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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

MATTAMY HOMES
WATERIDGE VILLAGE – BLOCK 22
1400 HEMLOCK ROAD

CITY OF OTTAWA
FILE #: D07-12-20-0066

PROJECT NO.: 17-948

DECEMBER 2020 – REV 7

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
WATERIDGE VILLAGE – BLOCK 22
1400 HEMLOCK ROAD

MATTAMY HOMES

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Hemlock Road (STA. 1+960 to STA. 2+300), Drawing No. 130, Project No. 38298, prepared by IBI Group, dated August 2, 2017.

Hemlock Road (STA. 2-300 to Wanaki Road), Drawing No. 131, Project No. 38298, prepared by IBI Group, dated August 2, 2017.

Michael Stoqua Street (Mikinak Road to Hemlock Road), Drawing No. 133, Project No. 38298, prepared by IBI Group, dated June 15, 2018.

Squadron Crescent Moses Tennisco Street (STA. 0+400 to STA. 0+700), Drawing No. 135, Project No. 38298, prepared by IBI Group, dated June 15, 2018.

Moses Tennisco Street (STA. 0+700 to STA. 0+780), Drawing No. 136, Project No. 38298, prepared by IBI Group, dated August 2, 2017.

Grading Plan, Drawing No. 210, Project No. 38298, prepared by IBI Group, dated February 2, 2018.

Ponding Plan, Drawing No. 751, Project No. 38298, prepared by IBI Group, dated June 16, 2017.

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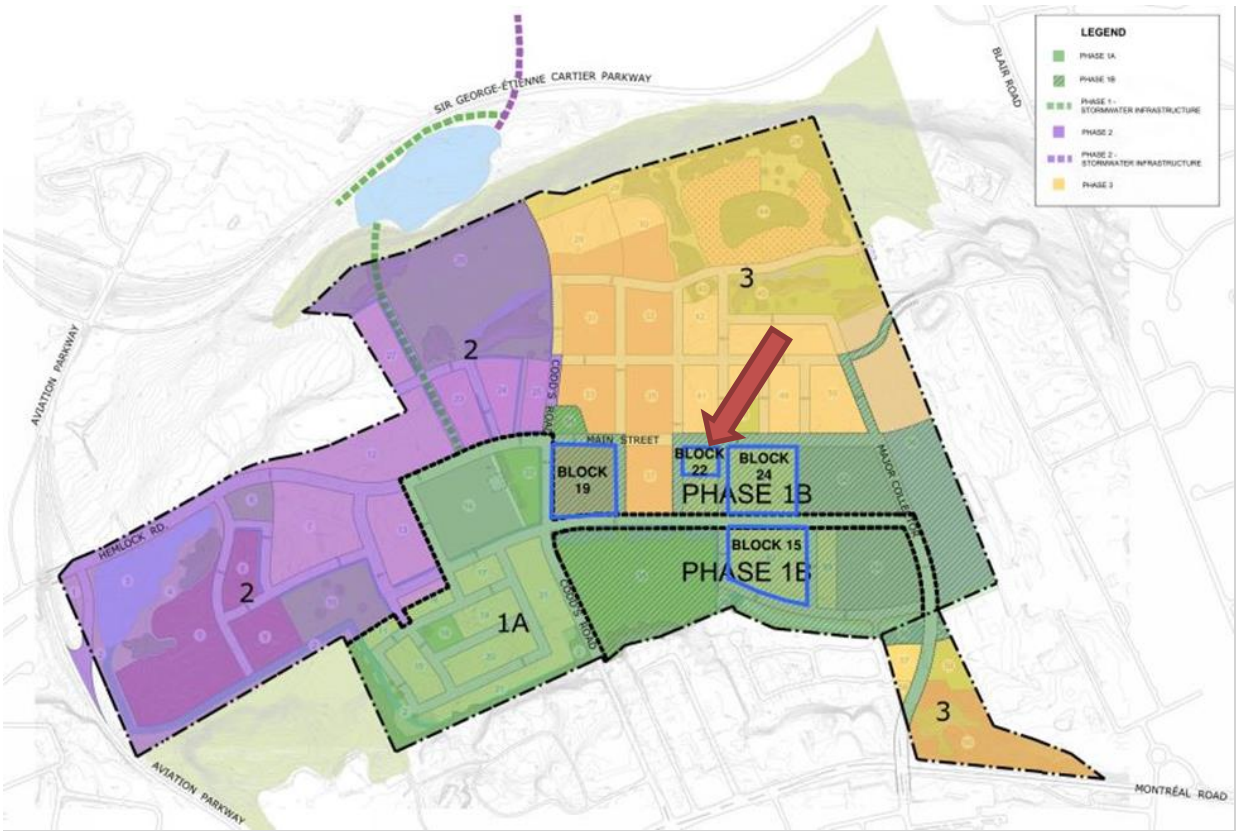
1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare a Functional Servicing and Stormwater Management report in support of the Site Plan Application for Block 22 of the former CFB Rockcliffe lands, which are currently under re-development by the Canada Lands Company. Block 22 is located at 1400 Hemlock Road within Wateridge Village at Rockcliffe Phase 1B as illustrated on ***Figure 1***.

Site Plan Approval was previously obtained from the City of Ottawa, but a new site plan is being proposed with updated building types and unit counts. It should be noted that the servicing and grading strategy for the proposed development remain consistent with the City of Ottawa's previously approved design. However, the servicing and grading design have been updated to reflect the current site plan, the latest City of Ottawa guidelines and pre-consultation comments received from the City of Ottawa. Pre-consultation comments and responses are included in ***Appendix A***.

The subject property is located within the City of Ottawa urban boundary, in the Rideau-Rockcliffe area. As illustrated in ***Figure 1***, the subject property is encompassed by Hemlock Road, Michael Stoqua Street and Moses Tennisco Street, all of which are currently under construction. Comprised of a single parcel, it measures approximately ***0.46 ha*** and is zoned Residential Fifth Density Zone (R5Y[2312]). A copy of the registered 4M-Plan 4M-1581 is included in ***Drawings/ Figures***.

Figure 1: Site Location



The proposed development by Mattamy Homes involves the construction of 18 Rear Lane Townhomes and 20 Stacked Townhomes. The development also includes surface parking for the Stacked Townhomes within the site. A copy of the site plan and site statistics is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail with respect to the availability of site services, to support the application for site plan control.

1.1 Existing Conditions

The existing lands are vacant, while the construction of the surrounding road network and underground services are currently underway at the time of this publication. Historically, the lands were part of the Canadian Forces Base Rockcliffe (CFB Rockcliffe).

A preliminary geotechnical investigation was completed by Paterson Group Inc. in August 2017. Per the geotechnical report, the subject site consists of a layer of existing fill from the previous land use underlain by stiff to very stiff brown silty clay. Practical refusal during borehole excavation was encountered at a maximum depth of 3.9 m below existing grade.

Supplemental information from Paterson Group Inc. was also received regarding the anticipated infiltration rates. An infiltration rate of 168 – 564 mm/day was estimated for Block 22.

The Canada Lands Company will be delivering the site to a pre-grade condition in accordance with Mattamy Homes requirements.

Hemlock Road

- 300 mm diameter PVC watermain
- 750 mm diameter storm sewer
- 250 mm diameter sanitary sewer

Michael Stoqua Street

- 200 mm diameter watermain
- 375 mm diameter storm sewer
- 250 mm diameter sanitary sewer

Moses Tennisco Street

- 200 mm diameter watermain
- 525 mm diameter storm sewer
- 250 mm diameter sanitary sewer

The infrastructure described above is based on as-built drawings. The as-built drawings are as per the Wateridge Village at Rockcliffe Phase 1B drawing set prepared by IBI Group dated June 15, 2018.

The servicing information received from IBI Group dated June 15, 2018 provides stubs to the proposed property and confirms storm and sanitary capacity within the external system at these new connection points.

The as-built drawings prepared by IBI Group detailing the services within Michael Stoqua Street and Moses Tennisco Street are included in the appendix ***Drawings/Figures***.

The existing services per ***Design Brief Phase 1B*** are considered “in service” as per correspondence with IBI Group included in ***Appendix A***. Refer to ***Drawing 2 – Existing Conditions*** for the Existing Conditions Plan.

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control. Once site plan approval has been received, the site will go through Part Lot Control.

The site will have one Standard Condominium that includes the Stacked Townhomes, laneways, parking units, and landscaped areas per the draft plan of condominium. The Rear Lane Townhomes will be freehold, but will be tied to the Standard Condominium through a Joint Use and Maintenance Agreement, and will pay a portion of the condominium fees. There will be a vehicle access easement in favour of the Rear Lane Townhomes to access their units. A pedestrian access easement over the east to west pathway will be provided for public access. Refer to the legal plans and Block 22 Condo Corporation Structure markup included in ***Appendix A***.

As the site will be severed into multiple ownerships through Part Lot Control, an ECA Approval will be required through the Ministry of the Environment, Conservation and Parks (MECP) as the development does not fall under the exemptions set out in O.Reg 525/98. It is anticipated that the ECA Approval will be coordinated with the City of Ottawa through the MECP's Transfer of Review program, which has recently been updated in view of the MECP's plan to move to a consolidated permissions approach. Subject to the written permission of the MECP Supervisor, the City of Ottawa may be allowed to review additional works currently not listed in Schedule A, including private works that may not be covered at the time of the application by an agreement pursuant to the Planning Act. Refer to Schedule A in ***Appendix A.***

As per consultation with the RVCA, additional stormwater quality control is not required for the subject site as the water quality objectives are being achieved through the Eastern SWM Facility. The RVCA has reviewed the proposed Low Impact Development (LID) measures for the development and concluded that they were acceptable. Supporting correspondence is included in ***Appendix A***.

The City of Ottawa reviews watermains on behalf of the MECP. The MECP "Form 1" is submitted to the City of Ottawa for approval of watermains.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report.

- Ottawa Sewer Design Guidelines,
  City of Ottawa, *SDG002,* October 2012
  (City Standards)

- Technical Bulletin PIEDTB-2016-01
  City of Ottawa, September 6, 2016.
  *(*PIEDTB-2016-01*)*

- Technical Bulletin ISTB-2018-01
  City of Ottawa, March 21, 2018.
  *(*ISTB-2018-01*)*

- Technical Bulletin ISTB-2018-04
  City of Ottawa, June 27, 2018.
  *(*ISTB-2018-04*)*

- Technical Bulletin ISTB-2019-02
  City of Ottawa, July 8, 2019.
  *(*ISTB-2019-02*)*

- Ottawa Design Guidelines – Water Distribution
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

- Technical Bulletin ISD-2010-2
  City of Ottawa, December 15, 2010.
  *(*ISD-2010-2*)*

- Technical Bulletin ISDTB-2014-02
  City of Ottawa, May 27, 2014.
  *(*ISDTB-2014-02*)*

- Technical Bulletin ISTB-2018-02
  City of Ottawa, March 21, 2018.
  *(*ISTB-2018-02*)*

- Design Guidelines for Sewage Works,
  Ministry of the Environment, 2008.
  (MOE Design Guidelines*)*

- Stormwater Planning and Design Manual,
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- Ontario Building Code Compendium
  Ministry of Municipal Affairs and Housing Building Development Branch,
  January 1, 2010 Update
  (OBC)

- Water Supply for Public Fire Protection
  Fire Underwriters Survey, 1999.
  (FUS)

- Low Impact Development Stormwater Management Planning and Design Guide
  Credit Valley Conservation & Toronto and Region Conservation, 2010.
  (LID Guide)

- Former CFB Rockcliffe Master Servicing Study
  IBI Group, August 2015
  (MSS)

- Low Impact Development (LID) Demonstration Project
  Aquafor Beech Ltd., August 2015
  (LID Demonstration Project)

- Wateridge Phase 1B Developer's Checklist
  Aquafor Beech Ltd., October 22, 2019
  (LID Checklist)

- Design Brief Wateridge Village at Rockcliffe Phase 1A
  IBI Group, April 2016
  (Design Brief Phase 1A)

- Design Brief Wateridge Village at Rockcliffe Phase 1B
  IBI Group, June 2017
  (Design Brief Phase 1B)

- Geotechnical Investigation Proposed Residential Development Block 22
  Paterson, September 10, 2020
  (Geotechnical Investigation)

- Landscaping Plan Review – Block 22 – Wateridge Village Residential Development – Phase 1B – Block 22
  Paterson, October 6, 2020
  (PG5345-MEMO.01)

- Grading Plan Review – Wateridge Residential Development – Phase 1B – Block 22
  Paterson, October 6, 2020
  (PG5345-MEMO.02)

- Geotechnical Review of Site Servicing Drawings – Wateridge Residential Development – Phase 1B – Block 22
  Paterson, October 6, 2020
  (PG5345-MEMO.03)

- Geotechnical Review of Lateral Support of Footings – Wateridge Residential Development – Phase 1B – Block 22
  Paterson, October 6, 2020
  (PG5345-MEMO.04)

- Hydraulic Capacity and Modelling Analysis – Wateridge Village Phase 1B – Block 22 Development
  GeoAdvice, September 24, 2020
  (Water Analysis)

- Wateridge Village Phase 1B – Proposed Block 22 Stormwater Management Design
  J.F. Sabourin and Associates, October 5, 2020
  (HGL Analysis)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa MONT pressure zone, as shown by the Pressure Zone map in ***Appendix B***. Based on the design drawings for the Wateridge Phase 1B subdivision, a local 200 mm diameter watermain was constructed within the Michael Stoqua Street and Moses Tennisco Street right-of-ways to service the subject site.

The water servicing for the subject site was accounted for in the design of the water distribution system outlined in the ***Design Brief Phase 1B***, water demand summarized below:

Table 1
Summary of Water Demand per *Design Brief Phase 1*

Design Parameter	Total Demand (L/min)
Average Daily Demand	25.5
Max Day	188.9
Max Day + Fire Flow	13,000 + 125.1

3.2 Water Supply Servicing Design

It is proposed to provide a connection to the 200 mm watermain within Michael Stoqua Street and a connection to the 200 mm watermain within Moses Tennisco Street. Block 4 Units 1A/B to 5A/B will be serviced by proposed connections to the existing 200 mm watermain on Michael Stoqua Street. The site is adequately serviced by surrounding fire hydrants on Hemlock Road, Michael Stoqua Street and Moses Tennisco Street.

The proposed development will have a perimeter meter in the vicinity of each proposed connection to the existing watermain system. The meters will not be located on City of Ottawa property.

Due to the width of the right-of-way and the proximity of the Rear Lane Townhomes, it is proposed to provide a watermain 2.5 m away from the proposed sanitary sewer. The water and sanitary sewers are designed in accordance with *Procedures to Govern Separation of Sewers and Watermains (Procedure F-6-1)* prepared by the Ministry of the Environment.

Table 2 summarizes the ***Water Supply Guidelines*** employed in the preparation of the water demand estimate for the proposed development.

Table 2
Water Supply Design Criteria

Design Parameter	Value
Townhouse	2.7 P/unit*
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	4.9 x avg. day**
Residential Peak Hour Demand	7.4 x max. day**
Residential Minimum Hour Demand	0.5 x avg. day
Contingency Factor	10%***
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	276 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa

Daily average based on Appendix 4-1 from **Water Supply Guidelines*
*** Residential Max. Daily and Peak Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.*
****10% Contingency Factor added to all demands to account for potential changes in occupancy*
-Table updated to reflect ISD-2010-2, ISDTB-2014-02 and ISTB 2018-02

Table 3 summarizes the anticipated water supply demand and proposed boundary conditions within the existing Montreal Road Pressure Zone. Future upgrades to the Montreal Road Pressure Zone are expected as described further in this section. ***Table 4*** summarizes the anticipated water supply demand and future boundary conditions within the future Montreal Road Pressure Zone.

Boundary conditions for the subject site were provided by the City of Ottawa for the nodes closest to the proposed connection points on Michael Stoqua Street and Moses Tennisco Street. For the Max Day + Fire Flow scenario, boundary conditions were only provided for the highest fire flow demand at the time as this will govern the design.

Table 3
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] Connection 1 (m H_2O)	Boundary Condition[2] Connection 2 (m H_2O)
Average Daily Demand	22.0		
Peak Hour Demand	163.0	146.7 m	146.7 m
Minimum Hour Demand	11.0	147.0 m	147.0 m
Max Day + Fire Flow (1)	107.9 + 14,000		
Max Day + Fire Flow (2)	107.9 + 15,000	140.0 m	140.0 m

1) Water demand calculation per ***Water Supply Guidelines*** + 10% contingency. See ***Appendix B*** for detailed calculations.
2) Boundary conditions received from City of Ottawa on May 22, 2020.

The above pressures are assuming the hydraulic grade line (HGL) under current conditions for the Montreal Road Pressure Zone.

Upgrades to the Montreal and Brittany pump stations are currently being planned by the City of Ottawa to support the overall CFB Rockcliffe development. The City plans to use a different pumping strategy that will try to maintain a constant HGL of 143.0 m, even during peak hour and / or fire flow conditions. On May 22, 2020, the City provided the future boundary conditions. The future boundary conditions are based on a proposed HGL target of 143.0 m at the Montreal Road pump station.

Table 4 summarizes the anticipated water supply demand and future boundary conditions, which are lower than under the current conditions for the Montreal Road Pressure Zone.

Boundary conditions for the subject site were provided by the City of Ottawa for the nodes closest to the proposed connection points on Michael Stoqua Street and Moses Tennisco Street. For the Max Day + Fire Flow scenario, boundary conditions were only provided for the highest fire flow demand at the time as this will govern the design.

Table 4
Water Demand and Boundary Conditions
Future Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] Connection 1 (m H_2O)	Boundary Condition[2] Connection 2 (m H_2O)
Average Daily Demand	22.0		
Peak Hour Demand	163.0	143.0 m	143.0 m
Minimum Hour Demand	11.0	143.0 m	143.0 m
Max Day + Fire Flow (1)	107.9 + 14,000		
Max Day + Fire Flow (2)	107.9 + 15,000	136.0 m	136.0 m

3) Water demand calculation per ***Water Supply Guidelines*** + 10% contingency. See ***Appendix B*** for detailed calculations.
4) Boundary conditions received from City of Ottawa on May 22, 2020.

The above pressures are lower than under the current conditions for the Montreal Road Pressure Zone, which is also consistent with the ***Design Brief Phase 1B***. Future development and upgrades to the existing Montreal Road Pressure Zone will reduce the HGL within the development compared to the current condition.

Refer to correspondence from the City of Ottawa and the ***Watermain Analysis*** located in ***Appendix B*** for reference.

A hydraulic analysis of the proposed watermain network has been prepared by GeoAdvice Engineering (***Watermain Analysis***, September 24, 2020) and is included in ***Appendix B***.

A pressure check is recommended during installation to determine if pressure reducing valves are required.

Fire flow requirements were determined in accordance with City of Ottawa ***Water Supply Guidelines***. The Water Supply Guidelines specific that fire flows are to be estimated

using the FUS in conjunction with the technical bulletin ISDTB-2014-02 and ISTB-2018-02.

The following assumptions were provided by Mattamy Homes for both Stacked Townhomes and Rear Lane Townhomes and were used in estimating the fire supply requirements:

- Type of construction – Wood Frame Construction
- Occupancy type – Limited Combustible
- Sprinkler Protection – None

The estimated fire flow ranges from ***14,000 L/min*** to ***18,000 L/min***; see ***Appendix B*** for detailed FUS calculations. ***Table 5*** summarizes the fire flow requirement calculated for each block, per the above assumptions and the available fire flow, assuming Class AA hydrants per *Table 18.5.4.3* of ***ISTB-2018-02.***

The maximum anticipated fire flow is ***18,000 L/min*** for Block 4 as can be seen in ***Table 5***.

Table 5
Estimated Fire Flow Demand

Block, Townhome Type and Street	Estimated Fire Demand (L/min)	Fire Hydrants within 75 m	Fire Hydrants within 150 m	Available Fire Flow per Table 18.5.4.3 of ISTB-2018-02 (L/min)
Block 1 (Rear Lane) – Hemlock Road	15,000	2	2	18,926
Block 2 (Rear lane) – Hemlock Road	15,000	2	2	18,926
Block 3 (Rear Lane) – Moses Tennisco Street	14,000	2	2	18,926
Block 4 (Stacked) – Michael Stoqua Street	18,000	2	2	18,926

The property has four (4) adjacent hydrants used to calculate the available fire flow, which are all assumed to be Class AA:

- Two (2) hydrants located along the south side of Hemlock Road, one at the northwest corner of the property and one across from Moses Tennisco Street;
- One (1) hydrant located along the east side of Michael Stoqua Street, at the southwest corner of the property; and

- One (1) hydrant located along the east side of Moses Tennisco Street, near the southeast corner of the property.

As can be seen in ***Table 5,*** the fire flow demand can be met by using existing fire hydrants for all of the proposed blocks within the development. Fire hydrant coverage plans for Block 1 and Block 4 (representing the two worst case scenarios) are included in ***Appendix B***.

The ***Design Brief Phase 1B*** had contemplated a higher population than currently proposed. It is anticipated that the decrease in population will not have a significant impact on pressures within the Wateridge Village Development. A water distribution model was completed to ensure that the internal pipe network can adequately service the proposed development.

3.3 Watermain Modeling

As described in the ***Watermain Analysis,*** InfoWater (Innovyze), a GIS water distribution system modeling and management software application was utilized to determine pipe sizing and the availability of pressures throughout the system during Minimum Hour Demand, Peak Hour Demand and Max Day plus Fire Flow scenarios. The static model determines pressures based on the available head obtained from the boundary conditions obtained from the City of Ottawa, as indicated in ***Table 3*** and ***Table 4.***

A summary of the resulting pressures at all nodes under current boundary conditions are summarized in ***Table 6*** below.

Table 6
Resulting Pressures Proposed Conditions

Node ID	Minimum Hour (kPa)	Peak Hour (kPa)
JCT-1	565.4	565.4
JCT-2	565.4	558.5
JCT-3	558.5	558.5
JCT-5	558.5	551.6

The minimum and maximum pressures shown in ***Table 6*** generally exceed the allowable pressures described in ***Table 2*** by less than 3%. As the pressures exceed the maximum allowable distribution pressure of 552 kPa, pressure reducing valves might be required.

A summary of the resulting pressures at all nodes under future boundary conditions are summarized in ***Table 7*** below.

Table 7
Resulting Pressures Future Conditions

Node ID	Minimum Hour (kPa)	Peak Hour (kPa)
JCT-1	530.9	530.9
JCT-2	524.0	524.0
JCT-3	524.0	524.0
JCT-5	517.1	517.1

The minimum and maximum pressures shown in ***Table 7*** do not exceed the maximum allowable distribution pressure of 552 kPa.

It should be noted that the Max Day + Fire Flow scenario was not included in the watermain modelling as fire flows would be drawn from existing fire hydrants and the existing watermain network within the ROW. Therefore, the pressure drops within the development are anticipated to be negligible in a fire flow scenario.

3.4 Water Supply Conclusion

It is proposed to service the development through two separate connections to the existing 200 mm diameter watermains within Michael Stoqua Street and Moses Tennisco Street. Block 4 Units 1A/B to 5A/B will be serviced by proposed connections to the existing 200 mm watermain on Michael Stoqua Street.

The anticipated water demand was submitted to the City of Ottawa for establishing boundary conditions.

The fire flow for the development ranges from ***14,000 L/min*** to ***18,000 L/min*** and the flow was analyzed through surrounding existing hydrants, assumed to be Class AA, using values from ***Table 18.5.4.3*** of ***ISTB-2018-02***. The fire flows could be met for all blocks per the ***Water Supply Guidelines***.

Pressures during the Minimum Hour Demand and Peak Hour Demand scenarios with current boundary conditions are higher than allowable pressure in ***Table 2***; thus, pressure reducing valves might be required. Pressures during the Minimum Hour Demand and Peak Hour Demand scenarios with future boundary conditions do not exceed the maximum allowable distribution pressure of 552 kPa.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The sanitary flow from the subject property has been considered in the wastewater design for the Wateridge Subdivision, as outlined in the ***Design Brief Phase 1B***.

The total wastewater flow from Block 22 contemplated in the ***Design Brief Phase 1B*** is summarized in ***Table 8*** below.

Table 8
Wastewater Flow per Design Brief Phase 1B – Total Site Area

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.43
Estimated Peak Dry Weather Flow	1.70
Estimated Peak Wet Weather Flow	1.83

The total flow summarized in ***Table 8*** is for the total drainage area from Block 22, with a total contemplated population of 105 and based on previous ***City Standards*** per the ***Design Brief Phase 1B***, but it should be noted that the ***Design Brief Phase 1B*** contemplated splitting the sanitary flows between sanitary sewers on Michael Stoqua Street and Moses Tennisco Street. Refer to ***Appendix C*** for calculation sheets and reduced copies of the IBI sanitary design sheet and drainage area map.

4.2 Wastewater Design

It is proposed that the development will be serviced by an internal sanitary sewer network connecting to the 250 mm diameter sewer within the Michael Stoqua Street right-of-way, as the City of Ottawa has requested a singular connection to the existing sanitary sewer network.

Block 4 Units 1A/B to 5A/B will be serviced by proposed direct connections to the existing 250 mm sanitary sewer on Michael Stoqua Street.

Existing MH210A is proposed to be relocated south to provide 2.5 m clearance to the existing watermain and is referred to as proposed MH6A on the engineering drawings.

Table 9 summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 9
Wastewater Design Criteria

Design Parameter	Value
Townhouse	2.7 P/unit
Average Daily Demand - Residential	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 3.8, Min 2.0 Harmon's Corrector Factor 0.8
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather) 0.28 L/s/ha (Wet Weather) 0.33 L/s/ha (Total)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012. and *ISTB-2018-01*	

Table 10 demonstrates the anticipated peak flow from the proposed development. See ***Appendix C*** for associated calculations.

Table 10
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.36
Estimated Peak Dry Weather Flow	1.23
Estimated Peak Wet Weather Flow	1.36

The estimated sanitary flow, based on the site plan provided in ***Drawings/Figures,*** anticipates a peak wet weather flow of ***1.36 L/s***.

The anticipated peak wastewater flow generated from the proposed development is lower than the total flow contemplated in the ***Design Brief Phase 1B*** for Block 22 (based on previous guidelines), but more than the ***0.96 L/s*** contribution to the existing 250 mm sanitary sewer in Michael Stoqua Street contemplated in the ***Design Brief Phase 1B***. With the increase in flows from Block 22, the existing 250 mm sanitary sewers from MH211A to MH166A on Michael Stoqua Street are shown to have 96% residual capacity. As such, the existing sanitary system can accommodate the flow from the proposed sanitary sewer system for Block 22.

A sanitary calculation sheet was prepared for the on-site sewers and existing downstream sewers on Mikinak Road to compare flows from the ***Design Brief Phase 1B***. The analysis is further detailed in the ***MSS Addendum*** (DSEL, October 2020). See ***Appendix C*** for the calculation sheet, the IBI design sheet and drainage area map and ***Drawing 10 – Sanitary Drainage Plan***.

4.3 Wastewater Servicing Conclusions

The sanitary flow from the subject property has been considered in the wastewater design for the Wateridge Subdivision, outlined in the ***Design Brief Phase 1B***.

Block 4 Units 1A/B to 5A/B will be serviced by proposed direct connections to the existing 250 mm sanitary sewer on Michael Stoqua Street.

Although the drainage from the site was revised to be entirely directed to the existing sanitary sewer within Michael Stoqua Street, the total anticipated peak wastewater flow generated from the proposed development is lower than contemplated in the ***Design Brief Phase 1B***. The downstream sanitary system can accommodate the flow from the proposed sanitary sewer system. The analysis is further detailed in the ***MSS Addendum*** (DSEL, October 2020).

The proposed wastewater design conforms to all relevant ***City Standards***.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Minor and major flow from the subject site was accounted for in the Wateridge Subdivision. The subject site was contemplated in the ***Design Brief Phase 1B*** to be conveyed to the Eastern SWM Facility. Major flow is proposed to be directed to a dry pond to the south of Mikinak Road for quantity control and will eventually discharge through the minor system to the Eastern SWM Facility.

Refer to ***Appendix D*** for reduced copy of the storm design sheet and drainage area figures prepared by IBI for the Wateridge Subdivision.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA).

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa, where the proposed development is required to:

- Follow quantity and quality controls outlined in the ***Design Brief Phase 1B***
- Incorporate Low Impact Development measures in accordance with the ***Design Brief Phase 1B***, ***LID Guide***, ***LID Demonstration Project*** and ***LID Checklist.***

5.3 Proposed Stormwater Management System

It was previously contemplated in the ***Design Brief Phase 1B*** that minor system drainage from the site would be evenly split between storm sewers on Michael Stoqua Street and Moses Tennisco Street. However, the current proposal has all of the minor system drainage discharging to the existing 375 mm storm sewer within Michael Stoqua Street.

Based on current ***City Guidelines***, the minor system discharge to the existing storm sewer system is restricted to the 5-year flow through the use of on-site controls in the form of Inlet Control Devices (ICDs) implemented within catch basins.

As discussed in ***Section 5.1***, the quantity controls for major flow from Block 22 will be provided by the dry pond south of the subject site and through the Eastern SWM Facility outlined in the ***Design Brief Phase 1B***.

The subject site was also accounted for in the design of the permanent pool of the Eastern SWM Facility which provides 80% TSS removal for the subdivision. No additional quality controls are required as confirmed by the RVCA in ***Appendix A.***

Existing MH210 is proposed to be shifted south to provide adequate separation from the existing watermain and is referred to as proposed MH4 on the engineering drawings.

The tributary drainage area from the proposed development to existing MH210 is more than the ***0.23 ha*** contribution to the existing 375 mm storm sewer in Michael Stoqua Street contemplated in the ***Design Brief Phase 1B***. There are also additional uncontrolled drainage areas to Michael Stoqua Street, Hemlock Road and Moses Tennisco Street, which require 100-year capture and were not accounted for in the ***Design Brief Phase 1B.*** These changes are further documented in the ***MSS Addendum*** (DSEL, October 2020).

With the increase in tributary area from Block 22, the existing 375 mm storm sewer from MH210 to MH211 on Michael Stoqua Street is shown to have 2% residual capacity. The existing downstream 600 mm storm sewers on Michael Stoqua Street from MH211 to MH166 are shown to have a minimum 9% residual capacity. All other existing storm sewers on Moses Tennisco Street, Hemlock Road and Mikinak Street are shown to have 5% residual capacity or more. As such, the existing storm system can accommodate the flow from the proposed storm sewer system for Block 22.

A storm design sheet was prepared to support the capacity of the internal and external storm sewer system. Refer to ***Appendix D*** for the calculation sheet and ***Drawing 11 – Storm Drainage Plan*** for the drainage area figure.

It should be noted that the actual 100-year flow to the existing minor system is much less than anticipated in the rational method based on PCSWMM modelling and the use of ICDs within catch basins. The 100-year flow to MH210 is 78.3 L/s as detailed in the ***HGL Analysis***. This is less than the 87 L/s flow that was initially considered acceptable from the development as detailed in the correspondence from IBI Group, located in Appendix D of the ***HGL Analysis.*** The modelled 100-year flow of 78.3 L/s is much less than the anticipated 138 L/s from the rational method and therefore, the existing pipe will have sufficient capacity for the proposed flows.

The overall Runoff Coefficient from the site is 0.75, which is less than the 0.80 that was allocated in the ***Design Brief Phase 1B*** and therefore, no additional quantity or quality controls are required. Refer to ***Appendix D*** for detailed calculations supporting the Runoff Coefficient of 0.75.

5.4 Hydraulic Grade Line (HGL) Analysis & Overland Flow Depth

A detailed PCSWMM model was prepared for the internal minor and major system to determine the conveyance of the minor system and review major system their relation to the critical underside of footing (USF) and surrounding house grade (SHG). Refer to the *Wateridge Village Phase 1B – Proposed Block 22 Stormwater Management Design* by J.F. Sabourin and Associates (***HGL Analysis***) included in ***Appendix D*** for reference for the detailed analysis.

The ***HGL Analysis*** calculates the 100-year HGL based on the 100-year 3-hour Chicago Storm and the 24-hour SCS Type II Storm. The highest 100-year HGL resulted from the 100-year 3-hour Chicago Storm, which is the governing design storm for the site.

Table 11, below, summarizes the HGL in the 100-year and the 100-year + 20% storm events within the site and the USF elevation for Block 4, which is the only proposed building with basements. The storm sewer from MH1 to MH2 controls the design since the proposed foundation drains from Block 4 connect to this leg of sewer as can be seen on ***Drawing 4***.

Table 11
HGL 100-Year and 100-Year + 20% Storms vs Underside of Footing

U/S MH	D/S MH	Critical Block ID	Critical USF (m)	100-Year HGL (m)*	Freeboard to Critical USF (m)*	100-Year + 20% HGL (m)**	Freeboard to Critical USF (m)**
MH1	MH2	Block 4	87.57	87.10	0.47	87.11	0.46
*Refer to Table C1-A in Appendix C of ***HGL Analysis***							
Refer to Table C1-F in Appendix C of ***HGL Analysis*							

As per ***Table 11***, above, there is a minimum 0.30 m freeboard between the 100-year HGL and the USF which does not extend to the footing during the 100-year + 20% events.

The depth of flow may extend adjacent to the right-of-way provided that the water level must not touch any part of the building envelope and must remain below the lowest building opening during the stress test event (100 year + 20%). There must be at least 15 cm of vertical clearance between the spill elevation on the street and the ground elevation at the nearest building envelope. The summary of the overland flow is summarized in ***Table 12,*** below.

Table 12
Overland Flow 100-Year and 100-Year + 20% Storms vs Surrounding House Grade

Subcatchment ID (per PCSWMM)	Critical Block ID	Critical SHG (m)	T/G (m)	Overland Flow Elev. 100-Year (m)*	Freeboard to Critical SHG (m)	Overland Flow Elev. 100-Year + 20% HGL (m)**	Freeboard to Critical SHG (m)
CB2B	Block 4	89.46	89.18	89.26	0.20	89.26	0.20
CB2A	Block 2	90.02	89.72	89.78	0.324	89.78	0.24
CB1C	Block 4	89.81	89.58	89.65	0.16	89.66	0.15
CB1B	Block 3	90.13	89.82	89.91	0.22	89.93	0.20
CB1A	Block 3	90.20	89.91	89.98	0.22	90.00	0.20
*Refer to Table 1 of ***HGL Analysis*** for depth (Overland Flow Elev. = T/G + Total Water Depth)							
Refer to Table 2 of ***HGL Analysis* for depth (Overland Flow Elev. = T/G + Total Water Depth)							

As shown in the table above, there is sufficient freeboard from the Surrounding House Grade compared to the overland flow elevations.

5.5 Low Impact Development (LID) Practices

LID measures are proposed in accordance with the ***Design Brief Phase 1B, LID Guide, LID Demonstration Project*** and ***LID Checklist***. It is proposed that flow from rooftops, sidewalks, landscaped areas and access lanes be directed to storage chambers in the form of oversized perforated pipes surrounded by granular material. Flow will enter the storage chambers through the network of catch basins proposed throughout the property. In order to meet the intent of the LID strategy per the ***LID Guide, LID Demonstration Project*** and ***LID Checklist***, it is insufficient to only capture roof drainage through the infiltration chambers and both roof drainage and parking areas are required to be directed to the infiltration chambers in order to meet the objectives.

The proposed LID measures are considered soakaways, trenches and chambers, which are acceptable for residential development per *Table 4.1* of the ***LID Checklist***, located in ***Appendix D.*** Refer to ***Drawing 4 – Site Servicing Plan*** for perforated pipe locations and ***Drawing 7 – Details*** for storage chamber details.

The granular base below the overflow elevation has been sized in accordance with the ***LID Guide, LID Demonstration Project*** and ***LID Checklist*** and based on infiltration rates, to ensure a maximum drawdown time of 48 hours. Based on Section 4.4 of the ***Geotechnical Investigation***, an infiltration rate ranging from ***168 mm/day*** to ***564 mm/day*** was estimated for the soil in Block 22.

The storage chambers are designed with the perforated pipes underlain with 350 mm of 50 mm clear stone, with clear stone extending 150 mm to either side of the perforated pipe and another 75 mm layer of clear stone above the obvert of the pipe. The perforated pipe and clear stone are wrapped in a non-woven needle punched geotextile or woven monofilament geotextile.

The catch basins connecting to the storage chambers will be equipped with a 1 m extended sump pit and a goss trap will be installed at the connection of the storage chamber to the catch basins. These measures are proposed to provide an additional level of treatment prior to discharging to the storm sewer system. The extended sump pits in the catch basins are to be monitored and cleaned out when required.

Details of the storage chambers are shown on ***Drawing 7 – Details***, accompanying this report.

All LID measures are designed to infiltrate or detain an equivalent of the 4 mm event over the site area and each LID measure must treat the minimum of the 15 mm event. A total infiltration requirement of 4 mm or ***18.4 m^3*** and a total treatment volume of the 15 mm event, or ***24.4 m^3*** is required per the ***LID Guide, LID Demonstration Project*** and ***LID Checklist***. The filter media, clear stone and perforated pipe result in a treatment volume

of ***25.4 m³,*** exceeding the 15 mm volume described above. Calculations are included in ***Appendix D.***

The proposed LID strategy was deemed to be acceptable by the RVCA and correspondence has been included in ***Appendix A*** for reference.

5.6 Stormwater Servicing Conclusions

Minor and major system flow from Block 22 was accounted for in the subdivision design. Quantity and quality controls are provided through a dry stormwater pond to the south and the Eastern SWM Facility to the north.

Changes to drainage areas to Michael Stoqua Street, Hemlock Road and Moses Tennisco Street, which require 100-year capture were analyzed and it was determined that there is sufficient capacity in the existing storm sewer system to accommodate the proposed flows from Block 22***.*** These changes are further documented in the ***MSS Addendum*** (DSEL, October 2020).

The 100-year hydraulic grade line is contained within the proposed storm sewers and the USF for Block 4 is greater than 0.30 m above the HGL at all locations. The ***HGL Analysis*** confirms that the proposed underside of footing elevation is 0.30 m (or greater) above the 100-year hydraulic grade line and that the 100 year + 20% stress test hydraulic grade line does not reach the underside of footing. There is sufficient freeboard from the Surrounding House Grade compared to the overland flow elevations.

LID practices in the form of underground storage chambers consisting of oversized perforated pipes surrounded by granular material are proposed connecting to proposed catch basins to capture infiltration runoff from the site, in accordance with the ***LID Guide***, ***LID Demonstration Project*** and ***LID Checklist.*** The catch basins connecting to the storage chambers will be equipped with a 1 m extended sump pit and a goss trap will be installed at the connection of the storage chamber to the catch basins. The proposed LID strategy was deemed to be acceptable by the RVCA.

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies.

6.0 GEOTECHNICAL CONSIDERATIONS

A ***Geotechnical Investigation*** entitled ***Proposed Residential Development Block 22*** was prepared by Paterson Group, dated September 10, 2020, detailing geotechnical recommendations for the subject site.

Grade raise restrictions as outlined in the above-mentioned geotechnical report (2.0 m permissible) are not exceeded in the proposed development. As per the geotechnical memo ***PG5345-MEMO.02***, prepared by Paterson Group, dated October 6, 2020, the proposed grading plan is supported and although engineered fill is required to protect against frost action for Blocks 1, 2 and 3, lightweight fill is not required. Geotechnical memo ***PG5345-MEMO.02*** is included in ***Appendix A***.

The review of LID features and infiltration rates of the subsoils below the proposed infiltration systems was determined for Block 22. The theoretical infiltration rates of the subsoils range from ***168 mm/day*** to ***564 mm/day*** and are included in the ***Geotechnical Investigation***. As per the geotechnical memo ***PG5345-MEMO.03***, prepared by Paterson Group, dated October 6, 2020, the long-term seasonally high groundwater table is expected to range between 85.5 m and 86.5 m. However, 0.5 m of groundwater lowering is an anticipated post-development and the post-development long-term seasonally high groundwater table is expected to range between 85.0 m and 86.0 m. Geotechnical memo ***PG5345-MEMO.03*** confirms that the proposed LID measures are sufficiently above the expected groundwater table. Geotechnical memo ***PG5345-MEMO.03*** is included in ***Appendix A***.

As the development proposes service connections from the back-to-back townhomes, directly to the services within Michael Stoqua Street, the existing road is to be reinstated to the extents shown on DSEL drawing, ***Drawing 3 – Grading Plan,*** accompanying this report, as per the pavement design outlined in the ***Geotechnical Investigation***. The reinstated pavement structure, where it abuts the existing pavement that is not being replaced, is to be installed as per the structure outlined in the ***Geotechnical Investigation***.

It is anticipated that bedrock removal will be required for the development of this site. Note that bedrock removal is to be completed in accordance with the ***Geotechnical Investigation.***

The development proposes watermain and water meter boxes in the vicinity of proposed buildings. A review of the servicing installation impact of these pipes and structures to the adjacent footings and recommendations for foundation support is completed as summarized in geotechnical memo ***PG5345-MEMO.04***, prepared by Paterson Group, dated October 6, 2020. It is recommended that a lightweight concrete infilled trench be installed under the footings for Blocks 1 and 2. Geotechnical recommendations for the footings are shown both on ***Drawing 3 – Grading Plan*** and ***Drawing 8 – Cross Sections***. Geotechnical memo ***PG5345-MEMO.04*** is included in ***Appendix A*** for reference.

Proposed landscaping constraints and recommendations are presented in the landscaping plan review memo ***PG5345-MEMO.01***, prepared by Paterson Group, dated October 6, 2020, included in ***Appendix A*** for reference.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs or an approved equivalent installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

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

- Limit extent of exposed soils at any given time;
- Re-vegetate exposed areas as soon as possible;
- Minimize the area to be cleared and grubbed;
- Protect exposed slopes with plastic or synthetic mulches;
- Install silt fence to prevent sediment from entering existing ditches;
- No refueling or cleaning of equipment near existing watercourses;
- Provide sediment traps and basins during dewatering;
- Install filter cloth between catch basins and frames;
- Plan construction at proper time to avoid flooding; and
- Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

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

- Verification that water is not flowing under silt barriers; and

- Clean and change filter cloth at catch basins.

Refer to ***Drawing 9 – Erosion Control Plan***.

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained to prepare a Functional Servicing and Stormwater Management for the proposed development for Block 22 of the former CFB Rockcliffe lands, which are currently under re-development. The preceding report outlines the following:

- Based on boundary conditions for the current Montreal Road Pressure Zone from the City of Ottawa and a water distribution model completed for the site, sufficient pressure exists to support the development. Anticipated pressures under current boundary conditions slightly exceed the maximum allowable pressures stipulated by the City of Ottawa and pressure reducing valves might be required. Based on future upgrades for the Montreal Road Pressure Zone, anticipated pressures under future boundary conditions from the City of Ottawa do not exceed the maximum allowable distribution pressure of 552 kPa.

- Based on estimated fire flow per the ***FUS***, there is sufficient capacity within the local fire hydrants, assumed to be Class AA, to provide the required fire flow.

- Block 4 Units 1A/B to 5A/B will be serviced by proposed direct connections to the existing 200 mm watermain and existing 250 mm sanitary sewer on Michael Stoqua Street.

- The proposed development is anticipated to have a peak wet weather flow of ***1.36 L/s***. Although the drainage from the site was revised to be entirely directed to the existing sanitary sewer within Michael Stoqua Street, the total anticipated peak wastewater flow generated from the proposed development is lower than contemplated in the ***Design Brief Phase 1B***. The downstream sanitary system can accommodate the flow from the proposed sanitary sewer system. The analysis is further detailed in the ***MSS Addendum*** (DSEL, October 2020).

- The quantity and quality controls are provided for the site through a dry pond to the south of the site and the Eastern SWM Facility outlined in the ***Design Brief Phase 1B.***

- Changes to storm drainage areas to Michael Stoqua Street, Hemlock Road and Moses Tennisco Street, were analyzed and it was determined that there is sufficient capacity in the existing storm sewer system to accommodate the proposed flows from Block 22***.*** These changes are further documented in the ***MSS Addendum*** (DSEL, October 2020).

- The 100-year hydraulic grade line is contained within the proposed storm sewers and the USF for Block 4 is greater than 0.30 m above the HGL at all locations. The ***HGL Analysis*** confirms that the proposed underside of footing elevation is 0.30 m (or greater) above the 100-year hydraulic grade line and that the 100 year + 20% stress test hydraulic grade line does not reach the underside of footing. There is

sufficient freeboard from the Surrounding House Grade compared to the overland flow elevations.

- LID practices in the form of underground storage chambers consisting of oversized perforated pipes surrounded by granular material are proposed connecting to proposed catch basins to capture infiltration runoff from the site, in accordance with the ***LID Guide***, ***LID Demonstration Project*** and ***LID Checklist.*** The catch basins connecting to the storage chambers will be equipped with a 1 m extended sump pit and a goss trap will be installed at the connection of the storage chamber to the catch basins. The proposed LID strategy was deemed to be acceptable by the RVCA

Prepared by,
David Schaeffer Engineering Ltd.

Per: Anthony Temelini, P.Eng.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Jennifer Ailey, P.Eng.

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APPENDIX A

Pre-Consultation / Geotechnical Memos

DEVELOPMENT SERVICING STUDY CHECKLIST

17-948 25/05/2020

4.1 General Content

☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1, Drawing 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	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.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	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).	N/A
☒	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 neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N/A
☐	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.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 2.1
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	N/A

4.2 Development Servicing Report: Water

☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 1.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	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.	Section 3.2
☐	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.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	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	Section 3.2, 3.3
☒	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.	Section 3.2
☐	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.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

☒	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).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐	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.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	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)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	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).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	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.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.2, 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.2, 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	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.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☒	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 5.2, 5.3, 5.4
☒	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.	Section 5.2, 5.3
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.2, 5.3
☒	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Section 5.4
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 6.0
☐	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.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	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 ct. 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.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 7.0
☒	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.	Appendix A
☒	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

Pre-Application Consultation Meeting Notes

1400 Hemlock Road – D07-01-20-0072

March 23, 2020 – 10:00am

Teleconference

Attendees

City of Ottawa

- Jean-Charles Renaud
- Mark Fraser
- Christopher Moise
- Wally Dubyk

Applicant Team

- Mina Rassa
- Jillian Normand
- Daniel Potechin

Community Association

- Jane Thompson
- Lysanne Brault

Project overview

18 rear lane towns, 20 stacked towns. There is currently a Site Plan approval (D07-12-17-0111) on the site. Mattamy wishes to revise the plans. Part of the Wateridge subdivision.

Comments from staff

Transportation (Wally Dubyk)

- Private road to include asphalt that will sustain the weight of an emergency vehicle
- Signs at either end of the private connection to ensure members of the pubic are aware that Kizis Private is a private road.
- Are the sidewalks depressed?
    - Yes
- Is there still a mid-block MUP proposed?
    - No

Planning (Jean-Charles Renaud)

- Why is an urban development over parked? Removal of parking spaces would provide opportunities for additional amenity space and a secure bike parking location.
- Could the parking area be optimized by providing angled spaces?
- Why is there a need for parallel parking?
- Ensure that the Secondary Plan's minimum density targets are still being met. The site is at the edge of the designation, closer to a higher density designation, which means it should hold more, not less, density.
- If there are no longer any trees on the property a TCR will not be required.
- The environmental planner suggested that the provisions for landscaping include trees at least as proposed in the currently approved SPC, not less.

Engineering (Mark Fraser)

- **Additional comments are attached to the follow-up email**
- Updated plans and studies will be needed
- Updated site servicing report - demonstrate consistency with higher level study. Use block 15 as examples.
- Noise assessment -provide copy of 2017 study, with addendum
- Geotech report - memo stating that details have been reviewed and that the findings are still valid
- Will be requesting memos similar to block 15
- ESA - not required, but provide copy of RSC
- Plans - updated engineering plans will be required
- Comments - all units to be serviced interior to the site. Perimeter metering.
    - Question from applicant
        - Service connection to side roads ok?
            - If condo, all units to be serviced from interior
            - Expectation from the city is still to have servicing from internal to the site.
        - Tree plantings - building will meet zoning first.
            - This has proven to be problematic on other sites and will need to be
- Hydro transformers - bollards location to be adjusted

Urban Design (Christopher Moise)

- **Additional comments attached to the follow-up email**
- Is there no better location for hydro transformer?
- Appreciate massing and elevation information. Understand within the block.
- More details of surrounding context would be useful in order to better understand relationships
- Now have front door facing rear internal. Look at relationship.
- This proposal less suitable than previous
- Building only 1m from curb. Problematic?

- Unsure about the quality of amenity space, relationship with other buildings. Blank wall conditions nearby. Massing drawings would be helpful.
- Reallocating parking to remove parallel spaces. Confusing overall design. Parking area needs rethinking.

Comments from the Community

- Seen alot of revisions to this site plan. Now it is segmented. Not ideal to keep revising with less quality. Should be at least as good as previous plans.
- Agree with Christopher Moise RE: parking and relationship of units. Now is unbalanced with changes in types of units.
- Used to be trees. Lost alot of these. Now looking only at garages, no trees.
- What variances required?
    - No variances required
- Landscaped area less than 30%
    - Intent is to meet this requirement
- Landscaping not shown on plans right now.
- Landscaped strip along south now gone. Landscaping being eroded between revisions.
- Problems with Molok. People that do pickup can be difficult. Could provide info regarding this. Could pass along.
- This plan is inferior to before

From: Renaud, Jean-Charles <Jean-Charles.Renaud@ottawa.ca>
Sent: Thursday, April 2, 2020 3:58 PM
To: Mina Rassa <Mina.Rassa@mattamycorp.com>
Cc: Moise, Christopher <christopher.moise@ottawa.ca>; Fraser, Mark <Mark.Fraser@ottawa.ca>; jtarch@rogers.com; Lysanne Brault <lbrault7@gmail.com>; Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Subject: 1400 Hemlock - Preconsultation Followup

Good afternoon Mina,

Further to our meeting on March 23, 2020, regarding the proposal for development at 1400 Hemlock Road, please find attached the minutes of the meeting as well as the studies and plans list.

Below are some supplementary comments from various disciplines:

Planning

- Please ensure continued conformity with the Secondary Plan, particularly as it relates to the density minimum targets. Include justification in support of the reduced density in this revised proposal.
- A Site Plan Control – Complex application will be required.

Urban Design

Comments:

- Please provide a massing drawing and elevations for information;
- More detail of the surrounding context would help determine streetscape relationships with adjacent built form (adjacent building footprints, etc.);
- The facing frontages of the stacked towns is lost from the previous approved plan. The new condition is a challenge because frontages now face the rear of the new townhouse building (which will be a dead space at grade), and the facing semi-private balconies of the towns will be one level above the public entrances across the parking lot which is a less compatible relationship than facing stacked towns;
- The private lane was previously a true lane with garages facing the sides of the stacked towns, which was a more compatible relationship;

Questions/Observations:

- Town house at the top of the south-west group is very close to the drive aisle (1m);
- Not sure what the quality of the amenity space in the south-east corner will be if the adjacent building is four storeys? More detail would be helpful to determine this, especially a section showing height of the building compared to the width of the amenity area. How will this adjacent wall be designed?
- Would removing the bottom one-way lane from the parking area allow for relocation of the parallel spaces?

- Perhaps alternatives to the parking layout will open up more opportunities for landscaping and a reduction in hard surface circulation;

Engineering

Comments**:**

- Updated engineering plans and studies are required to be submitted to support this project.
- Updated Site Servicing and Stormwater Management Report (SWM) to be provided. Highly recommend using the report prepared in support of Block 15 as a baseline example for the level of analysis and information required to support this project.
- **HGL Analysis** to be completed and included as part of the Site Servicing and SWM report if basements are being proposed.
- The proposed **site servicing and SWM design to be consistent with higher-level studies and plans**. Excerpts from relevant higher level studies and plans shall be discussed and provided in the Appendix of the report as supporting documentation. Any deviations will be required to be discussed and may require an update or addendum to the subdivision MSS to support the change(s) at the discretion of the City.
- **Low Impact Development (LID)** measures to be implemented as per the Wateridge Phase 1B Developer's Checklist, prepared by Aquafor Beech Ltd., dated October 22, 2019 and infiltration targets achieved.
- Consult with the Rideau Valley Conservation Authority regarding water quality criteria for the subject block prior to submission an application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report as supporting documentation.
- Include a copy of the previously approved 2017 transportation noise assessment report and provide a **transportation noise assessment addendum** similar to the addendum provided for Block 15 to update the analysis and recommendation for this site plan revision.
- Provide a copy of the geotechnical report and **a memorandum** stating that the details of this site plan have been reviewed from a geotechnical perspective and the findings and recommendations of the reports are valid for the site plan revision. Update report if determined to be necessary.
- Similar geotechnical memorandums that were required to support approval of Block 15 will be required for this project (ex. review of servicing installation impact of adjacent building foundations, infiltration rates specific to this site, landscaping plan review, grading plan review, etc.)
- Provide a **copy of the Record of Site Condition (RSC)** acknowledged by the Ministry for this site and **a memorandum** prepared by an environmental consultant confirming that no potential contaminating activities have taken place within the RSC area since the filling of the RSC.
- **Plan and Profile drawings** are required to be submitted as part of the engineering drawing package.
- All townhouse units are to be serviced internal to the site with only one storm and one sanitary sewer connection to the street.
- Site to be **perimeter metered** similar to Block 15.
- Request new boundary conditions to update hydraulic analysis.
- **All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied if it is determined that clay soils are present in this area**. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m

shall be achieved. A memorandum to be provided from geotechnical engineer similar to Block 15.

- The consultant shall determine if this project will be subject to an Environmental Compliance addressing approval (ECA) for Private Sewage Works. It shall be determined if the exemptions set out under Ontario Regulation 525/98: *Approval Exemptions* are satisfied. All regulatory approvals shall be documented and discussed in the report. If the SWM works are servicing one parcel of land under one ownership an ECA would not be required however if the intention is to create POTL to a condominium corporation or multiple condominium corporations an ECA will be required prior to registration of any condominium proposal.
- Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Site Lighting Plan, Photometric Plan and Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Required Engineering Plans and Studies:

PLANS:

- Existing Conditions and Removals Plan
- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan
- Details Plan
- Pre-Development (Approved Drainage Patterns) Drainage Area Plan
- Post-Development Drainage Area/Stormwater Management Plan
- Legal Survey Plan
- Site Lighting Plan and Photometric Plan

REPORTS:

- Site Servicing and Stormwater Management Report
- Geotechnical Study
- Updated Noise Study
- Copy of the Record of Site Condition acknowledged by the Ministry and a Memorandum prepared by an environmental consultant confirming No Potential Contaminating Activities have taken place in the RSC area since filling the RSC.

<u>Next Steps</u>

- Applications for Site Plan Control, Complex will be required
- A list of required studies and plans is attached
- Please note that the preconsultation comments are valild for one year. If you submit a development application after this time you may be required to meet for another pre-consultation meeting and/or the submission requirements may change
- Prior to making a complete submission, I also encourage you to discuss the proposal with the area Councillor, Rawlson King, local community associations as well as immediate neighbours.

JC

Jean-Charles Renaud, **MCIP/*MICU*, RPP/*UPC***

Planner II | *Urbaniste II*
Development Review, Central | *Examen des projets d'aménagement, Central*
Planning, Infrastructure and Economic Development Department | *Services de la planification, de l'infrastructure et du développement économique*
City of Ottawa | *Ville d'Ottawa*
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613.580.2424 ext./poste 27629

*****Please note that, while my work hours may be affected by the current situation, I still have access to email and telephone. Feel free to schedule telephone calls if you wish to discuss something with me over the telephone*****

'

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May 26, 2020

Jean-Charles Renaud
Planner II, Development Review Services
Planning, Infrastructure and Economic Development
City of Ottawa
110 Laurier Avenue West, 4th Floor
K1P 1J1

Re: **Wateridge Village Phase 1B: Block 22**
Fourth Submission for SPA (Municipal File No. D07-01-20-0072)

This submission is submitted to address the comments provided via email from the City of Ottawa on April 2, 2020, following a teleconference that was held on March 23, 2020. Meeting minutes from said teleconference were circulated in the e-mail with the comments from April 2.

The responses to the comments are as follows:

Meeting Minutes from March 23, 2020
Engineering Comments (Mark Fraser)

Comment 1: Additional comments are attached to the follow-up email.

Response: Noted.

Comment 2: Updated site servicing report - demonstrate consistency with higher level study. Use Block 15 as examples.

Response: The site servicing report has been updated to demonstrate consistency with higher level studies and follows the general format that was used in the reporting for Block 15.

Comment 3: Noise assessment - provide copy of 2017 study, with addendum.

Response: To be provided by others.

Comment 4: Geotech report - memo stating that details have been reviewed and that the findings are still valid.

Response: A revised geotechnical report dated April 24, 2020 has been prepared by Paterson Group. Geotechnical memos prepared by Paterson Group providing

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recommendations and confirming the review of the proposed servicing and grading design are included with this submission.

Comment 5: Will be requesting memos similar to Block 15.

Response: See response to Comment 4.

Comment 6: ESA - not required, but provide copy of RSC.

Response: To be provided by others.

Comment 7: Plans - updated engineering plans will be required.

Response: Please refer to the engineering plans, Revision 10 dated May 26, 2020 included with this submission.

Comment 8: Comments - all units to be serviced interior to the site. Perimeter metering. If condo, all units to be serviced from interior. Expectation from the City is still to have servicing from internal to the site.

Response: Water, sanitary and storm servicing for the proposed development is all internal to the site as requested. Water perimeter meters are included in the vicinity of both connections to the existing 200 mm watermains, but located within the development.

Comment 9: (From applicant): Tree plantings - building will meet zoning first. (City): This has proven to be problematic on other sites and will need to be [reviewed].

Response: Refer to the landscape plan which has been incorporated into the Site Plan included with this submission.

Comment 10: Hydro transformers - bollards location to be adjusted

Response: The proposed Hydro transformer location will be adjusted through the CUP process, which will be initiated once the proposed servicing design has been advanced.

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E-mail from Jean-Charles Renaud from April 2, 2020
Engineering Comments

Comment 1: Updated engineering plans and studies are required to be submitted to support this project.

Response: Please refer to the engineering plans, Revision 10 dated May 26, 2020 included with this submission.

Comment 2: Updated Site Servicing and Stormwater Management Report (SWM) to be provided. Highly recommend using the report prepared in support of Block 15 as a baseline example for the level of analysis and information required to support this project.

Response: The site servicing report has been updated to demonstrate consistency with higher level studies and follows the general format that was used in the reporting for Block 15.

Comment 3: HGL Analysis to be completed and included as part of the Site Servicing and SWM report if basements are being proposed.

Response: An HGL Analysis is currently underway and will be included as a follow up to this submission. As discussed in Section 5.4, at this time, the 100-year HGL is anticipated to be fully contained within the proposed storm sewers and is not anticipated to impact the underside of footing elevations for Block 4, which is the only block with basements.

Comment 4: The proposed **site servicing and SWM design to be consistent with higher-level studies and plans**. Excerpts from relevant higher-level studies and plans shall be discussed and provided in the Appendix of the report as supporting documentation. Any deviations will be required to be discussed and may require an update or addendum to the subdivision MSS to support the change(s) at the discretion of the City.

Response: The site servicing report has been updated to demonstrate consistency with higher level studies and follows the general format that was used in the reporting for Block 15. Excerpts from relevant higher-level studies and plans are included in the Appendix of the report.

Comment 5: Low Impact Development (LID) measures to be implemented as per the Wateridge Phase 1B Developer's Checklist, prepared by Aquafor Beech Ltd., dated October 22, 2019 and infiltration targets achieved.

