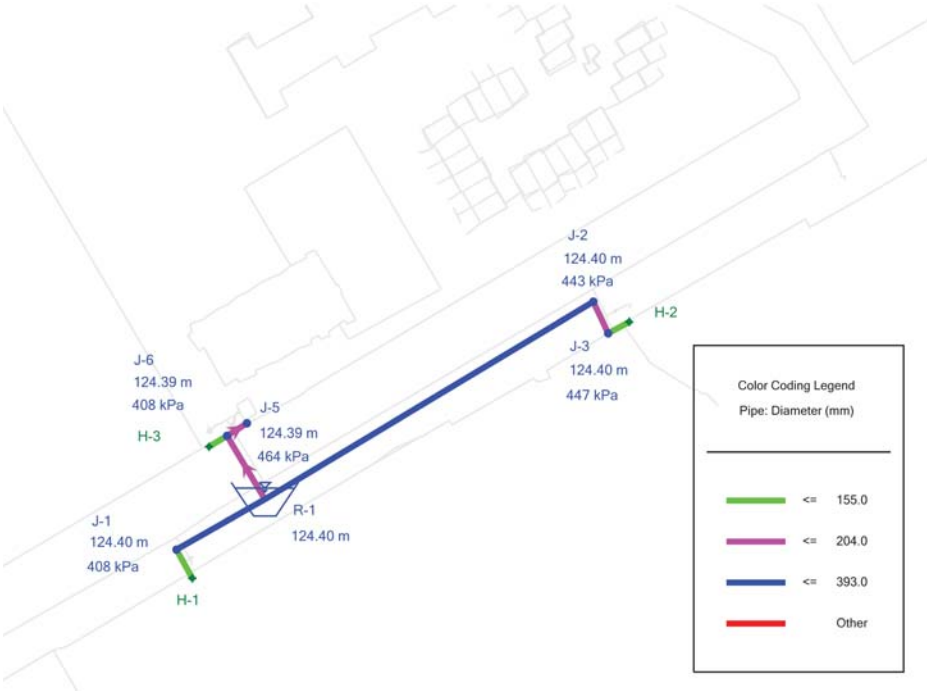
2.7 Simulation Results

The proposed servicing as presented on Drawing S was simulated under domestic (peak hour and high pressure check) as well as during a maximum day combined to a fire flow demand condition. Section 2.7.1 to 2.7.3 summarizes the simulation results.

2.7.1 Peak Hour Demand

The peak water demand of 11.83 L/s was assigned to Node J-5 (the mechanical room). Simulation results show that the minimum pressures was found to be 464 kPa (67.3 psi) as illustrated below and in in Appendix D4. However, given the height of the building, a domestic booster pump will be required which will be designed by the mechanical engineer to ensure that pressures at the top floor will exceed the minimum pressure criterion of 275 kPa (40 psi).

Peak Hour Simulation Results



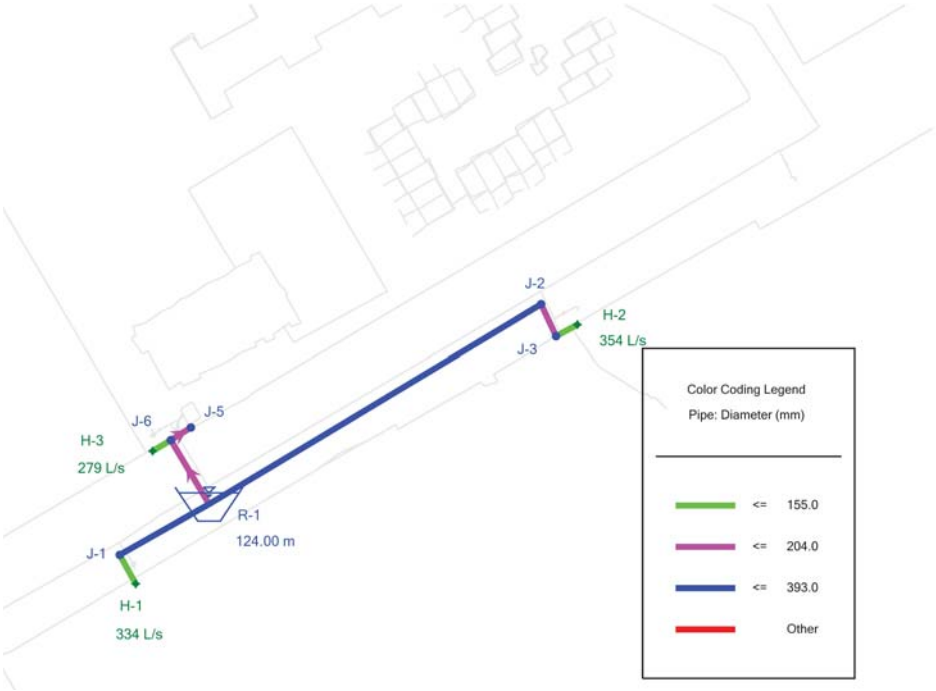
2.7.2 Maximum Day Demand plus Fire Flow

A fire flow simulation was carried out by allowing WaterCAD® to calculate the available fire flow that can be drawn from the hydrants without allowing any part of the system to experience pressures less than 140 kPa (20 psi).

As noted above, the simulation was carried out by assigning the maximum day demand of 5.38 L/s Node J-5, which was combined to the fire suppression demand of 3,200 L/min (53.3 L/s) and hose allowance of 950 L/min (15.83 L/s). Hence, Node J-5 was set with an overall demand of 74.55 L/s. Consequently, this simulation on its own would fulfill the OBC and NFPA 13. However, the same simulation will also show whether the distribution system and ROW hydrants can meet the RFF of 10,000 L/min (167 L/s) as per the City of Ottawa Protocol (ISTB-2018-02). Given the NFPA demand of 4,150 L/min (69.17 L/s) at Node J-5, fire flow availabilities from nearby hydrants should deliver a minimum of 97.5 L/s (5,850 L/min) (10,000 L/min – 4,150 L/min). Given the height of the building, a fire pump will be required for the fire suppression system which will be designed by the mechanical engineer.

Simulation results illustrated below show that the three (3) nearby hydrants can deliver fire flows ranging between 279 L/s (16,740 L/min) and 354 L/s (21,240 L/min) exceeding the minimum requirement of 97.5 L/s (5,850 L/min) (refer to Appendix D5 for detailed WaterCAD® simulation results).

Maximum Day plus Fire Flow Simulation Results



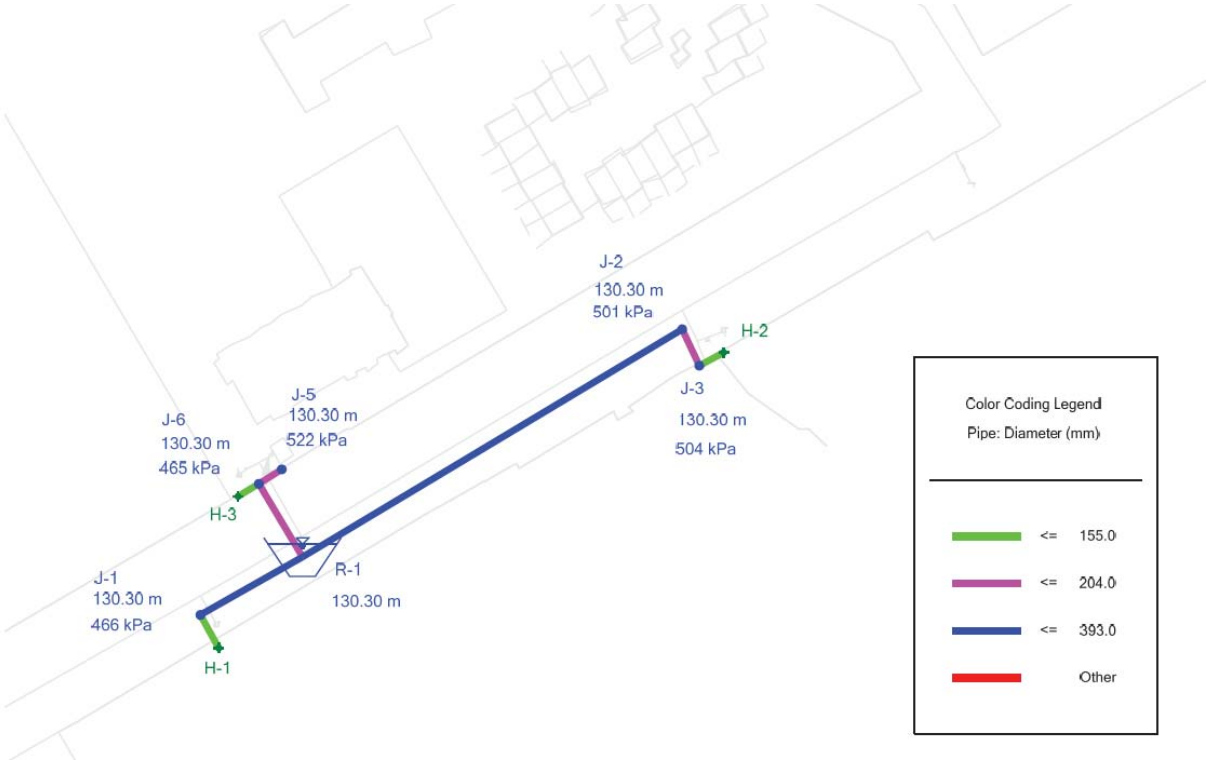
There are three (3) nearby hydrants that can provide fire flow protection to 2270 Walkley Road and one additional hydrant at the back of the building fed by the Halifax Drive watermain. One of the three (3) hydrants along Walkley Road is within 75 m while the other two (2) hydrants within 150 m. The aggregate sum of these hydrants as per ISTB-2018-02 is 13,300 L/min (221.7 L/.s). Consequently, the existing and proposed watermains can fulfill both the OBC (NFPA 13) while meeting the requirements of ISTB-2018-02.

2.7.3 High Pressure Check

The ODG and OBC require that a high pressure check (maximum hydraulic grade elevation) be performed on the proposed system to ensure that the maximum pressure constraint of 552 kPa (80 psi) of the Ontario Code & Guide for Plumbing is not exceeded. To generate the highest pressure, the demand was set to zero (0) and was reviewed at the elevation of the mechanical room (elevation 77.0 m).

Simulation results for this scenario indicate that a residual pressure of 522 kPa (75.7 psi) is expected at Node J-5 (i.e., the mechanical room) (refer to Appendix D6 for WaterCAD® simulation schematic and results). Hence, the simulated pressure is below the maximum pressure constraint of 552 kPa (80 psi). Consequently, there is no need to incorporate a pressure reducing valve (PRV) as part of the building plumbing.

Maximum HGL Simulation Results



3.0 WASTEWATER SERVICING

3.1 Background

Wastewater flows generated by 2270 Walkley Road are to be conveyed to the existing Walkley Road 525 mm diameter trunk sanitary sewer via a proposed 150 mm diameter sanitary service lateral as depicted on the Site Servicing Plan (Drawing S).

3.2 Design Criteria

The proposed sanitary service for 2270 Walkley Road was designed based on the City of Ottawa Sewer Design Guidelines ((OSDG) - (October 2012)) and associated Technical Bulletins. Key design parameters have been summarized in Table 3:

Table 3: Wastewater Servicing Design Criteria

Design Criteria	Design Value	Reference
Residential average flow	280 L per capita/day	ISTB-2018-01
Residential peaking factor	Harmon Formula	City Section 4.4.1
Infiltration flow	0.33 L/s/effective gross ha	ISTB-2018-01

Design Criteria	Design Value	Reference
Minimum velocity	0.6 m/s	City Section 6.1.2.2
Maximum velocity	3.0 m/s	City Section 6.1.2.2
Manning Roughness Coefficient (for smooth wall pipes)	0.013	City Section 6.1.8.2
Minimum allowable slopes	Varies	City Table 6.2, Section 6.1.2.2

3.3 Proposed Sanitary Servicing and Calculations

As previously noted, the wastewater flows from the site will be discharged into the municipal system (Walkley Road 525 mm diameter sanitary trunk) via a proposed 150 mm diameter sanitary service lateral. Based on the proposed densities for apartment buildings (as recommended by the OSDG), the peak wastewater flows were calculated based on the design value of 280 L per capita per day for 360 people (refer to Section 2.3 for details) as per the design parameters listed in Table 3. As such, a peak flow of 4.22 L/s was calculated based on a peaking factor of 3.43 and a total infiltration allowance of 0.21 L/s (0.64 ha x 0.33 L/s). The peak flow of 4.22 L/s was used as the design target for the purpose of sizing the proposed sanitary service. To fulfill the above design target of 4.22 L/s, the proposed 150 mm diameter sanitary service at a slope of 1.0% can accommodate the design flow. The proposed peak wastewater flow of 4.22 L/s is representative of 1.7 % of the total capacity of the 525 mm diameter sanitary trunk on Walkley Road; which is at a slope of 0.29 % with a total capacity of 241 L/s.

It should be noted, that the 525 mm diameter sanitary trunk on Walkley Road was designed and constructed prior to the 1990s when the City design parameters at the time were 450 L per capita per day. Using the total capacity of the 525 mm diameter trunk of 241 L/s and assuming the pipe was designed to full capacity, and that 30% of the total flow would be attributed to infiltration this would have given approximate flows of 72.3 L/s for infiltration and 168.7 L/s residential peak flow. In turn applying the old 450 L per capita per day design parameter this would have generated a population of approximately 31,715 people. Using the current City design parameter of 280 L per capita per day, this population of 31,715 people would generate a total residential peak flow of only 105 L/s which is 38% less than the original design flows of 168.7 L/s for the 525 mm diameter trunk. Given the above it is assumed that there is residual capacity in the 525 mm diameter trunk as a minimum of 63.7 L/s. The proposed peak wastewater flow of 4.22 L/s is thus representative of only 6.6 % of that residual capacity and it is anticipated that the 525 mm diameter trunk on Walkley Road would be able to accommodate the proposed peak flows.

3.4 Summary and Conclusions

Based on the above wastewater servicing details, it is recommended that the wastewater servicing shown on the Site Servicing Plan (Drawing S) be implemented to provide wastewater servicing for the proposed development.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Background

Storm runoff generated by the proposed 2270 Walkley Road apartment will be collected by on-site storm sewers that will be discharged into two (2) separate outlets; the Halifax Drive trunk storm sewer system and Walkley Road trunk storm sewer system.

Storm flows generated from the disturbed surfaces are to be controlled to the criterion described in the pre-consultation meeting notes that have been provided by the City (refer to Appendix C for copy of E-Mail summarizing the meeting notes).

4.2 Storm Criteria

Storm servicing developed for 2270 Walkley Road apartment site shall be designed to comply with the storm criteria provided by the City, which consists of the following (Appendix B):

- The 5-yr storm event should be based on the intensity duration frequency (IDF) statistics derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997. All stormwater management calculations presented herein were completed using rainfall regressions included in the OSDG.

- The existing servicing along Walkley Road and Halifax Drive was built around 1962. For separated sewer system built pre-1970, the design of the storm sewers is equivalent to a 1:2 year design storm capture.

- The pre-development runoff coefficient (C-Factor) or a maximum equivalent C-Factor of 0.5, whichever is less (§ 8.3.7.3), shall be used to establish the allowable release rate.

- The time of concentration (Tc) should be calculated to establish the allowable peak flow; however, the Tc cannot be less than 10 minutes.

- Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

- Stormwater quality control in accordance with the RVCA advice.

Storm servicing identified on Drawings S and SWM has been developed to meet the above criteria.

4.3 Allowable Release Rate

Storm servicing and stormwater management for the subject site (disturbed areas) is to be controlled to the 1:2 year peak flow although the sizing of the receiving trunk storm sewers (Halifax and Walkley) was based on the former City of Ottawa sizing rule where a 1:10 year design capture was used given that that the free flowing capacity of the trunks exceeded 1,400 L/s. As per the pre-consult criterion, the allowable peak flow was to be based on the lesser of the existing C-Factor or 0.5. Based on the review of the aerial photo and topography, most of the subject site is tributary to the Halifax Drive storm sewer system while a small area to the

Walkley Road storm sewer system. A Pre-Development Drainage Plan for the disturbed Surfaces is shown on FIG 3. As illustrated, drainage areas 1 to 5 are tributary to the Halifax Drive trunk sewer system while drainage areas 6 to 8 to the Walkley Road trunk storm sewer system. Table 4 below summarize areas for the various types of surface and their associated runoff coefficient under existing condition for both the Walkley Road and Halifax Drive trunk sewer systems.

