# 2370 Tenth Line Road – Site Servicing and Stormwater Management Report

Project #160401710

December 13, 2021

Prepared for:

Mattamy (Decoeur) Ltd.

Prepared by:

Stantec Consulting Ltd.

| Revision | Description | Author | | Quality Check | Independent Review |
|---|---|---|---|---|---|
| 0 | Site Servicing and SWM Report | A. Shobowale<br>D. Wu | Dec 13 2021 | D. Thiffault | K. Smadella |

This document entitled 2370 Tenth Line Road – Site Servicing and Stormwater Management Report was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Mattamy Homes (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____

**Aminat Shobowale, EIT**

Prepared by _____

**Dennis Wu, EIT**

Reviewed by _____

**Dustin Thiffault, P.Eng.**

Approved by _____

(signature)

**Karin Smadella, P.Eng.**

# Table of Contents

## LIST OF TABLES



## LIST OF FIGURES



## LIST OF APPENDICES

# 1.0 INTRODUCTION

Mattamy (Decoeur) Ltd. has commissioned Stantec Consulting Ltd. to prepare the following Servicing and Stormwater Management Report for their development site at 2370 Tenth Line Road located within the Avalon West area of the community of Orleans in the City of Ottawa.

The development site is zoned General Mixed-Use GM [950] and measures 3.69 ha in area. The site is bordered by Brian Coburn Boulevard East to the north, Decoeur Drive to the south, Tenth Line Road to the east and a residential subdivision and an elementary school to the west. The site location is outlined in **Figure 1.1**.

The proposed mixed-use development consists of 4 mixed-use blocks, 12 blocks of stacked townhomes, associated private streets, parking areas and amenity space. The objective of this report is to provide a servicing scenario for the site that is free of conflicts, provides on-site servicing in accordance with City of Ottawa design guidelines, and utilizes the existing local infrastructure in accordance with the various background studies, specifically the East Urban Community (Neighborhood 5), Avalon West – Stage 3 Site Servicing and Stormwater Management Report, prepared by Atrel Engineering, November 2014, as outlined in **Section 2.0**.

**Figure 1.1: Site Location**

# 2.0 REFERENCES

The following documents were referenced in the preparation of this report:


- East Urban Community (Neighborhood 5) Avalon West- Stage 3 Site Servicing and Stormwater Management Report, Atrel Engineering Ltd., November 2014 (Revision 7)
- Geotechnical Investigation – Proposed Mixed-Use Development – Tenth Line Road and Decoeur Drive, Ottawa Ontario. Paterson Group Inc., August 20, 2021
- City of Ottawa Design Guidelines – Water Distribution, Infrastructure Services Department, City of Ottawa, First Edition, July 2010, and all subsequent Technical Bulletins
- City of Ottawa Sewer Design Guidelines, 2nd Ed., City of Ottawa, October 2012, and all subsequent Technical Bulletins


# 3.0 POTABLE WATER

## 3.1 BACKGROUND

The site at 2370 Tenth Line Road is within the City of Ottawa's 2E pressure zone regulated by the Innes Road Elevated Tank. 300mm diameter municipal watermains run along the frontage of the site within Brian Coburn Boulevard and Decoeur Drive. A 200 mm municipal watermain is located within Tenth Line Road along the site frontage. The surrounding water distribution system provides opportunity for looping through the site, sufficient fire flow and pressure.

## 3.2 PROPOSED WATERMAIN SIZING AND LAYOUT

The proposed development will consist of 144 stacked townhome units, 96 apartments and 3170m$^2$ of commercial space contained within 12 stacked townhome blocks and 4 mixed use blocks, with associated infrastructure, access roadways and parking. The site will be serviced by a looped private water distribution network of 200mm and 250mm mains fed by connections to the existing 300mm municipal watermains within Brian Coburn Boulevard and Decoeur Drive. A district metering chamber will be installed over the property line valve water at the Decoeur Drive connection in accordance with the Water Distribution Guidelines to facilitate leak detection within the private site by the City of Ottawa (see **Drawing SSP-1)**.

The stacked townhome blocks will be provided with water service connections to each unit. The mixed-use buildings will be provided with an individual service. Each service will be individually metered.

