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SITE SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

10731854 CANADA INC.
788 MARCH ROAD

CITY OF OTTAWA

PROJECT NO.: 18-1039
CITY APPLICATION NO.: D07-12-18-0128

OCTOBER 2020 – REV 4

SITE SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
788 MARCH ROAD

10731854 CANADA INC.

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by 10731854 Canada Inc. to prepare a Site Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 788 March Road.

The subject property is located within the City of Ottawa urban boundary, in the Kanata North ward. As illustrated in ***Figure 1***, below, the subject property is bounded by Klondike Road to the north-west, March Road to the south-west, an existing church to the north-east and an existing residential lot to the south-east. Shirley's Brook lies within the site area; hence, the subject property lies within the floodplain overlay. The subject property measures approximately ***1.22 ha*** and is designated General Mixed-Use Zone (GM) under the current City of Ottawa zoning by-law. The development is restricted to the parameters of remaining outside of the 30 m setback from the Shirley's Brook Creek and the MVCA floodplain of ***74.00 m***, thus, the total development area is equal to ***0.59 ha***.

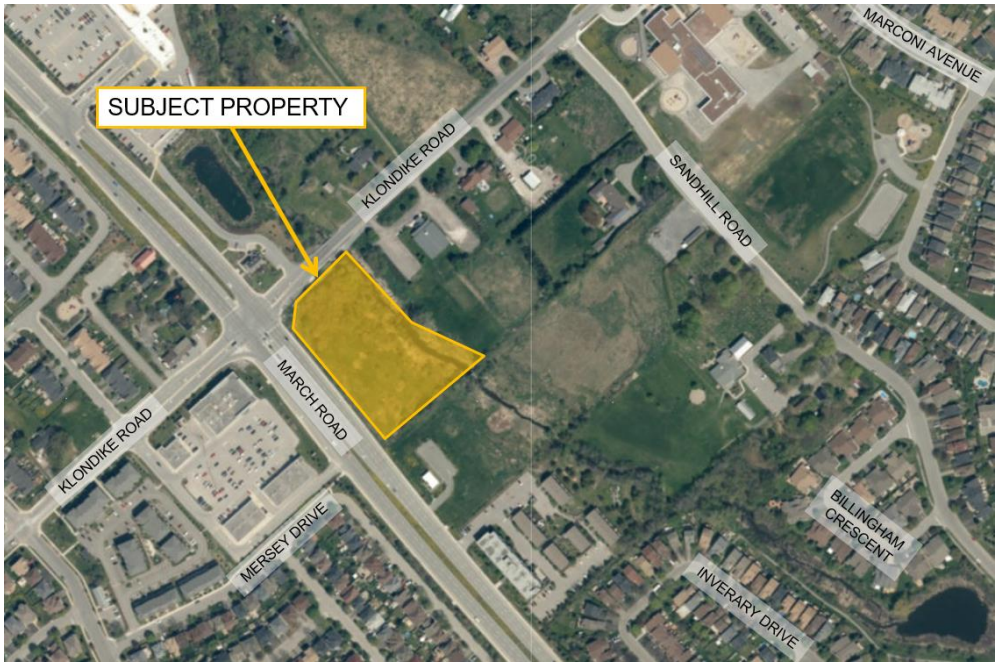

Figure 1: Site Location

The proposed development involves the construction of two, 4-storey apartment buildings consisting of a combined total of ***92 units***, an underground parking garage and a shared visitor parking lot. The development includes approximately ***260 m^2*** of amenity space.

The objective of this report is to support the application for Site Plan Control by providing sufficient detail to demonstrate the proposed development are supported by existing and proposed municipal servicing infrastructure and that the site design conforms to current City of Ottawa design standards.

1.1 Existing Conditions

The subject site is currently a vacant parcel consisting of grassy areas and a few trees. Shirley's Brook Creek, tributary to the Ottawa River, also lies within the subject site.

Sewer system and watermain distribution mapping collected from the City of Ottawa indicate that the following services exist across the property frontages, within the adjacent municipal right-of-ways:

Klondike Road:

- 406 mm diameter PVC watermain; and
- 750 mm diameter storm sewer, west of March Road.

March Road:

- 406 mm diameter PVC watermain;
- 675 mm and 825 mm diameter storm sewers, east of Klondike Road; and
- 1800 mm diameter storm sewer, west of Klondike Road.

Mersey Drive:

- 203 mm diameter watermain;
- 200 mm diameter sanitary sewer; and
- 525 mm diameter storm sewer.

1.2 Required Permits / Approvals

Development of the site is subject to the City of Ottawa Planning and Development Approvals process. The City of Ottawa must approve detailed engineering designs, drawings and reports prepared to support the proposed development plan.

The subject property contains existing trees. Development, which may require removal of existing trees, maybe subject to the City of Ottawa Urban Tree Conservation By-law No. 2009-200.

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 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 ISDTB-2014-01**
    City of Ottawa, February 5, 2014.
    (ITSB-2014-01)

  - **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)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, October 2012.
  (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 ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (ISDTB-2018-02)

- **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)

- **Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems**
  National Fire Protection Association
  2014 Edition.
  (NFPA 25)

- **Drainage Management Manual**
  Ministry of Transportation of Ontario (MTO), 1997.
  (MTO Drainage Manual)

- **Shirley's Brook Stormwater Management Facility 1 – West Design Brief**
  David McManus Engineering Ltd., April 15, 2009.
  (Shirley's Brook SWM Design Brief)

- **Due Diligence Servicing Brief, 788 March Road, Ottawa, Ontario**
  J.L.Richards, January 25, 2018.
  (Due Diligence Servicing Brief)

- **Kanata North Community Design Plan – Master Servicing Study**
  Novatech, June 28 2016.
  (KNCDP-MSS)

- **March Road Reconstruction Minor System Drainage Plan**
  Stantec, City of Ottawa Contract No. 163600607, dated June 2009.

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 2W2C pressure zone, as shown by the Pressure Zone map in ***Appendix B***. 406 mm diameter watermains exists within the March Road and Klondike Road right-of-ways. Refer to water distribution mapping included in ***Appendix B***.