Table 4: Existing Condition Surfaces

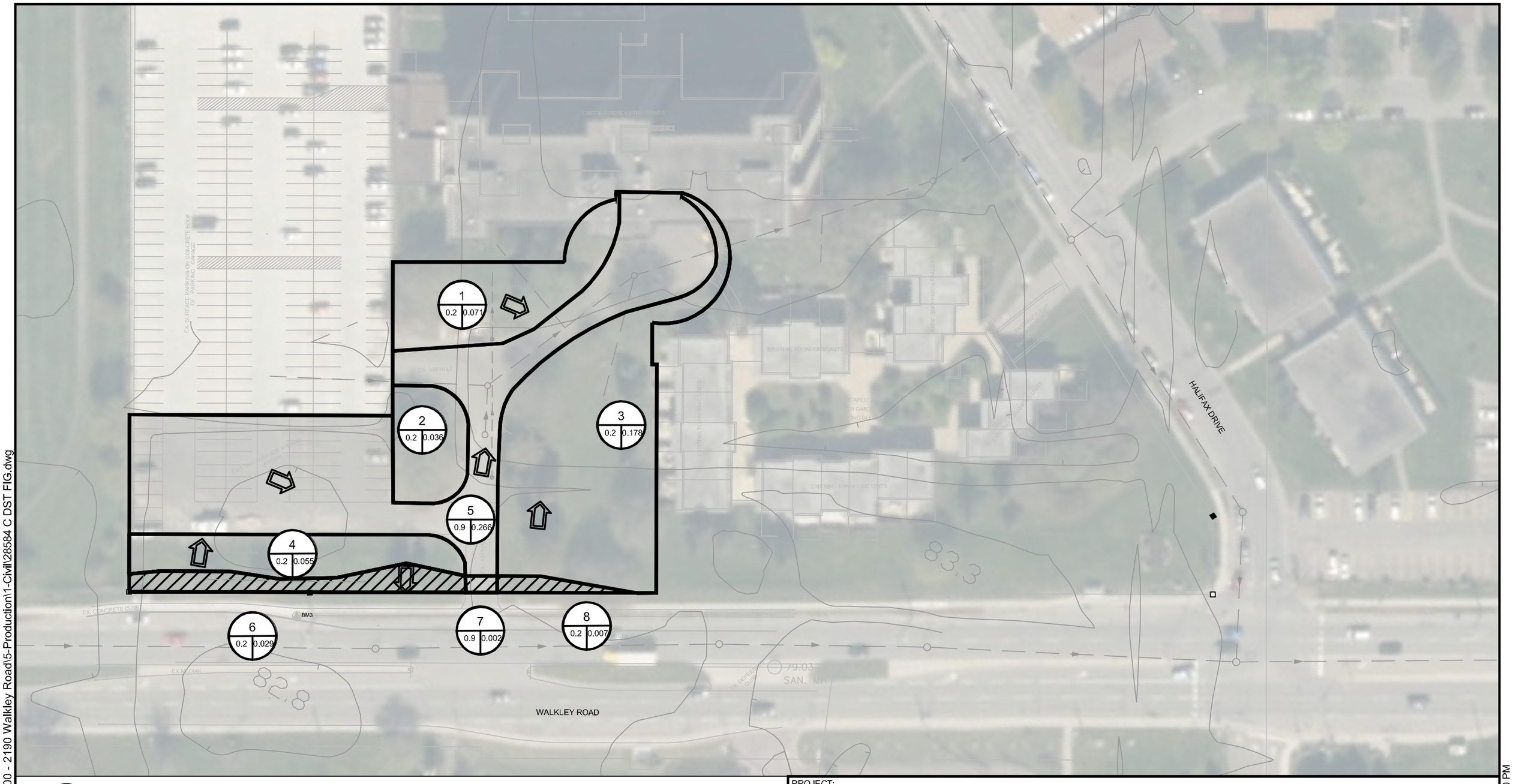
Area No	Area (ha)	Type	Runoff Coefficient (C)
Halifax Drive			
1	0.074	Landscape	0.20
2	0.036	Landscape	0.20
3	0.178	Landscape	0.20
4	0.055	Landscape	0.20
5	0.266	Asphalt	0.90
Total	0.609		0.51
Walkley Road			
6	0.029	Landscape	0.20
7	0.002	Asphalt	0.90
8	0.007	Landscape	0.20
Total	0.038		0.24

The allowable peak flow shall be estimated based on calculated C-Factors reflecting the existing conditions and shall not exceed 0.50. Based on the C-Factors of 0.51 and 0.24, allowable release rates shall be calculated based on C-Factors of 0.50 and 0.24 for the Halifax Drive and Walkley Road, respectively (refer to Appendix E2 for calculations).

The calculations included in Appendix E2 show a time of concentrations of 10.36 minutes and 0.15 minutes for the Halifax Drive and Walkley Road systems, respectively. Hence, the allowable peak flow was calculated based on times of concentrations of 10.36 minutes and 10 minutes for the Halifax Drive and Walkley Road systems, respectively. Based on the above, allowable release rates under a 1:2 year design event was estimated at 63.87 L/s and 1.92 L/s for the Halifax Drive and Walkley Road systems, respectively. Hence, the 1:100 year flows must be detained while releasing the total combined flow of 65.79 L/s (63.87 L/s + 1.92 L/s) as both sewers merged 100 m downstream to the Walkley Road 1650 mm diameter trunk storm sewer.

4.4 Proposed Storm Servicing

The general storm and stormwater servicing constraints used to develop the detailed design for the 2270 Walkley Road development are listed in Table 5 below.



8 — DRAINAGE AREA
0.2 | 0.007 — AREA (ha) | RUNOFF COEFFICIENT (2YR STORM)

FLOW DIRECTION

DRAINAGE AREA BOUNDARY

DRAINAGE AREAS TO WALKLEY ROAD

DRAINAGE AREAS TO HALIFAX DRIVE

AERIAL IMAGE FROM CITY OF OTTAWA, 2017

TOPOGRAPHIC INFORMATION VIA CITY OF OTTAWA 0.5m CONTOURS

PROJECT:

2270 WALKLEY ROAD

DRAWING:

PRE-DEVELOPMENT DRAINAGE CONDITIONS (DISTURBED SURFACES)

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS
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DESIGN:	KF
DRAWN:	SP/TB
CHECKED:	GF
JLR #:	28584-000.1

SCALE 1:750

DRAWING #: FIG. 3

PLOT DATE: July 25, 2019 3:33:20 PM

File Location: P:\28000\28584-000 - 2190 Walkley Road\5-Production\1-Civil\28584 C DST FIG.dwg

Table 5: Storm Servicing Design Criteria

General Design Criteria
Storm sewers sized to accommodate the 1:2 year peak flows calculated with the Rational Method and the City of Ottawa Intensity-Duration-Frequency (IDF) curves. Sewer sized to convey the restricted rooftop flows.
Storm sewers designed based on an inlet time of ten (10) minutes, as per the Technical Bulletin ISDTB-2012-4.
Minor system storm flows to be controlled to the 1:5 year recurrence for a maximum C-Factor of 0.50.
The 1:100 year peak flows to be detained on-site by means of on-site storage designed to limit the total outflows to the calculated 1:5 year peak flow.
Minimum swale grades at 1.5% (with lower grades, a sub-drain must be provided).
Minimum roadway profile grades at 0.5%.
Minimum of 0.30 m clearance between the underside of footing and the 1:100 year HGL elevation.
Sanitary maintenance holes located away from ponding areas to minimize extraneous flows. In locations where sanitary maintenance holes need to be located in ponding areas, watertight maintenance hole covers are provided.
Provide measures to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

A Storm Sewer Design Sheet was prepared (refer to Appendix E2), which demonstrates that the proposed sewers were sized based on the 1:2 year peak flows. The Design Sheet was developed to take into consideration the various restrictors; the rooftop restrictors, the podium's horizontal restrictors and the underground storage facility's restrictor.

4.5 Proposed Stormwater Management Solution and Calculations

4.5.1 Water Quantity

Storm servicing and stormwater management was developed to limit the 1:100 year post-development flows below the combined allowable peak flow of 65.79 L/s. In order to achieve this criterion, on-site restrictions (i.e., inlet control devices (ICDs) and rooftop restrictors) were deemed necessary to allow for rooftop storage, podium storage and underground storage.

The disturbed surfaces under post-development are shown on FIG4 and Table 6 below. This table and figure illustrates the various drainage areas along with their C-Factor and outlet (i.e., Halifax Drive or Walkley Road). Drawing SWM at the back of the Report shows the level of rooftop restrictions (to be confirmed by the mechanical engineer), the surface storage at the two (2) podium storage cells as well as the underground storage and associated restrictor along the north-south access road as described in the detailed stormwater management calculations (Appendix E2) using the Modified Rational Method

(MRM). It should be noted that the MRM calculation for the areas tributary to the underground storage pipe, was reduced by 50% to reflect the outflow reduction while the sewer fills up. This methodology has been used and accepted elsewhere within the City of Ottawa. In accordance with the OSDG, the runoff coefficient under the 1:100 year MRM calculation were increased by 25% up to the maximum of 0.90. The grass areas were therefore, accounted at a C-Factor of 0.25 (125% x 0.20) while the green podium at 0.75 (125% x 0.60). The following summarizes the various controls as taken into account in the MRM (Appendix E for details):

Table 5: Post-Development Condition Surfaces

Area (ha)	Type	1:100 Year Runoff Coefficient (C)
Halifax Drive		
0.107	Building	0.90
0.249	Podium (3 areas)	0.75
0.125	Asphalt (2 areas)	0.90
0.050	Landscape	0.25
0.531		0.77
Walkley Road		
0.007	Landscape	0.25
0.025	Podium (2 areas)	0.75
0.081	Asphalt	0.90
0.113		0.83

Halifax Drive trunk system:

Rooftop:

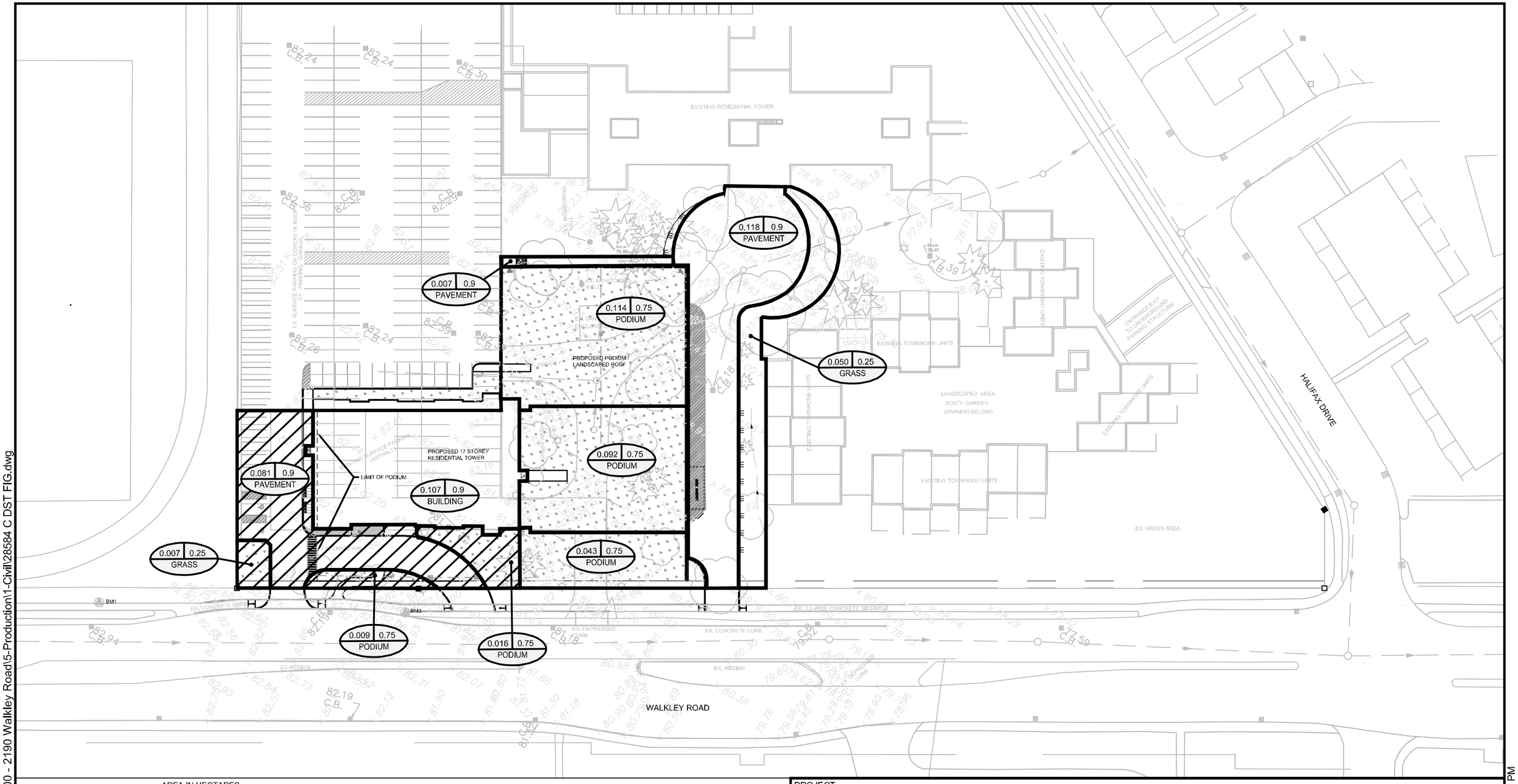
Based on a 6 L/s ICD, minimum storage volume requirement of 34 m^3 is required (Appendix E2). Assuming that 50% of the rooftop area is available for detention (i.e., 50% of 1,070 m^2), an equivalent ponding depth of ±0.06 m would fully contain the 1:100 year storm (refer to Drawing SWM).

Podium 1:

Based on a 4 L/s ICD (horizontal ICD), minimum storage of 34 m^3 is required (Appendix E2). Based on Drawing SWM, 109 m^3 is provided by means of a 0.17 m depression.

Podium 2:

Based on a 4 L/s ICD (horizontal ICD), minimum storage of 25 m^3 is required (Appendix E2). Based on Drawing SWM, 47 m^3 is provided.



0.211 | 0.75 PODIUM
- AREA IN HECTARES
- RUNOFF COEFFICIENT (1:100YR)
- SURFACE DESC.

DRAINAGE BOUNDARY

DRAINAGE AREAS TO WALKLEY ROAD

DRAINAGE AREAS TO HALIFAX DRIVE

EXISTING CATCH BASIN

EXISTING STORM SEWER & MAINTENANCE HOLE

PROJECT:

2270 WALKLEY ROAD

DRAWING:

POST-DEVELOPMENT DRAINAGE CONDITIONS (DISTURBED SURFACES)

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS
www.jlrichards.ca

DESIGN:	KF
DRAWN:	SP/TB
CHECKED:	GF
JLR #:	28584-000.1

SCALE 1:750

DRAWING #: FIG. 4

PLOT DATE: July 25, 2019 2:09:34 PM

File Location: P:\28000\28584-000 - 2190 Walkley Road\5-Production\1-Civil\28584 C DST FIG.dwg

Underground storage:

Based on a 45 L/s ICD, minimum storage of 34 m^3 is required (Appendix E2). As noted above, the targeted peak flow in the MRM was set to 50% of 45 L/s. Based on Drawing SWM, 40.5 m^3 is provided by means of a 900mm HDPE underground storage pipe exceeding the minimum requirement. This storage pipe would be complete with a custom ICD at MH103A with an orifice size of 134mm to control to the allowable 45 L/s.

Walkley Road trunk system:

Underground storage:

Based on a 6 L/s ICD, minimum storage of 42 m^3 is required (Appendix E2). As noted above, the targeted peak flow in the MRM was set to 50% of 6 L/s. Based on Drawing SWM, 51 m^3 is provided by means of a 1350mm HDPE underground storage pipe (41 m^3) and associated catch basin maintenance hole storage of CBMH1 (1.5 m^3) and CBMH2 (8.5 m^3), exceeding the minimum requirement. This storage pipe would be complete with a custom ICD at CBMH2 with an orifice size of 49 mm to control to the allowable 6 L/s.

Based on the above stormwater management measures, a total combined flow of 65.0 L/s will be released during a 1:100 year storm which is below the combined total flow of 65.48 L/s. Drawing 28584-SWM highlights the maximum storage volume provided by each ponding area, as well as the maximum ponding depth and ponding elevation. Also included on Drawing S and Drawing SWM are 1:100 year ponding tables which specify the maximum storage volume, the maximum ponding depth and ponding elevation for each ponding area based on the 1:100 year storm event. The allocated ICD release rate for each ponding area was sized to ensure that the 1:100 year storm event could be detained within the ponding areas provided on site.

4.5.2 Water Quality

Storm runoff generated by the proposed 2270 Walkley Road apartment will be collected and conveyed by on-site storm sewers that will eventually outlet into the Ottawa River via a series of trunk storm sewers, man-made ditches, creeks (Ramsey and Green's). As shown on FIG 3 and FIG 4, the site includes substantial pavement surfaces under existing conditions totalling 2,680 m^2 (Table 4) which is reduced to 2060 m^2 under post-development conditions.