### 3.2.1 Water Demands

Water demands for the proposed site were estimated using the City of Ottawa Design Guidelines – Water Distribution (2010). A daily rate of 280L/cap/day has been applied for the population of the proposed site. Population densities have been assumed as 2.7 persons per townhome unit, 1.4 to 3.1 persons per apartment unit, depending on the number of bedrooms, and a commercial demand of 28,000 L/ha/day. See **Appendix A.2** for detailed domestic water demand estimates.

The average day demand (AVDY) for the proposed site was determined to be 1.99 L/s. The maximum daily demand (MXDY) is 2.5 times the AVDY for residential uses and 1.5 times AVDY for commercial uses, which results in a MXDY demand of 4.98 L/s for the development. The peak hour demand (PKHR) is 2.2 times the MXDY for residential areas and 1.8 times AVDY for commercial uses, resulting in a PKHR demand of 10.95 L/s for the development.

### 3.2.2 Fire Flow Requirements

Three scenarios (ordinary, wood frame and wood frame with fire walls) construction were considered in the assessment for fire flow requirements according to the FUS Guidelines. The FUS Guidelines indicate that low hazard occupancies include apartments, dwellings, dormitories, hotels, and schools, and as such, a low hazard occupancy / limited combustible building contents credit was applied. Based on calculations per the FUS Guidelines (**Appendix A.3**), the worst case required fire flows for this site occur at Block A with a required fire flows of 16,000 L/min (266.7 L/s).

### 3.2.3 Boundary Conditions

Boundary conditions were provided for the site development by the City of Ottawa. These are included in **Appendix A.1** and summarized in

**Table 3.1: Hydraulic Analysis Existing Boundary Conditions**

| Connection | Maximum HGL (m) | Peak Hour HGL (m) | Max. Day plus Fire HGL (m) 267 L/s (16,000 L/min) | Ground Elevation (m) |
|---|---|---|---|---|
| Brian Coburn Boulevard (Connection #1) | 130.3 | 125.9 | 124.1 | 88.3 |
| Decoeur Drive (Connection #2) | 130.3 | 125.8 | 124.1 | 87.4 |

## 3.3 HYDRAULIC ASSESSMENT

### Level of Service

The City of Ottawa Water Distribution Design Guidelines state that the desired range of system pressures under normal demand conditions (i.e. basic day, maximum day and peak hour) should be in the range of 350 to 480 kPa (50 to 70 psi) and no less than 275 kPa (40 psi) at the ground elevation on the streets (i.e. at hydrant level). The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way is 552 kPa (80 psi). As per the Ontario Building Code (OBC) & Guide for Plumbing, if pressures greater than 552 kPa (80 psi) are anticipated, pressure relief measures are required. The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi). Under emergency fire flow conditions, the minimum pressure objective in the distribution system is 138 kPa (20 psi).

### Model Development

The proposed watermains within the 2370 Tenth Line Road Development were modeled in a H2OMAP hydraulic model to simulate the proposed distribution system. Hazen-Williams coefficients (“C-Factors”) were applied to the new watermain in accordance with the City of Ottawa’s Water Distribution Design Guidelines (**2**).

**Table 3.2: Proposed Watermain C-Factors**

| Pipe Diameter (mm) | C-Factor |
|---|---|
| 150 | 100 |
| 200 to 250 | 110 |
| 300 to 600 | 120 |
| > 600 | 130 |

## 3.4 HYDRAULIC MODEL RESULTS

The H2OMAP model results for the proposed site plan development can be found in **Appendix A.4**.

The results from the analysis show that the maximum pressure modeled is approximately 60.44 psi (417 kPa) and the minimum pressure during the peak hour scenario was approximately 59.50 psi (410 kPa) within the proposed 2370 Tenth Line Road development as shown in  and  respectively. These pressures are within the serviceable limit of 50 to 80 psi (345 to 552 kPa) and therefore there will be requirement for pressure reducing valves.

