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Prepared for:

LATITUDE HOMES
190 Lisgar Street
Ottawa, ON
K2P 0C4

Prepared by:

J.L. RICHARDS & ASSOCIATES LIMITED
1565 Carling Avenue
Ottawa, ON
K1Z 8R1
Tel: 613-728-3571
Fax: 613-728-6012

Assessment of Adequacy of Public Services

Wildpine Trails

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

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1.0 Introduction

1.1 Background

In 2020, J.L. Richards & Associates Limited (JLR) was retained by Latitude Homes Inc. (LHI) to prepare a Report that would assess the adequacy of public services in support of a Draft Plan of Subdivision Application for their property sited at 37 Wildpine Court, referred as Wildpine Trails.

This Assessment of Adequacy of Public Services (AAPS) Report has been prepared to outline the design objectives and criteria, servicing constraints and high-level strategies for developing the subject lands with water, wastewater, storm and stormwater management services in accordance with the following:

- the November 2009 Servicing Study Guidelines for Development Applications in the City of Ottawa (City);
- the Ottawa Sewer Design Guidelines (2012) and associated Technical Bulletins;
- notes prepared to summarize the February 27, 2020 pre-consultation meeting; and
- follow-up pre-consultations with the Mississippi Valley Conservation Authority (MVCA) to discuss the requirements of the Hydrological Impact Study (HIS).

A copy of the pre-consultation meeting notes (February 27, 2020) is included in Appendix A.

1.2 Site Description and Condition

The subject property is located within the urban limits of the City of Ottawa, specifically in the Stittsville area. The subject property, 37 Wildpine Court, is located at the extremity of two (2) existing cul-de-sacs, namely Ravencroft Court and Wildpine Court. As illustrated on Figure 1 (below), the property is mostly vegetated and includes a single-family house and a garage, and an asphalted turning circle.

Figure 1: Site Location

LHI proposes to redevelop the subject property with 29 townhouse units in 5 blocks. Two (2) blocks totalling 7 units each is located along a proposed private lane, and three (3) blocks totalling 16 units along a public right of way.

The Conceptual Plan for the proposed development is included in Appendix B. The proposed servicing for the development is shown in Figure F-SGE in Appendix E.

1.3 Existing Conditions and Infrastructure

As previously noted, the subject property abuts two existing ROWs. Based on the existing topographical survey and imagery, the existing impervious surfaces within 37 Wildpine Court consists of a single-family dwelling, wooden garage, metal shed as well as brick interlock, gravel driveway and asphalted cul-de-sac. The topographical survey shows that runoff from all the impervious surfaces is sheet flowing towards either Poole Creek or a wetland.

A review of existing services was carried out along the frontage of the subject property to identify existing sewers and watermains. Based on the review of the Drawings obtained from the City of Ottawa (Appendix C), the following infrastructure has been identified to exist within both municipal ROW abutting 37 Wildpine Court:

Watermains:

- 203 mm diameter PVC watermain is located at the property limit at Ravenscroft Court
- 203 mm diameter ductile iron watermain is located at the property limit at Wildpine Court

Sanitary Sewers:

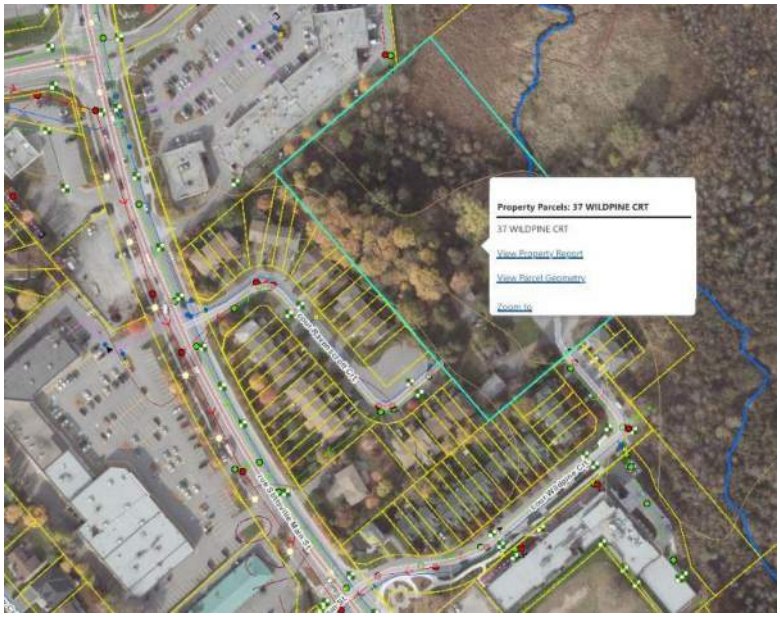
- 250 mm diameter PVC sanitary sewer is located at the property limit at Ravenscroft Court
- 250 mm diameter PVC sanitary sewer is located at the property limit at Wildpine Court

Storm Sewers:

- 300 mm diameter PVC storm sewer is located at the property limit at Ravenscroft Court
- 300 mm diameter PVC storm sewer is located at the property limit at Wildpine Court

Figure 2 below shows the existing infrastructure bounding the subject property.

Figure 2: Existing Infrastructure



1.4 Municipal Design Guidelines

This AAPS Report and associated functional site servicing drawing was prepared in accordance with the following:

Ottawa Sewer Design Guidelines (October 2012) complete with the following Technical Bulletins;

- ISTB-2012-01;
- ISTDB-2014-01;
- ISTDB-2016-01;
- ISTDB-2018-01;
- ISTDB-2019-01; and
- ISTDB-2019-02.

City of Ottawa Water Distribution Guidelines complete with the following Technical Bulletins:

- ISTDB-2010-02;
- ISTDB-2014-02; and
- ISTDB-2018-02.

Detail Drawings as well as well as Sewer Material Specifications including:

- Sewer Connection (2003-513) and Sewer Use (2003-514) By-Laws;
- Watermains/Services Material Specifications as well as Water and Road Standard Detail Drawings;
- Water By-Law (2018-167).

1.5 Pre-Consultation, Permits and Approvals

A pre-consultation meeting was originally held between the LHI, Fotenn, the MVCA and the City of Ottawa on February 27, 2020 (Appendix A). A follow-up pre-consultation meeting was held

between the MVCA and JLR to discuss the requirements of the upcoming HIS. The storm discharge criteria used for the preparation of this Report is presented in Section 4.1 (below).

Once the AAPS Report is approved under the joint OPA/ZBLA, the development of the above-referenced property will be subject to the Draft Plan of Subdivision and 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. It is expected that the Application for Environmental Compliance Approval (ECA) will be dealt under Transfer of Review.

2.0 Water Servicing

2.1 Existing Condition

The subject site is located within the urban boundary of the City of Ottawa and will be serviced by the central water distribution system. Water supply to the subject property currently originates from Pressure Zone 3W. Supply to this pressure is achieved via the Glen Cairn Pumping Station and the Campeau Drive Pumping Station, while the Stittsville Tank provides elevated storage to this zone.

Once developed, the supply to the Wildpine Trails development will originate from the two (2) 203 mm diameter (PVC) existing watermains located at the property limits at Ravenscroft Court and Wildpine Court as indicated in Section 1.3 above. These watermains will provide both domestic and fire protection to the Wildpine Trails development.

2.2 Water Supply Design Criteria

Any additions to the City of Ottawa water distribution system are designed according to the Ottawa Design Guidelines for Water Distribution (July 2010) and Technical Bulletins ISDTB-2014-02 and ISDTB-2018-02. These documents have been referred to in this section as the Design Guidelines, TB-2014-02, and TB-2018-02. The proposed system is designed to satisfy the pressure constraints for the maximum hourly demand (peak hour demand) and maximum day demand plus fire flow.

Section 4.2.2 of the Design Guidelines require that all new development additions to the public water distribution system be designed such that the minimum and maximum water pressure, as well as the fire flow rates, conform to the following:

- Under maximum hourly demand conditions (peak hour), the pressures shall not be less than 276 kPa;
- During periods of 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);
- In accordance with the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi);
- The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi); and

- Feedermains, which have been provided primarily for the purpose of redundancy, shall meet, at a minimum, the basic day plus fire flow demand.

Table 1 summarizes the design criteria for water distribution systems, which will serve as the basis of the detailed design of the proposed watermains for the site.

Table 1: Water Design Criteria

Design Criteria	Design Value
Population > 500	
Residential average demand	280 L/cap/day
Residential maximum demand	2.5 x Avg
Residential peak hour	2.2 x Max Day
Density Single Family	3.4
Density Semi & townhouse	2.7
Density (apt) 1-bedroom	1.4
Density (apt) 2-bedroom	2.1
Density (apt) 3-bedroom	3.1
Population < 500	
Residential average demand	280 L/cap/day
Peaking Factors	MOE Table 3-3
Fire Flow Requirements	
Municipal ROW	FUS
Pressure/Flow	
Peak hour	>275 kPa (40 psi)
Maximum day plus fire flow	>140 kPa (20 psi)
Minimum hour (maximum HGL)	<552 kPa (80 psi)

2.3 Domestic Water Demands

The water demands presented in this section reflect the unit count proposed on the Site Plan. Domestic water demands were calculated for 29 townhouse units and for a population density of 2.7 persons per unit as prescribed in Table 4.1 of the Design Guidelines.

The residential consumption rate for average day demand was set in accordance with Table 4-2 of the Design Guidelines. Since the proposed population for Wildpine Trails is less than 500 people, peaking factors interpolated from Table 3-3 of the MOE Design Guidelines were used to generate the maximum day, peak hour, and minimum hour demands. Table 2 summarizes the water consumption rates and peaking factors used in the HNA.

Table 2: Water Consumption Rates and Peaking Factors

Demand Scenario	Residential
Average Day Demand	280 L/c/d
Maximum Day Demand (Interpolated from Table 3-3, MOE 2008)	7.66 x Avg Day

Demand Scenario	Residential
Peak Hour Demand (Interpolated from Table 3-3, MOE 2008)	11.54 x Avg Day
Minimum Hour Demand	0.10 x Avg Day

Table 3 summarizes the water demand results based on the proposed site details and the peaking factors criteria found in Table 2 (refer to Appendix D1 for detailed calculations).

Table 3: Theoretical Water Demands

Demand Scenario	Water Demand (L/s)
Average Day	0.25
Maximum Day	1.94
Peak Hour	2.92
Minimum Hour	0.19

2.4 Proposed Watermain Sizing and Roughness

The overall watermain layout for Wildpine Court is shown in Appendix D2 (Model Schematic). Watermain roughness coefficients were determined using friction factors presented in Section 4.2.12 of the Design Guidelines and summarized in Table 4 below. The internal pipe diameters were modelled based on Section 4.3.5 of the Design Guidelines, summarized in Table 5.

Table 4: Watermain Roughness Coefficients

Watermain Diameter	C-Factor
50 mm	100
150 mm	100
200 to 250 mm	110

Table 5: Watermain Internal Diameters

Nominal Diameter	Inside Diameter
50 mm	50 mm
150 mm	155 mm
200 mm	204 mm

2.5 Fire Flow Requirements

2.5.1 General

Various guidelines are used throughout North America to establish fire flow requirements for different types of buildings. The Guidelines entitled “Water Supply for Public Fire Protection (1999)” developed by the Fire Underwriters Survey (FUS) govern fire flow protection in the City of Ottawa. Fire flow requirements for this HNA were calculated for

townhouse residential units in accordance with the FUS Guidelines, TB-2014-02, and TB-2018-02.

2.5.2 Required Fire Flow

The Design Guidelines and documents TB-2014-02 and TB-2018-02 require that fire flow be calculated based on the type of unit, exposure to adjacent units, building material, etc. In addition, the required fire flow (RFF) must also be calculated based on the maximum number of consecutive units should the distance between structures be less than 3.0 m (as per the FUS).

Based on the proposed layout for Wildpine Trails residential development, the critical RFF was calculated at four (4) locations as presented in Appendix D1:

- Critical Fire Area 1: Located in the north section of the development and is comprised of one (1) proposed block of five (5) townhouse units, one (1) proposed block of eight (8) townhouse units with a midway firewall, and one (1) block of three (3) existing units. Since the separation between the blocks is less than 3 m, the blocks are treated as a contiguous area.
- Critical Fire Area 2: Located in the east section of the development and is comprised of one (1) proposed block of seven (7) townhouse units.
- Critical Fire Area 3: Located in the west section of the development and is comprised of one (1) proposed block of seven (7) townhouse units.
- Critical Fire Area 4: Located adjacent to the existing wetland in the west section of the development and is comprised of two (2) townhouse units.

Appendix D1 also includes the RFF calculations in accordance with TB-2018-02. Based on these calculations, RFF was capped at 10,000 L/min (167 L/s) for three (3) of the fire areas and 8,000 L/min (133 L/s) for the two (2) townhouse units adjacent to the wetland.

2.6 Proposed Water Servicing Design

2.6.1 Water Servicing

The proposed water supply for Wildpine Trails includes two (2) 203 mm diameter watermains that would connect to the existing 203 mm diameter watermains on Ravenscroft Court and Wildpine Court. A 150 mm diameter watermain is proposed within the private lane fronting the block of five (5) townhouse units, and a 50 mm diameter water service is proposed to serve the units at the end of this private lane. Appendix D2 (Model Schematic) illustrates the overall layout of the watermains for Wildpine Trails.

2.6.2 Boundary Conditions

The performance of the proposed water distribution system in Wildpine Trails was evaluated under various domestic demands and fire flow conditions using the hydraulic boundary conditions provided by the City (refer to Appendix D3 for a copy of the City correspondence). Table 6 summarizes the hydraulic boundary conditions for Connection

1 on Ravenscroft Court, and Table 7summarizes the hydraulic boundary conditions for Connection 2 on Wildpine Court.

