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PROVENCE ORLEANS SUBDIVISION

PHASE 6

FUNCTIONAL SERVICING REPORT

PROVENCE ORLEANS SUBDIVISION – PHASE 6
2065 PORTOBELLO BOULEVARD
OTTAWA, ONTARIO

FUNCTIONAL SERVICING REPORT

Prepared for:

Provence Orleans Realty Investments Inc.

Prepared by:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

Issued: October 31, 2019
Revised: June 4, 2020
Revised: December 2, 2020
Revised: May 31, 2023

Ref: R-2019-000
Novatech File No. 117155

May 31, 2023

Planning, Infrastructure and Economic Development
City of Ottawa
110 Laurier Ave. West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: Kelly Livingstone, MCIP, RPP

Dear Mr. Livingstone:

Re: Provence Orleans Subdivision – Phase 6
Functional Servicing Report
Our File No.: 117155

Please find enclosed the revised report entitled "Provence Orleans Subdivision – Phase 6 – 2065 Portobello Boulevard – Functional Servicing Report". It has been revised to reflect the required changes to the conceptual servicing and stormwater management designs for the development arising from revisions to the site boundaries. The report is submitted in support of a revision to the previously approved Draft Plan of Subdivision for Provence Orleans Subdivision – Phase 6.

If you have any questions, please contact the undersigned.

Sincerely,

NOVATECH

Trevor McKay, P.Eng.
Project Manager | Land Development

cc: Evan Garfinkel, Provence Orleans Realty Investments Inc.

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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1.0 INTRODUCTION

This Servicing Brief has been prepared in support of a revision to a previously approved Draft Plan of Subdivision for Provence Orleans Subdivision – Phase 6. The proposed design is consistent with the Master Servicing Study (Gloucester and Cumberland East Urban Community Expansion Area and Bilberry Creek Industrial Park Master Servicing Update, prepared by Stantec Consulting Ltd. dated September 2013).

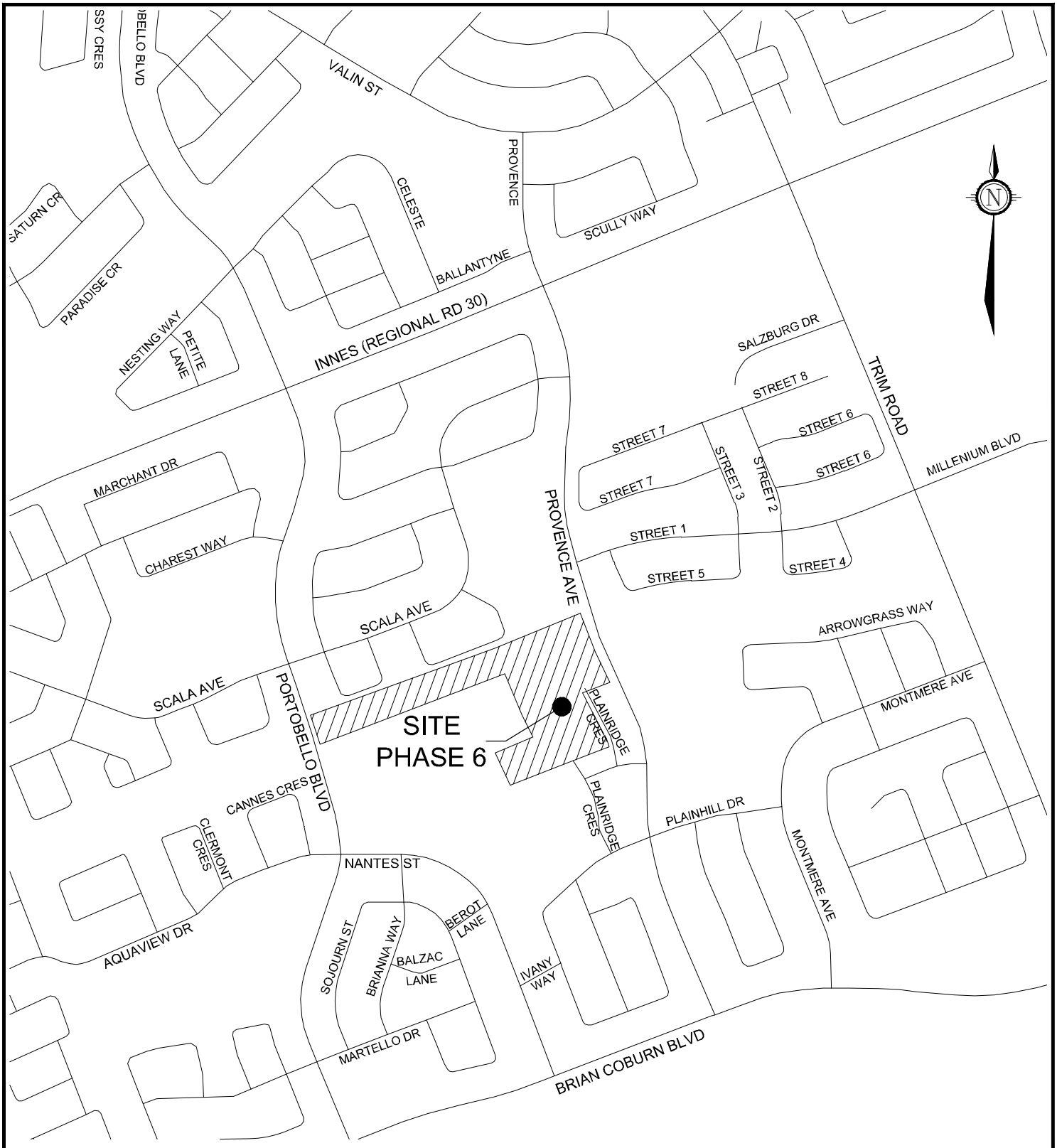
The proposed Provence Orleans Subdivision – Phase 6 development parcel is within the City of Ottawa and is owned by Provence Orleans Realty Investments Inc. (managed by Regional Group). The previously approved application for the site included 10.7ha of land located between Portobello Boulevard, Nantes Street and Plainridge Crescent. Approximately 1.6ha of this area has since been developed separately under Site Plan Application D07-12-20-0172. Approximately 4.5ha of the site (including the existing woodlot) has been transferred to the City of Ottawa (Part 2 and Part 3 on Plan 4R-34802, dated August 2, 2022). The remainder of the site ("Subject Site") is the subject of this revised report. The remaining area is composed of future transitway lands (approximately 2.1ha), parkland dedication (0.48ha) and proposed residential lands (approximately 2.0ha).

The residential lands included for development in this submission are located between Portobello Boulevard and Provence Avenue and completes Plainridge Crescent as shown on **Figure 1 – Key Plan**. The proposed conceptual layout of the subdivision includes 39 residential units as shown on **Figure 2 – Concept Plan / Phasing Plan**. The parcel of land consists of farmed fields and the eastern portion of the existing woodlot, as shown on **Figure 3 – Existing Conditions Plan**.

1.1 Additional Reports

This report provides information on the considerations and approach by which Novatech has designed and evaluated the proposed servicing for the Provence Orleans Subdivision – Phase 6. This report should be read in conjunction with the following:

- Gloucester and Cumberland East Urban Community Expansion Area and Bilberry Creek Industrial Park Master Servicing Update dated September 2013 prepared by Stantec Consulting Ltd.
- Geotechnical Investigation – Proposed Residential Development – Provence Orleans Subdivision – 2128 Trim Road - Ottawa, Report: PG4278-1 Revision 1 dated July 13, 2020 prepared by Paterson Group Inc.
- Trim Road Subdivision – Phase 3 – Stormwater Management Report, Ref: R-2004-250 dated November 29, 2005 prepared by Novatech.
- Trim Road Subdivision – Phase 3 – Design Brief, Ref: R-2004-251 dated April 27, 2005 prepared by Novatech.
- Phase I Environmental Site Assessment, Vacant Land, Trim Road and Portobello Boulevard, Ottawa, Ontario, Report: PE4111-1 dated January 20, 2018 prepared by Paterson Group Inc.
- Greater Cardinal Creek Subwatershed Management Plan dated August 11, 2014 prepared by AECOM.



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N.T.S

CITY of OTTAWA
PROVENCE ORLEANS SUBDIVISION
(2065 PORTOBELLO BOULEVARD)

KEY PLAN

DATE	JOB	FIGURE
MAY 2023	117155	FIGURE 1

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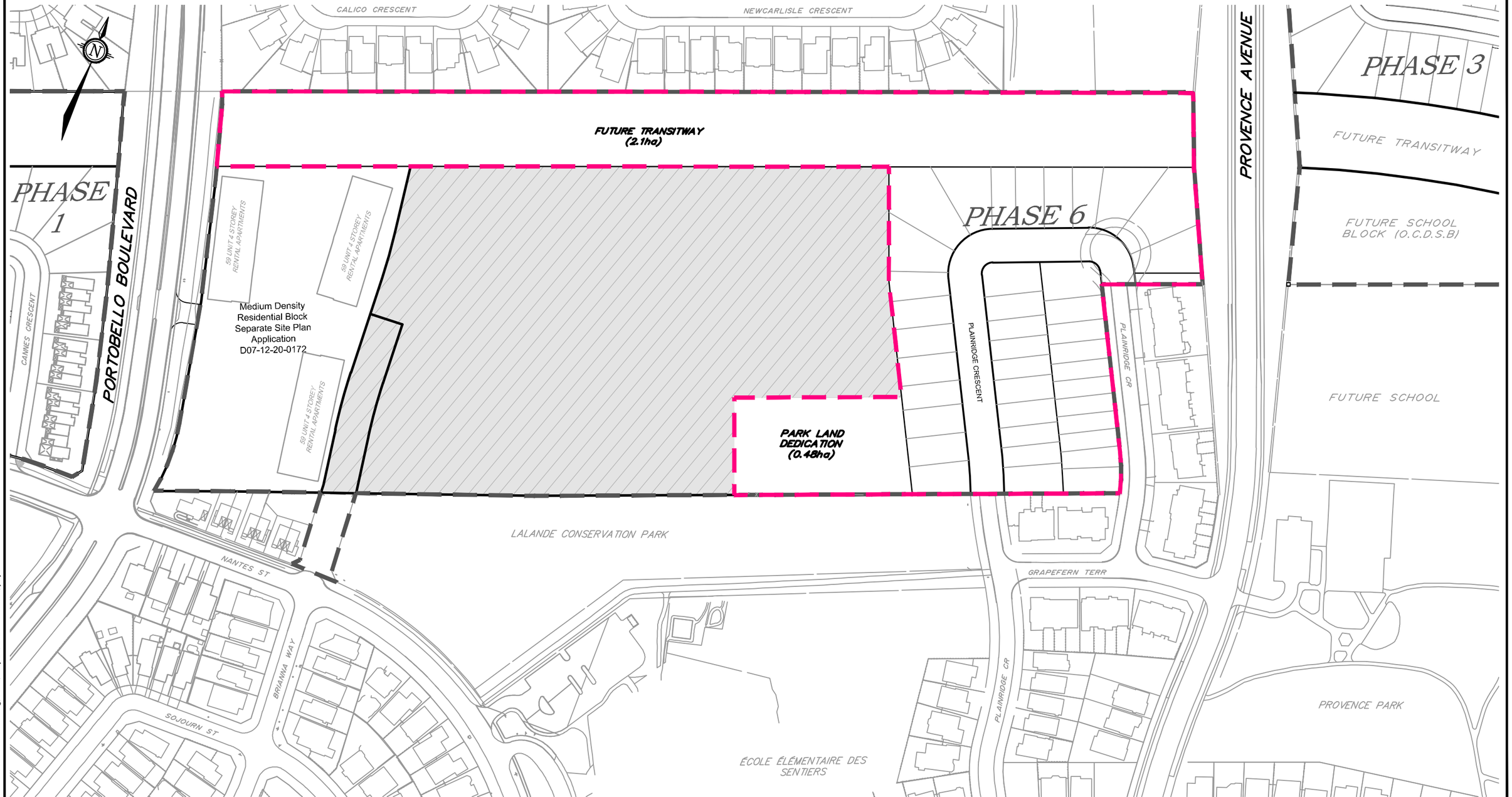

LEGEND:

- LANDS TRANSFERRED TO CITY
- PHASE 6 LIMITS
- PROVENCE ORLEANS DEVELOPMENT LIMITS

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PHASE 6 CONCEPT PLAN

SCALE 1 : 2000 (0 20 40 60 80)
DATE MAY 2023 | JOB 117155 | FIGURE FIGURE 2

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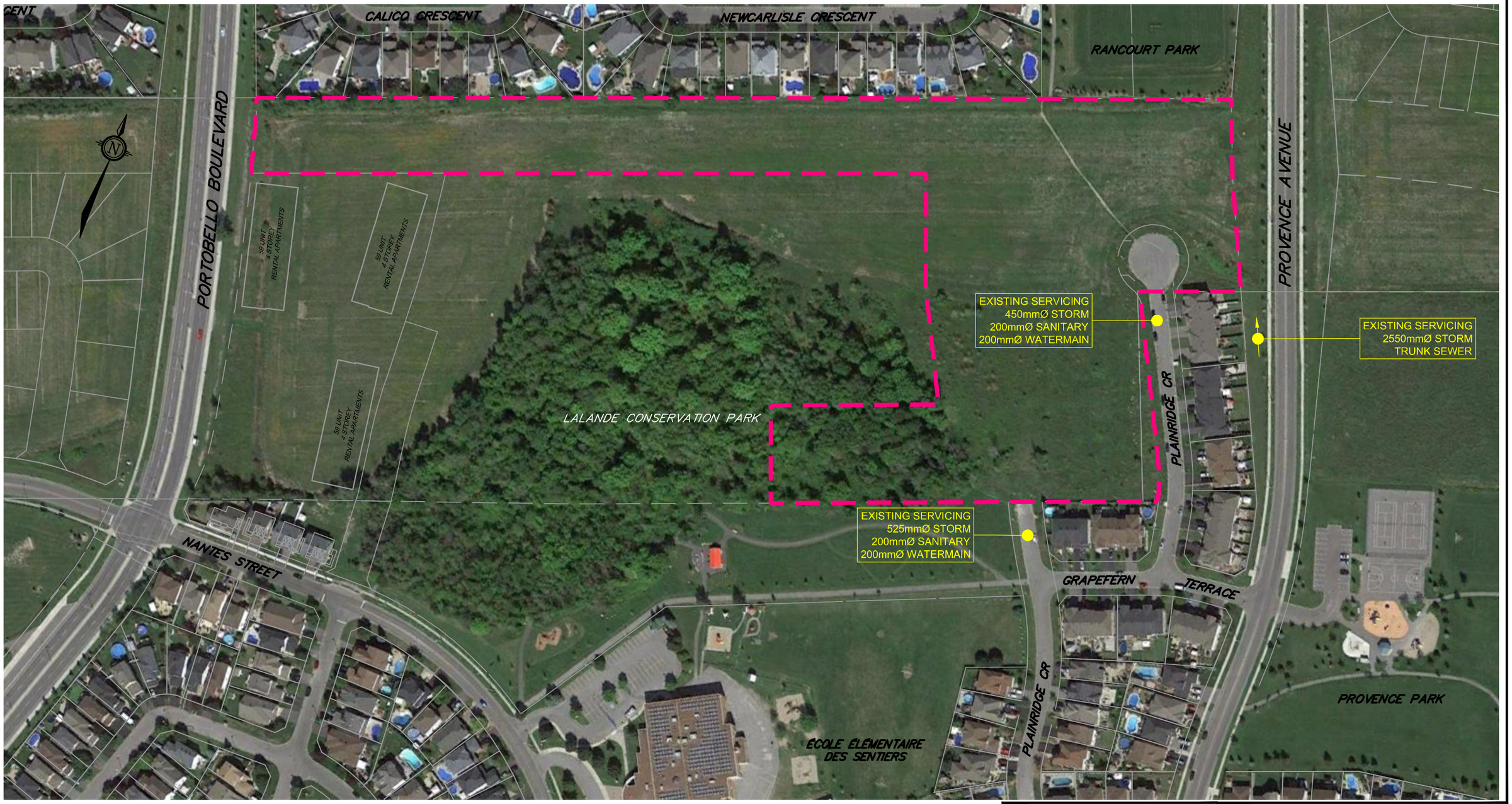

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CITY of OTTAWA
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(2065 PORTOBELLO BOULEVARD)

PHASE 6 EXISTING CONDITIONS PLAN

SCALE 1 : 2000 (0, 20, 40, 60, 80)
DATE MAY 2023
JOB 117155
FIGURE FIG-3

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- Phase I Environmental Site Assessment Update, Provence Orleans Phase 6, Part 5 – Plainridge Crescent, Ottawa, Ontario, Report: PE4111-LET.04 dated May 19, 2023 prepared by Paterson Group Inc.
- Provence Orleans Subdivision, Phase 6, Tree Conservation Report and Environmental Impact Statement - Updated, Report: Legault Phase 6 EISTCR23 dated May 24, 2023 prepared by Muncaster Environmental Planning Inc.

2.0 GEOTECHNICAL INVESTIGATION

Paterson Group Inc. conducted a geotechnical investigation in support of the proposed residential development on the Provence Orleans subdivision (Phases 1-6). The initial field investigations were performed on November 22 to 24, 2017, January 8, 2018, and February 5 to 7, 2018 and consisted of the following:

First Stage

- Seven (7) boreholes advanced across the site to a maximum depth of 9.8m below existing ground surface.
- Groundwater monitoring devices were installed throughout the site.

Second Stage

- Two (2) boreholes advanced at various locations to a maximum depth of 9.5m below existing ground surface.
- Groundwater monitoring devices were installed throughout the site.

Third Stage

- Twelve (12) boreholes advanced across the site to a maximum depth of 6.4m below existing ground surface.

The principal findings of this investigation determined that the soil profile over the whole study site generally consists of 0.2 to 0.3m of topsoil overlying a hard to soft, brown to grey silty clay layer with trace of sand. The two boreholes located within the current Phase 6 site limits (BH 3-17 and BH 3B-17) encountered a glacial till deposit with a depth of 2.6m-3.3m below the topsoil before encountering bedrock.

Depth to groundwater measured in a range from about 3m to 5m below ground surface across the study site.

From a geotechnical perspective, the subject site is suitable for the proposed residential development. Refer to *Geotechnical Investigation – Proposed Residential Development – Provence Orleans Subdivision – 2128 Trim Road - Ottawa, prepared by Paterson Group Inc. dated July 13, 2020 (PG4278-1, Revision 1)* for complete details and recommendations.

3.0 WATER SUPPLY

A preliminary hydraulic analysis was performed for the Provence Orleans Subdivision, Phase 6. Per the Master Servicing Study (*Gloucester and Cumberland East Urban Community Expansion Area and Bilberry Creek Industrial Park Master Servicing Update*, *Stantec Consulting Ltd. dated September 2013*), the Subject Site will be serviced with 200mm PVC pipe from two (2) separate connection points to existing 200mm diameter watermain stubs on Plainridge Crescent. Refer to **Figure 4 – Conceptual Watermain Alignment and Watermain Node Locations** and the Watermain plan from the Master Servicing Study in **Appendix A**.

Analysis of the proposed watermain was completed using EPANET v2.2. Boundary condition values were interpolated for each modelling scenario from the watermain boundary conditions provided by the City of Ottawa to provide approximated system pressures under the demands from the proposed subdivision layout and unit count due to the reduction of the proposed development limits. The original boundary conditions provided by the City of Ottawa are included in **Appendix A**. Revised boundary conditions will be requested from the City of Ottawa prior to detailed hydraulic design analysis.

The following design criteria per City of Ottawa Design Guidelines Water Distribution (2010), Section 4.2, were used to determine the watermain performance on-site. The average daily demand used was 350L/day/person as the projected number of persons in the subdivision is less than 500. The maximum hour and maximum day demands were calculated using Table 3-3 of the MOE Design Guidelines for Drinking-Water Systems for 0-500 persons and applied to the average daily demand.