**Figure 3.1: AVDY Pressure Results (psi)**

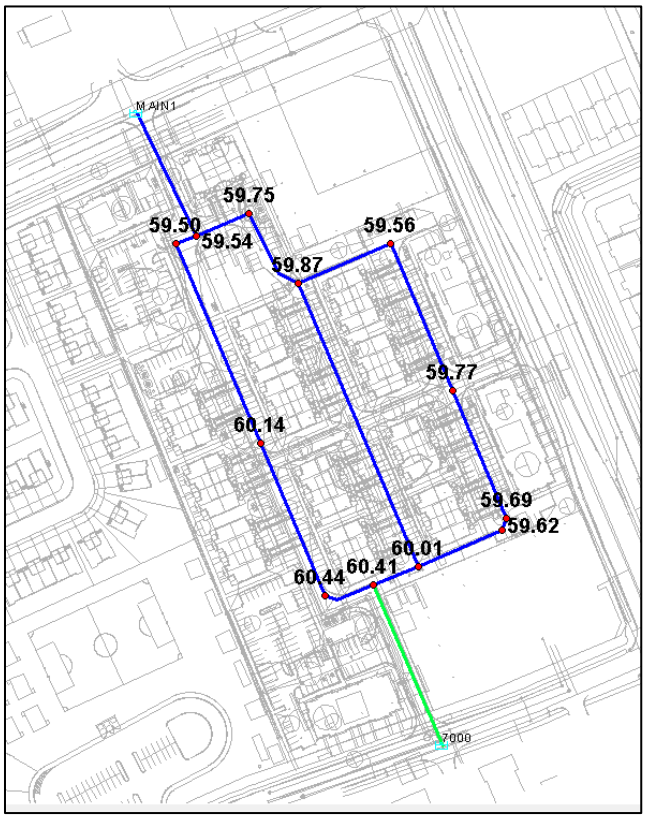
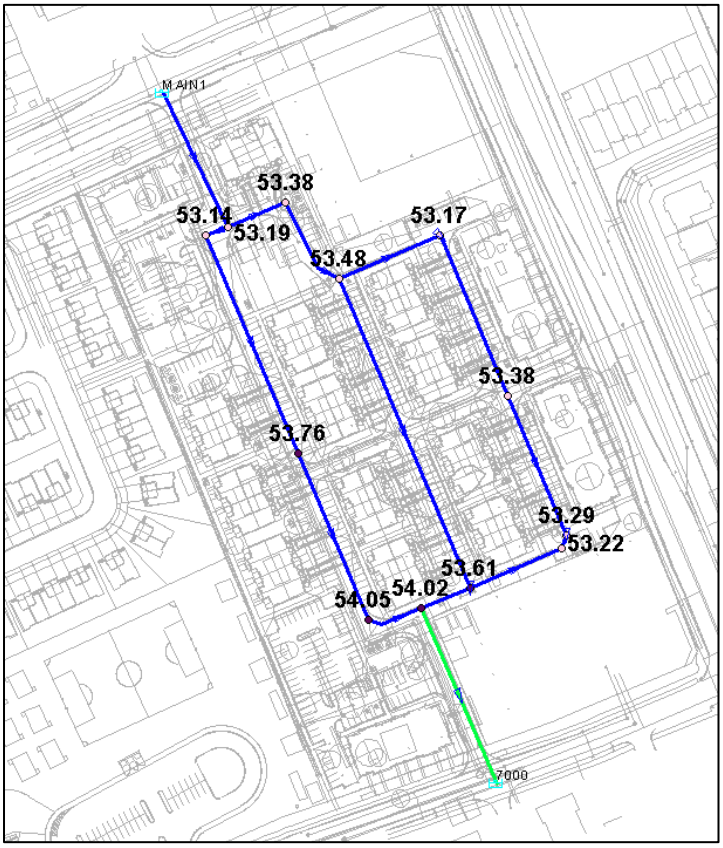


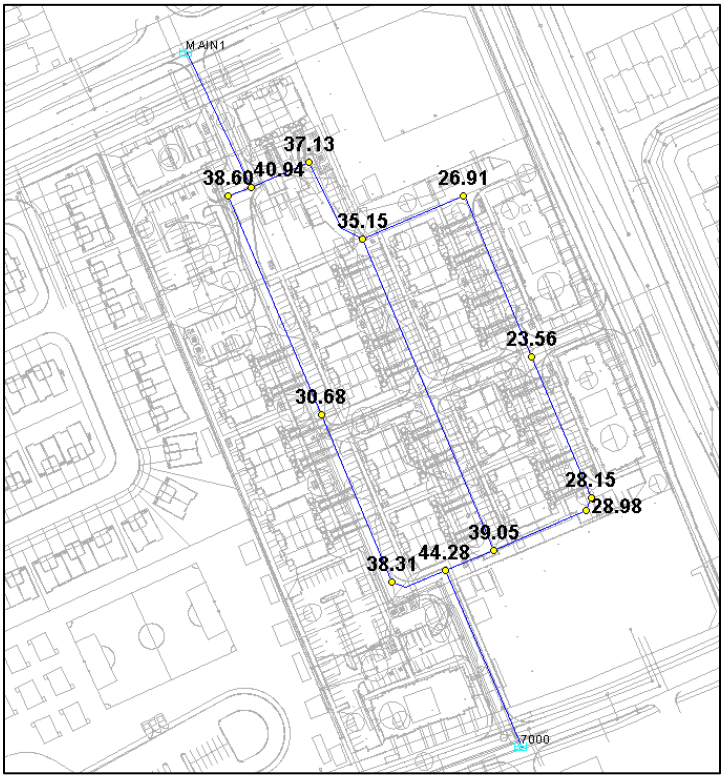
**Figure 3.2: PKHR Pressure Results (psi)**