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Response: LID measures are included in the proposed design and consists of storage chambers in the form of over-sized perforated pipes surrounded by clear stone and geotextile material. Details for the proposed LID measures are provided on Drawing 7 and discussed in Section 5.6 of the site servicing report.

Comment 6: Consult with the Rideau Valley Conservation Authority regarding water quality criteria for the subject block prior to submission an application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report as supporting documentation.

Response: Correspondence with the RVCA is included in Appendix A of the site servicing report. Per the e-mail from Jamie Batchelor dated May 6, 2020, the proposed development does not require any additional quality control measures.

Comment 7: Include a copy of the previously approved 2017 transportation noise assessment report and provide a **transportation noise assessment addendum** similar to the addendum provided for Block 15 to update the analysis and recommendation for this site plan revision.

Response: To be provided by others.

Comment 8: Provide a copy of the geotechnical report and **a memorandum** stating that the details of this site plan have been reviewed from a geotechnical perspective and the findings and recommendations of the reports are valid for the site plan revision. Update report if determined to be necessary.

Response: A copy of the revised geotechnical report by Paterson Group dated April 24, 2020 is included with this submission. The geotechnical memos are referenced in the site servicing report and included in Appendix A of the report.

Comment 9: Similar geotechnical memorandums that were required to support approval of Block 15 will be required for this project (ex. review of servicing installation impact of adjacent building foundations, infiltration rates specific to this site, landscaping plan review, grading plan review, etc.).

Response: See response to Comment 8.

Comment 10: Provide a **copy of the Record of Site Condition (RSC)** acknowledged by the Ministry for this site and **a memorandum** prepared by an environmental consultant confirming that no potential contaminating activities have taken place within the RSC area since the filling of the RSC.

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Response: To be provided by others.

Comment 11: Plan and Profile drawings are required to be submitted as part of the engineering drawing package.

Response: Plan and profile drawings for Kizis Private, the Parking Lot and Servicing Block are included with this submission. Refer to Drawings 4 and 5.

Comment 12: All townhouse units are to be serviced internal to the site with only one storm and one sanitary sewer connection to the street.

Response: All townhouse units are serviced internal to the site with only one storm and one sanitary connection to the existing servicing network on Michael Stoqua Street,

Comment 13: Site to be **perimeter metered** similar to Block 15.

Response: Water perimeter meters are included in the vicinity of both connections to the existing 200 mm watermains, but located within the development. Refer to Drawing 3.

Comment 14: Request new boundary conditions to update hydraulic analysis.

Response: Boundary conditions were requested and provided by the City on May 15, 2020. The boundary conditions and the hydraulic analysis are included in Appendix B of the site servicing report.

Comment 15: All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied if it is determined that clay soils are present in this area. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5 m shall be achieved. A memorandum to be provided from geotechnical engineer similar to Block 15.

Response: Refer to PG5345-MEMO.01 dated May 15, 2020 prepared by Paterson Group and included in Appendix A of the site servicing report.

Comment 16: The consultant shall determine if this project will be subject to an Environmental Compliance addressing approval (ECA) for Private Sewage Works. It shall be determined if the exemptions set out under Ontario Regulation 525/98: *Approval Exemptions* are satisfied. All regulatory approvals shall be documented and discussed in the report. If the SWM works are servicing one parcel of land under one ownership an ECA

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would not be required however if the intention is to create POTL to a condominium corporation or multiple condominium corporations an ECA will be required prior to registration of any condominium proposal.

Response: Blocks 1, 2 and 3 will undergo separate Part Lot Control processes for individual ownership severances while Block 4, Kizis Private and the parking area will undergo a separate Part Lot Control Process to form a single ownership. As such, an ECA Approval will be required through the Ministry of the Environment, Conservation and Parks (MECP) through the Direct Submission process as the development does not fall under the exemptions set out in O.Reg 525/98.

Comment 17: Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Site Lighting Plan, Photometric Plan and Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Response: To be provided by others, once the electrical design has been advanced.

Best regards,
David Schaeffer Engineering Ltd.

Anthony Temelini, P.Eng.
Junior Project Manager
T: (613) 875-7862
E: atemelini@dsel.ca

Steve Merrick

From: David Gilbert <DGilbert@Patersongroup.ca>
Sent: Friday, September 22, 2017 2:30 PM
To: Steve Merrick
Subject: RE: Wateridge Village Phase 1B - Geotech Report

Hi Steve,

As discussed, the upper portion of the soils profile within Block 19 consists mainly of a silty clay. If this material were re-compacted across the other blocks, we estimate that the infiltration rate would be approximately 50 mm/day. To provide an accurate infiltration rate assessment, we could complete a series of pask permeameter tests once the material has been placed and re-compacted or in its presence state within Block 19.

Best regards,

David Gilbert, P.Eng.
Senior Geotechnical Engineer

patersongroup
Solution Oriented Engineering
60 years serving our clients

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K2E 7J5
Tel: 613.226-7381 ext. 205

From: Steve Merrick [mailto:SMerrick@dsel.ca]
Sent: Thursday, September 21, 2017 9:21 AM
To: David Gilbert <DGilbert@Patersongroup.ca>
Subject: RE: Wateridge Village Phase 1B - Geotech Report

Hi Dave, same project but a different question. Can Paterson please provide an average infiltration rate for the Block 19? We are looking for this to size our LID systems understanding that the LID measures for Blocks 15, 22 and 24 will be within fill taken from Block 19.

I'll follow up with a phone call this morning to discuss.

Thanks!

Steve Merrick, P.Eng.
Project Manager / Intermediate Designer

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phone: (613) 836-0856 ext. 561
cell: (613) 222-7816
email: smerrick@DSEL.ca

From: Steve Merrick
Sent: Wednesday, September 20, 2017 4:03 PM
To: 'David Gilbert' <DGilbert@Patersongroup.ca>
Cc: 'Adam Fobert' <afobert@dsel.ca>
Subject: RE: Wateridge Village Phase 1B - Geotech Report

Thanks Dave, we are trying to get the feasibility of this option back to Mattamy quickly and your input would really help.

Thanks!

Steve Merrick, P.Eng.
Project Manager / Intermediate Designer

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phone: (613) 836-0856 ext. 561
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email: smerrick@DSEL.ca

From: Steve Merrick
Sent: Wednesday, September 20, 2017 3:29 PM
To: David Gilbert <DGilbert@Patersongroup.ca>
Cc: 'Adam Fobert' <afobert@dsel.ca>
Subject: RE: Wateridge Village Phase 1B - Geotech Report

Hi Dave,

We are looking at some servicing options for Mattamy' blocks at Wateridge and wanted to input from Paterson on zone of influence and sewers in close proximity to the units. I have attached 3 sketches (very rough) showing some restrictive areas. Can you advise on the zone of influence from the footings and provide any other geotechnical recommendations or issues with the proposed sections?

Please refer to the servicing plans for locations of the 3 sections.

Thanks!

Steve Merrick, P.Eng.
Project Manager / Intermediate Designer

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From: Jillian Normand [mailto:Jillian.Normand@mattamycorp.com]
Sent: Wednesday, August 9, 2017 5:21 PM
To: Adam Fobert <AFobert@dsel.ca>; Steve Merrick <SMerrick@dsel.ca>; Anne-Claude Schellenberg <ACSchellenberg@nak-design.com>; Sean Leogreen <sleogreen@nak-design.com>; Anita Bennell <abennell@nak-design.com>; Kevin Murphy <Kevin.Murphy@mattamycorp.com>; Jessica McLellan <Jessica.Mclellan@mattamycorp.com>; Marco VanderMaas <MVanderMaas@q4architects.com>; Daniel Potechin <Daniel.Potechin@mattamycorp.com>
Subject: Wateridge Village Phase 1B - Geotech Report

Hi team,

Please see attached for the updated Geotech Report, for your reference.

Jillian

Jillian Normand
Land Development Manager
T (613) 831-5144 (direct). **C** (613) 415-7786. **F** (613) 831-9060
Jillian.Normand@mattamycorp.com
Ottawa Office: 50 Hines Road, Suite 100, Ottawa, ON Canada K2K 2M5

Steve Merrick

From: Winston Yang <Winston.Yang@ibigroup.com>
Sent: Wednesday, August 16, 2017 11:50 AM
To: Adam Fobert; Jean Lachance
Cc: Jillian Normand; Jim Moffatt
Subject: RE: 918 Mattamy - Wateridge: IBI Servicing Review

Hi Adam and Jean,

I have reviewed the impact as per DSEL design for Block 15, 22 and 24.

Upon review of the proposed grading plans for Blocks 15, 22, and 24, we found the leave grades provided by DSEL to be reasonable.
We do not have a conceptual plan for Block 19 yet. The leave grades for that block seem low for a typical basement development. However they might be fine if underground parking is planned.

For the Servicing side, the storm and sanitary outlets location for each block were changed compared to the MSS and Design Brief.
Then we have implemented the changes DSEL made into our sewer design and have examined the capacity for each downstream sewers.
The result shows that the downstream sewers for storm and sanitary have the capacity to convey the flow for all new outlets for blocks, 15, 22 and 24.

In order to minimize the impact and cost, we are going to shift some manholes to accommodate the new outlets base on DSEL design.
For Block 22, MH210 and MH210A can be shifted to the south to replace the STM101 and SAN1 along Michael Stoqua Street.
For Block 24, MH213 and MH213A can be shifted to the south to replace the STM101 and SAN1 along Moses Tenisco Street. At the same time, MH212 and MH212A will be shifted to the south in order to reduce the length of the sewers.
For Block 15, there is no choice, the manhole STM101 and SAN1 are required for Squadron Crescent.
Since the typical 1200mm Dia. Manholes have been already ordered by the contractor.
We will contact the contractor to find out any further impacts will be caused by shifting the manholes.

For the storm section below. DSEL met the IBI criteria for the proposed lots.
In regards to Block 19, the drainage areas should be corresponded to IBI Lot141, Lot 167 in Phase 1A and Lot208B, Lot209 in Phase 1B.
And the IBI 100 year capture rate is 475l/s (283l/s+63l/s+46l/s+83l/s). Please considered in your design later on.

Should you have any questions please do not hesitate to contact either Jim or me.

Yours truly,

Winston Yang P.Eng.

email Winston.Yang@ibigroup.com web www.ibigroup.com

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From: Adam Fobert [mailto:AFobert@dsel.ca]
Sent: Tuesday, August 15, 2017 5:27 PM
To: Winston Yang <Winston.Yang@ibigroup.com>; Jim Moffatt <jmoffatt@IBIGroup.com>
Cc: Jean Lachance <JLachance@clc.ca>; Jillian Normand <Jillian.Normand@mattamycorp.com>
Subject: 918 Mattamy - Wateridge: IBI Servicing Review

Hello Jim and Winston,

How is your review of our site servicing is coming along? I have reviewed your Design Brief's for Phase 1A and 1B and have compared the analysis contained within to our proposed design.

I offer the following considerations based on my review:

General:
DSEL proposed one storm and one sanitary connection to each block. The City indicated that this was their expectation during our pre-consultation as it is their standard practice for multi-block parcels.

Block 15: The servicing brief shows three connections to Squadron Crescent. DSEL are proposing one connection downstream of the contemplated connections.

Block 22: The surrounding grades slope from east to west. The servicing brief shows a drainage divide mid-block, where half the site drains to Moses Tenisco and the other to Michael Stoqua . Moses Tenisco is 1.14m higher than Michael Stoqua at the proposed road connection points. As such, to avoid fighting grades DSEL proposed storm and sanitary connections to Michael Stoqua only.

Block 24: Moses Tenisco slopes from north to south 1.1m from Hemlock to Mikinak. The servicing brief shows a drainage divide mid-block with connections to Moses Tenisco and Mikinak. DSEL proposed a storm and sanitary outlet at the southern road connection on Moses Tenisco based on Mattamy's proposed site. This avoids fighting grades internally.

Wastewater:
Block 15:

IBI Servicing Brief = 487.3p
Mattamy Proposal = 335p

Proposed connections are downstream of IBI contemplated connections. Population is less than included in servicing brief. Therefore, we do not expect servicing issues with Block 15.

Block 22:

IBI Servicing Brief ~ 105p (note that I am interpolating since half of Block 22 is included in northern half of Block 24.)

Mattamy Proposal = 52p

IBI servicing brief assumed 52.5p tributary to Moses Tenisco. Therefore, we do not expect capacity issues.

Block 24:

IBI Servicing Brief ~284.4p (note that I am interpolating based on the population shown on phase 1A southern half of block 24).

Mattamy Proposal = 364p

DSEL reviewed the available capacity in the receiving sewers and did not see any capacity issues.

Note: Mattamy's proposed servicing eliminates the need for 63.8m of sanitary sewer on Moses Tennisco from MH213A to MH212A. Savings to CLC.

Stormwater:

I have reviewed Appendix E of the servicing briefs to compare our calculations to the assumptions used in the model.

Review of the Summary of DDSWMM Parameters

Block 15:

IBI Servicing brief: No storage assumed. 5 and 100 year capture 396L/s

Mattamy's proposal: 275m3 of storage provided. DSEL's estimated 5-year peak 357.4L/s

Block 19:

IBI Servicing brief: No storage assumed. 194 + 57 (note that Lot 209 and 208B are missing from chart).

Mattamy's proposal: TBD.

Block 22:

IBI Servicing brief: No storage assumed. 5 and 100 year (46 + 46) 92L/s

Mattamy's proposal: 46.5m3 of storage provided. DSEL's estimated 5-year peak 87L/s.

Block 24:

IBI Servicing brief: No Storage. 5 and 100 year capture (162 +162) 324L/s.

Mattamy's proposal: 27.3m3 of storage provided. DSEL's estimated 5-year peak 325.7L/s.

Let me know if you have any comments or questions. Thank you for your time.

Adam Fobert, P.Eng.
Manager of Site Plan Design

DSEL
david schaeffer engineering ltd.

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email: afobert@DSEL.ca

Genavieve Greenberg

From: Jim Moffatt <jmoffatt@IBIGroup.com>
Sent: Tuesday, October 1, 2019 11:26 AM
To: Genavieve Greenberg; Ed Ireland; Karlinda Hinds
Cc: Jillian Normand; Adam Fobert
Subject: RE: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

All sewers and watermains in Wateridge Village Phase 1B, including those on Squadron Crescent and downstream, are in service. If you require any further confirmation of Phase 1B services or have other questions about this Phase, just call me.

From: Genavieve Greenberg [mailto:GGreenberg@dsel.ca]
Sent: Friday, September 27, 2019 11:00 AM
To: Jim Moffatt <jmoffatt@IBIGroup.com>; Ed Ireland <ed.ireland@IBIGroup.com>; Karlinda Hinds <Karlinda.Hinds@ibigroup.com>
Cc: Jillian Normand <Jillian.Normand@mattamycorp.com>; Adam Fobert <AFobert@dsel.ca>
Subject: RE: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

Good morning Jim,

We are working on the servicing plan for this block currently.

We have been asked by the City just to obtain confirmation that the services within Squadron Crescent and the rest of Phase 1B are in fact “in service”. Would it be possible to have that confirmed?

Thank you,

Genavieve Greenberg
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 569
email: ggreenberg@DSEL.ca

From: Jim Moffatt <jmoffatt@IBIGroup.com>
Sent: Friday, September 27, 2019 10:17 AM
To: Ed Ireland <ed.ireland@IBIGroup.com>; Karlinda Hinds <Karlinda.Hinds@ibigroup.com>
Cc: Genavieve Greenberg <GGreenberg@dsel.ca>
Subject: RE: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

Do we have a plan from Dsel showing the servicing requirements for Block 15. We provided sewer outlets near the north west portion of the site.

From: Ed Ireland
Sent: Friday, September 27, 2019 10:06 AM
To: Jim Moffatt <jmoffatt@IBIGroup.com>; Karlinda Hinds <Karlinda.Hinds@ibigroup.com>
Cc: GGreenberg@dsel.ca
Subject: FW: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

Jim and Karlinda,

Can you email Genavieve the Wateridge files she needs and the construction group must have some correspondence with the City regarding service installation.

Ed

From: Genavieve Greenberg [mailto:GGreenberg@dsel.ca]
Sent: Friday, September 27, 2019 10:00 AM
To: Ed Ireland <ed.ireland@IBIGroup.com>
Subject: Wateridge at Rockcliffe Phase 1B Servicing Confirmation (Block 15)

Good morning Ed,

We have been requested by the City to obtain correspondence to confirm that the surrounding services for the proposed development are in service. Would you be able to provide confirmation that all of Wateridge Village at Rockcliffe Phase 1B are in service. Would you be able to confirm this for us?

I was also wondering if you might be able to send the most recent drawings for Phase 1B and if possible CAD for the Ponding Plan, Drawing No. 751.

I will give you a call this morning to discuss these items. If you have any questions at all please feel free to reach out to me.

Thank you,

Genavieve Greenberg
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 569
email: ggreenberg@DSEL.ca

SCHEDULE A
SEWAGE WORKS ALLOWED UNDER THE TRANSFER OF REVIEW PROGRAM

Works allowed to be submitted under the TOR program by the Municipality are described in Sections 1 and 2 below. The works must also meet any requirements in the applicable section. Works that are not described in Section 1 or 2, do not meet any applicable requirements or to which Section 3 applies are not allowed to be submitted under the TOR program.

1. Standard Works Allowed

i) Allowed Sanitary Sewage Works

Unless specified in Section 3 of this Schedule, only ECA applications for the following sanitary sewage works are allowed to be submitted by the Municipality under the TOR Program:

a. New or modified, municipal or private sanitary sewers, forcemains or siphons that:

   i. are designed in accordance with the Ministry document *Design Guidelines for Sewage Works, 2008* (PIBS 6879) as amended from time to time;
   ii. are not combined sewers; and
   iii. do not discharge directly to a sewage treatment plant.

b. New or modified, municipal or private sanitary sewage pumping stations that:
   i. are designed in accordance with the Ministry document *Design Guidelines for Sewage Works, 2008* (PIBS 6879) as amended from time to time; and
   ii. do not discharge directly to a sewage treatment plant.

For greater clarity, any sanitary sewage works that provide any treatment of sanitary sewage are not allowed to be submitted under the TOR program.

ii) Allowed Stormwater Works

Unless specified in Section 3 of this Schedule, only ECA applications for the following stormwater works are allowed to be submitted by the Municipality under the TOR Program:

a. New or modified municipal or private storm sewers, ditches, culverts and grassed swales that:

   i. are designed in accordance with the Ministry document *Stormwater Management Planning and Design Manual, 2003* (PIBS 4329e) as amended from time to time;
   ii. are designed primarily for the collection and transmission of stormwater;
   iii. discharge to existing storm sewers, other existing stormwater conveyance works, an approved stormwater management facility, or a Municipal Drain;
   iv. for drainage works under the *Drainage Act*, approval of a petition for the modifications must be obtained under the *Drainage Act* prior to submitting an application for an ECA;
   v. are not combined sewers or superpipes and does not connect to a combined sewer;
   vi. are not located on industrial land or designed to service industrial land;
   vii. do not propose to collect, store or discharge stormwater containing substances or pollutants (other than Total Suspended Solids, or oil and grease) detrimental to the environment or human health; and
   viii. do not require the establishment and monitoring of effluent quality criteria.

b. New or modified, municipal or private oil/grit separators that:

i. are designed in accordance with the Ministry document *Stormwater Management Planning and Design Manual, 2003* (PIBS 4329e) as amended from time to time;
ii. discharge to existing storm sewers, other existing stormwater conveyance, an approved stormwater management facility, or a Municipal Drain;
iii. for drainage works under the *Drainage Act*, approval of a petition for the modifications must be obtained under the *Drainage Act* prior to submitting an application for an ECA;
iv. are not located on industrial land or designed to service industrial land;
v. do not propose to collect, store or discharge stormwater containing substances or pollutants (other than Total Suspended Solids, or oil and grease) detrimental to the environment or human health; and
vi. do not require the establishment and monitoring of effluent quality criteria.

2. Additional Works Allowed

The Municipality may submit ECA applications for sanitary and/or stormwater works other than those allowed in Section 1 as described below and in accordance with any listed requirements.

The Municipality's TOR Program is expanded to include:

a. Combined Sewers

- the rehabilitation of existing combined sewers where there is no increase in combined sewage overflow (CSO).

b. Stormwater Management Facilities (wet ponds, wetlands, hybrid ponds, dry ponds)

- altering, modifying, adding, optimizing or expanding the retention capacity for existing approved stormwater management facilities, including stormwater outfalls, provided that:
  - if the proposed works are required to provide quality control, the works are designed to achieve Enhanced Level water quality control and erosion protection (i.e. 80% TSS removal); and
  - any attenuation design requirements are satisfied;

- installing new stormwater management facilities, including stormwater outfalls, provided that:
  - if the proposed works are required to provide quality control, the works are designed to achieve Enhanced Level water quality control and erosion protection (i.e. 80% TSS removal); and
  - any attenuation design requirements are satisfied;

- stormwater pumping stations.

c. Lot Level and Conveyance Control (Low Impact Development) Measures

- altering, modifying, adding, optimizing or expanding the retention capacity for existing approved low impact development (LID) measures, including stormwater outfalls, provided that:

  - if the proposed works are required to provide quality control, the LID measures are designed to achieve Enhanced Level water quality control and erosion protection (i.e. 80% TSS removal); and
  - any attenuation design requirements are satisfied;

- installing new LID measures, including stormwater outfalls, provided that:
  - if the proposed works are required to provide quality control, the LID measures are designed to achieve Enhanced Level water quality control and erosion protection (i.e. 80% TSS removal);
  - any attenuation design requirements are satisfied; and
  - the design considers corrective and remediation measures in the event of lack of performance of the LID measures;

- rooftop, surface and underground storage with inlet control devices or orifices.

For Works listed in 2a through 2c the following requirements must be met:

- the Works must be designed in accordance with the Ministry documents *Design Guidelines for Sewage Works, 2008* (PIBS 6879) and *Stormwater Management Planning and Design Manual, 2003* (PIBS 4329e), as amended from time to time;

- the Works must receive drainage only from non-industrial lands, where industrial lands are defined by *Ontario Regulation 525/98*;

- any stormwater management pond listed in 2b above shall not be used as a snowmelt facility;

- for Works that are designed to partially infiltrate or exfiltrate into the surrounding soils during high flow conditions:
  - based on the type of works, the vertical separation distance between the highest groundwater table (i.e. spring runoff) and the lowest elevation of the works shall adhere to Table 4.1 of the Ministry document *Stormwater Management Planning and Design Manual, 2003* (PIBS 4329e); and
  - groundwater must not be utilized as a potable water resource anywhere drainage is captured by the stormwater management works;

- infiltration or exfiltration stormwater works include:
  - pervious pipes and catch-basins;
  - filtering systems, and infiltration trenches, such as, soak away pits attached to pervious catch-basins and sand filter beds;
  - infiltration basins;
  - pervious pipes and catch-basins with infiltration trench systems, rainwater and snow melt into the surrounding soils during high flow conditions; and
  - open channels, ditches, swale drainage systems, bio-swales, tree pits, and infiltration trenches on public roads, or right-of-ways, designed to exfiltrate part or all of the stormwater runoff from the adjacent road into the surrounding soils. These types of works are to include vegetative surfaces;

- for stormwater pumping stations, high level alarm systems, appropriate response time during emergency conditions, and redundancy in pumping arrangement must be provided;

- for the rehabilitation of existing combined sewers, the Works must conform to *Ministry Procedure F-5-5, Determination of Treatment Requirements for Municipal and Private Combined and Partially Separated Sewer Systems*, as amended from time to time;

- for drainage works under the *Drainage Act*, approval of a petition for the modifications must be obtained under the *Drainage Act* prior to submitting an application for an ECA;

- the description of the works for a new or replacement outfall will identify the receiving watercourse if it discharges into any of the provincially recognized critical receivers and/or their tributaries;

- the applicant has consulted with the local Conservation Authority and obtained necessary clearance as required, if the works discharge to a surface water body;

- as part of the Letter of Recommendation, the Municipality has clearly identified all of the works which fall under this Section of Schedule A;

- the Municipality has notified all applicants for works allowed in this Section that the ECA may contain conditions requiring the development of an operation and maintenance program, including a spill contingency plan for the works; the Municipality shall include in their Letter of Recommendation any other conditions related to operation and maintenance of the works if applicable; and

- the Municipality shall maintain a report with detailed records of all the stormwater management works constructed during the year.

The report and records noted above are to include, but not be limited to, the approval number, date of approval, location, description of the stormwater management works, information about what, how, when, why and who operates and maintains the works.

The report must also include a summary of the operation and maintenance program activities, any trouble shooting activities, reports of any flooding conditions and/or any complaints received from the public. The report must also include a statement concerning the potential for these stormwater management systems to impact groundwater quality, which will be based upon the available evidence from inspection and maintenance activities.

The Ministry may require the submission of this report upon request. Further instructions on where and to whom the report is to be submitted will be provided by the Ministry.

In most cases, private works included in this Section will be subject to the requirements under the Environmental Bill of Rights (EBR), which includes mandatory posting of the project proposal on the Environmental Registry for a minimum of forty-five (45) days prior to the issuance of the Environmental Compliance Approval. Ontario Regulation 681/94 under the EBR sets forth the types of ECAs that are classified as Class I or II proposals which require posting on the Environmental Registry. All private wastewater ECAs are subject to posting on the Environmental Registry unless they relate to a discharge point which is already subject to an ECA approval and the proposed ECA would not permit an increase in the discharge of any specific contaminant from the discharge point. In addition, as per section 30 of the EBR, a proposal may be exempt from EBR requirements if the proposal has been considered in a substantially equivalent process of public participation.

3. Works Not Allowed To Be Submitted

Under no circumstances are the following applications for Works identified in either Section 1 or 2 to be submitted under the TOR program:

a. applications that are identified by the local Ministry District Office as being proposed within the zone of influence of a landfill area;

b. applications for sanitary sewage works that provide any treatment of sanitary sewage;

c. applications for Regional Stormwater Control Facilities or Regional Flood Control Facilities consisting of storm water management ponds that are designed to provide quality control or contain floods **greater than** the 100 year flood event;

d. applications that are for airports or airparks;

e. applications that are for pumping stations that service combined sewer systems;

f. applications for projects that have received a Part II Order request, until the request has been decided;

g. applications for projects that have undertaken an individual Environmental Assessment; and

h. applications that are likely to trigger the Duty to Consult.

In addition, if the Municipality determines that the works listed in an application have been constructed or are being constructed before an Environmental Compliance Approval has been issued, the Municipality shall:

i. immediately notify the local Ministry District Office; and

ii. confirm with the Supervisor, Transfer of Review Program (Supervisor) that the application must be submitted directly to the Ministry for review. Once this confirmation is obtained, the municipality shall return the application and all associated documents and fees to the applicant and advise them that the application will not be reviewed under the TOR program. With written permission from the Supervisor, the municipality may be allowed to proceed with the review of the application.

4. 2020 Program Update: Proposed Consolidated Linear Infrastructure Approach

In view of the Ministry's plan to move to a consolidated permissions approach to linear infrastructure in the near future and subject to the written permission of the Supervisor, the municipality may be allowed in the interim to review additional works currently not listed in this schedule (including private works that may not be covered at the time of the application by an agreement pursuant to the Planning Act under section 1 of this Agreement).

Anthony Temelini

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: May 6, 2020 1:24 PM
To: Anthony Temelini
Cc: Jennifer Ailey
Subject: RE: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements

Good Afternoon Anthony,

If the flows are still ultimately being directed to the Eastern SWM facility before being discharged to a watercourse (in keeping with the original intent in the overall drainage plan, then The RVCA would not require any further onsite water quality control measures save and accept LID's or best management practices where appropriate.

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

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

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: Tuesday, May 5, 2020 2:48 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements

Hi Jamie,

I'm writing to you regarding the proposed development known as Wateridge Village – Phase 1B Block 22, located at 1400 Hemlock Road, which proposes 20 back-to-back stacked townhomes, 18 rear lane townhomes and surface parking on 0.46 ha of land. Please see the attached map from GeoOttawa and the current site plan for your reference.

The subject property is located within the Ottawa River watershed and was contemplated in the overall design for Wateridge Village at Rockcliffe Phase 1B, prepared by IBI Group. The subject site was also accounted for in the design of the permanent pool of the Eastern SWM Facility which provides 80% TSS removal for the subdivision.

The drainage plan per the approved servicing report by IBI Group is attached and shows the subject lands with a runoff coefficient of 0.80 with flow directed to the Eastern SWM Facility. Please note that the approved drainage plan contemplated splitting storm flows from the site to Michael Stoqua Street and Moses Tennisco Street, but the current

storm strategy proposes sending all of the minor system drainage to Michael Stoqua Street as the City of Ottawa has requested a singular connection to the existing storm sewer system.

The current design for the development will direct minor system flow to the Eastern SWM Facility with major flow directed to the dry pond south of the site and ultimately to the Eastern SWM facility via the minor storm sewer system, which is generally consistent with the approved design by IBI Group. It should also be noted that the design for Block 22 will incorporate LID measures.

Based on this information, can you please confirm if any additional quality controls are required for Wateridge Village – Phase 1B Block 22?

Please feel free to contact me should you have any questions or if you would like to discuss.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

Anthony Temelini

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: November 23, 2020 11:59 AM
To: Anthony Temelini
Cc: Jennifer Ailey; Conor Sutherland
Subject: RE: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements and LID Strategy

Good Afternoon Anthony,

I can confirm that the proposed LID's are acceptable. The RVCA did not conduct a technical review, but only reviewed the proposed methods from a general perspective.

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

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

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: Friday, November 20, 2020 11:14 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>; Conor Sutherland <Conor.Sutherland@mattamycorp.com>
Subject: RE: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements and LID Strategy

Jamie,

I apologize for the multiple e-mails, but I just wanted to clarify that we are not looking for a full technical review of the LID strategy.

Rather, we would just appreciate confirmation from the RVCA that the proposed approach (i.e. the use of extended CB sump pits and goss traps) is acceptable for pre-treatment of the stormwater flows for the proposed development. This was the City's only comment with regards to the LID strategy.

Please let me know if you have any questions.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

From: Anthony Temelini
Sent: November 20, 2020 9:30 AM
To: 'Jamie Batchelor' <jamie.batchelor@rvca.ca>
Cc: 'Jennifer Ailey (jailey@dsel.ca)' <jailey@dsel.ca>; 'Conor Sutherland' <Conor.Sutherland@mattamycorp.com>
Subject: RE: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements and LID Strategy

Hi Jamie,

I left you a voicemail earlier this week and I was just wondering if you've had a chance to review the below and attached for the proposed LID strategy for Wateridge Village – Block 22. Can you please confirm that it is acceptable to the RVCA?

Please let me know if you have any questions.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
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From: Anthony Temelini
Sent: November 17, 2020 5:27 PM
To: 'Jamie Batchelor' <jamie.batchelor@rvca.ca>

Cc: 'Jennifer Ailey (jailey@dsel.ca)' <jailey@dsel.ca>; 'Conor Sutherland' <Conor.Sutherland@mattamycorp.com>
Subject: RE: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements and LID Strategy

Hi Jamie,

Further to below, please see attached for our latest servicing design and details showing the proposed LID strategy for Wateridge Village – Block 22:

- LIDs provided in the form of oversized (375 mm – 450 mm diameter) perforated pipes surrounded by a geotextile fabric and clear stone, connected to proposed catch basins (see Drawings 4 and 7).
    - This is considered to be a soakaway trench and chamber system, which is acceptable for development based on the LID guidelines.
- Flows from parking areas and rooftops are directed to the LID system.
- Pre-treatment is provided in the form of extended sump pits in the catch basins, connecting to goss traps so as to limit debris entering the perforated pipe (see Drawing 7).
- Refer to Drawing 9 for proposed erosion and sediment control measures during construction.

We are currently in the final stages of review with the City of Ottawa and per my discussions with our reviewer, they currently do not object to the proposed LID measures. However, they are asking for the RVCA's concurrence before providing their final approval.

As such, can you please review the attached and confirm that the proposed LID strategy is acceptable to the RVCA?

Please let me know if you have any questions.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

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Subject: RE: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements

Good Afternoon Anthony,

If the flows are still ultimately being directed to the Eastern SWM facility before being discharged to a watercourse (in keeping with the original intent in the overall drainage plan, then The RVCA would not require any further onsite water quality control measures save and accept LID's or best management practices where appropriate.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
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Sent: Tuesday, May 5, 2020 2:48 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: 948 - Wateridge Village - Phase 1B Block 22 Water Quality Requirements

Hi Jamie,

I'm writing to you regarding the proposed development known as Wateridge Village – Phase 1B Block 22, located at 1400 Hemlock Road, which proposes 20 back-to-back stacked townhomes, 18 rear lane townhomes and surface parking on 0.46 ha of land. Please see the attached map from GeoOttawa and the current site plan for your reference.

The subject property is located within the Ottawa River watershed and was contemplated in the overall design for Wateridge Village at Rockcliffe Phase 1B, prepared by IBI Group. The subject site was also accounted for in the design of the permanent pool of the Eastern SWM Facility which provides 80% TSS removal for the subdivision.

The drainage plan per the approved servicing report by IBI Group is attached and shows the subject lands with a runoff coefficient of 0.80 with flow directed to the Eastern SWM Facility. Please note that the approved drainage plan contemplated splitting storm flows from the site to Michael Stoqua Street and Moses Tennisco Street, but the current storm strategy proposes sending all of the minor system drainage to Michael Stoqua Street as the City of Ottawa has requested a singular connection to the existing storm sewer system.

The current design for the development will direct minor system flow to the Eastern SWM Facility with major flow directed to the dry pond south of the site and ultimately to the Eastern SWM facility via the minor storm sewer system, which is generally consistent with the approved design by IBI Group. It should also be noted that the design for Block 22 will incorporate LID measures.

Based on this information, can you please confirm if any additional quality controls are required for Wateridge Village – Phase 1B Block 22?

Please feel free to contact me should you have any questions or if you would like to discuss.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

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patersongroup

Geotechnical Investigation

Proposed Residential Development
Block 22
1400 Hemlock Road
Ottawa, Ontario

Prepared For

Mattamy Homes

September 10, 2020

Report: PG5345-1 Revision 1

Table of Contents

Page

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Mattamy Homes to conduct a geotechnical investigation for the proposed residential development located within Block 22 of the Wateridge Residential development located at 1400 Hemlock Road in the City of Ottawa (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objective of the current investigation was to:

- Determine the subsoil and groundwater conditions at this site by means of test holes.

- Provide geotechnical recommendations pertaining to design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

Investigating the presence or potential presence of contamination on the subject property was not part of the scope of work of this present investigation. A Phase I - Environmental Site Assessment (ESA) was conducted by Paterson for the subject site. The results and recommendations of the Phase I - ESA are presented under separate cover.

2.0 Proposed Development

Based on the available site plans, the proposed development within Block 22 will consist of a total of 38 units including townhouses and stacked units. It is further expected that at-grade asphalt covered car parking, access lanes and landscaping areas are also anticipated as part of the proposed development. It is expected that the aforementioned blocks will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the geotechnical investigation was carried out on March 3, 6, 7 and 8, 2017 for Blocks 15, 19, 22 and 24. During that time, a total of 3 boreholes were advanced to a maximum depth of 3.9 m below existing ground surface for Block 22. In addition, a total of 2 test pits were extended to a maximum depth of 1.6 m using a hydraulic excavator to assess the depth and quality of the overlying fill throughout the subject sites. A supplemental investigation consisting of 5 auger holes were advanced on September 3, 2020 within the proposed infiltration system footprint. The test holes were located in a manner to provide general coverage of the site and taking into consideration of existing site features and underground utilities. The locations of the test holes are shown on Drawing PG5345-1 - Test Hole Location Plan included in Appendix 2.

Test pits were excavated using a hydraulic shovel and the boreholes were extended using a track mounted drill rig. All fieldwork was conducted under the full-time supervision of our personnel under the direction of a senior engineer from our geotechnical department. The excavating procedures consisted of advancing each test hole to the required depths at the selected locations and sampling the overburden.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are logged on the Soil Profile and Test Data sheets presented in Appendix 1 of this report.

Sampling and In Situ Testing

Soil samples were recovered during drilling from the auger flights or a 50 mm diameter split-spoon sampler while the soil samples from the test pits were recovered from the side walls of the open excavation. The auger and split spoon samples recovered from the boreholes and the grab samples recovered from the sidewalls of the open test pits were placed in sealed plastic bags and all samples were transported to our laboratory. The depths at which the auger, split-spoon and grab samples were recovered from the test holes are shown as ‘AU’, ‘SS’ and ‘G’, respectively, on the Soil Profile and Test Data sheets presented in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as "N" values on the Soil Profile and Test Data sheets. The "N" value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

Undrained shear strength testing was conducted in cohesive soils using a field vane apparatus.

All soil samples were classified on site, placed in sealed plastic bags and were transported to our laboratory for visual inspection. Reference should be made to the Soil Profile and Test Data sheets presented in Appendix 1 for specific details of the soil profile encountered at the test hole locations.

Groundwater

51 mm diameter PVC groundwater monitoring wells were installed within BH 16-17 to permit monitoring of the groundwater levels subsequent to the completion of the sampling program.

Monitoring Well Installation

Typical monitoring well construction details are described below:

- ❑ 1.5 m of slotted 51 mm diameter PVC screen at the base of the aforementioned boreholes.
- ❑ 51 mm diameter PVC riser pipe from the top of the screen to the ground surface.
- ❑ No.3 silica sand backfill within annular space around screen.
- ❑ A minimum of 300 mm thick bentonite hole plug directly above PVC slotted screen.
- ❑ Clean backfill from top of bentonite plug to the ground surface.

The remainder of the boreholes completed during the geotechnical investigation were instrumented with flexible standpipes to monitor the groundwater level subsequent to the completion of the sampling program. The groundwater levels were recorded during the open test pits upon completion of the sampling program.

3.2 Field Survey

The boreholes completed during the current investigation were selected by Paterson and located in the field and surveyed by J. D. Barnes Limited. The test pits were selected, located and surveyed in the field by Paterson personnel to provide general coverage of the subject site by taking into consideration of former buildings, existing site features and underground utilities. The ground surface elevations at the test pits locations were reference to the ground surface elevations at nearby borehole locations previously surveyed by J. D. Barnes Limited. The locations and ground surface elevation at each test hole location are presented on Drawing PG5345-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

The soil samples recovered from the subject site were visually examined in our laboratory to review the results of the field logging.

One soil sample was submitted for grain size distribution analysis within Block 22 during the previously geotechnical investigation completed for the adjacent roadways by DST Consulting Engineers. The Grain Size Distribution sheet is provided in Appendix 1

Furthermore, Atterberg Limits testing was also conducted on two (2) representative soils samples within the adjacent roadways during the previous geotechnical investigation completed by DST Consulting Engineers. The Atterberg Limits testing sheets are provided in Appendix 1.

3.4 Analytical Testing

A total of 4 representative soil samples were submitted by others during the previous geotechnical investigation for analytical testing for the overall site to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The samples were submitted at that time to determine the concentration of sulphate and chloride, the resistivity and the pH of the sample within the adjacent roadways. The results are presented in Appendix 1 and are discussed further in Subsection 6.7.

Paracel Laboratories (Paracel), of Ottawa, performed the laboratory analysis of the soil sample submitted for analytical testing. Paracel is a member of the Standards Council of Canada/Canadian Association for Environmental Analytical Laboratories (SCC/CAEAL). Paracel is accredited and certified by SCC/CAEAL for specific tests registered with the association.

The following testing guidelines were utilized for the submitted soil samples. The anions were analyzed using EPA 300.1, the pH was analyzed using EPA 150.1, the resistivity was analyzed using EPA 120.1, and the percent solids was determined using gravimetrics.

4.0 Observations

4.1 Surface Conditions

The area covered by Block 22 was acquired by the Department of National Defence in the 1890's and used as a military base known as CFB Rockcliffe until the early 2010's. The majority of the subject section of the site was occupied by Private Married Quarters (PMQ's), outbuildings and common areas which were municipally serviced and linked by private asphalt covered roadways. By 2013, all structures within the subject section of the site were demolished while leaving the bulk of the asphalt covered roadways and municipal services intact.

Currently, Block 22 was generally grass covered and sparsely treed at the time of our field investigation completed between March 3 and 8, 2017. Some areas of the subject site are currently being utilized by the local contractors by placing construction trailers, generators and stockpiling material and equipment for the installation of the municipal services and construction of the proposed roadways around the perimeter of the sites.

The subject site is generally at grade with neighbouring properties and appears to be at grade with the proposed roadways which are currently under construction.

4.2 Subsurface Profile

Overburden

A total of 3 boreholes (BH 5-17, BH 6-17 and BH 16-17) and 2 test pits (TP 5-17, and TP 6-17) were extended to a maximum depth of 3.9 m below existing ground surface within Block 22. The subsoil conditions encountered at the test hole locations consist of an overlying fill extending to a maximum depth of 0.7 m overlying a very stiff to stiff brown silty clay which in turn is overlying a compact glacial till consisting of a brown to grey silty sand with gravel, trace clay, gravel, cobbles and boulders.

Practical auger refusal was encountered at each borehole location varying between 3.3 and 3.9 m at BH 6-17 and BH 5-17, respectively below existing ground surface within Block 22.

Bedrock

Based on available geological mapping, the subject sites are located in an area which straddles an interbedded limestone, shale and quartz sandstone of the Gull River Formation and a grey limestone of the Bobcaygeon Formation. The overburden drift thickness is estimated to be between 2 to 15 m depth.

4.3 Groundwater

Groundwater level readings were recorded on March 20, 2017, at the borehole locations. The groundwater level readings are presented in Table 1 below. Long-term groundwater level can also be estimated based on the observed colour, moisture levels and consistency of the recovered soil samples. Based on these observations, the long-term groundwater level is expected between 2 to 3 m depth. It should be noted that groundwater levels are subject to seasonal fluctuations, therefore the groundwater levels could vary at the time of construction.

Table 1 - Summary of Groundwater Level Readings

Borehole Number	Ground Elevation (m)	Groundwater Levels (m)		Recording Date
		Depth	Elevation	
BH 5-17	88.50	damaged	-	March 20, 2017
BH 6-17	88.51	n/a	-	March 20, 2017
* BH 16-17	88.25	1.22	87.03	March 20, 2017

Note:
* - Denotes borehole instrumented with a 51 mm diameter monitoring well.
- The ground surface elevations at each borehole location were provided by J. D. Barnes Limited.

4.4 Low Impact Development Feasibility

It is our understanding that storm water Infiltration chambers along with perforated pipes are proposed to be placed along the Kizis Private and the parking areas with an invert proposed at an approximate elevation of 87.5 m. Therefore, Paterson conducted a permeameter testing program of the underlying soils to confirm the required infiltration rates for the proposed infiltration chambers. The following summarizes the field observations during the supplemental investigation and the results of the testing.

In-Situ Testing

Permeameter testing was conducted using a Pask (Constant Head Well) Permeameter. At each location, an 83 mm hole was excavated using a Riverside/Bucket auger to a depth of 0.1 to 0.2 and 0.5 to 0.9 m below existing ground surface. All soil from the auger flights were visually inspected and initially classified on site. The permeameter reservoir was filled with water and inverted into the hole, ensuring it was relatively vertical and rests on the bottom of the hole. The water level of the reservoir was monitored at various time intervals until the rate of fall out of the permeameter reached equilibrium, known as *quasi "steady state"* flow rate. Quasi steady state flow can be considered to have been obtained after measuring 3 to 5 consecutive rate of fall readings with identical values. The values for the steady state rate of fall were recorded for each location.

Testing Results

A total of 10 constant head Pask permeameter tests were conducted at 5 locations within the eastern portion of the subject site to determine the design infiltration rates of the soils below the proposed infiltration system. The permeameter test locations were selected by Paterson in a manner to provide general coverage of the proposed infiltration system. Preparation and testing of this investigation are in accordance with the Canadian Standards Association (CSA) B65-12 - Annex E. The field saturated hydraulic conductivity (K_{fs}) values and design infiltration rates for each test hole location are presented in Table 2.

Field saturated hydraulic conductivity values were determined using Engineering Technologies Canada (ETC) Ltd. reference tables provided in the most recent ETC Pask Permeameter User Guide dated March 2016. The design infiltration rates were determined using Appendix C of the Low Impact Development Stormwater Management Planning and Design Guide (CVC, 2011). It should be noted that a safety correction factor was applied to the calculated design infiltration rates at each test hole location.

Table 2 - Field Saturated Hydraulic Conductivity and Design Infiltration Rates

Test Hole ID	Invert of Infiltration System (m)	Invert of Permeameter Testing (m)	K_{fs} (m/sec)	Infiltration Rate (mm/hr)	Design Infiltration Rate (mm/hr)	Soil Type
AH1	87.56	87.56	$2.7x10^{-6}$	59	23.5	Fill Material
		87.26	$1.7x10^{-5}$	95		
AH2	87.73	87.73	$< 2.2x10^{-8}$	< 18	< 7	Silty Clay
		87.40	$< 2.2x10^{-8}$	< 18		
AH3	87.74	87.60	$< 2.2x10^{-8}$	< 18	< 7	Silty Clay
		87.22	$6.3x10^{-8}$	23		
AH4	88.68	87.36	$< 2.2x10^{-8}$	< 18	< 7	Silty Clay
		87.06	$< 2.2x10^{-8}$	< 18		
AH5	88.55	88.35	$< 6.3x10^{-8}$	< 23	< 9	Silty Clay
		88.15	$< 6.3x10^{-8}$	< 23		

Based on Paterson's field investigation, the field saturated hydraulic conductivity values and design infiltration rates measured at the base of the proposed infiltration system are consistent with similar material Paterson has encountered on other blocks within the development and other sites with similar subsoil structures and typical values for silty clay deposits and fill material. Field saturated hydraulic conductivity values for the existing fill material range from $2.7x10^{-6}$ to $1.7x10^{-5}$ m/sec, while the silty clay ranges from $<2.2x10^{-8}$ to $6.3x10^{-8}$ m/sec. The design infiltration rate at the proposed system location ranges between < 7 mm/hr within the silty clay to 23.5 mm/hr within the existing fill material. It is recommended that the proposed infiltration system invert elevations are constructed at least 1 m above the long-term groundwater level to promote infiltration.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site based on the current plans is suitable for the proposed development. It is expected that the proposed residential buildings will be founded on conventional spread footings placed on a very stiff to stiff silty clay, compact glacial till, engineered fill and/or bedrock bearing surface

It is expected that some bedrock removal will be most likely be required within the north portion of Block 22 for building construction and service installation.

Due to the presence of a silty clay deposit encountered at the previously completed test holes, a permissible grade raise restriction is required for the subject site. If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill and/or other measures should be investigated to reduce the risks of unacceptable long-term post construction total and differential settlements.

Where the existing fill is encountered at design underside of footing elevation, it is anticipated that the footings will be extended to an undisturbed bearing surface or placed on an approved engineered fill placed on an undisturbed bearing surface.

The above and other considerations are discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and fill, such as those containing organic or deleterious materials, should be stripped from under any buildings and other settlement sensitive structures. It is anticipated that the existing fill, free of deleterious material and significant amounts of organics, can be left in place below the proposed building footprint, outside of lateral support zones for the footings, and below the proposed parking area and access lane. However, it is recommended that the existing fill layer **be proof-rolled several times under dry conditions and above freezing temperatures and approved by the geotechnical consultant at the time of construction**. Any poor performing areas noted during the proof-rolling operation should be removed and replaced with an approved fill.

Existing foundation walls, service pipes and other construction debris should be entirely removed from within the building perimeter.

Bedrock Removal

Based on the bedrock encountered in the area, it is expected that line-drilling in conjunction with hoe-ramming or controlled blasting will be required to remove the bedrock. In areas of weathered bedrock and where only a small quantity of bedrock is to be removed, bedrock removal may be possible by hoe-ramming.

Prior to considering blasting operations, the effects on the existing services, buildings and other structures should be addressed. A pre-blast or pre-construction survey located in proximity of the blasting operations should be conducted prior to commencing construction. The extent of the survey should be determined by the blasting consultant and sufficient to respond to any inquiries/claims related to the blasting operations.

As a general guideline, peak particle velocity (measured at the structures) should not exceed 50 mm/s during the blasting program to reduce the risks of damage to the existing structures.

The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is an experienced blasting consultant.

Vibration Considerations

Construction operations could cause vibrations, and possibly, sources of nuisance to the community. Therefore, means to reduce the vibration levels as much as possible should be incorporated in the construction operations to maintain a cooperative environment with the residents.

Two parameters determine the recommended vibration limit, the maximum peak particle velocity and the frequency. For low frequency vibrations, the maximum allowable peak particle velocity is less than that for high frequency vibrations. As a guideline, the peak particle velocity should be less than 15 mm/s between frequencies of 4 to 12 Hz, and 50 mm/s above a frequency of 40 Hz (interpolate between 12 and 40 Hz). These guidelines are for current construction standards. These guidelines are above perceptible human level and, in some cases, could be very disturbing to some people. A pre-construction survey is recommended to minimize the risks of claims during or following the construction of the proposed building.

Fill Placement

Fill used for grading purposes beneath the proposed buildings, such as for in-filling existing channels/ditches, should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The fill should be tested and approved prior to delivery to the site. It should be placed in lifts no greater than 300 mm in thickness and compacted using suitable compaction equipment for the specified lift thickness. Fill placed beneath the building areas should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and be compacted at minimum by the tracks of the spreading equipment to minimize voids. If these materials are to be used to build up the subgrade level for areas to be paved, they should be compacted in thin lifts to a minimum density of 95% of their respective SPMDD. Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls.

5.3 Foundation Design

Bearing resistance values are provided in Table 2 for footings placed on an undisturbed silty clay, glacial till or clean bedrock bearing surface. Footings designed using the bearing resistance values at SLS provided in Table 2 will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively. Footings placed on clean, surface sounded bedrock will be subjected to negligible settlements.

Where existing fill is encountered directly below the underside of footing (USF), the footings may be required to be lowered to an undisturbed, native bearing surface. Alternatively, a zero-entry, vertical trench can be excavated below the USF down to a native material and in-filled with engineered fill, compacted to a minimum 98% of the material's SPMDD or lean concrete mix (Minimum 15 MPa, 28 day strength). The in-filled trenches should be extended a minimum 150 mm beyond the footing face on all directions.

An undisturbed soil bearing surface consists of a surface from which all organic materials and deleterious materials, such as loose, frozen or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete for footings. A clean, surface-sounded bedrock bearing surface should be free of loose materials, and have no near surface seams, voids, fissures or open joints which can be detected from surface sounding with a rock hammer.

Table 3 - Bearing Resistance Values

Bearing Surface	Factored Bearing Resistance Values at ULS (kPa)	Bearing Resistance Values at SLS (kPa)
Stiff Silty Clay	225	150
Engineered Fill over In Situ Soil	225	150
Dense Glacial Till	250	175
Clean Surface Sounded Bedrock	1500	1000

Notes:
- ULS - Ultimate Limit States
- SLS - Serviceability Limit States
- A geotechnical resistance factor of 0.5 was applied to the provided bearing resistance values at ULS

Where a building is founded partly on bedrock and partly on soil, it is recommended to decrease the soil bearing resistance value by 25% for the footings placed on soil bearing media to reduce the potential long term total and differential settlements. Also, at the soil/bedrock and bedrock/soil transitions, it is recommended that the upper 0.5 m of the bedrock be removed for a minimum length of 2 m (on the bedrock side) and replaced with nominally compacted OPSS Granular A or Granular B Type II material. The width of the sub-excavation should be at least the proposed footing width plus 0.5 m. Steel reinforcement, extending at least 3 m on both sides of the 2 m long transition, should be placed in the top part of the footings and foundation walls.

Permissible Grade Raise Recommendations

Permissible grade raise recommendations have been determined for the proposed development based on the undrained shear strength values observed within the silty clay deposit during our field investigation. Based on our findings, a 2 m permissible grade raise should be used for the Block 22.

To reduce potential long term liabilities, consideration should be given to provide means to reduce long term groundwater lowering (e.g. clay dykes, restriction on planting around the structures, etc). It should be noted that building on silty clay deposits increases the likelihood of building movements and, therefore, of cracking. The use of steel reinforcement in foundations placed at key structural locations will tend to reduce foundation cracking as compared to unreinforced foundations.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to the insitu soils above the groundwater table when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V passes only through in situ soil of the same or higher capacity as the bearing medium soil. In sound unfractured bedrock, a 1H:6V slope may be used.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class C** for the shallow foundations considered within Block 22. A higher site class, such as Class A or B, may be available for foundations placed on or near the bedrock surface. However, the higher site class would have to be confirmed by site specific seismic shear wave velocity testing.

The soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the 2012 Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Basement Slab

With the removal of all topsoil and deleterious fill, such as those containing organic materials, within the footprint of the proposed buildings, the native soil or engineered fill surface will be considered to be an acceptable subgrade on which to commence backfilling for floor slab construction.

Any soft areas should be removed and backfilled with appropriate backfill material prior to placing any fill. OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab. It is recommended that the upper 200 mm of sub-floor fill consists of 19 mm clear crushed stone. All backfill material within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to at least 98% of its SPMDD.

5.6 Pavement Design

Car only parking areas, access lanes and local roadways are anticipated within the subject blocks. The proposed pavement structures are shown in Tables 4 and 5.

Table 4 - Recommended Pavement Structure - Car Only Parking Areas

Thickness (mm)	Material Description
50	**Wear Course -** HL-3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill	

Table 5 - Recommended Pavement Structure - Access Lanes and Local Roadways

Thickness (mm)	Material Description
40	**Wear Course -** HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course -** HL-8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
400	**SUBBASE** - OPSS Granular B Type II
	SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

For residential driveways and car only parking areas, an Ontario Traffic Category A will be used. For local and collector roadways, an Ontario Traffic Category B should be used for design purposes.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type I or Type II material.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 98% of the material's SPMDD using suitable compaction equipment.

Pavement Structure Drainage

Satisfactory performance of the pavement structure is largely dependent on keeping the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing its load carrying capacity.

Where silty clay is anticipated at subgrade level, consideration should be given to installing subdrains during the pavement construction. The sub-drain inverts should be approximately 300 mm below subgrade level and run longitudinal along the curblines. The subgrade surface should be crowned to promote water flow to the drainage lines.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

It is recommended that a perimeter foundation drainage system be provided for the proposed structures. The system should consist of a 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by a minimum of 150 mm of 19 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structure. The pipe should have a positive outlet, such as a gravity connection to the sump pit or storm sewer.

Backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should be used for this purpose.

6.2 Protection of Footings Against Frost Action

Perimeter footings, of heated structures are required to be insulated against the deleterious effect of frost action. A minimum of 1.5 m thick soil cover (or equivalent) should be provided in this regard.

A minimum of 2.1 m thick soil cover (or equivalent) should be provided for other exterior unheated footings.

6.3 Excavation Side Slopes

The side slopes of excavations in the soil and fill overburden materials should be either cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

In bedrock, almost vertical side slopes can be used provided that all loose rock and blocks with unfavourable weak planes are removed or stabilized.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

6.4 Pipe Bedding and Backfill

At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe should consist of OPSS Granular A. The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to a minimum of 99% of the material's SPMDD.

Generally, it should be possible to re-use the moist (not wet) silty clay, glacial till above the cover material if the excavation and filling operations are carried out in dry weather conditions. The silty clay, when wet, will be difficult to reuse due to its high fines content which makes compacting this material without an extensive drying period impractical.

Well fractured bedrock should be acceptable as backfill provided the rock fill is placed only from at least 300 mm above the top of the service pipe and that all stones 300 mm or larger in their longest dimension are removed. Where blast rock is used a blinding layer (OPSS Granular A crushed stone) or a geotextile may be required above the blast rock to reduce the loss of fine particles within the voids of the rockfill.

Based on the soil profile encountered, the subgrade for the services will be placed in both bedrock and in overburden soils. It is recommended that the subgrade medium be inspected in the field to determine how steeply the bedrock surface, where encountered, drops off. A transition treatment should be provided where the bedrock slopes at more than 3H:1V. At these locations, the bedrock should be excavated and extra bedding be placed to provide a 3H:1V (or flatter) transition from the bedrock subgrade towards the soil subgrade. This treatment reduces the propensity for bending stress to occur in the service pipes.

Trench backfill material within the frost zone (approximately 1.8 m below finished grade) should match the soils exposed at the trench walls to reduce differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

Typically, clay seals are recommended to be placed within service trenches where silty clay is present at invert level. Paterson has reviewed the available service profile drawings for the current phase. Based on our review and existing subsoils information, the silty clay deposit where encountered along proposed service alignment is located above the lowest service pipe invert level. Therefore, clay seals are not required. However, if silty clay is encountered at the lowest service invert level, it is recommended that, clay seals be provided in the service trenches at no more than 60 m intervals in the service trenches.

The seals should be at least 1.5 m long (in the trench direction) and should extend from trench wall to trench wall. The seals should extend from the frost line and fully penetrate the bedding, subbedding and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the SPMDD.

6.5 Groundwater Control

Due to the relatively impervious nature of the overlying silty clay within the east portion of the site, it is anticipated that groundwater infiltration into the excavations should be low and controllable using open sumps. Where excavations are extended within the glacial till and/or bedrock surface below the long term groundwater level, the groundwater infiltration is anticipated to be moderate to high. Generally, pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations.

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) Category 3 may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum 4 to 5 months should be allowed for completion of the PTTW application package and the review and issuance of the permit by the MECP.

For typical ground or surface water volumes, being pumped during the construction phase, between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project.

The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost in the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site. The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of an aggressive to very aggressive corrosive environment.

6.8 Landscaping Considerations

Tree Planting Restrictions

Paterson completed a soils review of the site to determine applicable tree planting setbacks, in accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines) for trees planted within a public right-of-way (ROW). Atterberg limits testing was completed for recovered silty clay samples at selected locations throughout the subject site. Grain size distribution testing was also completed on selected soil samples. The above-noted test results were completed on samples taken at depths between the anticipated underside of footing elevation and a 3.5 m depth below finished grade. The results of Atterberg Limit Tests completed within the vicinity of Block 22 are presented in Appendix 1.

Based on the results of the Atterberg limit testing mentioned above, the plasticity index was found to be less than 40% in all the tested clay samples. In addition, based on the clay content found in the clay samples from the grain size distribution test results, moisture levels and consistency, the silty clay across the subject site is considered low to medium sensitivity clay and cannot be designated as sensitive marine clays.

The following tree planting setbacks are recommended for the low to medium sensitivity silty clay deposit throughout the subject site. Large trees (mature height over 14 m) can be planted within these areas provided a tree to foundation setback equal to the full mature height of the tree can be provided (e.g. in a park or other green space). Tree planting setback limits may be reduced to **4.5 m** for small (mature height up to 7.5 m) and medium size trees (mature tree height 7.5 to 14 m), provided that the condition noted below are met:

- ❑ The underside of footing (USF) is 2.1 m or greater below the lowest finished grade must be satisfied for footings within 10 m from the tree, as measured from the centre of the tree trunk and verified by means of the Grading Plan as indicated procedural changes below.

- ❑ A small tree must be provided with a minimum of 25 m^3 of available soil volume while a medium tree must be provided with a minimum of 30 m^3 of available soil volume, as determined by the Landscape Architect. The developer is to ensure that the soil is generally un-compacted when backfilling in street tree planting locations.

- ❑ The tree species must be small (mature tree height up to 7.5 m) to medium size (mature tree height 7.5 m to 14 m) as confirmed by the Landscape Architect.

- ❏ The foundation walls are to be reinforced at least nominally (minimum of two upper and two lower 15M bars in the foundation wall).