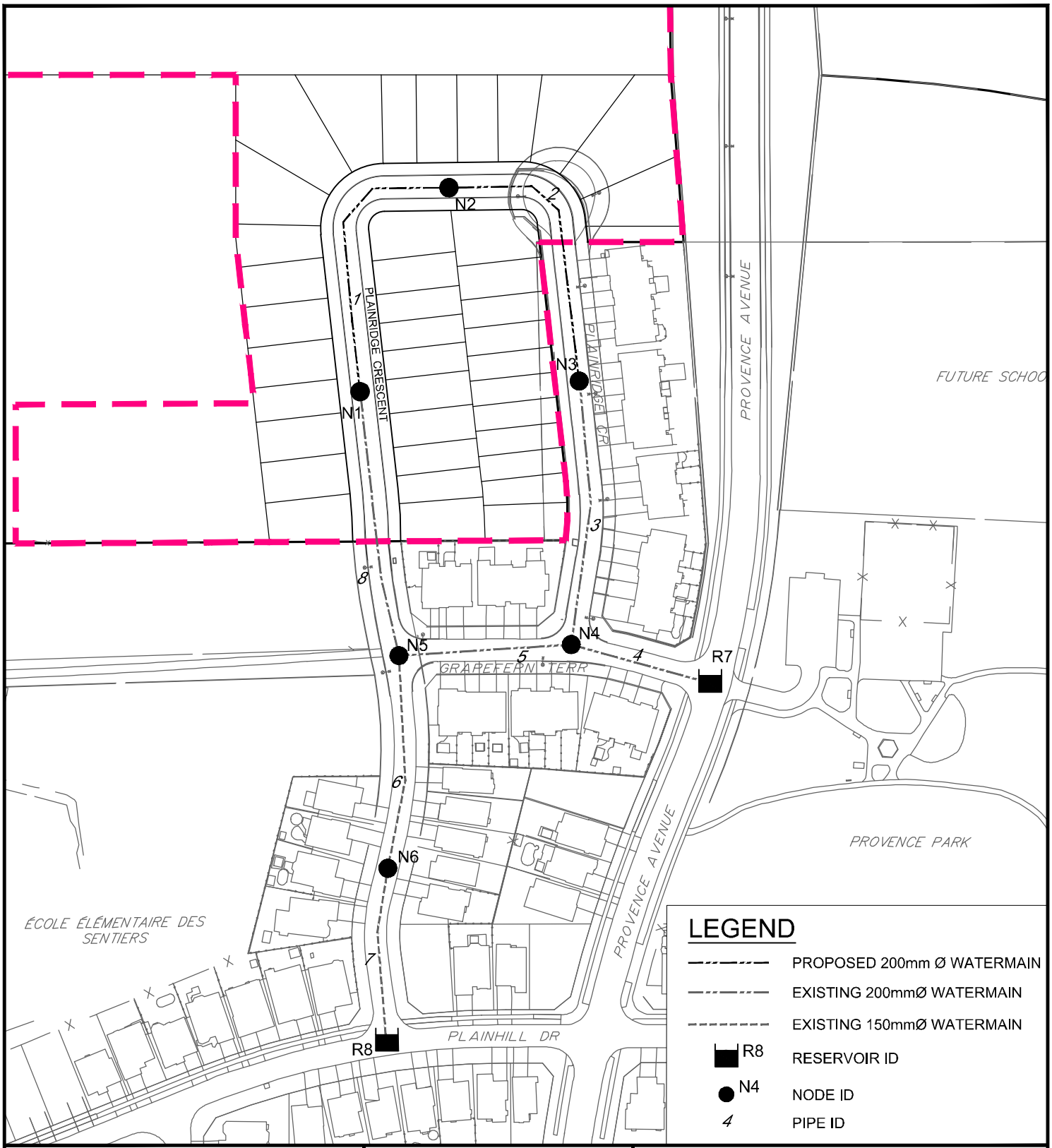
The required fire flow for the subdivision was calculated using the Fire Underwriter's Survey (FUS) 2020 and adjusted as per the City of Ottawa's design guidelines. The calculated minimum required fire flow for the largest standard lot configuration (50' lot) is 200L/s. However, as the subdivision layout meets the criteria of City of Ottawa Technical Bulletin ISTB-2014-02 (rear yard spacing > 10m), dated May 27, 2014, the fire flow requirement may be capped at 10,000L/min (167L/s).

The fire flows were modelled in accordance with City of Ottawa ISTB-2021-03 and Appendix H of the City of Ottawa Water Distribution Design Guidelines.

For reference, the FUS fire flow calculations are included in **Appendix A**.

Demands:

- Average Daily Demand 350L/day/person
- Single Home Density 3.4 people/unit
- Townhome Density 2.7 people/unit
- Maximum Daily Demand 3.7 Average Daily Demand
- Peak Hour Demand 5.6 Average Daily Demand
- Fire Flow 166.7L/s City of Ottawa ISTB-2014-02



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CITY of OTTAWA
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PHASE 6 CONCEPTUAL WATERMAIN LAYOUT / WATERMAIN NODE LOCATIONS

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE MAY 2023 | JOB 117155 | FIGURE FIGURE 4

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System Requirements:

- Maximum System Pressure (ROW) 690 kPa (100psi)
- Maximum System Pressure (Services) 552 kPa (80psi)
- Minimum System Pressure 275 kPa (40psi) excluding fire flows
- Minimum System Pressure 140 kPa (20psi) including fire flows
- Maximum Age 24 Hours (onsite)

Friction Factors:

- 150mm PVC 100
- 200mm PVC 110

The interpolated boundary conditions used for each of the demand scenarios can be found in **Table 3.1.**

Table 3.1: Phase 6 Interpolated Boundary Conditions

Demand (L/s)	R7 (m)	R8 (m)
Avg. Day (@ 1.10L/s)	131.31	131.38
Peak Hour (@ 6.16L/s)	126.86	126.71
Max. Day + Fire Flow (@ 170.73L/s)	118.71	118.17

Table 3.2 summarizes the watermain operating conditions during the high pressure, maximum daily demand and fire flow, and peak hour demands for Phase 6 of the development.

Table 3.2: Phase 6 Water Operating Conditions

Condition	Demand (L/s)	Minimum/Maximum Allowable Pressure (kPa/psi)	Operating Pressure (kPa/psi)
High Pressure	1.10	552/80 (Maximum)	405.6/58.8
Maximum Daily Demand (c/w Fire Flow)	4.06 (36.79, 95.44, 37.27) at Nodes 1, 2 & 3, respectively	140/20.0 (Minimum)	160.0/23.2 At Node 2
Peak Hour	6.16	276/40.0 (Minimum)	350.2/50.8

Based on the proposed Concept Plan and this hydraulic analysis, Phase 6 of the Provence Orleans Subdivision can be serviced with a 200mm watermain and two (2) connections to the existing watermain. A detailed hydraulic analysis will be required during the detailed engineering design. Refer to **Appendix A** for complete hydraulic analysis results.

4.0 SANITARY SEWER SYSTEM

Per the Master Servicing Study (Stantec, 2013), the Subject Site will be serviced by 200mm gravity sewers connecting to the existing sanitary sewer infrastructure on both sides of Plainridge Crescent. Both sides will outlet to the existing 200mm sanitary sewer on Grapefern Terrace and ultimately outlet to the existing collector sewer on Portobello Boulevard. Refer to **Figure 5 – Conceptual Sanitary and Storm Alignment**, **Figure 6 – Conceptual Post Development Sanitary Drainage Area Plan,** and the **Sanitary Collector Sewers and Drainage Areas Plan** from the Master Servicing Study in **Appendix B** for details.

Population estimates and sanitary flows from the sites for the proposed developments are calculated using design criteria from the City of Ottawa Sewer Design Guidelines (2012):

- Design Flow, Residential 280 L/c/day
- Residential Peaking Factor Harmon Equation
- Peak Correction Factor 2.0 minimum; 4.0 maximum
- Infiltration Allowance 0.33 L/s/ha
- Single Family Residential Dwelling 3.4 people/unit

Using the above criteria, the theoretical peak sanitary flows are summarized below in **Table 4.1**.

Table 4.1: Sanitary Flow Summary

Development Outlet	Population	Peak Residential Flow (L/s)	Peak Extraneous Flow (L/s)	Peak Design Flow (L/s)
Plainridge – Outlet #1	61	1.10	0.52	1.63
Plainridge – Outlet #2	77	1.18	0.42	1.60

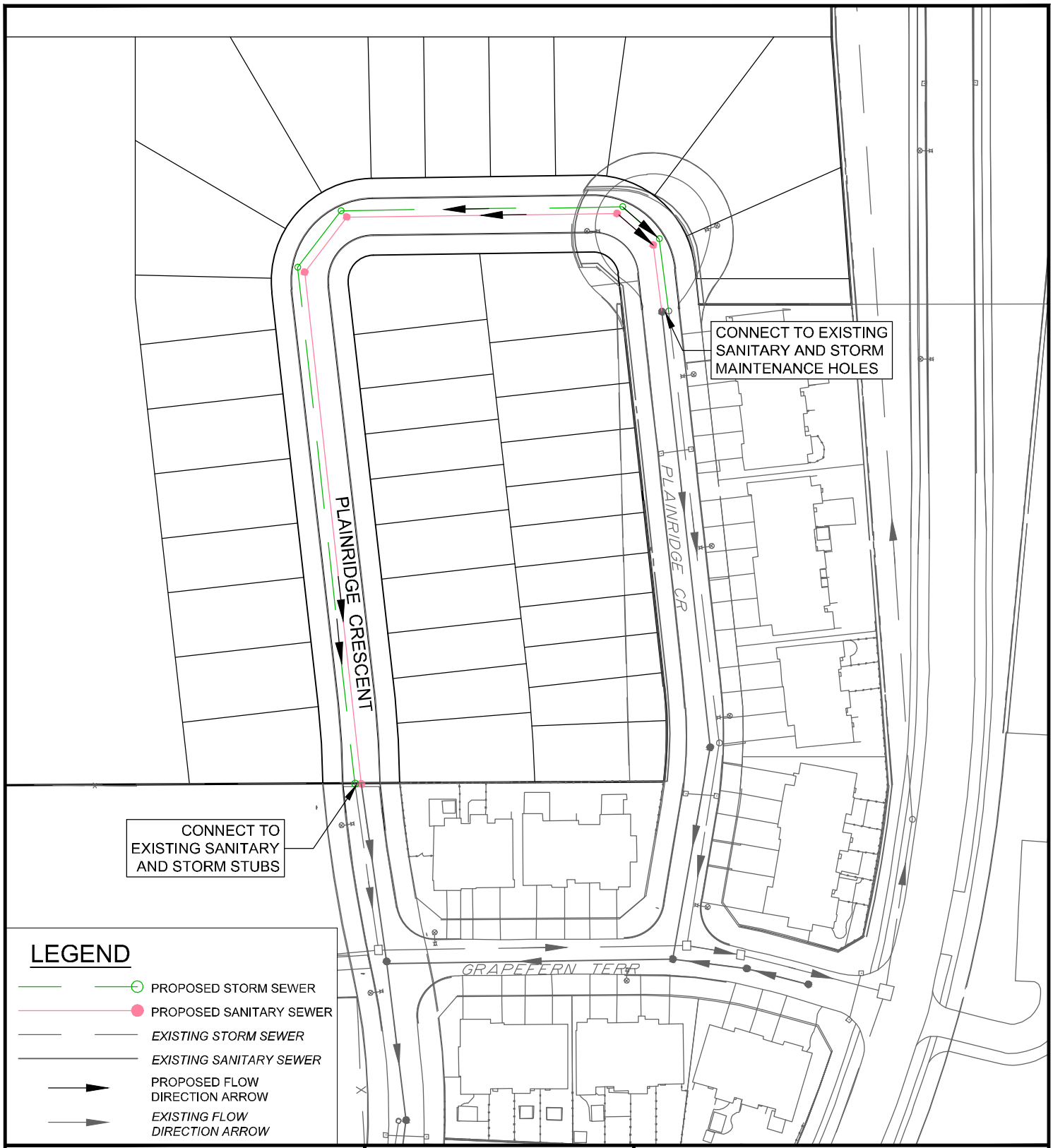
These flows are generally in line with anticipated sanitary flows in the Master Servicing Study (Stantec, 2013) from these areas to the existing sanitary systems and are less than those in the previously approved submission.

Outlet #1

As set out in the as-built design sheet referencing the existing sanitary sewers (see **Appendix B**), the existing sanitary sewer was designed for a future peak flow of 1.86L/s from the western side of the site to the existing cap leading to maintenance hole 407. The calculated peak flow for the proposed subdivision entering the existing sanitary sewer network at this point is 1.63L/s, therefore the existing downstream sanitary sewer is adequately sized for the proposed development.

Outlet #2

As set out in in the as-built design sheet referencing the existing sanitary sewers (see **Appendix B**), the existing sanitary sewer was designed for a future peak flow of 0.96L/s from the eastern side of the site to maintenance hole 1403. The calculated peak flow for the proposed subdivision entering the existing sanitary sewer network at sanitary maintenance hole 1403 is 0.31L/s.



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CITY of OTTAWA
PROVENCE ORLEANS SUBDIVISION (2065 PORTOBELLO BOULEVARD)

PHASE 6 CONCEPTUAL SANITARY AND STORM ALIGNMENT

SCALE 1 : 1250 (0 10 20 30 40 50)

DATE MAY 2023 | JOB 117155 | FIGURE FIGURE 5

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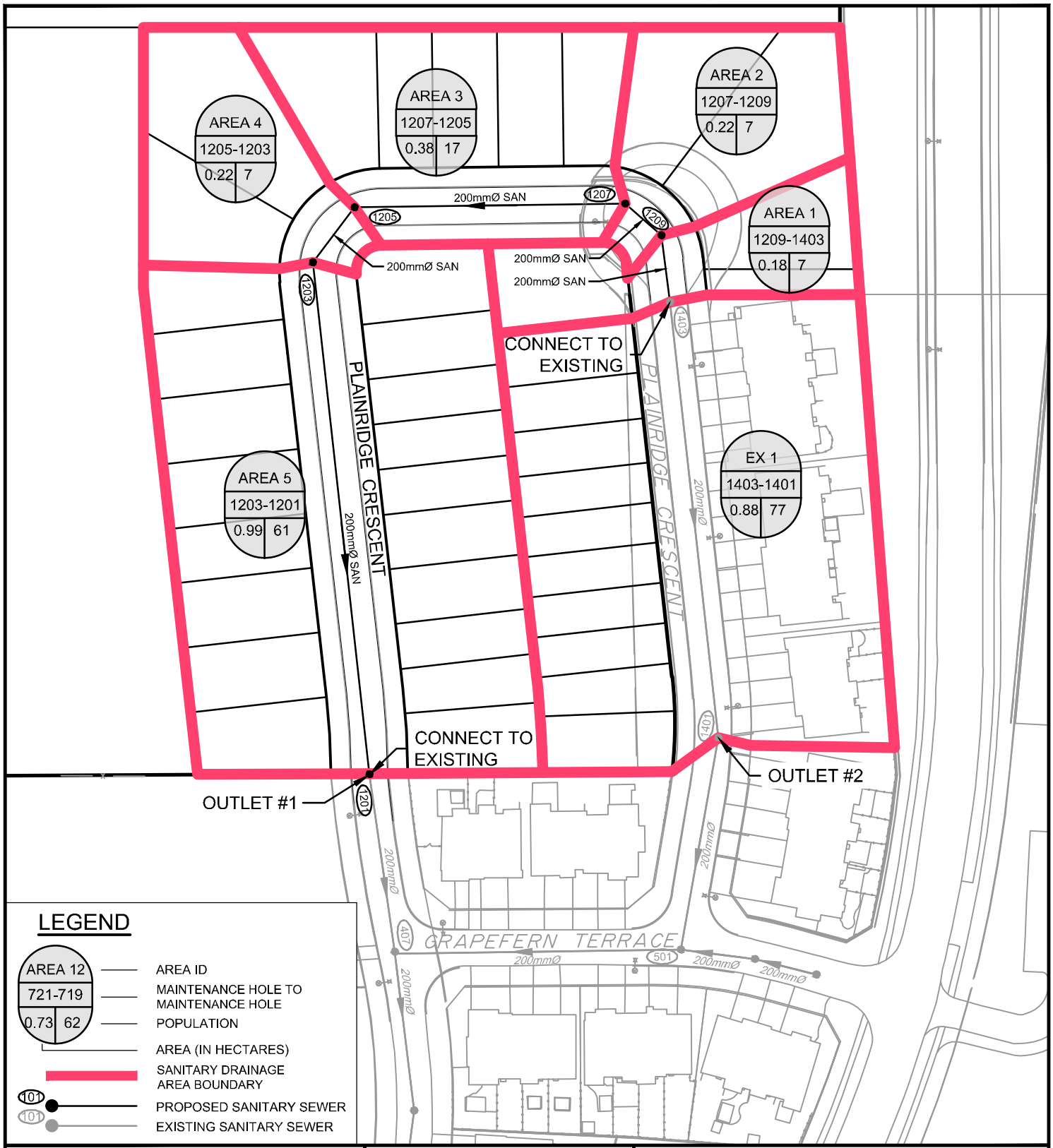

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CITY of OTTAWA
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(2065 PORTOBELLO BOULEVARD)

PHASE 6 CONCEPTUAL POST DEVELOPMENT SANITARY DRAINAGE AREA PLAN

SCALE 1 : 1250 (0 10 20 30 40 50)

DATE MAY 2023 | JOB 117155 | FIGURE FIGURE 6

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The proposed design includes the addition of ten (10) single units connecting into the existing sanitary sewer between maintenance holes 1403 and 1401. Per the as-built design sheet, this pipe run was sized using a peak design flow of 1.85L/s. The calculated peak flow for the proposed subdivision entering the existing sanitary sewer network at this point (including proposed and existing units) is 1.60L/s, therefore the existing downstream sanitary sewer is adequately sized for the proposed development. Refer to **Appendix B** for the conceptual sanitary sewer design sheets.

5.0 STORMWATER MANAGEMENT

5.1 Existing Conditions

Under existing conditions, the Subject Site consists primarily of farmed lands and is bounded by Provence Avenue to the east, a woodlot to the west, and existing residential developments to the north and south. Stormwater outlets for the site will be provided at the two connection points on Plainridge Crescent. Refer to **Figure 3 – Existing Conditions**.

The topography of the site can generally be described as a very gentle slope downwards from south to north. The site is generally lower than neighboring properties and roadways. Stormwater runoff from the site either infiltrates or is conveyed overland towards existing catchbasins which convey runoff to the existing storm sewer systems.

There is an existing ditch located along the northern edge of the future transitway which conveys surface flows from the site to a culvert pipe on the eastern side of Portobello Boulevard which is connected to the Portobello Boulevard storm sewer. The majority of the ditch is located in future transitway lands.

5.2 Stormwater Management Criteria

The stormwater management criteria used in the design of the Provence Orleans Subdivision were developed based on the Master Servicing Study (*Gloucester and Cumberland East Urban Community Expansion Area and Bilberry Creek Industrial Park Master Servicing Update* by Stantec dated September 2013) which references the applicable portions of *Update to Master Drainage Plan East Urban Community Expansion Area* (Cumming Cockburn Ltd., September 11, 2000) and have been adapted through discussions with the City. Further criteria has been identified as per recommendations from the *Greater Cardinal Creek Subwatershed Management Plan* (AECOM, August 11, 2014). Excerpts are included in **Appendix C.**

Minor System (Storm Sewers)

- Storm sewers are to be designed using the Rational Method for the 1:2 year return period;
- On an average basis, inflows to the storm sewer system are to be limited to 70 L/s/ha;
    - As this flow is less than the 2-year storm event, some ponding during the 2-year storm event will be allowed. The detailed design report should indicate depth, area, and time to dissipate;
- Inlet control devices (ICDs) will be installed in road and rear yard catchbasins to control inflows to the storm sewers;
- The 100-year hydraulic grade line in the storm sewer shall be at least 0.3 m below the underside of footing (USF) elevations for the proposed development;

- The HGL will be analyzed at the detailed design stage, when detailed grading and USF elevations have been determined.

Major System (Overland Flow)

- Minimum on-site detention storage provided by the major system is 150 m^3/ha calculated with road sag storage at a dynamic flow depth of 0.35m and rear yard swale sag storage at 0.4m static depth;
- Maximum depth of flow (static + dynamic) on local and collector streets shall not exceed 0.35 m. The depth of flow may extend adjacent to the right-of-way, provided that the water level does not touch any part of the building envelope and remains below the lowest building opening during the stress test event (100-year+20%);
    - There must be at least 0.15m of vertical clearance between the spill elevation on the street and the ground elevation at the building envelope in the proximity of a flow route or ponding area;
- Storm runoff that exceeds the capacity of the minor system is to be stored within road sags and rear yard swale sags and conveyed overland along defined major system flow routes;
- As per the Master Servicing Study Update (Stantec, 2013), major system storage in rear yards will be included/accounted for in the design computations;
- The product of the 100-year flow depth (m) on street and flow velocity (m/s) shall not exceed 0.60;
- ICD flow rates and flow per hectare are to be calculated for each drainage area to ensure that the following criteria are satisfied and to ensure that the flows are generally balanced to each inlet point.