The hydraulic model was also used to assess the fire flow conditions of the proposed site. The modeling was carried out to determine the anticipated amount of flow that could be provided under maximum day demands and a fire flow requirement of 266.7 L/s for Block A (Mixed use block if 28 residential units and commercial area of 915.11m$^2$) represented by node 10 in the hydraulic analysis results. Boundary condition parameters for the 2370 Tenth Line Road model assumed a maximum day plus fire flow based on a fire flow demand of 266.7 L/s.

Results of the fire flow analysis indicate that flows in excess of 16,000 L/min (266.7 L/s) can be delivered for the units that require less while still maintaining a residual pressure of 140 kPa (20 psi).

**Figure 3.3: Fire Flow Results – Residual Pressure (psi)**




## 3.5 SUMMARY OF FINDINGS

Based on the findings of the report, available pressure within the distribution systems meets maximum pressure guidelines as per City of Ottawa standards under typical demand conditions (peak hour and average day conditions).

The results indicate that sufficient fire flows are available within the proposed watermain network under emergency fire demand conditions (maximum day + fire flow) while meeting the minimum pressure requirements as per City of Ottawa standards.

# 4.0 WASTEWATER SERVICING

## 4.1 BACKGROUND

Municipal sanitary sewers run along the boundaries of the site within Brian Coburn Boulevard, Tenth Line Road and Decoeur Drive. The development site at 2370 Tenth Line Road will be serviced with a connection to the 250mm sanitary sewer within Decoeur Drive as per the Avalon West – Stage 3 Site Servicing and Stormwater Management Report, prepared by Atrel Engineering, November 2014. The Avalon West – Stage 3 sanitary collection system is directed to the Tenth Line Road Pumping Station at 2428 Tenth Line Road.

## 4.2 DESIGN CRITERIA

As outlined in the City's Sewer Design Guidelines, the following design parameters were used to calculate estimated wastewater flow rates and to size on-site sanitary sewers for the proposed phase of the development:

- Minimum Full Flow Velocity – 0.6 m/s
- Maximum Full Flow Velocity – 3.0 m/s
- Manning's roughness coefficient for all smooth walled pipes – 0.013
- Population Persons per unit – 1.4 to 3.1
- Extraneous Flow Allowance – 0.33 L/s/ha
- Residential Average Flows – 280 L/cap/day
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m

## 4.3 PROPOSED SERVICING

The proposed development at 2370 Tenth Line Road will consist of 144 stacked townhome units, 96 apartments and 3170 m2 of commercial space contained within 12 stacked townhome blocks and 4 mixed use blocks. The proposed development is consistent with the approved zoning for the site. As shown on **Drawing SA-1**, the development will be serviced by a network of 200mm and 250mm diameter sanitary sewers discharging to the existing 250mm sanitary sewer within Decoeur Drive.

Peak design flow from the site is calculated to be 7.6 L/s. The sanitary design sheet has been included in **Appendix B.1.**

The Avalon West-Stage 3 servicing report assumed that the land that encompasses 2322 Tenth Line Road, 2370 Tenth Line Road and 885 Decoeur Drive would be developed with a commercial use. The peak sanitary design flow assigned to the commercial block was 5.5L/s as per the sanitary design sheet and sanitary drainage area plan included in **Appendix B.2**. Although the design flows for the proposed mixed-use development on 2370 Tenth Line Road will be slightly higher than assumed in the Avalon West–Stage 3 report, the difference is considered negligible given that the City of Ottawa design criteria

for sanitary flows applied to the entire drainage area in design Stage 3 report were considerably more conservative than the current City design criteria.

Full port backwater valves are to be installed on all sanitary services within the site to prevent any surcharge from the downstream sewer main from impacting the proposed property.