The RVCA was consulted to get advice on water quality control given the above-noted information (refer to Appendix E1). Given the distance of the Site to Green's Creek and the reduction of the asphalt surfaces in the post-development condition, the RVCA accepted that water quality improvements can be achieved through Best Management Practices (BMP). It is recommended that these measures be explored as part of the full detailed design of 2270 Walkley Road.

4.6 Summary and Conclusions

The storm and stormwater management solutions presented in this Site Servicing Report were found to fulfill the water quantity and quality criterion presented in Section 4.2. The calculated 1:100 year restricted peak flow of 65 L/s is found to be below the allowable peak flow of 65.48 L/s while BMPs will be explored at detailed design as water quality improvements. In light of the above, it is recommended that the storm and stormwater management solution shown on the Site Servicing Plan and Drainage & Ponding Plan (Drawings S and SWM) be implemented to provide storm servicing for the proposed development.

5.0 EROSION AND SEDIMENTATION CONTROL

During construction of the proposed site, appropriate erosion and sedimentation control measures, as outlined in the Ontario Ministry of Natural Resources (MNR) Guidelines on Erosion and Sediment Control for Urban Construction Sites, will be implemented to trap sediment on site. As a minimum, the following erosion and sedimentation control measures will be implemented and identified as part of Site Plan Control. Measures will include:

- Supply and installation of a silt fence barrier, as per OPSD 219.110;
- Supply and installation of filter fabric between the frame and cover of catch basins and maintenance holes adjacent to the project area during construction, to prevent sediment from entering the sewer system. The filter fabric is to be inspected regularly and corrected as required;
- Stockpiling of material during construction is to be located along flat areas away from drainage paths. For material placed on sloped areas, stockpiles are to be enclosed with a silt fence to protect watercourses;
- All catch basins are to be equipped with sumps, inspected frequently, and cleaned as required;
- Sandbags are to be placed blocking part of the sewer pipe in the connecting storm maintenance holes to eliminate construction debris from entering the existing storm sewer system. The sandbags are to be removed after the proposed storm sewers have been fully cleaned.

The proposed erosion control measures shall conform to the following documents:

- “Guidelines on Erosion and Sediment Control for Urban Construction Sites” published by Ontario Ministries of Natural Resources, Environment, Municipal Affairs, and Transportation & Communication, Association of Construction Authorities of Ontario and Urban Development Institute, Ontario, May 1987.
- “MTO Drainage Manual”, Chapter F: “Erosion of Materials and Sediment Control”, Ministry of Transportation & Communications, 1985.
- “Erosion and Sediment Control” Training Manual by Ministry of Environment, Spring 1998.
- Applicable Regulations and Guidelines of the Ministry of Natural Resources.

This report has been prepared for the exclusive use of LS GP Inc., for the stated purpose, for the named development. Its discussions and conclusions are summary in nature and cannot be properly used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report was prepared for the sole benefit and use of LS GP Inc. and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:

Guy Forget, P.Eng.

Reviewed by:

Karla Ferrey, P.Eng.

Appendix A

Site Plan and Legal Plan

METRIC
DISTANCES AND ELEVATIONS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

COORDINATES WERE DERIVED FROM REAL TIME NETWORK OBSERVATIONS (SMARTNET) MTM ZONE 9, NAD83 ORIGINAL.

COORDINATES HAVE BEEN DETERMINED TO AN URBAN ACCURACY IN ACCORDANCE WITH SECTION 14(2) OF O.REG 216/10.

POINT ID	NORTHING	EASTING
1	5027698.17	373284.10
2	5027460.86	372878.28

COORDINATES CANNOT IN THEMSELVES BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

TOPOGRAPHIC SURVEY OF
PART OF BLOCK 'L', PART OF BLOCK L3, AND ONE FOOT RESERVE REGISTERED PLAN 728 AND PART OF LOT 19, JG, (GLOUCESTER) CITY OF OTTAWA

SCALE 1 : 500

0 10 20 50 metres

FAIRHALL, MOFFATT & WOODLAND LIMITED
ONTARIO LAND SURVEYORS

ELEVATION NOTES

1. ELEVATIONS SHOWN HEREON ARE REFERRED TO GEODETIC DATUM (CGVD28).
2. ELEVATIONS FOR MANHOLE COVERS AND CATCH BASINS HAVE TO BE INDEPENDENTLY CONFIRMED BEFORE THEY CAN BE ACCEPTED FOR FINAL DESIGN OR CONSTRUCTION PURPOSES.
3. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARKS HAVE NOT BEEN ALTERED OR DISTURBED AND THAT THEIR RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS DRAWING.

UTILITY NOTES

1. THIS DRAWING CANNOT BE ACCEPTED AS ACKNOWLEDGING ALL UNDERGROUND UTILITIES AND IT WILL BE THE RESPONSIBILITY OF THE USER TO CONTACT THE RESPECTIVE UTILITY AUTHORITIES FOR CONFIRMATION OR LOCATION.
2. BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., A FIELD LOCATION OF UNDERGROUND PLANT BY THE PERTINENT UTILITY AUTHORITY IS MANDATORY.
3. ON SITE UNDERGROUND UTILITIES INFORMATION SHOWN ARE AS LOCATED BY MULTIVIEW LOCATES INC. UTILITIES HAVE BEEN LOCATED FOR A PORTION OF SITE ONLY.

NOTES

1. BEARINGS ARE GRID, DERIVED FROM OBSERVED REFERENCE POINTS ① AND ② BY REAL TIME NETWORK OBSERVATIONS AND ARE REFERRED TO THE CENTRAL MERIDIAN, 76°30'W LONGITUDE MTM ZONE 9, (NAD83 ORIGINAL).
2. DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR 0.999950.
3. ELEVATIONS ARE REFERRED TO GEODETIC DATUM (CGVD28).

LEGEND

□	– SURVEY MONUMENT SET
■	– SURVEY MONUMENT FOUND
SIB	– STANDARD IRON BAR
RIB	– ROUND IRON BAR
(P)	– REGISTERED PLAN 728
(P1)	– PLAN 5R–6261
(P2)	– PLAN 5R–11369
(M)	– MEASURED
(S)	– SET
(D)	– INST. N685696
PIN	– PROPERTY IDENTIFIER NUMBER
(SU)	– SOURCE UNKNOWN
(857)	– FAIRHALL, MOFFATT & WOODLAND LTD., O.L.S.
CB	– CATCH BASIN
MH	– MANHOLE
LS	– LAMP STANDARD
	– CONIFEROUS TREE
	– DECIDUOUS TREE
GV	– GAS VALVE
WV	– WATER VALVE
	– SIGN
UP	– UTILITY POLE
—W—	– WATERMAIN
— — —	– OVERHEAD UTILITY WIRES
—UH—	– UNDERGROUND HYDRO
—UB—	– UNDERGROUND BELL
—G—	– GAS MAIN
—ST—	– STORM SEWER
—S—	– SANITARY SEWER
	– CURB
—E—	– UNDERGROUND ELECTRICAL

THIS IS NOT A VALID COPY UNLESS EMBOSSED WITH SEAL

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON

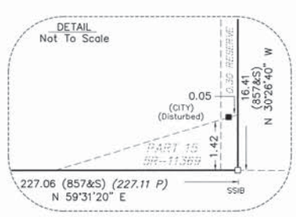
2018/05/31
DATE

JOHN H. GUTH
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2050403

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

DETAIL
Not To Scale

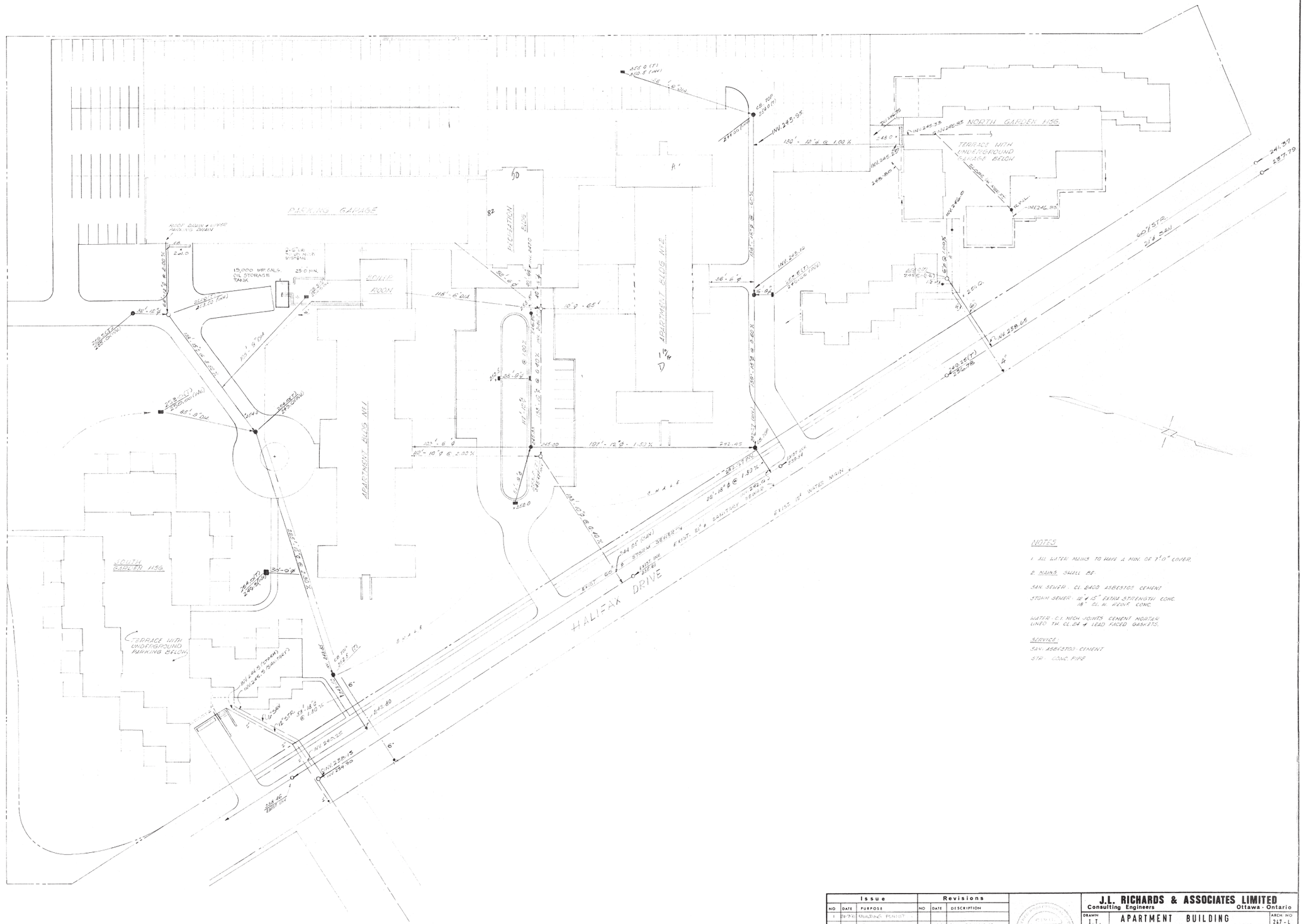


Fairhall Moffatt & Woodland LIMITED
ONTARIO LAND SURVEYORS
OTTAWA
Surveying and Land Information Services
100–1600 TENBY YDS DRIVE, KANATA, ONTARIO K2L 4B6
TEL: (613) 591–2580 FAX: (613) 591–1495
www.fmw.on.ca

JOB No. V15700
E373488.5, N5027833.0
REFERENCE No. 43 – 728 GR
G:\JOBS\V15700\DWG\25\
updated V157.2017.dwg (dj)
May 24, 2018

Appendix B

1968 Site Plan and Background Documents



NOTES

1. ALL WATER MAINS TO HAVE A MIN. OF 7'-0" COVER.

2. MAINS SHALL BE:

SAN. SEWER: CL. 2400 ASBESTOS CEMENT.

STORM SEWER: 12" & 15" EXTRA STRENGTH CONC.
18" CL. III REINF. CONC.

WATER: C.I. MECH. JOINTS, CEMENT MORTAR LINED TH. CL. 04 & LEAD FACED GASKETS.

SERVICE:

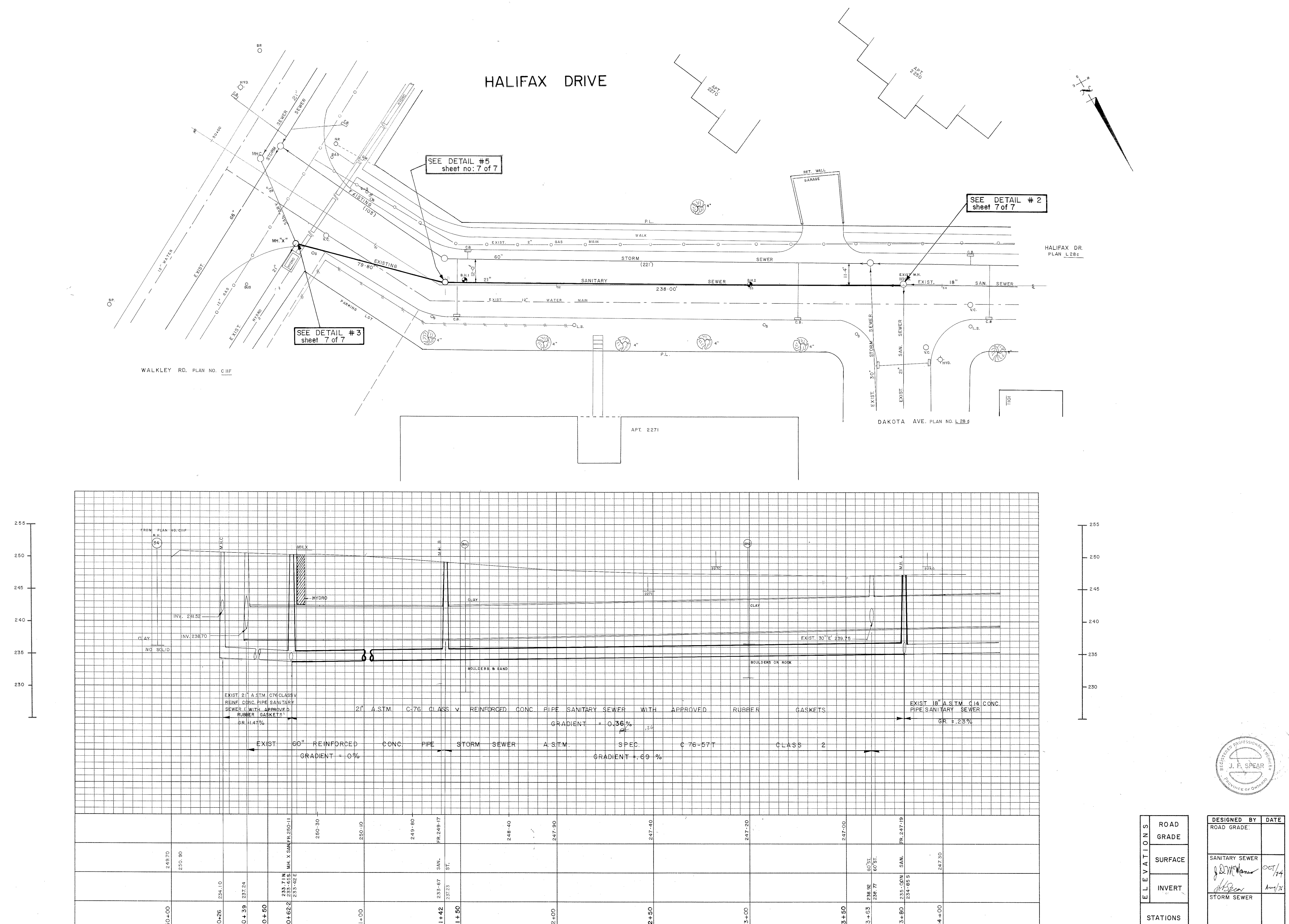
SAN: ASBESTOS CEMENT.

STR.: CONC. PIPE

Issue			Revisions		
NO	DATE	PURPOSE	NO	DATE	DESCRIPTION
1	28-7-68	BUILDING PERMIT			
			1	AUG/68	SAN. REVISIONS
			2	MAY/68	CB LEAD SIZES ADDED
		22/10/68 OIL TANK LOCATION	3	OCT/68	CONNECTIONS TO EXIST. SEWERS ADDED
		5/11/68 TH INSULATION CONFIRMED	4	OCT./68	WATER LOWERED W. OF APT. BLDG. NO. 2
6	24-11-68	REVISED AS SHOWN	5	OCT./68	STM. SEWER CHG. AS SHOWN

J.L. RICHARDS & ASSOCIATES LIMITED
Consulting Engineers — Ottawa · Ontario

DRAWN I.T.	APARTMENT BUILDING HALIFAX AVE. OTTAWA ONTARIO	ARCH. NO 247-L
CHECKED		ENG. NO 67-990
DATE 24.7.68	SITE PLAN	DRAW. NO
SCALE 1"= 32'-0"	URBANDALE REALTY CORP. LTD. OTTAWA ONTARIO	M-1



DATE	DESCRIPTION	DRAWN BY	APPROVED BY
JUNE 92	AS BUILT APPLIED, 27" SAN.	LRI(T.E.S.)BG	
SEPT 0/76	REALIGNED PROP. 21" SAN. INTER. WALKLEY RD.	G.Q.	