3.2 Water Supply Servicing Design

The subject property is proposed to be serviced through a single connection to the existing 406 mm municipal watermain located within March Road. Refer to drawing ***SSP-1***, accompanying this report, for a detailed water servicing layout.

Table 1, below, summarizes the ***Water Supply Guidelines*** employed in the preparation of the water demand estimate.

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Demand	280 L/p/d
Residential Average Apartment	1.8 P/unit
Residential Maximum Daily Demand	3.6 x Average Daily *
Residential Maximum Hourly	5.4 x Average Daily *
Amenity Space	2.5 L/m^2/d
Amenity Maximum Daily Demand	1.5 x avg. day
Amenity Peak Hour Demand	1.8 x max. day
Minimum Watermain Size	150 mm diameter
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	275 kPa
During normal operating conditions pressure shall not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa
** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.* *** Table updated to reflect ISD-2018-2*	

Table 2, below, summarizes the estimated water supply demand and boundary conditions for the proposed development based on the ***Water Supply Guidelines***.

Table 2
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Estimated Demand[1] (L/min)	Boundary Condition[2] March Road (m H_2O / kPa)
Average Daily Demand	32.7	134.2 / 550.3
Max Day + Fire Flow	116.9 + 12,000 = 12,116.9	126.0 / 469.9
Peak Hour	175.5	126.5 / 474.8

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 78.1 m. See ***Appendix B.***

Fire flow requirements are to be determined in accordance with City of Ottawa ***Water Supply Guidelines*** and the Ontario Building Code.

Fire flow requirements were estimated per City of Ottawa Technical Bulletin ***ISTB-2018-02***. The following parameters were coordinated with the architect:

- Type of construction – Wood Frame Construction;
- Occupancy type – Limited Combustibility; and
- Sprinkler Protection – Supervised Sprinkler System.

The above assumptions result in an estimated fire flow of approximately ***12,000 L/min***. A certified fire protection system specialist will need to be employed to design the building fire suppression system and confirm the actual fire flow demand.

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in the boundary request correspondence included in ***Appendix B***. The water calculations provided along with the boundary condition request have been revised to align with the daily consumption rate of 280 L/person/day identified by City of Ottawa Technical Bulletin ISTB-2018-03. As a result, the estimated water demand for the site decreased by approximately 20%. It is not anticipated to have a significant impact on the previously provided boundary conditions.

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow demand for the demands indicated by the correspondence in ***Appendix B***. As shown by ***Table 2,*** above, the minimum and maximum pressures fall within the required range identified in ***Table 1***.

In accordance with City of Ottawa technical bulletin **ISDTB-2014-02**, redundant service connections will be required due to an estimated average daily demand greater than 50 m^3/day. As identified by ***Table 2***, the development proposes an average daily demand of 47 m^3/day, therefore a redundant connection is not required.

A hydrant has been added near the intersection of March Road and Klondike Road to provide adequate fire protection for the proposed development. The fire hydrant has been designed in accordance with ***ISTDB-2018-02***. Refer to drawing ***SSP-1***, accompanying this report, for the proposed location.

3.3 Water Supply Conclusion

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in the boundary request correspondence included in ***Appendix B***. The water calculations provided along with the boundary condition request have been revised to align with the daily consumption rate of 280 L/person/day identified by City of Ottawa Technical Bulletin ISTB-2018-03. As a result, the estimated water demand for the site decreased by approximately 20%. It is not anticipated to have a significant impact on the previously provided boundary conditions.

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow demand for the demands indicated by the correspondence in ***Appendix B***. The minimum and maximum pressures fall within the City of Ottawa required range.

DSEL employed a daily consumption rate of 280 L/person/day to align with the revised wastewater rates identified by City of Ottawa Technical Bulletin ISTB-2018-03. As a result, DSEL is submitting for a deviation from the ***Water Supply Guidelines***.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject property lies within the East March Trunk sewer catchment area, as shown by the ***Trunk Sanitary Sewers and Collection Areas Map,*** included in ***Appendix C***. There are existing sanitary sewers within Mersey Drive and Klondike Road (further west of March Road). An existing 200 mm sanitary sewer stub that is capped at both ends also exists across March Road, at the southwest corner of the site.

4.2 Wastewater Design

It is expected that the proposed development will be serviced by the future 525 mm sanitary trunk sewer to be constructed along March Road from Shirley's Brook Drive to Maxwell Bridge per the **Kanata North Community Design Plan – Master Servicing Study *(KNCDP-MSS)***. The development is proposed to connect to the future sanitary sewer via a proposed 200 mm sanitary service. Refer to, ***SSP-1,*** in ***Drawings/Figures*** for sanitary servicing layout.

The site area, as well as, the neighbouring parcel at 760 March Road were included in the ***KNCDP-MSS*** sanitary design sheet provided in ***Appendix C*** and are identified as Drainage Area X-5. The ***KNCDP-MSS*** assumes both sites were to be developed as high density residential, with a combined total area of ***1.76 ha*** and a total contributing peak flow of ***5.1 L/s***.

Table 3, below***,*** summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 3
Wastewater Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0 Harmon's Corrector Factor 0.8
Commercial/Amenity Floor Space	5 L/m^2/d
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.	

Table 4, below, demonstrates the estimated peak flow from the proposed development to the sanitary connection within March Road. See ***Appendix C*** for associated calculations.

Table 4
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.93
Estimated Peak Dry Weather Flow	2.29
Estimated Peak Wet Weather Flow	2.46

The estimated peak wet weather sanitary flow, based on the ***Site Plan,*** provided in ***Drawings/Figures,*** is ***2.46 L/s*** to the March Road sanitary connection.

The subject site was contemplated in the ***KNCDP-MSS***, and was identified as a ***1.78 ha*** parcel with a peak flow of ***5.1 L/s***. The ***KNCDP-MSS*** contemplated ***0.83 ha*** of the subject lands and ***0.93 Ha*** from the adjacent 760 March Road. Pro-rated the allocation for the subject site is ***2.41 L/s***. The proposed development results in an increase of ***0.05 L/s*** to the future sanitary sewer within March Road.

As per the ***KNCDP-MSS*** sanitary design sheet provided in ***Appendix C***, the most restrictive leg of pipe up to the Briar Ridge Pump Station has a contemplate capacity of ***18 L/s*** (202.4 L/s Capacity – 184.4 L/s Flow), which is sufficient to convey the proposed increase in flow.