- ❏ Grading surround the tree must promote drainage to the tree root zone (in such a manner as not to be detrimental to the tree).

It is well documented in the literature, and is our experience, that fast-growing trees located near buildings founded on cohesive soils that shrink on drying can result in long-term differential settlements of the structures. Tree varieties that have the most pronounced effect on foundations are seen to consist of poplars, willows and some maples (i.e. Manitoba Maples) and, as such, they should not be considered in the landscaping design.

Swimming Pools

The in-situ soils are considered to be acceptable for in-ground swimming pools. Above ground swimming pools must be placed at least 3 m away from the residence foundation and neighbouring foundations founded on silty clay. Otherwise, pool construction is considered routine, and can be constructed in accordance with the manufacturer`s requirements.

7.0 Recommendations

It is a requirement for the foundation design data provided herein to be applicable that the following material testing and observation program be performed by the geotechnical consultant.

- ❏ Review master grading plan from a geotechnical perspective.
- ❏ Observation of all bearing surfaces prior to the placement of concrete.
- ❏ Sampling and testing of the concrete and fill materials used.
- ❏ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❏ Observation of all subgrades prior to backfilling.
- ❏ Field density tests to determine the level of compaction achieved.
- ❏ Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory inspection program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, we request that we be notified immediately in order to permit reassessment of our recommendations.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Mattamy Homes or their agent(s) are not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

Faisal I. Abou-Seido, P.Eng.

David J. Gilbert, P.Eng.

Report Distribution:

- ❑ Mattamy Homes (3 copies)
- ❑ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

TEST DATA SHEETS BY OTHERS

GRAIN SIZE DISTRIBUTION ANALYSIS BY OTHERS

ATTERBERG LIMITS TESTING RESULTS BY OTHERS

ANALYTICAL TESTING RESULTS BY OTHERS

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Blocks 15, 19, 22 & 24
335 St. Laurent Blvd., Ottawa, Ontario

DATUM Ground surface elevations referenced from the ground surface elevations of borehole locations provided by J.D. Barnes Limited.

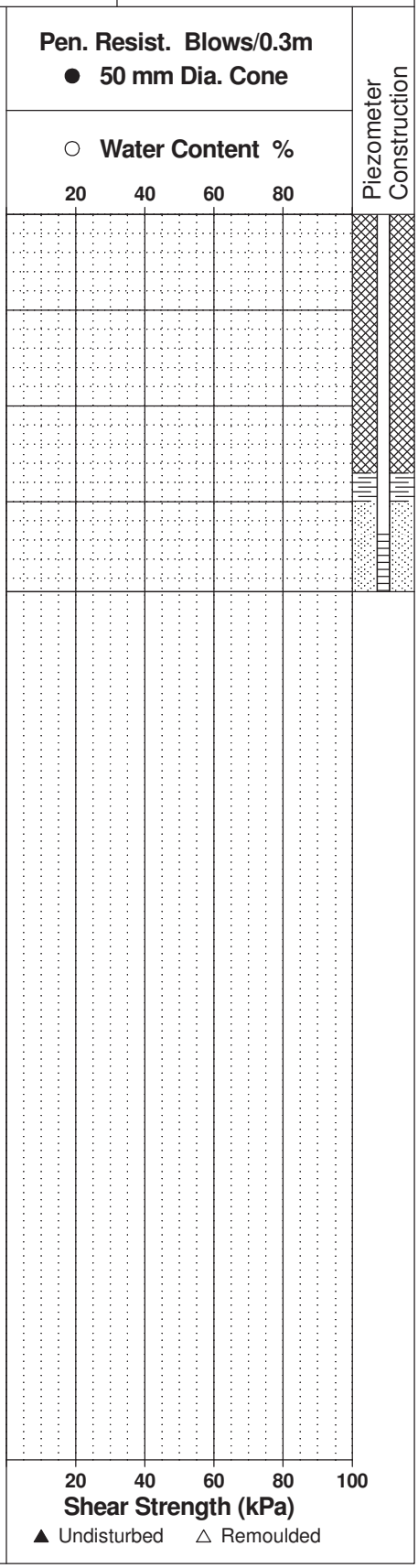
FILE NO. PG4064

REMARKS

HOLE NO. BH 5-17

BORINGS BY CME 55 Power Auger **DATE** March 6, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.50
Asphaltic concrete 0.08		AU	1				
FILL: Crushed stone 0.60		AU	2				
- some sand by 0.46m depth		SS	3	15	10	1	87.50
Very stiff to stiff, brown **SILTY CLAY** 2.13		SS	4	67	8	2	86.50
GLACIAL TILL: Brown silty sand with gravel, trace clay and cobbles		SS	5	17	20	3	85.50
- grey by 2.6m depth		SS	6	42	13		
3.94		SS	7	100	50+		
End of Borehole							
Practical refusal to augering at 3.94m depth							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Blocks 15, 19, 22 & 24
335 St. Laurent Blvd., Ottawa, Ontario

DATUM Ground surface elevations referenced from the ground surface elevations of borehole locations provided by J.D. Barnes Limited.

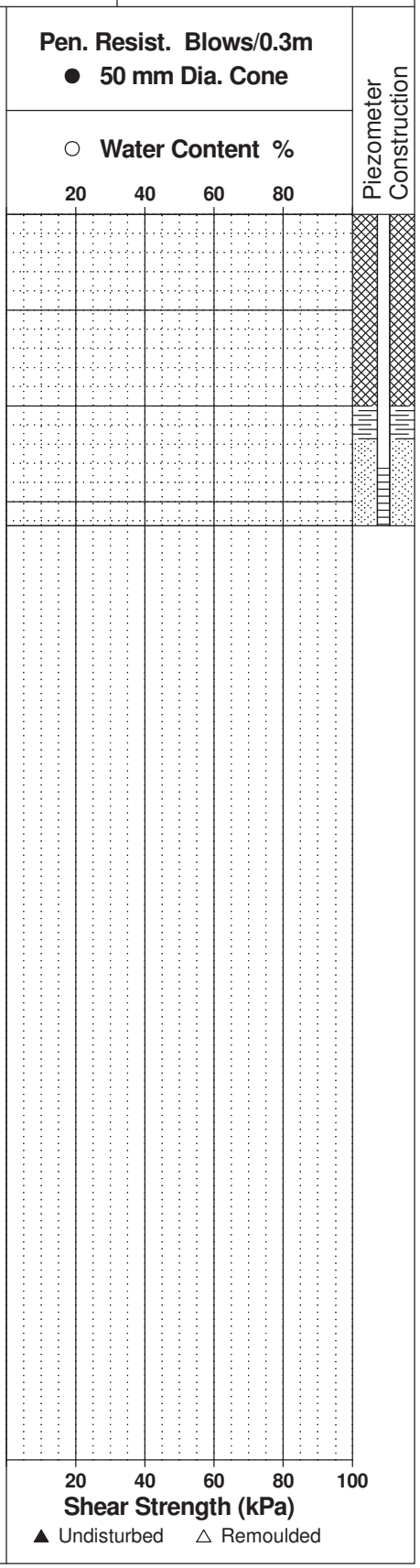
FILE NO. PG4064

REMARKS

HOLE NO. BH 6-17

BORINGS BY CME 55 Power Auger **DATE** March 6, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
25mm Asphaltic concrete over crushed stone, some sand **FILL** 0.51		AU	1			0	88.51
		AU	2				
		SS	3	29	11	1	87.51
Very stiff to stiff, brown **SILTY CLAY**		SS	4	67	13	2	86.51
		SS	5	100	16		
3.18		SS	6	100	50+	3	85.51
GLACIAL TILL: Brown silty clay with sand, gravel, trace cobbles and boulders 3.25							
End of Borehole							
Practical refusal to augering at 3.25m depth							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Blocks 15, 19, 22 & 24
335 St. Laurent Blvd., Ottawa, Ontario

DATUM Ground surface elevations referenced from the ground surface elevations of borehole locations provided by J.D. Barnes Limited.

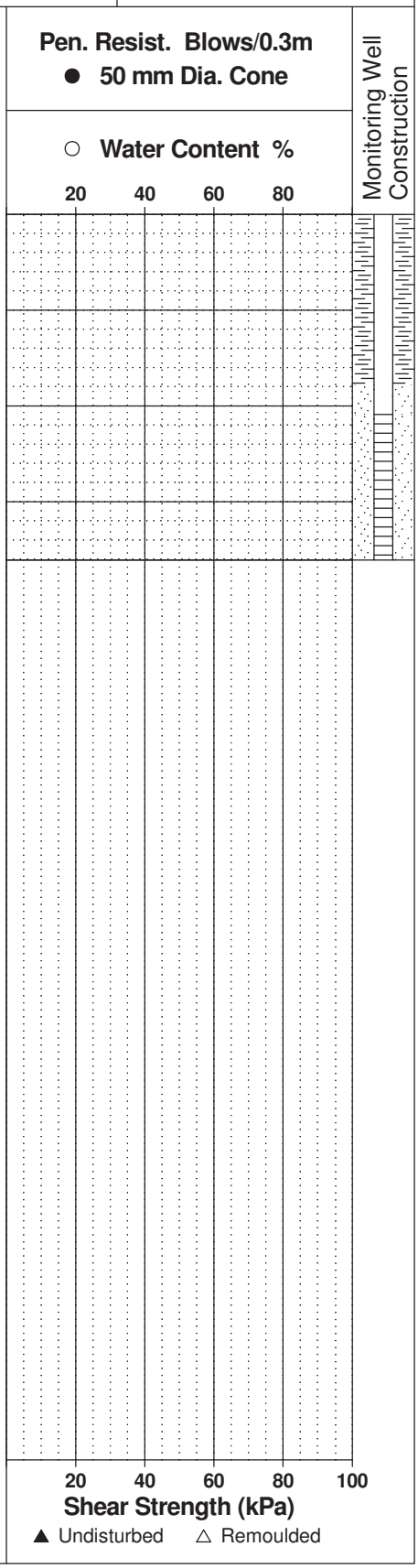
FILE NO. PG4064

REMARKS

HOLE NO. BH16-17

BORINGS BY CME 55 Power Auger **DATE** March 8, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.25
OVERBURDEN						1	87.25
						2	86.25
2.74							
Very stiff to stiff, brown **SILTY CLAY,** trace sand		SS	1	100	11	3	85.25
3.61							
End of Borehole							
Practical refusal to augering at 3.61m depth							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Blocks 15, 19, 22 & 24
335 St. Laurent Blvd., Ottawa, Ontario

DATUM Ground surface elevations referenced from the ground surface elevations of borehole locations provided by J.D. Barnes Limited.

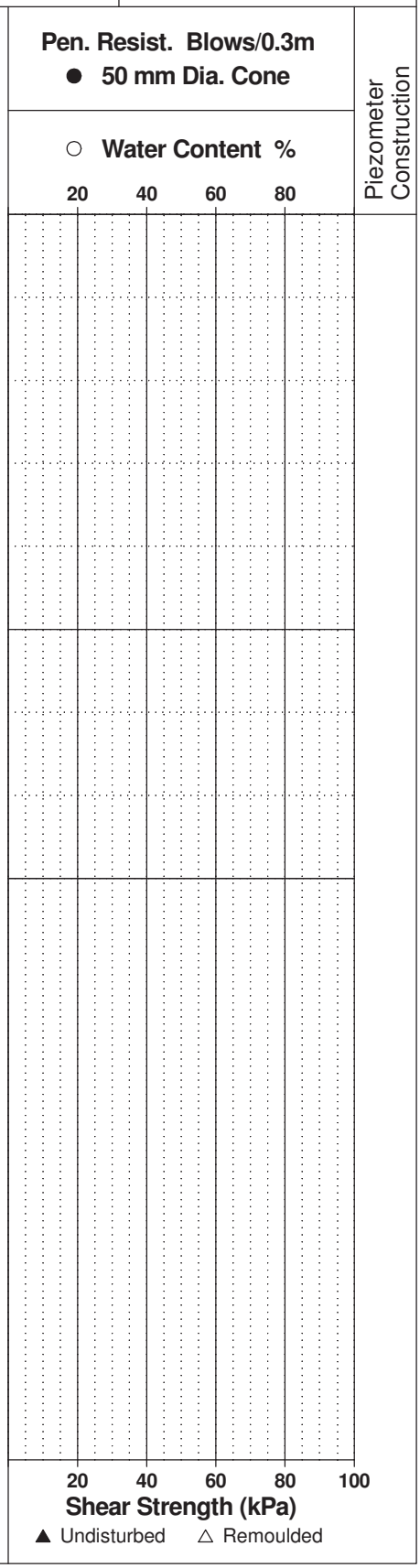
FILE NO. PG4064

REMARKS

HOLE NO. TP 5-17

BORINGS BY Hydraulic Excavator **DATE** March 6, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.31
FILL: Topsoil, some crushed stone and gravel		G	1				
0.35							
FILL: Brown silty clay with sand, gravel, trace concrete, coal and slag		G	2			1	87.31
1.20							
Very stiff to stiff, brown **SILTY CLAY**		G	3				
1.60							
End of Test Pit							
(TP observed to be dry upon completion - March 6, 2017)							



Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Blocks 15, 19, 22 & 24
335 St. Laurent Blvd., Ottawa, Ontario

DATUM Ground surface elevations referenced from the ground surface elevations of borehole locations provided by J.D. Barnes Limited.

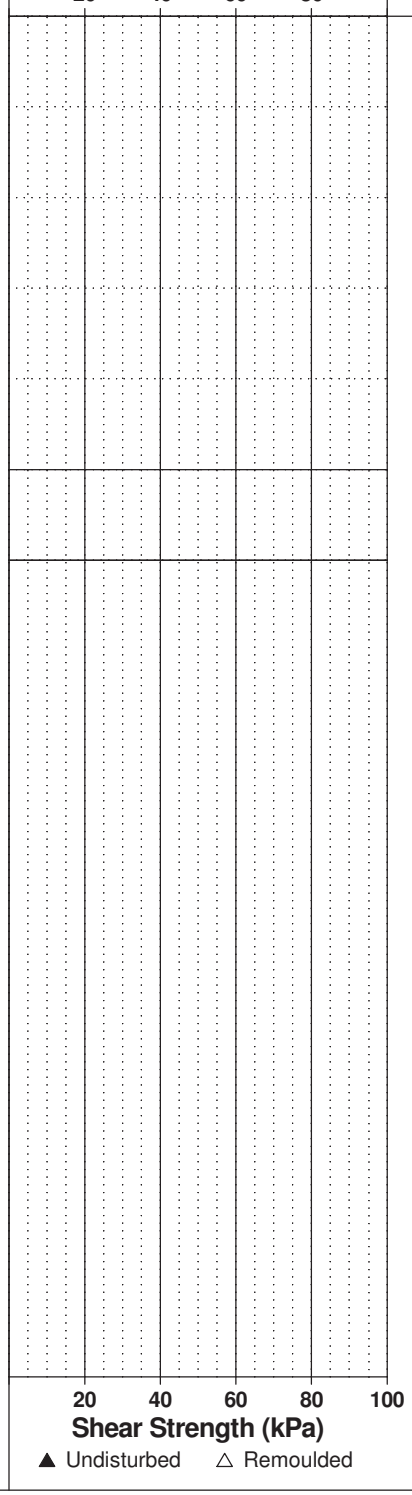
FILE NO. PG4064

REMARKS

HOLE NO. TP 6-17

BORINGS BY Hydraulic Excavator **DATE** March 6, 2017

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	88.84		
FILL: Topsoil with brown silty clay, sand and crushed stone		G	1						
0.40									
Very stiff to stiff, brown **SILTY CLAY**		G	2			1	87.84		
1.20									
End of Test Pit									
(TP observed to be dry upon completion - March 6, 2017)									



SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2 / (D10 \times D60)$
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay
(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

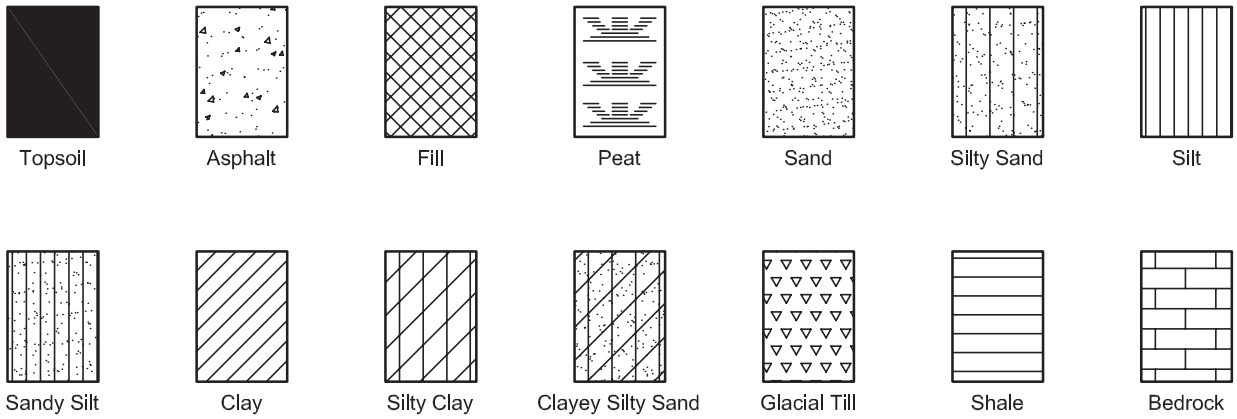
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

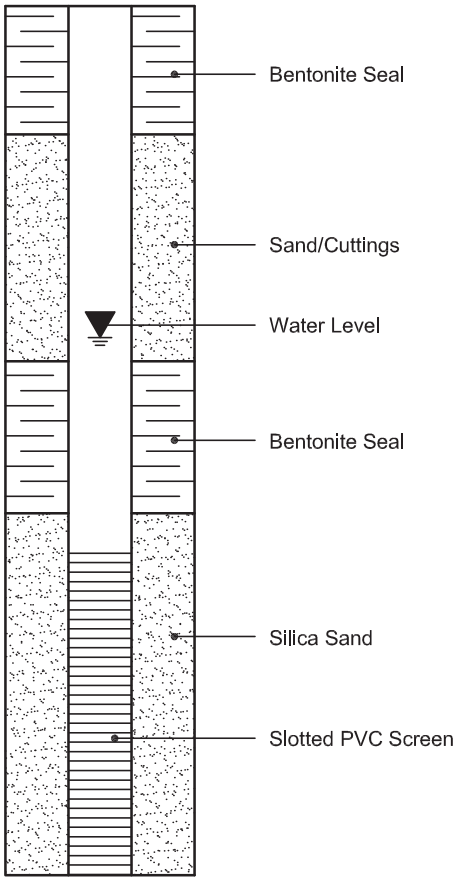
SYMBOLS AND TERMS (continued)

STRATA PLOT

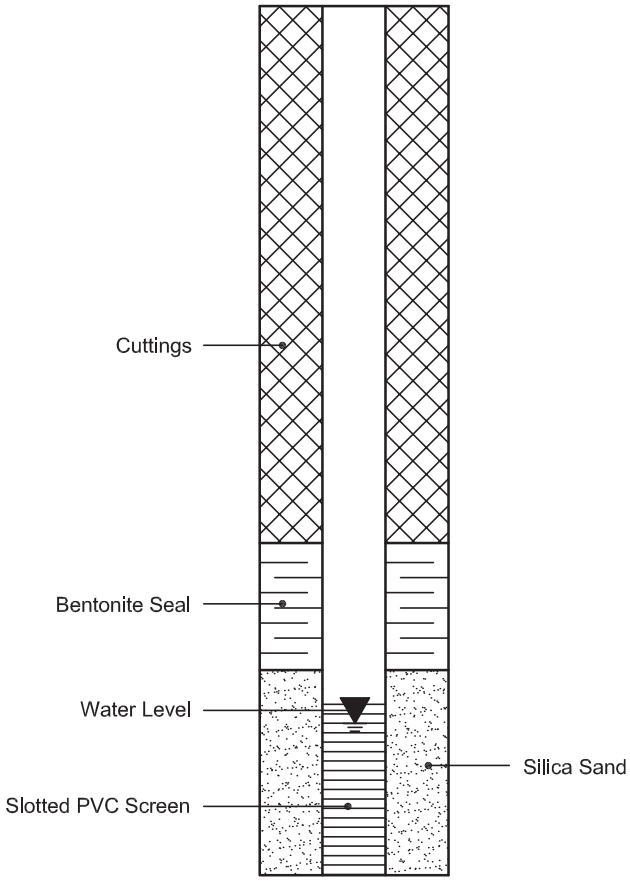


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



LOG OF BOREHOLE BH16-04

DST REF. No.: **IN-SO-026755**
CLIENT: **Canada Lands Company**
PROJECT: **Site Servicing Phase 1B**
LOCATION: **Wateridge Village, Ottawa, Ontario**
SURFACE ELEV.: **88.52 metres**

Drilling Data
METHOD: **Hollow Stem Auger**
DIAMETER: **200 mm**
DATE: **September 2, 2016**
COORDINATES: **5035156.93** m N, **372783.61** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80 / SPT (N) □ Blows/0.3m DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
					ASPHALT - 75 mm thick					
	88				FILL - SAND AND GRAVEL - brown, compact	SS1		13		
1.0					CLAY - silty, trace of sand and gravel, brown (possible fill), stiff to very stiff	SS2		14		
	87					SS3		20		
2.0										
	86				TILL - sand, gravelly, trace clay, brown, compact	SS4		25		
3.0					End of Borehole at 2.7 m Split Spoon Sampler and Auger Refusal on Inferred Bedrock					
	85									
4.0										
	84									
5.0										
	83									
6.0										
	82									
7.0										
	81									

BOREHOLE (STANDARD) PHASE 1B BOREHOLES V1.3.GPJ DST_MIN.GDT 10-24-16

DST consulting engineers
DST Consulting Engineers
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

LOG OF BOREHOLE BH16-05

DST REF. No.: **IN-SO-026755**
CLIENT: **Canada Lands Company**
PROJECT: **Site Servicing Phase 1B**
LOCATION: **Wateridge Village, Ottawa, Ontario**
SURFACE ELEV.: **90.01 metres**

Drilling Data
METHOD: **Hollow Stem Auger**
DIAMETER: **200 mm**
DATE: **August 29, 2016**
COORDINATES: **5035156.92** m N, **372873.6** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80 / SPT (N) □ Blows/0.3m DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	90				TOPSOIL - 230 mm thick					
					FILL - SAND - some gravel, trace silt, possible cobbles and boulders, brown, very loose to dense	SS1		5		
1.0	89		●			SS2		30		
			●			SS3		37		12 81 (7)
2.0	88				End of Borehole at 2.1 m Split Spoon Sampler and Auger Refusal on Inferred Bedrock					
3.0	87									
4.0	86									
5.0	85									
6.0	84									
7.0	83									

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DST Consulting Engineers
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

LOG OF BOREHOLE BH16-11

DST REF. No.: **IN-SO-026755**
CLIENT: **Canada Lands Company**
PROJECT: **Site Servicing Phase 1B**
LOCATION: **Wateridge Village, Ottawa, Ontario**
SURFACE ELEV.: **89.13 metres**

Drilling Data
METHOD: **Hollow Stem Auger**
DIAMETER: **200 mm**
DATE: **September 1, 2016**
COORDINATES: **5035076.08** m N, **372873.57** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80; SPT (N) □ Blows/0.3m; DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	89				TOPSOIL - 25 mm thick					
					CLAY - silty, brown, firm to very stiff	SS1		13		Standpipe piezometer 20 mm diameter installed as shown
1.0	88					SS2		17		
						SS3		10		
2.0	87					SS4		4		Groundwater level is 2.55 m (Elev. 86.58 m), on Sept. 8, 2016
3.0	86				CLAY - silty, grey, firm	SS5			✖	
									✖	
4.0	85				TILL - silty clay, trace sand and gravel, light grey, soft to firm	SS6		2		
						SS7		7		
5.0	84					SS8		50+		
					End of Borehole at 5.3 m Split Spoon Sampler and Auger Refusal on Inferred Bedrock					
6.0	83									
7.0	82									

BOREHOLE (STANDARD) PHASE 1B BOREHOLES V1.3.GPJ DST_MIN.GDT 10-24-16

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SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

LOG OF BOREHOLE BH16-12

DST REF. No.: **IN-SO-026755**
CLIENT: **Canada Lands Company**
PROJECT: **Site Servicing Phase 1B**
LOCATION: **Wateridge Village, Ottawa, Ontario**
SURFACE ELEV.: **87.87 metres**

Drilling Data
METHOD: **Hollow Stem Auger**
DIAMETER: **200 mm**
DATE: **August 31, 2016**
COORDINATES: **5035071.7** m N, **372783.61** m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l)	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) / SPT (N) Blows/0.3m / DCPT	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	87.87				ASPHALT - 75 mm thick					
					FILL - SAND AND GRAVEL - some silt, brown, loose	SS1		9		
1.0	87				CLAY - Silty, brown, hard	SS2		8		
2.0	86					SS3		12	>>	
						SS4		10		
3.0	85					SS5		2		
4.0	84				CLAY - Silty, grey, firm	SS6		0		
						SS7		2		
5.0	83				TILL - silty clay, some sand and gravel, grey					
					End of Borehole at 5.1 m Split Spoon Sampler and Auger Refusal on Inferred Bedrock					
6.0	82									
7.0	81									
	80									

BOREHOLE (STANDARD) PHASE 1B BOREHOLES V1.3.GPJ DST_MIN.GDT 10-24-16

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SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

LOG OF BOREHOLE / MONITORING WELL BHMW6

DST REF. No.: **OE04940**
CLIENT: **Canada Lands Company**
PROJECT: **Steam Line Decommissioning**
LOCATION: **Canadian Forces Base, Rockcliffe, Ottawa, Ontario**
SURFACE ELEV.: **--/--**

Drilling Data
METHOD: **CME 55 Track Mounted Drill Rig**
DIAMETER: **200 mm**

DATE: **November 11 2004**

CCGD * O RKI EAGLE (PPM) 20 40 60 80 □ MINIRAE (PPM) 5 10 15 20	PPM	SAMPLES No.	Type	SPT N-Value	SYMBL	SUBSURFACE PROFILE MATERIAL DESCRIPTION	DPTH m	ELEV m	WATER DATA	REMARKS
						SURFACE				
						GRASS COVER				
	0	SS1		9		FILL - sand, silty, some gravel, trace clay, loose to compact, dark brown	0.5			Groundwater level observed 3.2 m below grade on November 25, 2004.
	0	SS2		21		- sand, some gravel, compact, orange brown	1.0			
	0	SS3		16		CLAY - silty, trace sand, very stiff to hard, brownish grey with limonite staining	1.5			
	0	SS4		48		- olive grey	2.0			
						- boulders	2.5			
	0	SS5		22		SAND - silty, some clay, compact to very dense, light brown	3.0			SS6: Insufficient sample recovery to collect duplicate fraction for CCGD
		SS6		89			3.5			
						End of borehole at 3.7 m depth.				

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Email: ottawa@dstgroup.com
Web: www.dstgroup.com

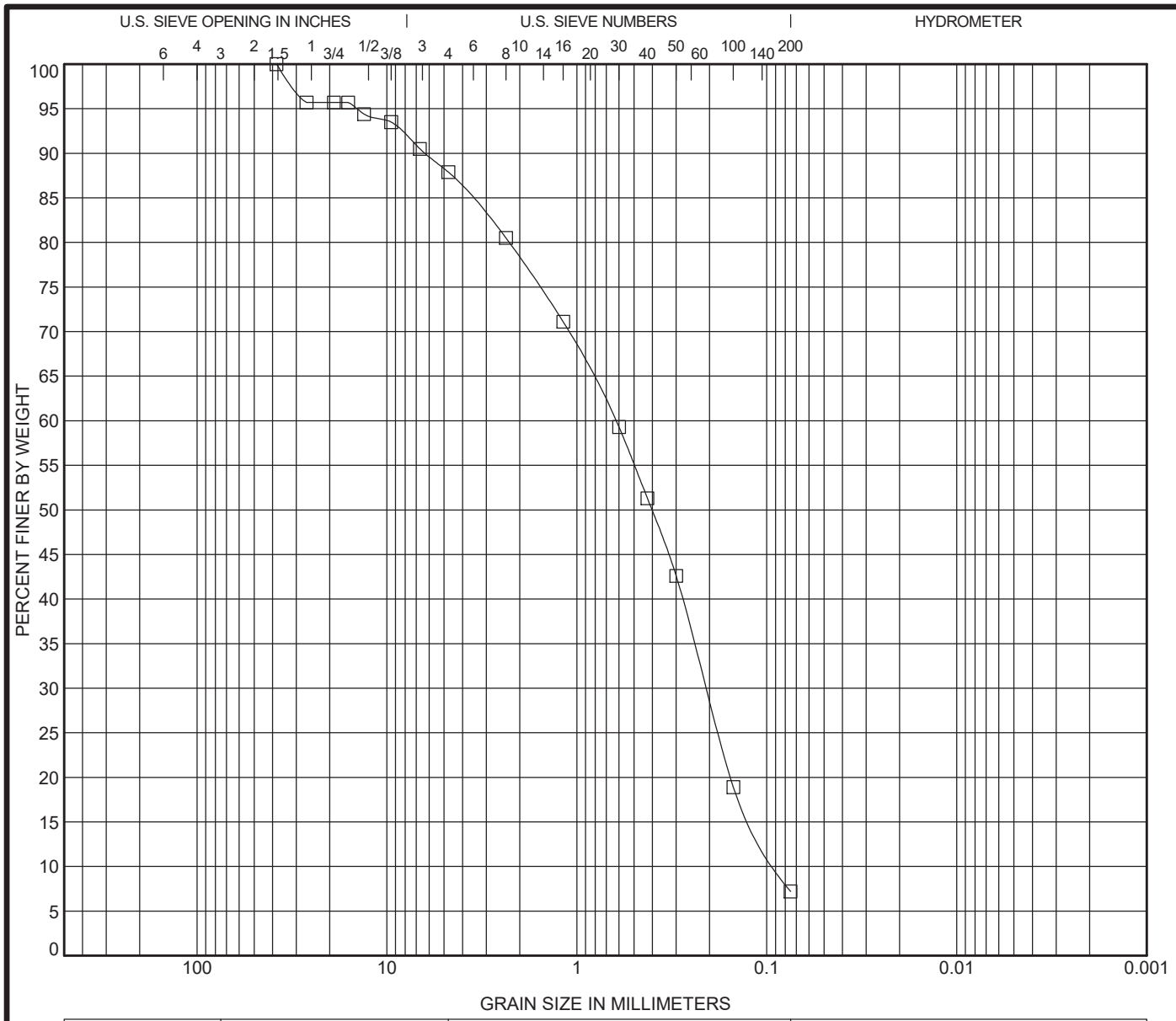
* - Catalytic Combustible Gas Detector

SAMPLE TYPE LEGEND

Auger Sample | Rock Core | Ponar Sample
Split Spoon Sample | Side Sampler
Thin Wall Tube | Grab Sample

APPENDIX H

GASTECBH (OTTAWA) OE04940.GPJ DST_MIN.GDT 10/3/06



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	
☐	**BH16-05, SS-3, Depth: 1.5 - 2.1 m**
	Date started:
	Date completed:

DST consulting engineers

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2150 Thurston Drive
Ottawa, Ontario K1G 5T9
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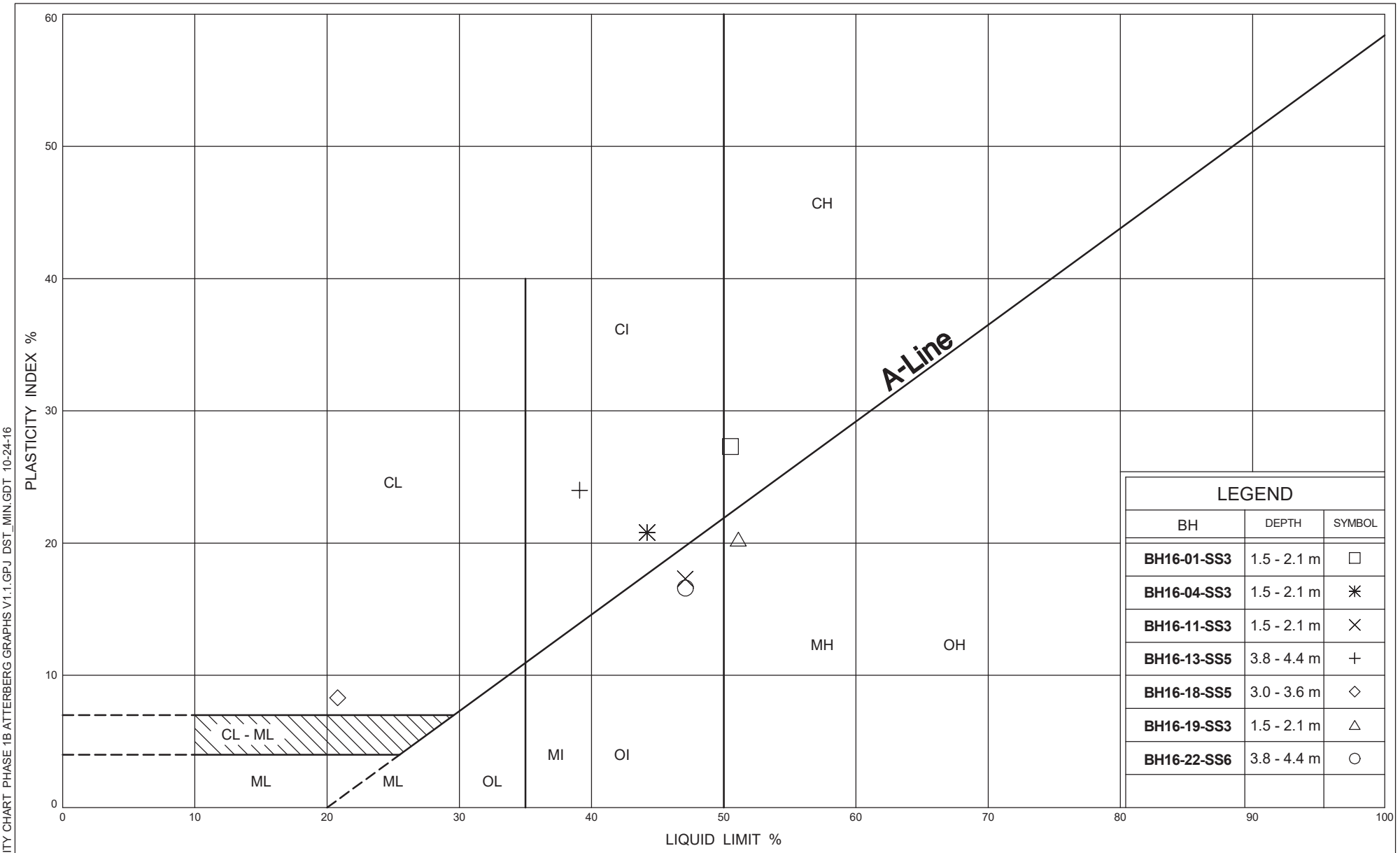
GRAIN SIZE DISTRIBUTION CURVE

Project: Site Servicing Phase 1B

Location: Wateridge Village, Ottawa, Ontario

Project Number: IN-SO-026755

CAN_GRAIN_SIZE_SIEVE TEST BH-05(SS-3) V1.1.GPJ DST_MIN.GDT 10-24-16



ONTARIO MOT PLASTICITY CHART PHASE 1B ATTERBERG GRAPHS V1.1.GPJ DST_MIN.GDT 10-24-16

DST consulting engineers

PLASTICITY CHART

DST Ref. No.: **IN-SO-026755**

Client: **Canada Lands Company**

Project: **Site Servicing Phase 1B**

APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG5345-1 - TEST HOLE LOCATION PLAN

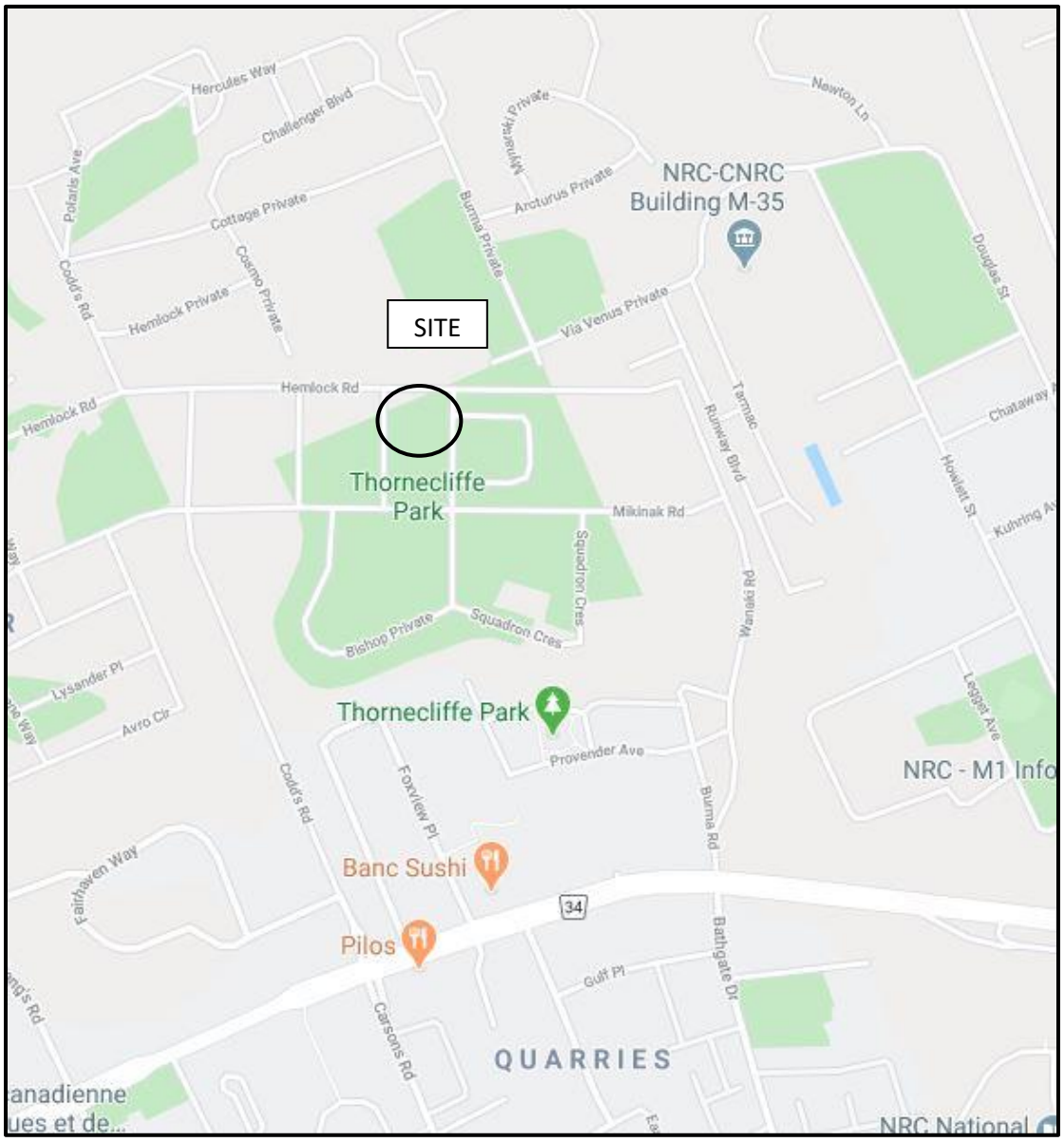
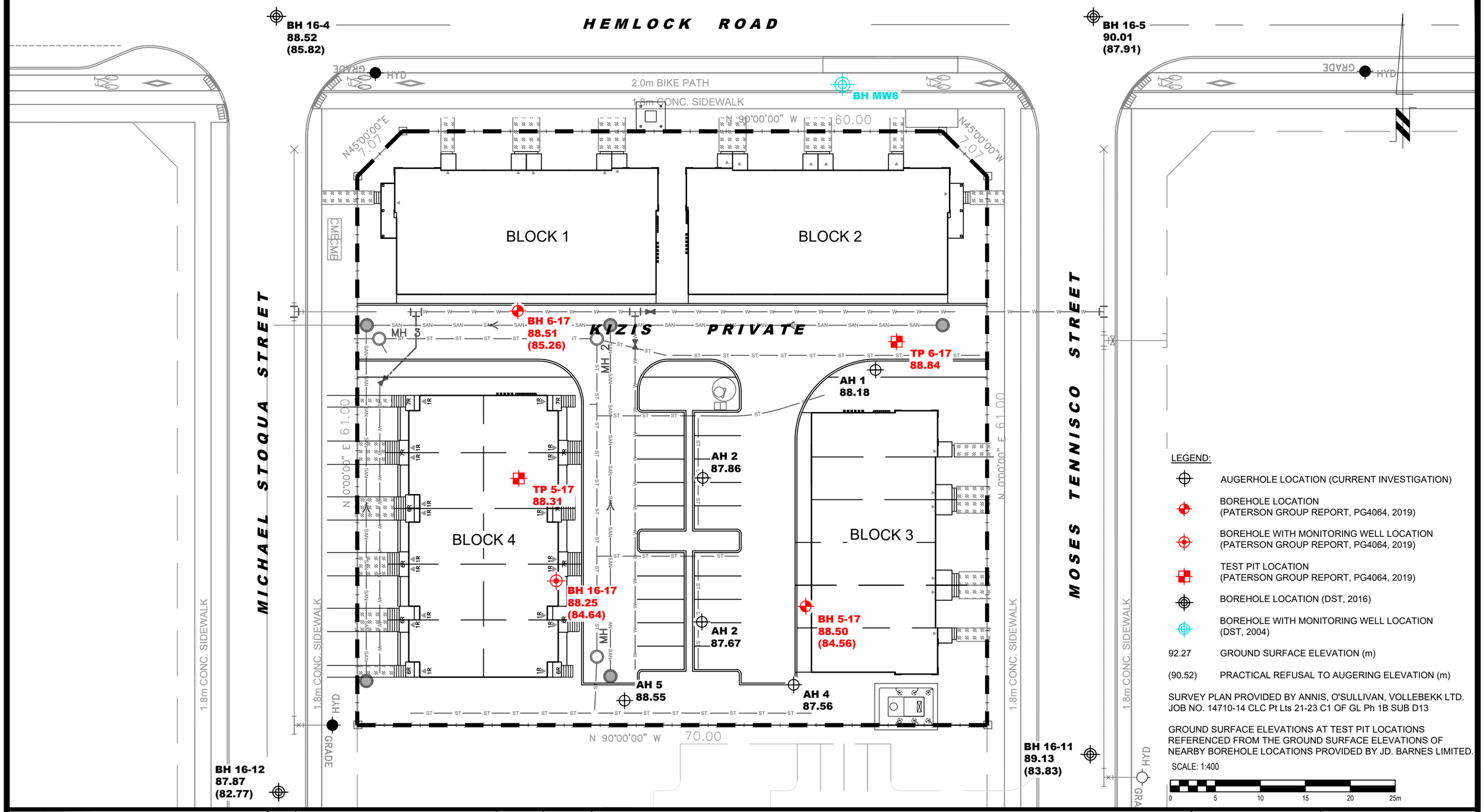


FIGURE 1

KEY PLAN



LEGEND:

- AUGERHOLE LOCATION (CURRENT INVESTIGATION)
- BOREHOLE LOCATION (PATERSON GROUP REPORT, PG4064, 2019)
- BOREHOLE WITH MONITORING WELL LOCATION (PATERSON GROUP REPORT, PG4064, 2019)
- TEST PIT LOCATION (PATERSON GROUP REPORT, PG4064, 2019)
- BOREHOLE LOCATION (DST, 2016)
- BOREHOLE WITH MONITORING WELL LOCATION (DST, 2004)
- 92.27 GROUND SURFACE ELEVATION (m)
- (90.52) PRACTICAL REFUSAL TO AUGERING ELEVATION (m)

SURVEY PLAN PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
JOB NO. 14710-14 CLC Pt Lts 21-23 C1 OF GL Ph 1B SUB D13

GROUND SURFACE ELEVATIONS AT TEST PIT LOCATIONS REFERENCED FROM THE GROUND SURFACE ELEVATIONS OF NEARBY BOREHOLE LOCATIONS PROVIDED BY JD. BARNES LIMITED.

SCALE: 1:400

0 5 10 15 20 25m

patersongroup
consulting engineers
154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE DD/MM/YYYY	INITIAL
2	AUGER HOLE LOCATIONS ADDED TO PLAN	08/09/2020	NZ
1	UPDATED SITE ADDRESS	04/09/2020	DP

MATTAMY HOMES

GEOTECHNICAL INVESTIGATION
1400 HEMLOCK ROAD
WATERIDGE RESIDENTIAL DEVELOPMENT- BLOCK 22
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:400	Date: 04/2020
Drawn by: RCG	Report No.: PG5345-1
Checked by: FA	Dwg. No.: PG5345-1
Approved by: FA	Revision No.: 2

p:\autocad drawings\geotechnical\pg53xx\pg5345\pg5345-1-test hole location plan (rev.01)_1_10246_af43af92.sv$.dwg

re: **Landscaping Plan Review - Block 22**
Wateridge Village Residential Development - Phase 1B - Block 22
1400 Hemlock Road - Ottawa

to: Mattamy Homes - **Mr. Conor Sutherland** - Conor.Sutherland@mattamycorp.com

date: October 6, 2020

file: PG5345-MEMO.01 Revision 1

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a review of the landscaping drawings for Block 22 of the aforementioned residential development. It should be noted that Block 22 is located along both, City of Ottawa publicly owned roads and on a private road. The following memorandum should be read in conjunction with Paterson Report PG5345-1 Revision 1 dated September 10, 2020.

Landscaping Plan Review

Paterson reviewed the following landscaping plan prepared by Nak Design Strategies and grading plan prepared by DSEL regarding the aforementioned development:

- Landscape Plan - Block 22 - Job No. 20-076, Sheet No. L-01, Revision 4 dated September 30, 2020.
- Planting Plan - Block 22 - Job No. 20-076, Sheet No. L-02, Revision 4 dated September 30, 2020.
- Grading Plan - Wateridge Block 22 - Phase 1- Project No. 17-948, Sheet No. 3, Revision 11, dated June 23, 2020 (Received September 2020).

Blocks Adjacent to Publicly Owned Roads

Based on the landscaping plans provided, the proposed tree planting is in compliance with the recommendations provided by Paterson and is considered acceptable from a geotechnical perspective, provided the items noted below are addressed. Atterberg testing was completed at two (2) borehole locations across the overall site, all with plasticity index results of less than 40%. This satisfies the first condition for reducing the tree foundation setback to **4.5 m** in the City of Ottawa guideline "Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines." The following conditions are also required to be met based on the tree planting guidelines:

- The proposed trees should have a minimum setback of 4.5 m from the proposed foundation walls. Based on our review of the landscaping plan, a 4.5 m setback has been provided for all street trees, **with the exception of Block 2 - Unit 6.** It was noted that the 4.5 m setback intersected with the majority of stair and porch structures fronting onto a publicly owned road.

- The underside of footing is required to be 2.1 m below finished grade at the locations of the trees. Reference should be made to Table 1 below and following comments regarding the underside of footing elevations.
- Adequate soil volumes are required to be provided for the proposed trees - 25 cubic meters for small trees and 30 cubic meters for medium trees. This should be confirmed by the landscape architect.
- Tree species are required to be small to medium size, confirmed by the landscape architect. Reference should be made to the section below for comments regarding the tree species and appropriate setbacks from building foundation walls.
- The foundation walls are required to have a minimum of two 15-M bars in the upper and lower sections of the foundation walls. This should be indicated on the drawings for the relevant blocks foundation wall. Reference should be made to the additional comments below.
- Grading surrounding the tree should be designed to promote draining towards the tree root zone. This should be confirmed by the landscape architect and civil engineer.

Table 1 below provides a summary of the landscaping and grading information for the relevant Blocks:

Table 1 - Landscaping Plan and Grading Details

Block - Unit	Underside of Footing Elevation	Lowest Prop. Finished Grade	Foundation Depth (m)	Underside of Engineered Pad (If Required)	Tree to Foundation (m)
1-1	89.20	89.48	0.28	87.38	5.3
1-2	89.20	89.56	0.36	87.46	6.6
1-3	89.20	89.64	0.44	87.54	6.7
1-4	89.20	89.73	0.53	87.63	6.4
1-5	89.20	89.81	0.90	88.00	7.8
1-6	89.20	90.13	0.93	88.03	7.8
2-1	89.37	90.13	0.76	88.03	7.7
2-2	89.37	90.02	0.65	87.92	6.4
2-3	89.37	90.10	0.73	88.00	6.6
2-4	89.37	90.18	0.81	88.08	6.4
2-5	89.37	90.26	0.89	88.40	6.4
2-6	89.37	90.34	0.97	88.50	3.1
3-1	89.23	90.13	0.90	88.03	6.1
3-2	89.23	90.16	0.93	88.06	7.2
3-3	89.23	90.18	0.95	88.08	6.3
3-4	89.23	90.20	0.97	88.10	7.2

Table 1 - Landscaping Plan and Grading Details					
Block - Unit	**Underside of Footing Elevation**	**Lowest Prop. Finished Grade**	**Foundation Depth (m)**	**Underside of Engineered Pad (If Required)**	**Tree to Foundation (m)**
3-5	89.23	90.22	0.99	88.12	6.5
3-6	89.23	90.25	1.02	88.15	6.1
4-1	87.57	89.46	1.89	87.36	8.4
4-2	87.57	89.64	2.07	87.54	8.6
4-3	87.57	89.64	2.07	87.54	8.6
4-4	87.57	89.64	2.07	87.54	8.6
4-5	87.57	89.64	2.07	87.54	8.5
4-6	87.57	89.89	1.90	87.79	5.9
4-7	87.57	89.86	2.29	N/A	N/A
4-8	87.57	89.83	1.80	N/A	N/A
4-9	87.57	89.79	2.22	N/A	N/A
4-10	87.57	89.69	1.70	N/A	N/A

Based on our review, the following outstanding issues need to be completed for the proposed development to qualify for the reduced tree planting setback:

Item A: Underside of Footing Elevation

Based on our review, a 2.1 m depth to underside of footing has not been provided for the blocks where trees have less than 10 m horizontal separation from the foundation wall.

Based on Paterson's conversations with the City staff for Block 15, It is understood that the City of Ottawa is open to accept reducing the required soil cover down to 1.9 m provided additional measures are provided and approved by the geotechnical consultant. Therefore, it is assumed the same approved recommendations provided for Block 15 would apply for Block 22 based on the similar subsurface profiles encountered throughout the subject sites. The following summarizes our justification for a reduced soil cover based on the subsurface profile, groundwater table and the proposed tree planting setback:

Based on our review of the proposed site conditions, the proposed footings along the front of the lots can be placed with a minimum 1.9 m soil cover provided that a minimum 300 mm thick granular pad be placed between the underside of footing and the underlying silty clay deposit. The rationale for this is that tree roots cannot penetrate a compacted granular fill. In addition, the groundwater table is well below the granular pad which makes it too deep for the roots to reach and impact the underlying silty clay material that is considered consolidated as a result of the surcharge program. Therefore, provided a minimum 300 mm thick granular pad is in place, the 1.9 m soil cover between the underside of pad to finished grade is sufficient from a geotechnical perspective.

Based on our review of the proposed USF levels, it is our understanding that footing depths range between 0.28 to 2.3 m below proposed finished grade. To compensate for the reduced foundation depth, an engineered fill pad (OPSS Granular A or Granular B Type II) can be placed below the footing to a depth of 1.9 m below proposed finished grade surrounding the building. The engineered fill should be placed in 300 mm thick loose lifts and compacted to a minimum 98% of the material's SPMDD and approved by Paterson at the time of construction. The engineered fill pad will effectively increase the depth between the finished grade and the underlying silty clay deposit to the required 1.9 m which achieves the same goal as lowering the footing from a tree planting perspective. More recommendations will follow in Item D below. Reference can be made to Figure 1 attached for additional information.

These recommendations are required for Block 1, Block 2, Block 3 and Block 4 - Unit 1 through Unit 6.

Item B: Tree Species

The landscaping architect should confirm that the tree species placed within 7.5 m of the foundation wall consist of small and medium size trees with a mature tree height less than or equal to 14 m. It is understood that the tree heights listed on the plan are the mature heights of these trees in natural conditions and not in city conditions.

Item C: Additional Reinforcing Requirements

As required by the guidelines, the foundation walls should be provided with a minimum of two 15-M bars in the upper and lower sections of the foundation walls. This should be indicated on the relevant drawings and reviewed by Paterson at the time of construction. This requirement applies to **all residential structures** adjacent to ROW trees within Block 22 of Phase 1B.

Provided these remaining conditions have been met, the landscaping drawings noted above are in compliance with the City of Ottawa tree planting guidelines.

Item D: Trees within 4.5 m of Front Stairs or Porches

Based on our review of the above noted drawings, the footing depths were found to be at a minimum of 0.6 m below proposed finished grade or lower. Based on the newest tree planting guidelines, the footings need to be placed at a minimum depth of 2.1 m below finished grade or an approved reduced depth of 1.9 m..

It is understood that a number of the stair case structures have 2 or 3 risers extending horizontally beyond the foundation walls towards publicly owned roads within the 4.5 m allowable tree planting horizontal separation, which includes **Block 1, Block 2, Block 3 and Block 4 - Unit 1 through Unit 6**.

In order to avoid lowering the footings and/or have differential settlement due to part of the riser being within the 4.5 m tree setback, it is recommended that where the front porch footings/risers are located within the 4.5 m setback, a granular backfill be introduced. Where the 1.9 m soil cover is not satisfied, the native material within the footprint of the front porch footings should be sub-excavated to a maximum 300 below the USF level and replaced with a granular pad consisting of OPSS Granular A or Granular B Type II placed in 300 mm loose lifts and compacted to 98% of the material's SPMDD. The granular pad should only be extended horizontally a minimum of 600 mm beyond the face of the foundation wall (towards the interior side of the front porch). It is important to note that a minimum 3H:1V frost taper will be required to transition from the granular pad to the native soil. Please refer to Figure 1 attached.

In addition, the backfill against the front facing porch foundation should also be backfilled with the above noted granular material. The horizontal extent of the foundation wall backfill should be dependent on the extent of the risers above, a minimum of 300 mm wide layer should be provided beyond the lowest riser.

We trust that this information satisfies your immediate requirements.

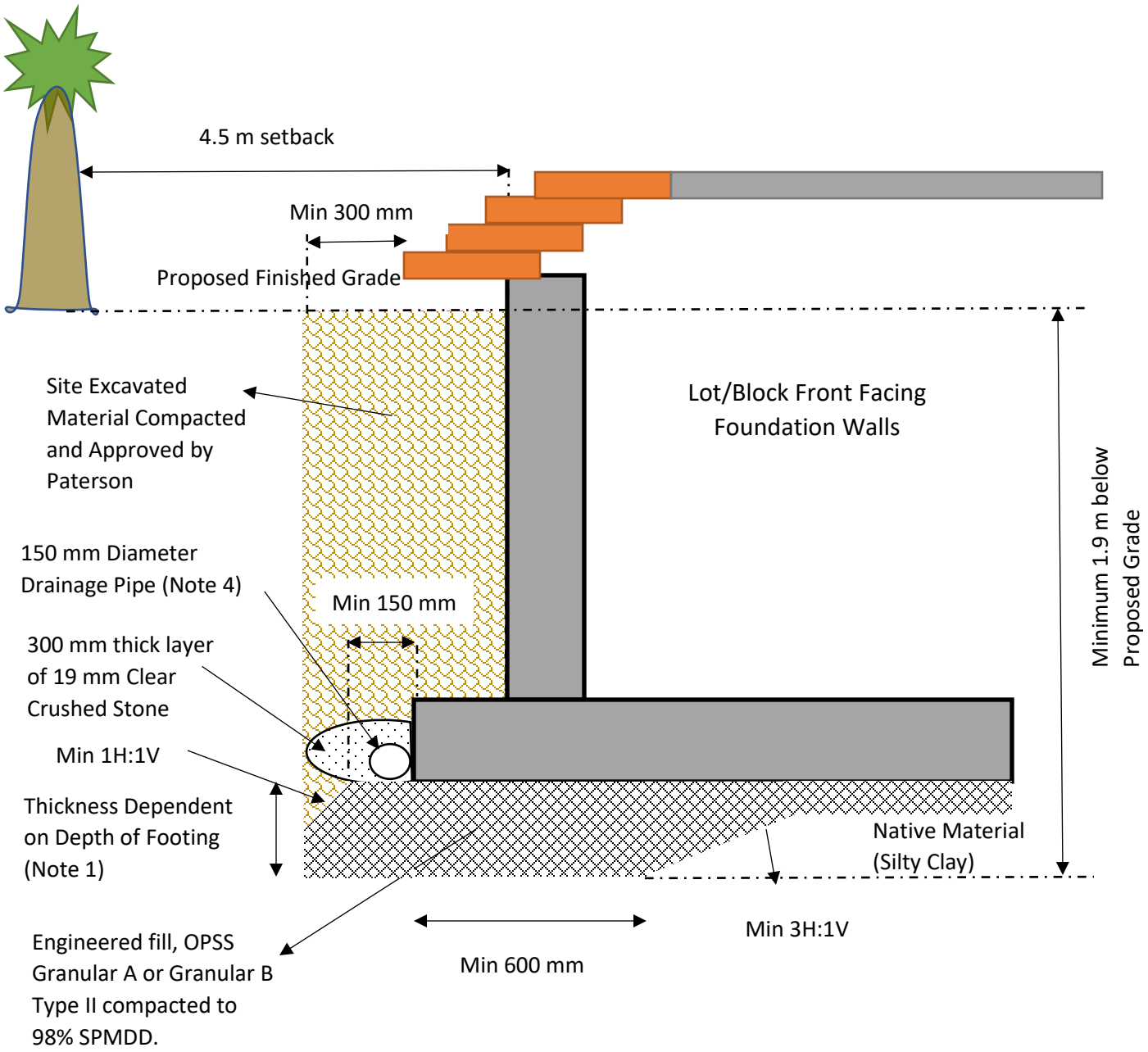
Best Regards,

Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

Figure 1 – Engineered Pad Below USF For Tree Planting Purposes



Notes:

- Note 1: Where front porch footings have a minimum depth below finished grade of 1.9 m, the granular pad below the footings will not be required.
- Note 2: The thickness of the engineered pad is dependent of the depth of footings below proposed grade. The thickness of the engineered pad can be calculated by subtracting the depth of footing from 1.9 m.
- Note 3: The placement of the engineered fill should be reviewed and approved in the field by Paterson personnel.
- Note 4: The 150 mm diameter perforated, corrugated drainage pipe should be geotextile wrapped, placed at the founding level and connected to a positive outlet with a gravity connection.

patersongroup **memorandum**

consulting engineers

re: **Grading Plan Review**
Wateridge Residential Development - Phase 1B - Block 22
1400 Hemlock Road - Ottawa

to: Mattamy Homes - **Mr. Conor Sutherland** - Conor.Sutherland@mattamycorp.com
cc: DSEL - **Ms. Jennifer Ailey** - JAiley@dsel.ca
date: October 6, 2020
file: PG5345-MEMO.02 Revision 3

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a review of the grading plan for Block 22 of the aforementioned residential development. The following memorandum should be read in conjunction with Paterson Report PG5345-1 Revision 1 dated August 25, 2020.