Table 6: Hydraulic Boundary Conditions at Connection 1 on Ravenscroft Court

Demand Scenarios	Head (m)
Peak Hour	156.4
Maximum Day + Fire Flow 1 8,000 L/min (133 L/s)	149.2
Maximum Day + Fire Flow 2 10,000 L/min (167 L/s)	142.8
Maximum Pressure Check	160.8

Table 7: Hydraulic Boundary Conditions at Connection 2 on Wildpine Court

Demand Scenarios	Head (m)
Peak Hour	156.4
Maximum Day + Fire Flow 1 8,000 L/min (133 L/s)	148.4
Maximum Day + Fire Flow 2 10,000 L/min (167 L/s)	143.9
Maximum Pressure Check	160.8

2.7 Simulation Results

A Hydraulic Network Analysis (HNA) was carried out to confirm preliminary water servicing. Boundary conditions were provided by the City (Appendix D3) and used in this HNA. Simulations were carried out under peak hour, maximum day demand plus fire flow, and maximum HGL.

2.7.1 Peak Hour

The peak hour demand shown in Table 2-3 was distributed between the two junctions within the site. Using the boundary conditions shown in Table 2-6 and Table 2-7, the minimum pressures were found to be 368 kPa (53.3 psi) at Junction J-1 and 370 kPa (53.6 psi) at Junction J-2. The simulated hydraulic grade lines (HGL) were found to be 156.09 m at junction J-2, while the remainder of the development was found to be at a constant elevation of 156.40 m.

Based on the simulation results, the minimum pressure criterion of 276 kPa (40 psi) will be exceeded throughout the site. The simulation results for the Peak Hour demand scenario are presented in Appendix D4.

2.7.2 Maximum Day Plus Fire Flow

The maximum day demand table shown in Table 2-3 was simulated simultaneously with the available fire flow to ensure adequate fire protection. The simulation was carried out using the boundary conditions presented in Table 2-6 and Table 2-7.

The fire flow simulation was carried out by allowing WaterCAD® to calculate the maximum fire flow that can be drawn from each hydrant without allowing any part of the system to experience pressures less than 140 kPa (20 psi) and recognizing that hydrants have a limited capacity. Based on the preliminary location of the hydrants, the simulation results showed that 95 L/s (the maximum fire flow that a hydrant can supply per ISTB-2018-02) can be drawn from each proposed hydrant within the site while maintaining a minimum system pressure of 140 kPa.

The simulation results (Appendix D5) show that the proposed water distribution system can deliver a minimum fire flow of 13,000 L/min (217 L/s) within the Wildpine development under the 10,000 L/min (167 L/s) boundary condition. Hence, the RFF can be fulfilled everywhere within the site.

2.7.3 Maximum HGL

The Design Guidelines 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) is not exceeded. Based on the calculated average day demand (refer to Table 2-3) and corresponding boundary conditions (refer to Table 2-6 and Table 2-7), a maximum pressure of 416 kPa (60.3 psi) and a minimum pressure of 411 kPa (59.6 psi) is expected at Junction J-2 and J-1, respectively (refer to Appendix D6 model output results). These values are below the maximum pressure constraint of 552 kPa (80 psi). Hence, the system will achieve pressures below the maximum pressure constraint during the maximum HGL demand.

2.8 Water Servicing Conclusions

An HNA was carried out to assess the high-level water servicing and hydrants spacing. The analysis confirmed that the pressure constraints listed in Table 2-1 were met.

3.0 Wastewater Servicing

3.1 Background

The subject property is within the serviced area of the Stittsville Trunk Collector Sewer, which ultimately conveys the wastewater flows to the Robert O. Pickard Environmental Centre (ROPEC) for treatment. Wastewater flows from Wildpine Trails will be collected and conveyed by on-site sanitary sewers that will outlet to the 250 mm diameter sanitary sewer along Wildpine Court. Both sanitary sewers then outlet to the trunk 300 mm diameter sanitary sewer on Stitsville Main Street.

The proposed sanitary sewers for Wildpine Trails were conceptually sized based on the City of Ottawa Sewer Design Guidelines ((OSDG) - (October 2012)) and associated Technical Bulletins. Key design parameters have been summarized in Table 8.

Table 8: 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 x 0.8	City Section 4.4.1

Design Criteria	Design Value	Reference
Infiltration Allowance 0.05 L/s/ha (dry I/I) 0.28 L/s/ha (wet I/I)	0.33 L/s/ha	ISTB-2018-01
Minimum velocity	0.6 m/s	OSDG Section 6.1.2.2
Maximum velocity	3.0 m/s	OSDG Section 6.1.2.2
Manning Roughness Coefficient	0.013	OSDG Section 6.1.8.2
Minimum allowable slopes	Varies	OSDG Table 6.2, Section 6.1.2.2

3.2 Theoretical Sanitary Peak Flow

Peak wastewater flows were estimated based on the proposed density for townhouse units which is 2.7 person/unit and using the theoretical unit flow of 280 L/capita/day. Based on this design criteria and Harmon Peaking Factor, a total combined peak wastewater flow of 1.59 L/s was calculated. Table 9 summarizes the theoretical peak flows for the project site (refer to Appendix E for calculations).

Table 9: Theoretical Peak Wastewater Flow

Design Criteria	Flow (L/s)
Theoretical Population: 78 (29 units)	
Theoretical Average Day Flow (Dry Weather)	0.25
Peak Wastewater Flow (Dry Weather) based on Harmon	0.92
Dry & Wet I/I (0.33 L/s/ha – X ha)	0.68
Total Theoretical Peak Flow	**1.59**

3.3 Proposed Sanitary Sewer Sizing

The proposed sanitary sewers within the project site will collect wastewater flows before discharging into the existing Wildpine Court 250 mm diameter sanitary sewer system. Given the overall peak wastewater flows of 1.59 L/s, the proposed on-site sanitary sewers will consist of 200 mm diameter sewers with overall slopes of 0.32% (refer to Drawing SK4), the minimum sewer slope as per Section 6.1.2.2 of the Guidelines. This configuration can, therefore, accommodate peak flows up to 19.4 L/s, exceeding the target flow of 1.59 L/s.

The upstream section of the sewer along the public ROW will be set to 0.65%; however, the sewer reach along the private lane will be set to a flatter slope (minimum of 0.32%) to maximize the cover over this sanitary sewer reach. Final grades will be set at detailed design while considering cover, crossing, etc.

3.4 Wastewater Servicing Conclusions

Wastewater from this development is tributary to the existing Wildpine Court 250 mm diameter sanitary sewer which is available at the Site boundary limit . The theoretical peak wastewater flow of 1.59 L/s will be accommodated by proposed on-site 200 mm diameter sewers which will be at the minimum slope of 0.32%.

4.0 Storm Servicing and Stormwater Management

4.1 Background

The subject property is adjacent to the Poole Creek channel and there is an unevaluated wetland within the northern portion of the property. Runoff from the site currently flows overland into either Poole Creek or the wetland which is connected to Poole Creek. There is currently no minor system storm sewer servicing the site however developments to the south and west have minor system storm servicing in an urbanized cross section. Part of the rear yards of the development to the west contributes flow to the wetland.

Poole Creek and the unevaluated wetland are within the Hazard Regulation Limits of the Mississippi Valley Conservation Authority (MVCA).

4.2 Design Criteria and Constraints

The design of stormwater management servicing for the site will be as per the municipal design requirement documents set out in Section 1.4. The site is immediately south of the Upper Poole Creek Subwatershed Study which states that there is no water quantity control for developments but there is a requirement for 80% TSS removal of stormwater runoff to Poole Creek. Since the site is downstream of the Upper Poole Creek Subwatershed Study the City has directed that the quantity control criteria in the subwatershed study is not applicable and the post development runoff to Poole Creek must meet pre-development conditions.

An Environmental Impact Statement has been prepared on the unevaluated wetland area to the north and it has identified that pre-development water balance conditions must be maintained for the health of the wetland function. Due to the proposed development being within 30 metres of the wetland the MVCA requires a Hydrological Impact Study to be completed.

4.3 Hydrological Impact Study Findings

The Hydrological Impact Study (HIS) detailed the long term continuous water balance simulations that had been undertaken in PCSWMM models of the pre, post and mitigated development scenarios.

Inputs to the long term continuous simulation modelling included soil parameters based on the results of the geotechnical investigations. The geotechnical investigations of the site included testholes, groundwater elevation recordings and infiltration testing. The infiltration testing results were used in the ground infiltration parameters with the soils data used in the groundwater component of the modelling.

The modelling found that infiltration would reduce as a result of the development however by integrating infiltration mitigation measures into the development the infiltration of the site would be increased to beyond that currently achieved at the site and runoff would reduce but still required control to meet predevelopment levels. The outcomes of the HIS can be summarized in Table 10.

Table 10: Summary of Hydrological Impact Study Results

Water Budget Component	Pre Development Percent of Water Budget (%)	Post Development Percent of Water Budget (%)	Mitigation Option Percent of Water Budget (%)
Rainfall	100	100	100
Evapotranspiration	53	36	36
Runoff	26	51	15
Infiltration	20	14	49

4.4 Allowable Peak Flow

The runoff from the site currently drains towards both the wetland and Poole Creek. Analysis of the existing topography has identified the overland flow path split between the two. The predevelopment flow rates to both the Wetland and Poole Creek have been identified as being the allowable release rates. The pre-development / allowable release rates for the site under various storm return period events are shown in Table 11.

Table 11: Peak Pre-Development Flow Rates (3-hour Chicago Storm)

Return Period Event	Peak Flow to Wetland (l/s)	Peak Flow to Poole Creek (l/s)
1:2	11.6	0.1
1:5	20.5	13.7
1:10	31.2	27.3
1:100	77.3	72.0

The pre-development rates were simulated in PCSWMM using the critical 3-hour Chicago storm distribution. Site impervious accounted for the current gravel turning area and buildings on the site. Soil infiltration parameters were based on the infiltration testing results from the geotechnical investigations carried out on the site.

4.5 Conceptual Storm Servicing Solution

The conceptual stormwater management servicing for the site includes the following components:

- Conventional storm sewers servicing the site along the public right of ways and the private lane;
- Weeping tile drainage on a separate system to protect basements in the event of high HGLs;
- A third pipe infiltration system laid under the conventional storm sewers to infiltrate the 20 mm storm event (Etobicoke Exfiltration System, EES);
- Overflow of the system to the wetland via a level spreader at the elevation of the 15 metre setback line from the wetland;
- Underground storage close to the elevation of the overflow level spreader to allow control of events greater than the 1:10 year up to the 1:100 year.

The stormwater management solution will consist of two (2) separate systems. The primary system consists of an Etobicoke Exfiltration System (EES) which accommodates frequent flows for infiltration, supplemented by a conventional piped sewer system and a perched outlet to the wetland via a control orifice and level spreader. Additional underground storage will also be required to maintain post-development flows to the wetland to pre-development levels.

The EES will consist of twin 200 mm diameter perforated pipes surrounded by a 600 mm deep by 900 mm clear stone envelope under the storm sewer on the private lane. The EES will be connected to the manhole at the intersection and will be graded to the north-west along the private laneway. A connection to the manhole at the north-west end of the private lane will be capped but to allow for exfiltration and will also be used for clean out during maintenance of the system. A total of 14 m³ of storage is available in the EES while the combined storage of infiltrated runoff to 116.2 metre elevation is 17 m³, consisting of the EES, manhole and sewer storage below the outlet to the wetland.

The perched outlet to the wetland is via a 200 mm diameter control orifice at 116.2 metres and a level spreader at 116.5 metres which is positioned at the lowest elevation to allow spill without earthworks required within 15 metres of the wetland. The level spreader will ensure that any flows discharging via the perched outlet will mimic the spread of shallow overland flow to the wetland in the pre-development condition.

Additional underground storage is located to the north of the north-west end of the private right-of-way and consists of 60m³ of storage tanks between the elevations of 116.2 metres and 117.0 metres. Below these elevations discharges are required to go via the outlet to the wetland to achieve pre-development flow rates while storage above 117 metres increases the head on the outlet orifice so that discharges are beyond the allowable release rate in the large events.
No controls, other than a reduced contributing area, are proposed for areas draining to Poole Creek which is consistent with the Upper Poole Creek Subwatershed Study (MMM 2000) although the site is downstream and outside of the limits of the Upper Poole Creek Subwatershed. The catchment draining to Poole Creek consists only of clean water runoff from roofs and rear yards and the drainage area has been limited to an extent whereby the post-development drainage from the smaller catchment is comparable to the pre-development runoff. By not providing controls, the runoff consists of sheet flow to the creek along the channel banks and is similar to pre-development conditions. No point discharges to Poole Creek is proposed which in turn means that no erosion potential is being created.

Water Quality control is required for the runoff from the public ROW and private laneway and front yards facing the ROW. Surface runoff from these catchments is all collected via street catch basins which in turn is connected to the minor system and the EES. The drainage area to the EES is 0.57 ha at an average imperviousness of 55%.

According to Table 3.2 of the MECP SWM Planning and Design Manual storage of 30 m³/ha is required to provide 80% TSS removal for lands with an average imperviousness of 55%, which means that for the EES drainage area storage of up to 17 m³ is required to be infiltrated. The combined storage of the EES and runoff captured in the minor system to drain to the EES is 17 m³ which is that required to provide 80% TSS removal. Therefore, the EES on its own meets the enhanced protection level and no further water quality controls are required.

4.6 Evaluation of Conceptual Stormwater Management Solution

4.6.1 Quantity Control

Quantity control is provided on the site via the EES, underground storage cells and limiting of runoff areas to Poole Creek. The pre and post development peak flow rates to each of the downstream receivers is compared in Table 12 below.