REVISIONS

NOTES:

- A MINIMUM 1' CLEARANCE TO BE MAINTAINED BETWEEN SEWERS AND WATERMAINS.
- UTILITIES SHOWN ARE TAKEN FROM BEST AVAILABLE RECORDS. CONTRACTOR IS 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.

REGISTERED PROFESSIONAL ENGINEER J. F. SPEAR PROVINCE OF ONTARIO

DESIGNED BY	DATE
ROAD GRADE:	
SANITARY SEWER	OCT/74 Aug/76
STORM SEWER	

CITY OF OTTAWA
DEPARTMENT OF PHYSICAL ENVIRONMENT
ENGINEERING AND SURVEYS BRANCH

HALIFAX DRIVE

FROM DAKOTA AVE. TO WALKLEY RD.

CHIEF DESIGN AND CONSTRUCTION ENGINEER

J.E. MacKenzie P.Eng. COMMISSIONER — L.D. Smith P.Eng. BRANCH DIRECTOR

DESIGNED BY: D. McMANUS
DRAWN BY: L. J. L.
CHECKED BY:
SCALES: HOR. 1" = 20' VERT. 1" = 6'
CONTRACT No. 76-27
DATE: AUG. / 76
SURVEY BOOKS: 3578
PLAN No.: 1327
SHEET 1 of 7

2321 B — 110 F 50 —

M 372-4

NO.	REVISION	BY	DATE

THE REGIONAL MUNICIPALITY OF OTTAWA-CARLETON
TRANSPORTATION DEPARTMENT
Design & Construction Division

DWG. NO. R-1606-11

WALKLEY ROAD RECONSTRUCTION
CONROY ROAD TO ST. LAURENT BOULEVARD

SHEET 11 OF 50

CONTRACT NO. 87-503

GRADING & DRAINAGE
STA. 13+600 — STA. 13+900

DATE: JULY, 1987

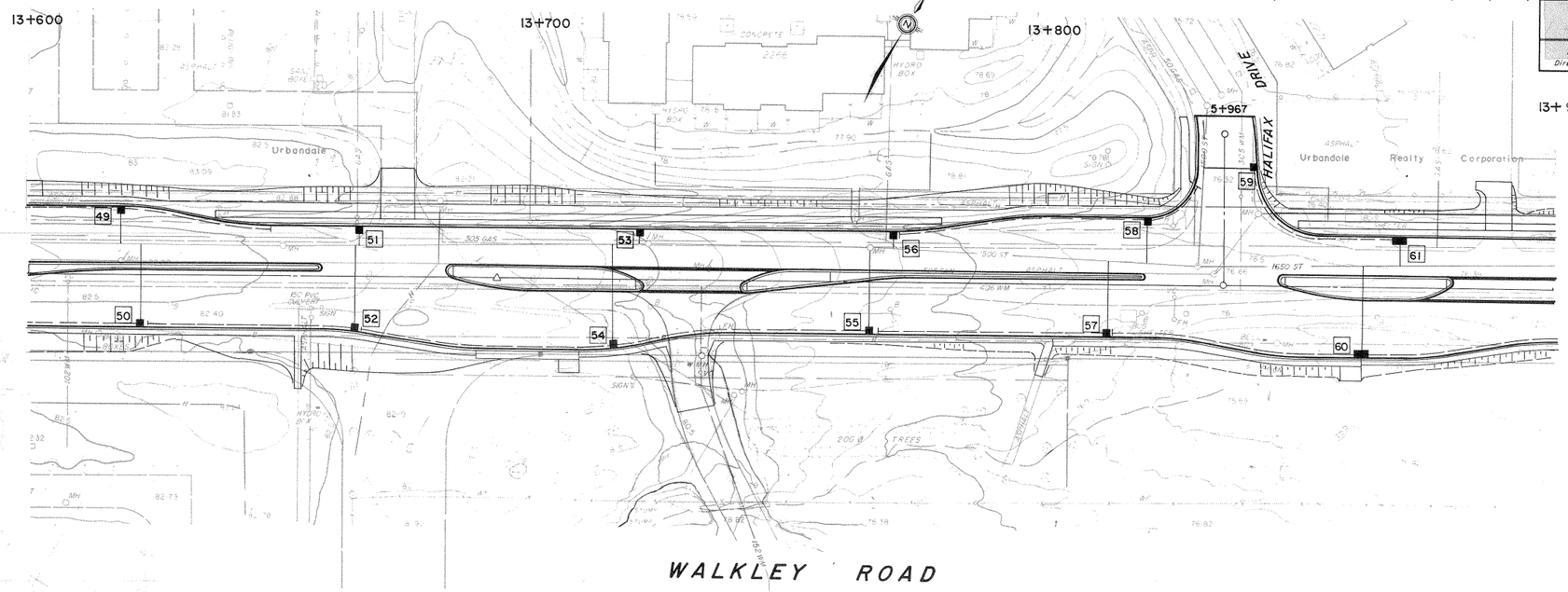
HORIZONTAL 0m 5 10 20
VERTICAL 0m 1 2

L.G. MORLEY — Director Design & Constr.
W.S. BEVERIDGE P.ENG. — Chief Design Engineer

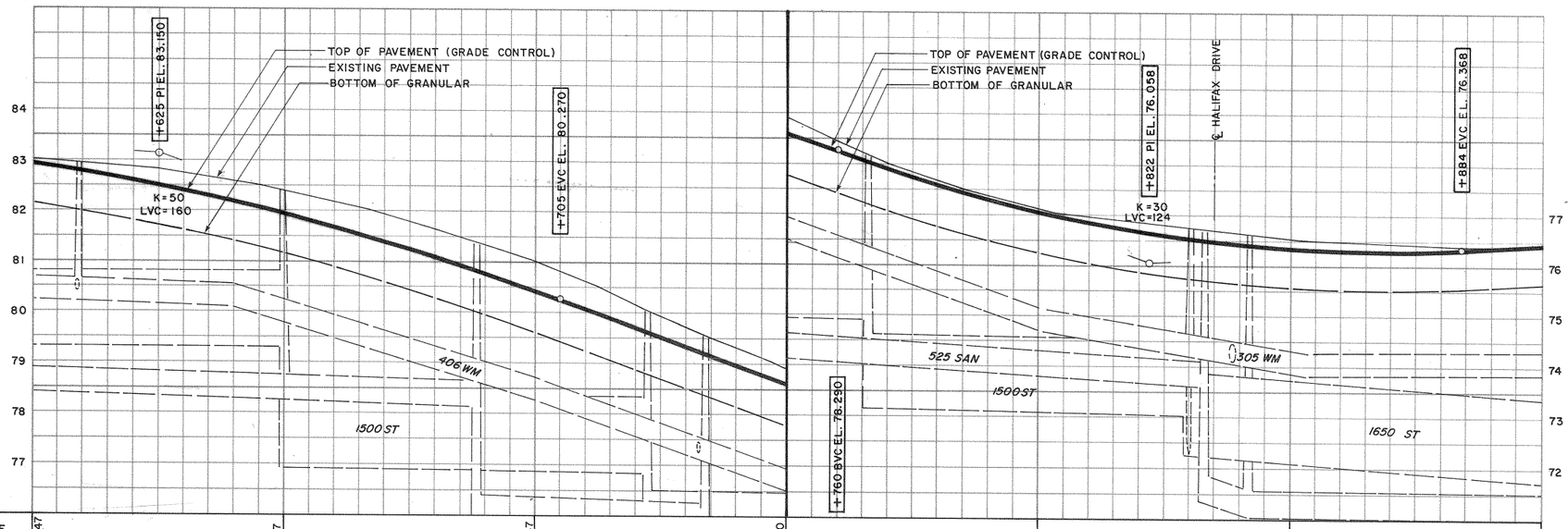
McCORMICK RANKIN
CONSULTING ENGINEERS

REGISTERED PROFESSIONAL ENGINEER P. TURNER PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER R.A. HUNTON PROVINCE OF ONTARIO

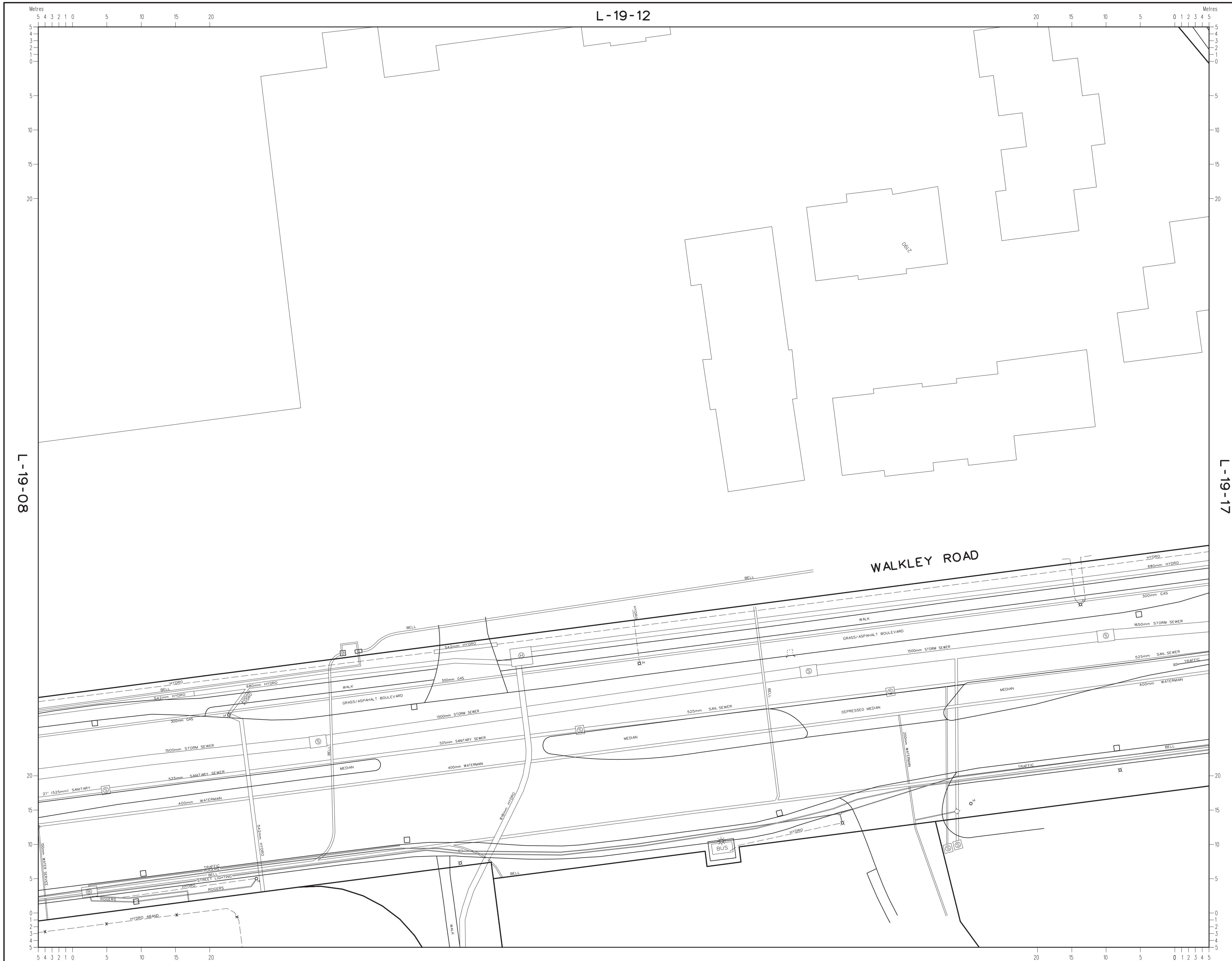


NOTE:
THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.



℄ PROFILE ELEVATIONS	82.947	81.947	80.447	78.650	77.115	76.389	76.448
STATION	13+600	13+650	13+700	13+750	13+800	13+850	13+900

TYPE-A DWG. FRAME: 790mm X 574mm



REVISIONS / RÉVISIONS	DATE	BY
HYDRO DATA DUMP - 2007 ADDED MISSING HYDRO DUCT	MARCH 08	DC
BELL - BEL020T108 (FEB 2003) NEW CUSTOMER CONDUIT ON S/S OF WALKLEY	MARCH 08	DC
CITY - OST04023 (NOV 2004) CONCRETE PAD ADDED TO S/S OF WALKLEY	MARCH 08	DC
BEL020T108 - WALKLEY (NOV 2002) NEW CONDUIT ADDED	JUL 2013	ZB
BEL09313 - WALKLEY (2009) NEW BELL HARDWARE INSTALLED	JUL 2013	ZB
ROG020T269 - WALKLEY (JUL 2002) ROGERS 18m NEW CONDUIT ADDED	JUL 2013	ZB
BELL1510539-WALKLEY RD(SEPT, 2016) BELL CONDUIT AND HARDWARE ON WALKLEY RD	MAY 2018	KJ
CITY, ALL EXTERNAL AGENCIES DIGITIZED FROM CITY/UTILITY DATA RECEIVED	MAY 2017	KJ

LEGEND

- Water Valve, Valve Chamber, Fire Hydrant
- Sewer Manhole, Catch Basin Manhole
- Catch Basin / Drainage, Wing Wall, Head Wall
- Pole, Pole w/ light, Decorative, Lawn Light
- Power Supply, Panel, Pedestal, Transformer, Tower, Regulator
- Amp, Hand Hole, Vault, Gas Valve
- OC Transpo: Bus Shelter-No Power, Energized, Isolated
- Streetscape: Planter Box, Grate Square, Eng. Soil
- Traffic Connect Box / Disconnect Box, SL Disconnect
- R.L Hand Hole, R.L. Camera
- Scada: Handhold, Monitoring Panel
- Reducer
- Pipe, Duct, Conduit, Lateral
- Culvert
- Abandoned
- Capped
- Buried Cable
- Property Line
- Install Year (2015)

TELECOM GLOSSARY

A	Allstream	P	Primus
AT	Atria	P2P	Canadian P2P Fibre
B	Bell	R	Rogers
BH	Birch Hill	S	Sprint
F	Fibre Noir	SL	Street Lighting
G	Globility	T	Traffic
GT	Group Telecom	TO	Telecom Ottawa
H	Hydro Ottawa	TU	Telus
H1	Hydro One	V	Videotron
L / L3	Level 3	Z	Zayo

GLOSSARY - OTHER

DD	Dept. of Defence	PED	Pedestal (owner unknown)
MH	Manhole (owner unknown)	PW	Public Works
O/OC	OCTranspo	UP	Utility Pole (owner unknown)
SCD	Scada		

CAUTION/ATTENTION

Although utility locations are established using the best available information, they cannot be guaranteed.
Property lines were compiled from plans and documents recorded in the Land Registry System and are for indexing purposes only.

Bien que l'emplacement des services publics soient établis en utilisant la meilleure information disponible, ils ne peuvent pas être garantis.
Des lignes de propriété ont été compilées en utilisant des plans et des documents enregistrés dans le système de cadastre et sont pour l'indexation seulement.