4.3 Wastewater Servicing Conclusions

The site is tributary to the East March Trunk sewer. The development is estimated to generate a peak wet weather flow of ***2.46 L/s*** to be directed to the future 525 mm sanitary sewer within March Road. Based on coordination with City staff, the future 525 mm sanitary has sufficient capacity to accommodate the flow increase of ***0.05 L/s*** from the proposed development.

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

5.0 STORMWATER MANAGEMENT

A stormwater management strategy has been developed to ensure there is no increased risk of flooding to the surrounding residential neighbourhood due to the development of the subject property.

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system located within the Ottawa West sub-watershed. As such, approvals for proposed development within this area are under the approval authority of the City of Ottawa.

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 Mississippi Valley Conservation Authority (MVCA). Consultation with the MVCA is located in ***Appendix A***.

The site area is serviced by Shirley's Brook Stormwater Management (SWM) Facility, referred to as Pond No 1 – West, per the ***Shirley's Brook SWM Design Brief***. The site area lies within area ID *Klondike A-500,* per the Service Area Drainage Plan provided in ***Appendix D***. The pond is designed to accommodate minor flow from the site area and provide both water quantity control in the minor event and quality control to "Normal" level of treatment (70% total suspended solids removal). The pond was designed to accept minor flow at a rate of ***70 L/s/ha*** from the subject site and adjacent site.

The local 675 mm and 825 mm storm sewers fronting the site within March Road were sized to accommodate the 5-year flow from the subject site assuming a runoff coefficient of 0.80 for a total of ***352 L/s***. Refer to *Minor System Drainage Plan* prepared by Stantec and included in ***Appendix D***.

A hydraulic grade line (HGL) analysis completed by Stantec resulted in an HGL of ***77.08 m*** at EX ST11 (**MH158**), respectively. Refer to drawing ***EX-1,*** accompanying this report, for location of the above noted manholes.

It was assumed that the existing development contained no stormwater management controls for flow attenuation. The existing stormwater runoff from the site area generally drains northeast into Shirley's Brook Creek. Existing storm sewers lie within March and Klondike Road. The time of concentration using the Federal Aviation Administration method has been calculated with the following parameters: 0.71 Ha; 0.20 RC; 72 m flow length; slope equal to 8.1%; and resulting in a time of concentration of ***12.4 minutes***.

The estimated pre-development peak flows for the 2, 5, and 100-year events are summarized in ***Table 5,*** below:

Table 5
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	27.0
5-year	36.5
100-year	78.2

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa and are summarized below:

- Attenuate to a target release rate of ***70 L/s/Ha*** based on ***Shirley's' Brook SWMF Design Brief***;
- Flow attenuation is required up to and including the 100-year storm event; and
- "Enhanced" equal to 80% Total Suspended Solids (TSS) removal required per the ***SWM Design Guide.***

Based on the limits of proposed works of ***0.59 Ha,*** a release rate of ***43.4 L/s*** is required (*0.59 Ha x 70 L/s/Ha = 41.5 L/s*).

5.3 Proposed Stormwater Management System

It is proposed that the stormwater from the proposed development outlet to the existing internal 675 mm storm sewer within March Road. Refer to drawing ***SSP-1***, accompanying this report, for a detail servicing layout.

Runoff from the proposed path east of the development (Area EX-1) will maintain existing flow patterns and convey flow to Shirley's Creek. As the path is provided outside of the proposed limits of the development it has been included as an external area. Runoff from the remainder of the development will be directed towards Shirley's' Brook SWM Pond per the ***Shirley's' Brook SWMF Design Brief***. ***Table 6*** Below, demonstrates the approximate post development flow that will be conveyed directly towards Shirley's Creek.

Table 6
Summary of Proposed Peak Storm Flow Rates (Tributary to Shirley's Brook)

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
5-year	10.5
100-year	22.6

As summarized in ***Table 6,*** above, there is a ***71%*** decrease in flow directed towards Shirley's Brook Creek from the existing condition.

To meet the stormwater objectives the proposed development will use a combination internal cistern storage, rooftop storage, and surface ponding. Uncontrolled flow will be compensated for in areas with flow attenuation controls. ***Table 7,*** below***,*** estimates post-development flow rates.

Table 7
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Required Storage	100-Year Release Rate	100-Year Required Storage	100-Year Available Storage
	(L/s)	(m^3)	(L/s)	(m^3)	(m^3)
Unattenuated Areas (U1, U2, U3)	4.2	0.0	9.1	0.0	0.0
Attenuated Areas (P2)	10.2	36.2	10.4	104.0	108.0
Attenuated Areas (P3)	5.3	3.7	11.2	7.8	7.8
Attenuated Areas (BLDG)	8.3	35.3	11.0	77.3	151.6
Total	**28.0**	**75.2**	**41.7**	**189.1**	**267.4**

Summarized in the table above, approximately ***189 m^3*** of storage is required in order to achieve a total release rate of ***41.7 L/s.***

The proposed development consists of mostly rooftop, surface parking area and outdoor amenity space. Flow from rooftops (Area BLDG) will be controlled before discharging to the storm sewer system. The release rate and storage calculations for roof top attenuation were estimated based on Zurn Industries Ltd. design guidelines for Model Z-105-5 Control-Flo Single Notch drains. Other products may be specified provided that the restricted release rate and sufficient storage is provided to meet or exceed the values in ***Appendix D***. Runoff from rooftops is considered clean and therefore no pre-treatment is required.

The entrance to the parking garage (Area P3) is proposed to drain to a ***7.8 m^3*** internal stormwater cistern. The cistern will be located within the parking garage and will be conveyed to the municipal storm sewer via the internal mechanical plumbing system.

Quality controls will be provided by the Shirley's Creek SWMF. The cistern is proposed to be controlled to a maximum release rate of ***11.2 L/s*** and proposed to discharge to a 300 mm lateral. The pump will be required to pump up to a minimum elevation of 77.08 m, 0.30 m above the 100-Year HGL at ST11, to ensure positive drainage from the cistern to the adjacent minor system in the 100-year event.