# 5.0 STORMWATER MANAGEMENT

## 5.1 OBJECTIVES

The goal of this servicing and stormwater management (SWM) plan is to determine the measures necessary to control the quantity and quality of stormwater released from the proposed development to meet the criteria established during the consultation process with City of Ottawa, and to provide sufficient details required for approval and construction.

## 5.2 EXISTING CONDITIONS AND SWM CRITERIA

The development site at 2370 Tenth Line Road is 3.69 ha in area and is currently vacant. The site is bounded by municipal roadways on the north, south and east sides. The western limit of the development is bounded by a residential subdivision and school. Stormwater generated on the site is subject to the requirements outlined in the Avalon West – Stage 3 Site Servicing and Stormwater Management Report, prepared by Atrel Engineering, November 2014 and design criteria provided by the City of Ottawa as part of the pre-application consultation June 2021. Design criteria are summarized below:

i. Post-development peak flows up to 100-year event are to be controlled to a release rate of 220 L/s/ha. Excess stormwater is to be detained on-site.
ii. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
iii. Emergency major overland flows are to be directed to the adjacent municipal ROWs.
iv. Time of concentration (Tc) are for pre-development, with a maximum of 10 min

Other criteria considered in the SWM design are described in Section 5 of the Ottawa Sewer Design Guidelines (October 2012) including all subsequent technical bulletins.

The post-development peak flows up to the 100-year storm event must be controlled to **811.8 L/s**, given the allowable release rate of 220 L/s/ha, and the total site area of 3.69 ha.

## 5.3 STORMWATER MANAGEMENT DESIGN

As specified in the Avalon West- Stage 3 report, minor system flows from the site are to be directed to Decoeur Drive. Excerpts form the Atrel report are include in **Appendix C.3**. The proposed 3.69 ha development area will be serviced by a new storm sewer connection to the existing 1200mm diameter concrete storm sewer flowing east to west on Decoeur Drive, as shown on **Drawing SD-1** in **Appendix E**.

Catch basins for the parking areas, all of which are tributary to the private stormwater collection system, will be equipped with inlet control devices (ICDs) to provide surface storage. Rooftop storage is provided

for all four mixed-use buildings. The private stormwater system collects flows in a main branch underneath the westernmost parking areas and ultimately outlet to the existing 1200 mm diameter concrete storm sewer on Decoeur Drive (see **Drawing SD-1** in **Appendix E)**.

The site will have five uncontrolled areas that will sheet drain to Brian Coburn Boulevard to the north, Tenth Line Road to the east, and Decoeur Drive to the south. The proposed site plan, drainage areas and proposed storm sewer infrastructure are shown on **Drawing SD-1 and SSP-1.**

### 5.3.1 Water Quantity Control

The Modified Rational Method (MRM) was used to assess the flow rate and volume of runoff generated under pre-development conditions. The site was subdivided into sub-catchments tributary to separate quantity control measures and subject to different inlet controls. **Drawing SD-1** delineates the appropriate sub-catchment areas. The MRM spreadsheet is included in **Appendix C.1.**

The following assumptions were made in the creation of the storm drainage plan and accompanying MRM spreadsheet:

1) Rooftop storage is available on all four roof catchment areas over the mixed-use buildings.
2) On-site stormwater runoff will be collected using a combination of landscape inlets and catch-basins with ICDs, flows in excess of the allowable release rate with be detained in surface storage areas.
3) Five areas along the northern, eastern, and southern perimeters of the site will respectively sheet drain uncontrolled to Brian Coburn Boulevard, Tenth Line Road, and Decoeur Drive.
4) All captured tributary flows on site will be directed to the 1200 mm diameter concrete storm sewer on Decoeur Drive.

#### 5.3.1.1 Rooftop Storage

Rooftop storage is proposed on each of the four mixed-use buildings on the site (see **Drawing SD-1**).

Rooftop storage will be achieved by installing restricted flow roof drains. The following calculations assume the roof will be equipped with standard Watts Model R1100 Accuflow Roof Drains or approved equivalent, see **Appendix C** for Modified Rational Method design sheet.

Watts Drainage “Accutrol” roof drain weir data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the “Accutrol” weir has been used as an example only, and that other products may be specified for use, provided that the total roof drain release rate is restricted to match the maximum rate of release indicated in **Table 5.1**, and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater.