Water Quality & Quantity Control

- On-site stormwater water quantity is to be controlled to the allowable release rate of 70 L/s/ha.
- An '*Enhanced'* level of water quality treatment (80% long-term TSS removal) is required on-site.
    - Stormwater runoff from the minor system will be directed to the existing Cardinal Creek stormwater management facility, where a 'Normal' level of water quality treatment (70% long-term TSS removal) is provided;
    - Additional on-site stormwater water quality treatment is to be provided by water quality treatment units.
    - The combined treatment is to provide an overall 'Enhanced' water quality treatment (80% total long-term TSS removal) prior to discharging to Cardinal Creek.
- The first 5mm of water from all rainfall events is to be retained on site to the extent possible.
- Lot level and conveyance Best Management Practices should be implemented to promote infiltration and treatment of storm runoff;

Erosion and Sediment Control

- Erosion and the amount of sedimentation should be minimized during construction and on a permanent basis;
- Erosion and sediment control measures are to be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987);
- All erosion and sediment control measures are to be installed to the satisfaction of the engineer, the municipality and the conservation authority prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and remain present during all phases of site preparation and construction.

Low Impact Development

- Where feasible, low impact stormwater management design techniques should be considered for implementation in suitable areas through detailed design/site plan stage.

5.3 Proposed Storm Drainage System

Storm servicing for the Provence Orleans Subdivision will be provided using a dual drainage system: runoff from frequent events will be conveyed by storm sewers (minor system), while flows from large storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system).

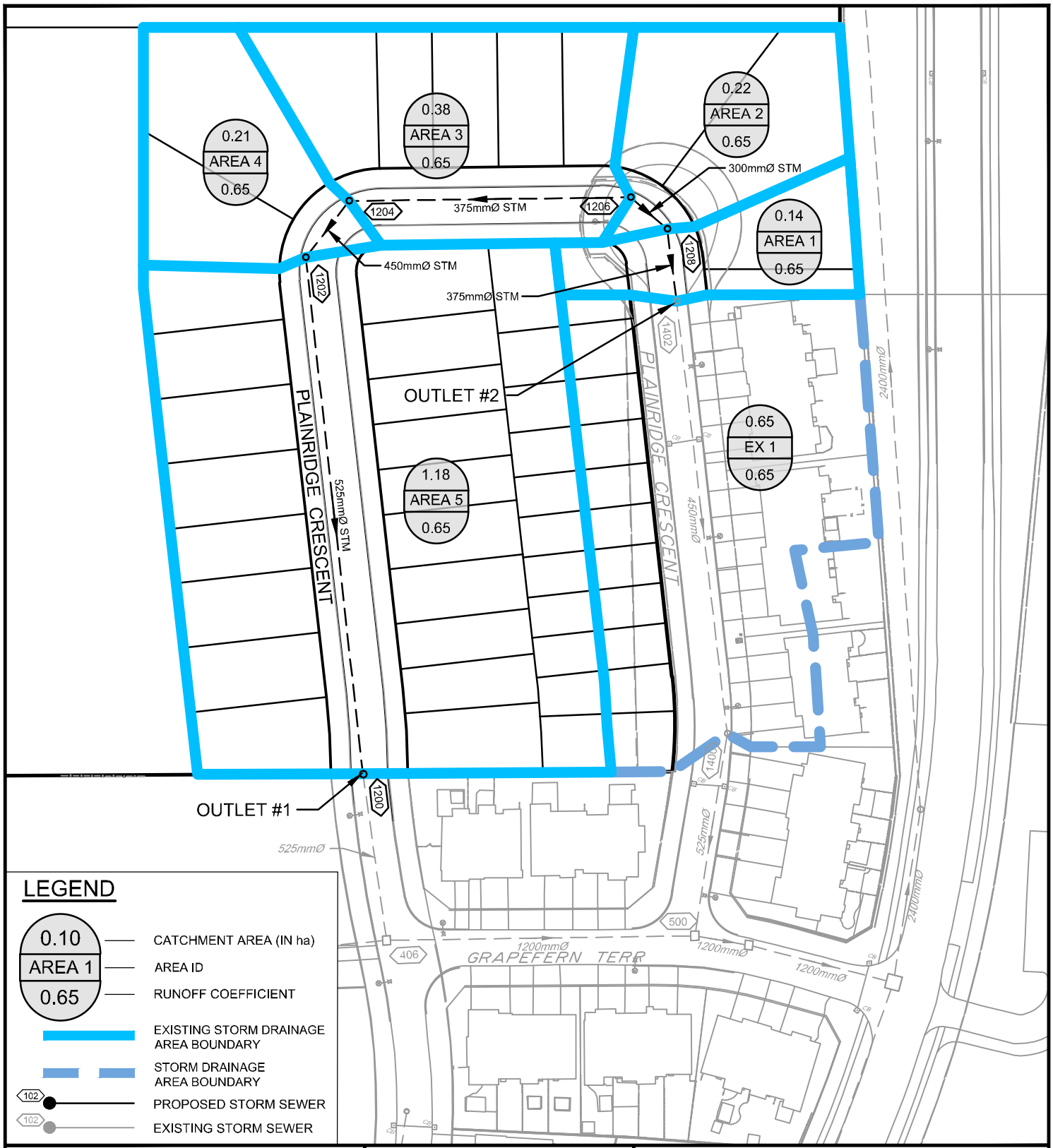
Per the Master Servicing Plan (Stantec, 2013), flows from the Subject Site will outlet to the existing storm sewers on Plainridge Crescent via proposed onsite gravity sewers and ultimately outlet to the trunk storm sewer on Provence Avenue. Refer to **Figure 5 – Conceptual Sanitary and Storm Alignment** and **Figure 7 – Conceptual Post Development Storm Drainage Area Plan** and the **Storm Collector Sewers and Drainage Areas Plan** from the Master Servicing Study in **Appendix B** for details.

The Cardinal Creek stormwater management facility is the ultimate outlet for the minor system. Major system flows will be contained within the site limits, while emergency overland flows will be directed to Plainridge Crescent, Grapefern Terrace and Provence Avenue.

As part of the effort to limit the impact of development on this downstream outlet, the first 5mm of water from all rainfall events is to be retained on site (where possible), as set out in the *Greater Cardinal Creek Subwatershed Management Plan* (AECOM, August 11, 2014). This requirement is anticipated to be achieved by implementation of exfiltration pipes connected to the roadway catchbasins within the right of way.

5.3.1 Storm Sewer Design (Minor System)

The minor system has been conceptually designed using the Rational Method to convey peak flows associated with the 2-year storm event. The conceptual storm sewer design sheet is provided in **Appendix B**. Refer to **Figure 5 – Conceptual Sanitary and Storm Alignment** for details and **Figure 7 – Conceptual Post-Development Storm Drainage Area Plan**. The criteria used to size the storm sewers are summarized in Table 5.1.



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CITY of OTTAWA
PROVENCE ORLEANS SUBDIVISION
(2065 PORTOBELLO BOULEVARD)

PHASE 6 CONCEPTUAL POST DEVELOPMENT STORM DRAINAGE AREA PLAN

SCALE 1 : 1250 (0 10 20 30 40 50)

DATE MAY 2023 | JOB 117155 | FIGURE FIGURE 7

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Table 5.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2-year Return Period
Storm Sewer Design	Rational Method/Modeling
IDF Rainfall Data	Ottawa Sewer Design Guidelines (Oct. 2012)
Initial Time of Concentration (T_c)	10 minutes
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

Outlet #1
As set out in *Trim Road Subdivision – Phase 3 Stormwater Management Report* (Novatech, November 29, 2005), the existing storm sewer was designed for a future flow of 154.0L/s from the western side of the site to the existing cap leading to maintenance hole 406. The calculated uncontrolled peak flow for the proposed design entering the existing storm sewer network at this point is 228.3L/s. The capacity of the existing 525mm diameter concrete storm sewer from the existing cap to maintenance hole 406 was analyzed and found to have sufficient capacity to accommodate these additional flows.

Outlet #2
The existing storm sewer was designed for a future flow of 91.9L/s from the eastern side of the site to maintenance hole 1402 based on the *Trim Road Subdivision – Phase 3 Stormwater Management Report* (Novatech, November 29, 2005). The calculated peak flow for the proposed development entering the existing storm sewer network at this point is 49.4L/s.

Based on the existing storm sewers have sufficient capacity to accommodate the 2-year design flows from the proposed development. Actual inflows to the minor system will be controlled using inlet control devices designed to restrict the flows to 70L/s/ha, lowering the peak flow. A complete stormwater management analysis will take place at the detailed design.

Inlet Control Devices

Inflows to the minor system will be controlled using inlet control devices (ICDs) designed to control inflows to the storm sewer system to 70L/s/ha for all storm events up to and including the 100-year event.

Rear yard catchbasins will be connected in series with an ICD at the outlet of the downstream structure. ICDs for rear-yard catchbasins will be sized at the detailed design stage.

ICDs will be either round orifice plates or vortex-type inlets. The required ICD sizes will be confirmed at the detailed design stage.

5.3.2 Overland Flow Path (Major System)

The site will be graded to provide an engineered overland flow route (major system) for large, infrequent storms, or in the event that the storm sewer system becomes obstructed. 150 m^3/ha on-site detention storage will be provided within the right-of-way (ROW) and the rear yard sags

to the extent possible. Major system flows will be conveyed overland along defined major system flow routes as shown on **Figure 7 – Phase 6 Storm Drainage Area Plan** and **Figure 8 – Phase 6 Preliminary Macro Grading Plan**. The design of the major system will be completed at the detailed design stage. The major system will be designed to contain flows from the 100-year storm event on site. The route will adhere to the macro grading plan prepared in the Master Serving Plan (Stantec, 2013) and emergency overland flows will be directed to existing City rights of way.

5.3.3 Allowable Release Rates & Required Storage

Table 5.2 outlines the required storage and allowable release rate for this phase of the proposed development.

- On an average basis, inflows to the storm sewer system are to be limited to 70 L/s/ha;
- On-site detention storage provided by the major system is 150 m^3/ha to the extent possible.

Table 5.2: Release Rate & Storage Requirements

Phase	Area[1] (ha)	Storage Target (m^3)	Allowable Release Rate (L/s)
Phase 6	2.13	320	149

1 - Area does not include the woodlot or the transitway lands.

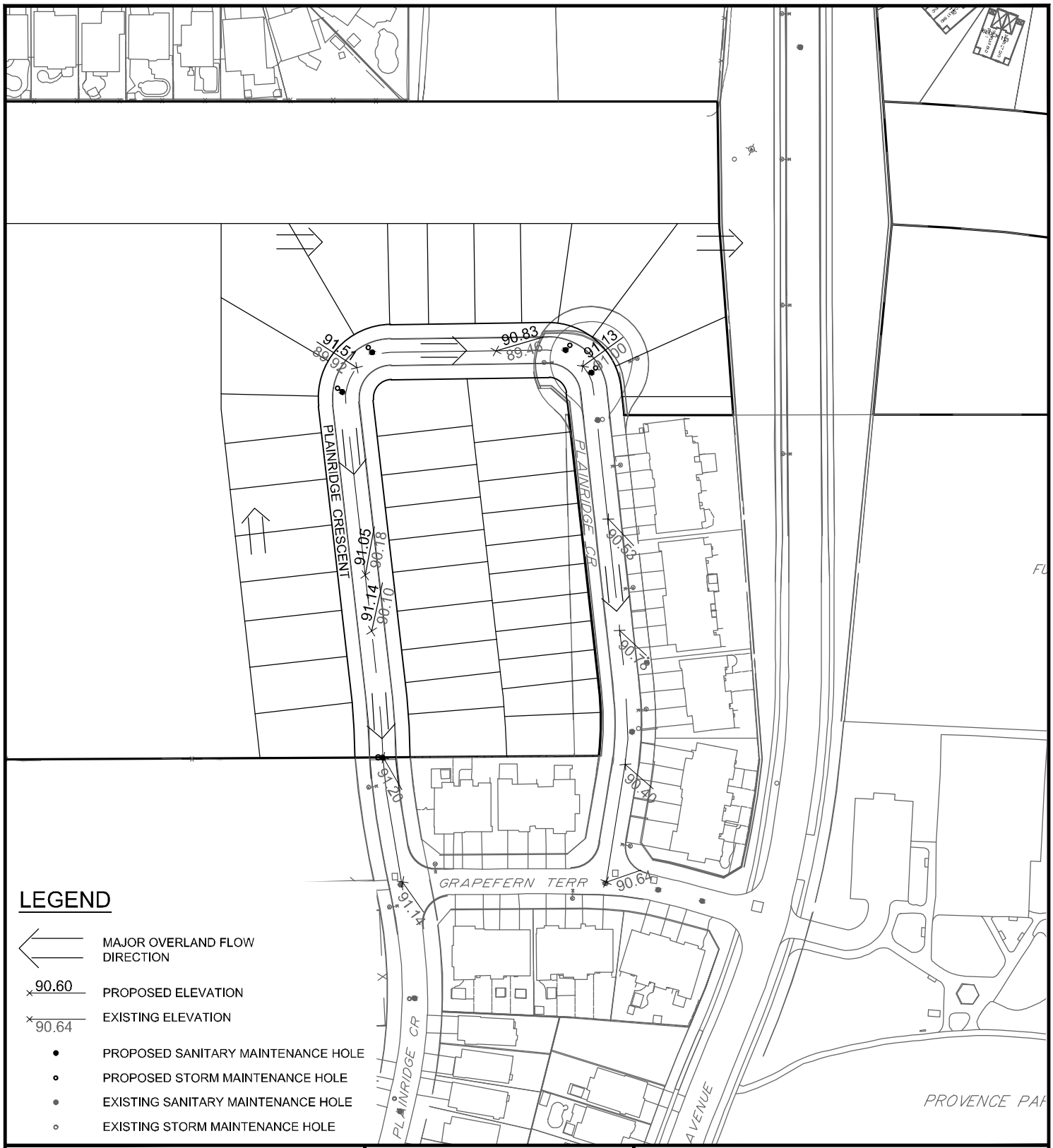
The required major system storage will be provided through maximizing ponding areas in both the rights-of-way and rear-yard swales. Storage will be based on the static + dynamic ponding depths. The allowable release rate will be achieved through inlet control devices in each roadway catchbasin and rear-yard connections to the mainline storm sewer. This approach is consistent with the approved detailed designs for previous phases of the Provence Orleans Subdivision (Phase 1, Phases 2 & 3, and Phase 4).

5.4 Water Quality

The proposed development ultimately outlets to the Cardinal Creek stormwater management facility, which has been designed to provide a 'Normal' level of water quality treatment (70% long-term TSS removal). To provide '*Enhanced*' stormwater water quality treatment (80% long-term TSS removal) for Phase 6, a water quality treatment unit is proposed for the development at Outlet 1 prior to outletting to the existing Plainridge Crescent storm sewer where new surface water flows are being added. The water treatment unit to be used is anticipated to be an online Vortechnic unit located within the ROW. Details will be determined at detailed design.

5.5 Retention of the First 5mm of Rainfall

The *Greater Cardinal Creek Subwatershed Management Plan* (AECOM, August 11, 2014) requires, to the extent possible, the on-site retention of the first 5mm of all rainfall events for infill development within the watershed. Similar to the previously approved detailed design for Provence Orleans Subdivision - Phase 4, it is proposed to provide infiltration within the rights-of-way with a series of exfiltration trenches. This will enable the entire runoff from a 5mm event over the proposed development will be captured and infiltrated.



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CITY of OTTAWA
PROVENCE ORLEANS SUBDIVISION
(2065 PORTOBELLO BOULEVARD)

PHASE 6 PRELIMINARY MACRO GRADING PLAN

SCALE 1 : 1250 (0 10 20 30 40 50)

DATE APR 2023 | JOB 117155 | FIGURE FIGURE 8

SHT8X11.DWG - 216mmx279mm

M:\2017\117155\CAD\Design\Figures\Design Brief\PH-6\117155-PH6-GR-MACRO.dwg, FIG8, Jun 07, 2023 - 9:51am, sbennett

5.6 Hydrologic & Hydraulic Modeling

The *Ottawa Sewer Design Guidelines* state that hydrologic modeling is required for all dual drainage systems. The proposed development was included in the stormwater management analysis within the *Trim Road Subdivision – Phase 3 Stormwater Management Report* (Novatech, 2005). The major and minor system flows where analyzed using a SWMHYMO model. The allowable minor system release rates and major storage requirements were included in the previous modelling.

At the detailed design stage a PCSWMM model for Phase 6 will be developed to account for both the minor and major system flows from the development and ensure no adverse impacts on the downstream drainage system. The results of the analysis will be used to:

- Determine the total major and minor system runoff from the site.
- Calculate the storm sewer hydraulic grade line for the 100-year storm event; and
- Evaluate ponding volumes during the 100-year event.

The PCSWMM modelling will use information from the *Trim Road Subdivision - Phase 3 Stormwater Management Report* (prepared by Novatech, dated November 29, 2005), including the boundary conditions for the minor system and major system flows.

6.0 UTILITIES

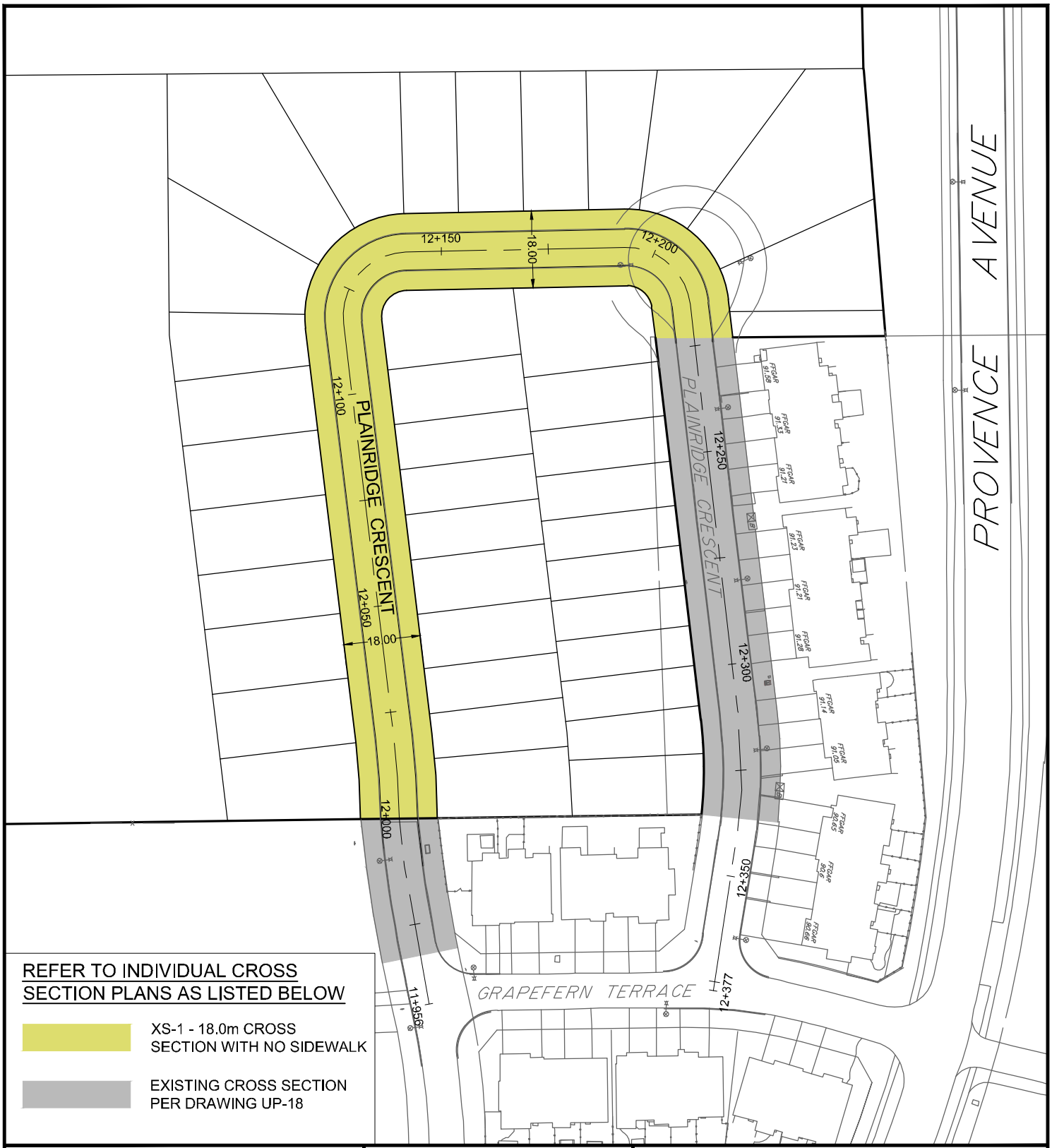
The development will be serviced by hydro, gas, and communications cables by extending the existing service stubs on Plainridge Crescent. Refer to **Figure XS-1 – Typical Road Cross Section 18m ROW – No Sidewalk** and **UP-18** for utility placement details within the proposed and existing 18m right of way, respectively. Refer to **Figure XS-0 – Cross Section Key Plan** for the proposed locations of each of the cross sections.