Table 12: Comparison of Allowable Peak Flow Rates to Post Development Controlled Peak Flow Rates (3-hour Chicago)

Return Period Event	Pre-Development to Wetland (l/s)	Post Development to Wetland (l/s)	Pre-Development to Poole Creek (l/s)	Post Development to Poole Creek (l/s)
1:2	11.6	12.8	0.1	26.1
1:5	20.5	22.0	13.7	40.55
1:10	31.2	32.7	27.3	50.2
1:100	77.3	78.6	72.0	79.6

The water quantity controls provide for control of the post development release rates to the allowable pre-development release rates. Relying on the reduction in runoff area to Poole Creek for the small events results in an increase in baseflow to the creek in these events however there is a control to close to pre-development flow rates for the 1:100 year return period event.

4.6.2 Quality Control

For runoff draining to Poole Creek quality control is provided by only directing runoff to Poole Creek from rear yards and rooftops which is clean water.

Water quality control for flow to the wetland is provided by the EES infiltration trench. To provide 80% TSS removal for areas with 55% average impervious (which is the average impervious of the proposed development area contributing ot the EES) an infiltration volume of 17 m³ is required (or 30m³/ha as per Table 3.2 of the Stormwater Management Planning and Design Manual, MECP 2003).

The EES together with pipe storage up to the elevation of the overflow provides a volume of 17 m³ which is that required for water quality treatment.

4.7 Storm and Stormwater Management Conclusions

The high-level stormwater management analysis revealed that the provision of on-site storage volume is required to meet the storm discharge criterion of limiting the 1:100-year post-development peak flows to the pre-development level. Pre-development flow rates to the wetland are achieved using the mitigation measures and the Hydrological Impact Study has confirmed that the stormwater management approach has maintained the pre-development water balance.

This report has been prepared for the exclusive use of Latitude Homes, for the stated purpose, for the named facility. 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 Latitude Homes 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:

Lucie Dalrymple P.Eng.,
Associate; Manager, Planning & Development

Prepared by:

Bobby Pettigrew, P.Eng.
Senior Water Resources Engineer

Appendix A

Summary of pre-consultation meetings (2)

Guy Forget

From: Raad Akrawi <rakrawi@groupeheafey.com>
Sent: Thursday, October 15, 2020 3:33 PM
To: Guy Forget
Cc: 'Carmine Zayoun'
Subject: RE: Wildpine Trails Inc.
Attachments: 37 Wildpine_Zayoun_2020-09-29 L1-2.pdf; SWM_Upper Poole Creek Subwatershed Study _2000.pdf

Hi Guy,

Apology for the late reply – in regards to the concept plan, please use the one attached.

Also, I have received additional information from the City through the planner, which would affect stormwater management for the above-noted project. Please see below.

"

Hi Jaime,

Our engineer found some new information for the site and updated the pre-consult notes. Could you help pass this along to your team. There are 2 attachments, one as pdf in the email and one in the link below.

https://ottawacity.sharepoint.com/:b:/s/External-PSDevelopmentReview/EVCdQZ9TpfNLrHctsxIXgU0ByuL4WU4bv0FA9NcEYU3H3w?email=posen%40fotenn.com&e=wfRnlx

Engineering

- The Servicing Study Guidelines for Development Applications are available at the following link: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans
- Record drawings and utility plans are available for purchase from the City's Information Centre. Contact the City's Information Centre by email at informationcentre@ottawa.ca or by phone at (613) 580-2424 x44455
- ~~Stormwater quantity control criteria – post development peak flows from the site are to be controlled to pre-development levels for all storms up to and including the 100-year storm~~.
- Storm water quantity control criteria- follow the criteria provided in the Upper Poole Creek subwatershed study.
- The Upper Pool Creek subwatershed study includes criteria on infiltration, baseflow temperatures as well as water quality. The applicant may discuss the criteria shown in the attached pdf with the MVCA.
- It appears that based on the lay of the land, runoff from the existing land is directly discharged to Poole Creek.

- Existing sanitary sewers are available on Wildpine Court and Ravenscroft Crt. to make service connection. Please make appropriate service connection based on the existing available capacity of the sewer.
- Existing watermain stubs are available on Wildpine Court and Ravenscroft Court for service connections.
- Stormwater quality control – Consult with the Conservation Authority (MVCA) for their requirements. Include the correspondence with MVCA in the stormater/site servicing report.
- MECP ECA (Environmental Compliance Approval) is required due to direct discharge to Poole Creek. ECA application will be direct submission to MECP (MOE).
- Clearly show and label the property lines on all sides of the property.
- Clearly show and label all the easements (if any) on the property, on all plans.
- When calculating the post development composite runoff coefficient (C), please provide a drawing showing the individual drainage area and its runoff coefficient.
- When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the storage requirement prior to the 1:100 year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.
- Engineering plans are to be submitted on standard A1 size (594mm x 841mm) sheets.
- Phase 1 ESA and Phase 2 ESA must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
- Provide the following information for water main boundary conditions:
    1. Location map with water service connection location
    2. Average daily demand (l/s)
    3. Maximum daily demand (l/s)
    4. Maximum hourly demand (l/s)
    5. Fire flow demand (provide detailed fire flow calculations based on the fire underwriters survey method)
- If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.

Feel free to contact Infrastructure Project Manager, Santhosh Kuruvilla, at santhosh.kuruvilla@ottawa.ca, for follow-up questions.

“

Regards,
Raad Akrawi

From: Guy Forget <gforget@jlrichards.ca>
Sent: October 15, 2020 9:36 AM
To: Raad Akrawi <rakrawi@groupeheafey.com>
Subject: Wildpine Trails Inc.

Hi Raad,

We have just noted that you have forwarded to us two different concepts; Option 1 and Option 2.

Can you tell me which of the two will be used?

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

J.L. Richards & Associates Limited
700 - 1565 Carling Avenue, Ottawa, ON K1Z 8R1
Direct: 343-804-5363

J.L. Richards & Associates Limited is proactively doing our part to protect the wellbeing of our staff and communities while improving our communication technology. ***We are pleased to announce that we have implemented direct phone lines for all of our staff, allowing you to connect with us regardless of whether we are working remotely or in the office.*** *We are dedicated to delivering quality services to you through value and commitment, as always. Please reach out to us if you have any questions about your project.*

Appendix B

Concept Plan and
Topographical Survey

TOPOGRAPHICAL PLAN OF SURVEY

PART OF LOT 24
CONCESSION 11
Geographic Township of Goulbourn
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 400

16 12 8 4 0 8 16 Metres

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

Surveyor's Certificate
I CERTIFY THAT :
1. This survey and plan are correct and in accordance with the Surveys Act and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 7th day of January, 2021.

Jan 7/21
Date

T. Hartwick
Ontario Land Surveyor

Notes & Legend

	Denotes	Survey Monument Planted
■	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
(WIT)	"	Witness
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
Meas.	"	Measured
OU	"	Origin Unknown
(P1)	"	Registered Plan 4M-845
(P2)	"	Plan 4R-8858
(P3)	"	Plan 4R-9020
(P4)	"	Plan 4R-8990
(P5)	"	Registered Plan 4M-1103
(P6)	"	Plan SR-10835
(P7)	"	Plan 4R-31094
(P8)	"	Plan 5R-7791
(P9)	"	Plan 4R-12472
(P10)	"	Plan 4R-29715
(P11)	"	AOG Plan July 9, 2003
	"	Deciduous Tree
	"	Coniferous Tree
FH	"	Fire Hydrant
WV	"	Water Valve
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
CB	"	Catch Basin
BH	"	Borehole
GM	"	Gas Meter
HH	"	Handhole
TB-B	"	Bell Terminal Box
TB-C	"	Cable Terminal Box
TB-T	"	Traffic Terminal Box
B	"	Bollard
S	"	Sign
UP	"	Utility Pole
AN	"	Anchor
LS	"	Light Standard
FP	"	Fence Post
AC	"	Air Conditioner
Ø	"	Diameter
+65.00	"	Location of Elevations
+65.00	"	Top of Concrete Curb Elevation
+65.00	"	Top of Wall Elevation
C/L	"	Centreline
CLF	"	Chain Link Fence
BF	"	Board Fence
TRW	"	Timber Retaining Wall

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ELEVATION NOTES
1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

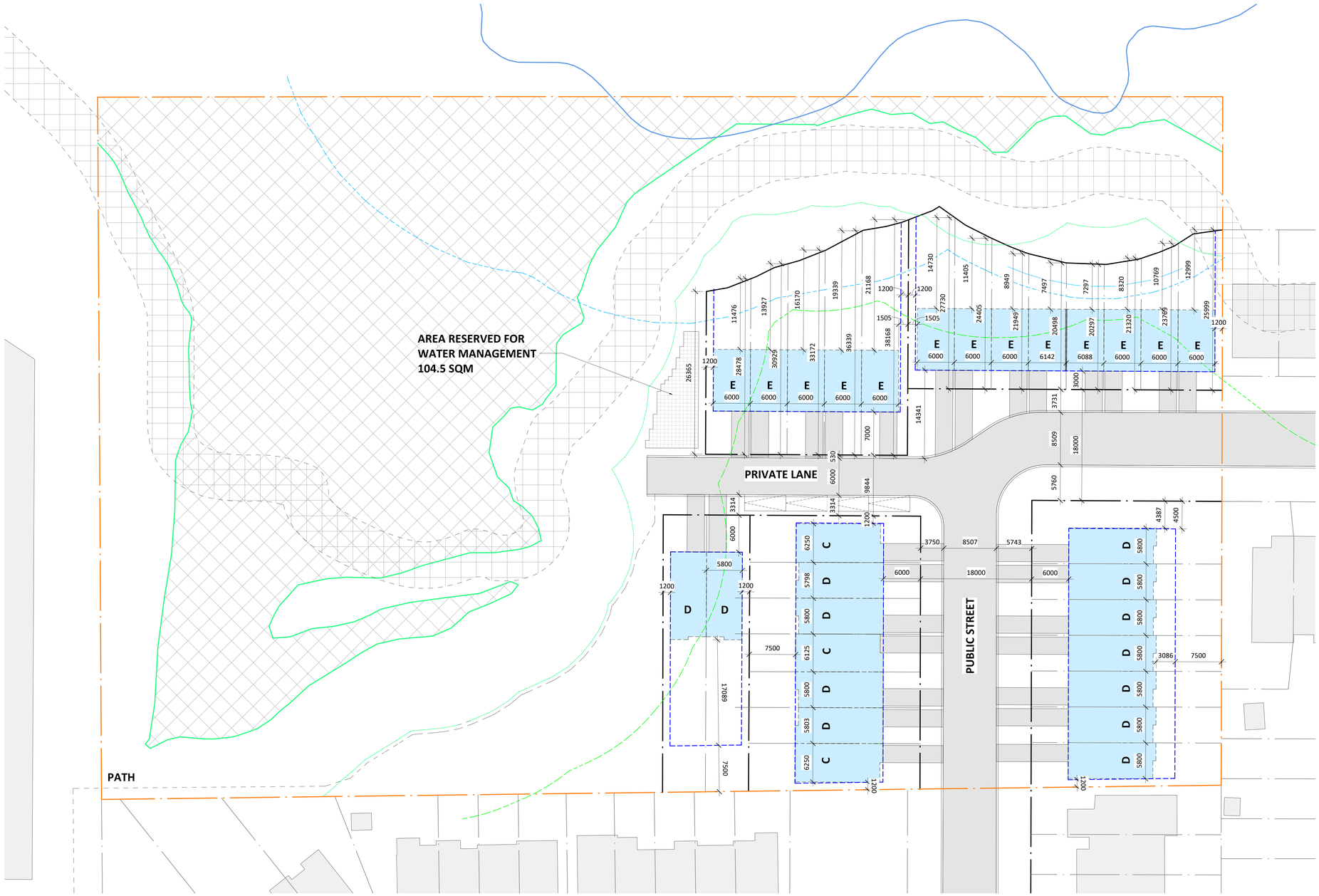
UTILITY NOTES
1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2150129

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

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com

Ontario Land Surveyors | Job No. 2/203-20 Zavyn Pt Lt 24 Cl 02 POS Dl | N



1 37 WILDPINE COURT - SITE PLAN
1 : 250

FOR INFORMATION, IN PROGRESS
JUNE 30, 2021

C:\Users\ppomerleau\Documents\21010_DEV-WILDPINE_CENTRAL_R21_ppomerleauJW453.rvt

Project
WILDPINE DEVELOPMENT
37 WILDPINE COURT

Owner

Architect
PMA ARCHITECTES
(418) 651-8954
INFO@PMAARCHITECTES.COM
3070, CHEMIN DES QUATRE-BOURGEOIS
QUÉBEC (QC) G1W 2K4
PMAARCHITECTES.COM

Mechanic-electricity

Landscape architect

Structural engineer

Designer

Seal

Seal

Revision

N°	Description	Date

Reference
A: Detail number
B: Number of the sheet where it is detailed

Note

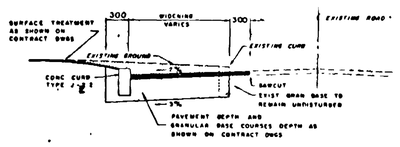
Date 2021-06-30
Scale Comme indiqué
Folder 21010
Draw by P.POMERLEAU

Title
SITE PLAN

Sheet
A101

Appendix C

Drawing of Existing Infrastructure



ROAD WIDENING DETAIL

SEE NOTES 4&5 ON DWG Nº 88-6288-GPI

CENTRELINE OF THE PROPOSED ACCESS SHOULD BE SHIFTED APPROXIMATELY 1 0m TO THE NORTH SO AS TO IMPROVE THE ALIGNMENT OF THE INTERSECTION

EXIST TEE SHALL BE REMOVED & SALVAGED & REPLACE WITH CROSS. CONNECTION BY R.M.O.C.