Relevant design information is presented in Table 1 - Summary of Design Details for the subject blocks. The relevant design and inspection information includes the following:

- ❏ Legal block number
- ❏ Original ground surface elevation
- ❏ Proposed finished grade elevation
- ❏ Bearing resistance values
- ❏ Proposed USF elevation
- ❏ Seismic site class
- ❏ Approximate proposed frost cover depth
- ❏ Approximate engineered fill thickness
- ❏ LWF requirements, if applicable.

Grading Plan Review

Paterson reviewed the following grading plan prepared by DSEL, received on October 1, 2020, regarding the aforementioned development:

- ❏ Grading Plan - Block 22 - Job No. 17-948, Sheet 3, Revision 12, dated October 6, 2020.

Based on our review of the above noted grading plan, the proposed grade raises within Block 22 of the aforementioned development are acceptable from a geotechnical perspective and will not require the use lightweight fill at this time.

Where existing fill is encountered directly below the underside of footing (USF), the footings may be required to be lowered to an undisturbed, native bearing surface. Alternatively, a zero-entry, vertical trench can be excavated below the USF down to a native material and in-filled with engineered fill, compacted to a minimum 98% of the material's SPMDD or lean concrete mix (Minimum 15 MPa, 28 day strength). The in-filled trenches should be extended a minimum 150 mm beyond the footing face on all directions.

Protection of Footings Against Frost Action

Based on our review, several townhouse blocks were noted to be provided with reduced soil cover to footings against frost action. The following townhouse blocks were noted to have insufficient soil cover:

- ❏ Townhouse Block 1 - Units 1 to 6 - Approximately 0.75 m of soil cover
- ❏ Townhouse Block 2 - Units 1 to 6 - Approximately 1.0 m of soil cover
- ❏ Townhouse Block 3 - Units 1 to 6 - Approximately 1.0 m of soil cover

It should be noted that consideration was given to the engineered fill to be placed below a number of the above noted footings. Since non-frost susceptible, free draining material is proposed to be used below those footings, the thickness of the free draining material can compensate for the absence of enough frost cover. Therefore, based on the proposed estimated thickness of engineered fill required below the footings noted in Table 1, additional frost protection in the form of insulation will not be required for the subject site. Where the estimated thickness of fill is not carried out as anticipated below a footing footprint, Paterson should be notified to evaluate the requirement for addition insulation below the footings prior to placement of concrete.

Table 1 attached to this memo presents our summary of design details for the current phase.

We trust that this information satisfies your requirements.

Best Regards,

Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

Table 1 - Summary of Grading Design Details - Wateridge Village - Block 22

Legal Lot/ Block Number	Underside of Footing Elevation (Proposed) (m)	Original GS Front (m)	Existing GS Front	Proposed GS Front (m)	Original GS Rear (m)	Existing GS Rear*	Proposed GS Rear (m)	Approx. Proposed Frost Cover Depth (m)	Minimum Bearing Capacity - Serviceability Limit States (kPa)	Seismic Site Class	Permissible Grade Raise (m)	Above Permissible Grade Raise Front (m)	Above Permissible Grade Raise Rear	Approximte Engineered Fill Thickness Under Footings (m)	LWF required in Garage and Front Porch (m)	LWF Required (m)
Block 1 - Unit 1	89.20	88.50	88.76	89.92	88.50		89.48	0.72	150.00	C	2.00	n/a	n/a	1.00	n/a	n/a
Block 1 - Unit 2	89.20	88.60	88.71	89.98	88.50		89.56	0.78	150.00	C	2.00	n/a	n/a	0.90	n/a	n/a
Block 1 - Unit 3	89.20	88.70	88.71	90.04	88.50		89.64	0.84	150.00	C	2.00	n/a	n/a	0.80	n/a	n/a
Block 1 - Unit 4	89.20	88.80	88.80	90.10	88.50		89.73	0.90	150.00	C	2.00	n/a	n/a	0.70	n/a	n/a
Block 1 - Unit 5	89.20	88.90	89.00	90.16	88.50		89.81	0.96	150.00	C	2.00	n/a	n/a	0.60	n/a	n/a
Block 1 - Unit 6	89.20	89.00	89.00	90.43	88.60		90.13	1.23	150.00	C	2.00	n/a	n/a	0.50	n/a	n/a
Block 2 - Unit 1	89.37	89.10	88.87	90.43	88.60		90.13	1.06	150.00	C	2.00	n/a	n/a	0.80	n/a	n/a
Block 2 - Unit 2	89.37	89.20	88.87	90.37	88.70		90.02	1.00	150.00	C	2.00	n/a	n/a	0.80	n/a	n/a
Block 2 - Unit 3	89.37	89.30	88.87	90.43	88.70		90.10	1.06	150.00	C	2.00	n/a	n/a	0.80	n/a	n/a
Block 2 - Unit 4	89.37	89.40	89.29	90.50	88.75		90.18	1.13	150.00	C	2.00	n/a	n/a	0.38	n/a	n/a
Block 2 - Unit 5	89.37	89.50	89.29	90.56	88.75		90.26	1.19	150.00	C	2.00	n/a	n/a	0.38	n/a	n/a
Block 2 - Unit 6	89.37	89.60	89.29	90.60	88.80		90.57	1.23	150.00	C	2.00	n/a	n/a	0.38	n/a	n/a
Block 3 - Unit 1*	89.23	88.90	88.60	90.31	88.85	88.18	90.13	1.08	150.00	C	2.00	n/a	n/a	1.35	n/a	n/a
Block 3 - Unit 2*	89.23	88.90	88.60	90.25	88.70	88.05	90.16	1.02	150.00	C	2.00	n/a	n/a	1.48	n/a	n/a
Block 3 - Unit 3*	89.23	88.90	88.60	90.19	88.60	87.95	90.18	0.96	150.00	C	2.00	n/a	n/a	1.58	n/a	n/a
Block 3 - Unit 4*	89.23	88.85	88.79	90.20	88.55	87.85	90.20	0.97	150.00	C	2.00	n/a	n/a	1.68	n/a	n/a
Block 3 - Unit 5*	89.23	88.80	88.79	90.22	88.50	87.75	90.22	0.99	150.00	C	2.00	n/a	n/a	1.78	n/a	n/a
Block 3 - Unit 6*	89.23	88.75	88.17	90.25	88.50	87.65	90.25	1.02	150.00	C	2.00	n/a	n/a	1.88	n/a	n/a
Block 4 - Unit 1	87.57	88.40	88.01	89.46	-		-	1.89	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 2	87.57	88.35	88.01	89.64	-		-	2.07	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 3	87.57	88.35	87.93	89.64	-		-	2.07	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 4	87.57	88.30	87.93	89.64	-		-	2.07	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 5	87.57	88.25	87.93	89.64	-		-	2.07	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 6	87.57	88.20	88.00	89.97	-		-	2.40	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 7	87.57	88.25	88.19	89.95	-		-	2.38	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 8	87.57	88.30	88.19	89.91	-		-	2.34	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 9	87.57	88.30	88.29	89.87	-		-	2.30	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a
Block 4 - Unit 10	87.57	88.35	88.29	89.69	-		-	2.12	150.00	C	2.00	n/a	n/a	n/a	n/a	n/a

DSEL Grading Plans Reviewed: Grading Plan - Wateridge - Block 22 - Project 17-948 - Sheet No. 3 - Revision 12, dated October 6, 2020.
Note: Bearing Capacities noted in the table are based on engineered fill being placed over an undisturbed, native in-situ soil bearing surface. Based on the proposed USF elevations, in-situ silty clay and/or glacial till is anticipated to be encountered below the existing fill as a suitable bearing medium.
Note: Approximate fill thickness estimated based on subexcavating up to 300 mm below the original ground surface elevation observed during the geotechnical investigations. Existing ground surface elevations may differ from original ground surface elevations encountered during the geotechnical investigations.
Note: *Reflective of rear existing ground surface elevations based on permeameter testing associated with current investigation.

patersongroup

consulting engineers

memorandum

re: **Geotechnical Review of Site Servicing Drawings**
Wateridge Residential Development - Phase 1B - Block 22
1400 Hemlock Road - Ottawa

to: Mattamy Homes - **Mr. Conor Sutherland** - Conor.Sutherland@mattamycorp.com

to: DSEL - **Ms. Jennifer Ailey** - Jailey@dsel.ca

date: October 6, 2020

file: PG5345-MEMO.03 Revision 2

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a geotechnical review of the design drawings prepared by DSEL for Block 22 of the aforementioned residential development. The following memorandum should be read in conjunction with Paterson Report PG5345-1 Revision 1 dated September 10, 2020.

Geotechnical Review

Paterson has reviewed the following set of site service drawings, cross-sections and grading plans prepared by DSEL:

- ❏ Grading Plan - Block 22 - Job No 17-948, Sheet 3, Revision 12, dated October 6, 2020.
- ❏ Site Servicing Plan - Block 22 - Job No. 17-948, Sheet 4, Revision 12, dated October 6, 2020.
- ❏ Cross-Section - Block 22 - Job No. 17-948, Sheet 8, Revision 12, dated October 6, 2020

From a geotechnical perspective, the relevant recommendations (i.e., adequate frost protection of services, pavement structure drainage, pipe bedding and backfill) provided in Paterson Report PG5345-1 Revision 1 dated September 10, 2020., have been sufficiently incorporated into the above-noted drawings.

Clay Seals

Based on our review of the aforementioned site servicing plan prepared by DSEL, the proposed location of the clay seals appears to be in accordance with our geotechnical recommendations. The seals should be at least 1.5 m long (in the trench direction) and should extend from trench wall to trench wall. Should trench walls extend beyond the anticipated trench width inferred by the location of the clay seal depicted on the aforementioned site servicing planprepared by DSEL, the clay seal is recommended to extend the full trench width.

The seals should extend from the frost line and fully penetrate the bedding, subbedding and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the SPMDD.

It should be noted that a grading plan review and subsequent recommendations will be completed under a separate memorandum report for the subject site.

Stormwater Storage Pipe Chambers

Based on our review of the current servicing plans, the lowest elevation of the bottom of the proposed storage media is approximately 87.5 m. Based on our findings in the geotechnical report and existing borehole coverage, the current long-term seasonally high groundwater table is estimated between an elevation of 86.5 to 85.5 m. However, it should be noted that a 0.5 m of post-development groundwater lowering will occur within the vicinity of the subject site. Therefore the post-development long-term groundwater table is estimated at an elevation of 86.0 to 85.0 m.

Based on the available information, the elevation of the base of the storage media at 87.5 m conforms to having 1 m of separation from the seasonally high groundwater table. Therefore, the design of the infiltration system is acceptable from a geotechnical perspective.

We trust this memorandum meets your immediate requirements.

Best Regards,

Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

patersongroup
consulting engineers

memorandum

re: **Geotechnical Recommendations - Review of Servicing Installation Impact on Adjacent Building Foundations**
Wateridge Village Residential Development - Phase 1B - Block 22
1400 Hemlock Road - Ottawa

to: Mattamy Homes - **Mr. Conor Sutherland**- Conor.Sutherland@mattamycorp.com
cc: DSEL - **Ms. Jennifer Ailey**- JAiley@dsel.ca
date: October 6, 2020
file: PG5345-MEMO.04 Revision 2

Paterson Group (Paterson) has prepared the current memorandum report to provide geotechnical recommendations for supporting the building footings directly adjacent to the proposed service alignments across the aforementioned site. The following memorandum should be read in conjunction with Paterson Report PG5345-1 Revision 1 dated September 10, 2020.

Background Information

Paterson reviewed the following plan and sketches provided by David Schaeffer Engineering Limited (DSEL) for servicing at the aforementioned residential development:

- ❏ Site Servicing Plan - Wateridge - Block 22 - Project No. 17-948 - Sheet 4, Revision 12 dated October 6, 2020.
- ❏ Cross Sections - Wateridge - Block 22 - Project No. 17-948 - Sheet 8, Revision 12 dated October 6, 2020.

Based on the cross section details provided by DSEL, cross sections 2-2 and 3-3 have service alignments located within the lateral support zone of the adjacent building foundations:

- ❏ Section 2-2: The underside of the bedding for the water chamber structure will be located at approximately 85.85 m and the underside of footing is located at an elevation of 89.20 m. Therefore, the vertical separation is approximately 3.35 m with a lateral separation of approximately 0.30 m which does not include the additional trench excavation of approximately 0.3 m.

- ❏ Section 3-3: The underside of the bedding for the water chamber structure will be located at approximately 86.65 m and the underside of footing is located at an elevation of 89.37 m. Therefore, the vertical separation is approximately 2.72 m with a lateral separation of approximately 0.30 m which does not include the additional trench excavation of approximately 0.3 m.

Based on the proposed service and structure locations with respect to the adjacent building foundations, the following backfilling program is recommended to ensure that adequate lateral support is provided to the adjacent buildings.

Geotechnical Recommendations

Section 2-2

In order to ensure that the lateral support zone of the proposed footings (1H:1V from the face of footing) are not impacted by the water chamber structure, the lateral support zone for the footings should be dropped below the underside of excavation below the proposed water chamber structure which was measured to be at an elevation of 85.85 m.

In order to accomplish this, a lean-concrete (15 MPa, 28 day strength) in-filled trench extending to an elevation of 85.75 m is recommended to be placed below the footings of the exterior walls adjacent to water chamber structure at the south-west corner of Block 1. The lean concrete should be carried down to a depth of 85.75 for a minimum of 1.5 m beyond the edge of the chamber structures excavation at the proposed USF level along the west and south foundation walls. The bottom of the trench should then be tapered to USF upward at a 3H:1V incline to match the proposed USF elevations. The near vertical, zero entry trench should extend a minimum of 300 m beyond the exterior face of the affected footings. The near vertical, zero entry trench should be reviewed and approved by Paterson at the time of construction.

Section 3-3

In order to ensure that the lateral support zone of the proposed footings (1H:1V from the face of footing) are not impacted by the storage structure, the lateral support zone for the footings should be dropped below the underside of excavation below the proposed water chamber structure which was measured to be at an elevation of 86.65 m.

In order to accomplish this, a lean-concrete (15 MPa, 28 day strength) in-filled trench extending to an elevation of 86.55 m is recommended to be placed below the footings of the east foundations walls for Blocks 2. The lean concrete should be carried down to a depth of 86.55 for a minimum of 1.5 m beyond the edge of the chamber structures excavation at the proposed USF level along the south and east foundation walls. The bottom of the trench should then be tapered to USF upward at a 3H:1V incline to match the proposed USF elevations. The near vertical, zero entry trench should extend a minimum of 300 m beyond the exterior face of the affected footings. The near vertical, zero entry trench should be reviewed and approved by Paterson at the time of construction.

Watermain Adjacent to Block 1 and Block 2

It's understood that the proposed 100 mm diameter watermain will be installed adjacent to and within the lateral support zones for the south foundation walls and for Block 1 and Block 2. Based on our review, it is recommended that the lateral support zones for the south footings for Block 1 and Block 2 be dropped to a minimum of 300 mm below the invert of the watermain pipe using lean-concrete in-filled trenches. The trenches should be extended a minimum of 300 mm beyond the exterior face of the south footings where required.

Other Services

All other services were reviewed to be in conformance with our recommendations without interfering with the lateral support zone of footings.

We trust that this information is satisfactory to meet your immediate requirements.

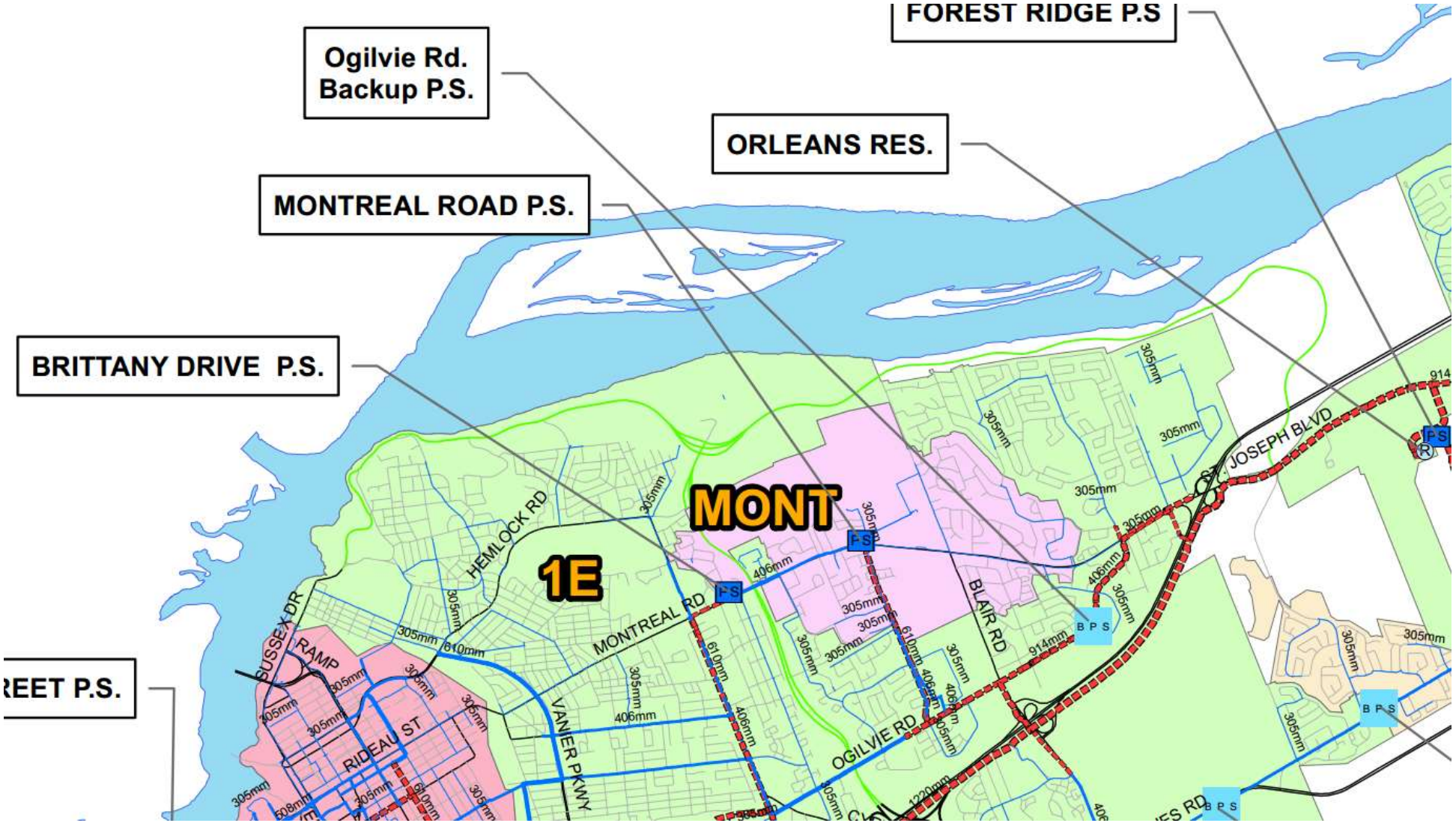
Paterson Group Inc.

Drew Petahtegoose, B.Eng.

Faisal I. Abou-Seido, P.Eng.

APPENDIX B

Water Supply


FOREST RIDGE P.S
Ogilvie Rd.
Backup P.S.
ORLEANS RES.
MONTREAL ROAD P.S.
BRITTANY DRIVE P.S.
REET P.S.
MONT
1E
HEMLOCK RD
MONTREAL RD
SUSSEX DR
RAMP
RIDEAU ST
VANIER PKWY
OGILVIE RD
BLAIR RD
ST. JOSEPH BLVD
305mm
406mm
610mm
914mm
1220mm
508mm
P S
B P S

Mattamy Homes
Wateridge - Block 22
Proposed Site Conditions

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	-	0
Semi-detached	2.7	-	0
Townhouse	2.7	38	103
Apartment			0
Bachelor	1.4	-	0
1 Bedroom	1.4	-	0
2 Bedroom	2.1	-	0
3 Bedroom	3.1	-	0
Average	1.8	-	0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	103	28.8	20.0	141.3	98.1	213.4	148.2

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5 $L/m^2/d$	-	0.00	0.0	0.0	0.0	0.0	0.0
Office	75 $L/9.3m^2/d$	-	0.00	0.0	0.0	0.0	0.0	0.0
Restaurant*	125 L/seat/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			**28.8**	**20.0**	**141.3**	**98.1**	**213.4**	**148.2**
Total Demand			28.8	20.0	141.3	98.1	213.4	148.2
Total Demand+10%			**31.7**	**22.0**	**155.4**	**107.9**	**234.8**	**163.0**

* Estimated number of seats at 1 seat per $9.3m^2$

Block 1
Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1251.5	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	11674.4	L/min	
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%
Fire Flow	**10200.0 L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered	0%
Reduction	**0 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	30.1m-45m	29	3	87	5%	
S	Wood Frame	10.1m-20m	29	3	87	14%	
E	Wood Frame	0m-3m	15	3	45	23%	
W	Wood Frame	20.1m-30m	15	3	45	8%	
		% Increase				**50%**	*value not to exceed 75%*

Increase	**5100.0**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	15300.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	15000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided Mattamy Homes
-Calculations based on Fire Underwriters Survey - Part II

Block 2
Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1250.2	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	11668.0	L/min	
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%
Fire Flow	**10200.0 L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered	0%
Reduction	**0 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	30.1m-45m	29	3	87	5%	
S	Wood Frame	10.1m-20m	29	3	87	14%	
E	Wood Frame	20.1m-30m	15	3	45	8%	
W	Wood Frame	0m-3m	15	3	45	23%	
		% Increase				**50%**	*value not to exceed 75%*

Increase	**5100.0**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	15300.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	15000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided Mattamy Homes
-Calculations based on Fire Underwriters Survey - Part II

Block 3
Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1218.8	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	11520.5	L/min	
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	**10200.0**	**L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered 0%

Reduction	**0**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	10.1m-20m	15	3	45	13%	
S	Wood Frame	30.1m-45m	15	3	45	5%	
E	Wood Frame	20.1m-30m	29	3	87	9%	
W	Wood Frame	20.1m-30m	29	3	87	9%	
		% Increase				**36%**	*value not to exceed 75%*

Increase	**3672.0**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	13872.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	14000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided Mattamy Homes
-Calculations based on Fire Underwriters Survey - Part II

Block 4
Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	2318.2	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	15888.6	L/min	
	16000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**13600.0**	**L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered	0%	
Reduction	**0**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	10.1m-20m	19	4	76	14%	
S	Wood Frame	>45m	19	4	76	0%	
E	Wood Frame	20.1m-30m	31	4	124	10%	
W	Wood Frame	20.1m-30m	31	4	124	10%	
		% Increase				**34%**	*value not to exceed 75%*

Increase	**4624.0**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	18224.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	18000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided Mattamy Homes
-Calculations based on Fire Underwriters Survey - Part II

Anthony Temelini

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: May 22, 2020 2:01 PM
To: Anthony Temelini
Cc: Jennifer Ailey
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request
Attachments: Wateridge Village Phase 1B Block 22 May 2020.pdf; geoOttawa.pdf; block 22 Site Plan- 2020 May 4 _ec.pdf; wtr-2020-05-07_948_ggg.pdf; wtr-2020-05-07_948_ggg_water demand.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Anthony,

Please find below boundary conditions, HGL, for hydraulic analysis at **1400 Hemlock Road [BLOCK 22] within Wateridge Village Phase 1B** (zone MONT) assumed to be connected to the 203mm dia. watermain on Michael Stoqua Street and the 203mm dia. watermain on Moses Tennisco Street (see attached PDF for locations) for both existing and future conditions.

Domestic and Fire Flow Water Demands:
Type of Development: Residential (18 rear lane townhome units and 20 back-to-back stacked townhome units)
Average Day Demand = 0.36 L/s
Maximum Day Demand = 1.80 L/s
Peak Hour Demand = 2.72 L/s
Fire Flow Demand = 15,000 L/min
HGL has been provided for the higher fire flow (Blocks 1 and 2) since that will govern the design.

Existing Conditions Based on Current Pump Operations:
(HGL is the same at both connections)
Minimum HGL = 146.7m
Maximum HGL = 147.0m ***The maximum pressure is estimated to be more than 80 psi.*** *A pressure check at completion of construction is recommended to determine if pressure control is required.*
Max Day + FireFlow (250L/s) = 140.0m

Future Conditions Based on a Proposed HGL Target of 143.0m at Montreal Road P.S:
(HGL is the same at both connections)
Minimum HGL = 143.0m
Maximum HGL = 143.0m
Max Day + FireFlow (250L/s) = 136.0m

These are based on computer model simulation.

Disclaimer: *The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.*

Regards,

Mark Fraser, P. Eng.
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Fraser, Mark
Sent: May 15, 2020 3:38 PM
To: Anthony Temelini <ATemelini@dsel.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Anthony,

Please find below boundary conditions, HGL, for hydraulic analysis at **1400 Hemlock Road [BLOCK 22] within Wateridge Village Phase 1B** (zone MONT) assumed to be connected to the 203mm dia. watermain on Michael Stoqua Street and the 203mm dia. watermain on Moses Tennisco Street (see attached PDF for locations).

Domestic and Fire Flow Water Demands:
Type of Development: Residential (18 rear lane townhome units and 20 back-to-back stacked townhome units)
Average Day Demand = 0.36 L/s
Maximum Day Demand = 1.80 L/s
Peak Hour Demand = 2.72 L/s
Fire Flow Demand = 15,000 L/min
HGL has been provided for the higher fire flow (Blocks 1 and 2) since that will govern the design.

Existing Conditions based on Current Pump Operations (HGL is the same at both connections):
Minimum HGL = 146.7m
Maximum HGL = 147.0m. ***The maximum pressure is estimated to be more than 80 psi.*** *A pressure check at completion of construction is recommended to determine if pressure control is required.*
Max Day + FireFlow (250L/s) = 140.0m

Please note the following:

- ***Boundary conditions provided above are for existing conditions****. Upgrades to the Montreal and Brittany pump stations are currently being planned to support the CFB Rockcliffe development. The City plans to control the discharge HGL to 143.0m. Furthermore, the current plan is to use a different pumping strategy that will try to maintain a constant HGL of 143.0m even during peak hour and/or fire flow conditions.*
- ***Boundary conditions will be forthcoming for future pump operation conditions*** *as requested. Our model currently does not include the future pumping changes into the zone Mont so the model has to be modified and the future HGL target reconfirmed.*

These are for current conditions and are based on computer model simulation.

Disclaimer: *The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.*

Regards,

Mark Fraser, P. Eng.
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: May 11, 2020 2:47 PM
To: Fraser, Mark <Mark.Fraser@ottawa.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Mark,

Thanks for confirming.

Can you please ensure that the Water Resources Unit provides us with two (2) sets of boundary conditions, one for the Montreal Pressure Zone under current conditions and one for the Montreal Pressure Zone under future conditions (after the upgrades described in the attached excerpt have been made)?

Please let us know.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: May 11, 2020 9:18 AM
To: Anthony Temelini <ATemelini@dsel.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Anthony,

The below request for boundary conditions has been sent to the Water Resources Unit. Please note that it can take approx. 5-10 business days to receive boundary conditions. I will forward you the boundary conditions once received.

Regards,

Mark Fraser
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: May 08, 2020 1:31 PM
To: Fraser, Mark <Mark.Fraser@ottawa.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Mark,

Per the attached engineering comments from April 2, please note that we are proceeding with the boundary condition request for Wateridge Village – Phase 1B Block 22:

1. Location of Service / Street Number: 1400 Hemlock Road.

2. Development information and fire flow requirements:

- Proposed residential development with 18 rear lane townhomes and 20 back-to-back stacked townhomes.
- Back-to-back stacked townhomes will have automatic sprinklers.
- Perimeter meters to be used.
- It is anticipated that the development will have two (2) connection points to existing services (see attached geoOttawa markup):
    - Connection 1 to the existing 200 mm diameter watermain on Michael Stoqua Street;
    - Connection 2 to the existing 200 mm diameter watermain on Moses Tennisco Street;
- It is anticipated that required **fire flows will range from 233 L/s** (14,000 L/min) **to 250 L/s** (15,000 L/min) per the attached calculations.

3. Anticipated demands for the development have been calculated per the attached spreadsheet, with an additional 10% contingency to be conservative:

	L/min	L/s	L/s (+10%)
Avg. Daily	20.0	0.33	0.36
Max Day	98.1	1.64	1.80
Peak Hour	148.2	2.47	2.72
Min Hour	10.0	0.17	0.19

Can you please forward the boundary condition request to the City's water modelling group and confirm once it has been submitted?

Please let us know when we can expect to receive the boundary conditions.

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

'

Hydraulic Capacity and Modeling Analysis Wateridge Village Phase 1B - Block 22 Development

Final Report

Prepared for:
David Schaeffer Engineering Ltd.
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

Prepared by:
GeoAdvice Engineering Inc.
Unit 203, 2502 St. John's Street
Port Moody, BC V3H 2B4

Submission Date: September 24, 2020

Contact: Mr. Werner de Schaetzen, Ph.D., P.Eng.
Project: 2020-040-DSE

Document History and Version Control

Revision No.	Date	Document Description	Revised By	Reviewed By
R0	May 20, 2020	Draft	Ferdinand de Schoutheete	Werner de Schaetzen
R1	May 22, 2020	Final	Ferdinand de Schoutheete	Werner de Schaetzen
R2	May 25, 2020	Final	Ferdinand de Schoutheete	Werner de Schaetzen
R3	September 23, 2020	Updated Draft	Ben Loewen	Werner de Schaetzen
R4	September 24, 2020	Final	Ben Loewen	Werner de Schaetzen

Statement of Qualifications and Limitations
This document represents GeoAdvice Engineering Inc. best professional judgment based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by a member of the engineering profession currently practicing under similar conditions. No warranty, express or implied is made.

Contents

1 Introduction

GeoAdvice Engineering Inc. ("GeoAdvice") was retained by David Schaeffer Engineering Ltd. ("DSEL") to size the water main network for the Wateridge Village Phase 1B - Block 22 development ("Development") in the City of Ottawa, ON ("City").

The development is located at 1400 Hemlock Road between Michael Stoqua Street and Moses Tennisco Street. To the west of the development there is an existing 200 mm trunk main on Michael Stoqua Street, and to the east there is an existing 200 mm trunk main on Moses Tennisco Street.

The development consists of 18 rear-lane townhomes and 20 back-to-back stacked townhomes. Ten (10) Block 4 units, which front Michael Stoqua Street, will have direct service connections to the existing 200 mm water main.

The development model will have two (2) connections to the City water distribution system:

- Connection 1: Existing 200 mm diameter watermain on Michael Stoqua Street; and
- Connection 2: Existing 200 mm diameter watermain on Moses Tennisco Street.

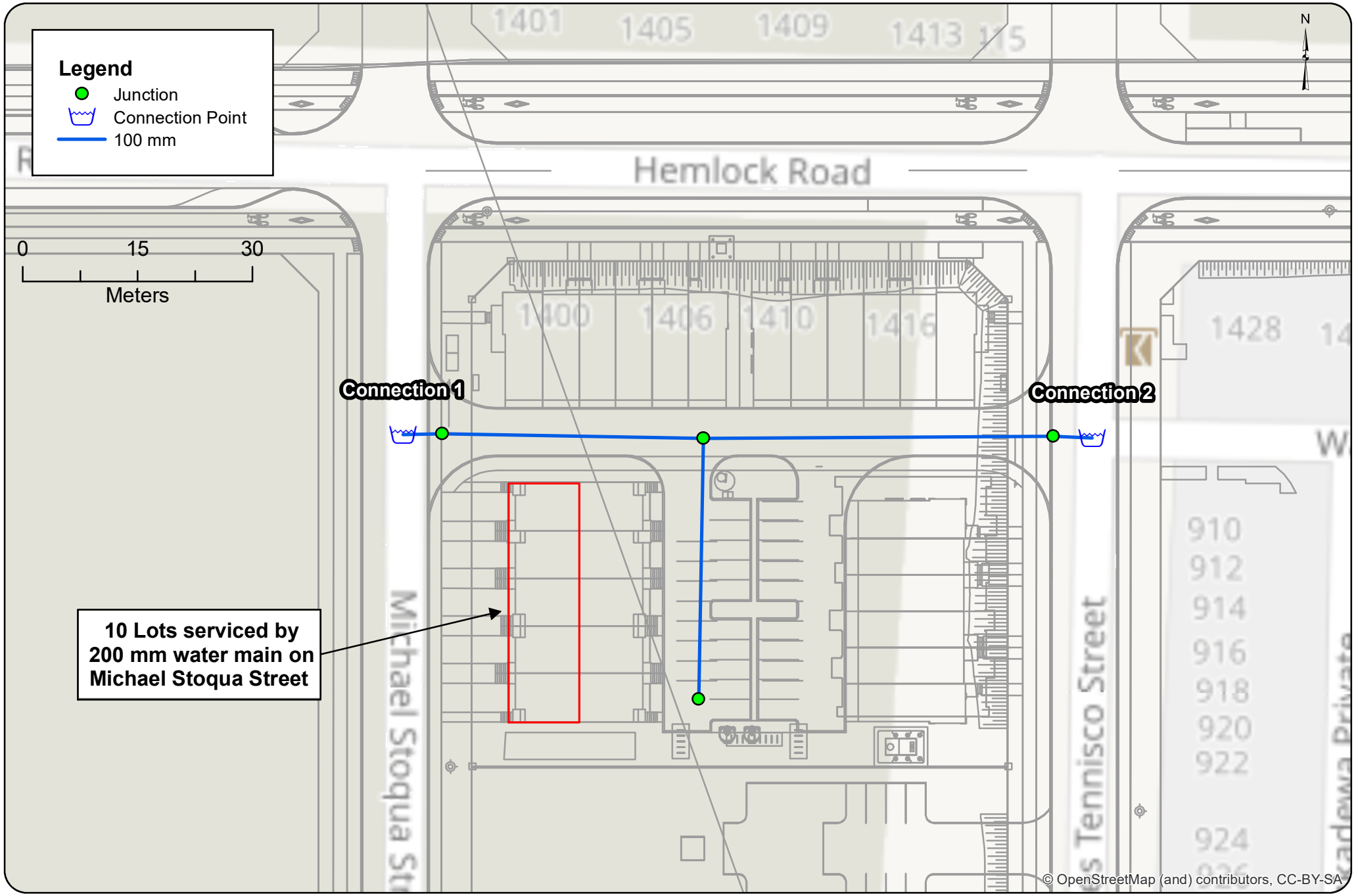
As agreed upon with DSEL, the following scenarios were assessed for the Wateridge Village Phase 1B - Block 22 development:

- Existing Scenario (based on current pump operations)
- Future Scenario (based on future proposed pump operations)

The development site is shown in **Figure 1.1** with the final recommended pipe diameters.

This report describes the assumptions and results of the hydraulic modeling and capacity analysis using InfoWater (Innovyze), a GIS water distribution system modeling and management software application.

The results presented in this report are based on the analysis of steady state simulations. No extended period simulations were completed in this analysis to assess the water quality or to assess the hydraulic impact on storage and pumping.



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis**
Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **September 2020**
Created by: **BL**
Reviewed by: **WdS**

Site Layout and Connection Points

Figure 1.1

2 Modeling Considerations

2.1 Water Main Configuration

The water main network was modeled based on development layout provided by DSEL to GeoAdvice on May 12, 2020.

2.2 Elevations

Elevations of the modeled junctions were assigned based on the grading plan of the development provided by DSEL to GeoAdvice on May 12, 2020.

2.3 Consumer Demands

Demand calculations were completed by DSEL. A summary of the rates and peaking factors used for this development is shown in **Table 2.1** below.

Table 2.1: City of Ottawa Demand Rate and Peaking Factors

Demand Type	Amount	Unit
Average Day Demand		
Residential	280	L/c/d
Maximum Daily Demand		
Residential	4.9 x avg. day	L/c/d
Peak Hour Demand		
Residential	7.4 x avg. day	L/c/d
Minimum Hour Demand		
Residential	0.5 x avg. day	L/c/d

Table 2.2 summarizes the water demand calculations for the Wateridge Village Phase 1B - Block 22 Development. Demands were uniformly distributed to all the nodes in the model.

Table 2.2: Development Demand Calculations

Dwelling Type	Number of Units	Unit Rate*	Pop	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Minimum Hour Demand (L/s)
Townhouse	38 **	2.7 cap/unit	103	0.33	1.63	2.46	0.17
Total (+ 10 %)				**0.37**	**1.80**	**2.72**	**0.19**

***City of Ottawa Design Guidelines**

****Although ten (10) of the 38 lots will be serviced by the 200 mm water main on Michael Stoqua Street, the demands have been included in this analysis (conservative assumption).**

2.4 Fire Flow Demand

Fire flow calculations were completed by DSEL and are summarized in **Table 2.3** below.

Table 2.3: Fire Flow Requirements at 140 kPa (20 psi)

Development Type	Fire Flow (L/min)	Fire Flow (L/s)
Blocks 1 and 2	15,000	250
Block 3	14,000	233
Block 4	18,000	300

As agreed with the City, no hydraulic fire flow modeling (Max Day Demand plus Fire Flow) was completed as the fire flows provided by the adjacent hydrants are sufficient. In addition, a hydrant spacing analysis has been conducted in accordance to the City of Ottawa Design Guidelines and the available fire flow results are summarized in **Section 5.3**. Finally, it is expected that there would be minimal impact to the internal network in a fire flow scenario.

2.5 Boundary Conditions

The boundary conditions were provided by the City of Ottawa in the form of Hydraulic Grade Line (HGL) at the following locations:

- Connection 1: Existing 200 mm diameter watermain on Michael Stoqua Street; and
- Connection 2: Existing 200 mm diameter watermain on Moses Tennisco Street.

The above connection points are illustrated in **Figure 1.1**.

Table 2.4 and **Table 2.5** summarize the existing and future boundary conditions used to size the Wateridge Village Phase 1B - Block 22 development water network.

Table 2.4: Existing Boundary Conditions (Provided by DSEL on May 15, 2020)

Condition	Connection 1 HGL (m)	Connection 2 HGL (m)
Min Hour (maximum pressure)	147.0	147.0
Peak Hour (minimum pressure)	146.7	146.7

Table 2.5: Future Boundary Conditions (Provided by DSEL on May 22, 2020)

Condition	Connection 1 HGL (m)	Connection 2 HGL (m)
Min Hour (maximum pressure)	143.0	143.0
Peak Hour (minimum pressure)	143.0	143.0

The existing boundary conditions are based on the current Montreal Road pump station setting and the future boundary conditions are based on a proposed HGL target of 143.0 m at the Montreal Road pump station.

The existing and future boundary conditions can be found in **Appendix A**.

3 Hydraulic Capacity Design Criteria

3.1 Pipe Characteristics

Pipe characteristics used for the development are outlined in **Table 3.1** below.

Table 3.1: Model Pipe Characteristics

Diameter (mm)	Hazen Williams C-Factor (/)
100	110

3.2 Pressure Requirements

As outlined in the City of Ottawa Design Guidelines, the generally accepted best practice is to design new water distribution systems to operate between 350 kPa (50 psi) and 480 kPa (70 psi). The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way shall not exceed 552 kPa (80 psi). Pressure requirements are outlined in **Table 3.2.**

Table 3.2: Pressure Requirements

Demand Condition	Minimum Pressure		Maximum Pressure	
	(kPa)	(psi)	(kPa)	(psi)
Normal Operating Pressure (maximum daily flow)	350	50	480	70
Peak Hour Demand (minimum allowable pressure)	276	40	-	-
Maximum Fixture Pressure (Ontario Building Code)	-	-	552	80
Maximum Distribution Pressure (minimum hour check)	-	-	552	80
Maximum Day Plus Fire	140	20	-	-

4 Hydraulic Capacity Analysis

The proposed water mains within the development were sized to the minimum diameter which would satisfy the peak hour demand. Modeling was carried out for minimum hour and peak hour using InfoWater. The existing and future boundary conditions provided by DSEL were used to size the network, and the results are presented in the following sections.

Detailed pipe and junction model input data can be found in **Appendix B**.

4.1 Development Pressure Analysis

The modeling results indicate that the development can be adequately serviced by the proposed water main layout shown in **Figure 1.1**. Modeled service pressures for the development are summarized in **Table 4.1**.

Table 4.1: Summary of Available Service Pressures

Scenario	Minimum Hour Demand Maximum Pressure	Peak Hour Demand Minimum Pressure
Existing	82 psi	80 psi
Future	77 psi	75 psi

As outlined in the City of Ottawa Design Guidelines, the generally accepted best practice is to design new water distribution systems to operate between 50 psi and 70 psi. The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way shall not exceed 80 psi. As such, based on the City boundary conditions, pressure reducing valves may be required under the Existing scenario.

Detailed pipe and junction result tables and maps can be found in **Appendix C**.

5 Other Servicing Considerations

5.1 Water Supply Security

The City of Ottawa Design Guidelines allow single feed systems for developments up to a total average day demand of 50 m^3/day and require two (2) feeds if the development exceeds 50 m^3/day for supply security, according to Technical Bulletin ISDTB-2014-02.

The Wateridge Village Phase 1B - Block 22 development services a total average day demand of 32 m^3/day (0.37 L/s); as such, only one (1) feed is required.

5.2 Valves

No comment has been made in this report with respect to exact placement of isolation valves within the distribution network for the Wateridge Village Phase 1B - Block 22 development other than to summarize the City of Ottawa Design Guidelines for number, location, and spacing of isolation valves:

- Tee intersection – two (2) valves
- Cross intersection – three (3) valves
- Valves shall be located 2 m away from the intersection
- 300 m spacing for 150 mm to 400 mm diameter valves
- Gate valves for 100 mm to 300 mm diameter mains
- Butterfly valves for 400 mm and larger diameter mains

Drain valves are not strictly required under the City of Ottawa Design Guidelines for water mains under 600 mm in diameter. The Guidelines indicate that “small diameter water mains shall be drained through hydrant via pumping if needed.”

Air valves are not strictly required under the City of Ottawa Design Guidelines for water mains up to and including 400 mm in diameter. The Guidelines indicate that air removal “can be accomplished by the strategic positioning of hydrant at the high points to remove the air or by installing or utilizing available 50 mm chlorination nozzles in 300 mm and 400 mm chambers.”

The detailed engineering drawings for the Wateridge Village Phase 1B - Block 22 development are expected to identify valves in accordance with the requirements noted above.

5.3 Hydrants

City of Ottawa Design Guidelines for maximum hydrant spacing are the following:

- 125 m for single family unit residential areas on lots where frontage at the street line is 15 m or longer;
- 110 m for single family unit residential areas on lots where frontage at the street line is less than 15 m and for residential areas zoned for row housing, doubles or duplexes; and
- 90 m for institutional, commercial, industrial, apartments and high-density areas.

Proposed hydrant locations were provided by DSEL to GeoAdvice on May 15, 2020.

Table 5.1 summarizes the theoretical available fire flow for each block based on the number of hydrants within the vicinity of the development.

Table 5.1: Fire Hydrant Spacing Analysis

Block Number	Required Fire Demand (L/min)	Number of Fire Hydrants within 75 m	Number of Fire Hydrants within 75 m and 150 m	Available Fire Flow* (L/min)
Block 1	15,000	1	3	17,033
Block 2	15,000	1	3	17,033
Block 3	14,000	1	3	17,033
Block 4	18,000	2	2	18,926

***Theoretical available fire flow, as per Table 18.5.4.3 of City of Ottawa ISTB-2018-02**

As shown in the table above, the theoretical available fire flow is higher than the required fire flow demand for each block.

6 Conclusions

The hydraulic capacity and modeling analysis of the Wateridge Village Phase 1B - Block 22 development yielded the following conclusions:

- The proposed water main network can deliver all required domestic flows under the existing and future boundary conditions.
- Domestic pressures expected to range between 80 psi and 82 psi under the existing scenario and between 75 psi and 77 psi under the future scenario.
- Since the anticipated service pressures in the existing scenario are predicted to exceed the City of Ottawa Design Guideline of 80 psi, pressure reducing valves may be required.
- The proposed service connections from Block 4 to the Michael Stoqua Street are not expected to impact the existing water main system.

Submission

Prepared by:

Ben Loewen, E.I.T.
Hydraulic Modeler / Project Engineer

Approved by:

LICENSED PROFESSIONAL ENGINEER
W. B. F. de Schaetzen
100116349
PROVINCE OF ONTARIO

Sept 24, 2020

Werner de Schaetzen, Ph.D., P.Eng.
Senior Modeling Review / Project Manager

Appendix A Boundary Conditions

Appendix A.1 Existing Boundary Conditions Provided by DSEL on May 15, 2020.

Gmail

Ferdinand de Schoutheete <ferdinand.geoadvice@gmail.com>

Fwd: FW: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Werner de Schaetzen - GeoAdvice <werner@geoadvice.com>
To: Ferdinand de Schoutheete <Ferdinand@geoadvice.com>

15 May 2020 at 12:57

-------- Forwarded message --------
From: **Jennifer Ailey** <JAiley@dsel.ca>
Date: Fri, May 15, 2020 at 12:49 PM
Subject: FW: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request
To: werner de schaetzen <werner@geoadvice.com>
CC: Anthony Temelini <ATemelini@dsel.ca>

Hi Werner,

I hope you're keeping well. Please see below and attached for the boundary conditions. Please let me know if you have any questions.

I hope you enjoy the long weekend.

Thanks,

Jennifer Ailey, P.Eng.
Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

Phone: (613) 836-0856 ext. 526
Cell: (613) 222-6476
Email: jailey@dsel.ca

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: May 15, 2020 3:38 PM
To: Anthony Temelini <ATemelini@dsel.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Anthony,

Please find below boundary conditions, HGL, for hydraulic analysis at **1400 Hemlock Road [BLOCK 22] within Wateridge Village Phase 1B** (zone MONT) assumed to be connected to the 203mm dia. watermain on Michael Stoqua Street and the 203mm dia. watermain on Moses Tennisco Street (see attached PDF for locations).

Domestic and Fire Flow Water Demands:

Type of Development: Residential (18 rear lane townhome units and 20 back-to-back stacked townhome units)

Average Day Demand = 0.36 L/s

Maximum Day Demand = 1.80 L/s

Peak Hour Demand = 2.72 L/s

Fire Flow Demand = 15,000 L/min

HGL has been provided for the higher fire flow (Block 1 and 2) since that will govern the design.

Existing Conditions based on Current Pump Operations (HGL is the same at both connections):

Minimum HGL = 146.7m

Maximum HGL = 147.0m. ***The maximum pressure is estimated to be more than 80 psi.*** *A pressure check at completion of construction is recommended to determine if pressure control is required.*

Max Day + FireFlow (250L/s) = 140.0m

Please note the following:

- ***Boundary conditions provided above are for existing conditions***. *Upgrades to the Montreal and Brittany pump stations are currently being planned to support the CFB Rockcliffe development. The City plans to control the discharge HGL to 143.0m. Furthermore, the current plan is to use a different pumping strategy that will try to maintain a constant HGL of 143.0m even during peak hour and/or fire flow conditions.*
- ***Boundary conditions will be forthcoming for future pump operation conditions*** *as requested. Our model currently does not include the future pumping changes into the zone Mont so the model has to be modified and the future HGL target reconfirmed.*

These are for current conditions and are based on computer model simulation.

Disclaimer: *The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.*

Regards,

Mark Fraser, P. Eng.

Project Manager, Planning Services

Development Review Central Branch

City of Ottawa | Ville d'Ottawa

Planning, Infrastructure and Economic Development Department

110 Laurier Avenue West, 4th Floor, Ottawa ON, K1P 1J1

Tel:613.580.2424 ext. 27791

Fax: 613-580-2576

Mail: Code 01-14

Email: Mark.Fraser@ottawa.ca

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: May 11, 2020 2:47 PM
To: Fraser, Mark <Mark.Fraser@ottawa.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Hi Mark,

Thanks for confirming.

Can you please ensure that the Water Resources Unit provides us with two (2) sets of boundary conditions, one for the Montreal Pressure Zone under current conditions and one for the Montreal Pressure Zone under future conditions (after the upgrades described in the attached excerpt have been made)?

Please let us know.

Thank you,

Anthony Temelini, P.Eng.

Junior Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

Appendix A.2 Future Boundary Conditions Provided by DSEL on May 22, 2020.

Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

Fraser, Mark <Mark.Fraser@ottawa.ca>
to Anthony Temelini, Jennifer Ailey

Hi Anthony,

Please find below boundary conditions, HGL, for hydraulic analysis at **1400 Hemlock Road [BLOCK 22] within Wateridge Village Phase 1B** (zone MONT) assumed to be connected to PDF for locations) for both existing and future conditions.

Domestic and Fire Flow Water Demands:
Type of Development: Residential (18 rear lane townhome units and 20 back-to-back stacked townhome units)
Average Day Demand = 0.36 L/s
Maximum Day Demand = 1.80 L/s
Peak Hour Demand = 2.72 L/s
Fire Flow Demand = 15,000 L/min
HGL has been provided for the higher fire flow (Blocks 1 and 2) since that will govern the design.

Existing Conditions Based on Current Pump Operations:
(HGL is the same at both connections)
Minimum HGL = 146.7m
Maximum HGL = 147.0m ***The maximum pressure is estimated to be more than 80 psi.*** *A pressure check at completion of construction is recommended to determine if pressure cont*
Max Day + FireFlow (250L/s) = 140.0m

Future Conditions Based on a Proposed HGL Target of 143.0m at Montreal Road P.S:
(HGL is the same at both connections)
Minimum HGL = 143.0m
Maximum HGL = 143.0m
Max Day + FireFlow (250L/s) = 136.0m

These are based on computer model simulation.

Disclaimer: *The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information availa 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 pi*

Regards,

Mark Fraser, P. Eng.
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Fraser, Mark
Sent: May 15, 2020 3:38 PM
To: Anthony Temelini <ATemelini@dsel.ca>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: 948 - Wateridge Village Phase 1B Block 22 Boundary Condition Request

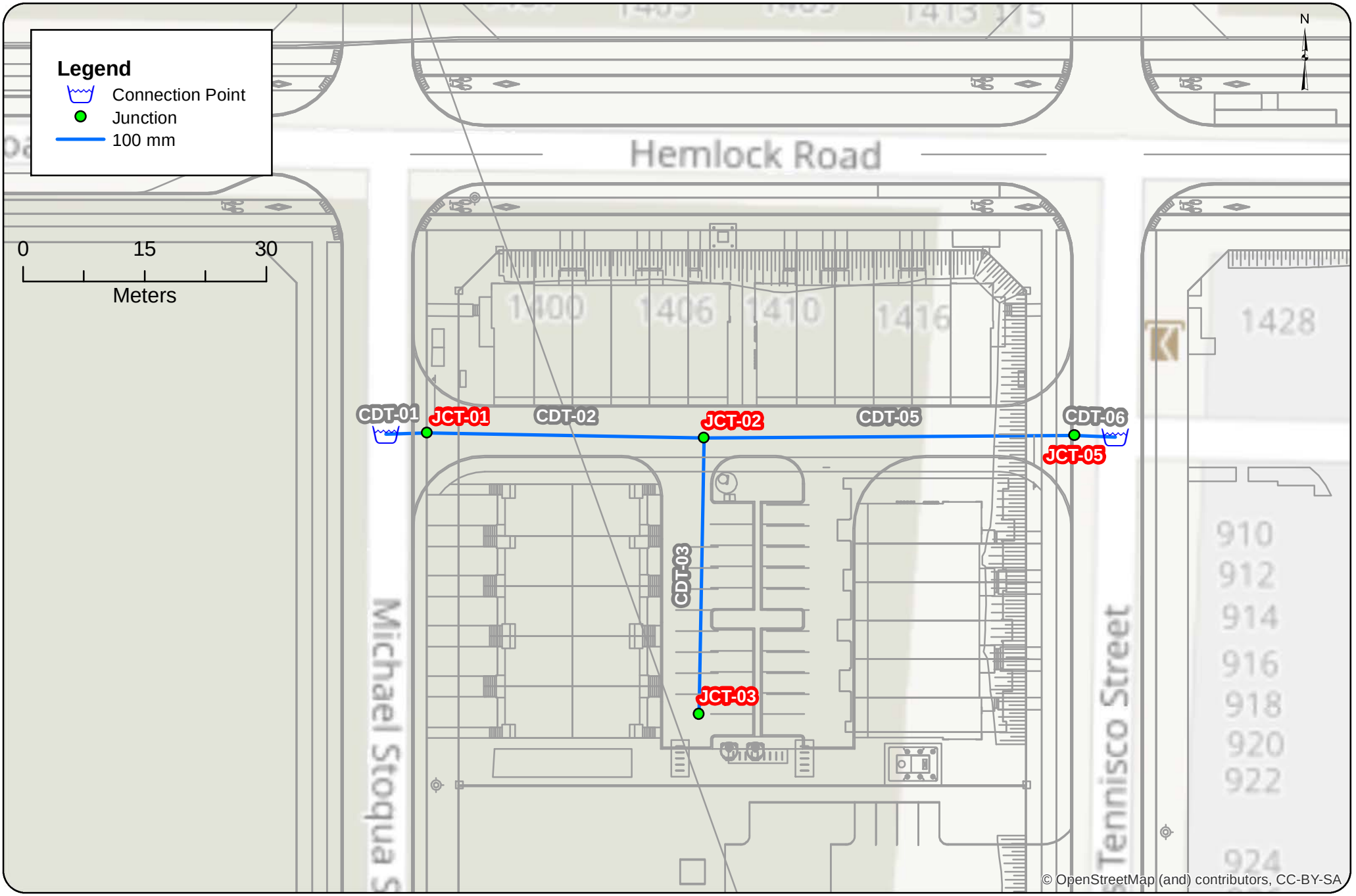
HI Anthony,

Please find below boundary conditions, HGL, for hydraulic analysis at **1400 Hemlock Road [BLOCK 22] within Wateridge Village Phase 1B** (zone MONT) assumed to be connected to PDF for locations).

Domestic and Fire Flow Water Demands:
Type of Development: Residential (18 rear lane townhome units and 20 back-to-back stacked townhome units)
Average Day Demand = 0.36 L/s
Maximum Day Demand = 1.80 L/s
Peak Hour Demand = 2.72 L/s
Fire Flow Demand = 15,000 L/min
HGL has been provided for the higher fire flow (Blocks 1 and 2) since that will govern the design.

Existing Conditions based on Current Pump Operations (HGL is the same at both connections):

Appendix B Pipe and Junction Model Inputs



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis**
Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **September 2020**
Created by: **BL**
Reviewed by: **WdS**

System Layout

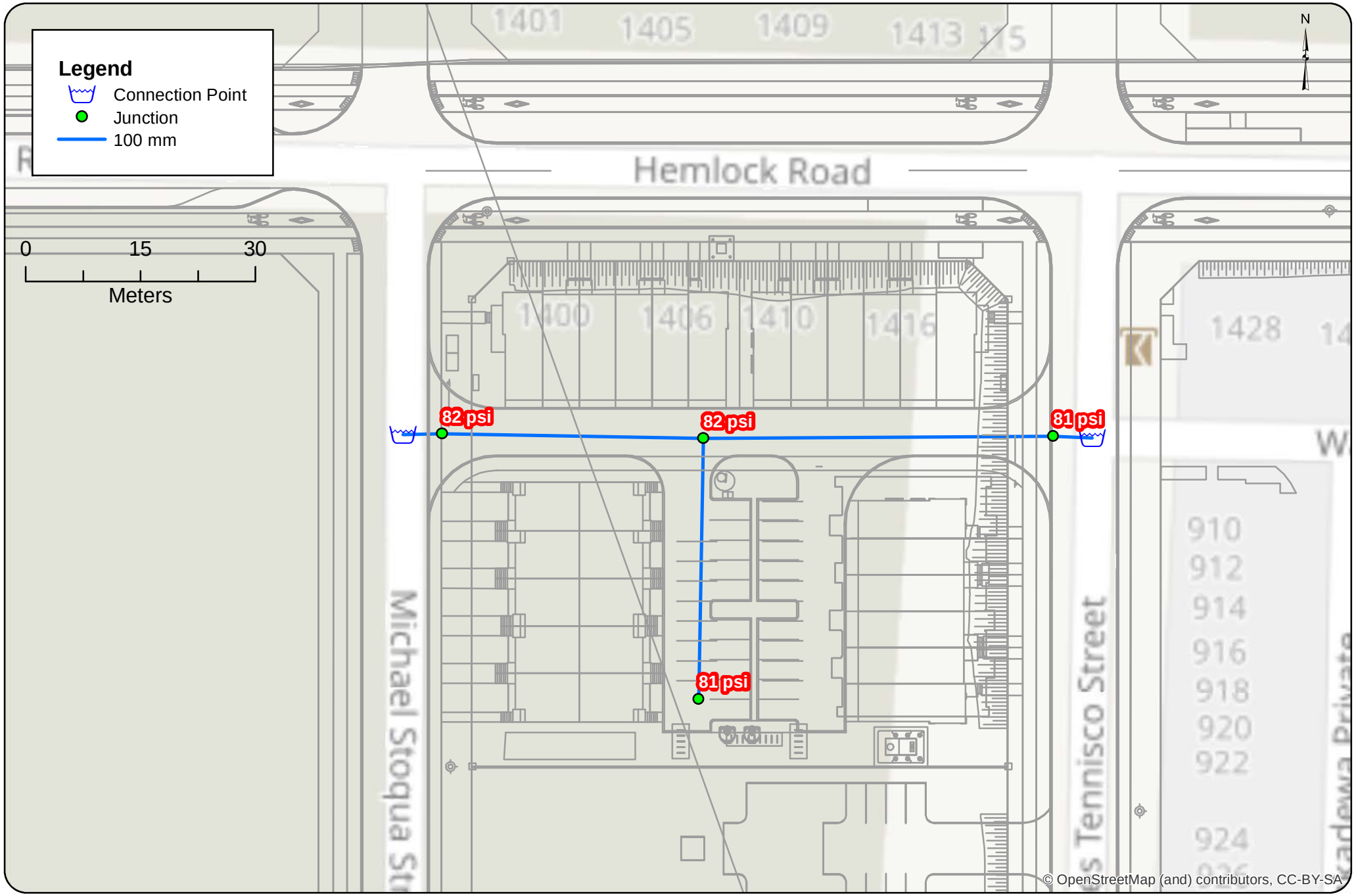
Figure B.1

Model Inputs

ID	From	To	Length (m)	Diameter (mm)	Roughness
CDT-01	RES_01	JCT-01	5.00	100	110
CDT-02	JCT-01	JCT-02	34.16	100	110
CDT-03	JCT-02	JCT-03	34.06	100	110
CDT-05	JCT-02	JCT-05	45.68	100	110
CDT-06	JCT-05	RES_02	5.00	100	110

ID (Char)	Elevation (m)
JCT-01	89.12
JCT-02	89.61
JCT-03	89.79
JCT-05	90.33

Appendix C MHD and PHD Model Results



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Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **September 2020**
Created by: **BL**
Reviewed by: **WdS**

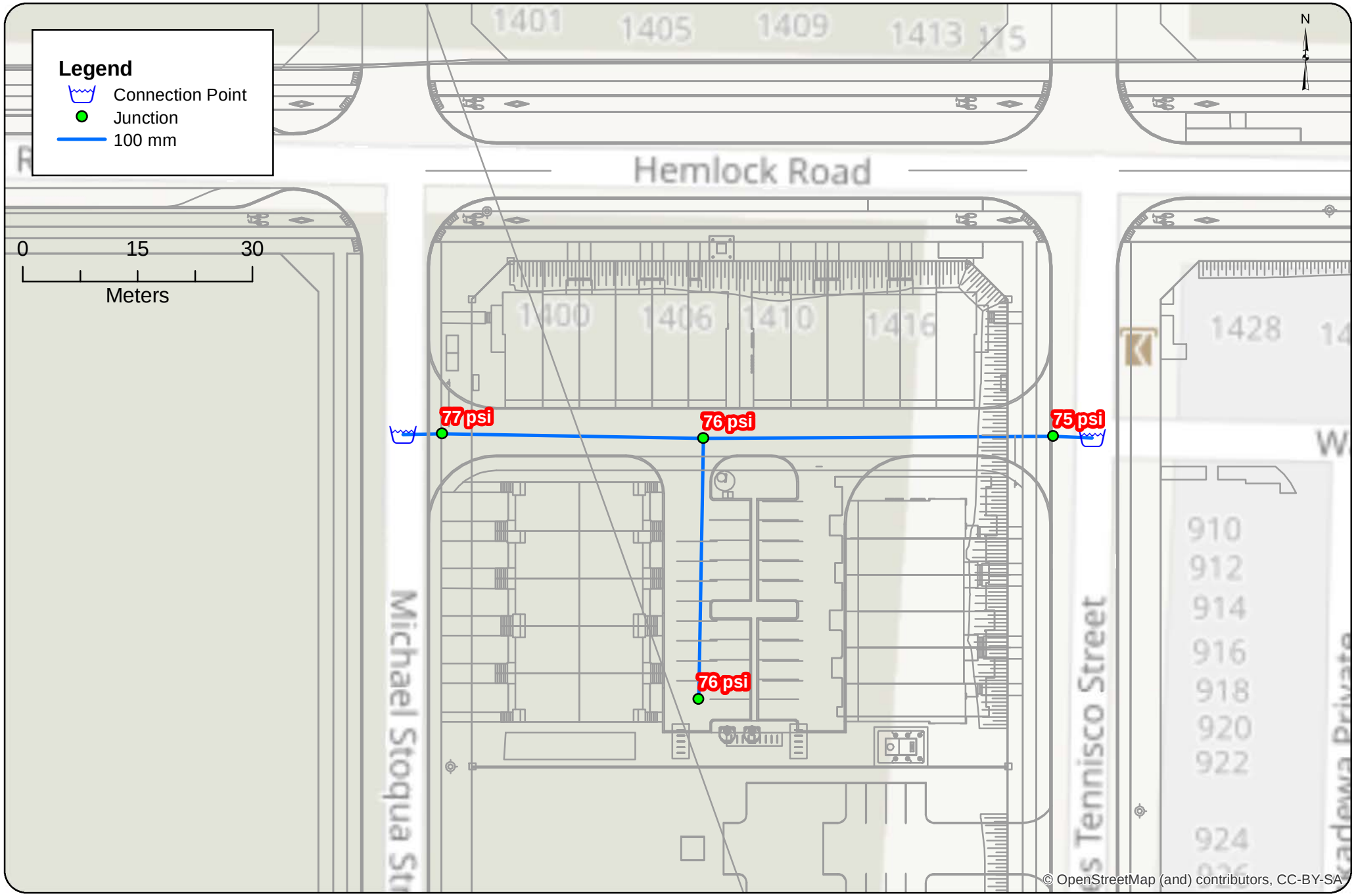
MHD Results
Existing Scenario

Figure C.1

Minimum Hour Demand Modeling Results - Existing

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)
CDT-01	RES_01	JCT-01	8.65	100	110	0.10	0.01	0.00	0.01
CDT-02	JCT-01	JCT-02	30.59	100	110	0.05	0.01	0.00	0.00
CDT-03	JCT-02	JCT-03	34.06	100	110	0.05	0.01	0.00	0.00
CDT-05	JCT-02	JCT-05	41.73	100	110	-0.04	0.01	0.00	0.00
CDT-06	JCT-05	RES_02	9.00	100	110	-0.09	0.01	0.00	0.01

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
JCT-01	0.05	89.12	147	82
JCT-02	0.05	89.61	147	82
JCT-03	0.05	89.79	147	81
JCT-05	0.05	90.33	147	81



GeoAdvice Engineering Inc.