The referenced proposed cross section (**Figure XS-1 – Typical Road Cross Section 18m ROW – No Sidewalk**) has been developed to address concerns related to tree setbacks from hard surfaces (sidewalk and curb) while respecting both the minimum setback requirements from house foundations based on the presence of sensitive marine clays and the separation requirements from proposed utility trenches.

During the detailed design stage, it is anticipated that additional geotechnical analysis will be completed on the site to more accurately delineate the limits of the sensitive marine clays. The proposed cross sections, specifically the maximum size of the proposed trees, will be reviewed to provided larger trees wherever possible.

Canada Post will service the site with community mailboxes.

Site lighting will be provided along roadways and walkways as per City standards.



REFER TO INDIVIDUAL CROSS SECTION PLANS AS LISTED BELOW

XS-1 - 18.0m CROSS SECTION WITH NO SIDEWALK

EXISTING CROSS SECTION PER DRAWING UP-18

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CITY of OTTAWA
PROVENCE ORLEANS SUBDIVISION
(2065 PORTOBELLO BOULEVARD)

PHASE 6 CROSS SECTION KEY PLAN

SCALE 1 : 1250 (0, 10, 20, 30, 40, 50)

DATE MAY 2023 | JOB 117155 | FIGURE XS-0

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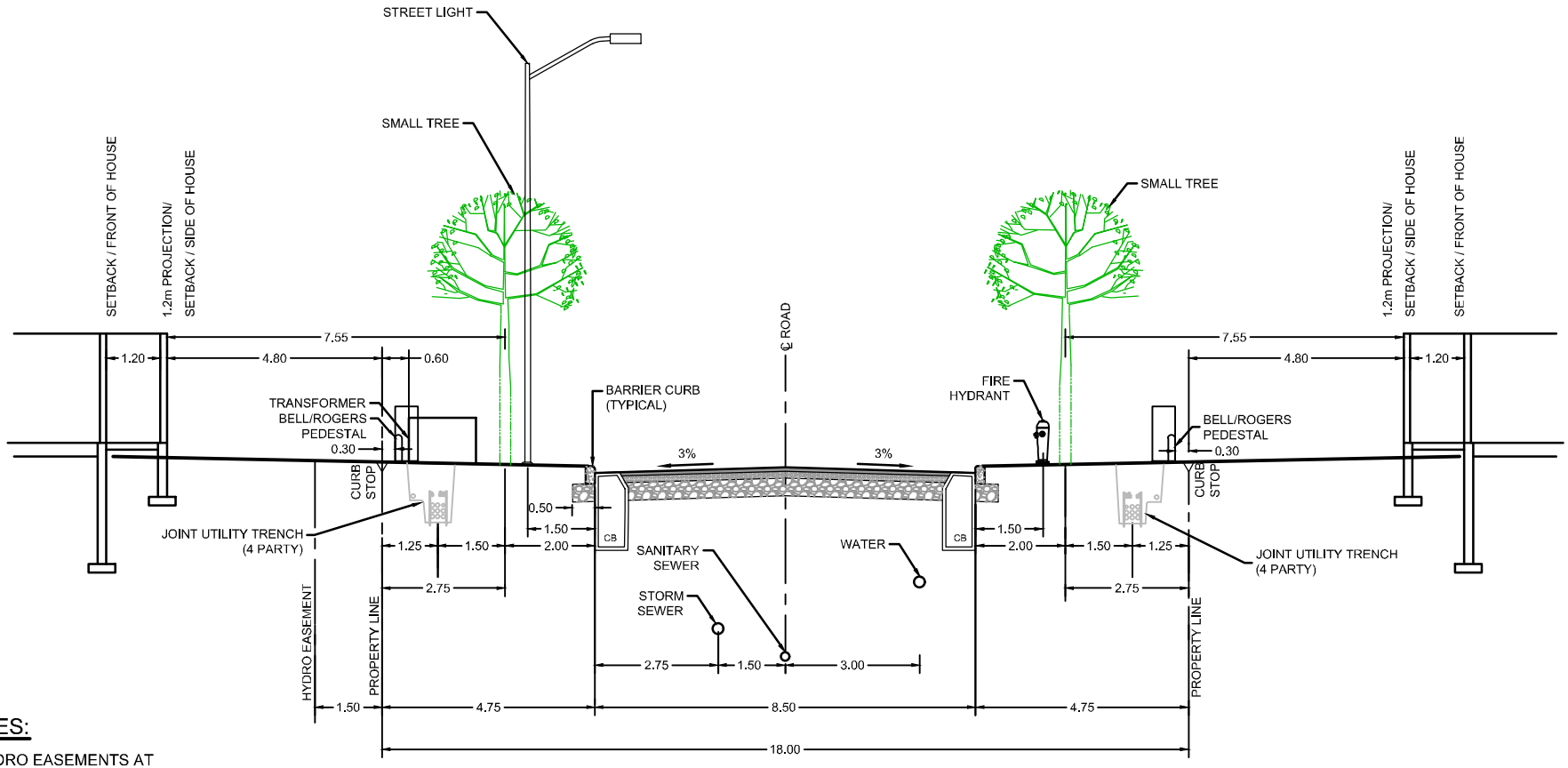

NOTES:

1. HYDRO EASEMENTS AT TRANSFORMER LOCATIONS ONLY.
2. EXISTING SOIL CONDITIONS TO BE CONFIRMED AT DETAILED DESIGN. WHERE SUITABLE SOILS (NON-CLAYS) ARE PRESENT, SMALL TREES WILL BE REPLACED BY MEDIUM/LARGE TREES.

RESIDENTIAL ROAD 18.0m ROW (NO SIDEWALK) CROSS SECTION
PLAINRIDGE CRESCENT (STA. 12+000 to 12+223)
N.T.S.
4-PARTY JOINT UTILITY TRENCH

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CITY of OTTAWA
PROVENCE ORLEANS SUBDIVISION
(2065 PORTOBELLO BOULEVARD)

TYPICAL ROAD CROSS SECTION 18m ROW - NO SIDEWALK

SCALE 1 : 150 (0 2 4 6)

DATE MAY 2023 | JOB 117155 | FIGURE XS-1

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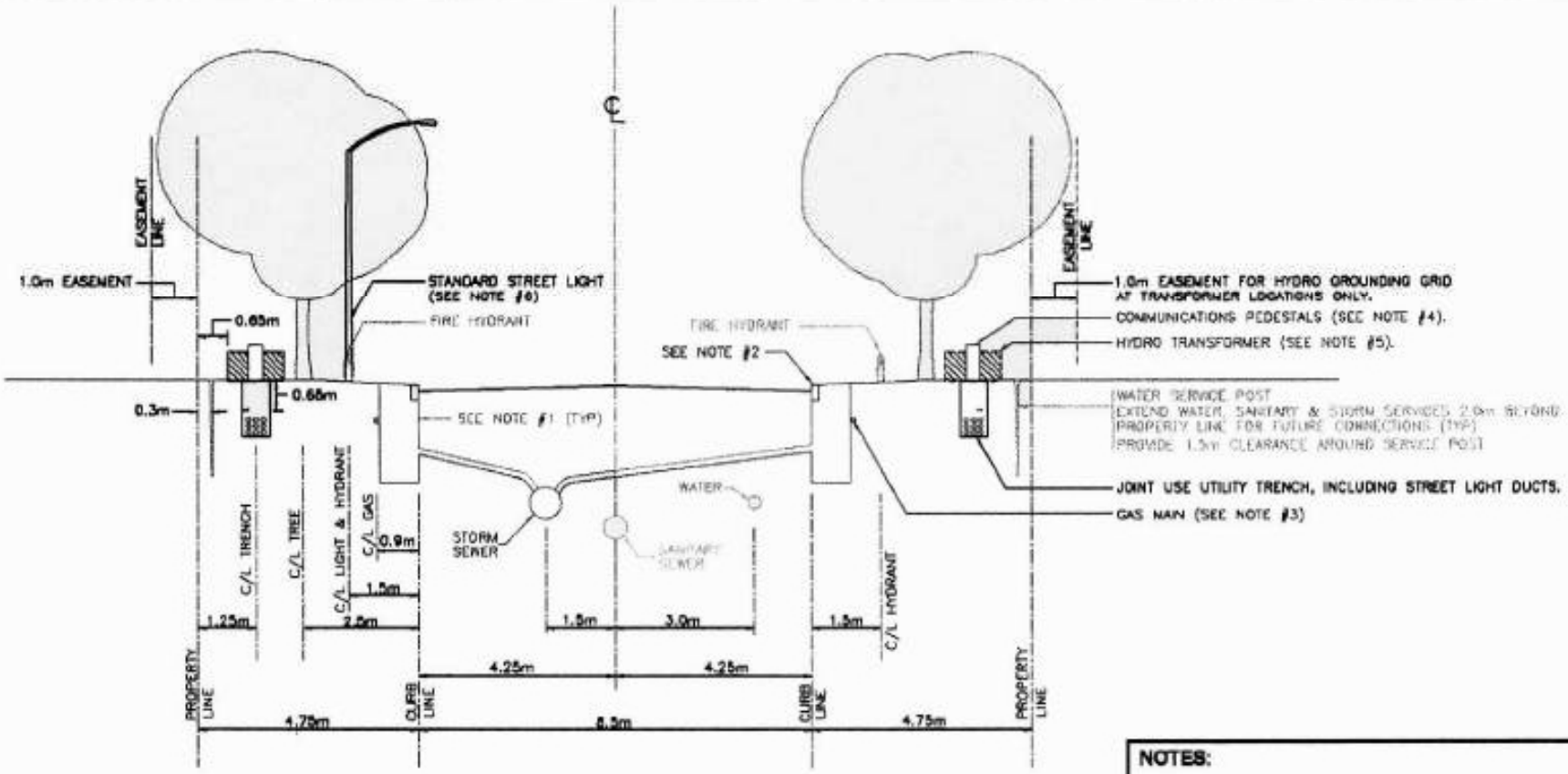


8.5 METRE PAVEMENT ON 18.0 METRE RIGHT-OF-WAY

NOTES:

1. IN-ROAD CATCH BASINS MAY BE USED AS AN ALTERNATIVE FOR SPECIAL CONDITIONS.
2. CONCRETE CURBS MAY BE BARRIER TYPE OR MOUNTABLE TYPE. CATCH BASIN TYPE WILL SUIT CURB DESIGN.
3. AT CATCH BASIN LOCATIONS THE GAS MAIN SHALL HAVE 0.6m CLEARANCE FROM STRUCTURE.
4. ALL PEDESTALS TO BE INSTALLED IN LINE WITH HYDRO TRANSFORMERS OR ON SIDE OF TRENCH AWAY FROM ROAD.
5. REQUIREMENT FOR PROTECTIVE BOLLARDS AT TRANSFORMERS SHALL BE DETERMINED BY HYDRO OTTAWA ON A CASE BY CASE BASIS.
6. STREET LIGHTS CAN BE LOCATED ON EITHER SIDE OF ROW.

Ottawa

STANDARD LOCATIONS FOR UTILITY PLANT

Scale: 1:100	
Date: August 6, 2003	
Dwg: UP-18	Sheet: 1 of 12

7.0 ROADWAY GRADING

Grading throughout the proposed subdivision will be in general accordance with the macro grading plan in the Master Servicing Study (Stantec, 2013) for the area and tie-in to Plainridge Crescent. The emergency overland flow route will be directed to Plainridge Crescent, Grapefern Terrace and Provence Avenue. See **Figure 8 – Preliminary Macro Grading Plan** for details.

At the detailed design stage the grading will be completed to maximize the ponding within the right of way.

8.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987).

Typical erosion and sediment control measures recommended include, but are not limited to, the use of silt fences around perimeter of site (OPSD 219.110), filter fabric or inserts under catch basin/maintenance hole lids, heavy duty silt fence barrier (OPSD 219.130), straw bale check dams (OPSD 219.180), rock check dams (219.210 or OPSD 219.211), dewatering trap (OPSD 219.240), temporary water passage system (OPSD 221.030), riprap (OPSS 511), mud mats, silt bags for dewatering operations, topsoil and sod to disturbed areas and natural grassed waterways. Dewatering and sediment control techniques will be developed for the individual situations based on the above guidelines and utilizing typical measures to ensure erosion and sediment control is controlled in an acceptable manner and there is no negative impact to adjacent lands, water bodies or water treatment/conveyance facilities.

It will be the responsibility of the Contractor to submit a detailed construction schedule and appropriate staging, dewatering and erosion and sediment control plans to the Contract Administrator for review and approval prior to the commencement of work. City of Ottawa Special Provision F-1005 will become part of any development contract and which outlines the contractual requirements which includes preparation of a detailed erosion and sediment control plan.

- All erosion and sediment control measures are to be installed to the satisfaction of the engineer, the municipality and the conservation authority prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and remain present during all phases of site preparation and construction.
- A qualified inspector should conduct daily visits during construction to ensure that the contractor is working in accordance with the design drawings and that mitigation measures are being implemented as specified.
    - A light duty silt fence barrier is to be installed in the locations shown on the Erosion and Sediment Control Plan.
    - Straw bale barriers are to be installed in drainage ditches that will remain open as part of the development.
    - Inserts are to be placed under the grates of all proposed and existing catchbasins and structures.
    - After complete build-out, all sewers are to be inspected and cleaned and all sediment and construction fencing is to be removed.

- The contractor shall ensure that proper dust control is provided with the application of water (and if required, calcium chloride) during dry periods.
- The contractor shall immediately report to the engineer or inspector any accidental discharges of sediment material into any ditch or sewer system. Appropriate response measures shall be carried out by the contractor without delay.
- The contractor acknowledges that failure to implement erosion and sediment control measures may result in penalties imposed by any applicable regulatory agency.

9.0 CONCLUSIONS AND RECOMMENDATIONS

The report demonstrates that the proposed strategy for the watermain servicing, the sanitary servicing and the stormwater management is achievable and feasible in support of an amendment to the Draft Plan Application for Phase 6 of the Provence Orleans Subdivision. The downstream and existing systems have sufficient capacity to service the proposed development.

- The watermain flows will be supplied by an onsite 200mm diameter watermain connecting to existing 200mm diameter watermain stubs on Plainridge Crescent.
- The sanitary flows will be collected by an on-site sanitary sewer system and directed to existing sanitary sewers on Plainridge Crescent and ultimately to the collector sewer on Portobello Boulevard.
- The stormwater flows will be collected by the on-site storm sewer system and directed to existing storm sewers on Plainridge Crescent and ultimately to the trunk sewer on Provence Avenue.

In closing, Novatech recommends the City of Ottawa accept the findings of this Functional Servicing Report and provide a revised draft plan approval for Provence Orleans Subdivision, Phase 6, Ottawa, Ontario.

Respectfully issued,

NOVATECH

Prepared By:

Samantha Bennett, M.A.Sc., E.I.T.
Civil Engineering Intern | Land Development

Prepared By:

Melanie Schroeder, B.A.Sc., P. Eng
Project Engineer | Water Resources

LICENSED PROFESSIONAL ENGINEER
T. J. MCKAY
100195434
MAY 31, 2023
PROVINCE OF ONTARIO

Reviewed/Approved by:

Trevor McKay, P. Eng.
Project Manager | Land Development

APPENDIX A
Water Calculations

BOUNDARY CONDITIONS

Boundary Conditions For: Legault Lands Phase 1 - 6

Date of Boundary Conditions: 2018-May-24

Provided Information:

Scenario (Phase 1)	Demand	
	L/min	L/s
Average Daily Demand	45	0.8
Maximum Daily Demand	112.2	1.9
Peak Hour	247.2	4.1
Fire Flow #1 Demand	10,000	166.7
Fire Flow #2 Demand	13,000	216.7

Scenario (Phase 2 & 4)	Demand	
	L/min	L/s
Average Daily Demand	178.8	3.0
Maximum Daily Demand	600	10.0
Peak Hour	984	16.4
Fire Flow #1 Demand	10,000	166.7
Fire Flow #2 Demand	13,000	216.7

Scenario (Phase 3 & 5)	Demand	
	L/min	L/s
Average Daily Demand	148.8	2.5
Maximum Daily Demand	371.4	6.2
Peak Hour	816.6	13.6
Fire Flow #1 Demand	10,000	166.7
Fire Flow #2 Demand	13,000	216.7

Scenario (Phase 6)	Demand	
	L/min	L/s
Average Daily Demand	142.2	2.4
Maximum Daily Demand	354.6	5.9
Peak Hour	780.6	13.0
Fire Flow #1 Demand	10,000	166.7
Fire Flow #2 Demand	13,000	216.7

Number of Connections: 9

BOUNDARY CONDITIONS

Location:

Results:

Connection #: 1 – Aquaview Dr. First Connection

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.1	57.2
Peak Hour	123.8	48.3
Max Day Plus Fire (10,000) L/min	124.4	49.1
Max Day Plus Fire (13,000) L/min	123.8	49.9

[1]Elevation: **89.72 m**

Connection #: 2 – Aquaview Dr. Second Connection

BOUNDARY CONDITIONS

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.1	57.4
Peak Hour	123.8	48.5
Max Day Plus Fire (10,000) L/min	124.8	49.9
Max Day Plus Fire (13,000) L/min	123.8	48.5

[1]Elevation: **89.83 m**

Connection #: 3 – Salzburg Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.1	58.3
Peak Hour	123.7	49.4
Max Day Plus Fire (10,000) L/min	121.0	45.4
Max Day Plus Fire (13,000) L/min	119.1	42.8

[1]Elevation: **89.03 m**

Connection #: 4 – Trim Rd

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.0	57.3
Peak Hour	123.7	48.3
Max Day Plus Fire (10,000) L/min	120.4	47.8
Max Day Plus Fire (13,000) L/min	118.4	40.7

[1]Elevation: **89.71 m**

Connection #: 5 – Provence Ave – First Connection

BOUNDARY CONDITIONS

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.0	59.6
Peak Hour	123.7	40.7
Max Day Plus Fire (10,000) L/min	121.6	47.7
Max Day Plus Fire (13,000) L/min	119.9	45.3

[1]Elevation: **88.08 m**

Connection #: 6 – Provence Ave – Second Connection

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.2	59.3
Peak Hour	123.7	50.2
Max Day Plus Fire (10,000) L/min	119.9	44.9
Max Day Plus Fire (13,000) L/min	116.7	40.4

[1]Elevation: **88.33 m**

Connection #: 7 – Provence Ave and Grapefern Terr

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.0	57.4
Peak Hour	123.7	48.2
Max Day Plus Fire (10,000) L/min	119.9	44.9
Max Day Plus Fire (13,000) L/min	117.4	39.4

[1]Elevation: **90.63 m**

Connection #: 8 – Plainridge Cres and Plainhill Dr.

BOUNDARY CONDITIONS

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.0	58.5
Peak Hour	123.7	49.4
Max Day Plus Fire (10,000) L/min	119.6	43.7
Max Day Plus Fire (13,000) L/min	117.3	40.4

[1]Elevation: **91.08 m**

Connection #: 9 – Nantes Street

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.0	56.7
Peak Hour	123.7	47.7
Max Day Plus Fire (10,000) L/min	120.9	43.8
Max Day Plus Fire (13,000) L/min	118.9	40.9

[1]Elevation: **90.105 m**

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:

a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

2) Connection locations included in this boundary condition maybe different from initial request provided by the representing consulting firm in order to better represent current water hydraulic model.