Runoff from the Parking Area (Area P2) will be directed to a catchbasin system; approximately ***108.0 m^3*** of storage will be provided by surface ponding and catchbasins Attenuation will be provided by a ***Tempest LMF85 ICD*** or an approved equivalent located on the outlet side of storm maintenance structure STM 102. Refer to ***Appendix D*** for associated calculations.

A portion around the boundary of the site will drain uncontrolled to March Road, Klondike Road and to Shirley's Brook via overland flow and will be compensated for in areas with flow attenuation controls. Refer to drawing ***SWM-1,*** included with this report, for post-development stormwater management plan and drainage areas described above.

An existing ditch within Klondike Road right-of-way lies parallel to the north-western site boundary and collects major system drainage from the east side of March Road between Morgan's Grant Way, Shirley Brook Drive and Klondike Road. Proposed regrading of Klondike right-of-way per ***GP-1***, included with this report, proposes the overland flow route from March Road east be redirected onto Klondike Road, hence eliminating the need for the ditch. It is proposed to tie back into the ditch at the east of the site access on Klondike Road.

Runoff from landscaped areas (Area U1, U2 & U3) will be conveyed towards the Shirley's Brook creek. Runoff from landscaped is considered clean and therefore no pre-treatment is required. Refer to drawing ***GP-1*** and ***SWM-1*** for further details.

The existing stormwater management pond outlined in the ***Shirley's Brook SWMF Design Brief*** was contemplated to provide 70% Total Suspended Solids (TSS) Removal to approximately ***0.78 Ha*** of drainage area resulting in a required ***85.8 m^3*** and ***31.2 m^3*** of permanent pool and extended detention volume, respectively. The subject property is proposed to convey approximately ***0.321 Ha*** of parking lot and access road area to the pond resulting in ***62.3 m^3*** and ***12.8 m^3*** of permanent pool volume and extended detention volume to provide 80% TSS Removal. Therefore, the pond was adequately sized to provide 80% TSS Removal for the subject property, refer to ***Appendix D*** for quality control calculations in accordance with the ***SWMP Design Guide.***

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm in accordance with City of Ottawa ***City Standards***. Based on the ***Shirley's' Brook SWMF Design Brief,*** the subject site is required to control stormwater to a release rate of 70.5 L/s/ha (41.5 L/s).

The development is proposed to be serviced by the existing 825 mm storm sewer within March road via a 300 mm lateral storm service. It is proposed to provide ***267.4 m^3*** using use a combination cistern storage within the proposed building, rooftop storage and surface ponding. The subject property results in less required permanent pool volume and extended detention volume to provide 80% TSS Removal than contemplated in the ***Shirley's Brook SWMF Design Brief.***

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

6.0 UTILITIES

Gas, Hydro, Streetlighting, Bell and Rogers services exist within the March Road and Klondike Road rights-of-way.

Utility servicing will be coordinated with the individual utility companies prior to site development.

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.

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by 10731854 Canada Inc. to prepare a Site Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 788 March Road. The preceding report outlines the following:

- Based on boundary conditions provided by the City, the existing municipal water infrastructure is capable of providing the proposed development with water within the City's required pressure range;
- The FUS method for estimating fire flow indicated ***12,000 L/min*** is required for the development;
- The proposed development is anticipated to have a peak wet weather flow of ***2.46 L/s*** directed to the future 525 mm March Road sanitary sewer. Based on the ***KNCDP-MSS*** sanitary design sheets, the 525 mm sanitary sewer will have sufficient capacity to accommodate the flow increase of ***0.57 L/s*** from the proposed development;
- Based on ***Shirley's Brook Stormwater Management Facility Design Brief***, the proposed development will attenuate flow to a release rate of ***41.5 L/s***;
- It is proposed to attenuate flow through an internal cistern. It is anticipated that ***267.4 m^3*** of storage will be provided via a combination of cistern storage within the proposed building, rooftop storage and surface ponding; and
- Water quality and quantity control to be provided by the Pond No. 1 – West, per ***Shirley's Brook SWMF Design Brief*****,** hence no additional quality control measures are proposed on-site.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Alison J. Gosling, P.Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

18-1039 11/05/2020

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
☒	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).	Section 1.0
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Drawings/Figures
☐	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.	Section 1.0
☐	Reference to geotechnical studies and recommendations concerning servicing.	N/A
☒	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 3.1
☒	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.	N/A
☐	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.	Section 4.2
☐	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 5.3
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 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.	N/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 5.3
☐	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.	N/A
☐	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.	N/A
☐	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 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	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 7.0
☐	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 8.0
☐	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.	
☐	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

File No. PC2017-0295

Subject: **788 March Road – Pre-Consultation Notes**
November 21, 2017 – 1:30PM, Room 4102E

Attendees

Name	Position	Organization
Kathy Rygus	Planner	City of Ottawa
Victoria Bissonnette	Planner	
Gabi Schaeffer	Project Manager (Infrastructure)	
Eric Surprenant	Project Manager (Infrastructure)	
Rosanna Baggs	Project Manager (Transportation)	
Matthew Hayley	Planner (Environmental)	
Mark Young	Planner (Urban Design)	
Ben Crooks	Planning Assistant	
Paul Black	Planner	Fotenn Planning & Design
Nico Church	Planner	
Edward Hayes	Owner	Omnipex Capital Corporation
Ralph Esposito	Owner	

Development Proposal

- The development of a six-storey structure, with retail uses on the ground floor and residential units above
- Proposed height of 21 m, versus the 18.5 m permitted in the Zoning By-law
- A 30 m setback from the Shirley's Brook creek centreline is proposed
- Proposing a right-in, right-out (RIRO) access from March Road and a full-movement access from Klondike Road
- Parking off of Klondike to be used for residents, parking off of March to be provided for the retail tenants
- Due to the proximity to future Bus Rapid Transit (BRT) stations along March Road, may want to investigate lowering the provision of parking
- No architect has been retained, still in the preliminary stage of identifying constraints and considerations.

Meeting Notes

<u>Environmental</u>

- Two primary environmental constraints affect the subject property: slope stability of Shirley's Brook & possible presence of Blanding's Turtles, an endangered species.