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Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **September 2020**
Created by: **BL**
Reviewed by: **WdS**

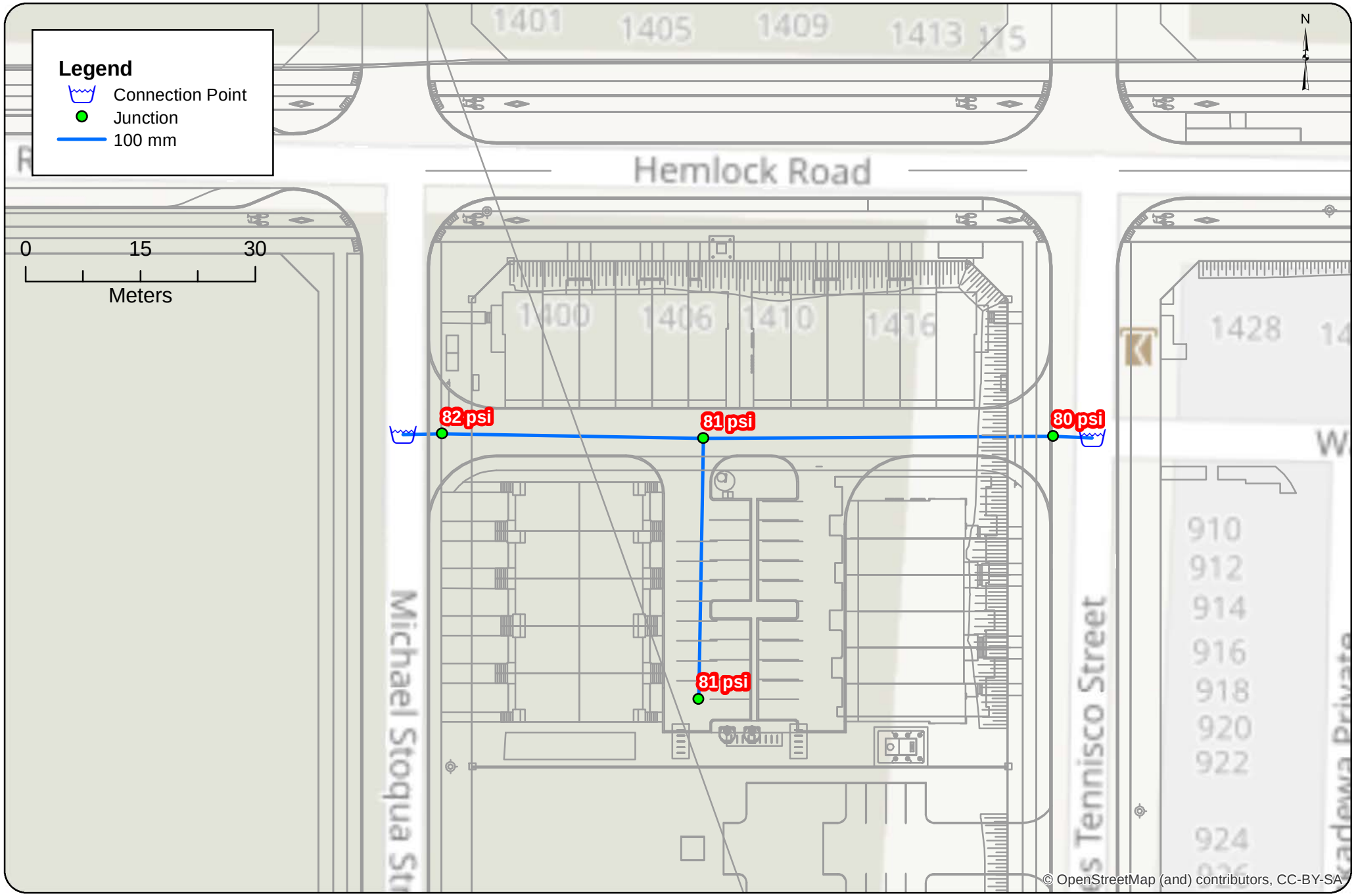
MHD Results
Future Scenario

Figure C.2

Minimum Hour Demand Modeling Results - Future

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)
CDT-01	RES_01	JCT-01	8.65	100	110	0.10	0.01	0.00	0.00
CDT-02	JCT-01	JCT-02	30.59	100	110	0.05	0.01	0.00	0.00
CDT-03	JCT-02	JCT-03	34.06	100	110	0.05	0.01	0.00	0.00
CDT-05	JCT-02	JCT-05	41.73	100	110	-0.04	0.01	0.00	0.00
CDT-06	JCT-05	RES_02	9.00	100	110	-0.09	0.01	0.00	0.00

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
JCT-01	0.05	89.12	143	77
JCT-02	0.05	89.61	143	76
JCT-03	0.05	89.79	143	76
JCT-05	0.05	90.33	143	75



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis**
Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **September 2020**
Created by: **BL**
Reviewed by: **WdS**

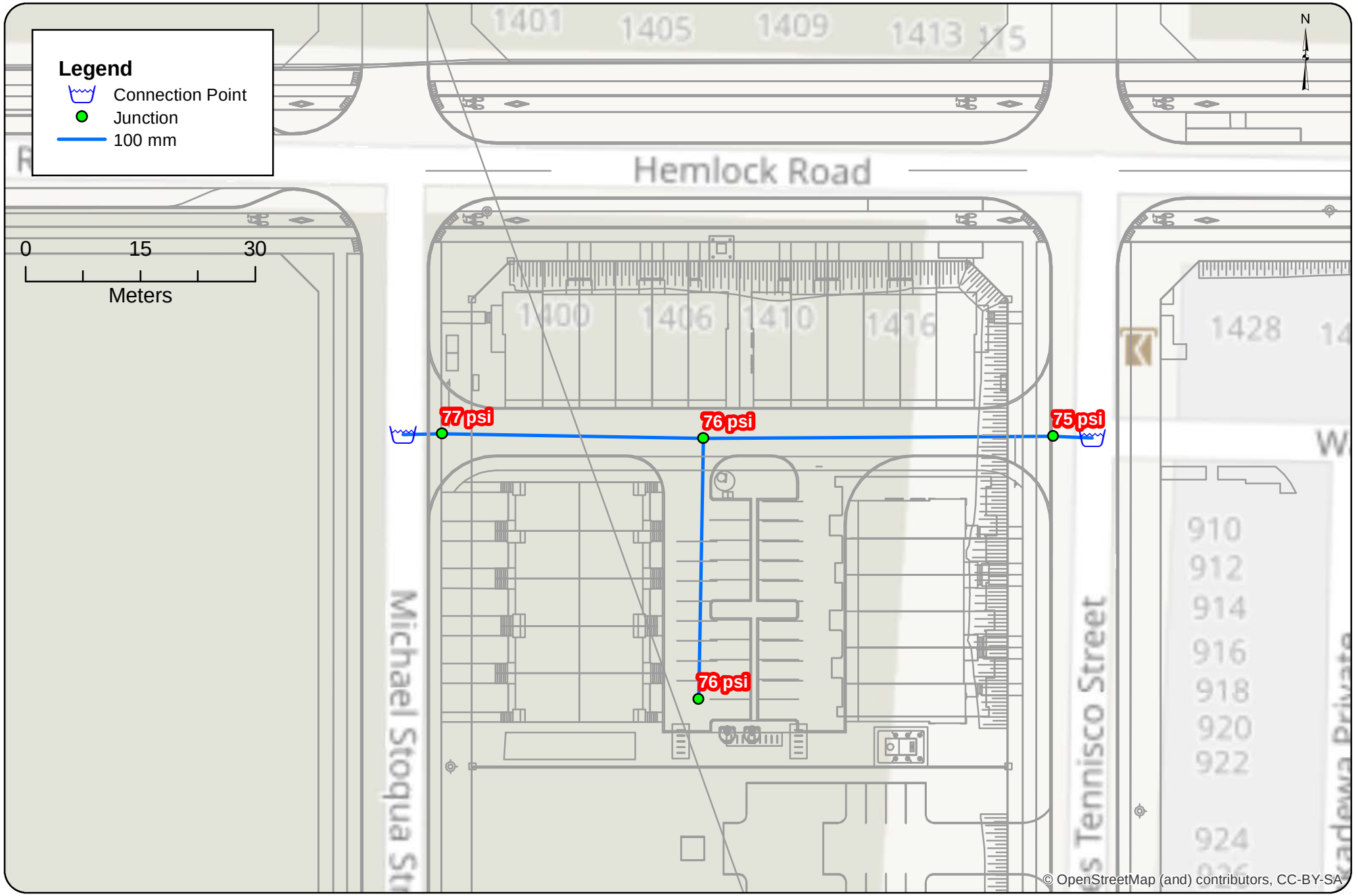
PHD Results
Existing Scenario

Figure C.3

Peak Hour Demand Modeling Results - Existing

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)
CDT-01	RES_01	JCT-01	8.65	100	110	1.40	0.18	0.01	0.68
CDT-02	JCT-01	JCT-02	30.59	100	110	0.72	0.09	0.01	0.20
CDT-03	JCT-02	JCT-03	34.06	100	110	0.68	0.09	0.01	0.18
CDT-05	JCT-02	JCT-05	41.73	100	110	-0.63	0.08	0.01	0.16
CDT-06	JCT-05	RES_02	9.00	100	110	-1.31	0.17	0.01	0.60

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
JCT-01	0.68	89.12	147	82
JCT-02	0.68	89.61	147	81
JCT-03	0.68	89.79	147	81
JCT-05	0.68	90.33	147	80



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis**
Wateridge Village Phase 1B Development
Client: **David Schaeffer Engineering Ltd.**
Date: **September 2020**
Created by: **BL**
Reviewed by: **WdS**

PHD Results
Future Scenario

Figure C.4

Peak Hour Demand Modeling Results - Future

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)
CDT-01	RES_01	JCT-01	8.65	100	110	1.40	0.18	0.01	0.68
CDT-02	JCT-01	JCT-02	30.59	100	110	0.72	0.09	0.01	0.20
CDT-03	JCT-02	JCT-03	34.06	100	110	0.68	0.09	0.01	0.18
CDT-05	JCT-02	JCT-05	41.73	100	110	-0.63	0.08	0.01	0.16
CDT-06	JCT-05	RES_02	9.00	100	110	-1.31	0.17	0.01	0.60

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
JCT-01	0.68	89.12	143	77
JCT-02	0.68	89.61	143	76
JCT-03	0.68	89.79	143	76
JCT-05	0.68	90.33	143	75

Anthony Temelini

From: Jillian Normand <Jillian.Normand@mattamycorp.com>
Sent: May 7, 2020 10:42 AM
To: Anthony Temelini; Jennifer Ailey
Cc: Conor Sutherland
Subject: FW: Block 22 - Site Plan - for detailed design

Hi Anthony,

Please see below from Q4 for Block 22.

Thanks,
Jillian

Jillian Normand, MCIP, RPP
Senior Land Development Manager
T (613) 831-5144 (direct). **C** (613) 415-7786. **F** (613) 831-9060
Jillian.Normand@mattamycorp.com
Ottawa Office: 50 Hines Road, Suite 100, Ottawa, ON Canada K2K 2M5

From: Matt Brown <MBrown@q4architects.com>
Sent: May 6, 2020 2:57 PM
To: Jillian Normand <Jillian.Normand@mattamycorp.com>; Cora Lia Taraciuk <ctaraciuk@q4architects.com>; Jessica McLellan <Jessica.Mclellan@mattamycorp.com>
Cc: Conor Sutherland <Conor.Sutherland@mattamycorp.com>
Subject: RE: Block 22 - Site Plan - for detailed design

Sorry Jillian

I am being reminded of the 3rd floor egress on the rear lane towns. I have updated below

Mathew Brown
Associate, Sr. Project Manager, Tech

Q4 Architects Inc.
2171 Avenue Road, Suite 302, Toronto, Ontario M5M 4B4
T: 416-322-6334 x240 F: 416-322-7294
www.q4architects.com

From: Matt Brown
Sent: May 6, 2020 2:24 PM
To: Jillian Normand <Jillian.Normand@mattamycorp.com>; Cora Lia Taraciuk <ctaraciuk@q4architects.com>; Jessica McLellan <Jessica.Mclellan@mattamycorp.com>
Cc: Conor Sutherland <Conor.Sutherland@mattamycorp.com>
Subject: RE: Block 22 - Site Plan - for detailed design

Hi Jillian

See my answers below

Mathew Brown
Associate, Sr. Project Manager, Tech

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From: Jillian Normand <Jillian.Normand@mattamycorp.com>
Sent: May 5, 2020 12:57 PM
To: Matt Brown <MBrown@q4architects.com>; Cora Lia Taraciuk <ctaraciuk@q4architects.com>; Jessica McLellan <Jessica.Mclellan@mattamycorp.com>
Cc: Conor Sutherland <Conor.Sutherland@mattamycorp.com>
Subject: FW: Block 22 - Site Plan - for detailed design

Hi Matt, Cora,

Please see below from DSEL. Could you please provide comment on the requested information so they can prepare the grading plan?

Thank you,
Jillian

Jillian Normand, MCIP, RPP
Senior Land Development Manager
T (613) 831-5144 (direct). **C** (613) 415-7786. **F** (613) 831-9060
Jillian.Normand@mattamycorp.com
Ottawa Office: 50 Hines Road, Suite 100, Ottawa, ON Canada K2K 2M5

From: Anthony Temelini <ATemelini@dsel.ca>
Sent: May 5, 2020 12:54 PM
To: Jillian Normand <Jillian.Normand@mattamycorp.com>
Cc: Jennifer Ailey <JAiley@dsel.ca>
Subject: RE: Block 22 - Site Plan - for detailed design

Hi Jillian,

Please note that we will need Mattamy to confirm the following to proceed with the design updates:

- Architectural relationships for all blocks with standard foundations (Block 4);
  - BSE to USF; 0.3m
  - USF to FFE 3.1m
  - TFW to FFE; 0.35m
  - SHG to FFE; 1.2min
  - Minimum number of risers; 6R
  - Maximum number of risers; 9R
  - Standard riser height;0.19
- Architectural relationships for all blocks with slab-on-grade foundations (Block 1, 2 and 3);
  - Finished grade to USF; 1.53m
  - SHG to FFE; 0.30
  - SHG to Top Window Elevation; n/a no windows below grade

- Maximum number of risers; 3R from garage or Front to SOG
- Standard riser height; 0.19

- Building Material Class for all blocks;
  - Per the attached excerpt from the water design guidelines, will the blocks be considered “wood frame” construction or “ordinary” construction? These are wood frame

Can you please confirm the above and let us know if you have any questions?

Thank you,

Anthony Temelini, P.Eng.
Junior Project Manager

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

cell: (613) 875-7862
phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

From: Jillian Normand <Jillian.Normand@mattamycorp.com>
Sent: May 4, 2020 3:33 PM
To: Christian Matteau <cmatteau@nak-design.com>; Anthony Temelini <ATemelini@dsel.ca>; Jennifer Ailey <JAiley@dsel.ca>; Faisal Abou-Seido <FAbou-Seido@Patersongroup.ca>; Rochelle Fortier <r.fortier@novatech-eng.com>; Wagar, Barrett <barrett.wagar@stantec.com>; Seema Nagaraj <seema@valcoustics.com>
Cc: Conor Sutherland <Conor.Sutherland@mattamycorp.com>
Subject: RE: Block 22 - Site Plan - for detailed design

Hi Everyone,

It was brought to my attention that the site entrance curb radii were not the same. Attached is the updated Site Plan which reflects R9 for both site entrances. This is the only change made to this iteration of the plan.

Thank you,
Jillian

Jillian Normand, MCIP, RPP
Senior Land Development Manager
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Jillian.Normand@mattamycorp.com
Ottawa Office: 50 Hines Road, Suite 100, Ottawa, ON Canada K2K 2M5

From: Jillian Normand
Sent: May 1, 2020 4:04 PM

To: Christian Matteau <cmatteau@nak-design.com>; Anthony Temelini <ATemelini@dsel.ca>; Jennifer Ailey <JAiley@dsel.ca>; Faisal Abou-Seido <FAbou-Seido@Patersongroup.ca>; Rochelle Fortier <r.fortier@novatech-eng.com>; Wagar, Barrett <barrett.wagar@stantec.com>; Seema Nagaraj <seema@valcoustics.com>
Cc: Conor Sutherland <Conor.Sutherland@mattamycorp.com>
Subject: Block 22 - Site Plan - for detailed design

Hello Everyone,

Attached is the final Site Plan that we are proceeding with for detailed design. As previously mentioned, we are planning to submit to the City on May 13th.

Please ensure communication is maintained with each other for the duration of the process to maintain consistency with plans to avoid conflicts with design.

As always, I'm available if you have any questions or concerns.

Have a great weekend,
Jillian

Jillian Normand, MCIP, RPP
Senior Land Development Manager
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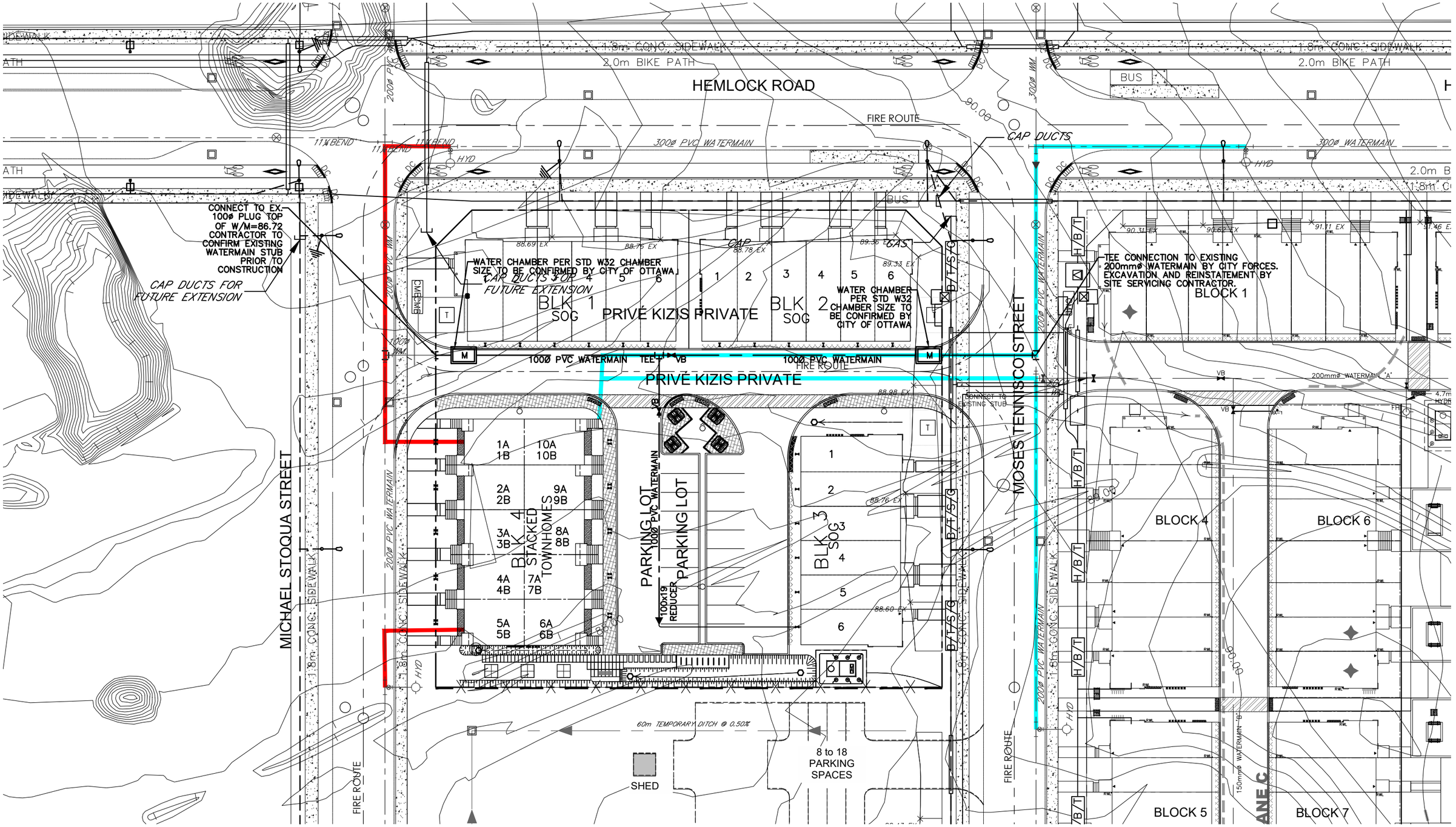
Jillian.Normand@mattamycorp.com
Ottawa Office: 50 Hines Road, Suite 100, Ottawa, ON Canada K2K 2M5



DSEL
david schaeffer engineering ltd
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Stittsville, Ontario, K2S 1E9
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Fax. (613) 836-7183
www.DSEL.ca

*ALL HYDRANTS ASSUMED TO BE CLASS AA PER GEOOTTAWA

HYDRANT DISTANCE TO BUILDING >76m AND <152m
(MAX. HYDRANT CAPACITY OF 3,785 L/min)
HYDRANT DISTANCE TO BUILDING <76m
(MAX. HYDRANT CAPACITY OF 5,678 L/min)

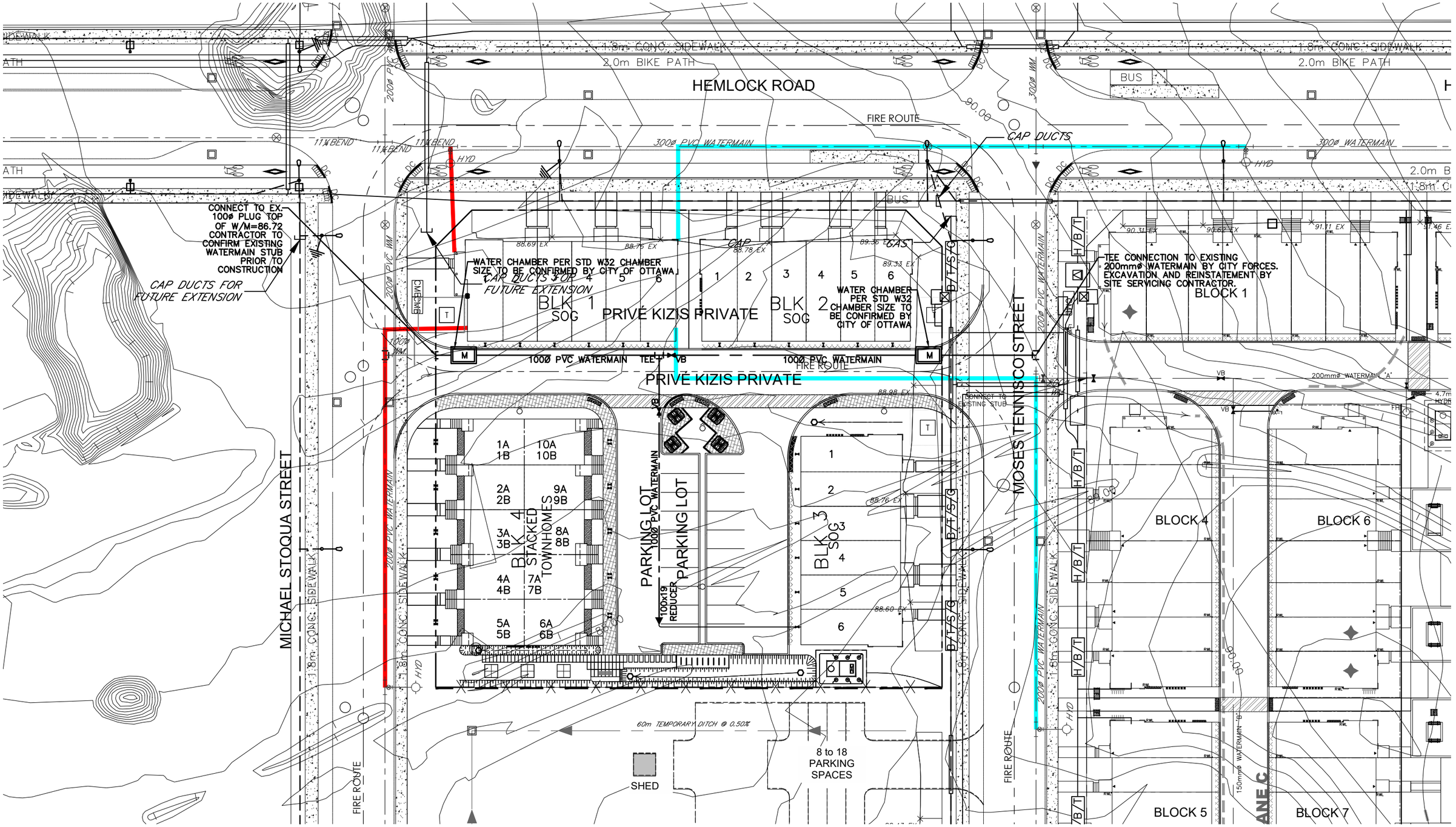
MAX. FIRE FLOW REQUIRED=18,000 L/min
MAX. FIRE FLOW AVAILABLE=18,926 L/min

MATTAMY HOMES WATERIDGE BLOCK 22 - PHASE 1B

CITY OF OTTAWA

HYDRANT COVERAGE FIGURE - BLOCK 4

SCALE:	1:500	PROJECT No.:	17-948
DATE:	DECEMBER 2020	FIGURE:	1



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HYDRANT DISTANCE TO BUILDING <76m
(MAX. HYDRANT CAPACITY OF 5,678 L/min)

*ALL HYDRANTS ASSUMED TO BE CLASS AA PER GEOOTTAWA

MAX. FIRE FLOW REQUIRED=15,000 L/min
MAX. FIRE FLOW AVAILABLE=18,926 L/min

MATTAMY HOMES
WATERIDGE BLOCK 22 - PHASE 1B
CITY OF OTTAWA

HYDRANT COVERAGE FIGURE - BLOCK 1

SCALE:	1:500	PROJECT No.:	17-948
DATE:	DECEMBER 2020	FIGURE:	2

APPENDIX C

Wastewater Collection

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

SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE			FIXED FLOW	TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)		FLOW			CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
														INSTITUTIONAL		COMMERCIAL		INDUSTRIAL													
STREET	AREA ID	FROM MH	TO MH	Phase 1B (Ha)	SF	SD	TH	APT	EXTERNAL (Ha)	IND	CUM	FACTOR	FLOW (L/s)	IND	CUM	IND	CUM	IND	CUM	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
Phase 1B																																
Hemlock Road	201A	MH201A	MH202A	0.31						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.31	0.31	0.09	0.00	0.09	50.02	87.06	250	0.65	0.987	49.93	99.83%
Future Street No. 6	EX202A	BULK202AN	MH202A						2.08	358.5	358.5	4.00	5.81		0.00		0.00		0.00	0.00	2.08	2.08	0.58	0.00	6.39	31.02	21.00	250	0.25	0.612	24.63	79.40%
Hemlock Road	202A	MH202A	MH203A	0.21						0.0	358.5	4.00	5.81		0.00		0.00		0.00	0.00	0.21	2.60	0.73	0.00	6.54	75.98	86.00	250	1.50	1.500	69.44	91.40%
Future Street No. 5	EX203A	BULK203AN	MH203A						1.40	160.5	160.5	4.00	2.60		0.00		0.00		0.00	0.00	1.40	1.40	0.39	0.00	2.99	83.23	21.00	250	1.80	1.643	80.24	96.40%
Hemlock Road	203A, EXPARK2	MH203A	MH204A	0.20					0.44	0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.64	0.64	0.18	0.00	0.18	82.07	86.00	250	1.75	1.620	81.89	99.78%
rue Moses Tennisco Street	EX204A	BULK204AN	MH204A						1.39	153.5	153.5	4.00	2.49		0.00		0.00		0.00	0.00	1.39	1.39	0.39	0.00	2.88	83.23	21.00	250	1.80	1.643	80.36	96.54%
Hemlock Road	204A	MH204A	MH205A	0.21						0.0	153.5	4.00	2.49		0.00		0.00		0.00	0.00	0.21	1.60	0.45	0.00	2.94	67.96	90.00	250	1.20	1.341	65.02	95.68%
rue Michael Stoqua Street	EX205A	BULK205AN	MH205A						1.38	241.5	241.5	4.00	3.91		0.00		0.00		0.00	0.00	1.38	1.38	0.39	0.00	4.30	67.96	21.00	250	1.20	1.341	63.66	93.67%
Hemlock Road	205A	MH205A	MH206A	0.25						0.0	395.0	4.00	6.40		0.00		0.00		0.00	0.00	0.25	3.23	0.90	0.00	7.30	31.02	112.00	250	0.25	0.612	23.71	76.45%
rue Bareille-Snow Street	EX206A-B	BULK206AN	MH206A						9.61	1755.0	1755.0	3.63	25.80		0.00		0.00		0.00	0.00	9.61	9.61	2.69	0.00	28.49	87.74	21.00	250	2.00	1.731	59.24	67.52%
Hemlock Road	206A	MH206A	MH207A	0.20						0.0	2150.0	3.56	31.02		0.00		0.00		0.00	0.00	0.20	13.04	3.65	0.00	34.67	55.26	89.33	300	0.30	0.757	20.59	37.26%
Block 20	PARK1	MH207AN	MH207A	0.32						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.32	0.32	0.09	0.00	0.09	39.24	14.00	250	0.40	0.774	39.15	99.77%
Hemlock Road	PARK1, 207A	MH207A	*BULK176AE*	0.12						0.0	2150.0	3.56	31.02		0.00		0.00		0.00	0.00	0.12	13.48	3.77	0.00	34.79	65.38	33.16	300	0.42	0.896	30.59	46.79%
Phase 1A																																
Hemlock Road		*BULK176AE*	*MH176A*							0.0	2150.0	3.56	31.02		0.00		0.00		0.00	0.00	0.00	13.48	3.77	0.00	34.79	65.38	*21.97*	*300*	*0.42*	0.896	30.59	46.79%
Phase 1B																																
chemin Wanaki Road	200A, COM1	MH200A	MH214A	0.25						0.0	0.0	4.00	0.00		0.00	0.90	0.90		0.00	0.78	1.15	1.15	0.32	0.00	1.10	73.41	98.28	250	1.40	1.449	72.30	98.50%
chemin Wanaki Road	214A, COM2	MH214A	*BULK153AN*	0.16						0.0	0.0	4.00	0.00		0.00	0.65	1.55		0.00	1.35	0.81	1.96	0.55	0.00	1.89	51.91	44.22	250	0.70	1.024	50.01	96.35%
Phase 1B																																
chemin Wanaki Road	143B	BULK143AE	MH143A	0.31						104.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.31	0.31	0.09	0.00	1.77	43.87	21.50	250	0.50	0.866	42.10	95.96%
chemin Wanaki Road	143A	MH143A	MH144A	0.27						0.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.27	0.58	0.16	0.00	1.85	87.74	47.73	250	2.00	1.731	85.89	97.89%
chemin Wanaki Road	144A, 144B	MH144A	MH145A	0.72						0.0	104.0	4.00	1.69		0.00		0.00		0.00	0.00	0.72	1.30	0.36	0.00	2.05	87.74	40.57	250	2.00	1.731	85.69	97.66%
chemin Wanaki Road	145A, 145B, 145C	MH145A	MH146A	2.77						835.6	939.6	3.82	14.53		0.00		0.00		0.00	0.00	2.77	4.07	1.14	0.00	15.67	107.45	53.01	250	3.00	2.121	91.79	85.42%
chemin Wanaki Road	146A	MH146A	MH147A	0.14						0.0	939.6	3.82	14.53		0.00		0.00		0.00	0.00	0.14	4.21	1.18	0.00	15.71	43.54	37.48	250	1.00	1.224	27.83	63.92%
chemin Wanaki Road	PARK2	BLK147AE	MH147A	0.55						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.55	0.55	0.15	0.00	0.15	39.24	17.66	250	0.40	0.774	39.08	99.61%
chemin Wanaki Road	147C	BLK147AW	MH147A	0.10						33.6	33.6	4.00	0.54		0.00		0.00		0.00	0.00	0.10	0.10	0.03	0.00	0.57	43.87	17.33	250	0.50	0.866	43.30	98.70%
chemin Wanaki Road	147A	MH147A	MH170A	0.03						0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.03	4.89	1.37	0.00	16.38	31.02	10.23	250	0.25	0.612	14.64	47.19%
chemin Wanaki Road	147B	MH107A	MH147C	0.16						0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.16	5.05	1.41	0.00	16.42	31.02	39.00	250	0.25	0.612	14.59	47.05%
chemin Wanaki Road		MH147C	*BLK148AW*							0.0	973.2	3.81	15.01		0.00		0.00		0.00	0.00	0.00	5.05	1.41	0.00	16.42	31.02	11.77	250	0.25	0.612	14.59	47.05%
Phase 1B																																
Block 9	154A	*MH158A*	MH217A	0.19						0.0	973.2	3.81	15.01		2.62		3.83		0.00	5.60	0.19	12.94	3.62	0.00	24.23	53.37	171.95	250	0.74	1.053	29.13	54.59%
croissant Squadron Crescent	215Aa-b	MH215A	MH216A	0.79	3	4				117.8	117.8	4.00	1.91		0.00		0.00		0.00	0.00	0.79	0.79	0.22	0.00	2.13	50.02	80.00	250	0.65	0.987	47.89	95.74%
croissant Squadron Crescent	216Aa-b	MH216A	MH217A	0.67	2	6				94.5	212.3	4.00	3.44		0.00		0.00		0.00	0.00	0.67	1.46	0.41	0.00	3.85	50.02	71.19	250	0.65	0.987	46.17	92.30%
croissant Squadron Crescent	217A	MH217A	MH218A	0.02						0.0	1185.5	3.75	18.01		2.62		3.83		0.00	5.60	0.02	14.42	4.04	0.00	27.65	36.70	10.52	250	0.35	0.724	9.05	24.66%
croissant Squadron Crescent	218A	MH218A	MH218B	0.02						0.0	1185.5	3.75	18.01		2.62		3.83		0.00	5.60	0.02	14.44	4.04	0.00	27.66	36.70	12.49	250	0.35	0.724	9.05	24.65%
	THORN1	*EX SANMH*	MH218B						5.55	1574.0	1574.0	3.66	23.36		0.00		0.00		0.00	0.00	5.55	5.55	1.55	0.00	24.92	74.13	46.02	300	0.54	1.016	49.21	66.39%
croissant Squadron Crescent	218B	MH218B	MH219A	0.07						0.0	2759.5	3.47	38.82		2.62		3.83		0.00	5.60	0.07	20.06	5.62	0.00	50.04	59.68	37.08	300	0.35	0.818	9.64	16.16%
croissant Squadron Crescent	219A	MH219A	MH220A	0.15						0.0	2759.5	3.47	38.82		2.62		3.83		0.00	5.60	0.15	20.21	5.66	0.00	50.08	59.68	72.49	300	0.35	0.818	9.60	16.09%
croissant Squadron Crescent	220A, 220B	MH220A	MH221A	1.46						319.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	1.46	21.67	6.07	0.00	54.48	59.68	43.77	300	0.35	0.818	5.21	8.72%
croissant Squadron Crescent	221A	MH221A	MH222A	0.02						0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.02	21.69	6.07	0.00	54.48	59.68	8.66	300	0.35	0.818	5.20	8.71%
croissant Squadron Crescent	222A	MH222A	*MH169A*	0.22						0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.22	21.91	6.13	0.00	54.54	59.68	89.42	300	0.35	0.818	5.14	8.61%

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u	INST	50,000	L/Ha/day	1.5
TH/SD	2.7	p/p/u	COM	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day 300 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5))
where P = population in thousands

Designed: WY

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	City submission No. 1	7/8/2016
2.	City submission No. 2	11/4/2016
3.	City submission No. 3	1/25/2017

File Reference:	Date:	Sheet No:
38298.5.7.1	7/8/2016	1 of 2

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

SANITARY SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Canada Lands Company

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE			FIXED FLOW	TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)		FLOW			CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	Phase 1B (Ha)	SF	SD	TH	APT	EXTERNAL (Ha)	IND	CUM	FACTOR	FLOW (L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	FLOW (L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
Phase 1A																																
croissant Squadron Crescent		*MH169A*	*MH165A*							0.0	3078.5	3.43	42.81		2.62		3.83		0.00	5.60	0.00	21.91	6.13	0.00	54.54	63.80	*27.00*	*300*	*0.40*	0.874	9.26	14.51%
Phase 1B																																
rue Moses Tennisco Street	212A	MH212A	MH213A	1.20						252.0	252.0	4.00	4.08		0.00		0.00		0.00	0.00	1.20	1.20	0.34	0.00	4.42	50.02	63.80	250	0.65	0.987	45.60	91.16%
rue Moses Tennisco Street	213A	MH213A	*BULK165AN*	0.35						52.5	304.5	4.00	4.93		0.00		0.00		0.00	0.00	0.35	1.55	0.43	0.00	5.37	39.24	50.79	250	0.40	0.774	33.87	86.32%
Phase 1A																																
rue Moses Tennisco Street		*BULK165AN*	*MH165A*							0.0	304.5	4.00	4.93		0.00		0.00		0.00	0.00	0.00	1.55	0.43	0.00	5.37	39.24	*22.50*	*250*	*0.40*	0.774	33.87	86.32%
Phase 1B																																
rue Michael Stoqua Street	210A	MH210A	MH211A	0.40						52.5	52.5	4.00	0.85		0.00		0.00		0.00	0.00	0.40	0.40	0.11	0.00	0.96	50.02	64.80	250	0.65	0.987	49.05	98.08%
rue Michael Stoqua Street	211A	MH211A	MH166B	0.35						52.5	105.0	4.00	1.70		0.00		0.00		0.00	0.00	0.35	0.75	0.21	0.00	1.91	50.02	52.19	250	0.65	0.987	48.11	96.18%
Phase 1A																																
rue Michael Stoqua Street		MH166B	*MH166A*							0.0	105.0	4.00	1.70		0.00		0.00		0.00	0.00	0.00	0.75	0.21	0.00	1.91	39.24	*21.10*	*250*	*0.40*	0.774	37.33	95.13%
Phase 1B																																
rue Bareille-Snow Street	208A	MH208A	MH209A	1.01						207.4	207.4	4.00	3.36		0.00		0.00		0.00	0.00	1.01	1.01	0.28	0.00	3.64	50.02	64.85	250	0.65	0.987	46.37	92.72%
rue Bareille-Snow Street	209A	MH209A	MH167B	0.35						52.6	260.0	4.00	4.21		0.00		0.00		0.00	0.00	0.35	1.36	0.38	0.00	4.59	50.02	52.87	250	0.65	0.987	45.42	90.82%
Phase 1A																																
rue Bareille-Snow Street		MH167B	*MH167A*							0.0	260.0	4.00	4.21		0.00		0.00		0.00	0.00	0.00	1.36	0.38	0.00	4.59	63.80	*20.43*	*300*	*0.40*	0.874	59.21	92.80%
Phase 1B																																
Codd's Road	230A	BLK231AN	MH231A						0.87	85.7	85.7	4.00	1.39		0.00		0.00		0.00	0.00	0.87	0.87	0.24	0.00	1.63	75.98	3.00	250	1.50	1.500	74.35	97.85%
Codd's Road	231A, EXPARK1	MH231A	*BULK176AN*						0.76	43.3	129.0	4.00	2.09		0.00		0.00		0.00	0.00	0.76	1.63	0.46	0.00	2.55	87.74	50.22	250	2.00	1.731	85.19	97.10%
Phase 1A																																
Codd's Road		*BULK176AN*	*MH176A*							0.0	129.0	4.00	2.09		0.00		0.00		0.00	0.00	0.00	1.63	0.46	0.00	2.55	55.49	*23.23*	*250*	*0.80*	1.095	52.94	95.41%

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	COM	50,000	L/Ha/day	1.5
Other	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart
				17000	L/Ha/day	

Notes:

1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day 300 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5))
   where P = population in thousands

Designed: WY

Checked: JIM

Dwg. Reference: 38298-501

No.	Revision	Date
1.	City submission No. 1	7/8/2016
2.	City submission No. 2	11/4/2016
3.	City submission No. 3	1/25/2017

File Reference:	Date:	Sheet No:
38298.5.7.1	7/8/2016	2 of 2

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________2017

Plan Number ______________________

LEGEND :

S168 2.01 0.80 — AREA NUMBER
RUNOFF COEFFICIENT
AREA IN HECTARES
POTENTIAL DRAINAGE DIRECTION

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6	REVISED PER MOECC COMMENTS	J.I.M.	2017:06:07
5	ISSUED FOR TENDER	J.I.M.	2017:03:23
4	SUBMISSION FOR MOECC APPROVAL	J.I.M.	2017:02:16
3	SUBMISSION No.3 FOR CITY REVIEW	J.I.M.	2017:01:25
2	SUBMISSION No.2 FOR CITY REVIEW	J.I.M.	2016:11:04
1	SUBMISSION No.1 FOR CITY REVIEW	J.I.M.	2016:07:08

CANADA LANDS COMPANY
SOCIÉTÉ IMMOBILIÈRE DU CANADA
30 Metcalfe Street Suite 601
Ottawa, On K1P 5L4
613 998 7777

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/06/07
PROVINCE OF ONTARIO

N

Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale 1 : 2000

Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	501A

D07-16-15-0003

#17063

Mattamy Homes
Wateridge Block 22
Wastewater Flow per Brief

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012

Site Area	0.460	**ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.13**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.3		105
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**105**	
Average Domestic Flow	**0.43**	**L/s**
Peaking Factor	**4.00**	
Peak Domestic Flow	**1.70**	**L/s**

Total Estimated Average Dry Weather Flow Rate	**0.43**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.70**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.83**	**L/s**

Mattamy Homes
Wateridge Block 22
Proposed Site Conditions

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area	0.460	**ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.02**	**L/s**
Infiltration / Inflow (Wet)	**0.13**	**L/s**
Infiltration / Inflow (Total)	**0.15**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7	38	104
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**104**	
Average Domestic Flow	**0.34**	**L/s**
Peaking Factor	**3.59**	
Peak Domestic Flow	**1.21**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$		0.00
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow	**0.00**
Peak Institutional / Commercial Flow	0.00
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.00**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**0.36**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.23**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.36**	**L/s**

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
PARKING LOT																													
	1A	3A	0.25	16		16	44	0.25	44	3.66	0.52		0.00		0.00		0.00	0.00	0.25	0.25	0.08	0.60	38.0	200	0.65	26.44	0.02	0.84	0.34
To PRIVÉ KIZIS PRIVATE, Pipe 3A - 5A								0.25	44				0.00		0.00		0.00			0.25									
BLOCK 2																													
	2A	3A	0.09	7		7	19	0.09	19	3.71	0.23		0.00		0.00		0.00	0.00	0.09	0.09	0.03	0.26	36.5	200	1.75	43.39	0.01	1.38	0.38
To PRIVÉ KIZIS PRIVATE, Pipe 3A - 5A								0.09	19				0.00		0.00		0.00			0.09									
PRIVÉ KIZIS PRIVATE																													
Contribution From BLOCK 2, Pipe 2A - 3A								0.09	19				0.00		0.00		0.00			0.09									
Contribution From PARKING LOT, Pipe 1A - 3A								0.25	44				0.00		0.00		0.00			0.25									
	3A	5A	0.08	5		5	14	0.42	77	3.62	0.90		0.00		0.00		0.00	0.00	0.08	0.42	0.14	1.04	27.0	200	0.35	19.40	0.05	0.62	0.33
	5A	210A					0	0.42	77	3.62	0.90		0.00		0.00		0.00	0.00	0.00	0.42	0.14	1.04	11.0	200	0.35	19.40	0.05	0.62	0.33
To RUE MICHAEL STOQUA STREET, Pipe 210A-211A								0.42	77				0.00		0.00		0.00			0.42									
RUE MICHAEL STOQUA STREET																													
Contribution From PRIVÉ KIZIS PRIVATE, Pipe 5A-210A								0.42	77				0.00		0.00		0.00			0.42									
	210A	211A	0.22	10		10	27	0.64	104	3.59	1.21		0.00		0.00		0.00	0.00	0.22	0.64	0.21	1.42	47.6	250	0.62	46.82	0.03	0.95	0.42
	211A	166B	0.35				53	0.99	157	3.55	1.80		0.00		0.00		0.00	0.00	0.35	0.99	0.33	2.13	52.2	250	0.65	47.94	0.04	0.98	0.48
	166B	166A						0.99	157	3.55	1.80		0.00		0.00		0.00	0.00	0.00	0.99	0.33	2.13	21.1	250	0.65	47.94	0.04	0.98	0.48
To RUE MIKINAK ROAD, Pipe 166A - 167A								0.99	157				0.00		0.00		0.00			0.99									
RUE MOSES TENNISCO STREET																													
	213A	212A						0.00	0				0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00	44.0	250	0.62	46.82	0.00	0.95	0.05
			0.35				53	0.35	53				0.00		0.00		0.00	0.00	0.35	0.35	0.12	0.12							
From Block 24 - DSEL Proj# 17-948	212A	165AN	1.61				342	1.96	395	3.42	4.38		0.00		0.00		0.00	0.00	1.61	1.96	0.65	5.02	10.8	250	0.74	51.16	0.10	1.04	0.66
	165AN	165A						1.96	395	3.42	4.38		0.00		0.00		0.00	0.00	0.00	1.96	0.65	5.02	22.5	250	0.40	37.61	0.13	0.77	0.53
To RUE MIKINAK ROAD, Pipe 165A - 166A								1.96	395				0.00		0.00		0.00			1.96									
RUE MIKINAK ROAD																													
Contribution From MOSES TENNISCO, Pipe 165AN - 165A								1.96	395				0.00		0.00		0.00			1.96									
	165A	166A	0.20					19.87	3428	2.91	32.37		0.00		5.11		0.00	1.66	0.20	24.98	8.24	42.27	90.0	375	0.30	96.03	0.44	0.87	0.84
Contribution From MICHAEL STOQUA, Pipe 166B - 166A								0.99	157				0.00		0.00		0.00		0.00	0.99									
	166A	167A	0.89				172	21.75	3756	2.89	35.13		0.00		5.11		0.00	1.66	0.89	26.86	8.86	45.65	112.0	375	0.29	94.42	0.48	0.85	0.85
								21.75	3756				0.00		5.11		0.00			26.86									

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2020-10-06
PROVINCE OF ONTARIO
JOB# 17-948

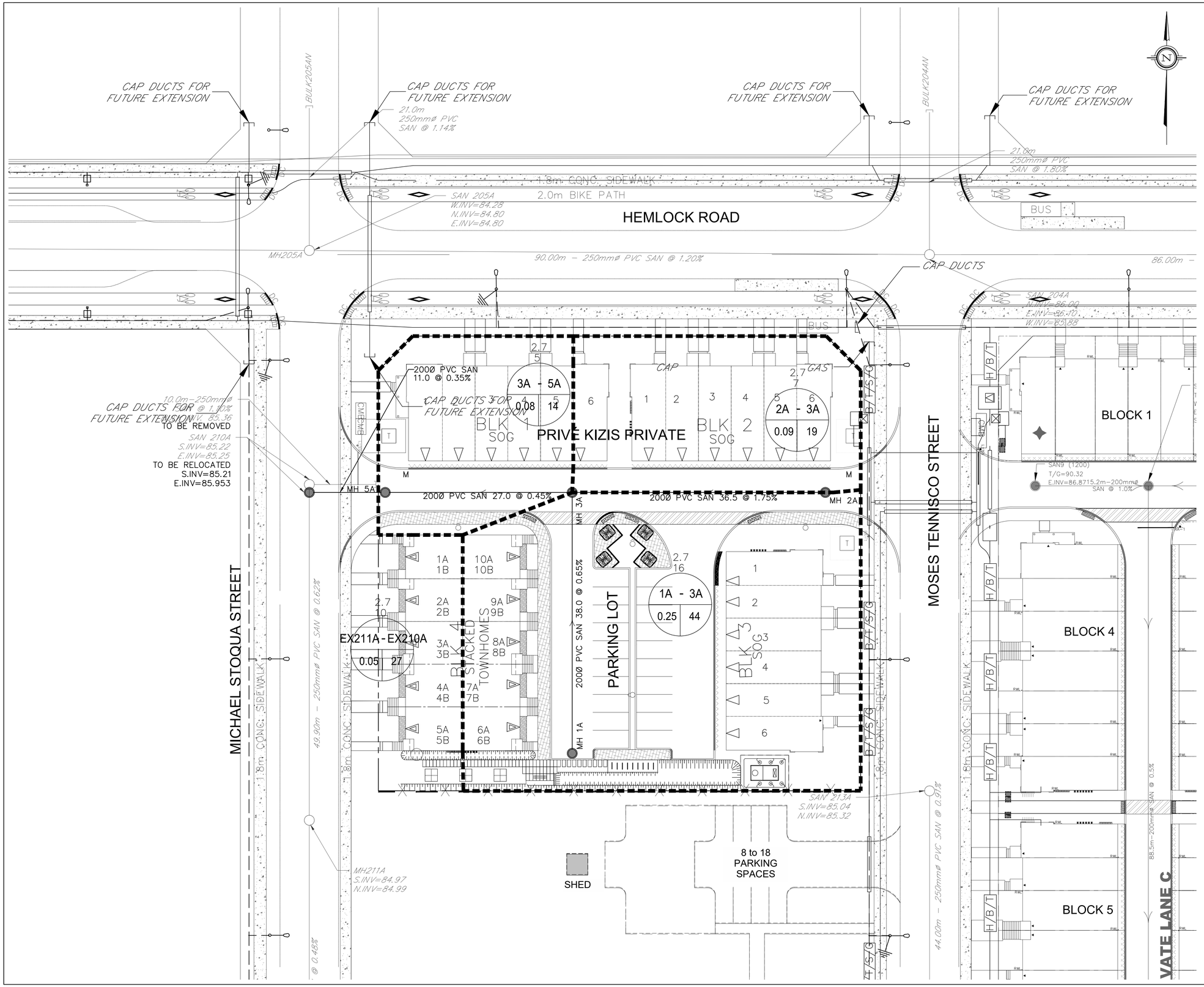
DESIGN PARAMETERS

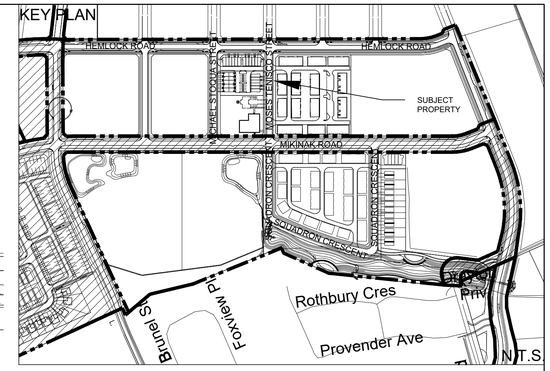
Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day					
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha			
Industrial Flow =	35000	L/ha/da	0.40509	l/s/Ha			
Max Res. Peak Factor =	4.00						
Commercial/Inst./Park Peak Factor =	1.00						
Institutional =	0.32	l/s/Ha					

Industrial Peak Factor = as per MOE Graph

Extraneous Flow =	0.330	L/s/ha		
Minimum Velocity =	0.600	m/s		
Manning's n =	(Conc)	0.013	(Pvc)	0.013
Townhouse coeff=	2.7			
Single house coeff=	3.4			

Designed:	GGG	PROJECT:	Mattamy Homes - Wateridge Block 22
Checked:	SLM	LOCATION:	City of Ottawa
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No.	11	File Ref: 17-948	Date: 10/6/2020
			Sheet No. 2 of 1





LEGEND

- SANITARY DRAINAGE BOUNDARY
- 2.7 / 7 — POPULATION PER UNIT / NUMBER OF UNITS
- 2A - 3A — UPSTREAM MH TO DOWNSTREAM MH
- 0.09 / 19 — AREA IN HECTARES / TOTAL POPULATION
- PROPOSED SANITARY MANHOLE

NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
13	A.J.T.	20-12-21	ISSUED FOR SITE PLAN AMENDMENT–SUBMISSION 7
12	A.W.T.	20-10-06	ISSUED FOR SITE PLAN AMENDMENT–SUBMISSION 6
11	G.G.G.	20-06-23	UPDATED HGL INFORMATION
10	S.L.M.	20-05-26	ISSUED FOR SITE PLAN AMENDMENT

TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY IBI GROUP
PROJ. NO. 38298
DATED NOVEMBER 13, 2017

SITE PLAN INFORMATION
SITE PLAN PROVIDED BY KORSIAK URBAN PLANNING
DATED DECEMBER 8, 2020

SITE SERVICING AND STORMWATER MANAGEMENT STUDY
SERVICING AND STORMWATER MANAGEMENT RECOMMENDATIONS PROVIDED BY DSEL
PROJ. NO. 17-948
DATED DECEMBER 2020

GEOTECHNICAL STUDY
GEOTECHNICAL RECOMMENDATIONS PROVIDED BY PATERSON GROUP INC.
PROJECT NO. PG5345-1
REVISION 1, DATED SEPTEMBER 10, 2020

BENCH MARK
ELEVATIONS ARE GEODETIC, REFERRED TO CITY OF OTTAWA VERTICAL BENCHMARK NO. 396
ELEV= 95.06 METERS

MATTAMY HOMES

WATERIDGE - BLOCK 22
PHASE 1B

david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

LICENSED PROFESSIONAL ENGINEER A.J. TEMELINI 100213887 PROVINCE OF ONTARIO

Ottawa
110 Laurier Ave W
Ottawa, Ontario, K1P 1J1
Tel. (613) 580-2400
www.Ottawa.ca

SANITARY DRAINAGE PLAN

DRAWN BY:	A.W.T.	CHECKED BY:	S.L.M.
DESIGNED BY:	S.L.M.	CHECKED BY:	A.D.F.
SCALE:	1:250		

0.0m 5.0m 10.0m

PROJECT No. 17–948

SHEET No. 10

CITY FILE No. D07-12-20-0066 CITY PLAN No. 17691

APPENDIX D

Stormwater Management

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

STORM SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Name of Client/Developer