3) 203 mm watermain at Salzburg Dr. is expected to be looped by preferably connecting to 203 mm watermain stub at Millennium Blvd and Trim Rd.

4) 203 mm watermain at Plainridge cres is expected to loop connect with the other 203 mm main extending through Grapfern Terr.

Disclaimer

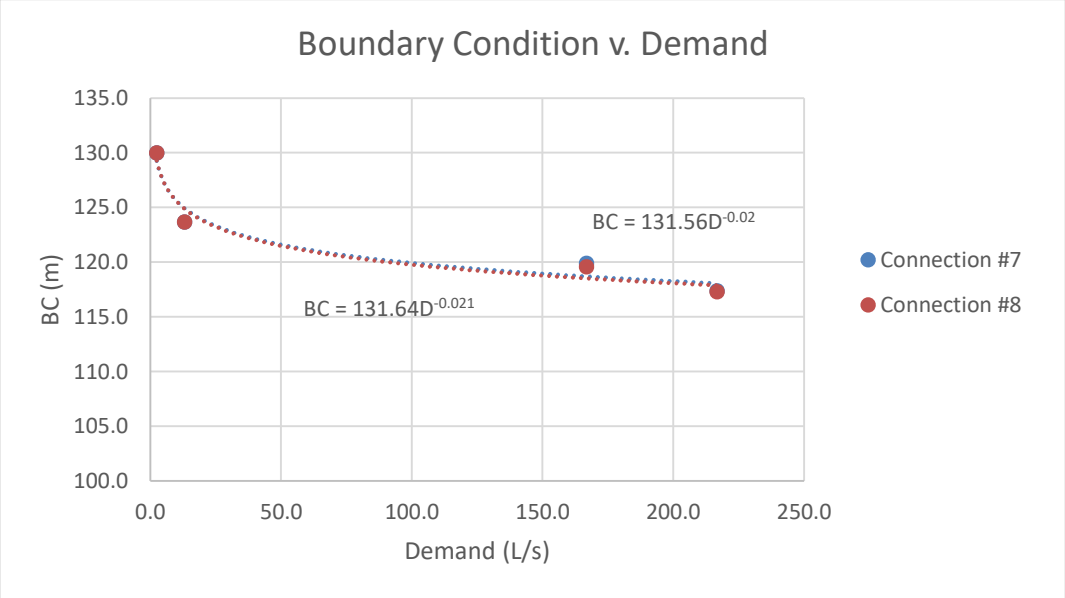
The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary 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.

BOUNDARY CONDITIONS
Provence Orleans - Phase 6

Adjusted Boundary Conditions

**Boundary conditions provided by City of Ottawa on May 24, 2018*

Scenario	Demand (L/s)	Pressure (m)	
		Connection #7 (Elevation = 90.63m)	Connection #8 (Elevation = 91.08)
Average Day (Max HGL)	2.4	130.0	130.0
Peak Hour	13.0	123.7	123.7
Max Day + Fire Flow #1 Demand (10,000L/s)	166.7	119.9	119.6
Max Day + Fire Flow #2 Demand (13,000L/s)	216.7	117.4	117.3
Boundary Condition Formula (Approximation)	-	$BC=131.56D^{-0.02}$	$BC=131.64D^{-0.021}$



Calculated Boundary Conditions based on Draft Plan Demands (CP32, May 31, 2023)

Scenario	Demand (L/s)	Boundary Condition (m)	
		Connection #7	Connection #8
Average Day	1.10	131.31	131.38
Peak Hour	6.16	126.86	126.71
Max Day + Fire Flow #1 Demand (10,000L/s)	170.73	118.71	118.17

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 117155
Project Name: Provence Orleans - Phase 6
Date: 5/31/2023
Input By: Samantha Bennett
Reviewed By: Trevor McKay

Legend: Input by User; No Information or Input Required

Building Description: 50' Lot - Maximum Zoning Footprint (Standard Configuration)
Wood frame

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	280			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**560**	
	F	**Base fire flow without reductions**				**8,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**6,800**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	0 - 3 m		25%	**5,100**
		East Side	20.1 - 30 m		10%	
		South Side	0 - 3 m		25%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**75%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**12,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**200**
				or	USGPM	3,170
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1800

Population and Consumption Rate Calculations

Node	Elevation	Number of Units			Population	Consumption Rates (L/s)			
		Existing		Proposed		Average Daily	Maximum Daily	Maximum Hourly	Maximum Fire Flow
		Townhomes	Single	Single					
R7	90.63								
R8	91.08								
N1	91.05			19	65	0.26	0.96	1.46	166.67
N2	90.83			9	31	0.12	0.44	0.67	166.67
N3	90.65	*22*		11	97	0.39	1.44	2.18	166.67
N4	90.65	*19*			51	0.21	0.78	1.18	166.67
N5	91.10				0	0.00	0.00	0.00	166.67
N6	90.00		*9*		31	0.12	0.44	0.67	166.67
		41	***9***	**39**	**274**	**1.10**	**4.06**	**6.16**	**-**

Water Demand Parameters:

1. Population density (as per Table 4.4, City of Ottawa):
   - Single Units 3.4 people/unit
   - Townhome Units 2.7 people/unit
2. Total Population at each node rounded to nearest whole number.
3. Water Demand (interpolated from Table 3-3, MOE, Population < 500):
   - Average Day Demand (Avg. Day) = Population*350L/s/d/person/86400s/day
   - Maximum Day Demand (Max. Day) = 3.7 *Avg. Day
   - Peak Hour Demand = 5.6 *Avg. Day
4. Fire Flows (calculated as per FUS 2020), to be capped at 10,000L/min as per City of Ottawa ISTB-2014-02.
5. Fire flows modelled in accordance with City of Ottawa ISTB-2021-03 and Appendix H of the City of Ottawa Water Distribution Design Guidelines.
6. Calculated Boundary Conditions:

Demand (L/s)	R7 (m)	R8 (m)
Avg. Day (@ 1.10L/s)	131.31	131.38
Peak Hour (@ 6.16L/s)	126.86	126.71
Max. Day + Fire Flow (@ 170.73L/s)	118.71	118.17

AVERAGE DAY DEMAND / HIGH PRESSURE CHECK
Provence Orleans - Phase 6

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi	Age hours
N1	91.05	0.26	131.31	40.26	394.95	57.28	1.09
N2	90.83	0.12	131.31	40.48	397.11	57.60	2.26
N3	90.65	0.39	131.31	40.66	398.87	57.85	3.65
N4	90.65	0.21	131.31	40.66	398.87	57.85	1.31
N5	91.10	0.00	131.32	40.22	394.56	57.23	0.24
N6	90.00	0.12	131.35	41.35	405.64	58.83	0.11
R7	131.26	2.16	131.31	0.00	0.00	0.00	0.00
R8	131.33	-3.26	131.38	0.00	0.00	0.00	0.00

Maximum Pressure
Maximum Age

AVERAGE DAY DEMAND / HIGH PRESSURE CHECK

Provence Orleans - Phase 6

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	105.00	204	110	0.81	0.02	0.01	0.050
Pipe 2	106.00	204	110	0.69	0.02	0.01	0.051
Pipe 3	100.00	204	110	0.30	0.01	0.00	0.061
Pipe 4	54.00	204	110	2.16	0.07	0.05	0.043
Pipe 5	65.00	204	110	-2.07	0.06	0.04	0.044
Pipe 6	80.00	155	100	3.14	0.17	0.43	0.047
Pipe 7	66.00	155	100	3.26	0.17	0.46	0.047
Pipe 8	100.00	204	110	1.07	0.03	0.01	0.048

MAXIMUM HOUR DEMAND

Provence Orleans - Phase 6

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
N1	91.05	1.46	126.80	35.75	350.71	50.87
N2	90.83	0.67	126.80	35.97	352.87	51.18
N3	90.65	2.18	126.81	36.16	354.73	51.45
N4	90.65	1.18	126.82	36.17	354.83	51.46
N5	91.10	0.00	126.80	35.70	350.22	50.79
N6	90.00	0.67	126.75	36.75	360.52	52.29
R7	126.82	-9.70	126.86	0.00	0.00	0.00
R8	126.66	3.54	126.71	0.00	0.00	0.00

Minimum Pressure

MAXIMUM HOUR DEMAND

Provence Orleans - Phase 6

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	105.00	204	110	-0.73	0.02	0.01	0.051
Pipe 2	106.00	204	110	-1.40	0.04	0.02	0.046
Pipe 3	100.00	204	110	-3.58	0.11	0.12	0.040
Pipe 4	54.00	204	110	-9.70	0.30	0.76	0.035
Pipe 5	65.00	204	110	4.95	0.15	0.22	0.038
Pipe 6	80.00	155	100	-4.21	0.22	0.74	0.045
Pipe 7	66.00	155	100	-3.54	0.19	0.54	0.046
Pipe 8	100.00	204	110	0.73	0.02	0.01	0.051

MAXIMUM DAY + FIRE FLOW DEMAND AT N1

Provence Orleans - Phase 6

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
N1	91.05	95.96	108.48	17.43	170.99	24.80
N2	90.83	36.27	108.89	18.06	177.17	25.70
N3	90.65	1.44	111.24	20.59	201.99	29.30
N4	90.65	0.78	113.55	22.90	224.65	32.58
N5	91.10	35.83	111.63	20.53	201.40	29.21
N6	90.00	0.44	115.18	25.18	247.02	35.83
R7	118.71	-131.84	118.71	0.00	0.00	0.00
R8	118.17	-38.88	118.17	0.00	0.00	0.00

Minimum Pressure

MAXIMUM DAY + FIRE FLOW DEMAND AT N1

Provence Orleans - Phase 6

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	105.00	204	110	-23.53	0.72	3.93	0.030
Pipe 2	106.00	204	110	-59.80	1.83	22.11	0.026
Pipe 3	100.00	204	110	-61.24	1.87	23.11	0.026
Pipe 4	54.00	204	110	-131.84	4.03	95.61	0.024
Pipe 5	65.00	204	110	69.82	2.14	29.46	0.026
Pipe 6	80.00	155	100	38.44	2.04	44.35	0.033
Pipe 7	66.00	155	100	38.88	2.06	45.30	0.032
Pipe 8	100.00	204	110	72.43	2.22	31.53	0.026

MAXIMUM DAY + FIRE FLOW DEMAND AT N2

Provence Orleans - Phase 6

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
N1	91.05	36.79	108.51	17.46	171.28	24.84
N2	90.83	95.44	107.14	16.31	160.00	23.21
N3	90.65	37.27	108.85	18.20	178.54	25.90
N4	90.65	0.78	113.35	22.70	222.69	32.30
N5	91.10	0.00	112.46	21.36	209.54	30.39
N6	90.00	0.44	115.56	25.56	250.74	36.37
R7	118.71	-134.57	118.71	0.00	0.00	0.00
R8	118.17	-36.15	118.17	0.00	0.00	0.00

Minimum Pressure

MAXIMUM DAY + FIRE FLOW DEMAND AT N2

Provence Orleans - Phase 6

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	105.00	204	110	44.99	1.38	13.06	0.028
Pipe 2	106.00	204	110	-50.45	1.54	16.14	0.027
Pipe 3	100.00	204	110	-87.72	2.68	44.95	0.025
Pipe 4	54.00	204	110	-134.57	4.12	99.30	0.023
Pipe 5	65.00	204	110	46.07	1.41	13.64	0.027
Pipe 6	80.00	155	100	35.71	1.89	38.70	0.033
Pipe 7	66.00	155	100	36.15	1.92	39.59	0.033
Pipe 8	100.00	204	110	81.78	2.50	39.48	0.025

MAXIMUM DAY + FIRE FLOW DEMAND AT N3

Provence Orleans - Phase 6

Junction Report

Node ID	Elevation m	Demand LPS	Total Head m	Pressure m	Pressure kPa	Pressure psi
N1	91.05	0.96	111.28	20.23	198.46	28.78
N2	90.83	36.27	109.51	18.68	183.25	26.58
N3	90.65	96.44	109.32	18.67	183.15	26.56
N4	90.65	36.61	113.20	22.55	221.22	32.08
N5	91.10	0.00	113.03	21.93	215.13	31.20
N6	90.00	0.44	115.82	25.82	253.29	36.74
R7	118.71	-136.55	118.71	0.00	0.00	0.00
R8	118.17	-34.17	118.17	0.00	0.00	0.00

Minimum Pressure

MAXIMUM DAY + FIRE FLOW DEMAND AT N3

Provence Orleans - Phase 6

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 1	105.00	204	110	51.69	1.58	16.88	0.027
Pipe 2	106.00	204	110	15.42	0.47	1.80	0.032
Pipe 3	100.00	204	110	-81.02	2.48	38.80	0.025
Pipe 4	54.00	204	110	-136.55	4.18	102.03	0.023
Pipe 5	65.00	204	110	18.92	0.58	2.62	0.031
Pipe 6	80.00	155	100	33.73	1.79	34.82	0.033
Pipe 7	66.00	155	100	34.17	1.81	35.67	0.033
Pipe 8	100.00	204	110	52.65	1.61	17.47	0.027

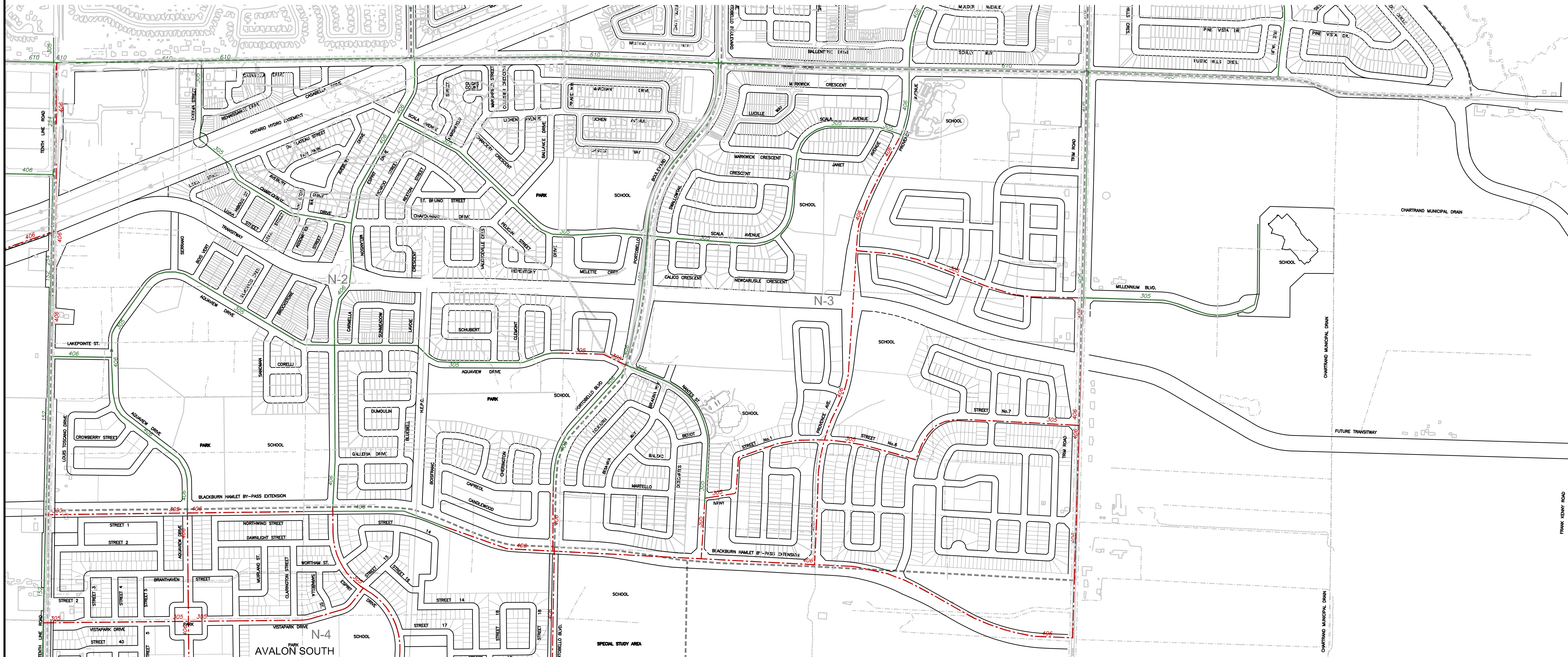
MAXIMUM DAY + FIRE FLOW DEMAND SUMMARY

Provence Orleans - Phase 6

Maximum day plus fire flow demand was modeled for Nodes 1-3 (nodes affected by the addition of proposed units). The following is a summary of the minimum pressures that occurred for each operating condition.

	Demand (L/s)			Minimum Pressure			
Fire at Junction	Maximum Daily	Fire Flow	Max Day + Fire	(m)	kPa	psi	Node
N1	0.96	166.67	167.63	17.43	170.99	24.80	N1
N2	0.44	166.67	167.11	16.31	160.00	23.21	N2
N3	1.44	166.67	168.11	18.67	183.15	26.56	N3

Minimum Pressure



0 50 150 250m

NEIGHBOURHOOD BOUNDARY
EUC AREA BOUNDARY
305 EXISTING WATERMAIN
305 FUTURE WATERMAIN
EXISTING ELEVATED STORAGE TANK
FUTURE ELEVATED STORAGE TANK

WATERMAINS

FIRST SUBMISSION:	FEB., 2004	WM 2
REVISION No.: 5	JUNE, 2006	

APPENDIX B
Storm and Sanitary Design

SANITARY SEWER DESIGN SHEET
Provence Orleans Subdivision - Phase 6
Developer: Provence Orleans Realty Investments Inc.

NOVATECH
Engineers, Planners & Landscape Architects

PROJECT: 117155
DESIGNED BY : JMR/SAB
CHECKED BY : TJM
DATE PREPARED : 05/31/2023

LOCATION				PROPOSED		*EXISTING*			CUMULATIVE		PEAK FACTOR M	POPULATION FLOW Q(p) (L/s)	PEAK EXTRANEOUS FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	PROPOSED SEWER							
STREET	FROM MH	TO MH	Area	Single Units	Townhouse Units	Townhouse Units	Population (in 1000's)	AREA (ha.)	Population (in 1000's)	AREA (ha.)					LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap
Plainridge Crescent	1207	1205	3	5			0.0170	0.38	0.017	0.380	4.0	0.22	0.13	0.35	63.3	200	203.20	DR 35	0.65	27.6	0.85	1%
Plainridge Crescent	1205	1203	4	2			0.0068	0.22	0.024	0.600	4.0	0.31	0.20	0.51	16.2	200	203.20	DR 35	0.40	21.6	0.67	2%
Plainridge Crescent	1203	1201	5	18			0.0612	0.99	0.085	1.590	4.0	1.10	0.52	1.63	120.6	200	203.20	DR 35	0.35	20.2	0.62	8%
OUTLET #1	-	-	-				-	-	**0.085**	**1.590**	-	**1.10**	**0.52**	**1.63**	-	-	-	-	-	-	-	-
Plainridge Crescent	1207	1209	2	2			0.0068	0.22	0.007	0.220	4.0	0.09	0.07	0.16	11.2	200	203.20	DR 35	0.65	27.6	0.85	1%
Plainridge Crescent	1209	*1403*	1	2			0.0068	0.18	0.014	0.400	4.0	0.18	0.13	0.31	15.7	200	203.20	DR 35	0.40	21.6	0.67	1%
Plainridge Crescent	*1403*	*1401*	*EX 1*	10		*16*	0.0772	0.88	0.091	1.280	4.0	1.18	0.42	1.60	*102.6*	*200*	*203.20*	*DR 35*	*0.40*	*21.6*	*0.67*	*7%*
OUTLET #2	-	-	-				-	-	**0.091**	**1.280**	-	**1.18**	**0.42**	**1.60**	-	-	-	-	-	-	-	-

Notes:
1. Q(d) = Q(p) + Q(i)
2. Q(i) = 0.33 L/sec/ha
3. Q(p) = (P x q x M/86,400)

Definitions:
Q(d) = Design Flow (L/sec)
Q(p) = Population Flow (L/sec)
Q(i) = Extraneous Flow (L/sec)

P = Population (3.4 persons/single unit, 2.7 persons/townhouse, 2.1 persons/apartment)
q = Average per capita flow = 280 L/cap/day - Residential
M = Harmon Formula (maximum of 4.0)
Minimum pipe size = 200mm
Minimum pipe slope = 0.32%

LICENSED PROFESSIONAL ENGINEER
T. J. MCKAY
100195434
MAY 31, 2023
PROVINCE OF ONTARIO

SANITARY SEWER DESIGN SHEET
TRIM ROAD SUBDIVISION - PHASE 3B
DEVELOPER: TRIM ROAD INC.