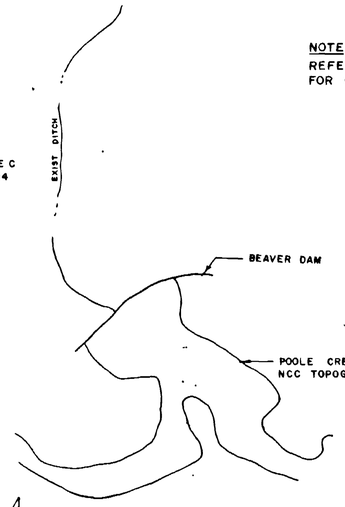
DAYLIGHTING EASEMENT

APPROX LOCATION OF 1:100 YR FLOOD LINE AS PER MVCA FLOOD RISK MAP FOR POOLE CREEK PLAN Nº 3.

CONCRETE HEADWALL AS PER OPSD 804 03 c/w HORIZONTAL GRATE AS PER OPSD 804 05 TYPE C TOP HEADWALL ELEV 115 14 INV. SEWER 114 30

RIP-RAP AS PER GOULBOURN TWP DWG Nº S-20

NOTE
REFER TO DWG Nº 88-6288-GPI FOR GRADING & DRAINAGE DETAILS



Regional Municipality of Ottawa-Carleton Works Department
Municipalité Régionale d'Ottawa-Carleton Département des Travaux

Approved

M.J. Willyams AS for DIRECTOR
R.O. Pickard — WORKS COMMISSIONER

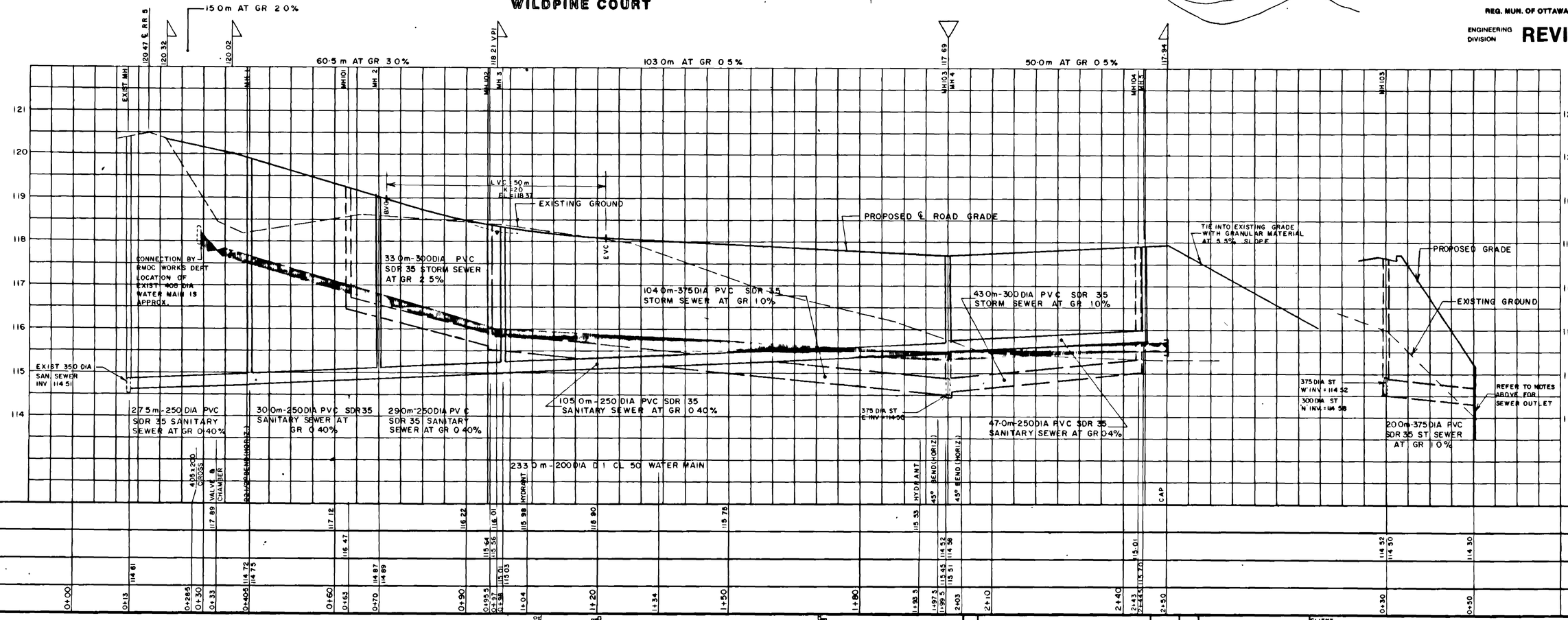
Date 7 Dec 87

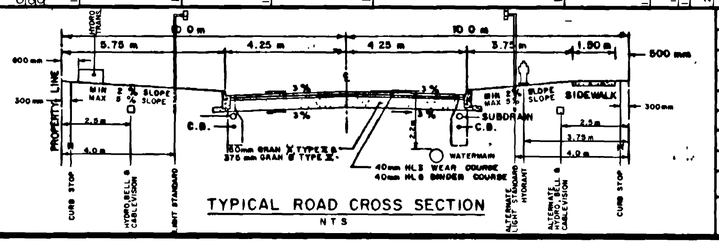
WATER WORKS

REG. MUN. OF OTTAWA-CARLETON ENGINEERING DIVISION **REVISED** 23 Dec 87

REG. MUN. OF OTTAWA-CARLETON ENGINEERING DIVISION **REVISED** 6 June 88

WILDPINE COURT





TYPICAL ROAD CROSS SECTION
NTS

No.	REVISIONS	DATE	BY
1	REV PER RMOC. WORKS DEPT.	0606-88	D.M.

APP'D

DESIGN K P E
DRAWN B P L
CHECKED K P E

CLIENT: LANTANA DEVELOPMENTS INC.

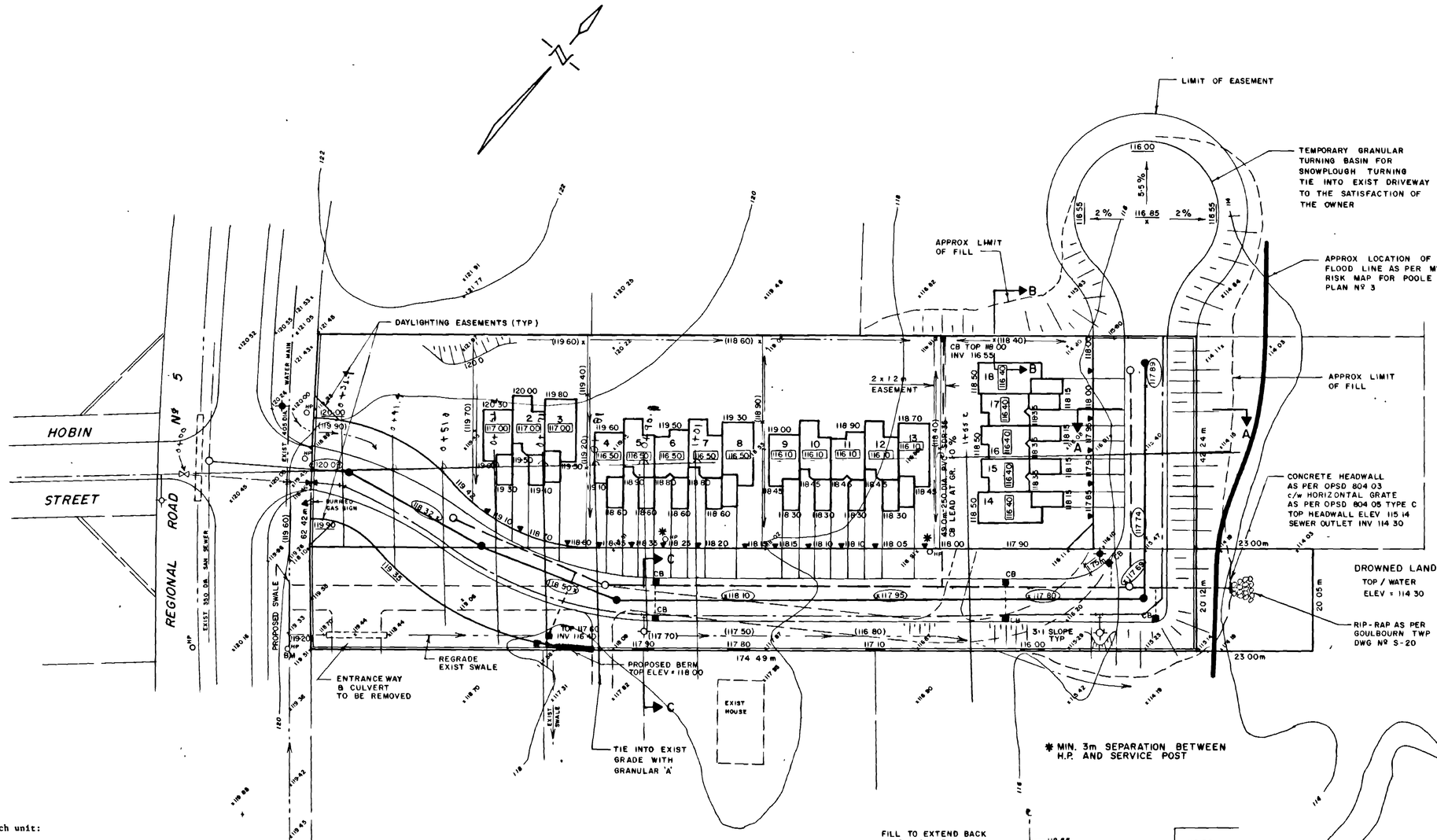
PROJECT: WILD PINE COURT

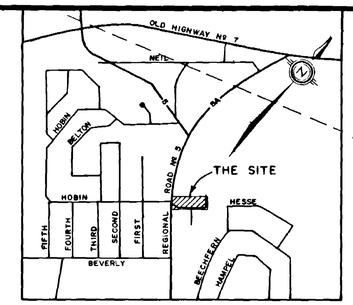
TITLE: PLAN & PROFILE 3704

OLIVER MANGIONE McCALLA & ASSOCIATES LIMITED
Consulting Engineers — Nepean, Ontario

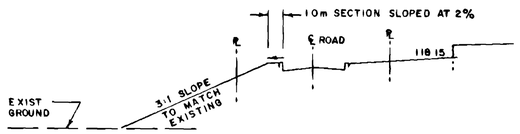
DATE: SEPTEMBER, 1987
SCALE: 1 : 500 HORIZ, 1 : 50 VERT
DRAWING No: 88-6288-1
REV:

7853

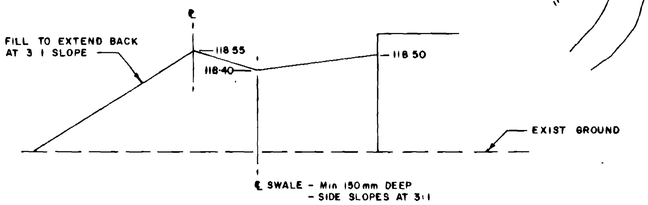




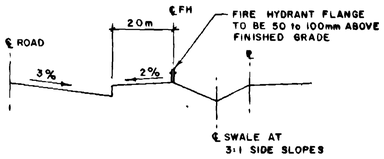
KEY PLAN
NTS



CROSS SECTION A-A
NTS



CROSS SECTION B-B
NTS



CROSS SECTION C-C
NTS

NOTES

1. Services to each unit:

   Sanitary - 150 mm dia. PVC SDR-28
   Storm - 100 mm dia. PVC SDR-28
   Water - 19 mm dia. copper with curb stop

2. Concrete mountable curb and gutter to be in accordance with Township of Goulbourn's Drawing No. R-20.

3. Rear yard catch basin to be placed in one lot only - 300 mm minimum from property line.

4. From edge of Regional Road to limit of right-of-way, road to be constructed to Regional Standards as follows:

   450 mm Granular 'B'
   150 mm Granular 'A'
   2-50 mm Base Course Asphalt - HL-8
   40 mm Wear Course Asphalt - HL-3

5. Road curb to be constructed to 5 metres within Regional Road right-of-way and then tapered to nothing. They should not encroach within the shoulder of Regional Road.

6. The joint along the existing edge of the Regional Road pavement should be staggered 300 mm with the sawcut depth equal to the top course of asphalt only.

7. Street light within Regional Road right-of-way shall consist of a concrete spun pole with a minimum 3.7 metre (12 foot) davit running parallel to the Regional Road. Lamp shall be a 200 Watt High Pressure Sodium mounted 10.7 metres above the asphalt. The exact location shall be determined in the field, however, the pole shall be a minimum of 3.7 metres (12 feet) from the edge of road.