**Table 5.1: Roof Control Area**

| ROOF ID | Accutrol Weir setting | # of Drains | 5-yr Release Rate (L/s) | 100 yr Ponding Depth (m) | 100 yr Release (L/s) | 100 yr Storage Required (cu.m) | Storage Provided (cu.m) |
|---|---|---|---|---|---|---|---|
| R101A | 25% open | 4 | 3.29 | 0.15 | 3.77 | 31.4 | 32.0 |
| R105A | 25% open | 4 | 3.27 | 0.15 | 3.74 | 26.1 | 28.0 |
| R113A | 25% open | 5 | 4.12 | 0.15 | 4.71 | 39.2 | 40.0 |
| R115A | 25% open | 5 | 4.12 | 0.15 | 4.71 | 39.2 | 40.0 |

### 5.3.1.2 Parking Lots

The private parking lots on the development are each equipped with proposed catchbasins with inlet control devices (ICD) to restrict minor system peak flows to 220 L/s/ha in the 100-year storm event. Ponding depths of up to 0.30 m provide surface storage during the 100-year storm event. It is demonstrated in **Appendix C.1** that no ponding is anticipated in a 2-year event. **Table 5.2** below shows the characteristics of the proposed ICDs (see **Appendix C.1** for detailed calculations).

**Table 5.2: Schedule of Inlet Control Devices at Controlled Tributary Areas**

| Catch Basin ID | Tributary Area ID | ICD Type | 5 yr Head (m) | 100 yr Head (m) | 5 yr Release (L/s) | 100 yr Release (L/s) |
|---|---|---|---|---|---|---|
| CB L105A | L105A | 108mm HF Orifice | 1.52 | 1.82 | 28.62 | 31.31 |
| CB L105B | L105B | 83mm HF Orifice | 1.38 | 1.51 | 6.71 | 7.02 |
| CB L105C | L105C | Vortex LMF 90 | 1.38 | 1.68 | 8.44 | 9.31 |
| CB L105D | L105D | 178mm HF Orifice | 1.38 | 1.68 | 74.07 | 81.72 |
| CB L105E | L105E | N/A | 1.38 | 1.38 | 3.65 | 7.82 |
| CB L104A | L104A | 178mm HF Orifice | 1.38 | 1.68 | 74.07 | 81.72 |
| CB L107A | L107A | 108mm HF Orifice | 1.38 | 1.63 | 27.27 | 29.63 |
| CB L108A | L108A | N/A | 1.38 | 1.38 | 8.23 | 17.62 |
| CB L109A | L109A | 83mm HF Orifice | 1.38 | 1.68 | 16.10 | 17.77 |
| CB L110A | L110A | Vortex LMF 70 | 1.38 | 1.47 | 5.06 | 5.22 |
| CB L110B | L110B | 152mm HF Orifice | 1.36 | 1.51 | 53.62 | 56.50 |
| CB L110C | L110C | 152mm HF Orifice | 1.38 | 1.54 | 54.01 | 57.05 |
| CB L111A | L111A | 127mm HF Orifice | 1.37 | 1.58 | 37.57 | 40.34 |
| CB L111B | L111B | 108mm HF Orifice | 1.37 | 1.58 | 27.17 | 29.18 |
| CB L112A | L112A | 83mm HF Orifice | 1.38 | 1.68 | 16.10 | 17.77 |

| | | | | | | |
|---|---|---|---|---|---|---|
| CB L113A | L113A | 127mm HF Orifice | 1.38 | 1.64 | 37.70 | 41.10 |
| CB L113B | L113B | 108mm HF Orifice | 1.36 | 1.53 | 27.07 | 28.71 |
| CB L114A | L114A | 102mm HF Orifice | 1.38 | 1.59 | 24.32 | 26.11 |
| CB L114B | L114B | 127mm HF Orifice | 1.38 | 1.59 | 37.70 | 40.47 |
| CB L115A | L115A | N/A | 1.38 | 1.38 | 1.97 | 4.22 |
| CB L116A | L116A | 95mm HF Orifice | 1.38 | 1.63 | 21.10 | 22.93 |
| CB L116B | L116B | 95mm HF Orifice | 1.38 | 1.68 | 21.10 | 23.28 |
| CB L116C | L116C | 152mm HF Orifice | 1.38 | 1.68 | 54.01 | 59.59 |
| CB L116D | L116D | | 1.38 | 1.38 | | |

Notably, flows from catch basins L116C and L116D would be controlled with a single 152mm HF Orifice at the STM116 manhole, as demonstrated by **Drawings SD-1** and **SSP-1** in **Appendix F**.