AS-BUILT (LENGTHS AND SLOPES) MARCH 2015

PROJECT : 97137-7
DESIGNED BY: JA
CHECKED BY: MSP / MER
DATE: 21-Dec-04
DATE REVISED: 13-Apr-05
DATE REVISED: 20-Sep-05
DATE REVISED: 18-Nov-05
ASBUILT SUB: 15-Mar-15

NOVATECH ENGINEERING CONSULTANTS LTD.

LOCATION								CUMULATIVE		PEAK FACTOR M	POPULATION FLOW Q(p) (L/s)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	PROPOSED SEWER								
STREET	AREA	FROM MH	TO MH	SINGLES	TOWNS	POPULATION (in 1000's)	AREA (ha.)	POPULATION (in 1000's)	AREA (ha.)					LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap	Depth of Flow/ Diameter
Legault	Future Development		1405	0	34			0.049	0.62	4.00	0.788	0.17	0.96	76.6	200	201.2	DR 35	0.65	26.9	0.84	0.04	
Plainridge	CI	1403	1401	0	16	0.043	0.68	0.092	1.30	4.00	1.488	0.36	1.85	102.6	200	201.2	DR 35	0.40	21.1	0.66	0.09	
Plainridge	CN	1401	501	0	5	0.014	0.21	0.105	1.51	4.00	1.706	0.42	2.13	50.4	200	201.2	DR 35	0.42	21.6	0.68	0.10	
Grapefern	CP-2	505	503	0	2	0.005	0.08	0.005	0.08	4.00	0.088	0.02	0.11	17.9	200	201.2	DR 35	0.50	23.6	0.74	0.00	
Grapefern	CP-1	503	501	0	4	0.011	0.13	0.016	0.21	4.00	0.263	0.06	0.32	17.5	200	201.2	DR 35	0.40	21.1	0.66	0.02	
Grapefern	CM (CN+CP-1+CM)	501	407	0	13	0.035	0.44	0.157	2.16	4.00	2.538	0.60	3.14	67.0	200	201.2	DR 35	0.33	19.1	0.60	0.16	
Legault	Future Development		CAP	0	35			0.095	1.19	4.00	1.531	0.33	1.86	173.8	200	201.2	DR 35	0.35	19.7	0.62	0.09	
Plainridge	CJ-2	CAP	407	0	0	0.000	0.07	0.095	1.26	4.00	1.531	0.35	1.88	42.0	200	201.2	DR 35	0.31	18.5	0.58	0.10	
Plainridge	CO (CM+CJ-2+CO)	407	405	0	0	0.000	0.06	0.251	3.48	4.00	4.069	0.97	5.04	37.0	200	201.2	DR 35	0.27	17.3	0.54	0.29	
Plainridge	CQ-1	405	403	6	0	0.020	0.32	0.272	3.80	4.00	4.399	1.06	5.46	37.8	200	201.2	DR 35	0.08	9.4	0.30	0.58	
Plainridge	CQ-2	403	401	3	0	0.010	0.22	0.282	4.02	4.00	4.565	1.13	5.69	29.6	200	201.2	DR 35	0.20	14.9	0.47	0.38	
Plainridge	CS	401	115	0	0	0.000	0.07	0.282	4.09	4.00	4.565	1.15	5.71	44.4	200	201.2	DR 35	0.74	28.7	0.90	0.20	
Plainhill	CR-2	119	117	5	0	0.017	0.34	0.017	0.34	4.00	0.275	0.10	0.37	39.0	200	201.2	DR 35	0.46	22.6	0.71	0.02	
Plainhill	CR-1	117	115	3	0	0.010	0.21	0.027	0.55	4.00	0.441	0.15	0.59	25.6	200	201.2	DR 35	0.74	28.7	0.90	0.02	
Plainhill	CT-2 (CS+CR-2+CT-2)	115	113	3	0	0.010	0.20	0.319	4.84	4.00	5.171	1.36	6.53	31.9	250	251.5	DR 35	0.19	26.3	0.53	0.25	0.33
Plainhill	CT-1	113	111	3	0	0.010	0.20	0.329	5.04	4.00	5.336	1.41	6.75	24.2	250	251.5	DR 35	0.17	24.9	0.50	0.27	0.34
Plainhill	CU	111	109	2	0	0.007	0.16	0.336	5.20	4.00	5.446	1.46	6.90	29.2	250	251.5	DR 35	0.27	31.4	0.63	0.22	0.34
Comfrey	DB	307	305	0	23	0.062	0.68	0.062	0.68	4.00	1.006	0.19	1.20	78.6	200	201.2	DR 35	0.66	27.1	0.85	0.04	
Comfrey	DA	305	303	0	3	0.008	0.16	0.070	0.84	4.00	1.138	0.24	1.37	14.5	200	201.2	DR 35	0.48	23.1	0.73	0.06	
Comfrey	CZ-2	303	301	0	4	0.011	0.17	0.081	1.01	4.00	1.313	0.28	1.60	22.6	200	201.2	DR 35	0.44	22.1	0.70	0.07	
Comfrey	CZ-1	301	205	0	4	0.011	0.18	0.092	1.19	4.00	1.488	0.33	1.82	54.5	200	201.2	DR 35	0.42	21.6	0.68	0.08	
Clubmoss	DC-1	201	203	11	0	0.037	0.54	0.037	0.54	4.00	0.606	0.15	0.76	63.9	200	201.2	DR 35	0.66	27.1	0.85	0.03	
Clubmoss	DC-2	203	205	3	0	0.010	0.16	0.048	0.70	4.00	0.771	0.20	0.97	20.5	200	201.2	DR 35	0.73	28.5	0.90	0.03	
Clubmoss	CY (CZ-1+DC-2+CY)	205	109	8	0	0.027	0.46	0.167	2.35	4.00	2.700	0.66	3.36	69.0	200	201.2	DR 35	0.33	19.1	0.60	0.18	
Plainhill	CV (CU+CY+CV)	109	107	5	0	0.017	0.42	0.520	7.97	3.97	8.349	2.23	10.58	84.6	250	251.5	DR 35	0.22	28.3	0.57	0.37	0.42
Plainhill	CW	107	105	2	0	0.007	0.14	0.527	8.11	3.96	8.451	2.27	10.72	7.2	250	251.5	DR 35	1.90	83.3	1.68	0.13	0.48
Plainhill	CX	105	103	16	0	0.054	0.81	0.581	8.92	3.94	9.271	2.50	11.77	99.1	250	251.5	DR 35	0.18	25.6	0.52	0.46	0.48

SANITARY SEWER DESIGN SHEET
TRIM ROAD SUBDIVISION - PHASE 3B
DEVELOPER: TRIM ROAD INC.

AS-BUILT (LENGTHS AND SLOPES) MARCH 2015

PROJECT : 97137-7
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NOVATECH ENGINEERING CONSULTANTS LTD.

LOCATION								CUMULATIVE		PEAK FACTOR M	POPULATION FLOW Q(p) (L/s)	PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	PROPOSED SEWER								
STREET	AREA	FROM MH	TO MH	SINGLES	TOWNS	POPULATION (in 1000's)	AREA (ha.)	POPULATION (in 1000's)	AREA (ha.)					LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap	Depth of Flow/ Diameter
Plainhill	Future Development		101	42	44			0.262	3.97	4.00	4.239	1.11	5.35	492.7	200	201.2	DR 35	0.35	19.7	0.62	0.27	
Plainhill	DD	101	103	2	0	0.007	0.10	0.268	4.07	4.00	4.349	1.14	5.49	18.2	200	201.2	DR 35	0.11	11.0	0.35	0.50	
Ivany	"Outlet" DL-1 (CX+DD+DL-1)	103	1803	0	0	0.000	0.02	0.849	13.01	3.84	13.227	3.64	16.87	18.6	300	299.4	DR 35	0.54	70.7	1.00	0.24	0.47
Ivany	DL-2	1803	1801	0	0	0.000	0.09	0.849	13.10	3.84	13.227	3.67	16.90	44.6	300	299.4	DR 35	0.11	31.9	0.45	0.53	0.48
Ivany	DL-3	1801	343	0	0	0.000	0.03	0.849	13.13	3.84	13.227	3.68	16.90	23.9	300	299.4	DR 35	0.13	34.7	0.49	0.49	0.47

Notes:

1. Q(d) = Q(p) + Q(i) , where Q(d) = Design Flow (L/sec)
   Q(p) = Population Flow (L/sec)
   Q(i) = Extraneous Flow (L/sec)
2. Q(i) = 0.28 L/sec/ha
3. Q(p) = (PxqxM/86,400), where P = Population (3.4 persons per single or 2.7 per semi-detached house)
   (School and Park Field House 50,000/L/ha/day)
   q = Average per capita flow = 350 L/cap/day
   M = Harmon Formula (maximum of 4.0)
4. Depth of flow/Diameter from Hydraulic properties of circular pipes flowing partially full

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
5.	RE-ISSUED FOR MOE/TENDER	NOV 18/05	MER
4.	ISSUED FOR MOE/TENDER	SEP 23/05	MER
3.	REVISED PER CITY COMMENTS / ISSUED FOR MOE	MAY 6/05	MER
2.	REVISED PER CITY COMMENTS	FEB 15/05	MER
1.	ISSUED FOR CITY APPROVAL	DEC 21/04	MER

LICENSED PROFESSIONAL ENGINEER M.E. RIDDELL 100040125 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

NOVATECH
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Facsimile (613) 254-5867
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DESIGN	MER
CHECKED	RSC
DRAWN	ATR
CHECKED	MER
APPROVED	RSC

SCALE 1 : 1000

CITY OF OTTAWA

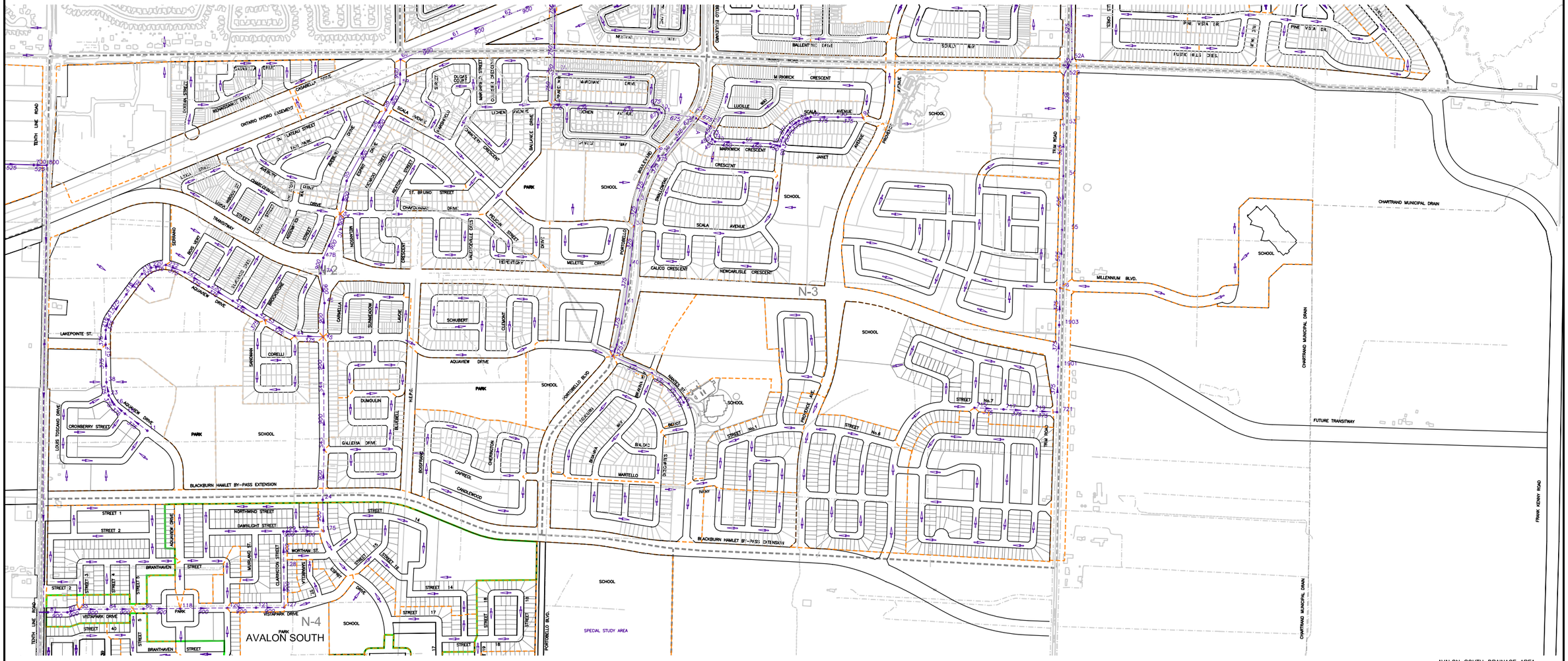
TRIM ROAD LANDS – PHASE 3

SANITARY AREA PLAN PHASE – 3B

PROJECT No. 97137

DATE DECEMBER 2004

DRAWING No. 97137-SAN2



SANITARY COLLECTOR SEWERS AND DRAINAGE AREAS

FIRST SUBMISSION:		FEB., 2004	SAN 2
REVISION No.:	5	JUNE, 2006	

STORM SEWER DESIGN SHEET (2 YEAR DESIGN EVENT)
Provence Orleans Subdivision - Phase 6
Developer: Provence Orleans Realty Investments Inc.

NOVATECH
Engineers, Planners & Landscape Architects

PROJECT #: 117155
DESIGNED BY : JMR/SAB
CHECKED BY : TJM
DATE PREPARED : 05/31/2023

LOCATION											PROPOSED SEWER								
STREET	FROM M.H.	TO M.H.	AREA #	INDIV AREA (ha)	INDIV R	INDIV. 2.78 AR	ACCUM. 2.78 AR	TIME OF CONC. (min)	RAINFALL INTENSITY 2-Year (mm/hr)	PEAK FLOW Q (L/s)	TYPE OF PIPE	PIPE SIZE (mm)	PIPE ID (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY	TIME OF FLOW (min)	CAPACITY (%)
Plainridge Crescent	1206	1204	3	0.38	0.65	0.69	0.69	10.00	77	**52.7**	DR 35	375	381	0.30	66.0	100.2	0.88	1.25	53%
Plainridge Crescent	1204	1202	4	0.21	0.65	0.38	1.07	11.25	72	**77.1**	CONC	450	457	0.30	16.7	162.9	0.99	0.28	47%
Plainridge Crescent	1202	1200	5	1.18	0.65	2.13	3.20	11.53	71	**228.3**	CONC	525	533	0.30	121.7	245.7	1.10	1.84	93%
OUTLET #1	-	-	-	-	-	-	**3.20**	**13.38**	-	**228.3**	-	-	-	-	-	-	-	-	-
Plainridge Crescent	1206	1208	2	0.22	0.65	0.40	0.40	10.00	77	**30.5**	DR 35	300	305	0.39	11.3	63.0	0.86	0.22	48%
Plainridge Crescent	1208	*1402*	1	0.14	0.65	0.25	0.65	10.22	76	**49.4**	DR 35	375	381	0.30	17.1	100.2	0.88	0.32	49%
OUTLET #2	-	-	-	-	-	-	**0.65**	**10.54**	-	**49.4**	-	-	-	-	-	-	-	-	-
Capacity Check (Existing Sewer for Outlet #1)																			
Plainridge Crescent	1200	*406*								***228.3***	*CONC*	*525*	*533*	*0.51*	*39.0*	*320.4*	*1.43*	*0.45*	***71%***

Definitions:
Q = Peak Flow in Litres per Second (L/s)
Q = 2.78 AIR, where
A = Area in hectares (ha)
I = Rainfall Intensity (mm/hr)
R = Runoff Coefficient

Notes:
1) 2-year Rainfall Intensity Curve per the City of Ottawa Design Guidelines (2012): I(2-year) = 732.951/ [(Tc(min)+6.199)]^0.81
2) Minumum Tc is 10min as per the City of Ottawa Design Guidelines (2012).
3) Roughness Coefficient 'n' in Manning's formula shall be 0.13 for Concrete & PVC pipes as per the City of Ottawa Design Guidelines (2012).
4) Minimum diameter for on street sewers = 250mm per the City of Ottawa Design Guidelines (2012).

STORM SEWER DESIGN SHEET
TRIM ROAD SUBDIVISION - PHASE 3B
DEVELOPER: TRIM ROAD INC.

AS-BUILT (LENGTHS AND SLOPES) MARCH 2015

PROJECT : 97137-7

DESIGNED BY: JA
CHECKED BY: CAH / MER
DATE PREPARED: 21-Dec-04
DATE REVISED: 13-Apr-05
DATE REVISED: 18-Nov-05
ASBUILT SUB: 15-Mar-15

NOVATECH ENGINEERING CONSULTANTS LTD.

AREA			AREA (ha)						INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC (min)	RAINFALL INTENSITY (mm/hr)	PEAK FLOW Q (L/s)	PROPOSED SEWER								
	FROM MH	TO MH	R= 0.20	R= 0.45	R= 0.52	R = 0.6	R = 0.7	R= 0.75						TYPE OF PIPE	PIPE SIZE (mm)	PIPE ID (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENTAGE OF CAPACITY
Ivany	Future Development	342								7.04	**27.18**	57.8	**406.7**	CONC	675	685	0.35	641.6	**517.2**	1.40	7.62	79%
Nantes	Future Development	342								2.16	**22.68**	67.3	**145.3**	CONC	450	448	0.35	158.8	**166.6**	1.06	2.50	87%
Ivany	342	1800								9.20	27.18	57.6	**530.1**	CONC	750	762	0.81	26.0	**1045.3**	2.29	0.19	51%
Ivany	1800	1802				0.17			0.28	9.48	27.37	57.4	**543.9**	CONC	750	762	0.45	44.1	**779.1**	1.71	0.43	70%
Ivany	1802	102								9.48	27.80	56.8	**538.3**	CONC	750	762	0.32	15.6	**657.0**	1.44	0.18	82%
											27.98											
Plainhill	Future Development	100								1.83	**21.93**	69.6	**127.7**	CONC	450	448	0.35	118.2	**166.6**	1.06	1.86	77%
Plainhill	100	102								1.83	21.93	66.3	**121.6**	CONC	450	448	0.54	14.8	**206.9**	1.31	0.19	59%
											22.12											
Plainhill	102	104		1.40					1.75	13.07	28.16	56.3	**735.5**	CONC	900	914	0.17	102.7	**777.8**	1.19	1.44	95%
Plainhill	104	106								13.07	29.60	54.4	**711.1**	CONC	900	914	0.96	7.3	**1848.3**	2.82	0.04	38%
Plainhill	106	108		0.62					0.78	13.84	29.65	54.4	**752.6**	CONC	900	914	0.20	88.2	**843.6**	1.29	1.14	89%
											30.79											
Clubmoss	Future Development	200								2.34	**22.97**	67.3	**157.7**	CONC	525	533	0.35	189.7	**264.9**	1.19	2.66	60%
Clubmoss	200	202			0.69				1.00	3.34	22.97	64.3	**215.0**	CONC	525	533	0.40	65.0	**283.2**	1.27	0.85	76%
Clubmoss	202	204								3.34	23.82	62.8	**210.0**	CONC	525	533	0.26	19.5	**228.3**	1.02	0.32	92%
											24.14											
Comfrey	Future Development	306								1.86	**23.18**	67.0	**124.8**	CONC	450	448	0.35	189.3	**166.6**	1.06	2.98	75%
Comfrey	306	304				0.56			0.93	2.80	23.18	64.0	**179.0**	CONC	525	533	0.42	79.2	**290.2**	1.30	1.01	62%
Comfrey	304	302			0.28				0.40	3.20	24.19	62.2	**199.3**	CONC	525	533	0.33	15.0	**257.2**	1.15	0.22	77%
Comfrey	302	300								3.20	24.41	61.9	**198.1**	CONC	525	533	0.51	25.3	**319.8**	1.43	0.29	62%
Comfrey	300	204				0.27			0.45	3.65	24.71	61.4	**224.2**	CONC	525	533	0.29	51.7	**241.1**	1.08	0.80	93%
											25.50											
Clubmoss	204	108		0.26					0.33	7.32	25.58	60.0	**439.1**	CONC	675	685	0.33	69.7	**502.2**	1.36	0.85	87%
											26.43											
Plainhill	108	110								21.16	30.60	53.2	**1126.1**	CONC	1050	1067	0.11	27.8	**945.3**	1.06	0.44	119%
Plainhill	110	112		0.25	0.2				0.60	21.77	31.04	52.7	**1147.0**	CONC	1050	1067	0.15	19.8	**1103.9**	1.23	0.27	104%
Plainhill	112	114		0.41					0.51	22.28	31.31	52.4	**1167.1**	CONC	1050	1067	0.54	31.5	**2094.5**	2.34	0.22	56%
											31.53											
Plainridge	404	402				0.14			0.23	0.23	20.00	70.3	**16.4**	DR 35	300	299	0.34	32.8	**56.1**	0.80	0.69	29%
Plainridge	402	400								0.23	20.69	68.8	**16.1**	DR 35	300	299	0.06	32.5	**23.6**	0.33	1.62	68%
Plainridge	400	114		0.36					0.45	0.68	22.31	65.6	**44.8**	DR 35	300	299	5.29	43.9	**221.1**	3.14	0.23	20%
											22.54											
Plainhill	114	116								22.96	31.49	52.2	**1198.2**	CONC	1200	1219	0.38	28.8	**2506.2**	2.15	0.22	48%
Plainhill	116	118		0.69					0.86	23.83	31.71	51.9	**1237.2**	CONC	1200	1219	0.41	46.0	**2603.2**	2.23	0.34	48%
											32.06											

STORM SEWER DESIGN SHEET
TRIM ROAD SUBDIVISION - PHASE 3B
DEVELOPER: TRIM ROAD INC.