8. Internal street light at Station 2 + 00 to be in accordance with Township of Goulbourn Drawing Number R-26.

BENCH MARK
NAIL IN HYDRO POLE 6" ABOVE GROUND S W CORNER OF SITE AT ENTRANCE TO ROW EAST SIDE OF R R Nº 5
ELEV = 119.567

LEGEND

- 119.56 EXISTING ELEVATION
- 120.00 PROPOSED ELEVATION
- (116.37) PROPOSED ℄ ROAD ELEVATION
- (116.80) PROPOSED ℄ SWALE ELEVATION
- PROPOSED SWALE
- PROPOSED SURFACE DRAINAGE
- CB PROPOSED CATCH BASIN
- SERVICE LOCATION
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATER MAIN
- PROPOSED TERRACING
- PROPOSED STREET LIGHT (Also refer to notes 7 & 8)
- 116.40 MINIMUM BOTTOM OF FOOTING ELEVATION (RAISE IF REQUIRED TO ACCOMODATE THE PROPOSED LOT GRADING)

Regional Municipality of Ottawa-Carleton Works Department
Municipalité Régionale d'Ottawa-Carleton Département des Travaux

Approved

M.J. Williams
FOR DIRECTOR
R.G. Pickard WORKS COMMISSIONER

Date 7 June 88
WATER WORKS

No	REVISIONS	DATE	BY

APP'D _____

DESIGN K P E
DRAWN G P L
CHECKED K P E

CLIENT: LANTANA DEVELOPMENTS INC.
PROJECT: WILD PINE COURT 3704-1
TITLE: GRADING & DRAINAGE PLAN

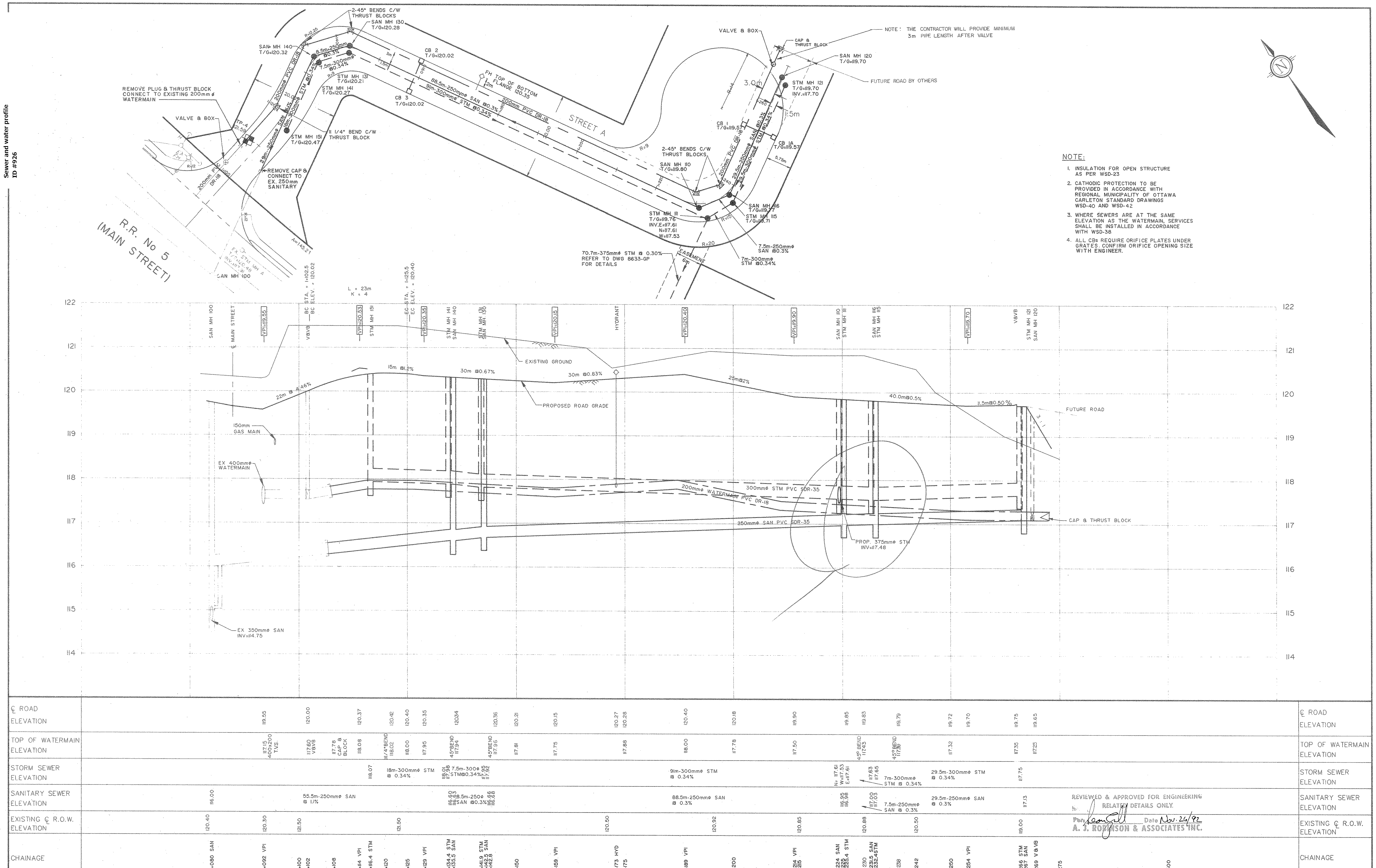
OLIVER MANGIONE McCALLA & ASSOCIATES LIMITED
Consulting Engineers Nepean Ontario

DATE SEPTEMBER, 1987 | SCALE 1 : 500 | DRAWING NO 88-6288-GP1 | REV

LICENCED PROFESSIONAL ENGINEER K P EMPEY PROVINCE OF ONTARIO

7853

Plan & Profile
NCC #348-013
File #92
RAVENSCROFT COURT
Sewer and water profile
ID #926



NOTE:

1. INSULATION FOR OPEN STRUCTURE AS PER WSD-23
2. CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH REGIONAL MUNICIPALITY OF OTTAWA CARLETON STANDARD DRAWINGS WSD-40 AND WSD-42
3. WHERE SEWERS ARE AT THE SAME ELEVATION AS THE WATERMAIN, SERVICES SHALL BE INSTALLED IN ACCORDANCE WITH WSD-38
4. ALL CBs REQUIRE ORIFICE PLATES UNDER GRATES. CONFIRM ORIFICE OPENING SIZE WITH ENGINEER.

REVIEWED & APPROVED FOR ENGINEERING RELATED DETAILS ONLY.
Per: [signature] Date Nov. 26/92
A. J. ROBINSON & ASSOCIATES INC.

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

No.	REVISION	DATE	BY
2	REVISED AS PER TOWNSHIP COMMENTS	SEP. 17/92	SC
1	ISSUED FOR APPROVAL	JULY 23/92	SC

REGISTERED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER — S.C. COURTLAND — PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	SCC	SCALE	
CHECKED	SCC	1:400 HORIZONTAL	
DRAWN	HEE		
CHECKED	SCC	1:40 VERTICAL	
APPROVED	JR		

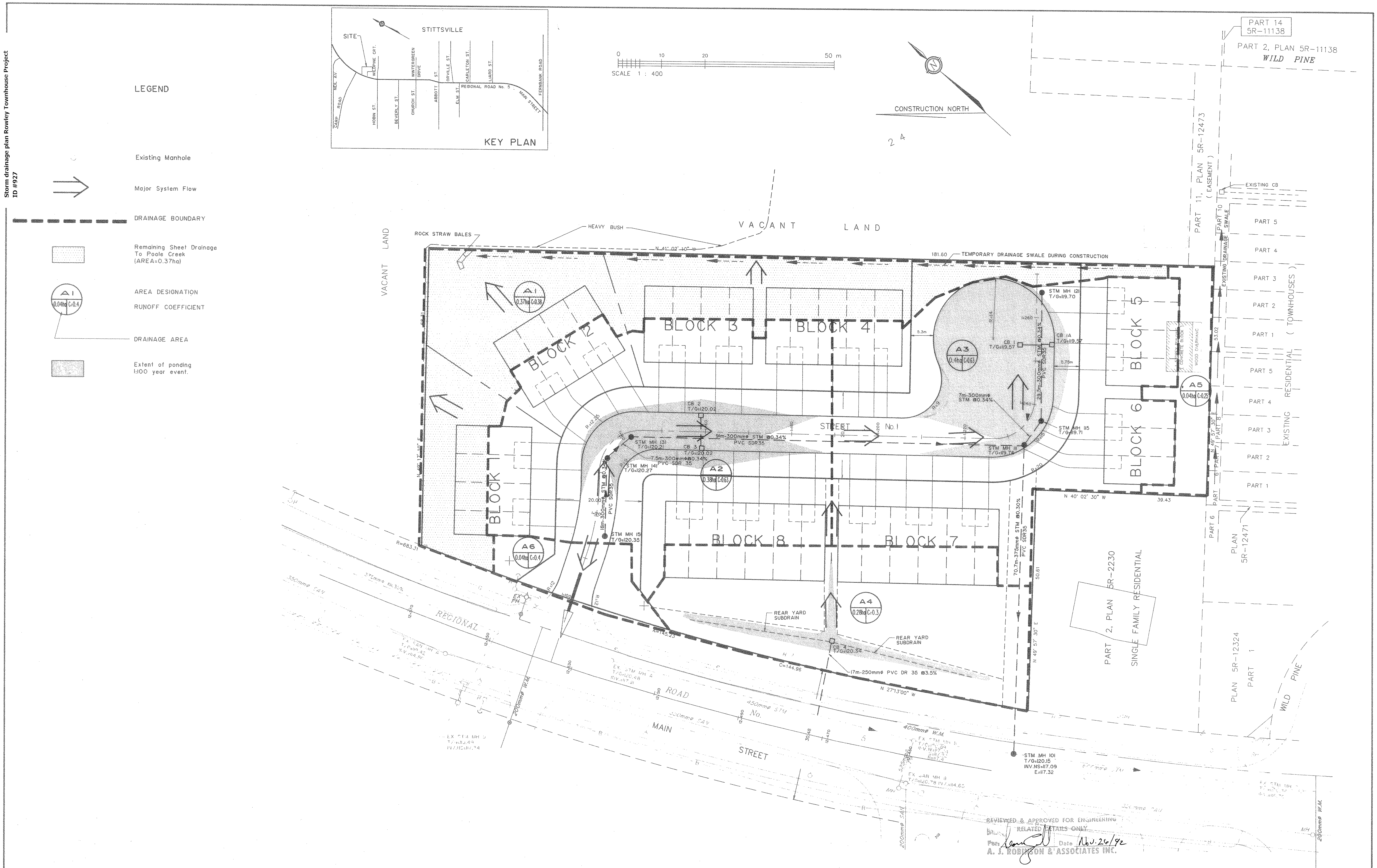
TOWNSHIP OF GOULBOURN

ROWLEY TOWN HOUSE PROJECT

PLAN AND PROFILE
STREET No. 1

PROJECT No. 8633
DATE JULY 1992
DRAWING No. 8633-PP1

Storm Drainage Plan
NCC #348-013
File #93
RAVENSCROFT COURT
Storm drainage plan Rowley Townhouse Project
ID #927



LEGEND
Existing Manhole
Major System Flow
DRAINAGE BOUNDARY
Remaining Sheet Drainage To Poole Creek (AREA=0.37ha)
AREA DESIGNATION
RUNOFF COEFFICIENT
DRAINAGE AREA
Extent of ponding 1:100 year event.
KEY PLAN
STITTSVILLE
SITE
REGIONAL ROAD No. 5
MAIN STREET
SCALE 1 : 400
CONSTRUCTION NORTH
VACANT LAND
HEAVY BUSH
ROCK STRAW BALES
TEMPORARY DRAINAGE SWALE DURING CONSTRUCTION
BLOCK 1
BLOCK 2
BLOCK 3
BLOCK 4
BLOCK 5
BLOCK 6
BLOCK 7
BLOCK 8
STREET No. 1
REAR YARD SUBDRAIN
EXISTING CB
EXISTING DRAINAGE SWALE
EXISTING RESIDENTIAL (TOWNHOUSES)
SINGLE FAMILY RESIDENTIAL
PART 14 5R-11138
PART 2, PLAN 5R-11138
WILD PINE
PART 11, PLAN 5R-12473 (EASEMENT)
PLAN 5R-12471
PART 2, PLAN 5R-2230
PLAN 5R-12324 PART 1
REGIONAL ROAD No. 5
MAIN STREET
400mmø W.M.
200mmø W.M.
STM MH 101 T/G=120.15 INV.NS=117.09 E=117.32
REVIEWED & APPROVED FOR ENGINEERING RELATED DETAILS ONLY
Date Nov. 26/92
A. J. ROBINSON & ASSOCIATES INC.

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

No.	REVISION	DATE	BY
2	REVISED AS PER TOWNSHIP COMMENTS	SEP. 17/92	SC
1	ISSUED FOR APPROVAL	AUGUST/92	UB

REGISTERED PROFESSIONAL ENGINEER S.C. COURTLAND PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER U. BOEHME PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD OTTAWA, ONTARIO

DESIGN	S.C.C	SCALE 1:400
CHECKED	U.B.	
DRAWN	H.E.E	
CHECKED	S.C.C	
APPROVED	J.R.	

TOWNSHIP OF GOULBOURN
ROWLEY TOWNHOUSE PROJECT
STORM DRAINAGE PLAN

PROJECT No.	8633
FIELD BOOK	
DATE	JANUARY 1992
DRAWING No.	8633-STMI

General Plan of Services

File #94

NCC #348-013

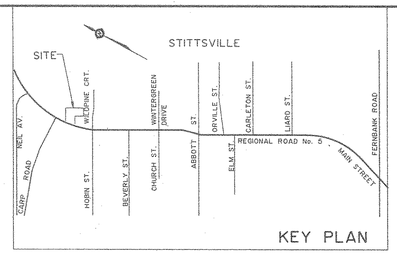
RAVENSCROFT COURT
General plan of services for Rowley Townhouse Project
ID #928

LEGEND

- TP-1 120.67 — Test Pit Location And Elevation
- Proposed Manhole
- Existing Manhole
- Sanitary, Storm, & Water Service
- Denotes Sanitary, & Storm Service With "Y" Type Water Connection (See WSD 26 & 27) In common Individual Storm/Sanitary services required for each unit.
- Proposed Fire Hydrant
- CMB — Community Mail Box

NOTE:
ALL COSTS RELATED TO EQUIPMENT (COMMUNITY MAILBOX) INSTALLATION, PRECAST PAD, ACCESS TO CMB AND MAINTENANCE OF THE ABOVE IS THE RESPONSIBILITY OF CANADA POST CORPORATION.