(a) Slope stability of Shirley's Brook
- The environmental management plan for the area discussed a 20 m setback from the top of bank due to the erosiveness of Shirley's Brook;
- The creek widens; so there is a need to determine the actual top of bank for this segment to establish more accurate setbacks;
- Will require that a civil engineer review the slope stability;
- Applicant has shown 30 m from the creek centreline on the concept plan as a conservative approach.

(b) Blanding's Turtles
- The area is regulated under the Endangered Species Act through the Ministry of Natural Resources (MNR);
- MNR approval or advice will be required on how to treat the 30 m setback area (e.g. with fencing, plantings, etc.);
- With regard to Category II and III turtle habitats, the applicant must make the case that the subject lands do not qualify as habitat based on the fact that they do not provide a corridor to other habitat;
    - Scenario 1: A permit will be required which will take 1-2 years
    - Scenario 2: A letter of advice will be provided which states that the MNR has no concerns.

- The proposed pathway within the creek setback area will be dealt with through the site plan approval process. Fencing and gates may be required to prevent turtles from escaping the protected corridor.

- The environmental issues are multi-jurisdictional, involving the City of Ottawa, Mississippi Valley Conservation Authority (MVCA), and the Ministry of Natural Resources:
    - The City will not become involved with review of the Environmental Impact Statement (EIS) until the application has been submitted;
    - It is recommended that the applicant contact MVCA soon;
    - The MNR process may started before application is submitted, provided that the development will not change substantially. They require EIS for their review. MNR will define limit of the turtle habitat; this limit is not made final until the application is received.

<u>Tree Conservation</u>
- A Tree Conservation Report (TCR) must be provided in support of the application; an approved TCR is a requirement of Site Plan Approval;
- Any removal of privately-owned trees 10 cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR;
- The TCR can be combined with the EIS;

- The TCR must list all trees on site by species, diameter and health condition. Note that TCR must address all trees with a critical root zone that extends into the developable area;
- If trees are to be removed, the TCR must clearly show where they are and document the reason they can not be retained;
- All retained trees must also be shown and all retained trees within the area impacted by the development process must be protected as per the City guidelines listed on Ottawa.ca;
- The City encourages the retention of healthy trees wherever possible;
- The removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR.

For more information on the process or for help with tree retention options, please contact Mark Richardson, Planning Forester (mark.richardson@ottawa.ca).

Transportation

- A full Transportation Impact Study (TIS) will be required due to the proximity of the site to the intersection of Klondike Road and March Road;
- The primary concern with access to Klondike Road is the recently completed improvements: new guard-rail, cycle track, bus pad and shelter;
- OC Transpo buses at the new stop may cause visibility problems with the northern site access;
- Need to ensure that vehicles utilizing the site access do not negatively impact the Klondike Road cycle track; raised bike lane may be recommended;
- The required clear throat lengths may affect the configuration of the surface parking lots;
- The Transportation Association of Canada (TAC) manual must be consulted to ensure that adequate distances are provided from proposed site accesses to the intersection;
- Surveyor must confirm that the Right of Way (ROW) protection has been taken for March Road;
- Please show all curb radii, turning templates, and all dimensions to speed up the plan circulation and review process;
- Ensure that sufficient space is provided so that cars can actually pass each other and move freely in the parking garage;
- The fire route may have to be adjusted due to concerns regarding fire vehicles operating on top of underground parking garages. Bringing the building closer to March Road would eliminate this issue.

Noise

- If building tenants are determined to be a noise sensitive use, a Noise Impact Assessment (NIA) will be required;

- If mechanical elements are proposed on the roof or exterior of the building, a stationary NIA will be required.

Engineering

- There is a watermain along the entire March Road frontage and along part of the Klondike Road frontage;
- Water frontage fees will apply;
- A stormwater sewer does exist along the March Road frontage, but certain items need to be addressed:
    - Consulting engineer must determine if this sewer has been designed to serve the property, or if stormwater flows will need to be directed to Shirley's Brook
    - Releasing stormwater flows into Shirley's Brook triggers the need for a Ministry of Environment Environmental Compliance Approval (ECA)
- There is no sanitary sewer fronting the site on either March Road or Klondike Road;
    - A sanitary sewer reaches 760 March Road; staff are unsure if this is owned by the City or Minto Communities. The applicant should consider reaching out to Minto to determine if capacity exists to add this development;
        - The Kanata North Community Design Plan (CDP) calls for a sanitary sewer to be built in front of the property, with construction scheduled to begin in 2019 & completion anticipated in 2020;
        - Consider coordinating with Kanata North Landowners Group to explore possible connections to the future sewer;
- The Kanata North CDP originally intended for this property to be commercial, therefore servicing constraints may exist due to the different use proposed;
    - A geotechnical investigation will be required: it should consider slope stability and the meanderbelt setback, as well as the hydraulic grade lines due to the two levels of underground parking proposed;
- Need to consider the Shirley's Brook floodplain:
    - Consult with the MVCA to determine the water level and the extent of the floodplain;
    - The proposed recreational pathway will need to be beyond a certain water level.

Planning & Urban Design

- The retail uses proposed on the ground floor are a very positive element of the project, considering that there is no requirement for mixed-use;
- The development is not within a Design Priority Area and therefore does not require consideration by Urban Design Review Panel;
- The future BRT corridor on March Road should be considered, including pedestrian connectivity being prioritized along with vehicular connections;

- The proposed height of 21m, above the 18 m permitted in the Zoning By-law, would require a minor variance from the Committee of Adjustment;
- Consider flanking the Klondike/March corner with the building, rather than a surface parking lot. It will be more attractive and prevent spillover parking from the March House day spa, which is experiencing parking challenges;
- If the C-shaped design is used, emphasize the front entrance and establish a direct pedestrian connection to March Road;
- If the building is residential use only, moving the parking lot to the rear of the site is preferred
- The access to the parking garage needs to be redesigned to improve the aesthetics from March and Klondike;
- Consider providing a direct link from the building amenity area to the creek pathway;
- A pedestrian easement along the southern side of the site may be requested to connect the creek pathway to March Road, instead of a walkway block;
- The site is in an area of archaeological potential, therefore an archaeological investigation will be required
- A Phase I Environmental Site Assessment (ESA) will be required

Brandon Chow

From: Brandon Chow
Sent: August 10, 2018 12:40 PM
To: 'Emily.Diamond@ontario.ca'
Cc: Steve Merrick
Subject: 788 March Rd - ECA requirement

Good afternoon Emily,

We would like to confirm our obligation under section 53 of the Ontario Water Resources Act (OWRA) for the development located at 788 March Road.