AS-BUILT (LENGTHS AND SLOPES) MARCH 2015

PROJECT : 97137-7

DESIGNED BY: JA
CHECKED BY: CAH / MER
DATE PREPARED: 21-Dec-04
DATE REVISED: 13-Apr-05
DATE REVISED: 18-Nov-05
ASBUILT SUB: 15-Mar-15

NOVATECH ENGINEERING CONSULTANTS LTD.

AREA			AREA (ha)						INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC (min)	RAINFALL INTENSITY (mm/hr)	PEAK FLOW Q (L/s)	PROPOSED SEWER								
	FROM MH	TO MH	R= 0.20	R= 0.45	R= 0.52	R = 0.6	R = 0.7	R= 0.75						TYPE OF PIPE	PIPE SIZE (mm)	PIPE ID (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENTAGE OF CAPACITY
Legault	Future Development	1402				0.81			1.35	1.35	**21.27**	68.0	**91.9**	CONC	450	448	0.35	80.3	**166.6**	1.06	1.27	55%
Plainridge	1402	1400				0.37			0.62	1.97	**21.27**	67.6	**133.0**	CONC	450	448	0.38	102.0	**173.5**	1.10	1.54	77%
Plainridge	1400	500				0.39			0.65	2.62	22.81	64.6	**169.2**	CONC	525	533	0.48	48.0	**310.2**	1.39	0.58	55%
											23.39											
Legault	Future Development	CAP				1.37			2.29	2.29	**21.95**	67.4	**154.0**	CONC	525	533	0.35	132.8	**264.9**	1.19	1.86	58%
Moulin	CAP	406								2.29	21.95	66.2	**151.4**	CONC	525	533	0.51	39.0	**319.8**	1.43	0.45	47%
											22.40											
Existing Phase 1	Legault	143			3.09				4.47	4.47	25.00	60.9	**272.0**									
	School	143	3.03						1.68	1.68	25.00	60.9	**102.6**									
	Portobello	143				2.00			3.34	3.34	28.00	56.5	**188.5**									
	Trim	143		0.10		0.20	0.21		0.87	0.87	20.00	70.3	**60.9**									
(Portobello and Nantes)	143	144								10.35	28.00	56.5	**585.0**	CONC	825	838	0.30	105.0	**820.2**	1.49	1.18	71%
Existing Phase 1	Legault	144				0.33	1.70		3.86	3.86	25.00	60.9	**235.0**									
	Trim	144				0.08			0.13	0.13	20.00	70.3	**9.4**									
	Trim	144		9.17					11.47	11.47	29.42	54.6	**626.9**									
(Nantes and Brianna)	144	146								25.82	29.42	54.6	**1410.8**	CONC	1200	1219	0.30	110.0	**2226.8**	1.91	0.96	63%
Existing Phase 1	Trim	146		1.29					1.61	1.61	24.33	62.0	**100.0**									
	Trim	146	2.16						1.20	1.20	25.00	60.9	**73.1**									
	School	146											**100.0**	Controlled on site								
(Nantes and Easement)	Legault	146	4.60						2.56	2.56	29.42	54.6	**139.8**									
Easement	146	1900								31.19	29.42	54.6	**1804.4**	CONC	1200	1219	0.35	101.2	**2405.2**	2.06	0.82	75%
Easement	1900	1902								31.19	30.24	53.6	**1773.1**	CONC	1200	1219	0.23	84.1	**1949.8**	1.67	0.84	91%
Easement	1902	406								31.19	31.08	52.7	**1742.2**	CONC	1200	1219	0.31	107.3	**2263.6**	1.94	0.92	77%
											32.00											
Grapefern	406	500								33.48	31.26	52.4	**1755.5**	CONC	1200	1219	0.29	72.0	**2189.4**	1.88	0.64	80%
											31.90											
Grapefern	500	502								36.09	31.89	51.7	**1867.2**	CONC	1200	1219	0.55	12.8	**3015.1**	2.58	0.08	62%
Grapefern	502	504				0.76			1.27	37.36	31.97	51.6	**1929.4**	CONC	1200	1219	0.51	33.3	**2903.4**	2.49	0.22	66%
											31.97											

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
6.	ISSUED WITH SWM REPORT	NOV 18/05	MER
5.	RE-ISSUED FOR MOE/TENDER	NOV 18/05	MER
4.	ISSUED FOR MOE/TENDER	SEP 23/05	MER
3.	REVISED PER CITY COMMENTS / ISSUED FOR MOE	MAY 6/05	MER
2.	REVISED PER CITY COMMENTS	FEB 15/05	MER
1.	ISSUED FOR CITY APPROVAL	DEC. 21/04	MER

LICENSED PROFESSIONAL ENGINEER M.E. RIDDELL 100040125 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

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ENGINEERING CONSULTANTS LTD.
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Ottawa, Ontario, Canada
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Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

DESIGN	MER
CHECKED	RSC
DRAWN	CAH
CHECKED	MER
APPROVED	RSC

SCALE 1 : 1000

CITY OF OTTAWA

TRIM ROAD LANDS - PHASE 3

STORM DRAINAGE AREA PLAN PHASE - 3B

PROJECT No. 97137-7

DATE DECEMBER 2004

DRAWING No. 97137-STM2

0 50 150 250m

- NEIGHBOURHOOD BOUNDARY
- EUC AREA BOUNDARY
- EXISTING STORM SEWER
- FUTURE STORM SEWER
- FUTURE MELTWATER FORCEMAIN
- STORM DRAINAGE AREA
- 900 STORM SEWER SIZE
- EXISTING SWM POND
- FUTURE SWM POND
- 101 MANHOLE AND NUMBER
- COLLECTOR SEWER FLOW DIRECTION
- LOCAL SEWER FLOW DIRECTION
- FUTURE MELTWATER PUMP STATION
- FUTURE DITCH REGRADING

STORM COLLECTOR SEWERS AND DRAINAGE AREAS

FIRST SUBMISSION:	FEB., 2004	STM 2
REVISION No.: 5	JUNE, 2006	

APPENDIX C
Stormwater Management

APPENDIX B

Cumberland EUC Expansion Area Drainage Guidelines

Stantec

CITY OF CUMBERLAND

UPDATE TO MASTER DRAINAGE PLAN
EAST URBAN COMMUNITY EXPANSION AREA

PROJECT 3133-LD

AUGUST 2000

City of Cumberland

Cumming Cockburn Ltd
Consulting Engineers, Planners and Environmental Scientists

5.0 LEVEL OF SERVICE

Through meetings with the City of Cumberland regarding acceptable levels of service, it was agreed the following criteria would be utilized within this study area.

I Minor System

I-a Storm sewers will be designed using the Rational formula for the 5 year storm using a 20 minute inlet time. Hydraulic grade line should be evaluated using the steady state Darcy-Weisbach formula.

I-b On an average basis, inflow rates into the minor system should be limited to 70 l/s/ha. All residential inlets will be equipped with inlet restrictions limiting flows to:

- 13.4 l/sec at a density of 5.2 minor system inlets per hectare, or
- 19.8 l/sec at a density of 3.5 minor system inlets per hectare, or a
- combination of both (not exceeding 70 l/s/ha).

(The term "inlet" means: "a single catchbasin" or "a group of interconnected catchbasins" connected by a single lead into the minor system).

I-c Catchbasin densities and capacities for commercial development should be assessed on a site specific basis to limit the inflow into the minor system to a maximum of 70 l/s/ha.

I-d Maximum permitted hydraulic grade line elevation to be 0.30 m below the underside of basement floor slab (top of footing).

II Major System

II-a Grading designs are to be based on split lot drainage.

II-b The major system should be designed to accommodate on-site detention with sufficient capacity to attenuate the July 1st 1979 storm.

II-c Modeling or detailed stormwater management calculations are required for residential subdivisions with an average runoff coefficient higher than c=0.6

and for commercial developments.

II-d The minimum on site storage is to be 150m³/ha (this storage is to be determined at 0.3 m depth on streets and 0.4 m depth in rear yards). Emergency storage in parks and other areas available for surface storage is also to be provided, unless there is a sufficient major system outlet (example: natural watercourse). A minimum of 30m³/ha of emergency storage must be provided. On site storage can be replaced with additional park storage where design constraints dictate. Where the minimum on-site detention requirement of 150 m³/ha cannot be met and where the residential development exceeds 10 hectares in area, modeling will be required to support the proposed major system routing.

II-e On-site detention storage may be provided in the following areas:

- low lying park surfaces; and/or
- road/rear yard low points (sawtoothing design).

II-f Calculation of the actual distributed on-site storage should be supported by stage storage curves developed by the design engineer. The depth and extent of surface storage is to be illustrated on the applicable grading plan.

II-g Maximum hydrostatic ponding depth on low lying park surfaces and the design stage storage curves should be determined and provided on a site specific basis.

II-h The grading plan is to be co-ordinated with the required ponding and the specified house grade is to be set 0.3 m above the ponding depths stated in IId.

II-i The City of Cumberland reserves the right to request detailed modeling if deemed warranted.

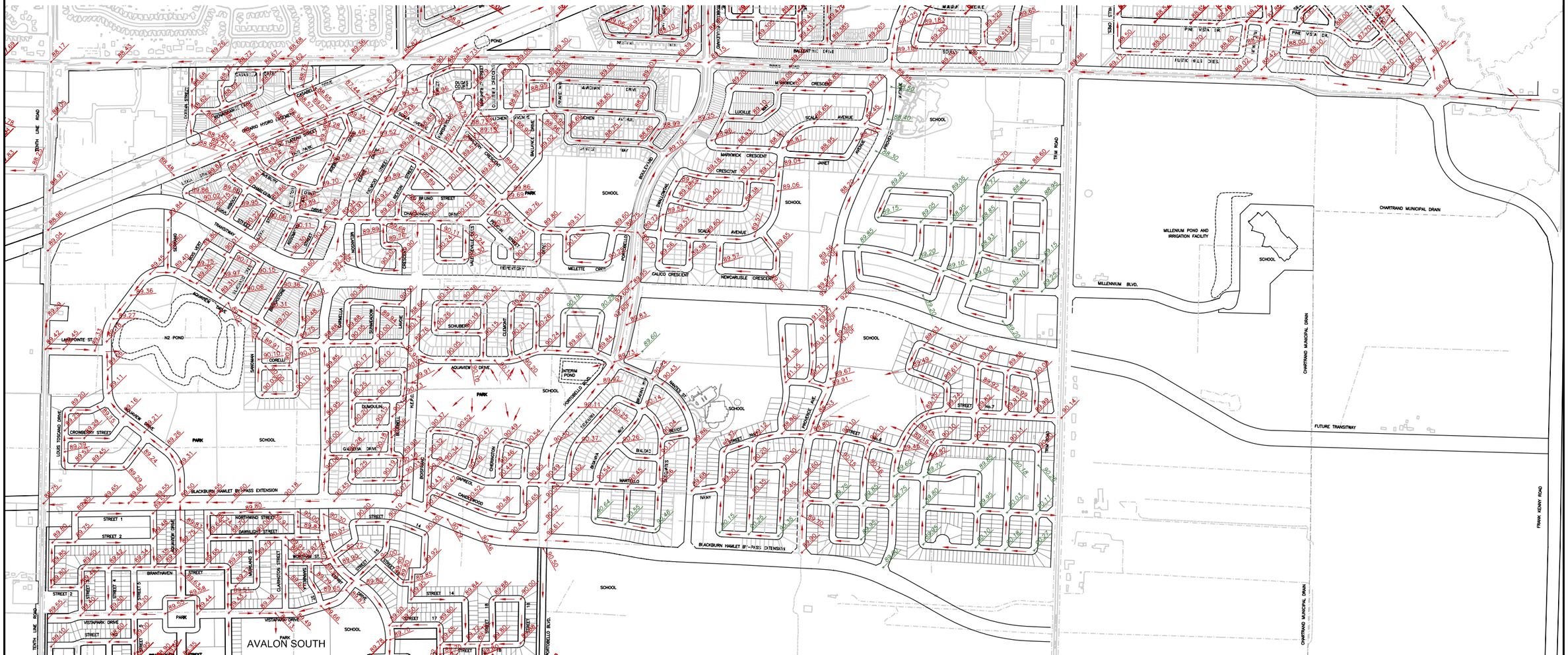
III Street Emergency Overflow

III On street routing to emergency storage areas must be provided and illustrated on the grade control plan or surface storage plan. This routing must incorporate a maximum 0.3 m grade difference between any high point and the adjacent upstream low point. An overall positive slope will be required across consecutive high points for routing purposes.

It should be noted that the City of Cumberland's decision to use split lot drainage in lieu of back to front drainage, wherever possible (see Item II-a) results in a significant increase in the level of protection to all new houses, by directing all surface drainage away from the house. This new grading scenario results in the house becoming the highest point on the lot. This grading method provides additional surface storage potential in rear yards which means that houses will be less likely to flood in any given major storm event.

The decision to use the split lot drainage in lieu of back to front drainage also provided an opportunity for the interconnection of the rear yard catchbasins and for further restriction of inflow into the storm sewer system. With the new design standard, both the street and rear yard catchbasins are now restricted to the design capacity of the sewer system. The updated Master Drainage Plan also establishes the release flow rate at a maximum of 70 litres per second per hectare (see Item I-b), which is generally a slightly higher level of protection than the 5 year rational design. A combination of all of these features reduces the potential for the storm sewer system to be surcharged during major storm events and therefore reduces the potential for basement flooding, thereby further increasing the level of protection to the residents.

The surface storage requirements outlined in II-d,e,f,g,h and III recognize the on site storage potential in street sags and rear yard sags. The suggested design guidelines also provide a higher level of protection by requiring overall surface routing through streets to a positive surface outlet such as a natural water course, or routing to an area such as a park land, where additional storage space is to be provided. The routing and the additional storage space provided in open spaces, as well as the inherent storage available in the system due to the hydraulics of surface routing in flat areas provides a high level of protection against flooding of homes for events in excess of the 1:100 year design storm and the July 1, 1979 event, which is consistent with the City's desire to improve the level of protection.



MACRO GRADING PLAN

FIRST SUBMISSION:		FEB., 2004	GRD2
REVISION No.:	5	JUNE, 2006	

0 50 150 250m

- NEIGHBOURHOOD BOUNDARY
- EUC AREA BOUNDARY
- EXISTING STORM SEWER
- FUTURE STORM SEWER
- FUTURE MELTWATER FORCEMAIN
- STORM DRAINAGE AREA
- 900 STORM SEWER SIZE
- EXISTING SWM POND
- FUTURE SWM POND
- 101 MANHOLE AND NUMBER
- COLLECTOR SEWER FLOW DIRECTION
- LOCAL SEWER FLOW DIRECTION
- FUTURE MELTWATER PUMP STATION
- FUTURE DITCH REGRADING

STORM COLLECTOR SEWERS AND DRAINAGE AREAS

FIRST SUBMISSION:	FEB., 2004	STM 2
REVISION No.: 5	JUNE, 2006	

APPENDIX D
Development Servicing Study Checklist

NOVATECH
Engineers, Planners & Landscape Architects

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Executive Summary (for larger reports only).	NA		
Date and revision number of the report.	Y	Cover	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	Fig 1-2	
Plan showing the site and location of all existing services.	Y	Fig 3	
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Y	1.0	
Summary of Pre-consultation Meetings with City and other approval agencies.	N		
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Y	1.0-7.0	
Statement of objectives and servicing criteria.	Y	3.0-5.0	
Identification of existing and proposed infrastructure available in the immediate area.	Y		Figures 4 to 7
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Y	5.0	
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Y	7.0	Figure 8

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	NA		
Proposed phasing of the development, if applicable.	NA		
Reference to geotechnical studies and recommendations concerning servicing.	Y	2.0	
All preliminary and formal site plan submissions should have the following information:			
Metric scale	Y		
North arrow (including construction North)	Y		
Key plan	Y		
Name and contact information of applicant and property owner	Y		
Property limits including bearings and dimensions	Y		
Existing and proposed structures and parking areas	Y		
Easements, road widening and rights-of-way	Y		
Adjacent street names	Y		

Development Servicing Study Checklist

4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available.	Y	3.0	
Availability of public infrastructure to service proposed development.	Y	3.0	
Identification of system constraints.	Y	3.0	
Identify boundary conditions.	Y	3.0	And Appendix A
Confirmation of adequate domestic supply and pressure.	Y	3.0	
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	3.0	And Appendix A
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y	3.0	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	NA		
Address reliability requirements such as appropriate location of shut-off valves.	Y	3.0	
Check on the necessity of a pressure zone boundary modification.	NA		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	3.0	
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	3.0	
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	NA		
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	3.0	
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Y		Figure 4 and Appendix A

Development Servicing Study Checklist

4.3 Wastewater	Addressed (Y/N/NA)	Section	Comments
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Y	4.0	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	Y	4.0	
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	Y	4.0	
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	4.0	
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Y	4.0	and Appendix B
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Y		Appendix B
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	4.0	Figure 5
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	NA		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	NA		
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	NA		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	NA		
Special considerations such as contamination, corrosive environment etc.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	5	
Analysis of the available capacity in existing public infrastructure.	Y	5	
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y		Figures 5 to 8
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	5	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Y	5	
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	5	
Set-back from private sewage disposal systems.	NA		
Watercourse and hazard lands setbacks.	NA		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	NA		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Y	5	
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	5	Appendix C
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Y	5	
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y		Appendix C
Any proposed diversion of drainage catchment areas from one outlet to another.	NA		
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	5	Appendix C

Development Servicing Study Checklist

If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	Y	5	Appendix C

4.4 Stormwater	**Addressed (Y/N/NA)**	**Section**	**Comments**
Identification of municipal drains and related approval requirements.	Y	5	
Description of how the conveyance and storage capacity will be achieved for the development.	Y	5	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y		Appendix C
Inclusion of hydraulic analysis including HGL elevations.	Y		Appendix C
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	8	
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	NA		
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

4.5 Approval and Permit Requirements	**Addressed (Y/N/NA)**	**Section**	**Comments**
Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	NA		
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	NA		
Changes to Municipal Drains.	NA		
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	NA		