Ottawa

Right of Way, Heritage, and Urban Design Services /
Gestionnaire, Services des emprises, du patrimoine, et du design urbain
Planning, infrastructure and Economic Develompent Department /
Direction generale de la planification, de l'infrastructure et du developpement economique
100 Constellation Cres., 6th Floor East / 6ème Étage Est, Ottawa, ON K2G 6J8

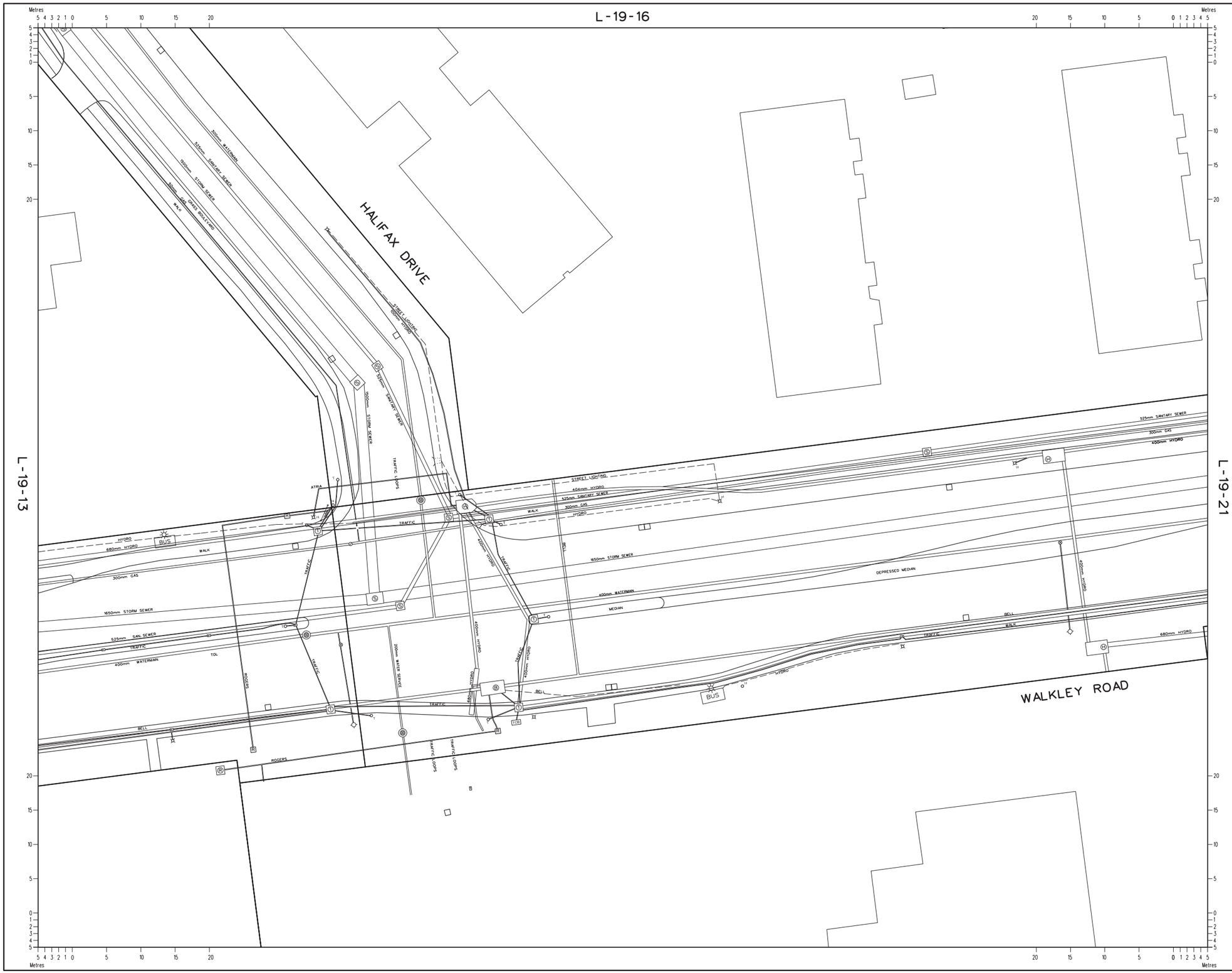
OTTAWA UTILITY COORDINATING COMMITTEE
CENTRAL REGISTRY
COMITÉ DE COORDINATION DES SERVICES PUBLICS D'OTTAWA
ENREGISTREMENT CENTRAL

PRODUCED BY: GIS & DATA MANAGEMENT BRANCH INFORMATION CENTRE UNIT

SCALE: 1 : 250

SHEET NUMBER
L-19-13

L-19-16



REVISIONS / RÉVISIONS	DATE	BY
REDRAWN FROM VOIDED UTILITY PLAN L-19-17	MARCH 08	DC
ROGERS - ROG 601 (JULY 2003) NEW CONDUITE ADDED TO S/S OF WALKLEY	MARCH 08	DC
ATR1030 - WALKLEY (2011) ATRIA 25.5m NEW CONDUIT ADDED	JUL 2013	ZB
CITY, ALL EXTERNAL AGENCIES DIGITIZED FROM CITY/UTILITY DATA RECEIVED	MAY 2018	KJ
WKL0205108 - WALKLEY RD (2015) BELL MANHOLE AND CONDUIT ON WALKLEY RD	MAY 2018	KJ

LEGEND

- Water Valve, Valve Chamber, Fire Hydrant
- Sewer Manhole, Catch Basin Manhole
- Catch Basin / Drainage, Wing Wall, Head Wall
- Pole, Pole w/ light, Decorative, Lawn Light
- Power Supply, Panel, Pedestal, Transformer, Tower, Regulator (PS, PED, GR)
- Amp, Hand Hole, Vault, Gas Valve
- OC Transpo: Bus Shelter-No Power, Energized, Isolated (BUS)
- Streetscape: Planter Box, Grate Square, Eng. Soil (TGS)
- Traffic Connect Box / Disconnect Box, SL Disconnect (TCB, TTSR, SDS)
- R.L Hand Hole, R.L. Camera (THH)
- Scada: Handhold, Monitoring Panel
- Reducer
- Pipe, Duct, Conduit, Lateral
- Culvert
- Abandoned
- Capped
- Buried Cable
- Property Line
- Install Year (2015)

TELECOM GLOSSARY

A	Allstream	P	Primus
AT	Atria	P2P	Canadian P2P Fibre
B	Bell	R	Rogers
BH	Birch Hill	S	Sprint
F	Fibre Noir	SL	Street Lighting
G	Globility	T	Traffic
GT	Group Telecom	TO	Telecom Ottawa
H	Hydro Ottawa	TU	Telus
H1	Hydro One	V	Videotron
L / L3	Level 3	Z	Zayo

GLOSSARY - OTHER

DD	Dept. of Defence	PED	Pedestal (owner unknown)
MH	Manhole (owner unknown)	PW	Public Works
O/OC	OCTranspo	UP	Utility Pole (owner unknown)
SCD	Scada		

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Property lines were compiled from plans and documents recorded in the Land Registry System and are for indexing purposes only.

Bien que l'emplacement des services publics soient établis en utilisant la meilleure information disponible, ils ne peuvent pas être garantis.

Des lignes de propriété ont été compilées en utilisant des plans et des documents enregistrés dans le système de cadastre et sont pour l'indexation seulement.

Ottawa
Right of Way, Heritage, and Urban Design Services / Gestionnaire, Services des emprises, du patrimoine, et du design urbain
Planning, Infrastructure and Economic Development Department / Direction generale de la planification, de l'infrastructure et du developpement economique
100 Constellation Cres., 6th Floor East / 6ème Étage Est, Ottawa, ON K2G 6J8

OTTAWA UTILITY COORDINATING COMMITTEE
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INFORMATION CENTRE UNIT

SCALE: 1 : 250

SHEET NUMBER
L-19-17

Appendix C

Pre-Consultation Notes

Karla Ferrey

From: Marcel Denomme <mdenomme@urbandale.com>
Sent: January 24, 2019 11:15 AM
To: Lucie Dalrymple
Cc: Roger Tuttle
Subject: FW: 2190 Halifax Dr - Preconsult Follow-up
Attachments: Pland and Study List_2190 Halifax.docx

Hi Lucy

Below and attached are the minutes of the pre-consult meeting with the City. Can you also include a schedule with your proposal as to when you would be providing the appropriate plans and studies supporting our re-zoning and site plan application.

Thanks

Marcel Denomme
Vice President of Land Development
Urbandale Corporation
mdenomme@urbandale.com
T: 613-731-6712 ext: 1230
C: 613-889-6204

Urbandale
www.urbandale.com

From: Bernier, John [mailto:John.Bernier@ottawa.ca]
Sent: January-31-18 8:29 AM
To: Marcel Denomme <mdenomme@urbandale.com>
Subject: 2190 Halifax Dr - Preconsult Follow-up

Good morning Marcel,

It was nice meeting you on January 17th, 2018 for our pre-consultation meeting (PC2017-0350). We had discussed the development of a 15-storey rental apartment building at 2190 Halifax Drive. The proposal includes two additional entrances on Walkley Road, a reconfiguration of the internal drive aisles, and an expansion of the underground parking garage.

Planning Comments:

1. Zoned Residential Fifth Density, Subzone B, with a maximum height of 39 metres [**R5B H (39)**].
2. The Official Plan designates this property **General Urban Area**.
3. The current zoning does not support 15 storeys, as 39 metres translates to approximately 12 storeys. 12 is a height that is already above what we would normally see and allow in the General Urban Areas.

4. An OPA would be required for the additional three storeys. However, it is difficult to support at this time, as there is clear direction in OPA 150 to discourage intensification outside of Mainstreets or Transportation Corridors.
5. 12 storeys is allowed, but perhaps 9 storeys is a better fit in terms of the massing and design being proposed.
6. Think about loading areas and connections to the building from these.
7. Include more tree plantings and landscaping.
8. Explore opportunities for at-grade commercial space, which are allowed as of right in high-rise buildings. Permitted commercial uses include: Personal Service Business, Retail Store (limited to florist, pharmacy, newsstand), Restaurant.
9. Provide walkway connections to the street and to the internal areas of the site. For instance, a protected crossing (pavement markings and landscaped buffers on either side to facilitate this) to the pool link path.
10. Recommend consulting with Councillor Jean Cloutier.

Forestry Comments:

11. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City; an approved TCR is a requirement of Site Plan Approval
12. Any removal of privately-owned trees 10cm or larger in diameter require a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
13. In this case, the TCR may be combined with the Landscape Plan,
14. the TCR must list all trees on site by species, diameter and health condition; if only a small portion of a property is being impacted, the TCR only needs to cover the area that may be impacted by the development. Note that the TCR must address all trees with a critical root zone that extends into the developable area.
15. If trees are to be removed, the TCR must clearly show where they are and document the reason they can not be retained
16. All retained trees must also be shown and all retained trees within the area impacted by the development process must be protected as per the City guidelines listed on Ottawa.ca
17. Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees
18. The City does encourage the retention of healthy trees wherever possible; please ask your design/planning team to find opportunities for retention wherever possible if the trees are healthy and will contribute to the design/function of the site. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca
19. The removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR; note that Forestry Services may ask for compensation for any City-owned tree that has to be removed.

Transportation Comments:

20. Walkley Road is designated as an Arterial road within the City's Official Plan with a ROW protection of 44.5 metres. The ROW limits are to be shown on all the drawings and the offset distance (22.25 metres) to be dimensioned from the existing centerline of pavement.

21. ***ROW interpretation*** – Land for a road widening will be taken equally from both sides of a road, measured from the centreline in existence at the time of the widening if required by the City. The centreline is a line running down the middle of a road surface, equidistant from both

edges of the pavement. In determining the centreline, paved shoulders, bus lay-bys, auxiliary lanes, turning lanes and other special circumstances are not included in the road surface.

22. The TIA (Transportation Impact Assessment) Guidelines (2017) were approved by Transportation Committee and City Council on June 14, 2017. The new version of the TIA Guidelines (2017) that are posted on the web are now to be used for the TIA Submission for development applications.

    The following list highlights the significant changes to the 2006 TIA Guidelines
    a) A Screening Test (Step 1) quickly determines if a transportation study is required. Consultants should fill in the form in Appendix B.
    b) Study Scope (Step 2) is site specifically tailored; there are no longer three defined types of TIA reports. Scoping report is required and needs to be signed off by TPM before the consultant moves on to Forecasting volumes.
    c) Sign off from City Transportation Project Manager is required at key points in the review process prior to TIA Submission (Step 5). See Figure 1 on page 9 for a good flow chart of the process.
    d) Multi Modal Level of Service (MMLOS) and Complete Street analysis is required to assess the impact of all modes of travel rather than just vehicle traffic.
    e) There is no longer a requirement for consultant pre-approval. Consultants must now sign and submit the Credentials Form included in the Appendix A with each TIA report.
    f) The TIA Submission (report, drawings and/or monitoring plan) is required **with** the development application.

    Click on the website;

    http://documents.ottawa.ca/sites/documents.ottawa.ca/files/tia_guidelines_en.pdf

23. Permanent structures such as curbing, stairs, retaining walls, and underground parking foundation also bicycle parking racks are not to extend into the City's right-of-way.

24. The concrete sidewalks should be 2.0 metres in width and be continuous and depressed through the proposed accesses (please refer to the City's sidewalk and curb standard drawing SC7.1 for unsignalized entrance).

25. Underground access ramp must be minimum 6.7 metres wide for 2-way traffic. If ramp exceeds 6% grade, a subsurface melting element will be required.

26. Show fire route on Site Plan. Minimum lane width for fire trucks is 6.0 metres. The fire route is to be approved by the Fire Chief.

27. The minimum clear throat length required is 15.0 metres from end of curb radius. Please refer to TAC Manual Part 2; Table 3.2.9.3 and Figure 3.2.5.2 for appropriate throat length and dimensioning.

28. Please note that Section 4.3 of the Official Plan requires that the proposed development include safe, direct and attractive pedestrian access form the public to the major building entrance. The plans must also include pedestrian connections to the optional additional developments should they proceed.

29. The distance between the nearest limits of a private approach intended for two-way vehicular traffic and any other private approach to the same property shall be a minimum of 9 metres measured at the street line, and at the curb line or roadway edge.

30. All one-way private approaches shall be designated with suitable signs erected in a conspicuous location adjacent to the highway to indicate the direction of traffic for which the private approach is intended, and all signs shall be erected and maintained by the owner to the satisfaction of the General Manager.

31. Curb returns are to be provided at the accesses with a minimum radius of 5.0 metres and are to be dimensioned on the drawings.

32. The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb and boulevard to City standards.

33. Please identify the type of delivery truck that would be servicing the site.

34. Lay-by is to be a minimum of 3.0 metres in width, corner radii of 5.0 metres and ensure for proper drainage.

35. Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe, secure places near main entrances and preferably protected from the weather.

Urban Design comments:

Please consider:

36. Place-making as a way to integrate the new building into the existing site with regard to connectivity and relationship to the pedestrian realm;
37. Relating the base of the new building to the existing low profile context on the site and in the neighbourhood as a whole through material and architectural treatment;
38. Improvements to the buffer area between the street and the building; ie sidewalks, tree planting etc.

Additional comment:

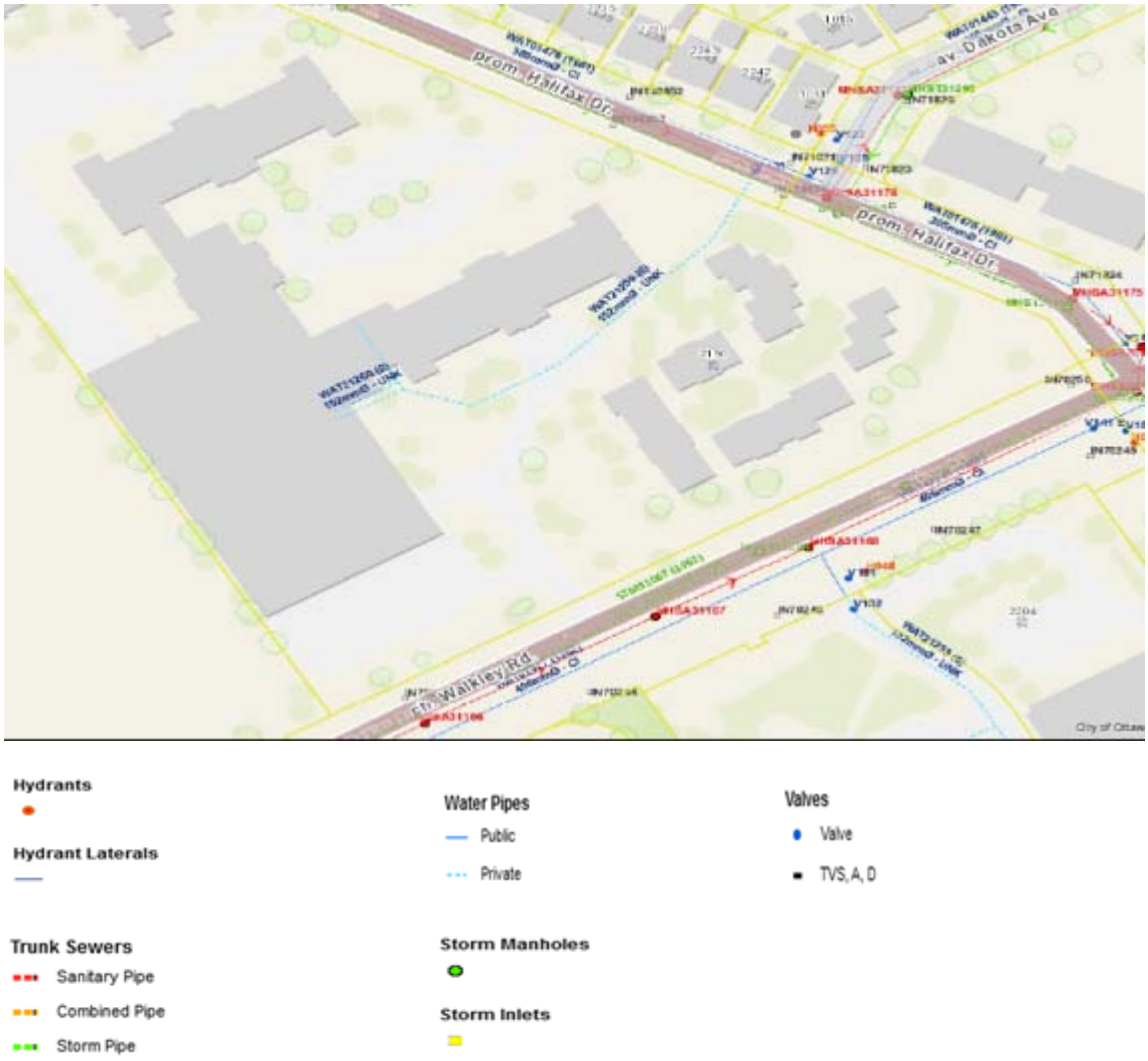
39. To better evaluate the additional height and building proposal on the site please provide some basic 3d modelling of the site and its immediate built context demonstrating the massing relationships