NOTE:
1. INSULATION FOR OPEN STRUCTURE AS PER WSD-23
2. CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH REGIONAL MUNICIPALITY OF OTTAWA CARLETON STANDARD DRAWINGS WSD-40 AND WSD-42
3. WHERE SEWERS ARE AT THE SAME ELEVATION AS THE WATERMAIN, SERVICES SHALL BE INSTALLED IN ACCORDANCE WITH WSD-38
4. ALL C.B.s REQUIRE ORIFICE PLATES UNDER GRATES. CONFIRM ORIFICE OPENING SIZE WITH ENGINEER.



SCALE 1 : 400 (0, 10, 20, 50 m)

CONSTRUCTION NORTH

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

No.	REVISION	DATE	BY
2	REVISED AS PER TOWNSHIP COMMENTS	SEP. 17/92	SC
1	ISSUED FOR APPROVAL	AUGUST/92	UB

REGISTERED PROFESSIONAL ENGINEER — S.C. COURTLAND — PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	S.C.C
CHECKED	U.B.
DRAWN	H.E.E
CHECKED	S.C.C
APPROVED	J.R.
SCALE	1:400

TOWNSHIP OF GOULBOURN
ROWLEY TOWNHOUSE PROJECT
GENERAL PLAN OF SERVICES STREET A

PROJECT No.	8633
FIELD BOOK	
DATE	JANUARY 1992
DRAWING No.	8633-GP

Grading Plan

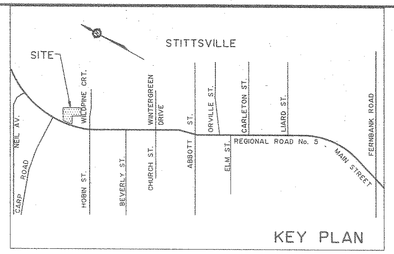
NCC #348-013 **File #95**

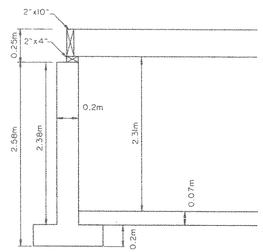
RAVENSCROFT COURT

Grading plan for Rowley Townhouse Project
ID #929

LEGEND

- Existing Manhole
- 120.23 — Proposed Elevation
- Proposed Road Elevation (By Others)
- Existing Contour
- Proposed Elevation / Existing Elevation
- USF =Underside of Footing; FF =Finished Floor; TOF =Top of Foundation; BFS =Basement Floor Slab
- Proposed Noise Attenuation Fence
- T/R 118.34 — Top of Retaining Wall
- Drainage/Storm Sewer Easements





TYPICAL BASEMENT SECTION
N.T.S.

REVIEWED & APPROVED FOR ENGINEERING RELATED DETAILS ONLY
Per _____ Date Nov. 26/92
A. J. ROBINSON & ASSOCIATES INC.

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

3	AS PER TOWNSHIP COMMENTS	SEP. 17/92	SC
2	REVISED AS PER SWM REPORT	AUGUST/92	UB
1	ISSUED FOR APPROVAL	JUNE/92	UB
NO.	REVISION	DATE	BY

REGISTERED PROFESSIONAL ENGINEER S.C. COURTLAND
REGISTERED PROFESSIONAL ENGINEER UDO ROEHME

NOVATECH
ENGINEERING CONSULTANTS LTD

DESIGN S.C.C	SCALE 1:400
CHECKED U.B.	
DRAWN H.E.E	
CHECKED	

TOWNSHIP OF GOULBOURN
ROWLEY TOWNHOUSE PROJECT

PROJECT No.	8633
FIELD BOOK	
DATE	JANUARY 1992
DRAWING No.	

Appendix D

Water Distribution System –
Hydraulic Network Analysis

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : WILDPINE TRAILS - 37 WILDPINE COURT
LOCATION : CITY OF OTTAWA
DEVELOPER : LATITUDE HOMES

NODE	RESIDENTIAL		NON-RESIDENTIAL			AVERAGE DAILY DEMAND (L/s)			MAXIMUM DAILY DEMAND (L/s)			PEAK HOUR DEMAND (L/s)		
	UNITS Row TH	POP'N	COMM. (ha.)	INST. (ha.)	Park (L/s)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total
37 Wildpine Court														
J-1	22	59	0.00	0.00	0.00	0.19	0.00	0.19	1.47	0.00	1.47	2.22	0.00	2.22
J-2	7	19	0.00	0.00	0.00	0.06	0.00	0.06	0.47	0.00	0.47	0.71	0.00	0.71
TOTALS	29	78	0.00	0.00	0.00	0.25	0.00	0.25	1.94	0.00	1.94	2.93	0.00	2.93

ASSUMPTIONS

RESIDENTIAL DENSITIES
- Townhouse (TH): 2.7 p / p / u

PEAKING FACTORS
- Maximum Day Peaking Factor: 7.66 x Avg Day (Table 3-3, MOE 2008)
- Peak Hour Peaking Factor: 11.54 x Avg Day (Table 3-3, MOE 2008)
- Minimum Hour Peaking Factor: 0.10 x Avg Day (Table 3-3, MOE 2008)

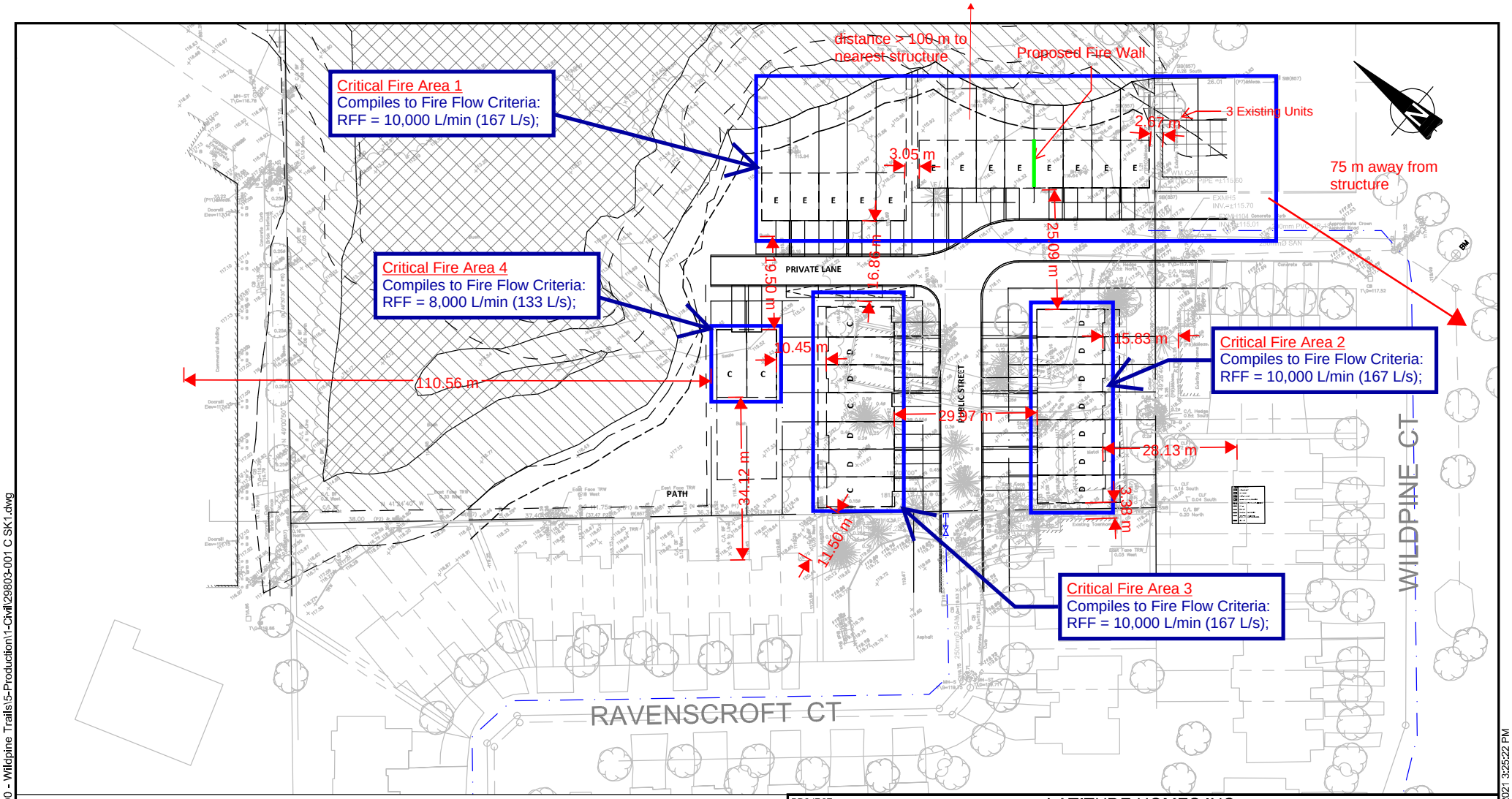
AVG. DAILY DEMAND
- Residential: 280 l / cap / day
- Institutional: 28,000 l / ha / day
- Commercial: 28,000 l / ha / day

MAX. DAILY DEMAND
- Residential: 700 l / cap / day
- Institutional: 42,000 l / ha / day
- Commercial: 42,000 l / ha / day

MAX. HOURLY DEMAND
- Residential: 1,540 l / cap / day
- Institutional: 75,600 l / ha / day
- Commercial: 75,600 l / ha / day
- Park: 0.0 L/s

TABLE 3-3, MOE 2008

Eq Pop	Mx Day	Pk Hr	Min Hr
30	9.5	14.3	0.1
150	4.9	7.4	0.1
300	3.6	5.4	0.2
450	3.0	4.5	0.3



PROJECT:
LATITUDE HOMES INC.
WILDPINE TRAILS INC.
37 WILDPINE COURT

DRAWING:
BASE PLAN SKETCH

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

DESIGN:	SP
DRAWN:	SP
CHECKED:	GF
JLR #:	29803-001

1:750 SCALE

DRAWING #: SK.1

File Location: P:\29000\29803-000 - Wildpine Trails\5-Production\1-Civil\29803-001 C SK1.dwg

PLOT DATE: Tuesday, March 23, 2021 3:25:22 PM

FUS Fire Flow Calculations

37 Wildpine Court - Row Townhouse

(JLR 29803-001)

CRITICAL FIRE AREA No. 1

Step	Parameter	Value		Note
A	Type of Construction	Wood Frame		
	Coefficient (C)	1.5		
B	Ground Floor Area	1101	m^2	Includes 1 Prop. Block of 5 TH units, 1 proposed Block of 8 TH units (with firewall midway) and 1 Block of Exist. Units (3 units) as the separation between the Blocks is 2.4 m (less than 3 m), blocks to be treated as contiguous area. Middle Block having 8 TH units include a fire wall per OBC
C	Height in storeys	2	storeys	Basements are excluded.
	Total Floor Area	2202	m^2	
D	Fire Flow Formula	F=220C√A		
	Fire Flow	15485	L/min	
	Rounded Fire Flow	15000	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	-2250		
	Fire Flow	12750	L/min	No rounding applied.
F	Sprinkler Protection	None		
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	110.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	220.0	m-storeys	
	Separation Distance	500	m	
	North Side Exposure Charge	0%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	40.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	80.0	m-storeys	
	Separation Distance	75	m	
	East Side Exposure Charge	0%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	14.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	28.0	m-storeys	
	Separation Distance	25.09	m	
	South Side Exposure Charge	8%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	10.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	20.0	m-storeys	
	Separation Distance	110	m	
	West Side Exposure Charge	0%		
	Total Exposure Charge	8%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	1020	L/min	
H	Fire Flow	13770	L/min	
	Rounded Fire Flow	14000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**10000**	**L/min**	The City of Ottawa's cap does apply since there is the 10 m minimum separation between the back of the units and no side flankage.
		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

FUS Fire Flow Calculations

37 Wildpine Court - Row Townhouse

(JLR 29803-001)

CRITICAL FIRE AREA No. 2

Step	Parameter	Value		Note
A	Type of Construction	Wood Frame		
	Coefficient (C)	1.5		
B	Ground Floor Area	575	m^2	Includes 1 Prop. Block of TH (7 units in total)
C	Height in storeys	2	storeys	Basements are excluded.
	Total Floor Area	1150	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	11191	L/min	
	Rounded Fire Flow	11000	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	-1650		
	Fire Flow	9350	L/min	No rounding applied.
F	Sprinkler Protection	None		
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	14.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	28.0	m-storeys	
	Separation Distance	25.09	m	
	North Side Exposure Charge	8%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	40.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	80.0	m-storeys	
	Separation Distance	15.83	m	
	East Side Exposure Charge	14%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	14.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	28.0	m-storeys	
	Separation Distance	3.38	m	
	South Side Exposure Charge	17%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	41.5	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	82.9	m-storeys	
	Separation Distance	29.97	m	
	West Side Exposure Charge	9%		
	Total Exposure Charge	48%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	4488	L/min	
H	Fire Flow	13838	L/min	
	Rounded Fire Flow	14000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**10000**	**L/min**	The City of Ottawa's cap does apply since there is the 10 m minimum separation between the back of the units and no side flankage.
		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