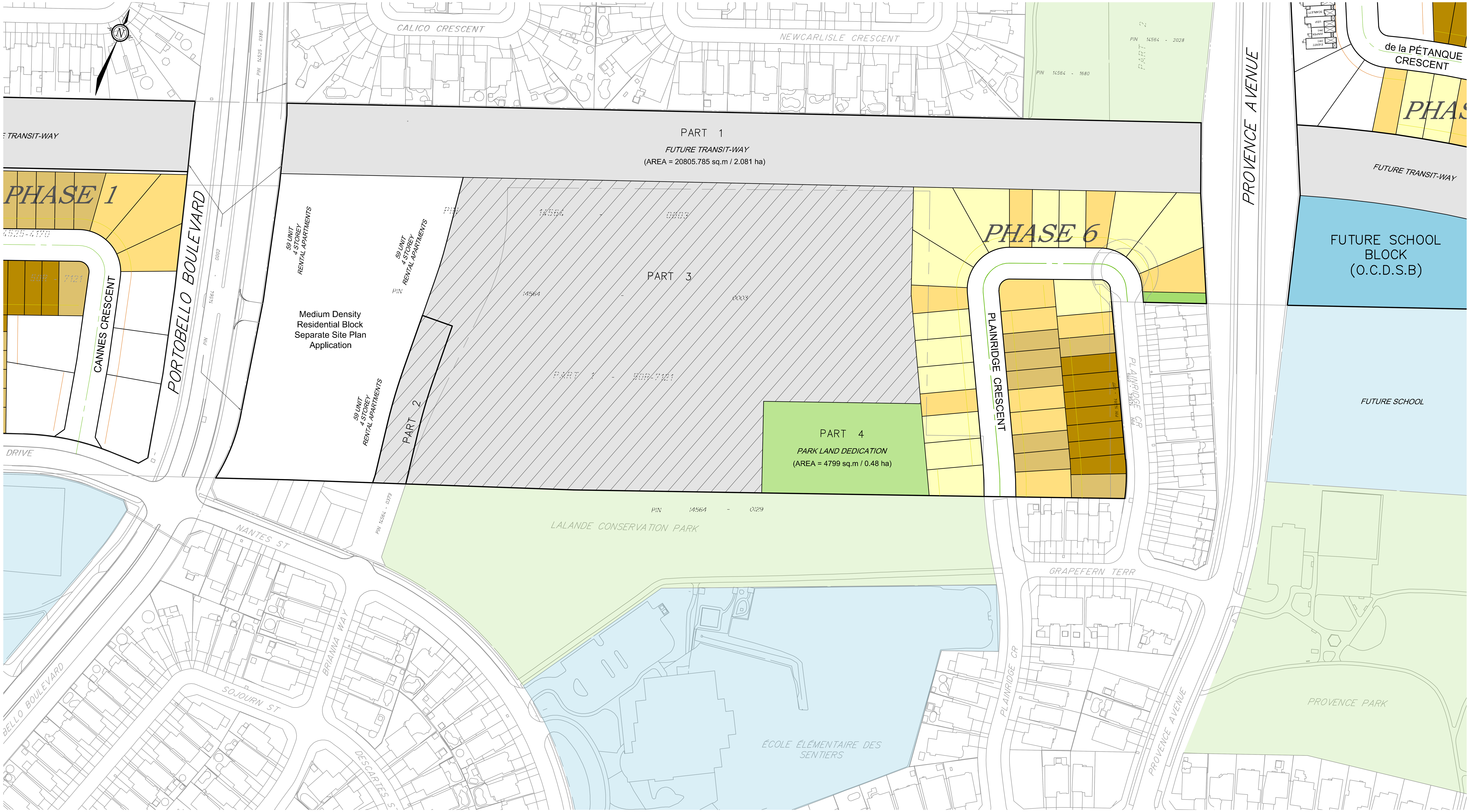
Development Servicing Study Checklist

4.6 Conclusion	Addressed (Y/N/NA)	Section	Comments
Clearly stated conclusions and recommendations.	Y	9.0	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	Y		Separate Comment Response Letters
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	9.0	

APPENDIX E
Plans

Revised
Concept Plan - 117155-CP32, Revision 2, May 2023
Draft Plan of Subdivision – Part of Lot 2, Concession 9, May 2023

Original
Concept Plan - 117155-CP25, Revision 5, May 2023
Draft Plan of Subdivision – Part of Lot 2, Concession 9, September 2020



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.

Phase 6	
Unit Breakdown	
Unit Count	
50' Singles	14
42' Singles	11
35' Singles	7
31' Singles	7
Total	39

LEGEND:
- 31' SINGLES
- 35' SINGLES
- 42' SINGLES
- 50' SINGLES
- PARK / WALKWAY BLOCK
- EXISTING PARK
- FUTURE SCHOOL BLOCK
- EXISTING SCHOOL
- LANDS TRANSFERRED TO CITY
- FUTURE TRANSITWAY

No.	REVISION	DATE	BY
2.	ISSUED WITH REVISED DRAFT PLAN APPLICATION	MAY 31/23	TJM
1.	ISSUED FOR REVIEW	MAY 18/23	TJM

SCALE 1:1000

1:1000 — 0 10 20 30 40

DESIGN MER/WLS
CHECKED MER
DRAWN CAH
CHECKED TJM
APPROVED MER

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY of OTTAWA
PROVENCE ORLEANS SUBDIVISION (2128 TRIM ROAD)

DRAWING NAME
CONCEPT PLAN 32
PHASE 6

PROJECT No. 117155-00
REV REV #2
DRAWING No. 117155-CP32-6

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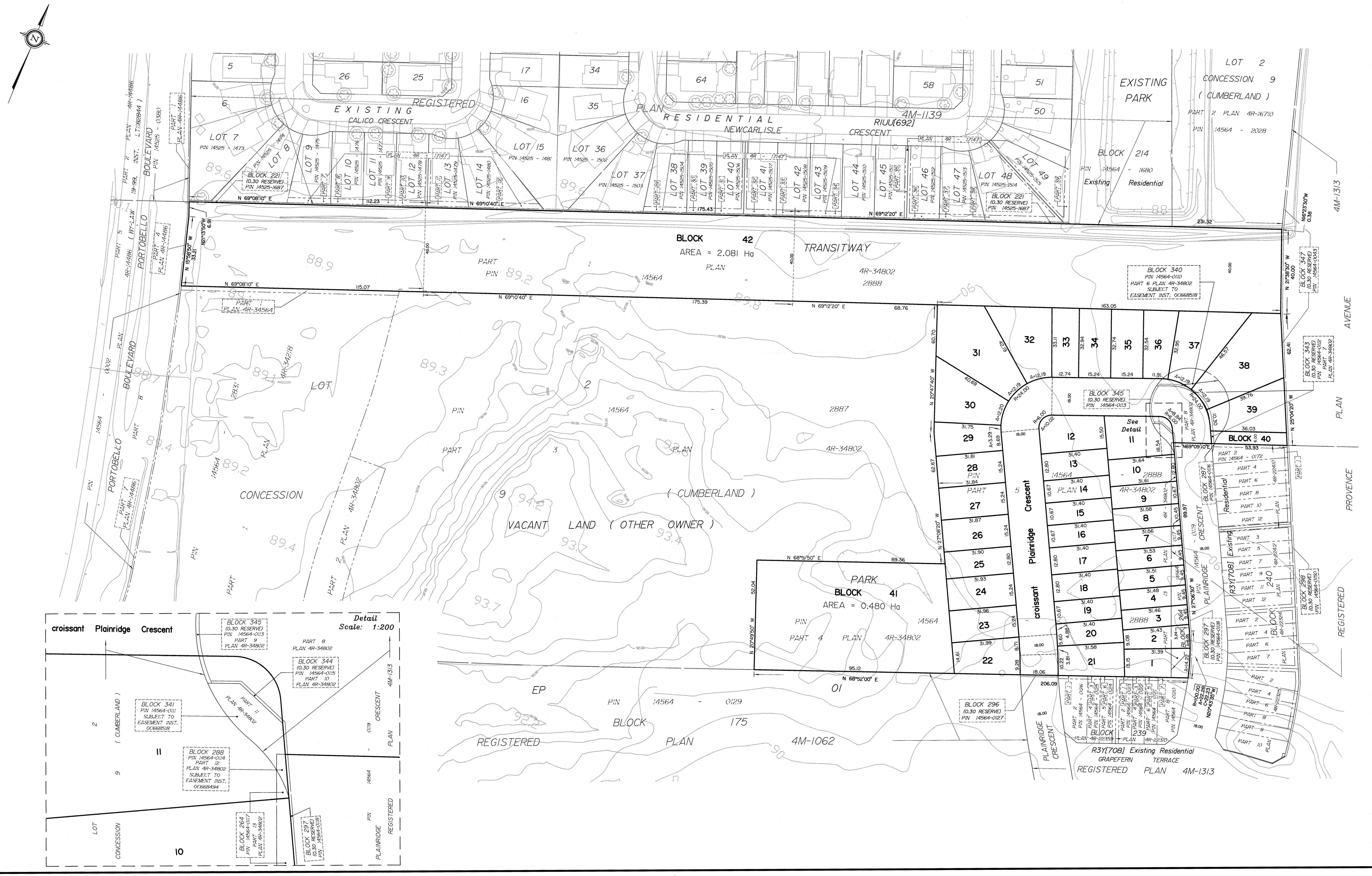


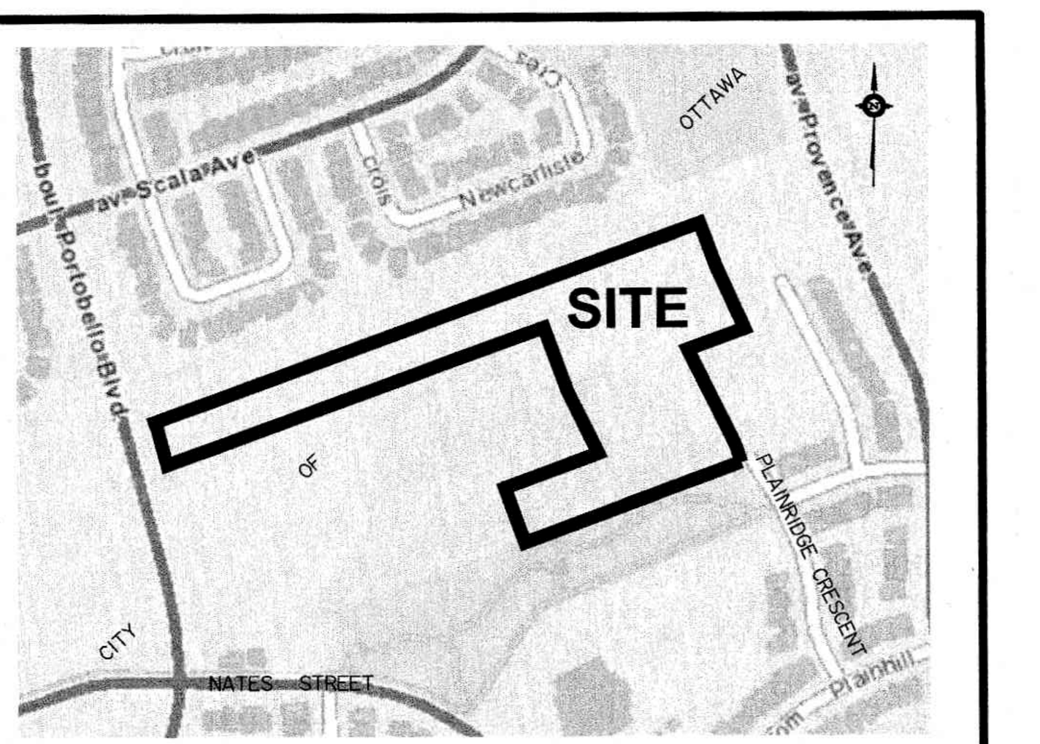
SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

________________________.

THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT.
THIS ____ DAY OF ____________, 20__ .

____

GERALDINE WILDMAN, MCIP, RPP, ACTING MANAGER,
DEVELOPMENT REVIEW-EAST
PLANNING, REAL ESTATE AND ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA



KEY MAP
NOT TO SCALE

DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 2 CONCESSION 9

Geographic Township of Cumberland

and

BLOCKS 264, 288, 340, 341, 343, 344, 345 and PART OF PLAINRIDGE CRESCENT REGISTERED PLAN 4M-1313 CITY OF OTTAWA

Prepared by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 750

30 22.5 15 7.5 0 15 30 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 :
The boundaries of the lands to be subdivided and their relationship to adjoining lands have been accurately and correctly shown.

May 31, 2023
Date

T. Hartwick
ONTARIO LAND SURVEYOR

Owner's Certificate

This is to certify that I am the owner / agent of the lands to be subdivided and that this plan was prepared in accordance with my instructions.

June 1, 2023
Date

Sender Gordon
Provence Orleans Realty Investments Inc.
I have authority to bind the corporation

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT

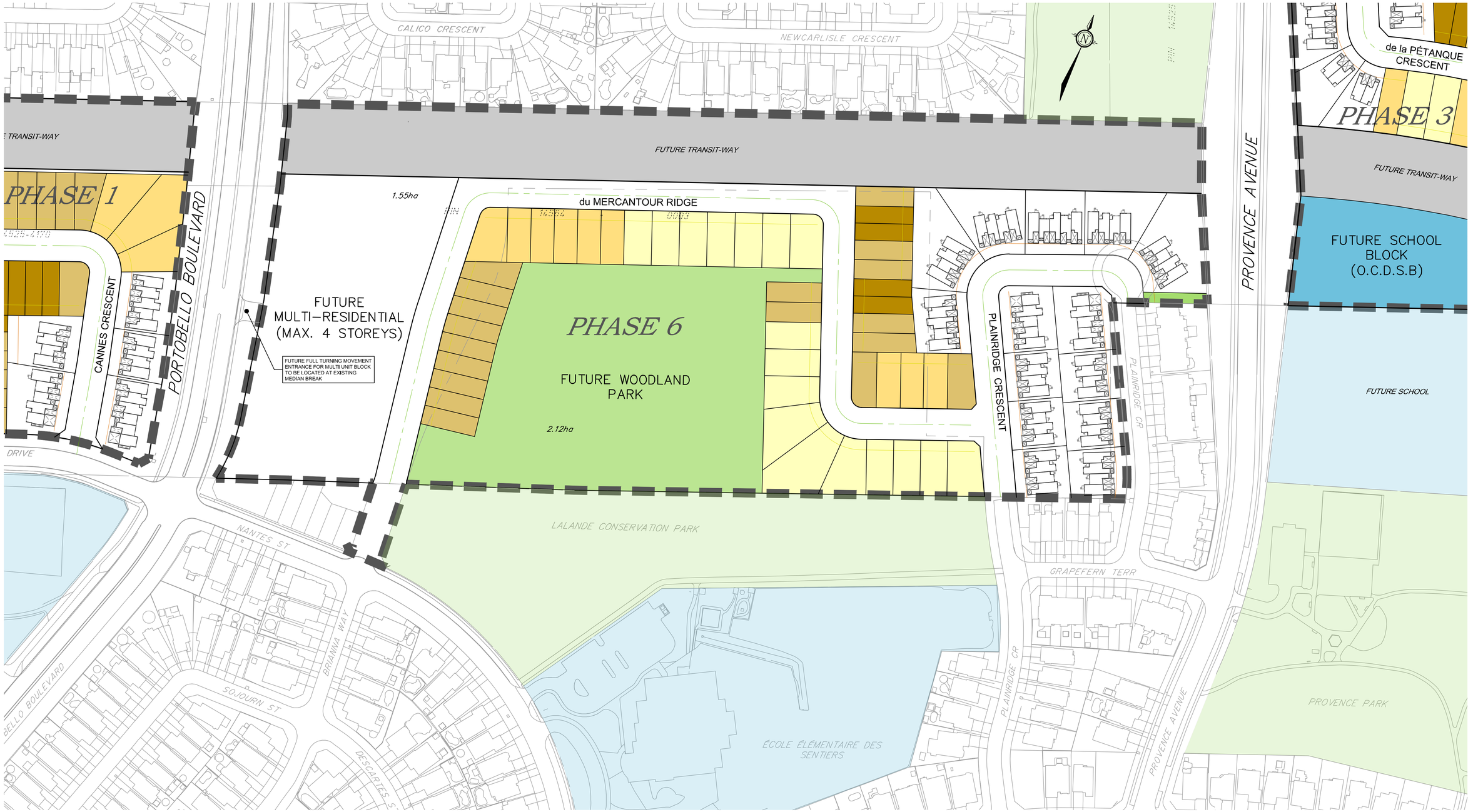
(a) see plan
(b) see plan
(c) see plan
(d) single family residential housing park land and transitway
(e) see plan
(f) see plan
(g) see plan
(h) City of Ottawa
(i) see soils report
(j) see plan
(k) sanitary, storm sewers, municipal water to be available
(l) Lots 36, 37, 38, 39 and Block 40 are subject to easement, Inst. OC668518. Lot 11 is subject to easement, Inst.'s OC668494 and OC668518.

AREA SCHEDULE

LOT\BLOCK	AREA (Ha)
1-39	1.882
40	0.022
41	0.480
42	2.081
Plainridge Crescent	0.402
TOTAL	4.867

Ontario Land Surveyors
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

Job No. 18811-19 Regional Pt Lt 2 C9 CU Ph2 DPS F2 | N



NOTE:
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Unit Breakdown / Phase

Phase #	50' Singles	42' Singles	35' Singles	31' Singles	Street Towns	Multi Unit	Total
Phase 6	17	9	18	4	60	177	285

LEGEND:
- 31' SINGLES
- 35' SINGLES
- 42' SINGLES
- 50' SINGLES
- PARK / WALKWAY BLOCK
- EXISTING PARK
- FUTURE SCHOOL BLOCK
- EXISTING SCHOOL

No.	REVISION	DATE	BY
5.	REVISED MULTI UNIT COUNT	NOV 11/20	TJM
4.	REVISED PHASE 6 TOWNHOUSE LAYOUT	AUG 14/20	CAH
3.	REVISED UNIT COUNT	NOV 08/19	MER
2.	REVISED MULTI UNIT BLOCKS	SEPT 05/19	MER
1.	ISSUED FOR DISCUSSION	APR 17/19	MER

SCALE: 1:1000 (1:1000, 0 10 20 30 40)

DESIGN: MER/WLS
CHECKED: MER
DRAWN: CAH
CHECKED: MER
APPROVED: MER

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY of OTTAWA
PROVENCE ORLEANS SUBDIVISION (2128 TRIM ROAD)

DRAWING NAME
CONCEPT PLAN 25
PHASE 6

PROJECT No. 117155-00
REV REV #5
DRAWING No. 117155-CP25

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PLEASE RECYCLE

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

_____

THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT.
THIS ____ DAY OF _____, 20__.

JEFF MCEWEN, P. ENG. MANAGER,
DEVELOPMENT REVIEW-EAST
PLANNING, INFRASTRUCTURE AND ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

KEY MAP
NOT TO SCALE

DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 2
CONCESSION 9
Geographic Township of Cumberland
And
BLOCKS 264, 288, 340, 341 and 343
REGISTERED PLAN 4M-1313
CITY OF OTTAWA

Prepared by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 750

30 22.5 15 7.5 0 15 30 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 :
The boundaries of the lands to be subdivided and their relationship to adjoining lands have been accurately and correctly shown.

Date — T. Marfleet, ONTARIO LAND SURVEYOR

Owner's Certificate

This is to certify that I am the owner / agent of the lands to be subdivided and that this plan was prepared in accordance with my instructions.

Date — David Kardish
Provence Orleans Realty Investments Inc.
I have authority to bind the corporation

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT

(a) see plan
(b) see plan
(c) see plan
(d) single and multi-family residential housing and park land
(e) see plan
(f) see plan
(g) see plan
(h) City of Ottawa
(i) see soils report
(j) see plan
(k) sanitary, storm sewers, municipal water, bell, hydro, cable and gas to be available
(l) Block 49 is subject to easement, Inst.'s OC563083 and OC668518.
Block 50 is subject to easement, Inst.'s OC563083, OC668494 and OC668518.

NOTES AND LEGEND

BLOCK 264* Denotes Lands to be transferred to developer prior to registration.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
1st 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. 18811-19 Regional Pt Lt 2 Cs CU Pt2 DPS F2 D4

N:\REGIONAL GROUP\LEGAULT LANDS (Nottingham)\18811-19_regional_legault lands_phase 6_tp\Final\18811-19 Regional Pt Lt 2 C9 CU Pt2 DPS F2 D4.dwg, 2020-09-29 7:47:42 AM