The subject lands are zoned as general mixed use and is wholly contained within one Property Identification Number (PIN).
The proposed development involves the construction of two 6-storey apartment buildings consisting of a total of 196 units, an underground parking garage and a visitor parking lot.

Stormwater run-off from the proposed development will be collected in the proposed building mechanical system. A cistern within the proposed building will be used for stormwater storage to attenuate the release rate to the City of Ottawa requirements. Stormwater is proposed to outlet to the existing 675mm storm sewer within March Road.

Proposed sanitary flows for the site will outlet to an existing 200mm service pipe which will outlet to the future 600mm sanitary within March Road.

As the stormwater and sanitary design will be servicing a single parcel of land and no connections are being proposed to an existing watercourse, it is assumed this falls within the exemption requirements of O.Reg 525/98.
Please confirm that the above rationale is satisfactory and let us know if you need any more information.

Thanks,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.532
fax: (613) 836-7183
email: bchow@DSEL.ca

Brandon Chow

From: Nader Nakhaei <NNakhaei@mvc.on.ca>
Sent: August 16, 2018 10:14 AM
To: Brandon Chow
Cc: Matt Craig; Steve Merrick; Niall Oddie
Subject: RE: 788 March Rd - MVCA
Attachments: 788MARCH.PDF

Hello Brandon,

I've attached a map which contains the floodplain and meander belt hazard lines for Shirley's brook. In general, we do not have any objection toward the proposed SWM approach but the adequacy of the sewer system sizing and the pond for the corresponded flows from the site should be shown in the submitted report. Also, it should be noted that the required quality control for Shirley's Brook is "Enhanced" (80% TSS removal).

Please be advised that MVCA been contacted before about this development and the following was our planner's comments at the time:

"As shown on the attached mapping, the subject lands contain floodplain and meander belt hazards in relation to Shirley's Brook. The flood plain is based on the 1:100 year return event and the meander belt hazard is determined by 20x the bankfull width of the watercourse.
The drawings within the brochure package that you provided indicate that a portion of the building would be constructed within the floodplain – which appears to be the ramp providing access for two (2) stories of underground parking. The meander belt hazard extends farther onto the property than the floodplain and further impacts the proposed building. MVCA does not permit new development within either the floodplain or the meander belt hazards. The applicant has the option of preparing a geomorphic assessment to assess the meander belt hazard for this reach of Shirley's Brook, which may refine the meander belt hazard. The development will then need to respect the greater hazard of the floodplain or the setback established by the geomorphic assessment.
As our regulation limit extends 15m beyond the greatest hazard, the development will remain within our regulated area and will required written authorization under O.Reg 153/06 "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses". The applicant will need to demonstrate that the building has been designed for drypassive
flood proofing for a floodplain elevation of 74.3m (0.3m above the 74m 1:100 year flood elevation) and designed to withstand hydrostatic pressures that may be encountered.
Upon discussion, MVCA will permit the inclusion of underground parking below the floodplain elevation provided the building has been designed for dry-passive flood proofing and hydrostatic pressures, as noted above. All mechanical rooms, storage areas and lounge will need to be above the 74.3m elevation; only parking will be permitted below this elevation. As part of dry-passive flood proofing, no openings in the structure are permitted below 74.3m (ventilation, windows, doors, etc.).
As noted in our previous correspondence, Shirley's Brook requires enhanced water quality treatment (80% TSS removal). Predevelopment flow rates are to be respected. Our policies do not allow SWM facilities within the floodplain or within the meander belt hazard. I understand that onsite stormwater storage and treatment is being proposed. The proposed site layout appears to maximize all lands outside of the floodplain. It may be beneficial to send along a conceptual SWM plan for review against our regulation policies.
MVCA notes that the subwatershed study for the area identified this reach of Shirley's Brook for restoration. The minutes from the pre-consultation meeting do not seem to mention any restoration plans, so I
am not sure if this topic has previously been discussed. However, MVCA would be recommending restoration along the watercourse as part of the proposed development."

Please inform us if anything has been changed regarding the development and also please do not hesitate to contact me if you have any further question or concern.

Regards,

Nader Nakhaei, Ph.D. | Postdoctoral Felllow / Water Resources Engineer (EIT) | Mississippi Valley Conservation Authority
www.mvc.on.ca | t. 613 253 0006 ext. 259 | f. 613 253 0122 | NNakhaei@mvc.on.ca

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From: Brandon Chow [mailto:BChow@dsel.ca]
Sent: Friday, August 10, 2018 12:41 PM
To: Nader Nakhaei <NNakhaei@mvc.on.ca>
Cc: Matt Craig <MCraig@mvc.on.ca>; Steve Merrick <SMerrick@dsel.ca>
Subject: 788 March Rd - MVCA

Good afternoon Nader,

DSEL is in the process of preparing a Stormwater Management Report for a proposed development located at 788 March Road.

The proposed development involves the construction of two 6-storey apartment buildings consisting of a total of 196 units, an underground parking garage and a visitor parking lot. A section of the existing Shirley's Brook Tributary is located along the north-eastern limit within the subject property. No development/alterations are proposed within a 30m setback from Shirley's Brook.

Areas within the 30m setback will remain in their existing condition and drain to Shirley's Brook. Stormwater run-off from the proposed development will be collected in the proposed building mechanical system. A cistern within the proposed building will be used for stormwater storage to attenuate the release rate to the City of Ottawa requirements. Stormwater from the site is proposed to outlet to the existing storm sewer within March Road which ultimately outlets to the existing March Road SWM Pond approximately 125m north-west of the subject property.

According to the SWM report prepared by DME (see link below), 70% TSS removal is provided within the SWM pond. The pond design as outlined in the report accommodates the minor stormwater flows contemplated from the subject property at 788 March Road.

https://spaces.hightail.com/receive/WnBv4EliB3

Please confirm if the SWM controls as outlined above are sufficient or if any additional quality/quantity controls are required for the subject site development.