FUS Fire Flow Calculations

37 Wildpine Court - Row Townhouse
(JLR 29803-001)

CRITICAL FIRE AREA No. 3

Step	Parameter	Value		Note
A	Type of Construction	Wood Frame		
	Coefficient (C)	1.5		
B	Ground Floor Area	580	m^2	Includes 1 Prop. Block of TH (7 units in total)
C	Height in storeys	2	storeys	Basements are excluded.
	Total Floor Area	1160	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	11239	L/min	
	Rounded Fire Flow	11000	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	-1650		
	Fire Flow	9350	L/min	No rounding applied.
F	Sprinkler Protection	None		
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	30.0	m-storeys	
	Separation Distance	16.86	m	
	North Side Exposure Charge	12%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	44.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	88.0	m-storeys	
	Separation Distance	29.97	m	
	East Side Exposure Charge	9%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	8.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	16.0	m-storeys	
	Separation Distance	11.5	m	
	South Side Exposure Charge	12%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	15.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	30.0	m-storeys	
	Separation Distance	10.45	m	
	West Side Exposure Charge	12%		
	Total Exposure Charge	45%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	4208	L/min	
H	Fire Flow	13558	L/min	
	Rounded Fire Flow	14000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**10000**	**L/min**	The City of Ottawa's cap does apply since there is the 10 m minimum separation between the back of the units and no side flankage.
		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

FUS Fire Flow Calculations

37 Wildpine Court - Row Townhouse

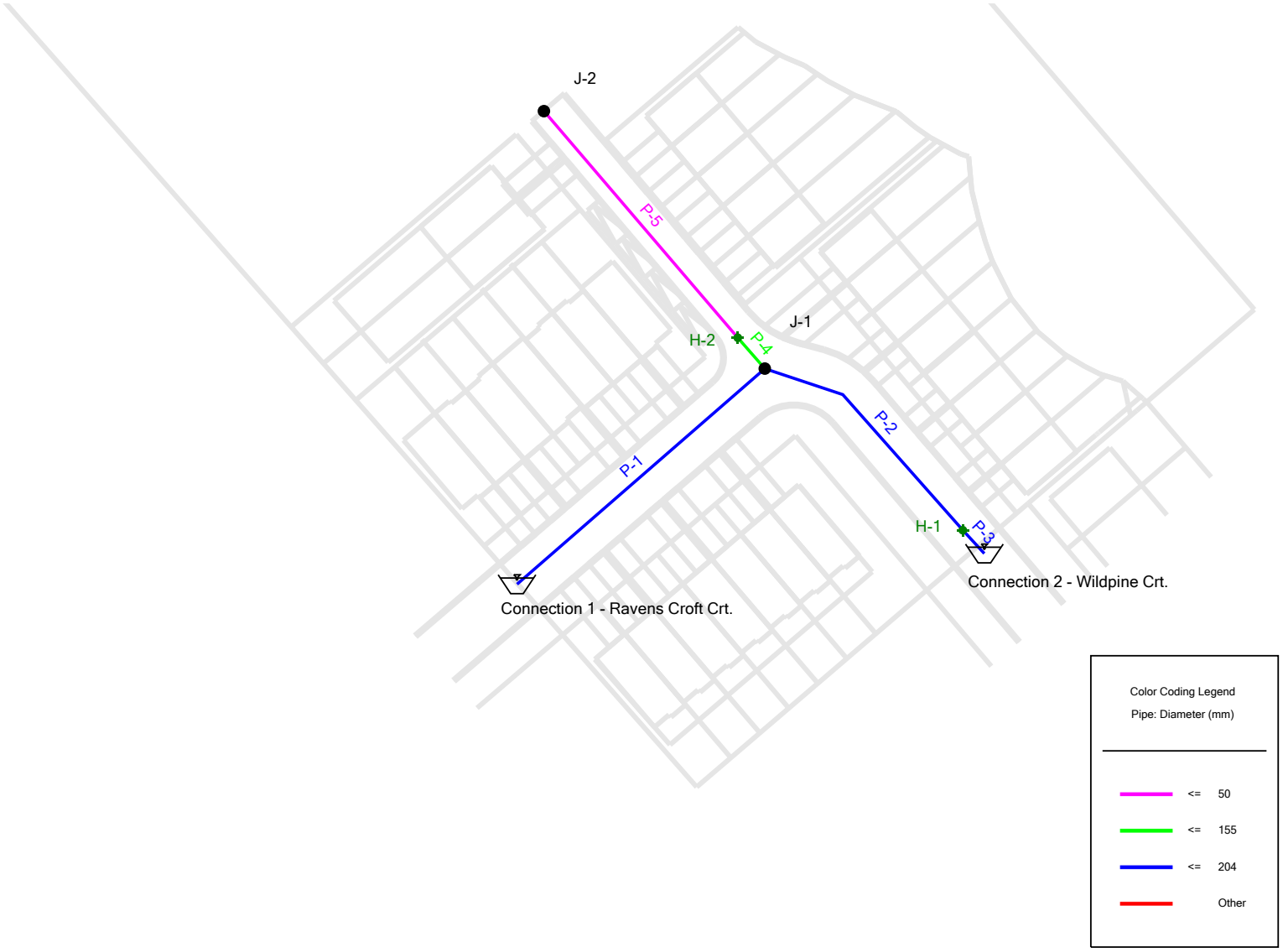
(JLR 29803-001)

CRITICAL FIRE AREA No. 4

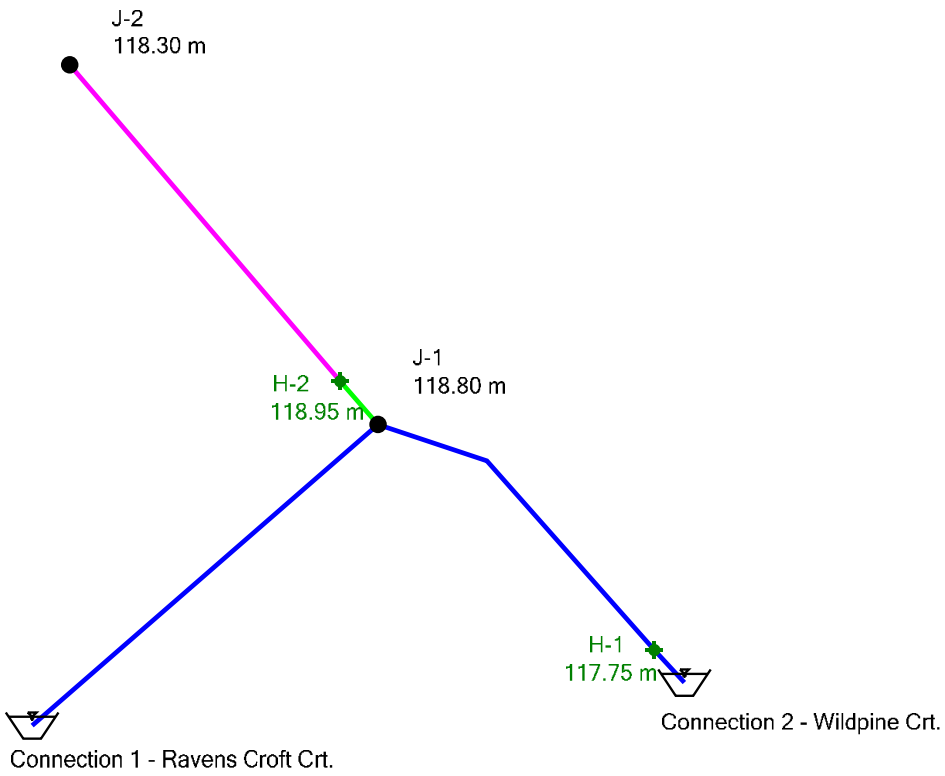
Step	Parameter	Value		Note
A	Type of Construction	Wood Frame		
	Coefficient (C)	1.5		
B	Ground Floor Area	180	m^2	Includes 2 units in one Block
C	Height in storeys	2	storeys	Basements are excluded.
	Total Floor Area	360	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	6261	L/min	
	Rounded Fire Flow	6000	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	-900		
	Fire Flow	5100	L/min	No rounding applied.
F	Sprinkler Protection	None		
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	6.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	12.0	m-storeys	
	Separation Distance	19.5	m	
	North Side Exposure Charge	12%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	14.0	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	28.0	m-storeys	
	Separation Distance	10.45	m	
	East Side Exposure Charge	12%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	12.5	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	25.0	m-storeys	
	Separation Distance	34.12	m	
	South Side Exposure Charge	5%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	14.5	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	29.0	m-storeys	
	Separation Distance	110.56	m	
	West Side Exposure Charge	0%		
	Total Exposure Charge	29%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	1479	L/min	
H	Fire Flow	6579	L/min	
	Rounded Fire Flow	7000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**8000**	**L/min**	Given that the long method yields 7,000 L/min, as per ISTDB-2014-02, a minimum fire flow of 8,000 L/min should be targeted
		133	**L/s**	

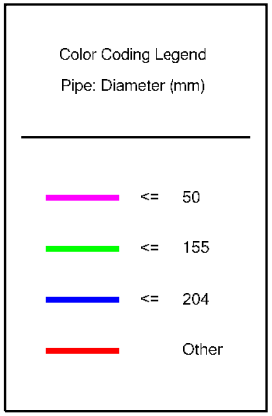
Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

Wildpine Trails
Model Schematic



Wildpine Trails
Model Schematic
Elevation Model



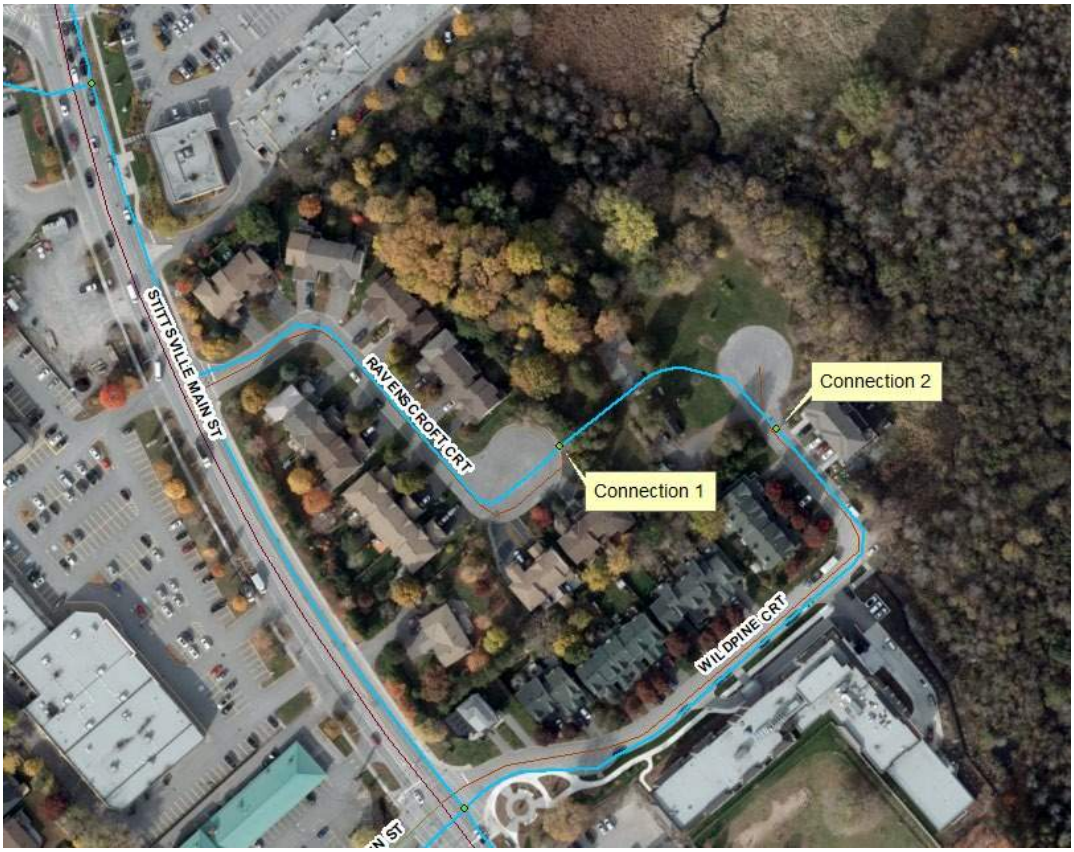


Boundary Conditions
37 Wildpine Court

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	15	0.25
Maximum Daily Demand	116	1.94
Peak Hour	175	2.92
Fire Flow Demand #1	8,000	133.33
Fire Flow Demand #2	10,000	166.67

Location



Results

Connection 1 – Ravens Croft Crt.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.8	58.2
Peak Hour	156.4	52.1
Max Day plus Fire 1	149.2	41.7
Max Day plus Fire 2	142.8	32.7

Ground Elevation = 119.8 m

Connection 2 – Wildpine Crt.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.8	61.3
Peak Hour	156.4	55.1
Max Day plus Fire 1	148.4	43.7
Max Day plus Fire 2	143.9	37.3