Engineering Comments:

40. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans
41. Servicing and site works shall be in accordance with the following documents:
    - ⇨ Ottawa Sewer Design Guidelines (October 2012) and Technical Bulletin PIEDTB-2016-01
    - ⇨ Ottawa Design Guidelines – Water Distribution (2010) and Technical Bulletins ISD-2010-2 and ISDTB-2014-02

- ⇨ 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)

42. 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 or by phone at (613) 580-2424 x.44455).
43. The Stormwater Management Criteria, for the subject site, is to be based on the following:
    i. The 5-yr storm event should be using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
    ii. The existing servicing under Walkley Road and Halifax Drive were built around 1962. For separated sewer system built pre-1970 the design of the storm, sewers are based on a 2-year storm.
    iii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
    iv. A calculated time of concentration (Cannot be less than 10 minutes).
    v. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.
    vi. Stormwater quality control criteria must consult with Rideau Valley Conservation Authority (RVCA).
44. Deep Services (Storm, Sanitary & Water Supply)



i. A plan view of the existing services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of existing services is:

   a. Halifax Drive:

      i. Sanitary – 450 mm Conc.

      ii. Storm – 1500 mm Concrete Reinforced.

      iii. Water – 305 mm Concrete Reinforced.

   b. Walkley Road:

      i. Sanitary – 525 mm Concrete Reinforced.

      ii. Storm – 1500 mm Concrete Reinforced.

      iii. Water – 406 mm Concrete Reinforced.

ii. As per City's Sewer Design guideline a monitoring manhole shall be required just inside the property line located in an accessible location (ie. Not in a parking area) for all non-residential and multi residential buildings connections from a private sewer to a public sewer.

iii. As per City's Sewer Design guideline it is expected that the alternative of a high level sewer in a public right-of-way and connected to the collector sewer is the preferred method of servicing properties.

iv. New connections to sewer or watermain services within Walkey Road and Halifax Drive are subject to City approval and to be made above the springline of the sewermain as per:

a. Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*

b. Std Dwg S11 (For rigid main sewers) – *lateral must be less that 50% the diameter of the sewermain,*

c. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – *for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,*

d. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

e. No submerged outlet connections.

45. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

i. Location of service

ii. Type of development and the amount of fire flow required (as per FUS, 1999).

iii. Average daily demand: ___ l/s.

iv. Maximum daily demand: ___l/s.

v. Maximum hourly daily demand: ___ l/s.

vi. Hydrant location and spacing to meet City's Water Design guidelines.

46. MOECC ECA Requirements –

An MOECC Environmental Compliance Approval may be required for the proposed development. Please contact Ontario Ministry of the Environment and Climate Change, Ottawa District Office to arrange a pre-submission consultation:

For residential applications: Charlie Primeau

(613) 521-3450, ext. 251

Charlie.Primeau@ontario.ca

For I/C/I applications: Emily Diamond

(613) 521-3450, ext. 238

Emily.Diamond@ontario.ca

47. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
48. General comments –
    I. Note: from the aerial imagery, it seems water servicing under Walkley Road is close to the median. Design, excavation and construction should be planned accordingly.

Should you have any questions or require additional information, please contact Sharif (Project Manager) directly at (613) 580-2424, x 20763 or by email at sharif.sharif@ottawa.ca.

The proposed application will be a Site Plan Control Application (new - Manager Approval, Public Consultation), which costs **$21,508.66** (click here for exact fees), plus the engineering design review and inspection fee, legal fees, as well as conservation authority fee of $105.

Please find attached the "Applicant's Study and Identification List" including the number of copies required for each in order for the application to be deemed complete. Here is the link to the guide for preparing studies and plans: *http://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2-3*

Best regards,

John Bernier
Planner
Development Review - South
Planning, Infrastructure and Economic Development Department
City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext/poste. 21576
ottawa.ca/planning / ottawa.ca/urbanisme

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Appendix D1

Water Demand Calculations and Schematic sis of Reports

2190 Walkely Road
Residential Development - Apartment Building
Model Schematic

Water Demand Calculations
2270 Walkley Road (JLR 28584-001)

2270 Walkley Road		
No. 1 bed room apartment	138	units
Density	1.4	p/p/u
No. Ppl	193	ppl
No. 2 bed room apartment	32	units
Density	2.1	p/p/u
No. Ppl	67	ppl
No. 3 bed rooms apartment	32	units
Density	3.1	p/p/u
No. Ppl	100	ppl
Population total	360	
Average Day Consumption Rate	350	L/c/d
Average Day Demand	**1.46**	**L/s**
Maximum Day Peaking Factor	3.4	x Avg Day (Table 3-3, MOE 2008)
Maximum Day Demand	**4.96**	**L/s**
Peak Hour Peaking Factor	5.1	x Avg Day (Table 3-3, MOE 2008)
Peak Hour Demand	**7.44**	**L/s**

Appendix D2

Fire Flow Calculations

FUS Fire Flow Calculations

2270 Walkley Road - JLR 22584-001.1

Step	Parameter	Value		Note
A	Type of Construction	Non-combustible		
	Coefficient (C)	0.8		
B	Ground Floor Area	971	m^2	
C	Height in storeys	17	storeys	Excluding Parking Garage 50% below Grade
	Total Floor Area	16507	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	22612	L/min	
	Rounded Fire Flow	23000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Limited Combustible		Residential buildings have a limited combustible occupancy
	Occupancy Charge	-15%		
	Occupancy Increase or Decrease	-3450		
	Fire Flow	19550	L/min	No rounding applied.
F	Sprinkler Protection	Automatic Fully Supervised		
	Sprinkler Credit	-50%		
	Decrease for Sprinkler	-9775	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Non-combustible		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	12	storeys	
	Length-Height Factor	180.0	m-storeys	
	Separation Distance	45.8	m	
	North Side Exposure Charge	0%		
	East Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	50.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	100.0	m-storeys	
	Separation Distance	51	m	
	East Side Exposure Charge	0%		
	South Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Non-combustible		
	Length of Exposed Wall:	48.0	m	
	Height of Exposed Wall:	15	storeys	
	Length-Height Factor	720.0	m-storeys	
	Separation Distance	86	m	
	South Side Exposure Charge	0%		
	West Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	24.5	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	49.0	m-storeys	
	Separation Distance	235	m	
	West Side Exposure Charge	0%		
	Total Exposure Charge	0%		All seperations exceed 45 m
	Increase for Exposures	0	L/min	
H	Fire Flow	9775	L/min	
	Rounded Fire Flow	10000	L/min	Flow rounded to nearest 1000 L/min.
	Required Fire Flow (RFF)	**10000**	**L/min**	
		167	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

Appendix D3

Hydraulic Boundary Conditions

From: Sharif, Sharif
To: Guy Forget; Bernier, John
Cc: Roger Tuttle; Karla Ferrey
Subject: RE: Hydraulic Boundary Conditions for the 2270 Walkley Road redevelopment - Urbandale
Date: Friday, March 29, 2019 4:24:22 PM
Attachments: image001.png
image005.emz
2270 Walkley MArch 2019.pdf

Good Afternoon Guy,

Here is the water boundary condition for the proposed development. If you have any question please let me know.

The following are boundary conditions, HGL, for hydraulic analysis at 2270 Walkley (zone 2C) assumed to be connected to the 406mm on Walkley (see attached PDF for location).

Minimum HGL = 124.4m

Maximum HGL = 130.3m

MaxDay + FireFlow (167 L/s) = 124.0m

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.

Have a great weekend!

Regards,

Sharif

From: Guy Forget <gforget@jlrichards.ca>
Sent: March 27, 2019 10:22 AM
To: Bernier, John <John.Bernier@ottawa.ca>
Cc: Roger Tuttle <rtuttle@urbandale.com>; Karla Ferrey <kferrey@jlrichards.ca>; Sharif, Sharif <sharif.sharif@ottawa.ca>
Subject: RE: Hydraulic Boundary Conditions for the 2270 Walkley Road redevelopment - Urbandale

Hi John,

FUS fire flow calculations as per the City's protocol with all 4 exposure distances exceeding 45 m. Hydrant spacing (limiting flow vs distance) will be reviewed in accordance with the protocol.

Guy

Guy Forget, P.Eng., LEED AP
Associate
Senior Water Resources Engineer

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-3571 Fax: 613-728-6012

From: Bernier, John <John.Bernier@ottawa.ca>
Sent: Tuesday, March 26, 2019 3:14 PM
To: Guy Forget <gforget@jlrichards.ca>
Cc: Roger Tuttle <rtuttle@urbandale.com>; Karla Ferrey <kferrey@jlrichards.ca>; Sharif, Sharif <sharif.sharif@ottawa.ca>
Subject: RE: Hydraulic Boundary Conditions for the 2270 Walkley Road redevelopment - Urbandale

Best regards,

Please provide an FUS calculation sheet. You can use NFPA standard for the site and internal fire flow calculation but for water boundary condition and fire flow demand from the City watermain, the water resources department require FUS.

For further inquiries, you can contact the Project Manager directly.

Sharif Sharif
sharif.sharif@ottawa.ca // 613-580-2400 x20763

Thanks,

John Bernier
Planner
Development Review South
City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext/poste. 21576
ottawa.ca/planning / ottawa.ca/urbanisme

From: Guy Forget <gforget@jlrichards.ca>
Sent: March 26, 2019 2:23 PM
To: Bernier, John <John.Bernier@ottawa.ca>

Cc: Roger Tuttle <rtuttle@urbandale.com>; Karla Ferrey <kferrey@jlrichards.ca>
Subject: RE: Hydraulic Boundary Conditions for the 2270 Walkley Road redevelopment - Urbandale

Hi John,

See our response below in red

i. Location of service (provide a figure/ map showing the connection location). The proposed watermain servicing the building will be off the Walkley Road 406 mm diameter feedermain. We will coordinate the exact location with the mechanical engineer. The proposed watermain will be located in the area denoted in a cloud (refer to the attached).

ii. Type of development and the amount of fire flow required (as per FUS, 1999). (provide the FUS calculation sheet). Given the type of usage, Section 11.2.2 of NFPA Standards governs rather that the FUS. On this basis, the fire flow requirement is 74.58 L/s.

iii. Average daily demand: ___ l/s. 1.43 L/s

iv. Maximum daily demand: ___l/s. 5.38 L/s

v. Maximum hourly daily demand: ___ l/s. 11.83 L/s

vi. Hydrant location and spacing to meet City's Water Design guidelines. Our submission will develop hydrant spacing that will meet City of Ottawa Design Guidelines.

Guy

Guy Forget, P.Eng., LEED AP
Associate
Senior Water Resources Engineer

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-3571 Fax: 613-728-6012

From: Bernier, John <John.Bernier@ottawa.ca>
Sent: Tuesday, March 26, 2019 2:05 PM
To: Karla Ferrey <kferrey@jlrichards.ca>
Cc: Guy Forget <gforget@jlrichards.ca>; Roger Tuttle <rtuttle@urbandale.com>
Subject: RE: Hydraulic Boundary Conditions for the 2270 Walkley Road redevelopment - Urbandale

Hi Carla,

Can you please fill out the following?

1. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

    i. Location of service (provide a figure/ map showing the connection location)

    ii. Type of development and the amount of fire flow required (as per FUS, 1999). (provide the FUS calculation sheet)

    iii. Average daily demand: ___ l/s.

    iv. Maximum daily demand: ___l/s.

    v. Maximum hourly daily demand: ___ l/s.

    vi. Hydrant location and spacing to meet City's Water Design guidelines.

John Bernier
Planner
Development Review South
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ottawa.ca/planning / ottawa.ca/urbanisme

From: Karla Ferrey <kferrey@jlrichards.ca>
Sent: March 26, 2019 8:48 AM
To: Bernier, John <John.Bernier@ottawa.ca>
Cc: Guy Forget <gforget@jlrichards.ca>; Roger Tuttle <rtuttle@urbandale.com>
Subject: Hydraulic Boundary Conditions for the 2270 Walkley Road redevelopment - Urbandale

Hi John,

As discussed on our phone conversation this morning, we would like to obtain hydraulic boundary conditions for the 2270 Walkley Road redevelopment (refer to Figure 1 below for Site Location).

Figure 1: Site Location

The proposed redevelopment will consist of a 15 storey high-rise building that will include 180 apartments; 60 x 3 bedrooms and 120 x 1 bedroom apartments (refer to attached Site Plan). A total population of 354 was calculated based on Section 4.3 of the OSDG (densities of 3.1 person/unit and 1.4 person/unit for the 3-bedroom and 1-bedroom apartments). Given the proximity of the site to the Walkley Road (refer to the attached Site Plan), it is proposed to supply potable water to the 15 storey high-rise apartment building from the Walkley Road 406 mm diameter feedermain (see attached for infrastructure along Walkley Road). It is anticipated that one single connection will be made to the Walkley Road 406 mm diameter feedermain which will into two service on private property (one for domestic and one for fire suppression system). Based on a population of 354, the theoretical domestic water demands are as follows:

Average day = 1.43 L/s;
Max Day = 5.38 L/s;
Peak Hour = 11.83 L/s.

As this redevelopment consists of a 15 storey high-rise building, fire flow are to be based on NFPA Standards (Section 11.2.2) which requires that the overall fire flow requirements be calculated between; i) the fire suppression system, and ii) the anticipated hose stream. Given that a residential occupancy is “ordinary hazard”, the overall fire flow requirements is 4,150 L/min or 69.2 L/s; 3,200 L/min for the fire suppression system and 950 L/min for the total combined hose. Therefore, the boundary condition under a maximum day plus fire flow should be estimated based on 74.58 L/s (5.38 L/s + 69.2 L/s).

If there is any questions, please feel free to call me.

Thank you

Karla Ferrey, P.Eng.
Associate
Senior Civil Engineer

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-3571 Fax: 613-728-6012

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Appendix D4

Peak Hour Simulation Results

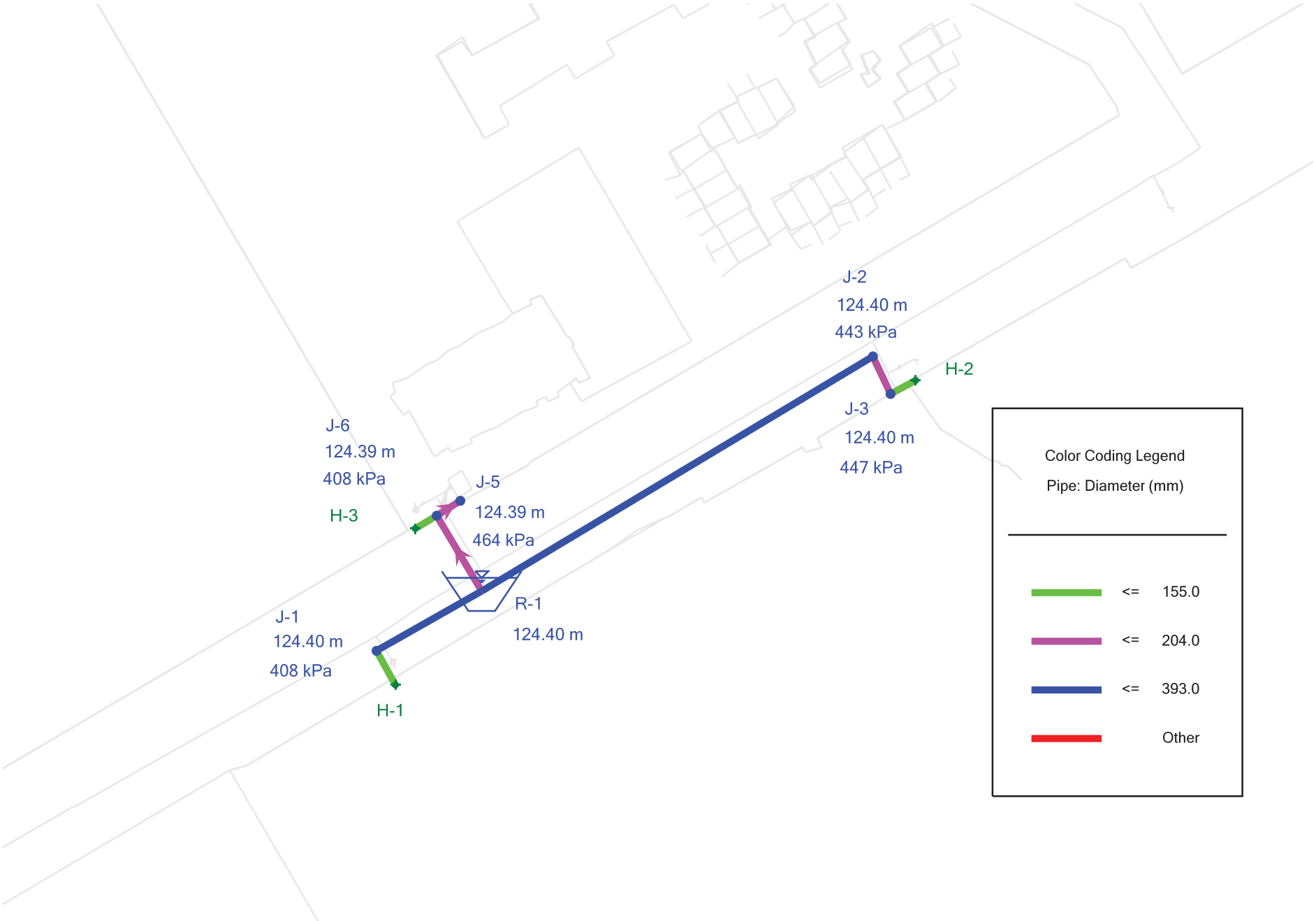
2190 Walkely Road
Residential Development - Apartment Building
Peak Hour Demand
Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-6	82.74	0.00	124.39	408
J-1	82.68	0.00	124.40	408
J-2	79.12	0.00	124.40	443
J-3	78.76	0.00	124.40	447
J-5	77.00	7.44	124.39	464