Thanks,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.532
fax: (613) 836-7183
email: bchow@DSEL.ca

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name:

788 March Road

Building Location:

788 March Road

Municipality:

City of Ottawa

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☑ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m.

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name:
Michael St. Louis

Firm:
Smith + Andersen

Phone #:
613 230 1186 ext 3120

City: Ottawa Province: Ontario

Mechanical Engineer's Seal

S1. ☐ The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.6.4 (3) OBC.

S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name:

Firm:

Phone #:

City: Province:

Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name:

788 March Road

Building Location:

Municipality:

788 March Road, Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☑ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m.

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name:

Firm:

Phone #:

City: Province:

Mechanical Engineer's Seal

S1. ☑ The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.6.4 (3) OBC.

S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name:
Sean Keating

Firm:
Read Jones Christoffersen

Phone #:
343-291-1081

City: Ottawa Province: Ontario

Structural Engineer's Seal

APPENDIX B

Water Supply

WEST

SUBJECT SITE

348-023

2W2C

MG

MARCHBROOK

2W2C PRESSURE ZONE

MORGANS GRANT PRESSURE ZONE

D_PS_MORGAN

2017 Water Distribution System

Department of Planning, Infrastructure and Economic Development

This map was compiled from existing & collected engineering Information from the City of Ottawa Geographic Information System and is protected by copyright. The location of Infrastructure is approximate and should not be used for construction purposes.

Scale 1:2500

Ottawa

Legend

- Public Hydrant
- Private Hydrant
- Summer only Flusher Hydrant
- Flusher Hydrant
- Acoustic Fibre Optic
- Gate Valve
- Tapping Valve
- Butterfly Valve (B)
- Buried Valve (BU)
- Drain Pipe
- Check Valve (CV)
- Closed Valve (CL)
- Drain-Out Valve (D)
- Left Hand Valve
- Spot Elevation (X 84.9)
- Pressure Reducing Valve (P)
- Air Relief Valve (A)
- Bypass Valve (Y)
- Large Chamber Valve (F000)
- Inspection Plate (IP 363)
- Cap
- Reducer
- Jump
- Water Meter (M)
- Water Service
- Backbone Pipe
- Watermain with Pipe Diameter, Material and Install Year (e.g. 203 PVC-1981)
- Pipe in Casing
- Pressure Zone Delineation and Identifier (2W)
- Well (W)
- Elevated Tank (T)
- Water Pumping Station (PS)
- Water Reservoir
- Water Treatment Plant (WTP)

Pipe Equivalents

nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2850	114
600	24	1650	66	3000	120

Pipe Materials

- A - ASBESTOS
- CI - CAST IRON
- CO - COPPER
- CO0 - AWWA C300
- CO1 - AWWA C301
- CO2 - AWWA C302
- CO3 - AWWA C303
- DI - DUCTILE IRON
- PE - POLYETHYLENE (DR11 TO DR21)
- PVC - POLYVINYL CHLORIDE
- STC - CONCRETE LINED STEEL PIPE
- UCI - UNLINED CAST IRON
- UNK - UNKNOWN MATERIAL

346-024	348-024	350-024
346-023	348-023	350-023
346-022	348-022	350-022

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		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
4 Bedroom	3.1		0
Average	1.8	92	166

	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	166	46.5	32.3	167.3	116.2	251.0	174.3

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 $L/m^2/d$	258	0.65	0.4	1.0	0.7	1.7	1.2
Office	75 $L/9.3m^2/d$	-	0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			0.6	0.4	1.0	0.7	1.7	1.2
Total Demand			**47.1**	**32.7**	**168.3**	**116.9**	**252.7**	**175.5**

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	7540.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	28654.9	L/min	
	29000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	**24650.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction	**-12325**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	>45m	40	2	80	0%	
S	Wood Frame	>45m	20	6	120	0%	
E	Wood Frame	>45m	80	2	160	0%	
W	Wood Frame	>45m	52	1	52	0%	
		% Increase				**0%**	*value not to exceed 75%*

Increase	**0.0**	**L/min**

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

Total Fire Flow

Fire Flow	12325.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by NEUF ARCHITECTS.
-Calculations based on Fire Underwriters Survey - Part II

Boundary Conditions Unit Conversion

March Road
Grnd Elev 78.1

	m H_2O	PSI	kPa
Avg. Day	**134.2**	75.5	550.3
Peak Hour	**126.5**	69.5	474.8
Max Day + FF	**126**	64.7	469.9

Boundary Conditions
788 March Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	41	0.68
Maximum Daily Demand	146	2.43
Peak Hour	219	3.65
Fire Flow Demand #1	6,660	111.00
Fire Flow Demand #2	12,000	200.00

Location

Results

Connection 1 - Klondike Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.2	77.7
Peak Hour	126.9	71.7
Max Day plus Fire 1	126.3	70.7
Max Day plus Fire 2	123.5	66.7

[1] Ground Elevation = 76.5 m

Connection 2 - March Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.2	75.5
Peak Hour	126.9	69.5
Max Day plus Fire 1	126.3	68.6
Max Day plus Fire 2	123.6	64.7

[1] Ground Elevation = 78.1 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Charlotte Kelly

From: Candow, Julie <julie.candow@ottawa.ca>
Sent: March 11, 2020 2:00 PM
To: Charlotte Kelly
Cc: Alison Gosling
Subject: RE: 788 March Road - Boundary Condition Request
Attachments: 788 March Road_Boundary Conditions_10March2020.docx

Hi Charlotte,

Please see attached boundary condition request.

Please note that the buildings fire demand must be calculated using the FUS method, in accordance with Technical Bulletin ISTB-2018-02 (which you have estimated at 12,000 L/min).

It is not clear how the 6,650 L/min fire demand was calculated.