Given variable release rates by Vortex LMF ICDs, the 5-year storage and flow values are represented by the maximum permissible release rates/storage volumes as a conservative calculation.

### 5.3.1.3 Uncontrolled Areas

Five uncontrolled areas cannot be graded to enter the site storm sewer system and as such, they will sheet drain to Brian Coburn Boulevard to the north, Tenth Line Road to the east, and Decoeur Drive to the south as per existing conditions (see **Drawing EX-1** and **Drawing SD-1**).

**Table 5.3 Peak Uncontrolled 5- and 100- Year run-off**

| Area IDs | Area (ha) | Runoff 'C' (5- Year) | 5 Year uncontrolled peak flow (L/s) | Runoff 'C' (100 -Year) | 100 Year uncontrolled peak flow (L/s) |
|---|---|---|---|---|---|
| UNC-1 | 0.06 | 0.63 | 10.95 | 0.79 | 23.45 |
| UNC-2 | 0.02 | 0.34 | 1.97 | 0.43 | 4.22 |
| UNC-3 | 0.04 | 0.46 | 5.33 | 0.58 | 11.42 |
| UNC-4 | 0.04 | 0.31 | 3.59 | 0.39 | 7.69 |
| UNC-5 | 0.05 | 0.30 | 4.34 | 0.38 | 9.31 |

### 5.3.2 Results

**Tables 5-4 and 5-5** demonstrate that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflow for the site.

**Table 5.4: Post-Development Discharge (5-Year)**

| Area Type | $Q_{release}$ (L/s) | Target (L/s) |
|---|---|---|
| Rooftop Storage | 14.8 | **811.8** |
| Controlled Tributary | 620.4 | |
| Uncontrolled (UNC-1) | 26.2 | |
| **Total** | **661.4** | |

**Table 5.5: Post-Development Discharge (100-Year)**

| Area Type | $Q_{release}$ (L/s) | Target (L/s) |
|---|---|---|
| Rooftop Storage | 16.9 | **811.8** |
| Controlled Tributary | 736.4 | |
| Uncontrolled (UNC-1) | 56.1 | |
| **Total** | **809.4** | |

### 5.3.3 Water Quality Control

The 2370 Tenth Line Road development site falls within the Eastern Trunk watershed, which conveys its runoff to the Neighbourhood 5 Stormwater Management Pond. The pond will provide enhanced water quality control (80% TSS removal) for the upstream development and further attenuate stormwater flows prior to discharge to McKinnon's Creek.

Relevant excepts from the Avalon West- Stage 3 Site Servicing and Stormwater Management Report, are included in **Appendix C.3**.

# 6.0 GRADING

The development site measures 3.69 ha in area. The existing topography is relatively flat with no significant grade change across the site. The objective of the grading design strategy is to satisfy the stormwater management requirements, adhere to permissible grade raise restrictions (see Section 10.0), and provide for minimum cover requirements for sewers. The grading plan has been provided for reference in **Appendix E**.

The grading design meets City of Ottawa guidelines for minimum and maximum slopes, meets the requirements of the private approach bylaw, provides sags for stormwater storage to meet allowable runoff criteria and provides an emergency overland flow outlet to Decoeur Drive **(see Drawing GP-1)**.

# 7.0 UTILITIES

As the subject site lies within residential development community, Hydro One, Bell, Enbridge Gas and Rogers servicing for the proposed site is expected to be readily available within the surrounding municipal roadways. The exact size, location and routing of electrical, gas and telecommunication utilities will be finalized following the site plan servicing design circulation.

# 8.0 APPROVALS

An Ontario Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA), under the Ontario Water Resources Act is expected to be required for proposed site given that multiple properties are serviced by the storm collection system within the shared access on Decoeur Drive.

An MECP Permit to Take Water (PTTW) or reporting on the Environmental Activity and Sector Registry (EASR) may be required for the site as some of the proposed works may be below the groundwater elevation shown in the geotechnical report. The geotechnical consultant shall determine whether a PTTW or EASR reporting is required prior to construction.

# 9.0 EROSION CONTROL

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).