2190 Walkely Road
Residential Development - Apartment Building
Peak Hour Demand
Pipe Table

Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Hydraulic Grade (Start) (m)	Hydraulic Grade (Stop) (m)	Flow (L/s)	Velocity (m/s)
P-5	7	155.0	PVC	100.0	124.39	124.39	0.00	0.00
P-6	8	204.0	PVC	110.0	124.39	124.39	-7.44	0.23
P-4	24	204.0	PVC	110.0	124.39	124.40	-7.44	0.23
P-7	33	393.0	PVC	120.0	124.40	124.40	0.00	0.00
P-8	126	393.0	PVC	120.0	124.40	124.40	0.00	0.00
P-9	11	155.0	PVC	100.0	124.40	124.40	0.00	0.00
P-10	11	204.0	PVC	110.0	124.40	124.40	0.00	0.00
P-11	8	155.0	PVC	100.0	124.40	124.40	0.00	0.00

2190 Walkely Road
Residential Development - Apartment Building
Peak Hour Demand



Appendix D5

Maximum Day Plus Fire Flow Simulation Results

2190 Walkely Road

Residential Development - Apartment Building

Max Day Demand + Fire Flow Requirement (10,000 L/min)

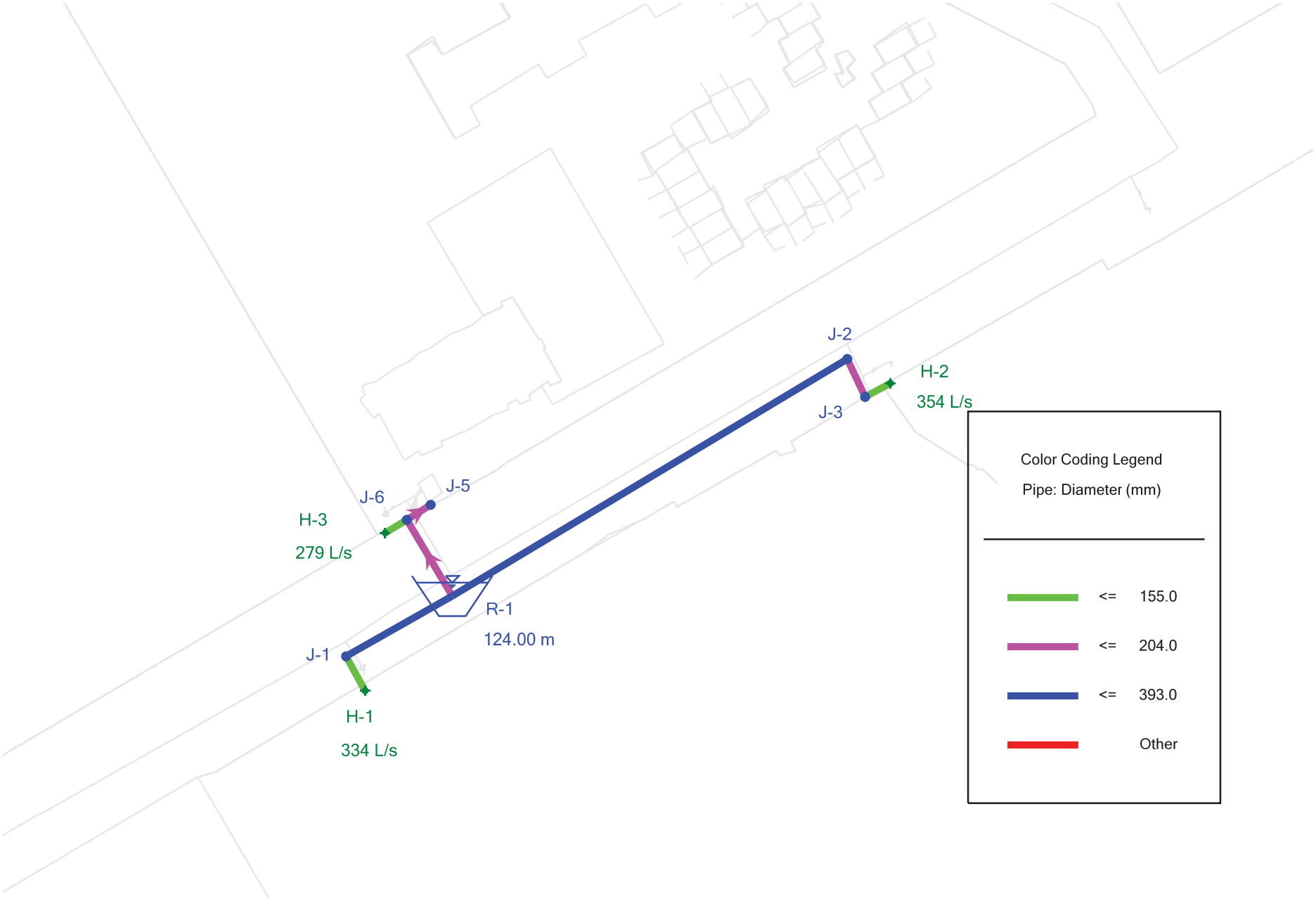
Hydrant Table

Label	Fire Flow (Needed) (L/s)	Fire Flow (Available) (L/s)	Flow (Total Available) (L/s)	Satisfies Fire Flow Constraints?	Pressure (Residual Lower Limit) (kPa)	Pressure (Calculated Residual) (kPa)	Junction w/ Minimum Pressure (System)
H-2	167	354	354	True	140	140	J-3
H-1	167	334	334	True	140	140	H-3
H-3	167	279	279	True	140	140	J-6

2190 Walkely Road

Residential Development - Apartment Building

Max Day Demand + Fire Flow Requirement (10,000 L/min)



Appendix D6

Maximum Pressure Check

2190 Walkely Road
Residential Development - Apartment Building
Max Pressure Check
Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-6	82.74	0.00	130.30	465
J-1	82.68	0.00	130.30	466
J-2	79.12	0.00	130.30	501
J-3	78.76	0.00	130.30	504
J-5	77.00	0.00	130.30	522

2190 Walkely Road
Residential Development - Apartment Building
Max Pressure Check
Pipe Table

Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Hydraulic Grade (Start) (m)	Hydraulic Grade (Stop) (m)	Flow (L/s)	Velocity (m/s)
P-4	24	204.0	PVC	110.0	130.30	130.30	0.00	0.00
P-5	7	155.0	PVC	100.0	130.30	130.30	0.00	0.00
P-6	8	204.0	PVC	110.0	130.30	130.30	0.00	0.00
P-7	33	393.0	PVC	120.0	130.30	130.30	0.00	0.00
P-8	126	393.0	PVC	120.0	130.30	130.30	0.00	0.00
P-9	11	155.0	PVC	100.0	130.30	130.30	0.00	0.00
P-10	11	204.0	PVC	110.0	130.30	130.30	0.00	0.00
P-11	8	155.0	PVC	100.0	130.30	130.30	0.00	0.00

2190 Walkely Road
Residential Development - Apartment Building
Max Pressure Check

Appendix E1

RVCA Pre-Consultation Email

Karla Ferrey

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: April 10, 2019 9:11 AM
To: Guy Forget
Subject: RE: 2270 Walkley Road Apartment

Good Morning Guy,

I have had a chance to review the proposal. Based on the distance from the outlet to Green's Creek, typically the Conservation Authority would be looking for onsite water quality control of 80% TSS removal. However we have also reviewed the scope of the project and offer the following comments:

Based on the plans provided, it appears that a large portion of the surface parking area in drainage area 4 will be replaced with the proposed 15 storey tower thereby replacing surface parking with rooftop drainage which is typically considered to be clean. The pavement area including the turning circle is being moved and represents approximately the same amount or slightly less than what is present on the site now. The parking spaces to remain in area 4 do not appear to involve any proposed alterations to the existing storm sewers or catchbasins. Therefore in consideration of the limited scope of parking/alterations proposed and the improvement of water quality that will result from the replacement of surface parking with rooftop drainage, the Conservation Authority is prepared to accept that water quality improvements can be achieved through best management practices. It will be important that the stormwater management plan clearly indicate how water quality as a result of this redevelopment project is being improved through best management practices.

It should also be noted that if in the future further development or alteration is being proposed whereby new surface parking areas are being proposed or the existing surface parking areas are being altered, then full onsite water quality control of enhanced (80% TSS Removal) will be required. If you have any questions do not hesitate to contact me.

Jamie Batchelor, MCIP,RPP
Planner, ext. 1191
jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Eric Lalande
Sent: Tuesday, April 02, 2019 2:36 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>

Cc: 'Guy Forget ' <gforget@jlrichards.ca>
Subject: FW: 2270 Walkley Road Apartment

Hi Jamie,

Can you follow up with Guy, as this falls in your area.

Thanks,

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Guy Forget <gforget@jlrichards.ca>
Sent: Tuesday, April 02, 2019 2:33 PM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Lucie Dalrymple <ldalrymple@jlrichards.ca>; Karla Ferrey <kferrey@jlrichards.ca>
Subject: 2270 Walkley Road Apartment

Hi Eric,

We have been retained to prepare a Site Servicing Brief for the purpose of rezoning for the above-noted property within the City of Ottawa. The Site will comprise a 15-storey high-residential building that will also include site entrances, underground parking and above ground green podium. The Site is bounded by Walkley Road to the south, by Halifax Drive to the east, by the Canterbury High School lands to the west and by residential units to the north. As part of the pre-consultation meeting, the City requested that the Owner consult with the RVCA to determine the water quality control criteria. The actual comment reads as follows:

"Stormwater quality control criteria must consult with Rideau Valley Conservation Authority (RVCA)"

A bit of background for the project:

As shown on the attached Site Plan, our client wishes to redevelop part of a large residential property that includes; two (2) high-rise towers, five (5) townhouse blocks, an elevated parking area as well as other at-grade parking areas. The areas impacted by this proposed development (disturbed area) are shown on 28584 Pre-Dev.PDF (overall disturbed area amounts to 0.6685 ha); about 0.3760 ha of landscaped area and 0.2925 ha of hard surface (pavement). Drawing 25584 Pre Dev.PDF shows the disturbed areas superimposed with the various drainage areas and associated runoff coefficients (C-Factor). Based on our calculations, the current runoff coefficient for the disturbed areas is ±0.50.

Under post-development conditions (refer to Drawing 25584 Post Dev.PDF), the disturbed area of ±0.6685 ha will consist of rooftop (0.12 ha), green podium (0.32 ha), and pavement of 1.10 ha (entrance/ramp at the front and side of the building including grading of 10 parking spaces (which are already existing) while those shown as hatched are those that are existing and will remain as is.

Runoff from this redevelopment will be collected by proposed on-site sewers (±100 m) that will:

i. discharge to the on-site storm sewers that is ±125 m long;
ii. that will then discharge to the Halifax 1350 mm diameter trunk storm sewer and travel 110 m until discharging to the Walkley Road 1650 mm diameter trunk storm sewer system;
iii. where the captured flows will be conveyed easterly along the Walkley Road trunk sewer system for 270 m;
iv. that will discharge and be conveyed along man-made straight reaches for 525 m until it crosses the Walkley Rail corridor where it will then be conveyed along about 730 m until discharging to Ramsey Creek and eventually Green's Creek.

Based on the above information, we would like to obtain RVCA's water quality criteria recognizing the size of the disturbed areas that are paved and the distance from fish habitat bearing watercourses.

If you need further clarifications, do not hesitate to call.

Guy

Guy Forget, P.Eng., LEED AP
Associate
Senior Water Resources Engineer

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-3571 Fax: 613-728-6012

Appendix E2

Design Sheets and Stormwater Management Calculations

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

2270 WALKLEY ROAD

URBANDALE CORPORATION
JLR NO. 28584.001

STORM SEWER DESIGN SHEET

Designed by: K.F.
Checked by: G.F
Date: April 2019
Revised: July 2019

Manning's Coefficient, n =	0.013
IDF CURVE =	2 year

STREET	Maintenance Hole Number		DRAINAGE AREAS								Inlet Time (min.)	In Pipe Flow Time (min.)	2 YR PEAK FLOW				PLUG FLOW	TOTAL	PLUG FLOW	SEWER DATA					Residual Capacity Q_{cap} - Q_d (L/s)	UPSTREAM				DOWNSTREAM				
			0.20	0.25	0.75	0.90	Total Area 2 Yr	Total Area 5 Yr	Cum. Area 2 YR (ha)	Cum. Area 5 YR (ha)			2.78AR	Cum. 2.78AR	2 Yr Intensity (mm/hr)	Peak Flow (L/s)	(L/s)	Peak Design Flow (L/s)	Peak ICD Flow (L/s)	PIPE Dia (mm)	Slope (%)	Q full (L/s)	V full (m/s)	Length (m)		Centre Line	Obvert	Invert	Cover	Center Line	Drop	Obvert	Invert	Cover
	FROM	TO																															
WALKEY OUTLET																																	
	CBMH1	CBMH2		0.007	0.025	0.082	0.11		0.11	0.00	10.00	0.33	0.26	0.26	76.81	20.13		20.13	20.1	1350	0.15	2156.55	1.46	28.8	2136.4	82.45	81.361	79.990	1.09	82.50		81.318	79.947	1.18
											10.33																						
	CBMH2	WALKLEY							0.11	0.00	10.33	0.28		0.26	75.56	19.81		19.81	19.8	375	0.25	91.46	0.80	13.6	71.6	82.50	80.328	79.947	2.17	82.75		80.294	79.913	2.46
											10.61																						
																															Existing 1500mm dia. Storm on Walkley Road, approx Inv 79.35, OBV 80.85, assumed springline connection +/- INV 79.91 for new service				
HALIFAX OUTLET																																	
Existing Parking Garage	Garage	MH100			0.011	0.476	0.49		0.49	0.00	10.00	0.03	1.21	1.21	76.81	93.23		93.23	93.2	225	1.62	59.60	1.45	2.5	-33.6	79.90	78.100	77.871	1.80	79.55	2.40	78.059	77.831	1.49
											10.03																						
2270 Walkley New Building	Service	MH100				0.116	0.12		0.12	0.00	10.00	0.12	0.29	0.29	76.81	22.29	6.00	22.29	99.2	250	0.45	41.62	0.82	5.9	19.3	82.75	75.682	75.428	7.07	79.55		75.655	75.401	3.89
											10.12																						
	MH100	MH101							0.60	0.00	10.12	0.42		1.50	76.35	114.84		114.84	99.2	375	0.45	122.70	1.08	27.3	7.9	79.55	75.655	75.274	3.89	79.80		75.532	75.151	4.27
	MH101	MH102							0.60	0.00	10.54	0.28		1.50	74.78	112.48		112.48	99.2	375	0.45	122.70	1.08	18.0	10.2	79.80	75.532	75.151	4.27	78.00		75.451	75.070	2.55
											10.82																						
Podium (North Connection)	Podium	MH102			0.206		0.21		0.21	0.00	10.00	0.07	0.43	0.43	76.81	32.99	8.00	32.99	8.0	300	0.35	59.68	0.82	3.5	26.7	78.50	75.464	75.159	3.04	78.00		75.451	75.147	2.55
											10.07																						
	MH102	MH103		0.078		0.007	0.09		0.89	0.00	10.82	0.32	0.07	2.01	73.79	147.97		147.97	106.5	375	0.70	153.03	1.34	25.7	5.1	78.00	75.451	75.070	2.55	77.00		75.271	74.890	1.73
											11.14																						
Podium (South Connection)	Podium	MH104			0.043		0.04		0.04	0.00	10.00	0.14	0.09	0.09	76.81	6.89		6.89	0.0	200	0.60	26.50	0.82	7.0	19.6	79.43	76.288	76.084	3.14	79.30		76.246	76.042	3.05
											10.14																						
	MH104	MH103A		0.050		0.118	0.17		0.21	0.00	10.14	0.41	0.33	0.42	76.26	32.00	45.00	32.00	45.0	900	0.80	1689.20	2.57	63.7	1657.2	79.30	76.246	75.331	3.05	77.00		75.736	74.822	1.26
											10.56																						
	MH103A	MH103							0.21	0.00	10.56	0.08		0.42	74.74	31.36		31.36	45.0	450	0.20	133.02	0.81	3.7	101.7	77.00	75.279	74.822	1.72	77.00		75.271	74.814	1.73
											10.63																						
	MH103	MH105							1.11	0.00	11.14	0.68		2.42	72.69	176.27		176.27	151.5	450	0.35	175.96	1.07	44.0	-0.3	77.00	75.271	74.814	1.73	77.70		75.117	74.660	2.58
	MH105	EX ST 103		0.115			0.12		1.22	0.00	11.82	0.14	0.08	2.50	70.44	176.46		176.46	157.2	450	2.69	487.83	3.00	24.4	311.4	77.70	75.117	74.660	2.58	77.20		74.461	74.004	2.74
	EX ST 103	Halifax Dr.							1.22	0.00	11.96	0.15		2.50	70.02	175.39		175.39	157.2	450	1.33	343.40	2.09	18.3	168.0	77.20	74.461	74.004	2.74	74.75		74.217	73.760	0.53
																															Existing 450mm ST, INV @ Main 1500mm dia. Storm on Halifax, approx Inv 242.00', per JLR Plan 1968, +/- INV 73.76				