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW												SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.30	C= 0.45	C= 0.50	C= 0.56	C= 0.60	C= 0.65	C= 0.70	C= 0.73	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
Phase 1B																																		
Hemlock Road	S201A-B, EX201	MH201	MH202								0.31		0.56	1.85	1.85	10.00	1.17	11.17	104.19	122.14	178.56	192.62				192.62	210.32	90.18	450			0.50	1.281	17.70	8.41%
Future Street No. 6	EX202A	BULK202N	MH202										0.90	2.00	2.00	12.23	0.27	12.50	93.72	109.82	160.45	187.60				187.60	286.47	16.00	600			0.20	0.982	98.87	34.51%
Hemlock Road	S202A, EX202B-C	MH202	MH203								0.10		0.55	1.42	5.27	12.50	0.53	13.03	92.61	108.50	158.52	487.86				487.86	784.52	86.00	600			1.50	2.688	296.66	37.81%
Future Street No. 5	S203B, EX203	BULK203N	203								0.09		0.73	1.80	1.80	10.88	0.12	11.00	99.76	116.92	170.90	179.44				179.44	351.93	16.00	450			1.40	2.144	172.49	49.01%
Hemlock Road	S203A, EXP203	MH203	MH204		0.44						0.16			0.68	7.75	13.03	0.49	13.53	90.49	106.01	154.87	700.89				700.89	847.38	86.00	600			1.75	2.903	146.49	17.29%
rue Moses Tennisco Street	S204B, EX204A	BULK204N	MH204								0.08		0.72	1.76	1.76	10.89	0.11	11.00	99.72	116.87	170.81	175.20				175.20	399.05	16.00	450			1.80	2.431	223.85	56.10%
Hemlock Road	S204A, EX204B	MH204	MH205								0.14		0.47	1.32	10.82	13.53	0.54	14.07	88.63	103.82	151.66	958.99				958.99	1,272.26	90.00	750			1.20	2.790	313.27	24.62%
rue Michael Stoqua Street	S205A, EX205A	BULK205N	MH205								0.08		0.81	1.96	1.96	11.15	0.15	11.30	98.49	115.42	168.69	192.75				192.75	297.43	16.01	450			1.00	1.812	104.68	35.20%
Hemlock Road	S205B-C, EX205B	MH205	MH206								0.17		0.63	1.73	14.51	14.07	1.20	15.26	86.70	101.55	148.32	1,257.92				1,257.92	1,818.95	112.01	1200			0.20	1.558	561.03	30.84%
Temp Ditch	FUTURE PHASE	DI 10	BULK206N		7.68									6.41	6.41	59.66	0.16	59.82	33.08	38.61	56.13	211.89				211.89	297.43	17.03	450			1.00	1.812	85.54	28.76%
rue Bareille-Snow Street	S206A, EX206A	BULK206N	MH206								0.06		1.02	2.39	2.39	10.85	0.15	11.00	99.91	117.09	171.14	238.30				238.30	448.66	17.50	525			1.00	2.008	210.35	46.89%
Hemlock Road	S206B, EX206B	MH206	MH207								0.03		0.46	1.08	17.98	15.26	0.78	16.04	82.71	96.86	141.44	1,486.80				1,486.80	2,227.75	89.33	1200			0.30	1.908	740.96	33.26%
Block 20	P207	CBMH207N	MH207		0.32									0.27	0.27	10.00	0.27	10.27	104.19	122.14	178.56	27.81				27.81	63.80	14.00	300			0.40	0.874	36.00	56.42%
Hemlock Road	S207	MH207	*BULK176E*								0.22			0.43	18.67	16.04	0.37	16.42	80.33	94.05	137.32	1,499.75				1,499.75	2,156.55	32.62	1350			0.15	1.460	656.80	30.46%
Phase 1A																																		
Ex. Hemlock Road	S176C	*BULK176E*	*MH176*								0.02			0.04	18.71	16.42	0.27	16.69	79.24	92.78	135.45	1,482.57				1,482.57	2,156.55	*24.06*	*1350*			*0.15*	1.460	673.98	31.25%
Phase 1B																																		
Codd's Road	S230, LOT230A-B	230	231								0.16		0.70	1.87	1.87	10.00	0.63	10.63	104.19	122.14	178.56	194.65				194.65	364.28	84.30	450			1.50	2.219	169.63	46.57%
Codd's Road	S231, LOT231	231	*BULK176N*								0.12		0.30	0.90	2.77	10.63	0.36	11.00	100.96	118.34	172.97	279.55				279.55	549.49	53.76	525			1.50	2.459	269.94	49.12%
Phase 1A																																		
Ex. Codd's Road	---	*BULK176N*	*MH176*											0.00	2.95	11.77	0.29	12.06	95.69	112.12	163.84	281.96				281.96	339.63	*18.21*	*525*			*1.50*	0.919	57.67	16.98%
Phase 1B																																		
chemin Wanaki Road	S200, LOT200	MH200	MH214								0.20		0.91	2.41	2.41	10.00	0.78	10.78	104.19	122.14	178.56	251.42				251.42	351.93	99.75	450			1.40	2.144	100.51	28.56%
chemin Wanaki Road	S214, LOT214	MH214	*BULK152N*								0.19		0.84	2.24	4.65	10.78	0.42	11.20	100.27	117.52	171.77	466.34				466.34	535.93	46.51	600			0.70	1.836	69.59	12.99%
Phase 1B																																		
chemin Wanaki Road	EX143	BULK143E	MH143										0.33	0.73	0.73	10.00	0.29	10.29	104.19	122.14	178.56	76.47				76.47	129.34	20.00	375			0.50	1.134	52.87	40.88%
chemin Wanaki Road		MH143	MH144											0.00	0.73	10.29	0.37	10.66	102.67	120.34	175.92	75.35				75.35	258.68	50.50	375			2.00	2.269	183.33	70.87%
chemin Wanaki Road	S144, EX144	MH144	MH145		0.55						0.18			0.81	1.54	10.66	0.30	10.97	100.81	118.15	172.70	155.54				155.54	258.68	41.15	375			2.00	2.269	103.14	39.87%
chemin Wanaki Road	S145, EX145	MH145	MH146								0.15		2.74	6.39	7.93	10.97	0.28	11.24	99.35	116.44	170.18	787.69				787.69	1,324.21	48.01	750			1.30	2.904	536.53	40.52%
chemin Wanaki Road		MH146	MH147											0.00	7.93	11.24	0.25	11.49	98.06	114.92	167.95	777.46				777.46	2,296.77	38.53	1050			0.65	2.570	1519.32	66.15%
chemin Wanaki Road	S147C	BULK147E	MH147		0.40									0.33	0.33	10.00	0.28	10.28	104.19	122.14	178.56	34.76				34.76	71.33	16.51	300			0.50	0.978	36.58	51.27%
chemin Wanaki Road	EX147	BULK 147W	MH147	0.16										0.09	0.09	12.00	0.32	12.32	94.70	110.96	162.13	8.42				8.42	71.33	18.72	300			0.50	0.978	62.91	88.19%
chemin Wanaki Road		MH147	MH170											0.00	8.35	12.32	0.09	12.41	93.35	109.38	159.81	779.62				779.62	2,296.77	13.96	1050			0.65	2.570	1517.16	66.06%
chemin Wanaki Road	S147A	MH170	BOX CULVERT								0.14			0.27	8.62	12.41	0.10	12.51	92.98	108.94	159.17	801.83				801.83	2,296.77	15.00	1050			0.65	2.570	1494.94	65.09%
Phase 1B																																		
rue Moses Tennisco Street	S212, LOT212A-B	MH212	MH213								0.15		1.03	2.58	2.58	10.00	0.66	10.66	104.19	122.14	178.56	269.09				269.09	361.72	63.80	525			0.65	1.619	92.63	25.61%
rue Moses Tennisco Street	S213, LOT213	MH213	*BULK165N*								0.21		0.23	0.92	3.50	10.66	0.82	11.47	100.85	118.20	172.77	353.25				353.25	519.40	55.71	750			0.20	1.139	166.15	31.99%
Temp Ditch	BLOCK 24	DI 1	MH165N		1.60									1.33	1.33	26.41	0.25	26.66	58.73	68.69	100.13	78.37				78.37	129.34	17.03	375			0.50	1.134	50.96	39.40%
Phase 1A																																		
Ex. Street No. 3	---	*BULK165N*	*MH165*											0.00	3.50	11.47	0.24	11.71	97.01	113.68	166.14	339.81				339.81	519.40	*16.10*	*750*			*0.20*	1.139	179.59	34.58%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: WY
Checked: JIM
Dwg. Reference: 38298-500

No.	Revision	Date
1.	City submission No. 1	7/8/2016
2.	City submission No. 2	11/4/2016
3.	City submission No. 3	1/25/2017

File Reference: 38298.5.7.1
Date: 7/8/2016
Sheet No: 1 of 2

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400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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ibigroup.com

STORM SEWER DESIGN SHEET

Former CFB Rockcliffe
City of Ottawa
Name of Client/Developer

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW												SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.56	C= 0.60	C= 0.65	C= 0.70	C= 0.73	C= 0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
Phase 1B																																		
Block 9	---	*MH157*	MH217											0.00	12.28	13.26	0.93	14.19	89.63	105.00	153.38	1,100.86				1,100.86	2,337.95	168.50	975			1.00	3.034	1237.09	52.91%
croissant Squadron Crescent	S215, R215	MH215	MH216					0.14				0.38		0.99	0.99	10.00	0.94	10.94	104.19	122.14	178.56	103.06				103.06	317.25	79.94	525			0.50	1.420	214.19	67.51%
croissant Squadron Crescent	S216, R216A-B	MH216	MH217					0.20				0.28		0.88	1.87	10.94	0.86	11.80	99.48	116.60	170.41	185.91				185.91	429.70	75.99	600			0.45	1.472	243.79	56.74%
croissant Squadron Crescent	---	MH217	MH218											0.00	14.15	14.19	0.10	14.29	86.28	101.05	147.59	1,220.93				1,220.93	1,911.03	12.94	1050			0.45	2.138	690.10	36.11%
croissant Squadron Crescent	S218	MH218	MH219								0.17			0.33	14.48	14.29	0.51	14.80	85.93	100.64	146.99	1,244.42				1,244.42	1,424.40	49.00	1050			0.25	1.594	179.98	12.64%
croissant Squadron Crescent	---	MH219	MH220											0.00	14.48	14.80	0.90	15.70	84.21	98.62	144.02	1,219.47				1,219.47	1,575.26	73.09	1200			0.15	1.349	355.79	22.59%
croissant Squadron Crescent	S220, LOT220	MH220	MH221								0.18		1.96	4.71	19.19	15.70	0.54	16.24	81.35	95.26	139.09	1,561.24				1,561.24	1,575.26	43.47	1200			0.15	1.349	14.02	0.89%
														FIXED OUTLET FLOW FROM SWM FACILITY = 6660 L/s																				
croissant Squadron Crescent	---	MH221	MH222											0.00	19.19	16.24	0.11	16.35	79.75	93.38	136.33	1,530.55			6,660.00	8,190.55	8,565.43	11.97	2400			0.11	1.834	374.88	4.38%
croissant Squadron Crescent	S222A-B	MH222	*BULK165S*								0.26			0.51	19.70	16.35	0.86	17.21	79.44	93.01	135.79	1,564.69			6,660.00	8,224.69	8,565.43	94.49	2400			0.11	1.834	340.74	3.98%
Phase 1A																																		
croissant Squadron Crescent	---	*BULK165S*	*MH165*											0.00	19.70	17.21	0.23	17.43	77.04	90.19	131.66	1,517.52			6,660.00	8,177.52	8,565.43	*24.90*	*2400*			*0.11*	1.834	387.92	4.53%
Temp Ditch	BLOCK 15	DI 4	MH165S		1.96									1.63	1.63	50.88	0.17	51.05	37.18	43.41	63.14	60.73				60.73	182.91	16.50	375			1.00	1.604	122.18	66.80%
Phase 1B																																		
rue Michael Stoqua Street	S210, LOT210	MH210	MH211								0.20		0.23	0.90	0.90	10.00	0.83	10.83	104.19	122.14	178.56	93.85				93.85	147.47	64.80	375			0.65	1.293	53.62	36.36%
Temp Ditch	BLOCK 22	DI 12	MH211N		0.46									0.38	0.38	19.39	0.33	19.72	71.62	83.82	122.31	27.44				27.44	43.87	17.38	250			0.50	0.866	16.43	37.45%
Temp Ditch	BLOCK 23	DI 13	MH166N		0.46									0.38	0.38	22.34	0.34	22.68	65.50	76.63	111.77	25.06				25.06	43.87	17.50	250			0.50	0.866	18.81	42.88%
rue Michael Stoqua Street	S211, LOT211	MH211	*BULK166N*								0.17		0.23	0.84	1.74	10.83	1.09	11.93	99.98	117.18	171.27	174.27				174.27	248.09	55.70	600			0.15	0.850	73.82	29.75%
Phase 1A																																		
rue Michael Stoqua Street	---	*BULK166N*	*MH166*											0.00	1.74	11.93	0.32	12.24	95.01	111.33	162.67	165.61				165.61	248.09	*16.10*	*600*			*0.15*	0.850	82.48	33.25%
Phase 1B																																		
rue Bareille-Snow Street	S208, LOT208A-B	MH208	MH209								0.19		0.81	2.17	2.17	10.00	0.76	10.76	104.19	122.14	178.56	226.22				226.22	317.25	64.85	525			0.50	1.420	91.03	28.69%
rue Bareille-Snow Street	S209, LOT209	MH209	*BULK167N*								0.20		0.20	0.83	3.01	10.76	1.01	11.77	100.34	117.60	171.89	301.53				301.53	339.63	55.70	675			0.15	0.919	38.10	11.22%
Temp Ditch	BLOCK 21	DI 11	MH167N		1.22									1.02	1.02	35.74	0.21	35.95	47.82	55.88	81.38	48.58				48.58	100.88	17.52	300			1.00	1.383	52.30	51.84%
Phase 1A																																		
rue Bareille-Snow Street	---	*BULK167N*	*MH167*											0.00	3.01	11.77	0.29	12.06	95.69	112.12	163.84	287.55				287.55	339.63	*16.10*	*675*			*0.15*	0.919	52.08	15.34%

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File Reference: 38298.5.7.1
Date: 7/8/2016
Sheet No: 1 of 2

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

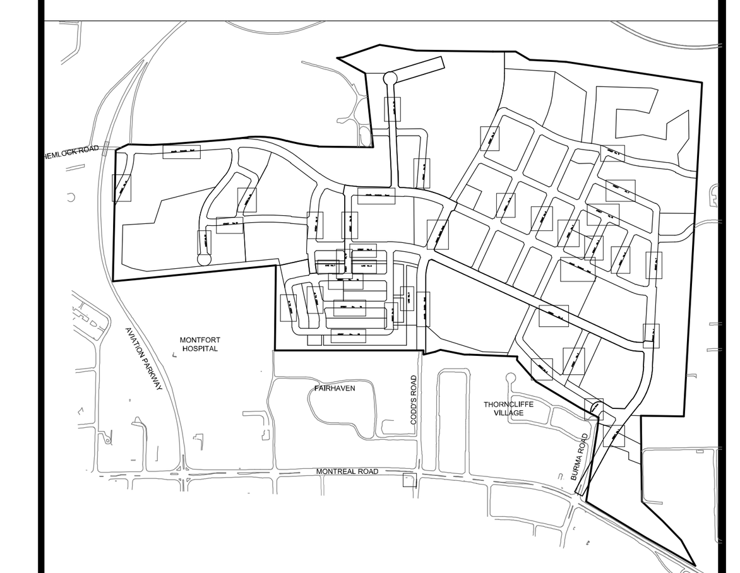
Signed ______________________

Date ______________________ 2017

Plan Number ______________________

LEGEND :

- AREA NUMBER
- RUNOFF COEFFICIENT
- AREA IN HECTARES
- POTENTIAL DRAINAGE DIRECTION



No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6	REVISED PER MOECC COMMENTS	J.I.M.	2017:06:07
5	ISSUED FOR TENDER	J.I.M.	2017:03:23
4	SUBMISSION FOR MOECC APPROVAL	J.I.M.	2017:02:16
3	SUBMISSION No.3 FOR CITY REVIEW	J.I.M.	2017:01:25
2	SUBMISSION No.2 FOR CITY REVIEW	J.I.M.	2016:11:04
1	SUBMISSION No.1 FOR CITY REVIEW	J.I.M.	2016:07:08

CANADA LANDS COMPANY
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30 Metcalfe Street Suite 601
Ottawa, On K1P 5L4
613 998 7777

IBI GROUP
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Ottawa ON K1S 5N4 Canada
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ibigroup.com

Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/06/07
PROVINCE OF ONTARIO

N

Drawing Title

STORM DRAINAGE AREA PLAN

Scale	
1 : 2000	
Design: J.I.M.	Date: MAY 2016
Drawn: M.M.	Checked: J.I.M.
Project No.: 38298	Drawing No.: 500A

D07-16-15-0003

#17063

LID Storage
15mm Required Storage

2020-10-02

STORAGE SUMMARY
BLOCK 22
TOTAL LID TREATMENT VOLUME

Total Area (sq.m)	4mm Volume (cu.m)
4600	18.4

Area ID	Drainage Area (sq.m)	Volume Req. (cu.m) (15mm Storm)	Perf Pipe Size (mm)	Pipe Length (m)	Volume Pipe + Granular (cu.m)
CB 1A	366.01	5.5	450	18	6.31
CB 1B	474.46	7.1	375	26	7.16
CB 2A	789.1	11.8	450	34	11.91
Total	**1629.57**	**24.4**		**78.0**	**25.4**

* Refer to Drawing DS-2 for Bioretention Cross Section
** Volume calculation assumes 40% Void Ratio for the Filter Media

U1	Imp.	Perv.	Total
Area	0.041	0.014	0.055
C	0.9	0.2	0.72

U2	Imp.	Perv.	Total
Area	0.006	0.020	0.026
C	0.9	0.2	0.36

U3	Imp.	Perv.	Total
Area	0.013	0.024	0.037
C	0.9	0.2	0.44

A1	Imp.	Perv.	Total
Area	0.155	0.030	0.185
C	0.9	0.2	0.79

A2	Imp.	Perv.	Total
Area	0.072	0.004	0.076
C	0.9	0.2	0.86

A3	Imp.	Perv.	Total
Area	0.074	0.006	0.080
C	0.9	0.2	0.84

Total	Imp.	Perv.	Total
Area	0.361	0.099	0.460
C	0.9	0.2	0.75

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

Ottawa

LOCATION: Location	LOCATION: From Node	LOCATION: To Node	AREA (Ha) 2 YEAR: AREA (Ha)	2 YEAR: R	2 YEAR: Indiv. 2.78 AC	2 YEAR: Accum. 2.78 AC	5 YEAR: AREA (Ha)	5 YEAR: R	5 YEAR: Indiv. 2.78 AC	5 YEAR: Accum. 2.78 AC	10 YEAR: AREA (Ha)	10 YEAR: R	10 YEAR: Indiv. 2.78 AC	10 YEAR: Accum. 2.78 AC	100 YEAR: AREA (Ha)	100 YEAR: R	100 YEAR: Indiv. 2.78 AC	100 YEAR: Accum. 2.78 AC	FLOW: Time of Conc. (min)	Intensity 2 Year (mm/h)	Intensity 5 Year (mm/h)	Intensity 10 Year (mm/h)	Intensity 100 Year (mm/h)	Peak Flow Q (l/s)	SEWER DATA: DIA. (mm) (actual)	DIA. (mm) (nominal)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF FLOW (min)	RATIO Q/Q full
PARKING LOT																																	
					0.00	0.00	0.08	0.84	0.19	0.19																							
	1	2			0.00	0.00	0.19	0.79	0.42	0.60			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	63	375	375	PVC	0.40	34.0	110.89	1.00	0.56	0.57
To PRIVÉ KIZIS PRIVATE, Pipe 2 - 3						0.00				0.60				0.00				0.00	10.56														
PRIVÉ KIZIS PRIVATE																																	
Contribution From PARKING LOT, Pipe 1 - 2						0.00				0.60				0.00				0.00	10.56														
	2	3			0.00	0.00	0.08	0.86	0.19	0.80			0.00	0.00			0.00	0.00	10.56	74.70	101.30	118.74	173.56	81	375	375	PVC	0.40	24.0	110.89	1.00	0.40	0.73
	3	210			0.00	0.00			0.00	0.80			0.00	0.00			0.00	0.00	10.96	73.30	99.37	116.46	170.21	79	375	375	PVC	2.85	14.0	295.99	2.68	0.09	0.27
To RUE MICHAEL STOQUA STREET, Pipe 210-211						0.00				0.80				0.00				0.00	10.96														
BLOCK 22 UNATTENUATED AREA U1																																	
U1					0.00	0.00			0.00	0.00			0.00	0.00	0.06	0.72	0.12	0.12	10.00	76.81	104.19	122.14	178.56	21									
To RUE MICHAEL STOQUA STREET, Pipe 210-211						0.00				0.00				0.00				0.12	10.00														
RUE MICHAEL STOQUA STREET																																	
Contribution From BLOCK 22 UNATTENUATED AREA U1						0.00				0.00				0.00				0.12	10.00														
Contribution From PRIVÉ KIZIS PRIVATE, Pipe 3 - 210						0.00				0.80				0.00				0.00	10.96														
S210	210	211			0.00	0.00	0.20	0.70	0.39	1.18			0.00	0.00			0.00	0.12	10.96	73.30	99.37	116.46	170.21	138	375	375	PVC	0.65	44.6	141.36	1.28	0.58	0.98
LOT 211					0.00	0.00	0.23	0.80	0.51	0.51			0.00	0.00			0.00	0.12	11.54	71.35	96.69	113.31	165.58	69									
S211	211	166N			0.00	0.00	0.17	0.70	0.33	2.03			0.00	0.00			0.00	0.12	11.54	71.35	96.69	113.31	165.58	216	600	600	CONC	0.15	55.7	237.81	0.84	1.10	0.91
	166N	166			0.00	0.00			0.00	2.03			0.00	0.00			0.00	0.12	12.65	67.94	92.02	107.81	157.51	205	600	600	CONC	0.15	16.1	237.81	0.84	0.32	0.86
To RUE MIKINAK ROAD, Pipe 166-167						0.00				2.03				0.00				0.12	12.97														
BLOCK 22 UNATTENUATED AREA U3																																	
U3					0.00	0.00			0.00	0.00			0.00	0.00	0.04	0.44	0.05	0.05	0.00	76.81	104.19	122.14	178.56	9									
To RUE MOSES TENNISCO STREET, Pipe 212-213						0.00				0.00				0.00				0.05	0.00														
RUE MOSES TENNISCO STREET																																	
Contribution From BLOCK 22 UNATTENUATED AREA U3						0.00				0.00				0.00				0.05	0.00														
S210	213	212			0.00	0.00	0.15	0.70	0.29	0.29			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	30	525	525	CONC	0.65	63.8	346.73	1.60	0.66	0.09
From Block 24 - DSEL Job#17-948							1.42	0.81	3.20	3.49			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	364									
LOT 213					0.00	0.00	0.23	0.80	0.51	0.51			0.00	0.00			0.00	0.00	10.66	74.35	100.81	118.16	172.71	52									
S211	212	165N			0.00	0.00	0.21	0.70	0.41	4.70			0.00	0.00			0.00	0.00	10.66	74.35	100.81	118.16	172.71	474	750	750	CONC	0.20	55.7	497.87	1.13	0.82	0.95
	165N	165			0.00	0.00			0.00	4.70			0.00	0.00			0.00	0.00	11.49	71.53	96.94	113.60	166.01	456	750	750	CONC	0.20	16.1	497.87	1.13	0.24	0.92
To RUE MIKINAK ROAD, Pipe 165-166						0.00				4.70				0.00				0.00	11.73														
FLOW FROM SQUADRON CRESCENT																																	
From Block 15 - DSEL Job#17-946					0.00	0.00			0.00	1.63			0.00	0.00			0.00	0.00	51.05	27.62	37.09	43.31	62.99	60									
SQUADRON CRES.					0.00	0.00			0.00	19.70			0.00	0.00			0.00	0.00	17.43	56.57	76.45	89.49	130.63	1506									
To RUE MIKINAK ROAD, Pipe 165-166						0.00				21.33				0.00				0.00	17.43														
RUE MIKINAK ROAD																																	
Contribution From FLOW FROM SQUADRON CRESCENT						0.00				21.33				0.00				0.00	17.43														
Contribution From MOSES TENNISCO, Pipe 165N-165						0.00				4.70				0.00				0.00	11.73														
FIXED FLOW PER PHASE 1A																								8884.00									
EX165B	165S	165			0.00	0.00			0.00	8.43			0.00	0.00			0.00	0.00	17.19	57.04	77.09	90.25	131.74	650									
S165	165	166			0.00	0.00	0.16	0.73	0.32	34.79			0.00	0.00			0.00	0.00	17.43	56.57	76.45	89.49	130.63	11544	2700	2700	CONC	0.25	89.6	16945.20	2.96	0.50	0.68
Contribution From MICHAEL STOQUA, Pipe 166N-166						0.00				2.03				0.00				0.12	12.97														
S166					0.00	0.00	0.28	0.73	0.57	0.57			0.00	0.00			0.00	0.00	13.61	65.26	88.33	103.47	151.14	50									
EX165B	166	167			0.00	0.00	0.61	0.80	1.36	38.74			0.00	0.00			0.00	0.12	17.93	55.61	75.14	87.95	128.37	11810	2700	2700	CONC	0.25	112.0	16945.20	2.96	0.63	0.70
RUE HEMLOCK ROAD																																	
U2					0.00	0.00			0.00	0.00			0.00	0.00	0.03	0.36	0.03	0.03	10.00	76.81	104.19	122.14	178.56	5									
	204-205	211			0.00	0.00			0.00	10.82			0.00	0.00			0.00	0.03	13.53	65.47	88.63	103.82	151.65	963	750	750	CONC	1.20	90.0	1219.53	2.76	0.54	0.79
	204-205	211			0.00	0.00			0.00	14.51			0.00	0.00			0.00	0.03	14.07	64.04	86.68	101.52	148.28	1262	1200	1200	CONC	0.20	112.0	1743.57	1.54	1.21	0.72

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2020-10-06
PROVINCE OF ONTARIO

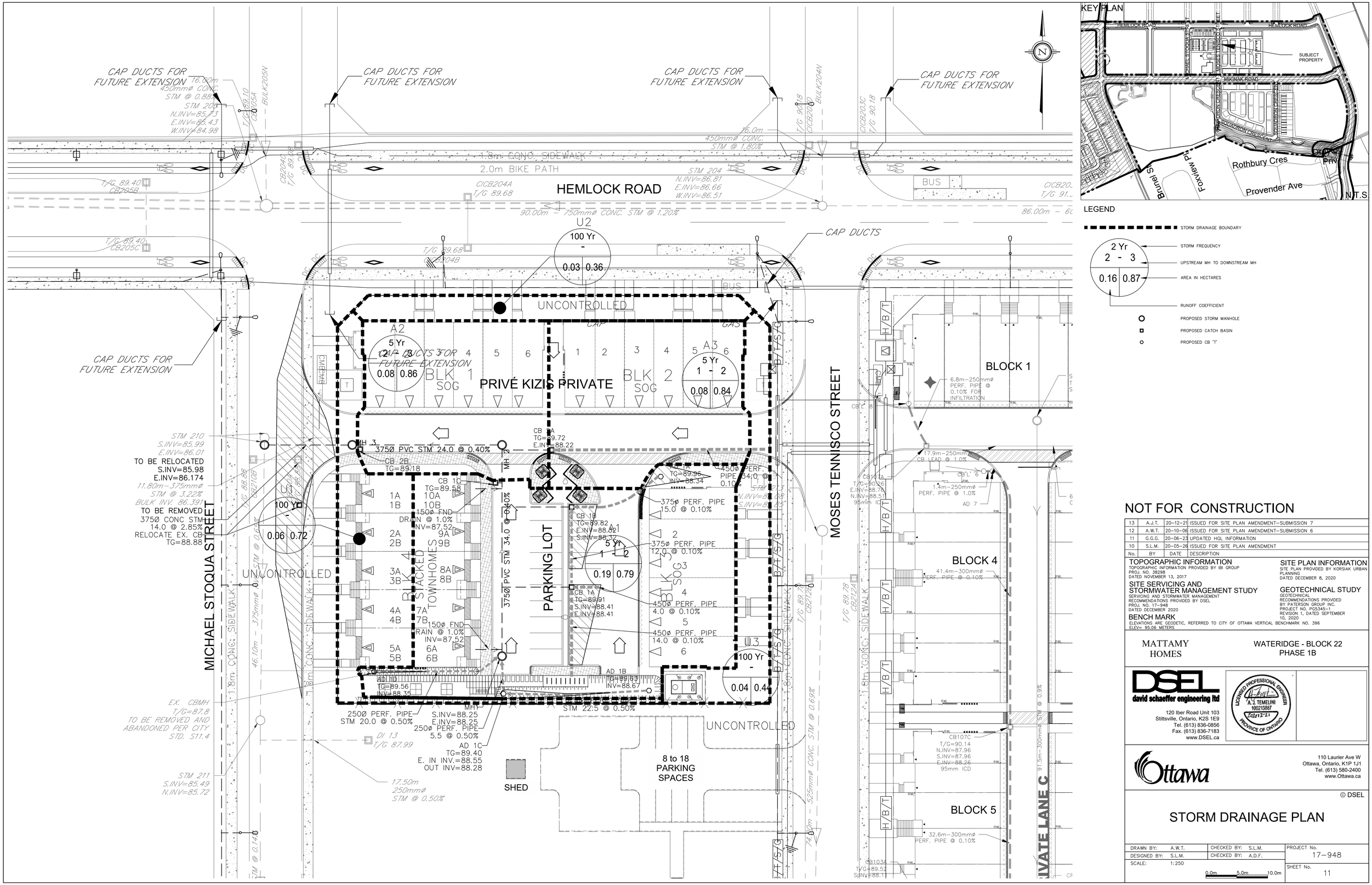
Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

JOB#17-948

Designed: GGG	PROJECT: Mattamy - Wateridge Block 22		
Checked: SLM	LOCATION: City of Ottawa		
Dwg. Reference: 10	File Ref: 17-948	Date: 06 Oct 2020	Sheet No. SHEET 1 OF 1

948_STM_ggg.xlsx



LEGEND

- STORM DRAINAGE BOUNDARY
- 2 Yr / 2 - 3 / 0.16 0.87 — STORM FREQUENCY; UPSTREAM MH TO DOWNSTREAM MH; AREA IN HECTARES; RUNOFF COEFFICIENT
- PROPOSED STORM MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED CB 'T'

NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION
13	A.J.T.	20-12-21	ISSUED FOR SITE PLAN AMENDMENT–SUBMISSION 7
12	A.W.T.	20-10-06	ISSUED FOR SITE PLAN AMENDMENT–SUBMISSION 6
11	G.G.G.	20-06-23	UPDATED HGL INFORMATION
10	S.L.M.	20-05-26	ISSUED FOR SITE PLAN AMENDMENT

TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY IBI GROUP
PROJ. NO. 38298
DATED NOVEMBER 13, 2017

SITE PLAN INFORMATION
SITE PLAN PROVIDED BY KORSIAK URBAN PLANNING
DATED DECEMBER 8, 2020

SITE SERVICING AND STORMWATER MANAGEMENT STUDY
SERVICING AND STORMWATER MANAGEMENT RECOMMENDATIONS PROVIDED BY DSEL
PROJ. NO. 17-948
DATED DECEMBER 2020

GEOTECHNICAL STUDY
GEOTECHNICAL RECOMMENDATIONS PROVIDED BY PATERSON GROUP INC.
PROJECT NO. PG5345-1
REVISION 1, DATED SEPTEMBER 10, 2020

BENCH MARK
ELEVATIONS ARE GEODETIC, REFERRED TO CITY OF OTTAWA VERTICAL BENCHMARK NO. 396
ELEV= 95.06 METERS

MATTAMY HOMES

WATERIDGE - BLOCK 22
PHASE 1B

DSEL
david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
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LICENSED PROFESSIONAL ENGINEER A.J. TEMELINI 100213887 PROVINCE OF ONTARIO

Ottawa
110 Laurier Ave W
Ottawa, Ontario, K1P 1J1
Tel. (613) 580-2400
www.Ottawa.ca

STORM DRAINAGE PLAN

DRAWN BY:	A.W.T.	CHECKED BY:	S.L.M.
DESIGNED BY:	S.L.M.	CHECKED BY:	A.D.F.
SCALE:	1: 250		

0.0m 5.0m 10.0m

PROJECT No. 17-948

SHEET No. 11

CITY FILE No. D07-12-20-0066 CITY PLAN No. 17691

J.F. Sabourin and Associates Inc.
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jfsa.com

Ottawa. ON
Paris. ON
Gatineau. QC
Montréal. QC
Québec. QC

October 05, 2020 Project Number: P1971

David Schaeffer Engineering Limited
120 Iber Road, Unit 103
Ottawa, Ontario
K2S 1E9

Attention: **Jennifer Ailey, P.Eng.**

Subject: **Wateridge Village Phase 1B – Proposed Block 22 Stormwater Management Design**

This memo is an update to a previous memo prepared by JFSA dated June 5, 2020. The previous version of this memo has been updated to reflect changes to the hydrologic and hydraulic modelling for this proposed development. Changes were completed to incorporate revisions to the contributing drainage areas and impervious values as well as to the internal storm sewer network configuration, sizes and inverts provided to JFSA by DSEL.

As requested by your office, we have evaluated, based on the available information as described below, the minor and major system design of the proposed private residential development by Mattamy Homes located at 1400 Hemlock Road in the City of Ottawa. The development is referred to as Wateridge Village Phase 1B – Block 22 based on the Stormwater Management (SWM) measures documented in the *Design Brief Wateridge Village at Rockcliffe Phase 1B Prepared for the Canada Lands Company* by IBI Group (June, 2017).

The subject property is located within the Ottawa River watershed and was included in the overall SWM design for Wateridge Village at Rockcliffe Phase 1B. In this SWM design, Block 22 was modelled with two drainage areas, LOT210 and LOT212B. LOT210 (west side) had an area of 0.23 ha, runoff coefficient of 0.80, and drained to Michael Stoqua Street. LOT212B had an area of 0.23 ha, runoff coefficient of 0.80 and drained to Moses Tennisco Street. From this report, Block 22 included a temporary ditch (60m long with a 0.50% slope) which collected minor system flows from both LOT210 and LOT212B draining to Michael Stoqua Street STM pipe. The subject site was also accounted for in the design of the Eastern SWM Facility which provides enhanced quality control for the subdivision.

The limit of the subdivision, as labelled in orange in Attachment A, consists of 18 proposed rear-lane townhomes, 20 proposed back-to-back stacked townhomes, and surface parking and has a total area of 0.46 ha. Within the subdivision, 0.34 ha will drain to the internal storm sewer on Michael Stoqua Street. The remaining 0.12 ha will sheet drain to the surrounding roads. The 0.34 ha area (hereby referred to as Block 22) was analyzed in this memo to assess the outflow to the Michael Stoqua Street storm sewer. Block 22 has an impervious area of 0.29 ha (86% impervious).

As seen in Attachment B, Block 22 consists of six (6) subcatchments labelled as CB2B, CB2A, CB1C, CB1B, CB1A, and AD1C. Each subcatchment drains to a corresponding catch basin (CB_2B, CB_2A, CB_1C, CB_1B, CB_1A, and AD_1C). All catch basins will be equipped with an Inlet Control Device (ICD) to control the flow to the 5-year storm, except for AD_1C as it is a landscape CB draining directly to MH1 therefore additional control is not necessary. The major system flow of subcatchment AD1C (0.023 ha) will drain along a ditch to the west and run offsite to Michael Stoqua Street on the southwest side of the site. Lots along the north side of the block (CB2B and CB2A) will drain south onto the road, Kizis Private, and into the storm sewer system. Lots on the west (CB1C) and east (CB1B and CB1A) area will drain along a parking lot and into the storm sewer system.

As noted above, in the approved servicing report by IBI Group, the drainage plan split minor and major system outflows from the site to Michael Stoqua Street and Moses Tennisco Street. However, the current storm strategy proposes sending the majority of the minor and major system drainage to Michael Stoqua Street. IBI Group has confirmed that this change will not negatively impact the overall subdivision performance, as documented in the correspondence in Attachment D.

The design criteria and guidelines used for the stormwater management of the subject site are those that were developed in the background documents as well as those provided in the *October 2012 City of Ottawa Sewer Design Guidelines* and generally accepted stormwater management design guidelines. The criteria for this project are listed below.

- Size ICDs for each street/parking lot catchbasin with a minimum of 5-year capture
- Complete a Hydraulic Gradeline (HGL) analysis confirming a 0.3 m freeboard between the underside of footing (USF) elevations for the townhouse blocks and the 100-year HGL elevation (3-hour Chicago and 24-hour SCS Type II). A 0 m freeboard is required for the 100-year + 20% stress test and three City of Ottawa historical events (July 1st, 1979, August 4th, 1988, August 8th, 1996).
- Confirm total (static + dynamic) 100-year water depths on the road/parking lot are less than 35 cm and total 100-year + 20% stress test water depths do not reach the building envelopes.

A PCSWMM model was built to simulate the major and minor system flows for multiple simulations as per the October 2012 City of Ottawa Sewer Design Guidelines. Refer to Attachment B for the PCSWMM model schematic. The following storms were run: 5-year 3-hour Chicago, 100-year 3-hour Chicago, 100-year 24-hour SCS Type II, 100-year + 20% 3-hour Chicago storm stress test, as well as the City of Ottawa historical events on July 1st, 1979, August 8th, 1996, and August 8th, 1996.

Note that the purpose of simulating the 100-year, 3-hour Chicago storm with a 20% increase is to stress test the drainage system for potential flooding resulting from climate change, as per the October 2012 City of Ottawa Sewer Design Guidelines.

The PCSWMM model schematic and hydraulic simulation results are presented in Attachment B for the 100-year Chicago storm. To limit minor system outflows to less than the 87 L/s accepted by IBI Group in the correspondence included in Attachment D (5-year Rational Method flow per DSEL), a 75 mm ICD (orifice) will be implemented for each street/parking lot catchbasin (5) in the system: CB_1A, CB_1B, CB_1C, CB_2A, and CB_2B. The landscape CB AD_1C will remain with 100% capture. The 5-year minor system outflow from the Block 22 storm sewer system to STM210, 64.9 L/s, is lower than the DSEL estimated peak flow of 87 L/s. The 100-year minor system outflow to STM210 is 78.3 L/s; again, lower than the DSEL estimated peak flow. The major system outflow to Michael Stoqua Street for the 5-year 3-hour Chicago storm from the portion of the block serviced by the internal storm sewer is 21.1 L/s, and 67.3 L/s for the 100-year 3-hour Chicago storm. It is JFSA's understanding IBI Group is to confirm this major system flow from the proposed development onto Michael Stoqua Street can be accommodated.

PRELIMINARY HYDRAULIC GRADELINE CALCULATIONS

Preliminary hydraulic gradeline calculations for the proposed storm sewer were performed in PCSWMM and are presented in Attachment C. The pipe data and storm sewer layout for the storm sewer are as provided by DSEL. As may be seen in the calculations in Attachment C, a freeboard of 0.3 m was achieved between the hydraulic gradeline and the estimated underside of footing elevations for the 100-Year 3-Hour Chicago and the 100-Year SCS Type II Storms. For the stress test (100-Year + 20%) and historical events, a freeboard of 0 m was achieved between the hydraulic gradline and the estimated underside of footing elevations.

MAJOR SYSTEM FLOW DEPTH CALCULATIONS

Within Block 22, the depth of water at the gutter will be retained within the right-of-water and will not exceed the maximum allowable value of 35 cm during the 100-year Chicago Storm, or reach the building envelopes during the 100-Year + 20% Chicago Storm. The Approach Flow, Capture Flow, and Total Water Depth (Static and Dynamic) can be found in the tables below. It was found for all major system segments, the product of the depth of water (m) at the gutter multiplied by the velocity of flow (m/s) will not exceed the maximum allowable 0.60 m^2/s.

Table 1: 100-Year 3-Hour Chicago Major System Flow Depth Calculations

Subcatchment ID	CB ID	Approach Flow (m^3/s)	Captured Flow (m^3/s)	Total Water Depth (Static + Dynamic) (m)	Velocity (m/s)	v * d (m^2/s)
CB2B	CB_2B	0.083	0.015	0.08	0.50	0.040
CB2A	CB_2A	0.038	0.014	0.06	0.42	0.025
CB1C	CB_1C	0.036	0.016	0.07	0.23	0.016
CB1B	CB_1B	0.028	0.014	0.09	0.29	0.026
CB1A	CB_1A	0.023	0.013	0.07	0.28	0.020

Table 2: 100-Year + 20% 3-Hour Chicago Major System Flow Depth Calculations

Subcatchment ID	CB ID	Approach Flow (m^3/s)	Captured Flow (m^3/s)	Total Water Depth (Static + Dynamic) (m)	Velocity (m/s)	v * d (m^2/s)
CB2B	CB_2B	0.107	0.016	0.08	0.53	0.042
CB2A	CB_2A	0.046	0.014	0.06	0.44	0.026
CB1C	CB_1C	0.044	0.016	0.08	0.24	0.019
CB1B	CB_1B	0.033	0.014	0.11	0.30	0.033
CB1A	CB_1A	0.027	0.014	0.09	0.29	0.026

It may therefore be concluded that the proposed SWM design for Block 22 is in accordance with the City of Ottawa standards and the design of the overall subdivision (per IBI Group).

Yours truly,
J.F Sabourin and Associates Inc.

Tamarra Lewis, B.Eng., EIT
Water Resources EIT

Laura Pipkins, P.Eng.
Project Engineer in Water Resources

Bryan Willcott, P.Eng.
Project Engineer in Water Resources

cc: J.F Sabourin, M.Eng, P.Eng
Director of Water Resources Projects

Attachments

Attachment A: Proposed Drainage Plan
Attachment B: PCSWMM Schematic
Attachment C: Pipe Data and Hydraulic Gradeline Results
Attachment D: Email Correspondence

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Montréal. QC
Québec. QC

Attachment A

Proposed Drainage Plan

Figure 1

HEMLOCK ROAD

MICHAEL STOQUA STREET

MOSES TENISCO STREET

CB2B
0.078Ha
94%

CB2A
0.079Ha
91%

CB1C
0.077Ha
84%

CB1B
0.048Ha
86%

CB1A
0.037Ha
99%

AD1C
0.023Ha
34%

PARKING LOT

PRIVÉ KIZIS PRIVATE

MH 1

MH 2

MH 3

LEGEND :

- LIMITS OF SUBDIVISION
- MAJOR SYSTEM SUBCATCHMENT BOUNDARY TO LOW POINTS AND OTHER AREAS
- MAJOR SYSTEM FLOW DIRECTION
- FIRST DIRECTION OF EXCESS MAJOR SYSTEM FLOW AT LOW POINT
- CB1A / 0.037Ha / 99% — SUB–CATCHMENT ID / SUB–CATCHMENT AREA / TOTAL IMPERVIOUSNESS

SCALE :

0 5 10 15 20 25m

N

J.F. Sabourin & Associates Inc.
WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
OTTAWA (613) 836–3884
GATINEAU (819) 243–6858

CLIENT :

DSEL
david schaeffer engineering ltd
120 IBER ROAD, UNIT 103
STITTSVILLE, ONTARIO., K2S 1E9
(613) 836–0856

PROJECT :
WATERIDGE VILLAGE PHASE 1B
PROPOSED BLOCK 22
SWM DESIGN

NO.	BY	DATE	DESCRIPTION	BY

PROPOSED DRAINAGE PLAN

FIGURE 1

DESIGNED:	TL/BW
DRAWN:	BL/BW
VERIFIED:	JFS
APPROVED:	JFS
DATE	PROJECT No.
Oct/20	1971

DRAWING REF.
1971–20\202005 Subm2\
Design\CAD\JFSA Figures_202010.dwg

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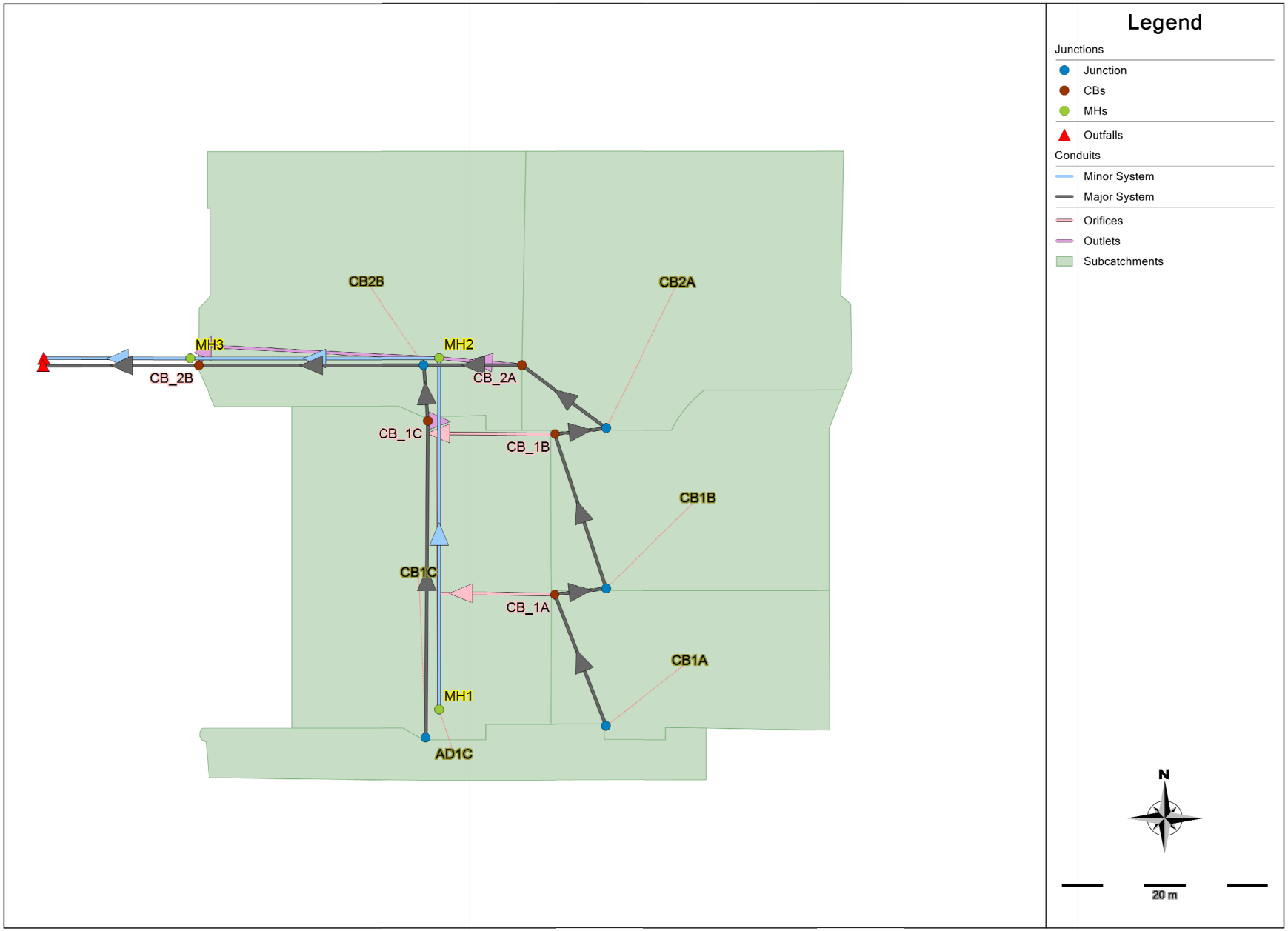
Paris. ON
Gatineau. QC
Montréal. QC
Québec. QC

Attachment B

PCSWMM Schematic

Figure 2


CB2B
CB2A
MH3
MH2
CB_2B
CB_2A
CB_1C
CB_1B
CB1B
CB1C
CB_1A
CB1A
MH1
AD1C
Legend
Junctions
Junction
CBs
MHs
Outfalls
Conduits
Minor System
Major System
Orifices
Outlets
Subcatchments
N
20 m

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Attachment C

Pipe Data and Hydraulic Gradeline Results

Tables C-1A to Table C-1F

Table C-1A: Pipe Data and Hydraulic Simulation Results for the 100-Year, 3-Hour Chicago Storm

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (h)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)
1	2	86.900	86.764	375	34.2	0.4	0.013	89.780	89.630	1.001	0.111	0.049	0.4	-0.175	1.17	87.100	86.920	4-6A	87.57	0.470
2	3	86.689	86.593	375	24.2	0.4	0.013	89.640	89.210	0.999	0.110	0.078	0.7	-0.144	1.17	86.920	86.710	4-10A	87.57	0.650
3	STM210	86.573	86.174	375	14.2	2.8	0.013	89.210	88.920	2.662	0.294	0.078	0.3	-0.238	1.17	86.710	86.430	N/A	N/A	N/A

Note: [1] A negative surcharge implies that the pipe is not flowing full

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe

Table C-1B: Pipe Data and Hydraulic Simulation Results for the 100-Year, 24-Hour SCS Type II Storm

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (h)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)
1	2	86.900	86.764	375	34.2	0.4	0.013	89.780	89.630	1.001	0.111	0.048	0.4	-0.175	12.00	87.100	86.910	4-6A	87.57	0.470
2	3	86.689	86.593	375	24.2	0.4	0.013	89.640	89.210	0.999	0.110	0.077	0.7	-0.154	12.00	86.910	86.700	4-10A	87.57	0.660
3	STM210	86.573	86.174	375	14.2	2.8	0.013	89.210	88.920	2.662	0.294	0.077	0.3	-0.248	12.00	86.700	86.430	N/A	N/A	N/A

Note: [1] A negative surcharge implies that the pipe is not flowing full

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe

Table C-1C: Pipe Data and Hydraulic Simulation Results for the July 1st, 1979 Historical Event

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (h)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)
1	2	86.900	86.764	375	34.2	0.4	0.013	89.780	89.630	1.001	0.111	0.044	0.4	-0.185	1.50	87.090	86.910	4-6A	87.57	0.480
2	3	86.689	86.593	375	24.2	0.4	0.013	89.640	89.210	0.999	0.110	0.072	0.7	-0.154	1.50	86.910	86.700	4-10A	87.57	0.660
3	STM210	86.573	86.174	375	14.2	2.8	0.013	89.210	88.920	2.662	0.294	0.072	0.2	-0.248	1.50	86.700	86.430	N/A	N/A	N/A

Note: [1] A negative surcharge implies that the pipe is not flowing full

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe

Table C-1D: Pipe Data and Hydraulic Simulation Results for the August 4th, 1988 Historical Event

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (h)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)
1	2	86.900	86.764	375	34.2	0.4	0.013	89.780	89.630	1.001	0.111	0.047	0.4	-0.175	2.02	87.100	86.910	4-6A	87.57	0.470
2	3	86.689	86.593	375	24.2	0.4	0.013	89.640	89.210	0.999	0.110	0.076	0.7	-0.154	2.02	86.910	86.700	4-10A	87.57	0.660
3	STM210	86.573	86.174	375	14.2	2.8	0.013	89.210	88.920	2.662	0.294	0.076	0.3	-0.248	2.02	86.700	86.430	N/A	N/A	N/A

Note: [1] A negative surcharge implies that the pipe is not flowing full

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe

Table C-1E: Pipe Data and Hydraulic Simulation Results for the August 8th, 1996 Historical Event

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (h)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)
1	2	86.900	86.764	375	34.2	0.4	0.013	89.780	89.630	1.001	0.111	0.042	0.4	-0.195	1.47	87.080	86.900	4-6A	87.57	0.490
2	3	86.689	86.593	375	24.2	0.4	0.013	89.640	89.210	0.999	0.110	0.070	0.6	-0.164	1.47	86.900	86.700	4-10A	87.57	0.670
3	STM210	86.573	86.174	375	14.2	2.8	0.013	89.210	88.920	2.662	0.294	0.070	0.2	-0.248	1.47	86.700	86.430	N/A	N/A	N/A

Note: [1] A negative surcharge implies that the pipe is not flowing full

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe

Table C-1F: Pipe Data and Hydraulic Simulation Results for the 100-Year, 3-Hour Chicago Storm + 20%

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (h)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)
1	2	86.900	86.764	375	34.2	0.4	0.013	89.780	89.630	1.001	0.111	0.052	0.5	-0.165	1.17	87.110	86.920	4-6A	87.57	0.460
2	3	86.689	86.593	375	24.2	0.4	0.013	89.640	89.210	0.999	0.110	0.081	0.7	-0.144	1.17	86.920	86.710	4-10A	87.57	0.650
3	STM210	86.573	86.174	375	14.2	2.8	0.013	89.210	88.920	2.662	0.294	0.081	0.3	-0.238	1.17	86.710	86.430	N/A	N/A	N/A

Note: [1] A negative surcharge implies that the pipe is not flowing full

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe

Ottawa. ON
Paris. ON
Gatineau. QC
Montréal. QC
Québec. QC

Attachment D

Email Correspondence

Tamarra Lewis

From: Winston Yang <Winston.Yang@ibigroup.com>
Sent: Monday, August 21, 2017 3:23 PM
To: Jean Lachance; Jim Moffatt; Adam Fobert
Cc: Jillian Normand
Subject: RE: 918 Mattamy - Wateridge: IBI Servicing Review

Hi Jean,

As per our phone conversation, there should be no impact on Block 23's proposed serving scheme for SWM and servicing due to few changes* for Block 22.

*Note: The overland flow route and servicing outlet for Block 22 are both draining toward Michael Stoqua Street instead of splting into half and assigning to Michael Stoqua Street and Moses Tennisco Street.

Should you have any questions please do not hesitate to contact me.

Yours truly,

Winston Yang P.Eng.

email Winston.Yang@ibigroup.com web www.ibigroup.com

IBI GROUP
Suite 400, 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel +1 613 225 1311 fax +1 613 225 9868

IBI **Defining the cities of tomorrow**

From: Jean Lachance [mailto:JLachance@clc.ca]
Sent: Tuesday, August 15, 2017 5:52 PM
To: Winston Yang <Winston.Yang@ibigroup.com>; Jim Moffatt <jmoffatt@IBIGroup.com>; Adam Fobert <AFobert@dsel.ca>
Cc: Jillian Normand <Jillian.Normand@mattamycorp.com>
Subject: Re: 918 Mattamy - Wateridge: IBI Servicing Review

Jim et al.,

What is the Mattamy's 100yr for each block and what impacts if any from Block 22 when considering Block 23 's proposed serving scheme for MHI.

Thanks,

Jean

Sent from my BlackBerry — the most secure mobile device — via the Rogers Network

From: AFobert@dsel.ca
Sent: August 15, 2017 5:26 PM
To: Winston.Yang@ibigroup.com; jmoffatt@IBIGroup.com
Cc: JLachance@clc.ca; Jillian.Normand@mattamycorp.com
Subject: 918 Mattamy - Wateridge: IBI Servicing Review

Hello Jim and Winston,

How is your review of our site servicing is coming along? I have reviewed your Design Brief's for Phase 1A and 1B and have compared the analysis contained within to our proposed design.

I offer the following considerations based on my review:

General:
DSEL proposed one storm and one sanitary connection to each block. The City indicated that this was their expectation during our pre-consultation as it is their standard practice for multi-block parcels.

Block 15: The servicing brief shows three connections to Squadron Crescent. DSEL are proposing one connection downstream of the contemplated connections.

Block 22: The surrounding grades slope from east to west. The servicing brief shows a drainage divide mid-block, where half the site drains to Moses Tenisco and the other to Michael Stoqua . Moses Tenisco is 1.14m higher than Michael Stoqua at the proposed road connection points. As such, to avoid fighting grades DSEL proposed storm and sanitary connections to Michael Stoqua only.

Block 24: Moses Tenisco slopes from north to south 1.1m from Hemlock to Mikinak. The servicing brief shows a drainage divide mid-block with connections to Moses Tenisco and Mikinak. DSEL proposed a storm and sanitary outlet at the southern road connection on Moses Tenisco based on Mattamy's proposed site. This avoids fighting grades internally.

Wastewater:
Block 15:

IBI Servicing Brief = 487.3p
Mattamy Proposal = 335p

Proposed connections are downstream of IBI contemplated connections. Population is less than included in servicing brief. Therefore, we do not expect servicing issues with Block 15.

Block 22:

IBI Servicing Brief ~ 105p (note that I am interpolating since half of Block 22 is included in northern half of Block 24.)

Mattamy Proposal = 52p

IBI servicing brief assumed 52.5p tributary to Moses Tenisco. Therefore, we do not expect capacity issues.

Block 24:

IBI Servicing Brief ~284.4p (note that I am interpolating based on the population shown on phase 1A southern half of block 24).

Mattamy Proposal = 364p

DSEL reviewed the available capacity in the receiving sewers and did not see any capacity issues.

Note: Mattamy's proposed servicing eliminates the need for 63.8m of sanitary sewer on Moses Tennisco from MH213A to MH212A. Savings to CLC.

Stormwater:
I have reviewed Appendix E of the servicing briefs to compare our calculations to the assumptions used in the model.

Review of the Summary of DDSWMM Parameters
Block 15:

IBI Servicing brief: No storage assumed. 5 and 100 year capture 396L/s
Mattamy's proposal: 275m3 of storage provided. DSEL's estimated 5-year peak 357.4L/s

Block 19:

IBI Servicing brief: No storage assumed. 194 + 57 (note that Lot 209 and 208B are missing from chart).
Mattamy's proposal: TBD.

Block 22:

- IBI Servicing brief: No storage assumed. 5 and 100 year (46 + 46) 92L/s
  Mattamy's proposal: 46.5m3 of storage provided. DSEL's estimated 5-year peak 87L/s.

Block 24:

IBI Servicing brief: No Storage. 5 and 100 year capture (162 +162) 324L/s.
Mattamy's proposal: 27.3m3 of storage provided. DSEL's estimated 5-year peak 325.7L/s.

Let me know if you have any comments or questions. Thank you for your time.

Adam Fobert, P.Eng.
Manager of Site Plan Design

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

office: (613) 836-0856
direct: (613) 836-0626
cell: (613) 222-9493
email: afobert@DSEL.ca

material. Based on in-situ soil testing of previous phases, it is anticipated that the soils tested in Phase 1B will have a field saturated hydraulic conductivity below 15mm/hr and therefore will require the installation of an underdrain per the TRCA/CVC LID Stormwater Planning and Design Guide (2010).

4.0 Recommended LID Types

The Draft Wateridge Village Phases 1B - Master Concept Plan (Appendix A) displays the proposed land-use in Phase 1B; including: low & medium rise residential and mixed-use, parks, and municipal ROW. Table 4.1 summarizes suitable LID measures by each land use.