1. Limit extent of exposed soils at any given time.
2. Re-vegetate exposed areas as soon as possible.
3. Minimize the area to be cleared and grubbed.
4. Protect exposed slopes with plastic or synthetic mulches.
5. Provide sediment traps and basins during dewatering.
6. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
7. Plan construction at proper time to avoid flooding.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

1. Verification that water is not flowing under silt barriers.
2. Clean and change silt traps at catch basins.

Refer to Erosion and Sediment Control Plan included in **Appendix E** for the proposed location of silt fences, cutoff swales, temporary sediment basins and other erosion control structures.

# 10.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation for the proposed development was completed by Paterson Group Inc. on August 20, 2021. The field testing consisted of advancing a total of four (4) test holes to a maximum depth of 6.6 m below existing ground surface across the site in addition to the previous investigation completed in 2005 with a borehole advancement to 20m below existing grade. For details which are not summarized below, please see the original Paterson report included in **Appendix D**.

The subject site is bare agricultural land with approximate geodetic elevation of 87.5 to 88.5m. The subsurface profile encountered at the test hole consists of topsoil/fill which is underlain by silty clay. The silty clay was encountered below the topsoil/fill across all test locations and it consisted of weathered silty clay crust followed by firm grey silty clay which was tested, and the values show stiff to very stiff consistency within both profiles. It is shown that the bedrock based on geological mapping of the subject area consists of interbedded limestone and shale of the Lindsay formation, within an overburden drift thickness of 25 to 50m depth.

Based on field observation (color and consistency of recovered soil samples) over the current investigation on August 11, 2021, the long-term groundwater table is expected to be at depths of 2m to 3m below ground surface although subject to seasonal fluctuations and may vary at time of construction.

Based on the observed soil conditions, a grade raise restriction of between 1.4m and 2.0m above existing grade was recommended for housing / roadways. Areas where grades are expected to exceed the maximum permissible grade raise will be subject to either a pre-loading/surcharge program, or lightweight fill and/or other approved means outside of proposed rights-of-way to reduce the risks of unacceptable long-term post construction differential settlements.

According to the geotechnical investigation, the site is considered satisfactory for the proposed development from a geotechnical perspective. It is recommended that the foundation be conventional style shallow foundation placed on an undisturbed, very stiff to stiff brown silty clay, firm grey silty clay or engineered fill placed over one of the above noted bearing surfaces.

It is advised that due to the presence of sensitive silty clay layer, the proposed development will be subject to grade raise restrictions but if a higher permissible grade raise is required, preloading with or without surcharge, lightweight fill and/or other measures should be investigated to minimize risks of unacceptable long-term post construction and differential settlements.

# 11.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding information, the following conclusions are summarized below:

## 11.1 POTABLE WATER ANALYSIS

The existing water distribution has sufficient flow and pressure to service the development. Also, pressure across the distribution system meets the pressure range as per City of Ottawa standards under typical demand conditions (peak hour and average day conditions).

The results also indicate that sufficient fire flows are available within the proposed watermain network under emergency fire demand conditions (maximum day + fire flow) while meeting the minimum pressure requirements as per City of Ottawa standards.

## 11.2 WASTEWATER SERVICING

2370 Tenth Line will be serviced by a network of gravity sewers which will direct wastewater flows to the Decoeur Drive. Although peak design flows are higher than assumed flows of sanitary section of the Avalon Stage 3 design report, the increase in flow from the site from the assumptions made as part of the subdivision design are considered negligible. The receiving sewer system has sufficient capacity to receive the design flows. Design guidelines for slope and velocity have been met within the proposed sewers.

## 11.3 STORMWATER MANAGEMENT

The Modified Rational Method was used to estimate stormwater storage and release from the site. Rooftop storage is available on all four roof catchment areas, and on-site stormwater runoff will be collected using a combination of catch-basins and ICDs, with excess detained as surface storage in the private parking areas. Five areas along the northern, eastern, and southern perimeters of the site will respectively sheet drain uncontrolled to Brian Coburn Boulevard, Tenth Line Road, and Decoeur Drive. All captured tributary flows on site will be directed to the 1200 mm diameter concrete storm sewer flowing east to west on Decoeur Drive. Both the minor system target and major system peak outflow target have been met with the proposed design.

## 11.4 GRADING

A grading plan has been prepared taking into account required overland flow conveyance, cover over sewers, hydraulic grade line requirements, and grade raise restrictions as identified in the geotechnical investigation.

## 11.5 UTILITIES

Utility infrastructure exists in the general area of the subject site. Exact size, location and routing of utilities will be finalized at the detailed design stage.