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

2270 WALKLEY ROAD APARTMENTS
STORMWATER MANAGEMENT CALCULATIONS

Area Breakdown of disturbed lands under Existing Conditions

Areas to 375 mm diameter on-site sewer, tributary to Halifax Drive sewer

Area No.	Areas (ha) to Halifax Drive	
	C = 0.20	C = 0.90
1	0.071	
2	0.036	
3	0.178	
4	0.055	
5		0.266
	A_{tot} =	0.606
	C_{avg} =	**0.51**

Areas to Walkley Road via sheet flow drainage

Area No.	Areas (ha) to Walkley Road	
	C = 0.20	C = 0.90
6	0.029	
7		0.002
8	0.007	
	A_{tot} =	0.038
	C_{avg} =	**0.24**

Time of Concentration Calculations (Existing Conditions)

To Existing on-site 375 mm diameter sewer (15 in) outletting to Halifax Drive trunk sewer:

Tc = Inlet Time + Pipe travelling time

Pipe travelling time:

62 ft - 300 mm diameter (12 in) @ 2.0% : Velocity (full) = 1.96 m/s
128 ft - 375 mm diameter (15 in) @ 3.5%: Velocity (full) = 3.0 m/s

Tc = 10 mins + (18.90 m / 1.96 m/s) + (39.01 m / 3.0 m/s)
Tc = 10 mins + 0.16 mins + 0.2 mins = 10.36 mins

Tc : 10.36 mins

Rainfall Statistics OSDG (Section 5.4.2)

Return Period	A	C	B
2	732.951	6.199	0.810
5	998.071	6.053	0.814
100	1735.688	6.014	0.820

Calculation of Existing Peak Flows to existing 300 mm diam (15 in) storm sewer at 2.3%:

Per pre-consultation notes, on-site retention between 1:5 year to 1:100 year

Evaluation of Allowable Flows (pre Pre-consultation meeting):

Qp = 2.78 x C x I x A, where :
Area = 0.606 ha
C = 0.51 (Existing)
C = 0.50 (To be used as allowable)
Inlet time = 10.36 mins

Qp (1:2 year) = 63.55 L/s

Time of Concentration Calculations (Existing Conditions)

To Walkley Road 1500 mm diameter sewer:

Tc = Sheet flow time; from top of berm to ROW limit

Length of travel = 5 m

Top of berm elevation = 82.31, bottom of slope = 82.05 m
Slope = 5.2%; Velocity = 0.6 m/s

Tc = Length / velocity; Tc = 5 m / 0.6 m/s per Uplands Method
Tc = 0.15 mins, use Tc = 10 mins (minimum allowed)

Tc = 10 mins

Rainfall Statistics OSDG (Section 5.4.2)

Return Period	A	C	B
2	732.951	6.199	0.810
5	998.071	6.053	0.814
100	1735.688	6.014	0.820

Calculation of Existing Peak Flows to Walkley Road trunk sewer:

Per pre-consultation notes, on-site retention between 1:5 year to 1:100 year

Evaluation of Allowable Flows (pre Pre-consultation meeting):

Qp = 2.78 x C x I x A, where :
Area = 0.038 ha
C = 0.24 (existing)
C = 0.24 (To be used as allowable)
Inlet time = 10 mins

Qp (1:2 year) = 1.92 L/s

Total Allowable Flow (Disturbed Areas at Walkley and Halifax) = 63.87 L/s + 1.92 L/s = 65.48 L/s

Post-Development Area Breakdown:

Halifax Drive outlet

Area Type	Area (ha)	C-Factor (100 yr)	Note	ICD	Outlet
Building	0.107	0.90	Roof ICD	6.00	Halifax
Podium1	0.114	0.75	ICD1	4.00	Halifax
Podium2	0.092	0.75	ICD2	4.00	
Podium3	0.043	0.75	ICD3		Halifax
Grass	0.050	0.25	ICD3		Halifax
Pavement	0.125	0.90	ICD3	45.00	Halifax
			Total ICD Controlled Flow (L/s) =	59.00	Halifax
			Total Allowable Flow (L/s) =	63.55	Halifax
			Total Flow Surplus (+) or Deficit (-) (L/s) =	**-4.55**	Halifax

Post-Development Area Breakdown:

Walkley Road Outlet

Area Type	Area (ha)	C-Factor (100 yr)	Note	ICD	Outlet
Grass	0.007	0.25	ICD4		Walkley
Podium	0.016	0.75	ICD4		Walkley
Podium	0.009	0.75	ICD4		Walkley
Pavement	0.081	0.90	ICD4	6.00	Walkley
			Total ICD Controlled Flow (L/s) =	6.00	Walkley
			Total Allowable Flow (L/s) =	1.92	Walkley
			Total Flow Surplus (+) or Deficit (-) (L/s) =	**4.08**	Walkley

Stormwater Management Calculations

Rainfall Statistics OSDG (Section 5.4.2)

Return Period	A	C	B
2	732.951	6.199	0.810
5	998.071	6.053	0.814
100	1735.688	6.014	0.820

BUILDING: To Halifax Drive (SWM Calculations):

	2 year	5 year	100 year
Roof (ha)	0.107	0.107	0.107
C-Factor =	0.90	0.90	0.90

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp Rooftop ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	47.80	6.00	41.80	25.08
15	142.89	38.25	6.00	32.25	29.03
20	119.95	32.11	6.00	26.11	31.33
25	103.85	27.80	6.00	21.80	32.70
30	91.87	24.59	6.00	18.59	33.47
35	82.58	22.11	6.00	16.11	33.83
40	75.15	20.12	6.00	14.12	33.88
45	69.05	18.49	6.00	12.49	33.71
50	63.95	17.12	6.00	11.12	33.36
55	59.62	15.96	6.00	9.96	32.87
60	55.89	14.96	6.00	8.96	32.27
65	52.65	14.09	6.00	8.09	31.57
70	49.79	13.33	6.00	7.33	30.78
75	47.26	12.65	6.00	6.65	29.93
80	44.99	12.04	6.00	6.04	29.01
85	42.95	11.50	6.00	5.50	28.05
90	41.11	11.01	6.00	5.01	27.03

PODIUM2: To Halifax Drive (SWM Calculations):

	2 year	5 year	100 year
Podium (ha)	0.092	0.092	0.092
C-Factor =	0.60	0.60	0.75

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD2 (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	34.25	4.00	30.25	18.15
15	142.89	27.41	4.00	23.41	21.07
20	119.95	23.01	4.00	19.01	22.81
25	103.85	19.92	4.00	15.92	23.88
30	91.87	17.62	4.00	13.62	24.52
35	82.58	15.84	4.00	11.84	24.86
40	75.15	14.41	4.00	10.41	24.99
45	69.05	13.25	4.00	9.25	24.96
50	63.95	12.27	4.00	8.27	24.80
55	59.62	11.44	4.00	7.44	24.54
60	55.89	10.72	4.00	6.72	24.20
65	52.65	10.10	4.00	6.10	23.78
70	49.79	9.55	4.00	5.55	23.31
75	47.26	9.06	4.00	5.06	22.79
80	44.99	8.63	4.00	4.63	22.22
85	42.95	8.24	4.00	4.24	21.62
90	41.11	7.89	4.00	3.89	20.98

Misc Areas to underground storage: To Halifax Drive (SWM Calculations):

Area Type	Area (ha)	C-Factor (100 yr)	Note	ICD	Outlet
Podium 3	0.043	0.750	ICD3		Halifax
Grass	0.050	0.250	ICD3		Halifax
Pavement	0.118	0.900	ICD3	45.0	Halifax
Weighted:	0.21	0.72			

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	74.93	22.50	52.43	31.46
15	142.89	59.96	22.50	37.46	33.72
20	119.95	50.34	22.50	27.84	33.40
25	103.85	43.58	22.50	21.08	31.62
30	91.87	38.55	22.50	16.05	28.89
35	82.58	34.65	22.50	12.15	25.52
40	75.15	31.53	22.50	9.03	21.68
45	69.05	28.98	22.50	6.48	17.49
50	63.95	26.84	22.50	4.34	13.01
55	59.62	25.02	22.50	2.52	8.32
60	55.89	23.46	22.50	0.96	3.44
65	52.65	22.09	22.50	N/A	N/A
70	49.79	20.89	22.50	N/A	N/A
75	47.26	19.83	22.50	N/A	N/A
80	44.99	18.88	22.50	N/A	N/A
85	42.95	18.03	22.50	N/A	N/A
90	41.11	17.25	22.50	N/A	N/A

Rainfall Statistics OSDG (Section 5.4.2)

Return Period	A	C	B
2	732.951	6.199	0.810
5	998.071	6.053	0.814
100	1735.688	6.014	0.820

PODIUM1: To Halifax Drive (SWM Calculations):

	2 year	5 year	100 year
Podium (ha)	0.114	0.114	0.114
C-Factor =	0.60	0.60	0.75

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD1 (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	42.44	4.00	38.44	23.07
15	142.89	33.96	4.00	29.96	26.97
20	119.95	28.51	4.00	24.51	29.41
25	103.85	24.68	4.00	20.68	31.03
30	91.87	21.84	4.00	17.84	32.11
35	82.58	19.63	4.00	15.63	32.82
40	75.15	17.86	4.00	13.86	33.27
45	69.05	16.41	4.00	12.41	33.51
50	63.95	15.20	4.00	11.20	33.60
55	59.62	14.17	4.00	10.17	33.57
60	55.89	13.29	4.00	9.29	33.43
65	52.65	12.51	4.00	8.51	33.20
70	49.79	11.83	4.00	7.83	32.90
75	47.26	11.23	4.00	7.23	32.54
80	44.99	10.69	4.00	6.69	32.13
85	42.95	10.21	4.00	6.21	31.67
90	41.11	9.77	4.00	5.77	31.17

PAVEMENT/GRASS/PODIUM: To Walkley Drive (SWM Calculations):

Area Type	Area (ha)	C-Factor (100 yr)	Note	ICD	Outlet
Grass	0.007	0.25	ICD4		Walkley
Podium	0.016	0.75	ICD4		Walkley
Podium	0.009	0.75	ICD4		Walkley
Pavement	0.081	0.90	ICD4		Walkley
				6.00	0
Weighted:	0.11	0.83			

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	46.36	3.00	43.36	26.02
15	142.89	37.10	3.00	34.10	30.69
20	119.95	31.15	3.00	28.15	33.77
25	103.85	26.96	3.00	23.96	35.95
30	91.87	23.85	3.00	20.85	37.54
35	82.58	21.44	3.00	18.44	38.73
40	75.15	19.51	3.00	16.51	39.63
45	69.05	17.93	3.00	14.93	40.31
50	63.95	16.61	3.00	13.61	40.82
55	59.62	15.48	3.00	12.48	41.19
60	55.89	14.51	3.00	11.51	41.45
65	52.65	13.67	3.00	10.67	41.61
70	49.79	12.93	3.00	9.93	41.70
75	47.26	12.27	3.00	9.27	41.71
80	44.99	11.68	3.00	8.68	41.67
85	42.95	11.15	3.00	8.15	41.58
90	41.11	10.67	3.00	7.67	41.44
95	39.43	10.24	3.00	7.24	41.26
100	37.90	9.84	3.00	6.84	41.05

UNDEGROUND STORAGE PIPE - CBMH 1 -CBMH 2 - Walkley Road Outlet

Diameter	Pipe Radius	Pipe Length	Area (pi r2)	Volume
900	450	28.8	0.64	18.32
1050	525	28.8	0.87	24.94
1350	675	28.8	1.43	41.22
1500	750	28.8	1.77	50.89
1650	825	28.8	2.14	61.58

Storage Volume Available CBMH 1 to Elevation 79.99 : 1.40 m^3
Storage Volume Available CBMH 2 to Elevation 82.75 : 8.46 m^3
Underground Pipe Storage CBMH1 to CBMH2 : 41.22 m^3
TOTAL : 51.08 m^3

UNDEGROUND STORAGE PIPE - MH103A - MH 104 -HALIFAX DRIVE OUTLET

Diameter	Pipe Radius	Pipe Length	Area (pi r2)	Volume
600	300	63.7	0.28	18.01
675	338	63.7	0.36	22.79
750	375	63.7	0.44	28.14
900	450	63.7	0.64	40.52
1050	525	63.7	0.87	55.16
1350	675	63.7	1.43	91.18

ORIFICE SIZING FOR TEMPORARY Storm SEWER ICD

JLR No.:	28584.001
Project:	2270 Walkley Road
Date:	April 12, 2019
Revised:	n/a
Designed by:	TC
Checked by:	

Notes: Values in blue are user variables
Values in red are calculated

User Notes: Temporary ICD used to control flow in sanitary sewer until all facilities are installed.

Stm MH103A

Q_{all} (L/s)	Outlet Pipe Dia. (mm)	Invert (m)	T/G (m)	Orifice Radius (m)	Head (m)
45.00	450	74.822	76.246	0.067	1.357

Solving for 'Q'

$$Q = CA\sqrt{2gh}$$

h=	1.357	Head (m) (input value calculated above)
C=	0.61	Coefficient of Discharge
D=	0.134	Diameter (m)
g=	9.8	Gravity (9.81 m/s^2)
A=	0.01410	Area of Flow (m^2)
Q=	0.044	Discharge (m^3/s)
	44.37	Discharge (L/s)

Solving for 'r' (radius of orifice)

$$r = \sqrt{\frac{Q}{C\pi\sqrt{2gh}}}$$

Circular Orifice		Square Orifice	
Radius =	0.067 m	One side =	0.119 m
Diameter =	0.134 m	=	119 mm
=	134 mm		
=	5.28 in		

ORIFICE SIZING FOR TEMPORARY Storm SEWER ICD

JLR No.: 28584.001
Project: 2270 Walkley Road
Date: April 12, 2019
Revised: n/a
Designed by: TC
Checked by:

Notes: Values in blue are user variables
Values in red are calculated

User Notes: Temporary ICD used to control flow in sanitary sewer until all facilities are installed.

Stm CBMH2

Q_{all} (L/s)	Outlet Pipe Dia. (mm)	Invert (m)	T/G (m)	Orifice Radius (m)	Head (m)
6.00	375	79.950	81.360	0.025	1.386

Solving for 'Q'

$$Q = CA\sqrt{2gh}$$

h= 1.386 Head (m) (input value calculated above)
C= 0.61 Coefficient of Discharge
D= 0.049 Diameter (m)
g= 9.8 Gravity (9.81 m/s^2)

A= 0.00189 Area of Flow (m^2)

Q= 0.006 Discharge (m^3/s)
5.99 Discharge (L/s)

Solving for 'r' (radius of orifice)

$$r = \sqrt{\frac{Q}{C\pi\sqrt{2gh}}}$$

Circular Orifice		**Square Orifice**	
Radius =	0.025 m	One side =	0.043 m
Diameter =	0.049 m	=	43 mm
=	49 mm		
=	1.93 in		

JLR Design Drawings

28584-000.1 S Site Servicing Plan
28584-000.1 G Grading Plan
28584-000.1 SWM Drainage and Ponding Plan
28584-000.1 ESC Erosion and Sediment Control Plan

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