Ground Elevation = 117.6 m

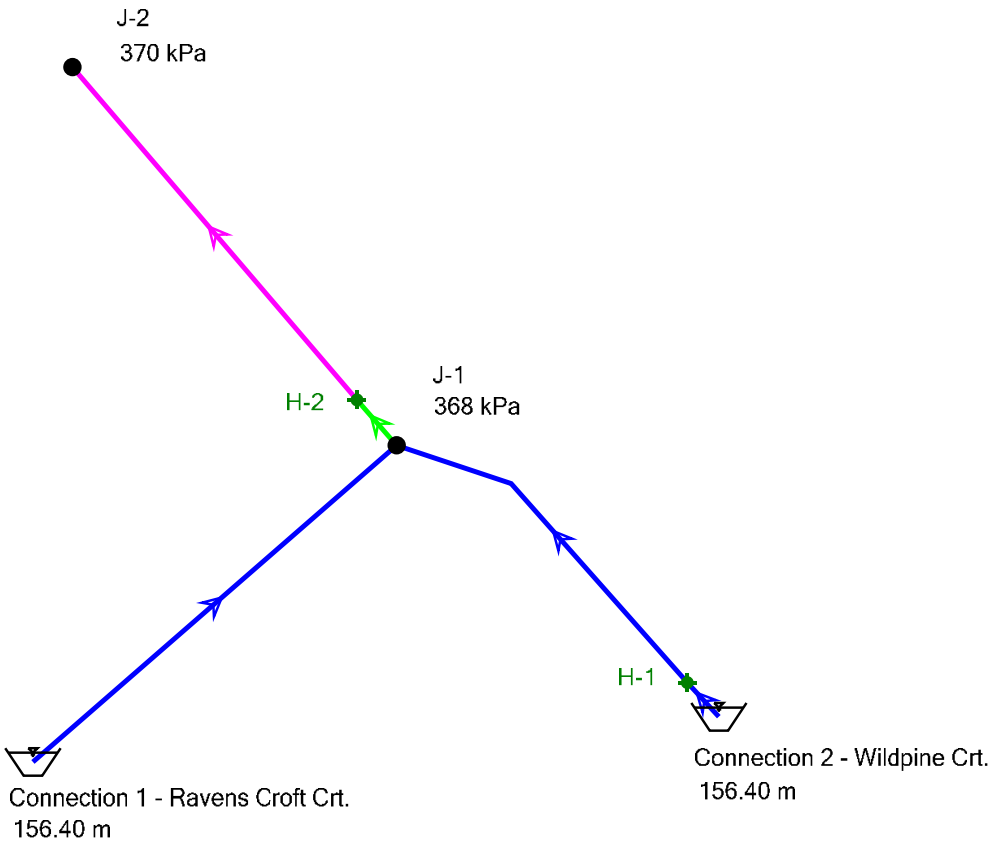
Notes

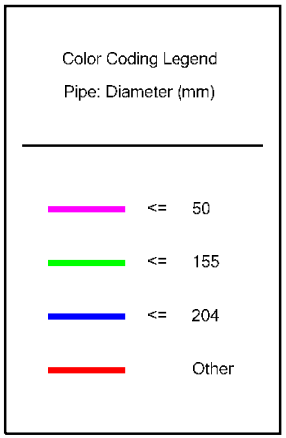
1. Internal looping of the watermain is required to meet minimum fire flow guidelines of 20 psi.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Wildpine Trails
Peak Hour Demand
Existing Condition





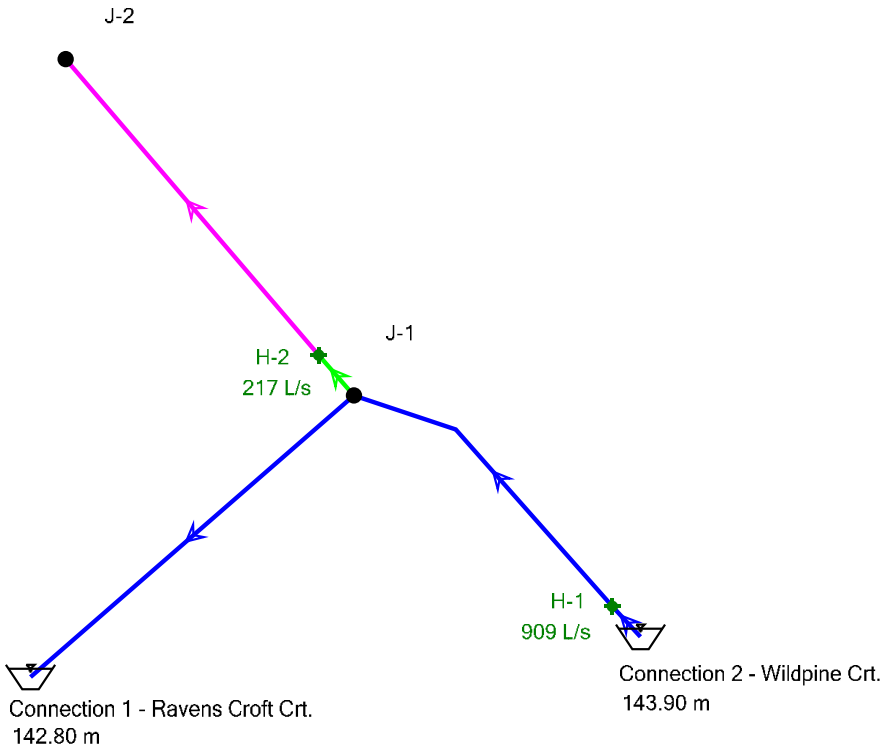
Wildpine Trails
Peak Hour Demand
Existing Condition
Junction Table

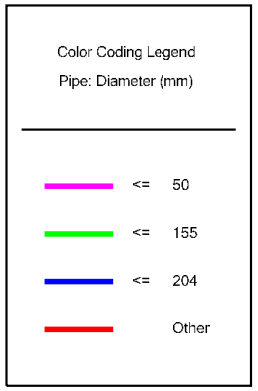
Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	118.80	2	156.40	368
J-2	118.30	1	156.09	370

Wildpine Trails
Peak Hour Demand
Existing Condition
Pipe Table

ID	Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Hydraulic Grade (Start) (m)	Hydraulic Grade (Stop) (m)	Flow (L/s)	Velocity (m/s)
63	P-5	45	50	Copper	100.0	156.40	156.09	1	0.36
62	P-4	6	155	PVC	100.0	156.40	156.40	1	0.04
42	P-1	50	204	PVC	110.0	156.40	156.40	1	0.04
59	P-2	40	204	PVC	110.0	156.40	156.40	-2	0.05
60	P-3	5	204	PVC	110.0	156.40	156.40	-2	0.05

Wildpine Trails
Max Daily Demand + Fire Flow Requirement (10,000 L/min)
Existing Condition

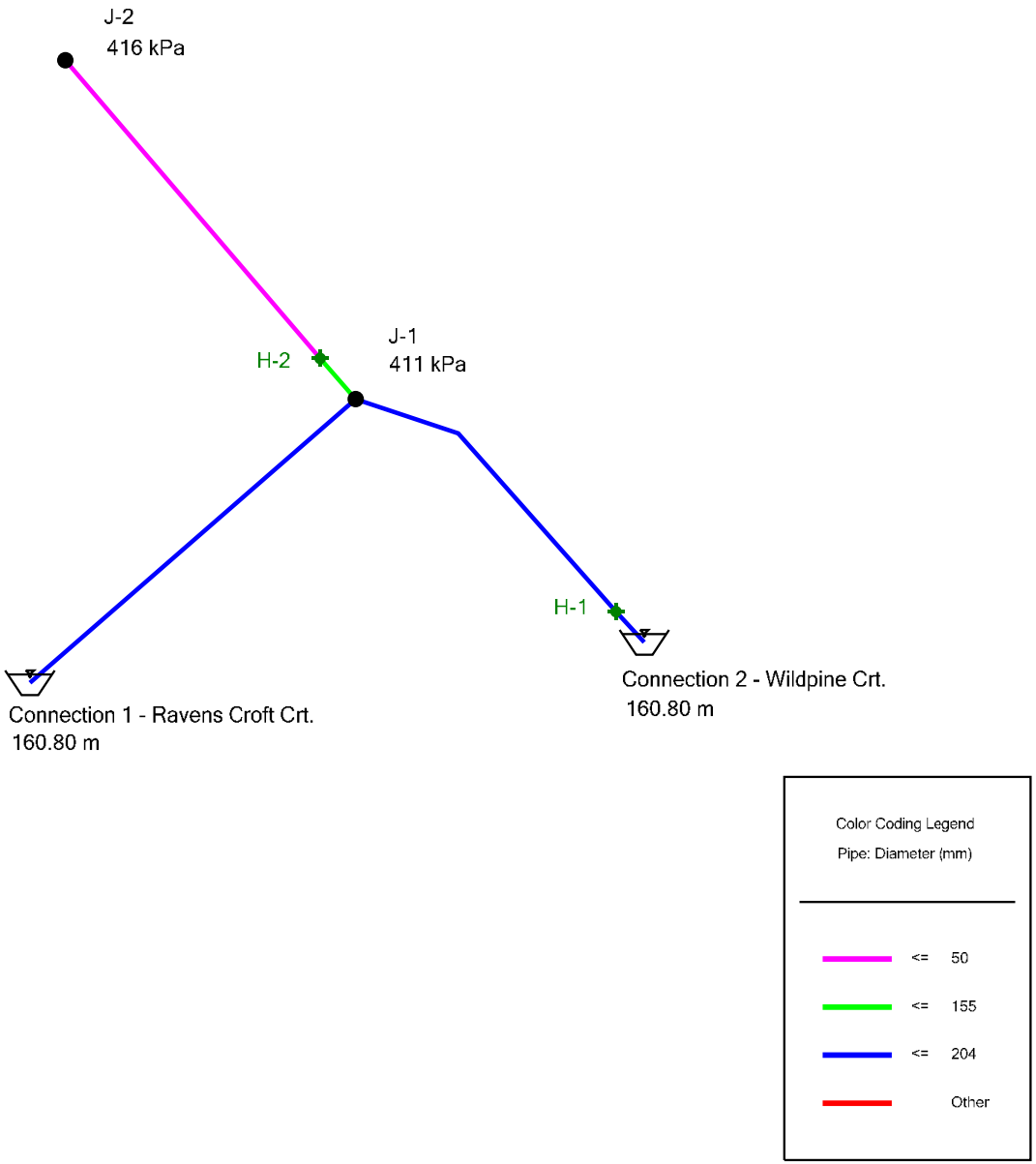




Wildpine Trails
Max Daily Demand + Fire Flow Requirement (10,000 L/min)
Existing Condition

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	217	217	True	140	140	J-2
H-1	167	909	909	True	140	140	H-2

Wildpine Trails
Maximum Pressure Analysis
Existing Condition



Wildpine Trails
Maximum Pressure Analysis
Existing Condition
Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-1	118.80	0	160.80	411
J-2	118.30	0	160.80	416

Wildpine Trails
Maximum Pressure Analysis
Existing Condition
Pipe Table

ID	Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Hydraulic Grade (Start) (m)	Hydraulic Grade (Stop) (m)	Flow (L/s)	Velocity (m/s)
42	P-1	50	204	PVC	110.0	160.80	160.80	0	0.00
59	P-2	40	204	PVC	110.0	160.80	160.80	0	0.00
60	P-3	5	204	PVC	110.0	160.80	160.80	0	0.00
62	P-4	6	155	PVC	100.0	160.80	160.80	0	0.00
63	P-5	45	50	Copper	100.0	160.80	160.80	0	0.00

Appendix E

Functional Design Drawing

PROJECT NORTH

WETLAND BOUNDARY

15m CONSERVATION AUTHORITY REG LIMITS FROM WETLANDS

30m SETBACK FROM WETLANDS

25m PROTECTION BUFFER WETLAND

PRIVATE LANE

PUBLIC STREET

PATH

RAVENSCROFT CT

WILDPINE CT

59.93 sq m

Approximate location and elevation of level spreader

Bench Mark (BM)

MH 118.30

Outlet to level spreader
Obv.116.40
Inv.116.20

Obv.115.70
Inv.115.10
EES pipes

WM CAP
TOP OF PIPE =±115.60

EXMH5
T/G 117.78
INV.=±115.70

EXMH104
T/G = 117.76
INV.=±115.01

200mm PVC DR-18

250mmØ SAN

EXMH120
T/G 119.78
INV.=±117.13

EXMH121
T/G=119.80
INV.=±117.70

WM CAP
TOP OF PIPE =±117.25

250mmØ SAN

Proposed Grades
Proposed Finish Floor
Proposed underside of footing
Proposed Watermain
Proposed 200 mm dia. Sanitary sewer
Proposed Storm sewer
Proposed EES system
Erosion and Sedimentation Silt Fence

No.	ISSUE / REVISION	DD/MM/YY
2	Submit as part of Adequacy of Public Services Report	July 22,2021
1	Functional design submitted to client for review	June 22,2021

VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: 1:400

0 5 10 20 30m

CLIENT:

CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROFESSIONAL STAMP

PROJECT:

WILDPINE TRAILS

37 WILDPINE COURT

DRAWING:

FUNCTIONAL SERVICING, GRADING and EROSION AND SEDIMENT CONTROL PLAN

DESIGN: LD	
DRAWN: LD	DRAWING #: F-SGE
CHECKED: BP	
JLR #: 29803-001	

File Location: P:\29000\29803-000 - Wildpine Trails\5-Production\1-Civil\Attach Civil\29803-001 C BASE.dwg

PLOT DATE: Thursday, July 22, 2021 12:56:29 PM

www.jlrichards.ca

Ottawa

864 Lady Ellen Place
Ottawa ON Canada
K1Z 5M2
Tel: 613 728-3571

ottawa@jlrichards.ca

Kingston

203-863 Princess Street
Kingston ON Canada
K7L 5N4
Tel: 613 544-1424

kingston@jlrichards.ca

Sudbury

314 Countryside Drive
Sudbury ON Canada
P3E 6G2
Tel: 705 522-8174

sudbury@jlrichards.ca

Timmins

834 Mountjoy Street S
Timmins ON Canada
P4N 7C5
Tel: 705 360-1899

timmins@jlrichards.ca

North Bay

501-555 Oak Street E
North Bay ON Canada
P1B 8L3
Tel: 705 495-7597

northbay@jlrichards.ca

Hawkesbury

326 Bertha Street
Hawkesbury ON Canada
K6A 2A8
Tel: 613 632-0287

hawkesbury@jlrichards.ca

Guelph

107-450 Speedvale Ave. West
Guelph ON Canada
N1H 7Y6
Tel: 519 763-0713

guelph@jlrichards.ca