Table 4.1 Low Impact Development (LID) Suitability Matrix by Land-Use

		Phase 1B Proposed Land-Uses			
		Low & Medium Rise Residential	Low and Medium Rise Mixed-Use	Schools & Parks	Municipal ROW
	Assumed Lot Coverage	**50-60%**	**80-100%**	**10-30%**	**n/a**
LID Type					
Lot-Level Controls	Green Roofs	□	□	n/a	n/a
	Bioretention	□□	□□	□□□	□□□
	Rainwater Harvesting	□	□	n/a	n/a
	Soakaways, Trenches & Chambers	□□□	□□□	□□□	n/a
	Downspout Disconnection	□□□	□□□	n/a	n/a
	Soil Amendments	□□□	□□□	□□□	n/a
	Permeable Pavements	□□	□□	□□	See Conveyance Controls
	Infiltration Basins	n/a	n/a	□□□	n/a
Conveyance Controls	Vegetated/Grass Swales	n/a	n/a	□	□□
	Bioswales/Biofilters	n/a	n/a	□□	□□□
	Perforated Pipes	n/a	n/a	□	□□
	Permeable Pavements	n/a	n/a	□□	□□□

*Assumed lot coverage indicates percentage of development with hard surface land cover

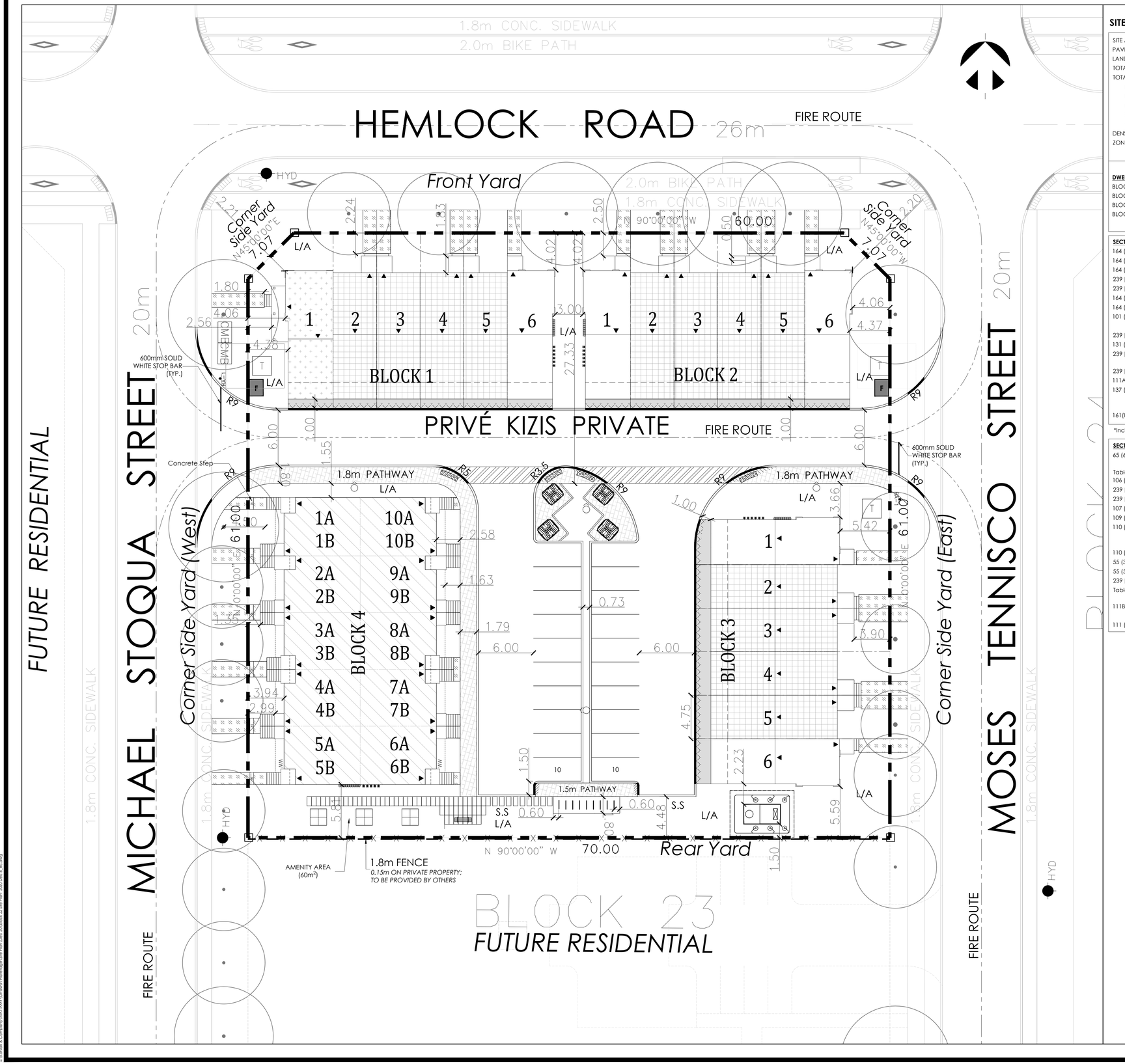
□□□ = **Highly Suitable,** □□ = **Suitable,** □ = **Poor Suitability,** n/a = **Not Applicable**

In areas where infiltration is not possible, i.e. over underground parking structures, runoff can be collected using ditch inlets, catch basins, or eavestroughs for roof surfaces and conveyed via pipe to an infiltration system or end-of-pipe facility.

Based on the land-use proposed in the Master Concept Plan for Phase 1B, the following LIDs can be implemented in Phase 1B:

- Soakaways, Trenches & Chambers
- Downspout Disconnection
- Soil Amendments
- Bioretention
- Infiltration Basins

DRAWINGS / FIGURES



SITE STATISTICS AND DEVELOPMENT DATA

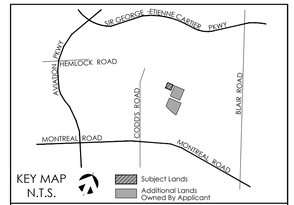
SITE AREA	4,594.19 m²
PAVED AREA	1,354.56 m² (30%)
LANDSCAPED AREA	1,381.51 m² (30%)
TOTAL BUILDING COVERAGE	1,858.12 m² (40%)
TOTAL GROSS FLOOR AREA	4,647 m²
TYPE A TOWNHOUSE MODEL (12)	1,702 m²
TYPE B TOWNHOUSE MODEL (2)	312 m²
TYPE C TOWNHOUSE MODEL (4)	622 m²
STACKED TOWNS UPPER MODEL (10)	1,152 m²
STACKED TOWNS LOWER MODEL (10)	859 m²
DENSITY (UPH)	82.6
ZONE CATEGORY	R5Y[2457]

DWELLING BLOCK	DWELLING TYPE	GROUND FLOOR AREA (m2)	UNITS
BLOCK 1	REAR LANE TOWNS	402.49	6
BLOCK 2	REAR LANE TOWNS	402.49	6
BLOCK 3	REAR LANE TOWNS	401.88	6
BLOCK 4	STACKED TOWNS	500.72	20
	TOTAL	1,707.58	38

SECTION	ZONE PROVISION - PLANNED UNIT DEVELOPMENT	REQUIRED	PROPOSED
164 (Table)	MIN. LOT WIDTH (m)	N/A	N/A
164 (Table)	MIN. LOT AREA (m²)	1,400 m²	4,594.19 m²
164 (Table)	MAX. BUILDING HEIGHT (m)	11.00 m	10.63 m
239 [2457]	MIN. FRONT YARD SETBACK (m)	3.00 m	4.02 m
239 [2457]	MIN. CORNER SIDE YARD SETBACK (m)	3.00 m	4.06 m
164 (Table)	MIN. REAR YARD SETBACK (m)	3.00 m	5.59 m
164 (Table)	MIN. INTERIOR YARD SETBACK (m)	3.00 m	N/A
101 (Table)	RESIDENT PARKING - REAR LANE TOWNS (18 @ 0.75/unit)	14	18
	STACKED (20 @ 0.5/unit)	10	20
239 [2457]	VISITOR PARKING	0	0
131 (Table)(1)	MIN. WIDTH OF PRIVATE WAY (m)	6.00 m	6.00 m
239 [2457]	SETBACK OF ANY WALL OF A RES. BUILDING TO PRIVATE WAY (m)	1.00 m	1.00 m
239 [2457]	MIN. SETBACK OF GARAGE DOOR TO PRIVATE WAY (m)	1.00 m	1.00 m
111A (Table)	BICYCLE PARKING (STACKED TOWNS)	10 (0.5/unit)	10
137 (Table)(7)	MIN. STACKED TOTAL AMENITY AREA (6m² per unit)	120 m²	230 m²*
	MIN. OF 50% OF THE REQUIRED TOTAL AMENITY AREA FOR COMMUNAL AMENITY AREA	60 m²	60 m²
161(8)	MIN. % LANDSCAPED AREA	30%	30%

*Includes an average of ±8.5m² per unit for terraces

SECTION	ADDITIONAL PROVISIONS	REQUIRED	PROPOSED
65 (6)	PERMITTED PROJECTIONS INTO YARDS: COVERED OR UNCOVERED BALCONY, PORCH, DECK	2.00 m (MAX) >1.0m to lot line	0.50 m 2.50 m
Table 65(5)	FIRE ESCAPES, OPEN STAIRWAYS, STOOP	>0.60m to lot line	1.35 m
106 (1)(a)	MIN. PERPENDICULAR PARKING SPACE SIZE	2.6 x 5.2 m	2.6 x 5.2 m
239 [2457]	MIN. DRIVEWAY WIDTH TO PARKING LOT (m)	6.00 m	6.00 m
239 [2457]	MIN. AISLE WIDTH TO SPACES (m)	6.00 m	6.00 m
107 (2)	MIN. DRIVEWAY WIDTH TO GARAGE (m)	2.60 m	4.75 m
109 (3)(b)	MAX. WALKWAY WIDTH PERMITTED IN YARD (m)	1.80 m	1.80 m
110 (Table)	MIN. LANDSCAPE BUFFER WIDTH PARKING LOT TO LOT LINE	1.50 m	4.48 m
	MIN. OF 15% OF LANDSCAPE AREA WITHIN AND SURROUNDING A PARKING LOT	15%	≥15%
110 (3)(b)	MIN. WASTE COLLECTION SETBACK TO LOT LINE (m)	3.00 m	27.33 m
55 (3)(e)(ii)	ACCESSORY STRUCTURE SETBACK (m)	0.60 m	1.50 m
55 (5)	PROJECTION HEIGHT (MAX) (m)	3.20 m	1.80 m
239 [2457]	UTILITY INSTALLATIONS SETBACK (m)	0.60 m	1.50 m
Table 131(4)	MIN. SEPARATION DISTANCE BETWEEN BUILDINGS WITHIN A PLANNED UNIT DEVELOPMENT (m)	1.20 m	3.00 m
111B (TABLE)	MIN. BICYCLE PARKING SPACE DIMENSIONS (m)	Width: 0.6 m Length: 1.8 m	0.6 m 1.8 m
111 (9)	MIN. BICYCLE PARKING SPACE ACCESS WIDTH AISLE (m)	1.5 m	1.5 m



SCALE 1:200 0 2 4 6 8 10 12

LEGEND

- PATHWAY (PAVERS)
- WALKWAY TO ENTRY
- CROSSWALK (PAVERS)
- ASPHALT DRIVEWAY
- MOUNTABLE CURB
- CURB (0.2m)
- DEPRESSED CURB
- PORCH
- WINDOW WELL
- PROJECTION (STAIRS)
- L/A LANDSCAPED AREA
- TYPE A TOWNHOUSE (4.75m)
- TYPE B TOWNHOUSE (5.21m)
- TYPE C TOWNHOUSE (5.13m)
- STACKED DWELLING
- PROPOSED LOT BOUNDARY
- BLOCK BOUNDARY
- FENCE
- BIKE RACK
- HYDRO METERS
- GAS METERS
- S.S SNOW STORAGE AREA
- BENCH
- PATIO SLABS AND STEPPING PONES
- ENTRANCE
- # UNIT NUMBER
- HYD FIRE HYDRANT
- RA STOP SIGN
- 3 PHASE TRANSFORMER & SWITCHGEAR
- TRANSFORMER
- CMB CANADA POST MAIL BOX
- ART/ WAYFINDING FEATURE
- FOOD GARDEN
- TACTILE WALKING SURFACE INDICATOR
- STREET TREE
- POLE MOUNT LIGHT LIGHTING (R=0.5m)
- EARTHBINS
- CONCRETE WALL

08/12/20	Added Earthbins	EC
14/10/20	Insert lighting plan	CR
10/09/20	Revise Block 4 setback, insert internal walkway	CR
14/05/20	Issue for Detailed Design	EC
25/03/20	Revise Site Plan for Site Plan Amendment	EC
01/03/18	Issue for Third Submission to City	SP
14/12/17	Issue for Second Submission to City	SP
28/07/17	Draft for review	SP
DATE (D.M.Y)	REVISION	BY

GENERAL NOTES
1. DO NOT SCALE DRAWINGS FOR PRINT.
2. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF KORSIAK URBAN PLANNING AND MATTAMY HOMES. COPYRIGHT RESERVED.
3. SITE PLAN PREPARED IN ACCORDANCE WITH PLAN 4M-1581 AND PLAN 4R-30196, PREPARED BY ANNIS O'SULLIVAN, VOLLEBEKK LTD.
4. TOWNHOUSE DWELLING UNITS ARE DESIGNED TO ACCOMMODATE CURBSIDE GARBAGE PICK-UP.
5. WALKWAYS AND CURBS TO BE TIED INTO PUBLIC ROW WHERE APPLICABLE.
6. REFERENCES CITY OF OTTAWA T.W.S.I. DETAIL SC7.3.
7. SNOW WILL BE REMOVED FROM THE SITE IMMEDIATELY, ONCE ON-SITE SNOW STORAGE AREAS HAVE BEEN FULLY UTILIZED.

PROJECT TEAM

SITE PLAN DESIGN: KORSIAK Urban Planning
PLANNING: Stantec
ARCHITECTURE: Q4A
CIVIL ENGINEER: DSEL
LANDSCAPE ARCHITECTURE: NAK design strategies
TRANSPORTATION: NOVATECH
NOISE: VALCOUSTICS Canada Ltd.
GEOTECHNICAL & STRUCTURAL: paterson group
MECHANICAL/ ELECTRICAL: LRJ
ENVIRONMENTAL: KILGOUR & Associates

mattamyHOMES

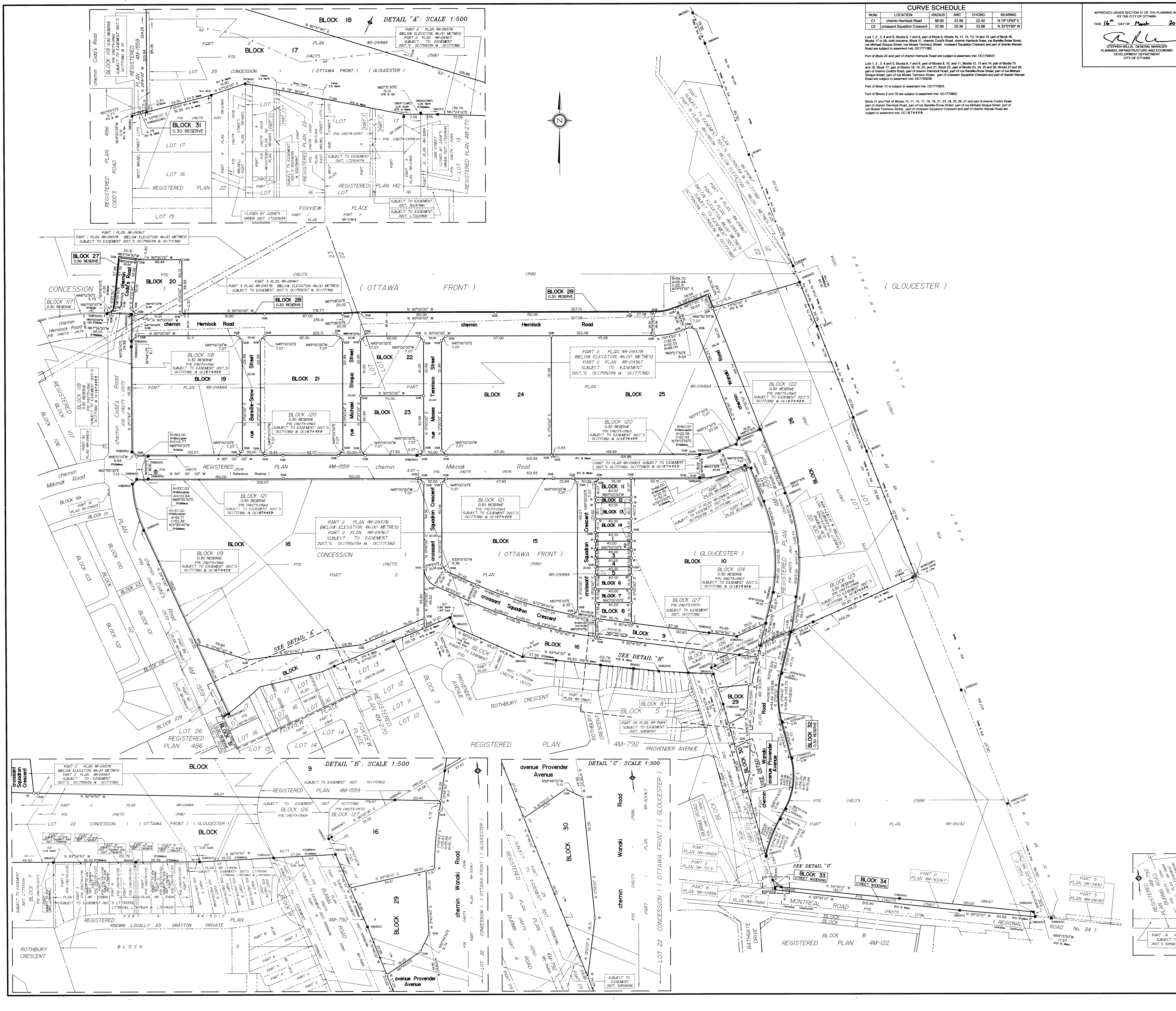
WATERIDGE VILLAGE: PHASE 1B
1400 HEMLOCK ROAD
BLOCK 22
PART OF LOTS 22 AND 23
CONCESSION 1 (OTTAWA FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
REGISTERED PLAN 4M-1559
CITY OF OTTAWA

TITLE: BLOCK 22 SITE PLAN

DATE: December 8, 2020 | DRAWN BY: EC CHECKED BY: CR | DRAWING NO. A2
FILE NO.: D07-12-20-0066
JOB NO.: Mattamy - Wateridge

D07-12-20-0066

DWG #17691



CURVE SCHEDULE

NUM.	LOCATION	RADIUS	ARC	CHORD	BEARING
C1	chemin Hemlock Road	60.00	22.56	22.42	N 79°13'50" E
C2	croissant Squadron Crescent	22.00	25.36	23.98	N 33°01'50" W

Lots 1, 2 , 3, 4 and 5, Blocks 6, 7 and 8, part of Block 9, Blocks 10, 11, 12, 13, 14 and 15, part of Block 16, Blocks 17 to 28, both inclusive, Block 31, chemin Codd's Road, chemin Hemlock Road, rue Bareille-Snow Street, rue Michael Stoqua Street, rue Moses Tennisco Street, croissant Squadron Crescent and part of chemin Wanaki Road are subject to easement Inst. OC1771382.

Part of Block 20 and part of chemin Hemlock Road are subject to easement Inst. OC1755037.

Lots 1, 2 , 3, 4 and 5, Blocks 6, 7 and 8, part of Blocks 9, 10, and 11, Blocks 12, 13 and 14, part of Blocks 15 and 16, Block 17, part of Blocks 18, 19, 20, and 21, Block 22, part of Blocks 23, 24, 25 and 26, Blocks 27 and 28, part of chemin Codd's Road, part of chemin Hemlock Road, part of rue Bareille-Snow Street, part of rue Michael Stoqua Street, part of rue Moses Tennisco Street, part of croissant Squadron Crescent and part of chemin Wanaki Road are subject to easement Inst. OC1755039.

Part of Block 10 is subject to easement Inst. OC1772805.

Part of Blocks 9 and 16 are subject to easement Inst. OC1772902.

Block 31 and Part of Blocks 10, 11, 15, 17, 18, 19, 21, 23, 24, 25, 26, 27 and part of chemin Codd's Road, part of chemin Hemlock Road, part of rue Bareille-Snow Street, part of rue Michael Stoqua Street, part of rue Moses Tennisco Street, part of croissant Squadron Crescent and part of chemin Wanaki Road are subject to easement Inst. OC1874459.

APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE CITY OF OTTAWA.

THIS 16th DAY OF March, 2017

STEPHEN WILLIS, GENERAL MANAGER
PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT
CITY OF OTTAWA

PLAN 4M- 1581

I CERTIFY THAT THIS PLAN IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4 AT 15:55 O'CLOCK ON THE 17 DAY OF March 2016 AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY IDENTIFIERS 04273-0561, 04273-0562, 04273-0563, 04273-0564, 04273-0565, 04273-0566, 04273-0567, 04273-0569, 04273-0570, 04273-0580, 04273-0581, 04273-0586 and 04273-0587 AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NO. OC1874890

Representative for LAND REGISTRAR

This plan comprises all of the land identified by PIN's 04273-0561, 04273-0562, 04273-0563, 04273-0564, 04273-0565, 04273-0566, 04273-0567, 04273-0569, 04273-0570, 04273-0580 04273-0586 and 04273-0587 and part of the land identified by PIN 04273-0581.

PLAN OF SUBDIVISION OF

PART OF LOTS 21, 22 And 23 CONCESSION 1 (OTTAWA FRONT)

Geographic Township of Gloucester

And

BLOCKS 118, 119, 120, 121, 122, 123, 124, 126 And 127 REGISTERED PLAN 4M-1559 CITY OF OTTAWA

Surveyed by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1250

50 37.5 25 12.5 0 25 50 Metres

Metric

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

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 22nd day of February, 2017.

Feb. 22, 2017
Date

E. H. Herweyer
Ontario Land Surveyor

OWNER'S CERTIFICATE

THIS IS TO CERTIFY THAT :

1. Lots 1, 2, 3, 4, 5, Blocks 6 to 26, both inclusive, Blocks 29, 30, the Streets, namely, rue Bareille-Snow Street, rue Michael Stoqua Street, rue Moses Tennisco Street, croissant Squadron Crescent, chemin Codd's Road, chemin Hemlock Road, avenue Provender Avenue and chemin Wanaki Road, the Street Widenings, namely, Blocks 33 and 34 and the Reserves, namely, Blocks 27, 28, 31 and 32 have been laid out in accordance with our instructions.
2. The Streets and Street Widenings are dedicated as public highways.

Dated the 16th day of March, 2017

Rodger Martin, Vice President, Real Estate Ontario & Atlantic
Canada Lands Company CLC Limited
I have the authority to bind the corporation.

Dated the 16th day of March, 2017

Jean Lachance, Senior Director Real Estate (Ottawa)
Canada Lands Company CLC Limited
I have the authority to bind the corporation.

NOTES AND LEGEND

—□—	denotes	Survey Monument Planted.
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar.
SSIB	"	Short Standard Iron Bar.
CC	"	Cut Cross.
IB	"	Iron Bar.
IBØ	"	Round Iron Bar.
IB	"	Iron Bar.
*	"	Survey Monument (0.3 long)
(WIT)	"	Witness
NT	"	Nontagential
CLF	"	Chain Link Fence
BF	"	Board Fence
R/W	"	Right-of-Way
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Registered Plan 4M-1559
(P2)	"	Plan 4R-26142
(P3)	"	Plan 4R-29484
(P4)	"	Plan 4R-29367
(P5)	"	Plan 4R-30067

Distances shown on curved limits are Arc distances unless otherwise noted.

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999947.

Bearings are grid, derived from the southerly limit of chemin Mikinak Road, shown to be N90°00'00" W on Registered Plan 4M-1559, and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919680105 and 0198434761, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

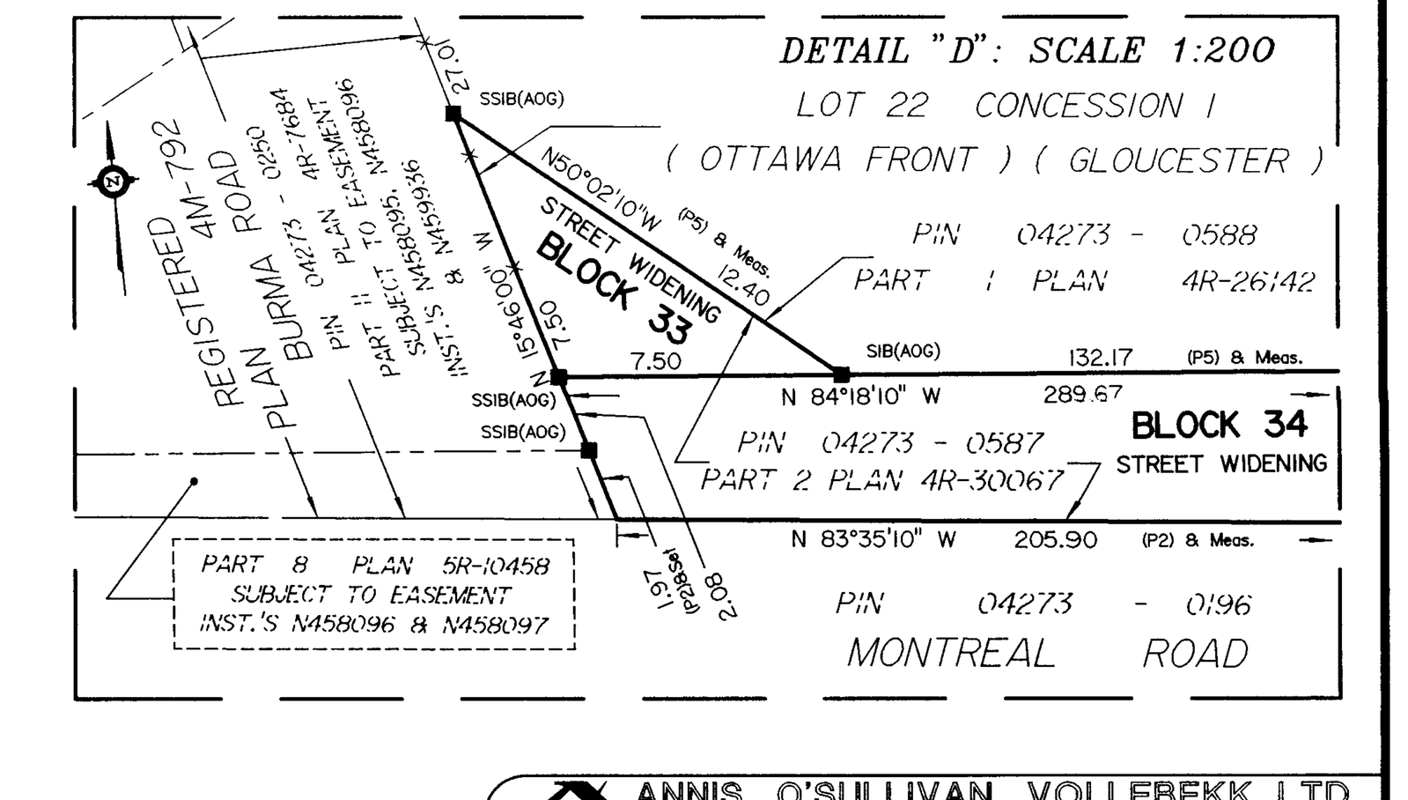
Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. 019198434761	Northing	5036178.12	Easting	372436.11
. 01919680146	Northing	5035456.42	Easting	372208.81
. Point A	Northing	5034986.54	Easting	373170.44
. Point B	Northing	5034986.54	Easting	372556.54

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

ELEVATION NOTES

1. Elevations are geodetic, referred to City of Ottawa Vertical Bench Mark No. 396 (01919680138), having an elevation of 95.06 metres.



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

Ontario Land Surveyors

Job No. 14710-14 CLC Pt Lts 21-23 CI OF GL Ph IB SUB F | N

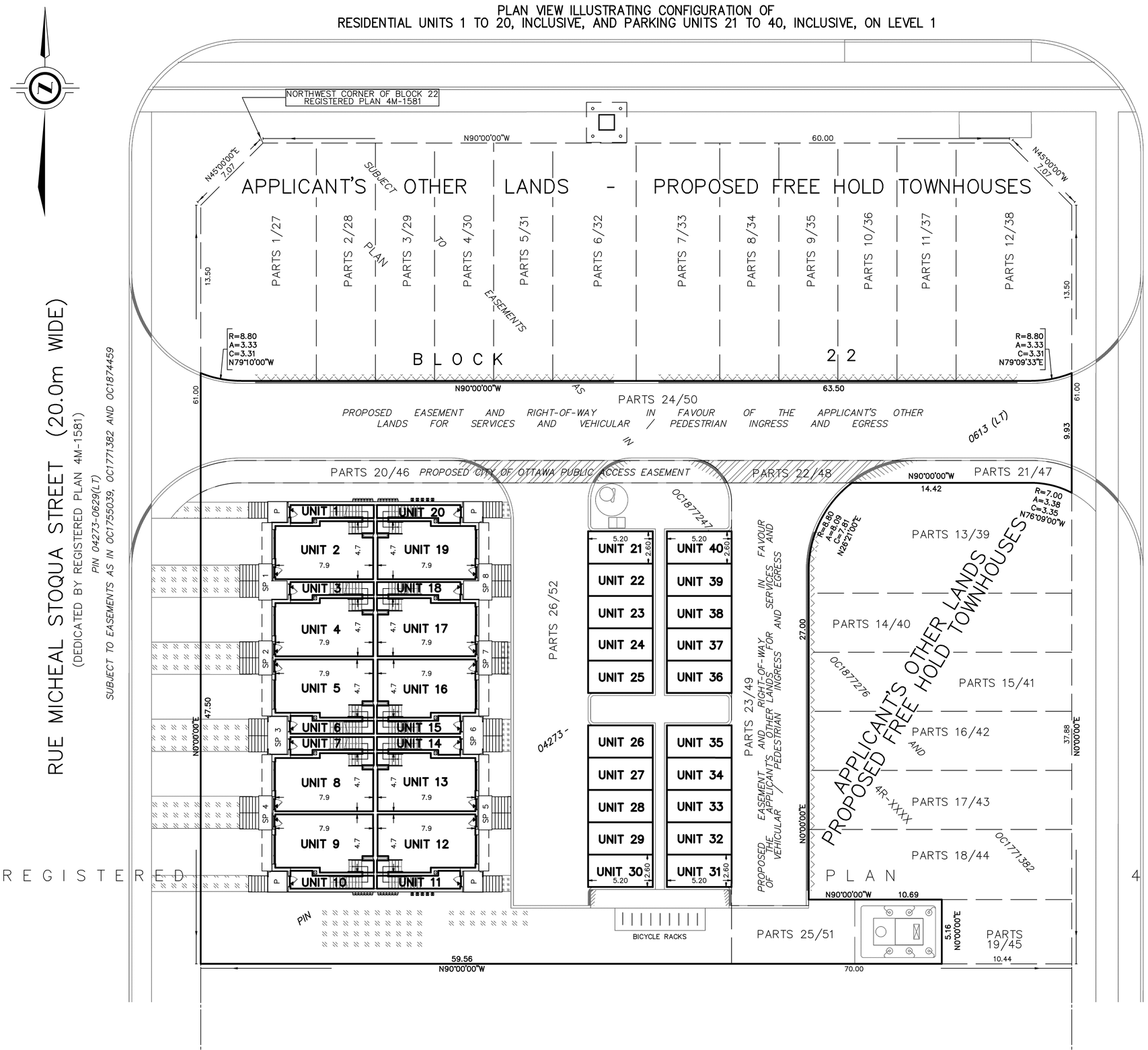
CHEMIN HEMLOCK ROAD (26.0m WIDE)

(DEDICATED BY REGISTERED PLAN 4M-1581)

PIN 04273-0627(LT)

SUBJECT TO EASEMENTS AS IN OC1755037, OC1755039, OC1771382 AND OC1874459

PLAN VIEW ILLUSTRATING CONFIGURATION OF RESIDENTIAL UNITS 1 TO 20, INCLUSIVE, AND PARKING UNITS 21 TO 40, INCLUSIVE, ON LEVEL 1



RUE MICHEAL STOQUA STREET (20.0m WIDE)
(DEDICATED BY REGISTERED PLAN 4M-1581)
PIN 04273-0629(LT)
SUBJECT TO EASEMENTS AS IN OC1755039, OC1771382 AND OC1874459

RUE MOSES TENNISCO STREET (20.0m WIDE)
(DEDICATED BY REGISTERED PLAN 4M-1581)
PIN 04273-0630(LT)
SUBJECT TO EASEMENTS AS IN OC1755039, OC1771382 AND OC1874459

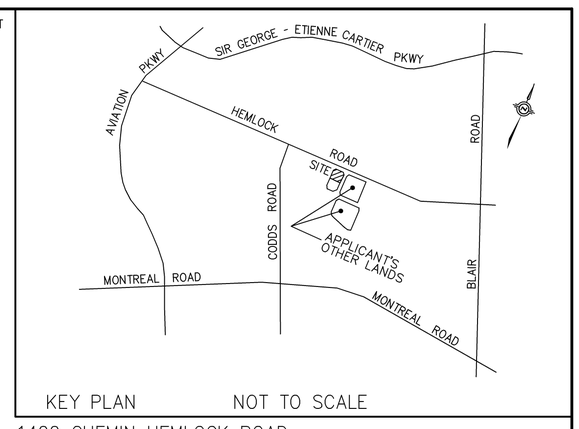
REGISTERED PLAN 4M-1581

BLOCK 23

PIN 04273 - 0614 (LT)

SUBJECT TO EASEMENTS AS IN OC1877247, OC1877276 AND OC1771382

LAND NOT OWNED BY APPLICANT



KEY PLAN NOT TO SCALE

1400 CHEMIN HEMLOCK ROAD

DRAFT PLAN OF STANDARD CONDOMINIUM OF

PART OF BLOCK 22 REGISTERED PLAN 4M-1581 CITY OF OTTAWA

J. D. BARNES LIMITED

SCALE 1 : 200

5 0 5 10 metres

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT.

FOR A,B,C,E,F,G, AND J SEE DRAFT PLAN AND KEY PLAN

D EACH UNIT IS SINGLE RESIDENTIAL, THE OWNER OF WHICH HAS OUTRIGHT OWNERSHIP. CERTAIN UNITS SHALL HAVE THE EXCLUSIVE USE OF PORTIONS OF THE COMMON ELEMENTS.

H MUNICIPAL WATER IS AVAILABLE ON ADJACENT STREETS

I CLAY LOAM

K MUNICIPAL STORM AND SANITARY SEWERS ARE AVAILABLE ON ADJACENT STREETS.

L ALL EASEMENTS AFFECTING THE SUBJECT SITE ARE SHOWN ON THE FACE OF THIS PLAN.

NOTES

BEARINGS HEREON ARE GRID, BEARINGS ARE REFERED TO SPECIFIED CONTROL POINTS (SCPs) 019198434761 AND 0198434761, AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30' WEST LONGITUDE, ZONE 09, NAD83 (ORIGINAL).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999947.

INTEGRATION DATA

SPECIFIED CONTROL POINTS (SCPs): MTM ZONE 09, NAD83 (ORIGINAL).

COORDINATES TO AN URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

POINT ID	EASTING	NORTHING
SCP 019198434761	372 436.11	5 036 178.12
SCP 01919680146	372 208.81	5 035 456.42

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

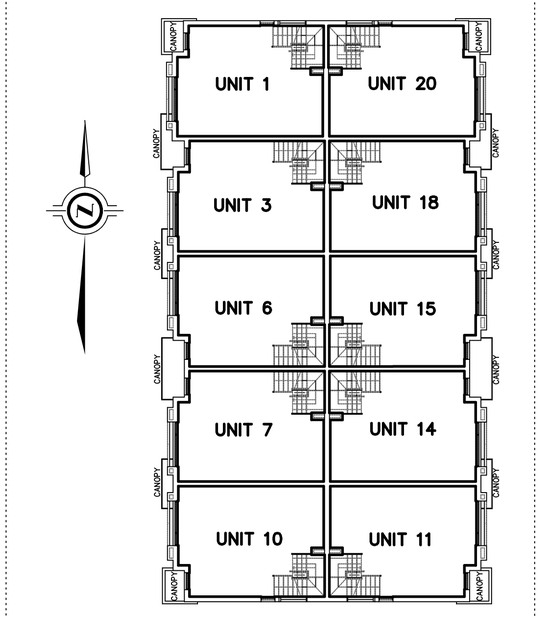
DEVELOPMENT STATISTICS

TOTAL NUMBER OF RESIDENTIAL UNITS = 20 STACKED TOWNHOUSES
SITE AREA = 4594.2 sq.m. (0.4594 ha.)
BUILDING COVERAGE = 1899.6 sq.m. (42%)
BUILDING HEIGHT = 3 STOREYS

PARKING

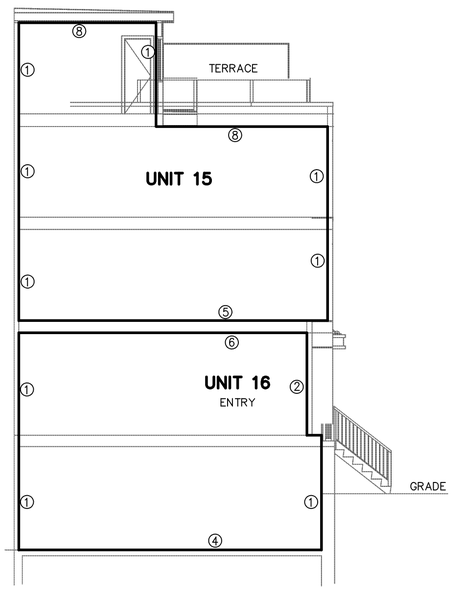
RESIDENT PARKING UNITS = 20
VISITOR PARKING SPACES = 0
VISITOR BICYCLE RACKS = 9

PLAN VIEW ILLUSTRATING CONFIGURATION OF RESIDENTIAL UNITS 1, 3, 6, 7, 10, 11, 14, 15, 18 AND 20, (SECOND STORY)

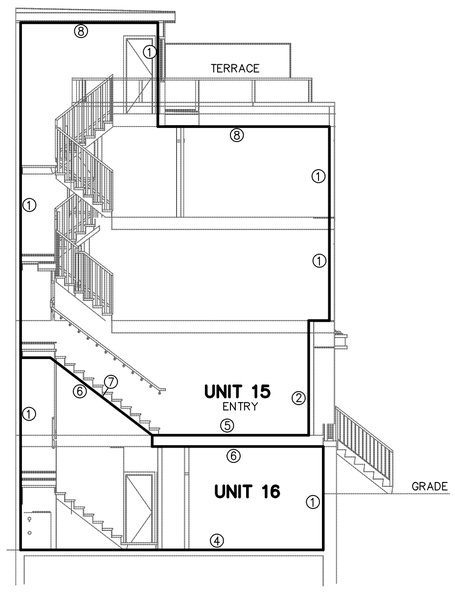


TYPICAL UNIT BOUNDARIES LEGEND

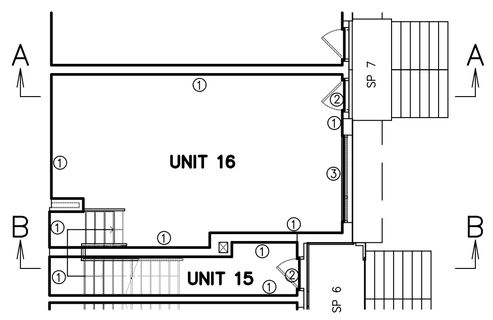
① DENOTES BACKSIDE OF DRYWALL SHEATHING
② DENOTES UNIT SIDE SURFACE OF DOOR AND FRAME
③ DENOTES UNIT SIDE SURFACE OF WINDOW AND FRAME
④ DENOTES UPPER SURFACE OF UNFINISHED CONCRETE FLOOR SLAB
⑤ DENOTES UPPER SURFACE OF UNFINISHED FIRE SEPARATION FLOOR ASSEMBLY
⑥ DENOTES LOWER SURFACE OF UNFINISHED FIRE SEPARATION FLOOR ASSEMBLY
⑦ DENOTES UPPER SURFACE OF UNFINISHED FIRE SEPARATION FLOOR ASSEMBLY BENEATH STAIRS
⑧ DENOTES UPPER SURFACE OF DRYWALL CEILING IN UPPER MOST STOREY



SECTION VIEW A-A ILLUSTRATING TYPICAL VERTICAL RELATIONSHIP OF UPPER AND LOWER UNITS ON LEVEL 1
NOT TO SCALE



SECTION VIEW B-B ILLUSTRATING TYPICAL VERTICAL RELATIONSHIP OF UPPER AND LOWER UNITS ON LEVEL 1
NOT TO SCALE



PLAN VIEW ILLUSTRATING TYPICAL UNIT BOUNDRIES ON LEVEL 1
(AT GRADE)
NOT TO SCALE

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE DEVELOPED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE _____ PRELIMINARY
GEORGE ZERVOS
ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE

I HEREBY CONSENT TO THE SUBMISSION OF THIS PLAN FOR APPROVAL.

MATTAMY (ROCKCLIFFE) INC.

DATE _____ _____

PARTS 1 AND 2 APPROVED AND PARTS 3 AND 4 EXEMPTED UNDER SECTION 9(3) OF THE CONDOMINIUM ACT R.S.O. 1998 AND SECTION 51 OF THE PLANNING ACT, R.S.O. 1993, THIS ___. DAY OF _____ 20 __.

_____
STEPHEN WILLIS, MCIP, RPP
GENERAL MANAGER
PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT
DEPARTMENT, CITY OF OTTAWA

ZONING: R5Y[2457]

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
62 STEACIE DRIVE, SUITE 103, KANATA, ON K2K 2A9
T: (613) 731-7244 F: (613) 254-8659 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
NS	GZ	18-10-037-03
FILE: $FILE$		DATED: 9/8/2020

SCHEDULE			
PARTS	BLOCK	PLAN	PIN
1			
2			
3			
4			
5			
6			
7			
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9			
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22			
23			
24			
25			
26			
27			
28	ALL OF 22	4M-1581	ALL OF 04273-0613 (LT)
29			
30			
31			
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52			

PARTS 1 TO 52 (BOTH INCLUSIVE), ARE SUBJECT TO EASEMENTS AS IN OC1877247 AND OC1877276

PARTS 27 TO 52 (BOTH INCLUSIVE), ARE SUBJECT TO EASEMENT AS IN OC1771382

PART	DIAGRAM No. SHOWING PLAN VIEWS OF PARTS		CROSS-SECTIONS SHOWING VERTICAL EXTENTS OF PARTS	
	1	2	"A"-"A"	"B"-"B"
1	•			
2	•			
3	•			
4	•			
5	•			
6	•			
7	•			
8	•		•	
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45		•		
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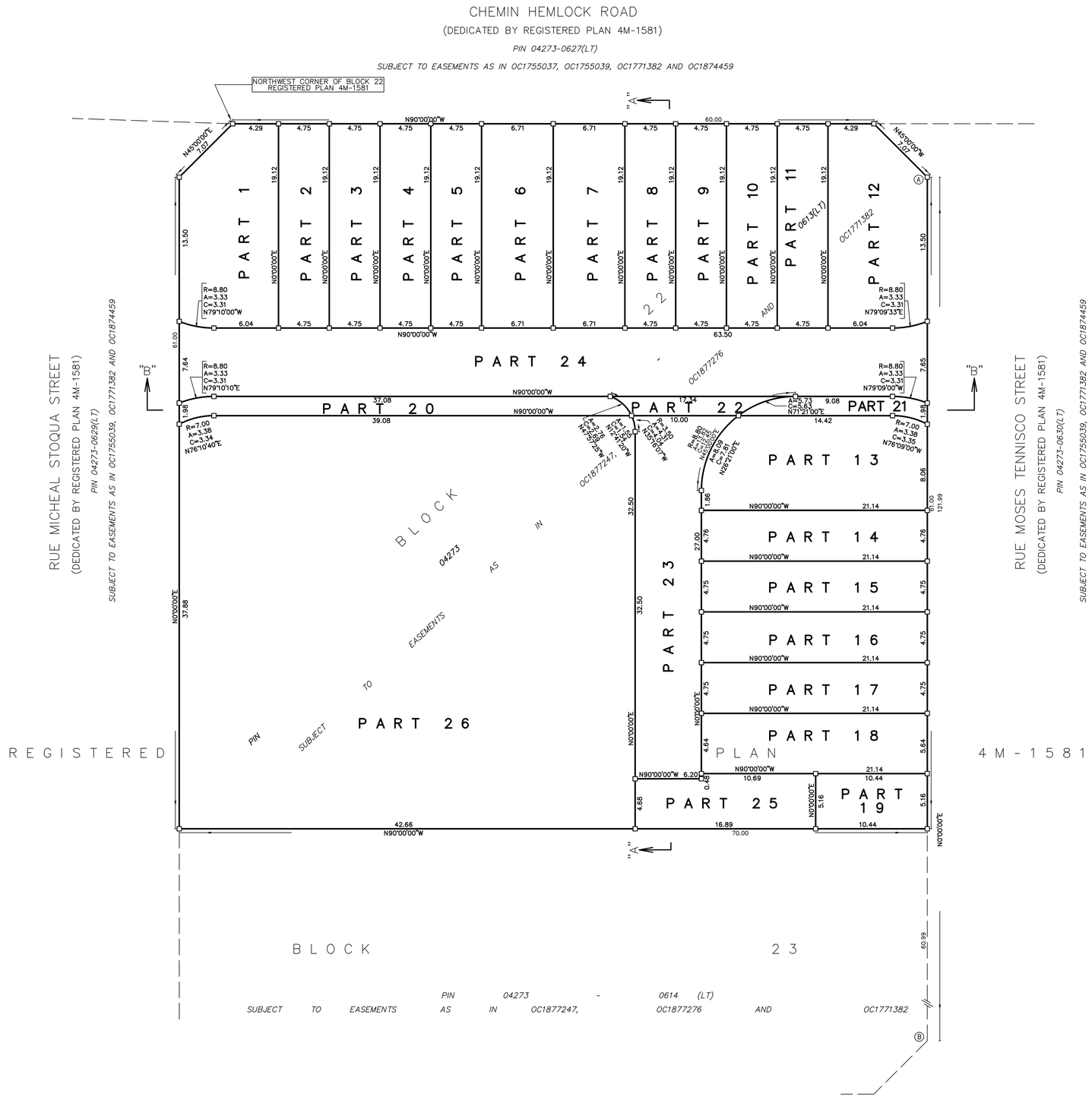
52		•		



STRATA PLAN OF SURVEY OF

BLOCK 22
REGISTERED PLAN 4M-1581
CITY OF OTTAWA

SCALE 1 : 200

5 0 5 10 metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 915mm IN WIDTH BY 609mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:200

J.D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

ALL SET SURVEY MONUMENTS ARE PB'S UNLESS OTHERWISE NOTED.

PARTS 1 TO 26, (INCLUSIVE), ARE ABOVE THE HOROZONTAL PLANE AT THE ELEVATION OF 46.00m.

BEARINGS ARE MTM GRID, REFERED TO OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, MTM ZONE 9, NAD83 (ORIGINAL) (2010.0).

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INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORPs): MTM ZONE 9, NAD83 (ORIGINAL) (2010.0).

COORDINATES TO URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

POINT ID	EASTING	NORTHING
ORP (A)	372863.63	5035139.43
ORP (B)	372863.63	5035017.44

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

ELEVATION NOTE

ELEVATIONS ARE GEODETIC AND ARE ESTABLISHED USING GLOBAL POSITIONING SYSTEM (GPS) EQUIPMENT TO ESTABLISH ELLIPSOIDAL HEIGHTS. ELLIPSOIDAL HEIGHTS WERE TRANSFORMED TO CGVD-1928 DATUM (GEODETIC) USING THE FEDERAL HT2.0 HEIGHT TRANSFORMATION MODEL.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
PB	DENOTES	PLASTIC BAR
WIT	DENOTES	WITNESS
MEAS	DENOTES	MEASURED
JDB	DENOTES	J.D. BARNES LIMITED

ALL SET IB, SIB, SSIB AND PB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11 (4) OF O.REG. 525/91.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN COMPRISING OF 2 SHEETS, ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON , 2020.

DATE

PRELIMINARY
GEORGE ZERVOS
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER XXXXXXX

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
62 STEACIE DRIVE, SUITE 103, KANATA, ON K2K 2A9
T: (613) 731-7244 F: (613) 254-8659 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
NS	GZ	18-10-037-03
FILE: G:\18-10-037\03 - Block 22\PLT\18-10-037-03_R_PLAN.dgn		DATED: 8/21/2020

CHEMIN HEMLOCK ROAD
(DEDICATED BY REGISTERED PLAN 4M-1581
PIN 04273-0627(LT)
SUBJECT TO EASEMENTS AS IN OC1755037, OC1755039, OC1771382 AND OC1874459

RUE MICHEAL STOQUA STREET
(DEDICATED BY REGISTERED PLAN 4M-1581)
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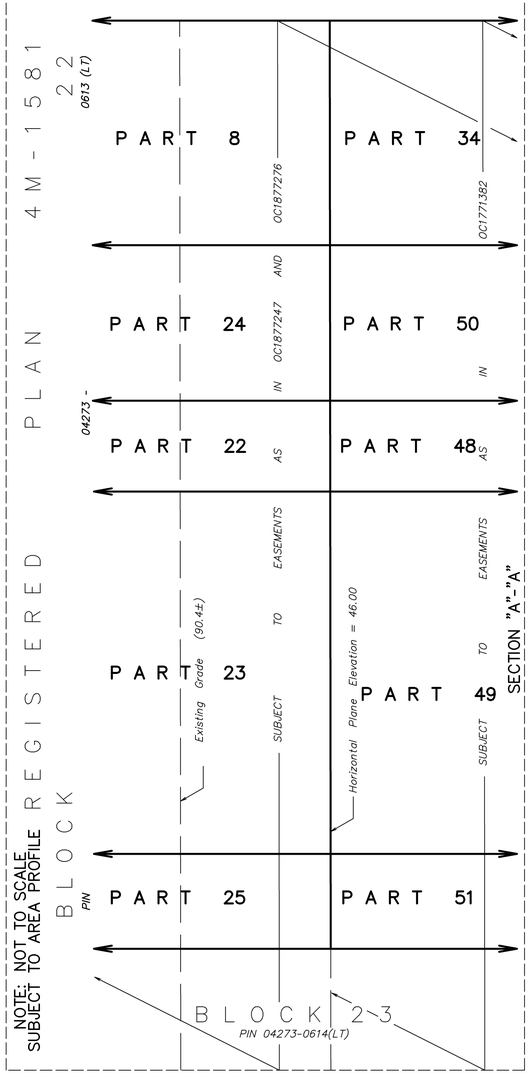
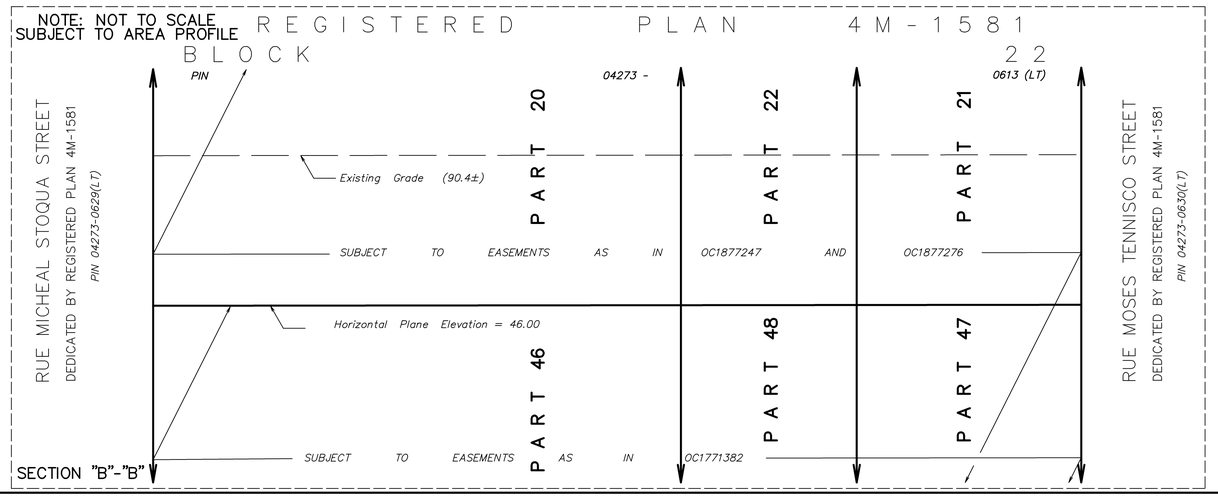
RUE MOSES TENNISCO STREET
(DEDICATED BY REGISTERED PLAN 4M-1581)
PIN 04273-0630(LT)
SUBJECT TO EASEMENTS AS IN OC1755039, OC1771382 AND OC1874459

REGISTERED PLAN 4M-1581





STRATA PLAN OF SURVEY OF
BLOCK 22
REGISTERED PLAN 4M-1581
CITY OF OTTAWA

SCALE 1 : 200
5 0 5 10 metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 915mm IN WIDTH BY 609mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:200

J.D. BARNES LIMITED

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NOTES

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PARTS 26 TO 52, (INCLUSIVE), ARE BELOW THE HOROZONTAL PLANE AT THE ELEVATION OF 46.00m.

BEARINGS ARE MTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, MTM ZONE 9, NAD83 (ORIGINAL) (2010.0).

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INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORPs): MTM ZONE 9, NAD83 (ORIGINAL) (2010.0).

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LEGEND

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□	DENOTES	SURVEY MONUMENT SET
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SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
PB	DENOTES	PLASTIC BAR
WIT	DENOTES	WITNESS
MEAS	DENOTES	MEASURED
JDB	DENOTES	J.D. BARNES LIMITED

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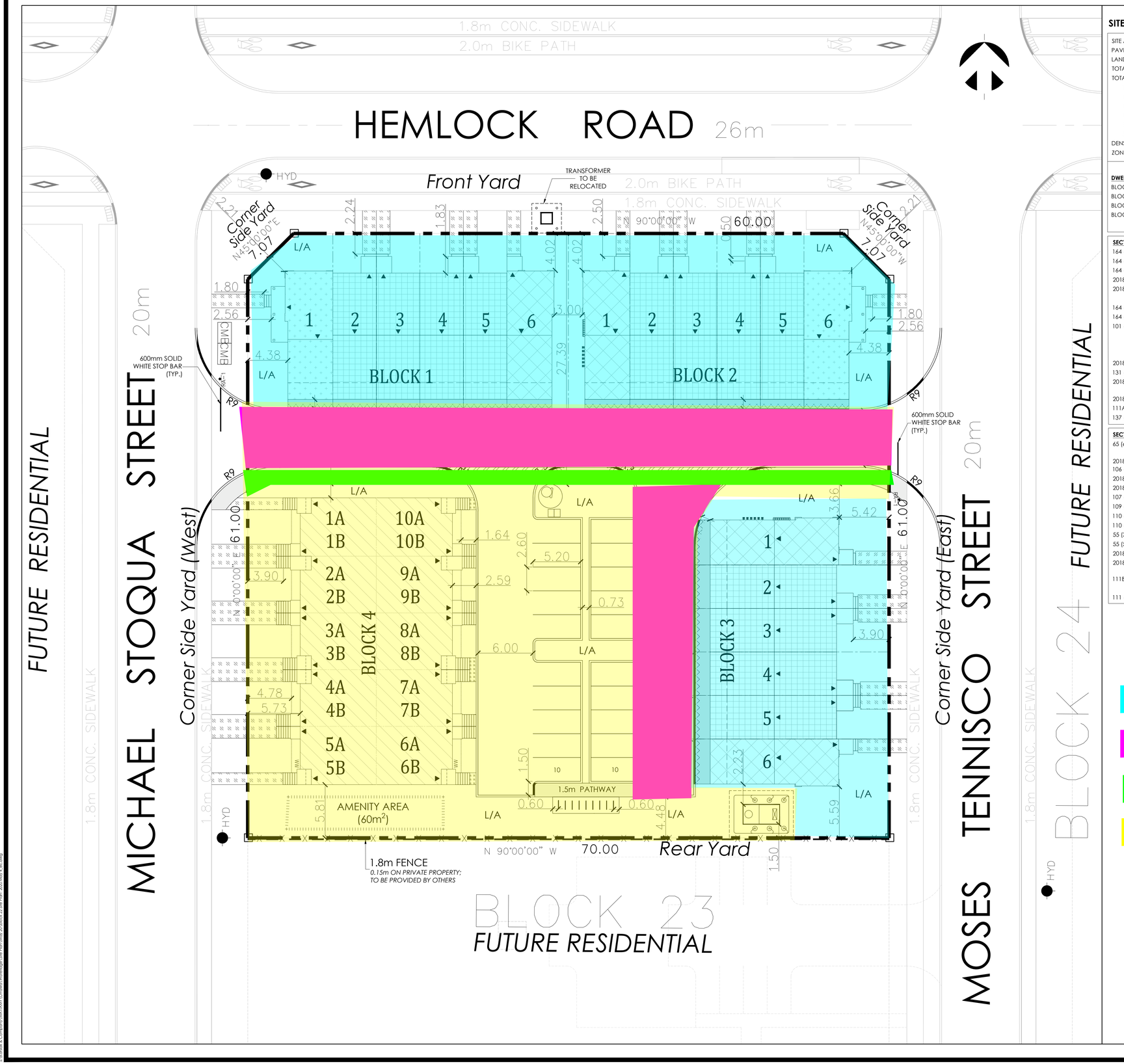
THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER XXXXXXX

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
62 STEACIE DRIVE, SUITE 103, KANATA, ON K2K 2A9
T: (613) 731-7244 F: (613) 254-8659 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
NS	GZ	18-10-037-03

FILE: G:\18-10-037\03 - Block 22\PLY\18-10-037-03_R_PLAN.dgn DATED: 8/21/2020



SITE STATISTICS AND DEVELOPMENT DATA

SITE AREA	4,594.19 m²
PAVED AREA	1,304.28 m² (28%)
LANDSCAPED AREA	1,390.33 m² (30%)
TOTAL BUILDING COVERAGE	1,899.58 m² (42%)
TOTAL GROSS FLOOR AREA	5,981 m²
TYPE A TOWNHOUSE MODEL (4)	680 m²
TYPE B TOWNHOUSE MODEL (3)	447 m²
TYPE C TOWNHOUSE MODEL (2)	342 m²
TYPE D TOWNHOUSE MODEL (2)	332 m²
STACKED TOWNS UPPER MODEL (20)	2,340 m²
STACKED TOWNS LOWER MODEL (20)	1,840 m²
DENSITY (UPH)	82.6
ZONE CATEGORY	R5Y[2457]

DWELLING BLOCK	DWELLING TYPE	GROUND FLOOR AREA (m2)	UNITS
BLOCK 1	REAR LANE TOWNS	402.49	6
BLOCK 2	REAR LANE TOWNS	402.49	6
BLOCK 3	REAR LANE TOWNS	401.88	6
BLOCK 4	STACKED TOWNS	500.72	20
	TOTAL	1,707.58	38

SECTION	ZONE PROVISION - PLANNED UNIT DEVELOPMENT	REQUIRED	PROPOSED
164 (Table)	MIN. LOT WIDTH (m)	N/A	N/A
164 (Table)	MIN. LOT AREA (m²)	1,400 m²	4,594.19 m²
164 (Table)	MAX. BUILDING HEIGHT (m)	11.00 m	10.63 m
2018-124	MIN. FRONT YARD SETBACK (m)	3.00 m	4.02 m
2018-124	MIN. CORNER SIDE YARD SETBACK (m)	East: 1.68 m West: 1.68 m	East: 2.21 m West: 2.21 m
164 (Table)	MIN. REAR YARD SETBACK (m)	5.00 m	5.59 m
164 (Table)	MIN. INTERIOR YARD SETBACK (m)	1.20 m	N/A
101 (Table)	RESIDENT PARKING - TYPE A (12 @ 0.75/unit)	9	12
	TYPE B (2 @ 0.75/unit)	1.5	2
	TYPE C (4 @ 0.75/unit)	3	4
	STACKED (20 @ 0.5/unit)	10	10
2018-124	VISITOR PARKING	0	0
131 (Table)(1)	MIN. WIDTH OF PRIVATE WAY (m)	6.00 m	6.00 m
2018-124	SETBACK OF ANY WALL OF A RES. BUILDING TO PRIVATE WAY (m)	1.00 m	1.00 m
2018-124	MIN. SETBACK OF GARAGE DOOR TO PRIVATE WAY (m)	1.00 m	1.00 m
111A (Table)	BICYCLE PARKING (STACKED TOWNS)	10 (0.5/unit)	9
137 (Table)(7)	MIN. STACKED TOTAL AMENITY AREA (6m² per unit)	120m²	60m²

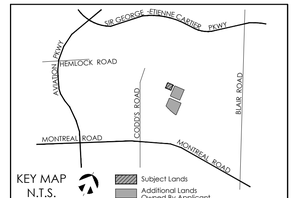
SECTION	ADDITIONAL PROVISIONS	REQUIRED	PROPOSED
65 (6)	PERMITTED PROJECTIONS INTO YARDS: COVERED OR UNCOVERED BALCONY, PORCH, DECK	2.00 m (MAX) >1.0m to lot line	0.50 m 2.50 m
2018-124	FIRE ESCAPES, OPEN STAIRWAYS, STOOP	>0.97m to lot line	1.80 m
106 (1)(a)	MIN. PERPENDICULAR PARKING SPACE SIZE	2.6 x 5.2 m	2.6 x 5.2 m
2018-124	MIN. DRIVEWAY WIDTH TO PARKING LOT (m)	6.00 m	6.00 m
2018-124	MIN. AISLE WIDTH TO SPACES (m)	6.00 m	6.00 m
107 (2)	MIN. DRIVEWAY WIDTH TO GARAGE (m)	2.60 m	4.75 m
109 (3)(b)	MAX. WALKWAY WIDTH PERMITTED IN YARD (m)	1.80 m	1.50 m
110 (Table)	MIN. LANDSCAPE BUFFER WIDTH PARKING LOT TO LOT LINE	1.50 m	4.48 m
110 (3)(b)	MIN. WASTE COLLECTION SETBACK TO LOT LINE (m)	3.00 m	27.39 m
55 (3)(e)(ii)	ACCESSORY STRUCTURE SETBACK (m)	0.60 m	1.50 m
55 (5)	PROJECTION HEIGHT (MAX) (m)	3.20 m	1.80 m
2018-124	UTILITY INSTALLATIONS SETBACK (m)	0.60 m	1.50 m
2018-124	MIN. SEPARATION DISTANCE BETWEEN BUILDINGS WITHIN A PLANNED UNIT DEVELOPMENT (m)	3.00 m	3.00 m
111B (TABLE)	MIN. BICYCLE PARKING SPACE DIMENSIONS (m)	Width: 0.6m Length: 1.8m	0.6m 1.8m
111 (9)	MIN. BICYCLE PARKING SPACE ACCESS WIDTH AISLE (m)	1.5m	1.5m

Freehold RLT w access/servicing through Standard Condo

Vehicle Access Easement/Servicing for RLT (owned by S.C)

Pedestrian Access Easement/ Public Access (owned by S.C)

Standard Condo Corporation



SCALE 1:200 0 2 4 6 8 10 12

LEGEND

- PATHWAY
- WALKWAY TO ENTRY
- CROSSWALK (PAVERS)
- ASPHALT DRIVEWAY
- MOUNTABLE CURB
- CURB (0.2m)
- DEPRESSED CURB
- PORCH
- WINDOW WELL
- PROJECTION (STAIRS)
- L/A LANDSCAPED AREA
- TYPE A TOWNHOUSE (4.75m)
- TYPE B TOWNHOUSE (5.21m)
- TYPE C TOWNHOUSE (5.13m)
- STACKED DWELLING
- PROPOSED LOT BOUNDARY
- BLOCK BOUNDARY
- FENCE
- BIKE RACK
- HYDRO METERS
- GAS METERS
- ENTRANCE
- # UNIT NUMBER
- HYD FIRE HYDRANT
- STOP SIGN
- 3 PHASE TRANSFORMER & SWITCHGEAR
- TRANSFORMER
- CANADA POST MAIL BOX

DATE (D-M-Y)	REVISION	BY
04/05/20	Issue for Detailed Design	EC
25/03/20	Revise Site Plan for Site Plan Amendment	EC
01/03/18	Issue for Third Submission to City	SP
14/12/17	Issue for Second Submission to City	SP
28/07/17	Draft for review	SP

GENERAL NOTES

1. DO NOT SCALE DRAWINGS FOR PRINT.
2. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF KORSIAK URBAN PLANNING AND MATTAMY HOMES. COPYRIGHT RESERVED.
3. SITE PLAN PREPARED IN ACCORDANCE WITH PLAN 4M-1581 AND PLAN 4R-30196, PREPARED BY ANNIS O'SULLIVAN, VOLLEBEKK LTD.
4. TOWNHOUSE DWELLING UNITS ARE DESIGNED TO ACCOMMODATE CURBSIDE GARBAGE PICK-UP.
5. WALKWAYS AND CURBS TO BE TIED INTO PUBLIC ROW WHERE APPLICABLE.
6. REFERENCES CITY OF OTTAWA T.W.S.I. DETAIL SC7.3

PROJECT TEAM

SITE PLAN DESIGN: KORSIAK Urban Planning
LANDSCAPE ARCHITECTURE: NAK design strategies
MECHANICAL/ ELECTRICAL: LRJ
PLANNING: Stantec
TRANSPORTATION: NOVATECH
ARCHITECTURE: Q4A
NOISE: VALCOUSTICS Canada Ltd.
ENVIRONMENTAL: KILGOUR & Associates
CIVIL ENGINEER: DSEL
GEOTECHNICAL & STRUCTURAL: paterson group

mattamyHOMES

WATERIDGE VILLAGE: PHASE 1B
1400 HEMLOCK ROAD
BLOCK 22
PART OF LOTS 22 AND 23
CONCESSION 1 (OTTAWA FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
REGISTERED PLAN 4M-1559
CITY OF OTTAWA

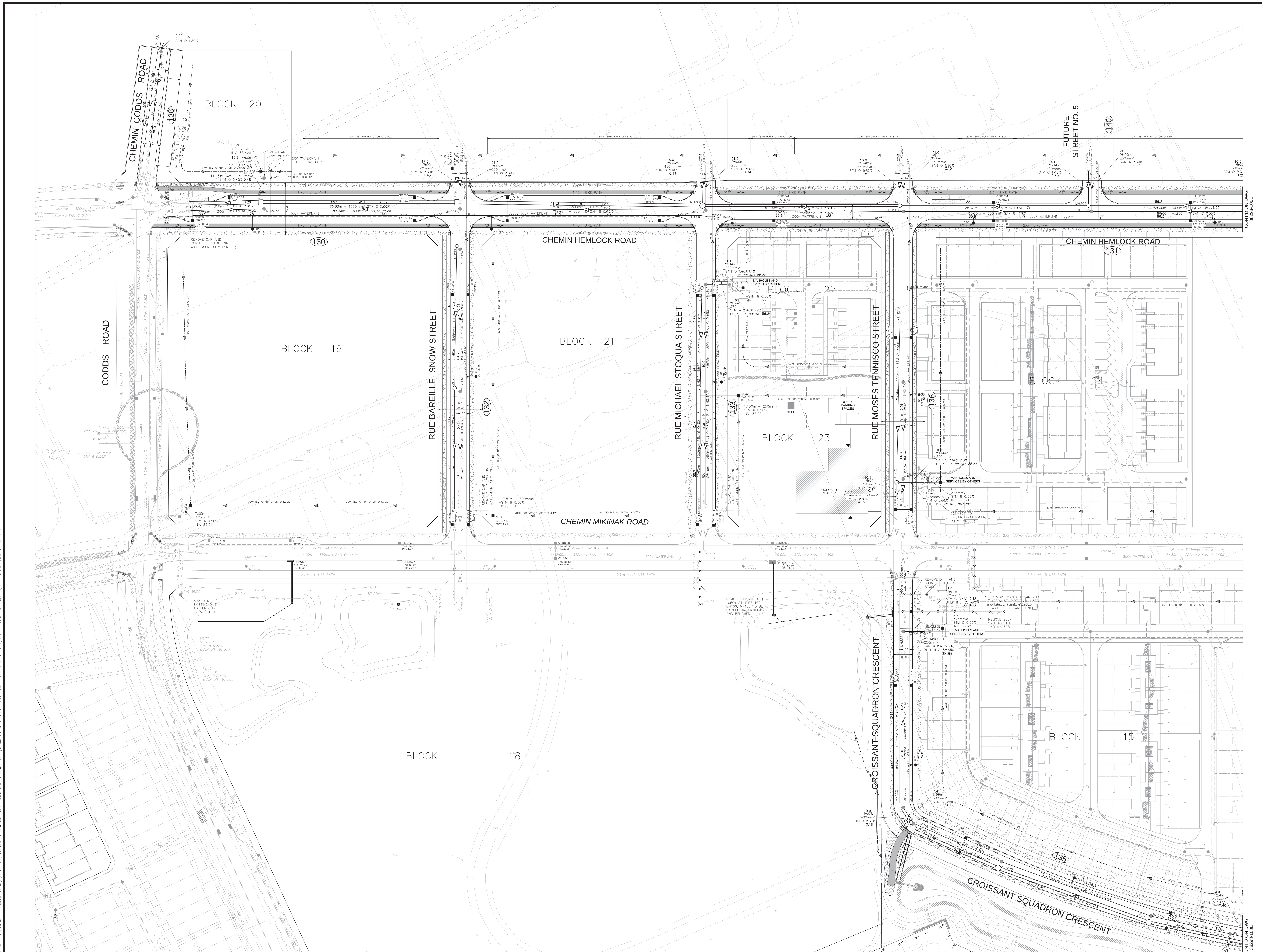
TITLE: BLOCK 22 SITE PLAN

DATE: May 4, 2020 | DRAWN BY: EC | CHECKED BY: CR | DRAWING NO.: A2
FILE NO.: D07-12-17-0111
JOB NO.: Mattamy - Wateridge

D07-12-17-0111

DWG #17691

X:\Urban & Company\MATTAMY\Ottawa\Wateridge\Site Plan\Misc 20\Block 22 Site Plan- 2020 May 4_4r.dwg

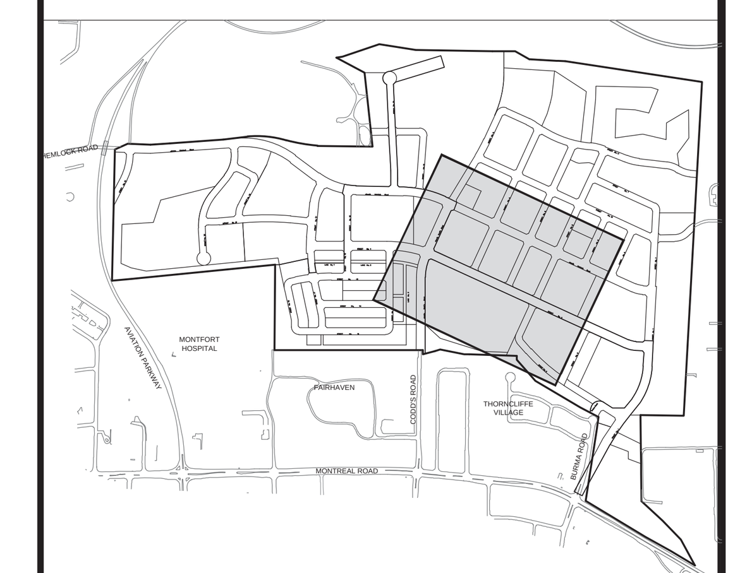


REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________ 2017

Plan Number ______________________



No.	REVISIONS	By	Date
14			
13			
12	AS BUILT	J.I.M.	2018:06:15
11	REVISED DITCH INLET LOCATION FOR BLOCKS 15, 18, 22 AND 24	J.I.M.	2018:02:02
10	REVISED CB222C & CB222D LOCATION	J.I.M.	2017:11:13
9	REVISED PER MATTAMY DESIGN FOR BLOCKS 22, 24 AND 15	J.I.M.	2017:09:15
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3	SUBMISSION No.3 FOR CITY REVIEW	J.I.M.	2017:01:25
2	SUBMISSION No.2 FOR CITY REVIEW	J.I.M.	2016:11:04
1	SUBMISSION No.1 FOR CITY REVIEW	J.I.M.	2016:07:08

CANADA LANDS COMPANY
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Ottawa, On K1P 5L4
613 998 7777

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
18/06/15
PROVINCE OF ONTARIO

N

Drawing Title

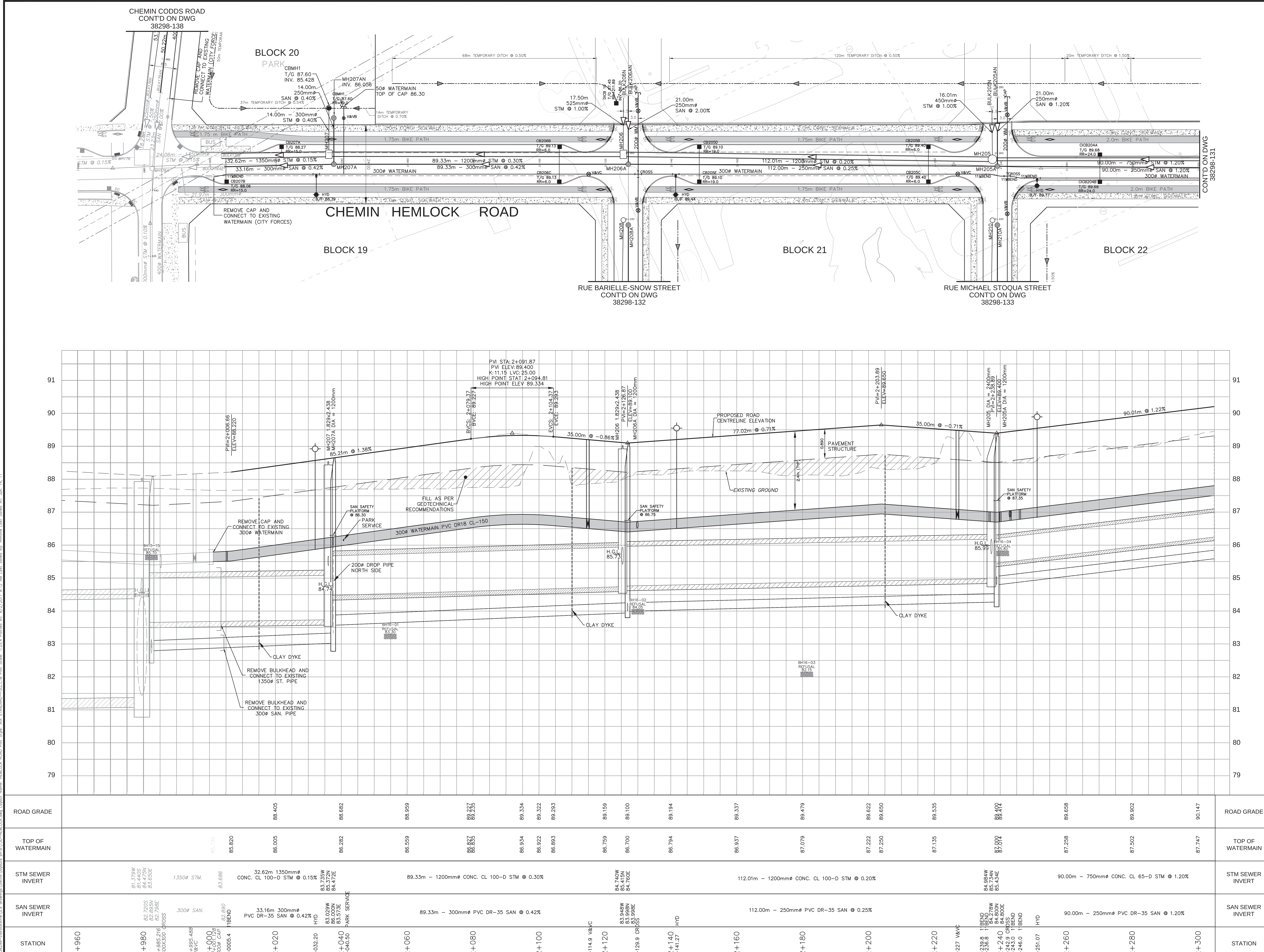
GENERAL PLAN OF SERVICES

Scale 1 : 750

Design	Date
J.I.M.	MAY 2016
Drawn: M.M.	Checked: J.I.M.
Project No.: 38298	Drawing No.: 100D

D07-16-15-0003

#17063



REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________ 2017

Plan Number ______________________

No.	REVISIONS	By	Date
14			
13			
12			
11			
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Project Title
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/08/02
PROVINCE OF ONTARIO

N

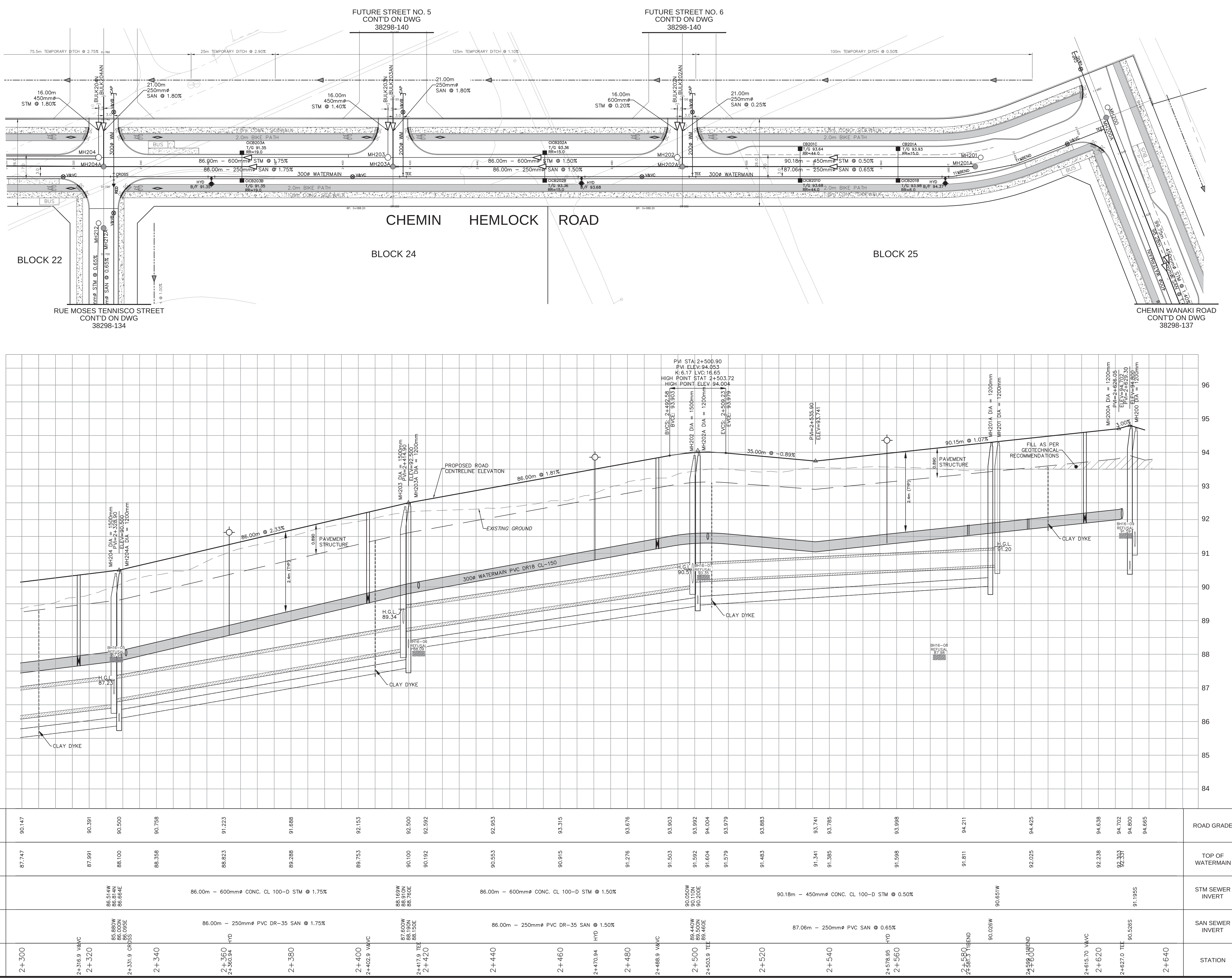
Drawing Title
HEMLOCK ROAD
STA. 1+960 TO 2+300

Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

Design	Date
J.I.M.	MAY 2016
Drawn	**Checked**
M.M.	J.I.M.
Project No.	**Drawing No.**
38298	130

D07-16-15-0003

#17063

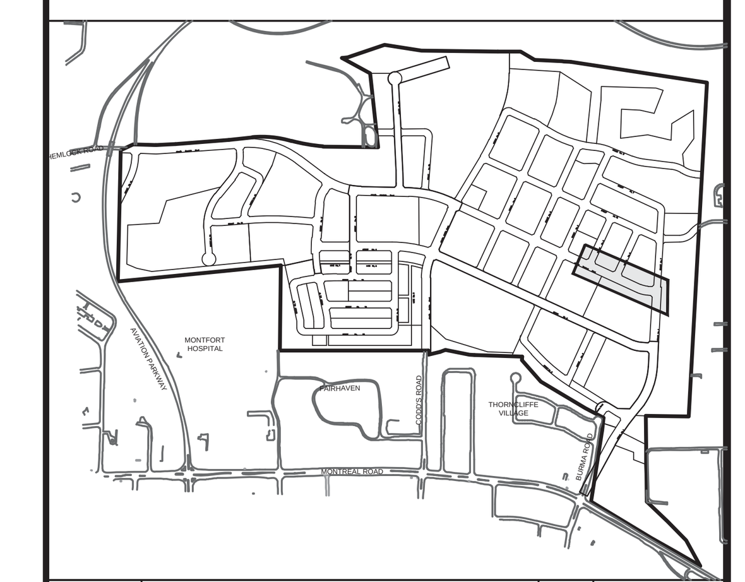


REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________ 2017

Plan Number ______________________



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ibigroup.com

Project Title
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/08/02
PROVINCE OF ONTARIO

N

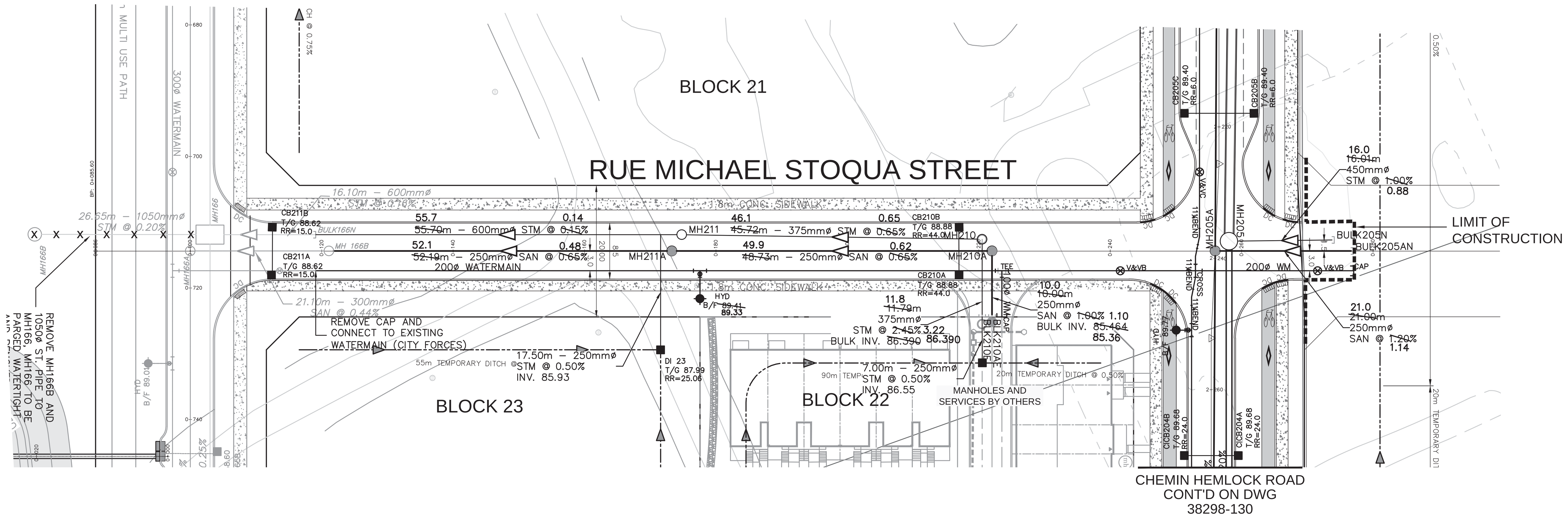
Drawing Title
HEMLOCK ROAD
STA. 2+300 TO WANAKI ROAD

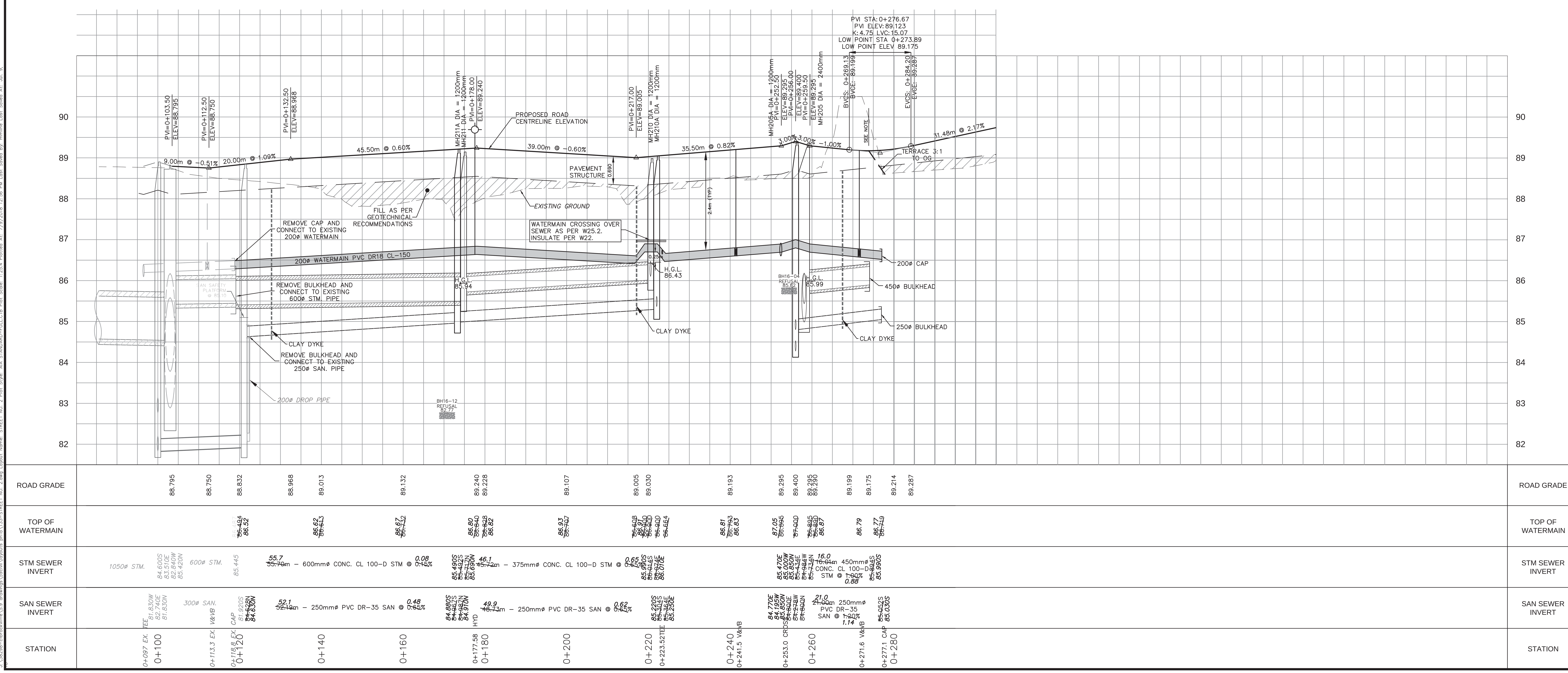
Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

Design	Date
J.I.M.	MAY 2016
Drawn	**Checked**
M.M.	J.I.M.
Project No.	**Drawing No.**
38298	131

D07-16-15-0003

#17063





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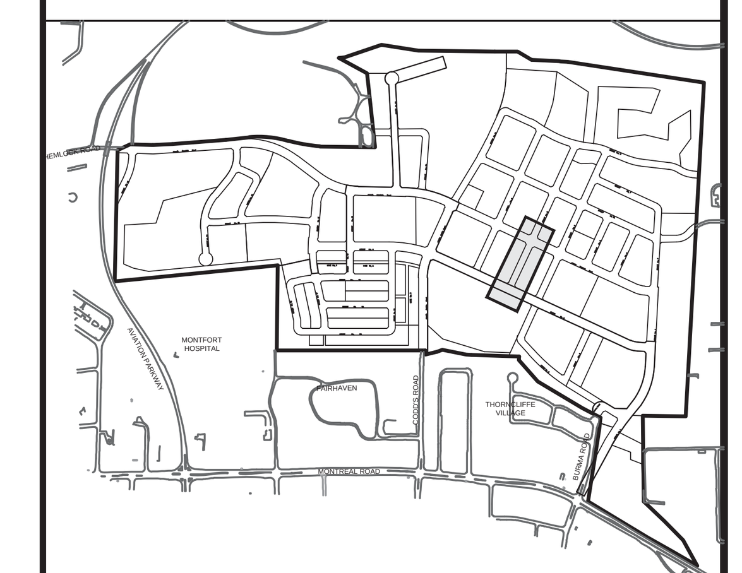
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________________

Date ______________________ 2017

Plan Number ______________________

NOTE:
FROM ±STA. 0+277-FUTURE ROAD CENTRE LINE PROFILE IS PROVIDED FOR CONTINUITY.



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ibigroup.com

Project Title
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
18/06/15
PROVINCE OF ONTARIO

N

Drawing Title
MICHAEL STOQUA STREET
MIKINAK ROAD TO HEMLOCK ROAD

Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	133

D07-16-15-0003

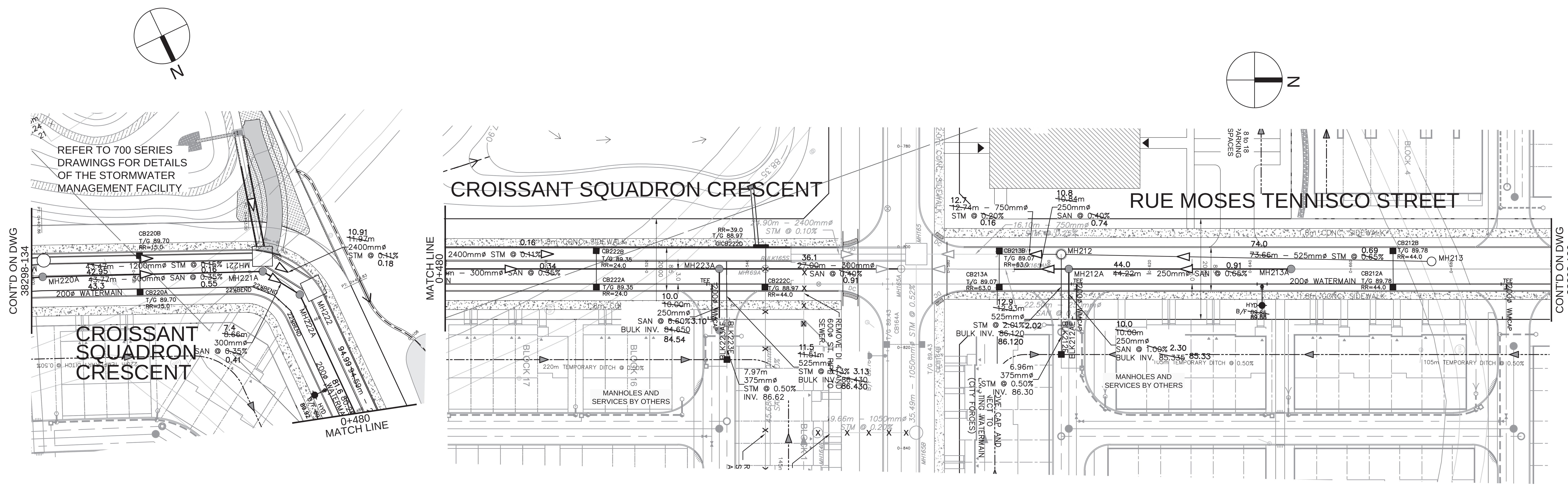
#17063

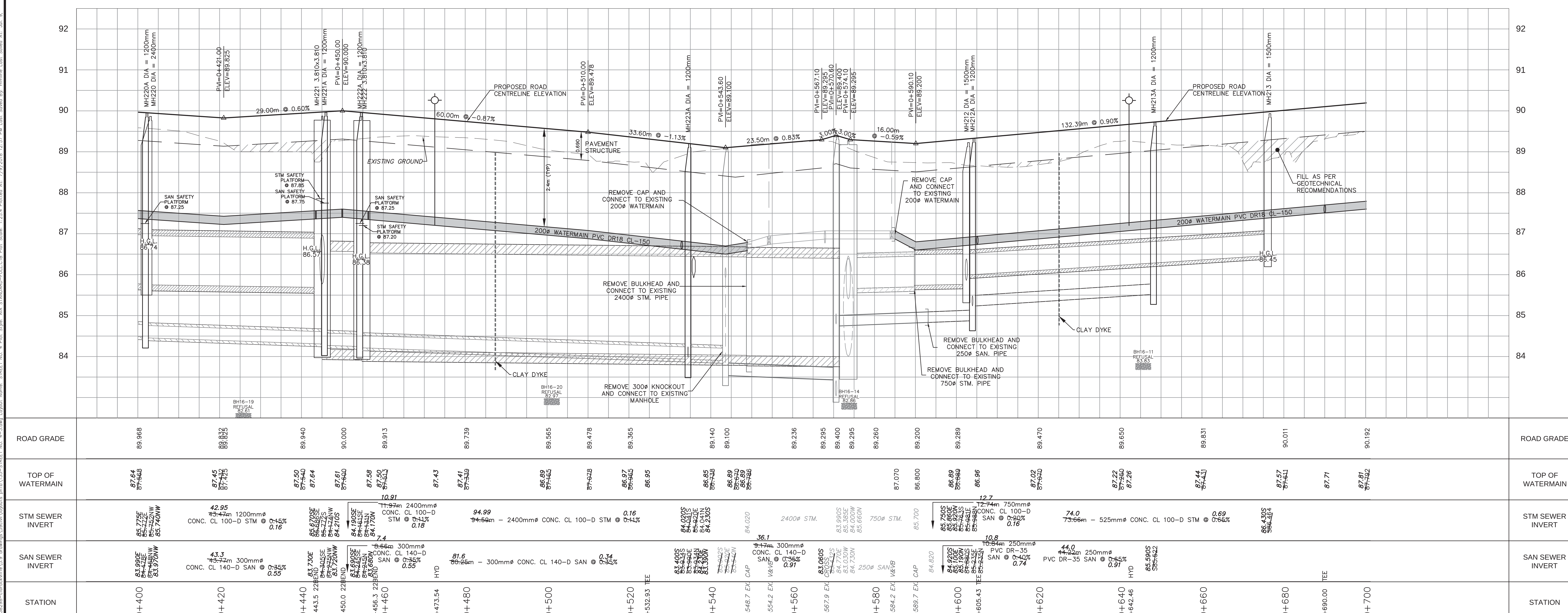
REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

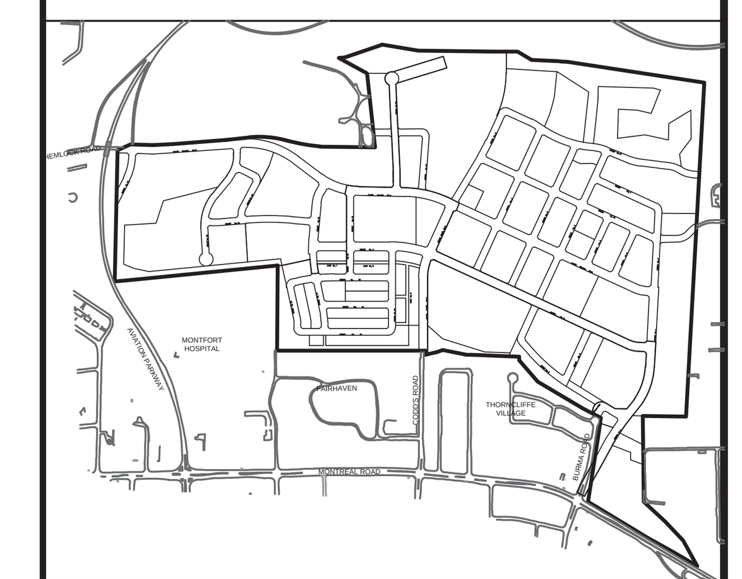
Signed ____________________

Date ____________________ 2017

Plan Number ____________________







No.	REVISIONS	By	Date
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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE

PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
18/06/15
PROVINCE OF ONTARIO

Drawing Title

SQUADRON CRESCENT MOSES TENNISCO STREET

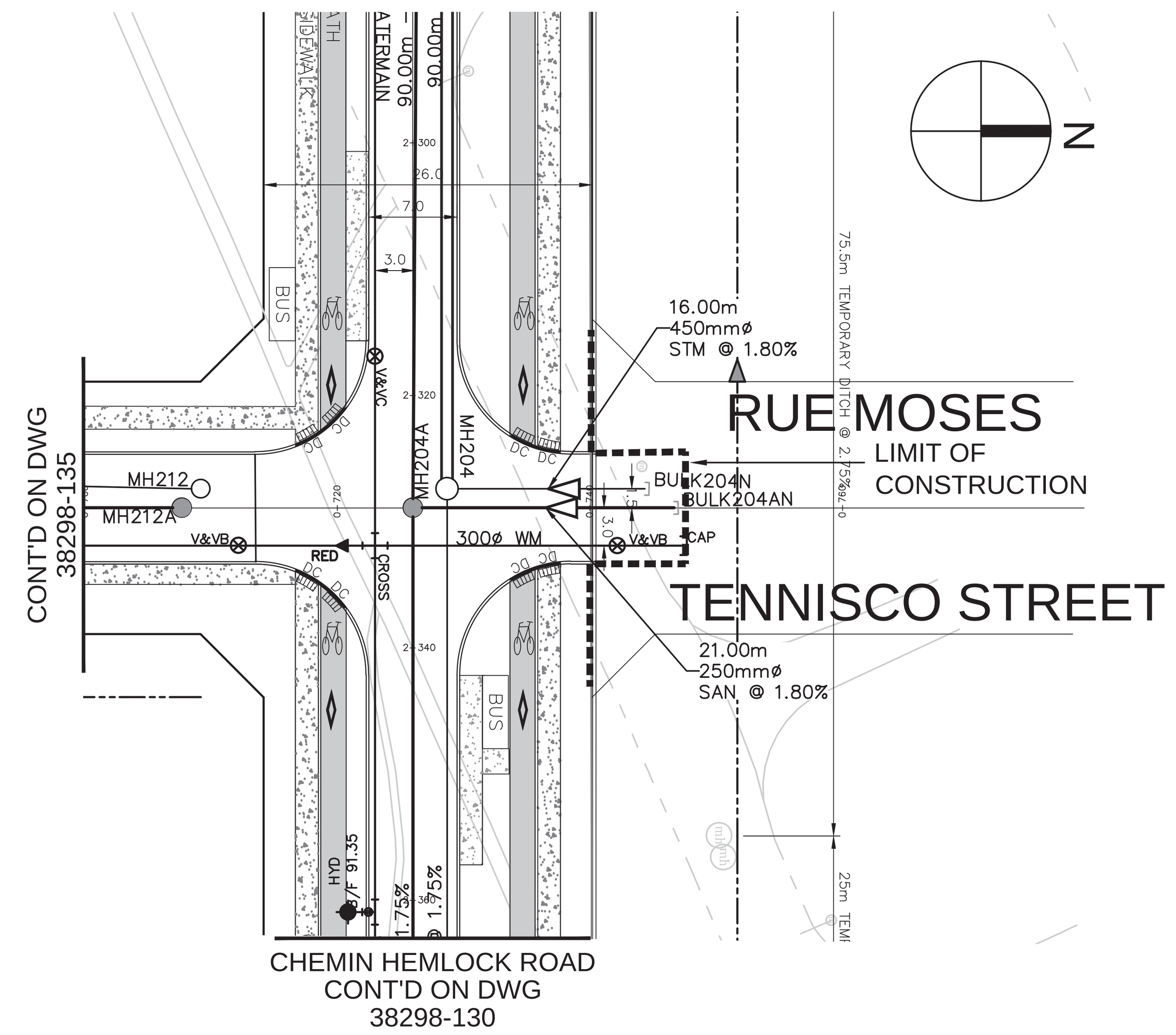
STA. 0+400 TO STA. 0+700

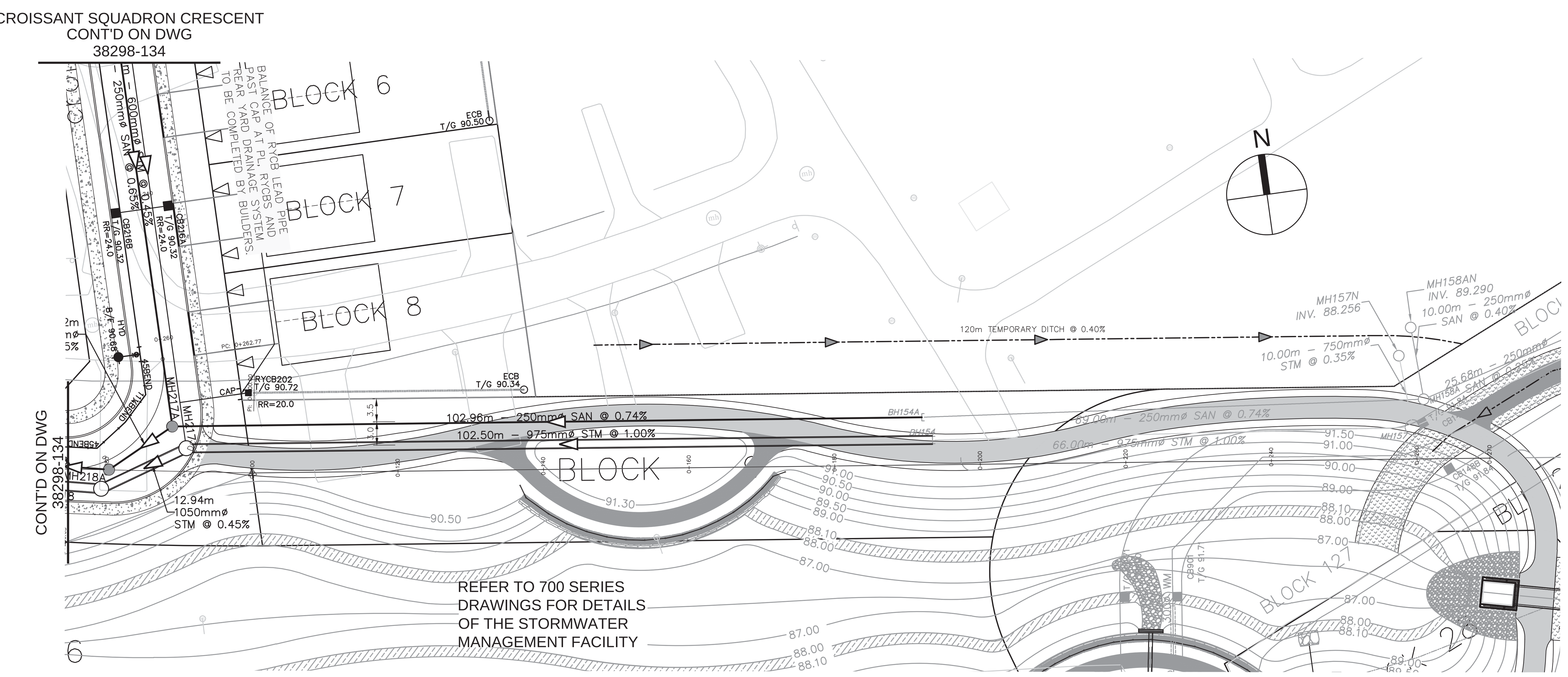
Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

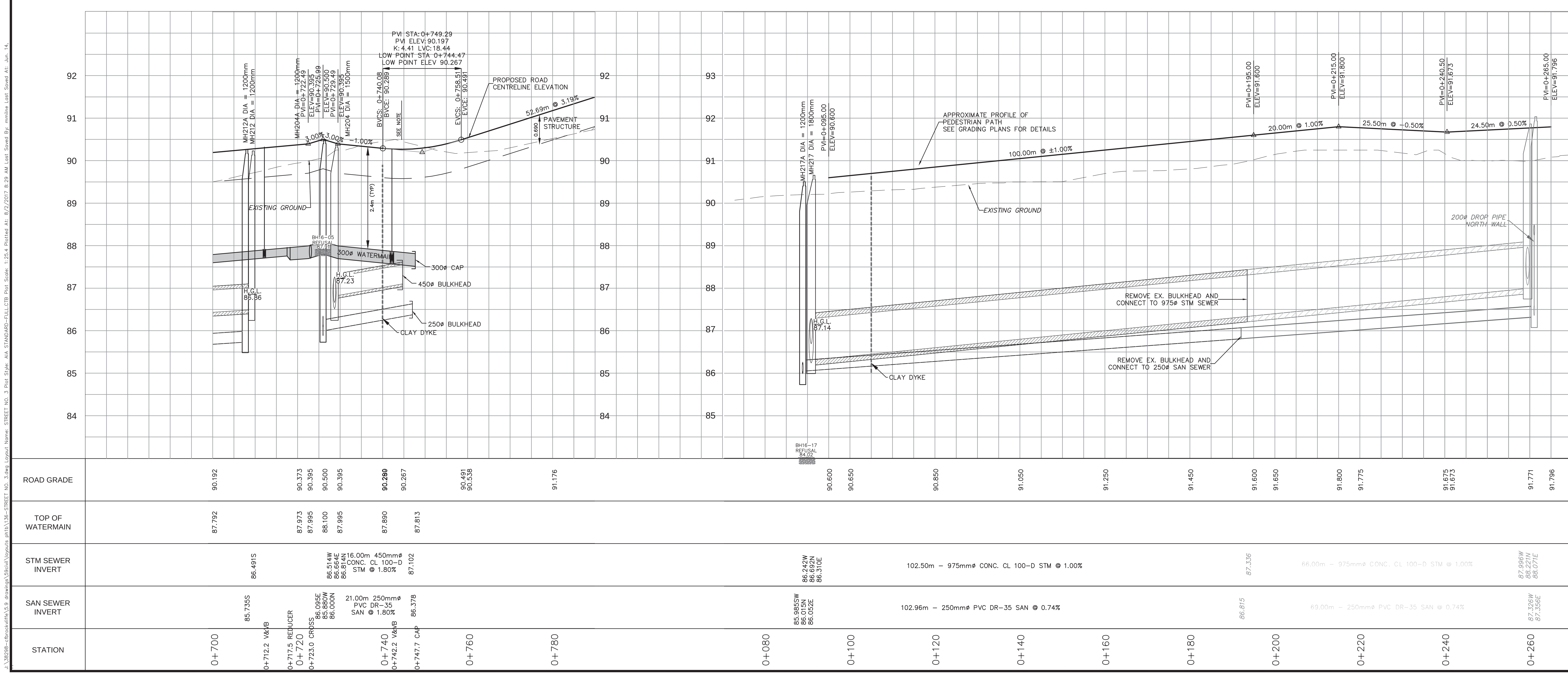
Design: J.I.M.
Date: MAY 2016
Drawn: M.M.
Checked: J.I.M.
Project No.: 38298
Drawing No.: 135

D07-16-15-0003

#17063



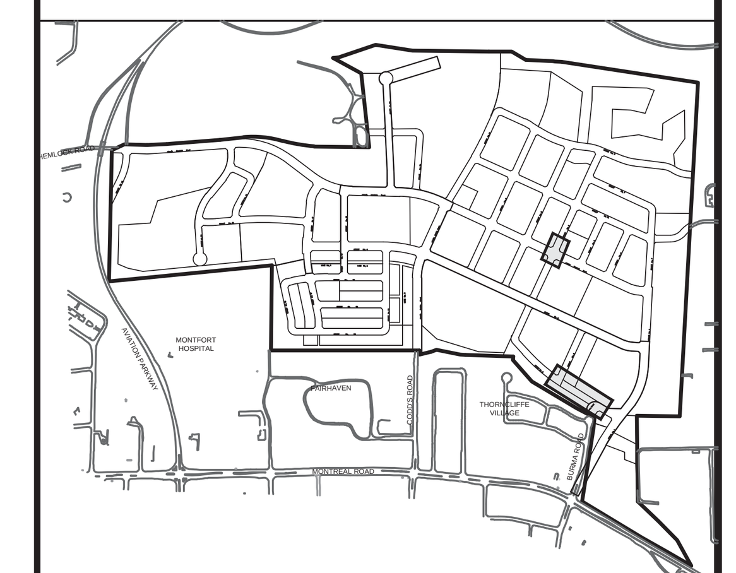




REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ______________
Date ______________ 2017
Plan Number ______________

NOTE:
FROM ±STA. 0+747.7-FUTURE ROAD CENTRE LINE PROFILE IS PROVIDED FOR CONTINUITY.



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Project Title
WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
17/08/02
PROVINCE OF ONTARIO

Drawing Title
MOSES TENNISCO STREET
STA. 0+700 TO STA. 0+780

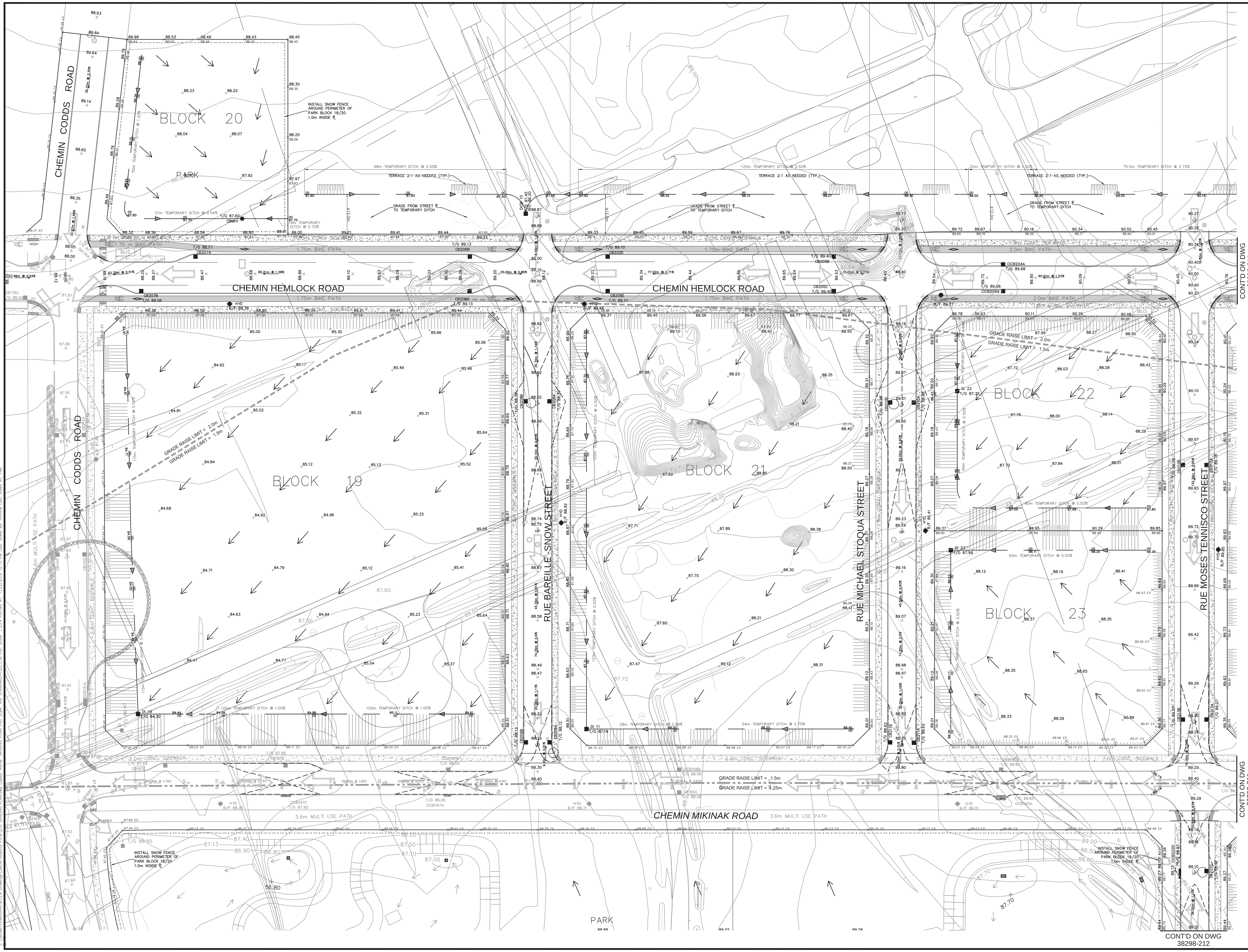
BLOCK 9

Scale
HORIZ. SCALE 1 : 500
VERT. SCALE 1 : 50

Design	Date
J.I.M.	MAY 2016
Drawn	**Checked**
M.M.	J.I.M.
Project No.	**Drawing No.**
38298	136

D07-16-15-0003

#17063



GRADING & DRAINAGE
APPROVED

Signed ____________________

Date ____________________2017

NOTES:

FOR GRADING LEGEND, DETAILS AND CROSS SECTIONS REFER TO DRAWINGS 38298-015 & 38298-016.

THE PROPOSED PARK BLOCK GRADING IS TEMPORARY AND ENSURES THE PROPERTY WILL HAVE POSITIVE DRAINAGE UNTIL THE FINAL PARK GRADING DESIGN IS IMPLEMENTED.

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14			
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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
18/02/02
PROVINCE OF ONTARIO

N

Drawing Title

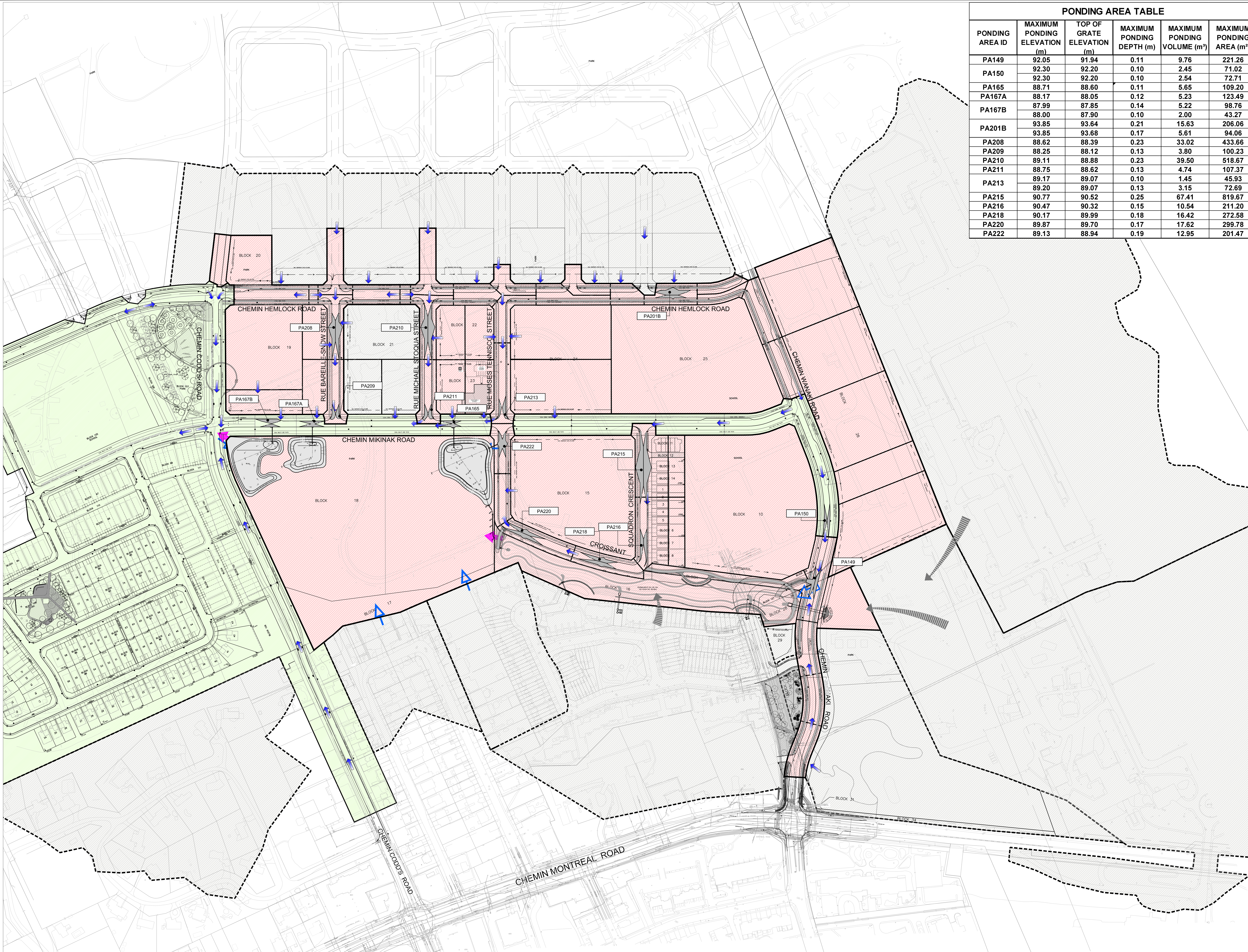
GRADING PLAN

Scale 1 : 500

Design	Date
J.I.M.	MAY 2016
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
38298	210

D07-16-15-0003

#17063



PONDING AREA TABLE

PONDING AREA ID	MAXIMUM PONDING ELEVATION (m)	TOP OF GRATE ELEVATION (m)	MAXIMUM PONDING DEPTH (m)	MAXIMUM PONDING VOLUME (m^3)	MAXIMUM PONDING AREA (m^2)
PA149	92.05	91.94	0.11	9.76	221.26
PA150	92.30	92.20	0.10	2.45	71.02
	92.30	92.20	0.10	2.54	72.71
PA165	88.71	88.60	0.11	5.65	109.20
PA167A	88.17	88.05	0.12	5.23	123.49
PA167B	87.99	87.85	0.14	5.22	98.76
	88.00	87.90	0.10	2.00	43.27
PA201B	93.85	93.64	0.21	15.63	206.06
	93.85	93.68	0.17	5.61	94.06
PA208	88.62	88.39	0.23	33.02	433.66
PA209	88.25	88.12	0.13	3.80	100.23
PA210	89.11	88.88	0.23	39.50	518.67
PA211	88.75	88.62	0.13	4.74	107.37
PA213	89.17	89.07	0.10	1.45	45.93
	89.20	89.07	0.13	3.15	72.69
PA215	90.77	90.52	0.25	67.41	819.67
PA216	90.47	90.32	0.15	10.54	211.20
PA218	90.17	89.99	0.18	16.42	272.58
PA220	89.87	89.70	0.17	17.62	299.78
PA222	89.13	88.94	0.19	12.95	201.47

REVIEWED BY
DEVELOPMENT REVIEW SERVICES BRANCH

Signed ____________________

Date ____________________ 2016

Plan Number ____________________

LEGEND:

- PHASE 1B DRAINAGE AREA
- PHASE 1A DRAINAGE AREA
- EXTERNAL DRAINAGE AREA
- PA116 — POND ID
- MAJOR FLOW
- TOTAL FLOW
- MAJOR FLOW TO PARK DRY POND
- MAJOR FLOW TO BURMA SWMF
- EMERGENCY OVERLAND FLOW
- MH136 MANHOLE ID

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6	REVISED PER CITY COMMENTS	J.I.M.	2017:06:16
5	REVISED PER MOECC COMMENTS	J.I.M.	2017:06:07
4	SUBMISSION FOR MOECC APPROVAL	J.I.M.	2017:02:16
3	SUBMISSION No.3 FOR CITY REVIEW	J.I.M.	2017:01:25
2	SUBMISSION No.2 FOR CITY REVIEW	J.I.M.	2016:11:04
1	SUBMISSION No.1 FOR CITY REVIEW	P.S.	2016:07:11

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Project Title

WATERIDGE VILLAGE AT ROCKCLIFFE
PHASE 1B

J.I. MOFFATT
17/06/16

N

Drawing Title

PONDING PLAN

Scale 1:2000

Design	Scale
P.S.	JULY 2016
Drawn	Checked
S.V.	P.S.
Project No.	Drawing No.
38298	751

D07-16-15-0003

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