Julie Candow, P.Eng.
Project Manager - Infrastructure Approvals

City of Ottawa
Development Review - West Branch
Tel: 613-580-2424 x 13850

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: February 27, 2020 2:09 PM
To: Candow, Julie <julie.candow@ottawa.ca>
Cc: Alison Gosling <AGosling@dsel.ca>
Subject: 788 March Road - Boundary Condition Request

Good afternoon Julie,

We would like to kindly request boundary conditions for the proposed development at 788 March Road using the following proposed development demands:

1. Location of Service / Street Number: 788 March Road
2. Type of development and the amount of fire flow required for the proposed development:
   - Type of development: The proposed development involves 2 four-storey residential complexes connected via a two-storey shared amenity area. Please see the attached site plan for reference.
   - The apartment buildings are proposed to consist of ***92*** residential units and ***258 m2*** of amenity space.
   - Proposed Connections:
     - Connection 1 to existing 406 mm diameter watermain along Klondike Road east of March Road.

- Connection 2 to existing 406 mm diameter watermain along March Road south of Klondike Road.
- Fire demand based on Technical Bulletin ISTB-2018-02 has been used to estimate a max fire demand of ***12,000 L/min***. Refer to the attached for detailed calculations.
- As a fully-supervised sprinkler system is proposed, the fire flow per the National Fire Protection Association 13 has also been estimated at ***6,650 L/min***. Could the pressure at both fire flows please be provided?

Demand	L/min	L/s
Avg. Daily	40.8	0.68
Max Day	145.9	2.43
Peak Hour	219.1	3.65

Please let me know if you have any questions.

Thank-you,

Charlotte Kelly, E.I.T.
Junior Engineering Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

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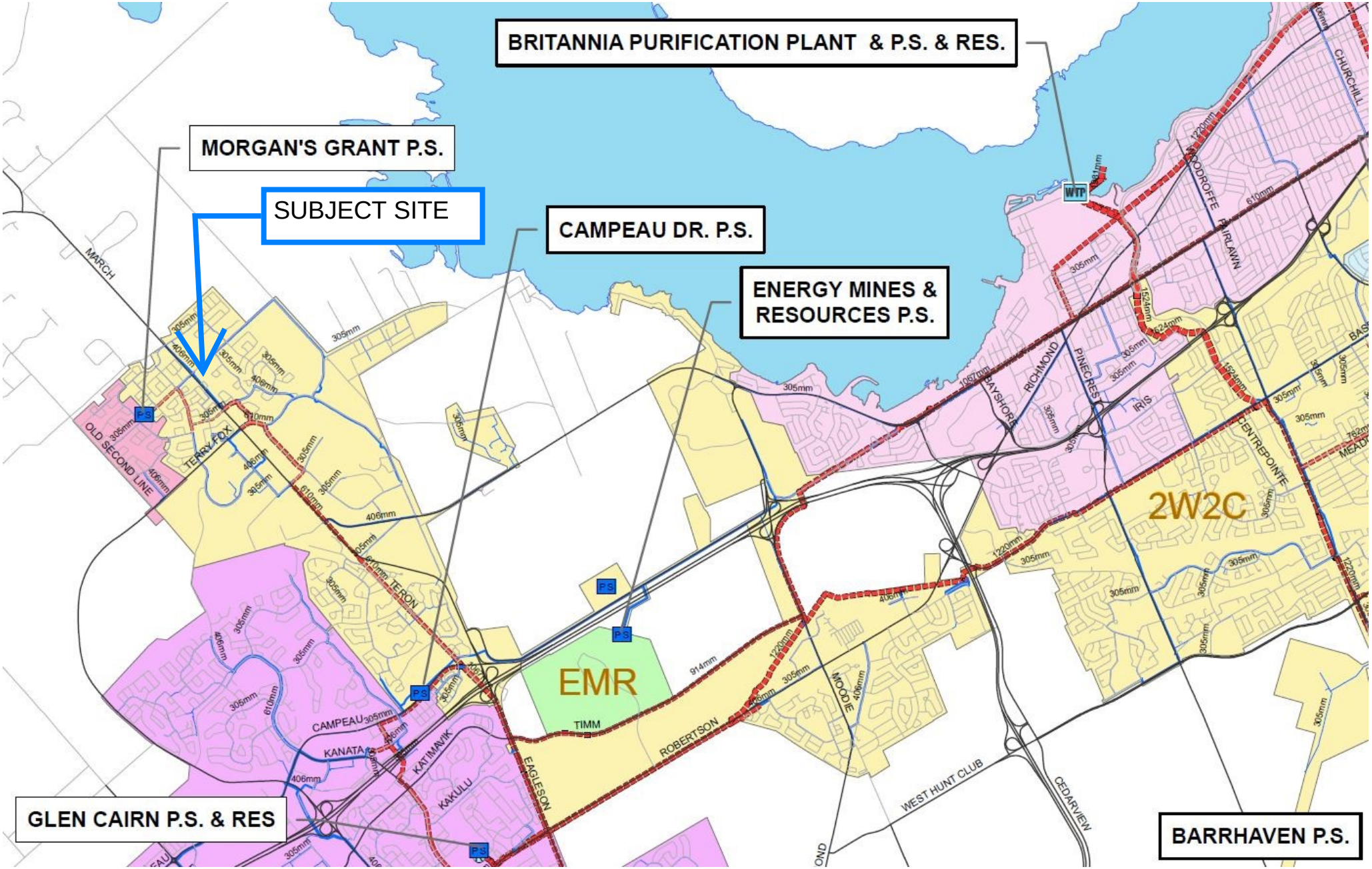

BRITANNIA PURIFICATION PLANT & P.S. & RES.
MORGAN'S GRANT P.S.
SUBJECT SITE
CAMPEAU DR. P.S.
ENERGY MINES & RESOURCES P.S.
GLEN CAIRN P.S. & RES
BARRHAVEN P.S.
EMR
2W2C
MARCH
OLD SECOND LINE
TERRY FOX
TERON
CAMPEAU
KANATA
KATIMAVIK
KAKULU
EAGLESON
TIMM
ROBERTSON
MOODIE
WEST HUNT CLUB
CEDARVIEW
RICHMOND
BAYSHORE
PINECREST
IRIS
CENTREPOINTE
WTP
P.S

Smith + Andersen

1600 Carling Ave Suite 530 Ottawa Ontario K1Z 1G3
613 230 1186 f 613 230 2598 smithandandersen.com

2020-09-28

City of Ottawa
Infrastructure Services and Community Sustainability
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Attention: City Building Official

RE: 788 MARCH ROAD
S+A PROJECT # 18664.001
SPRINKLER SYSTEM DESIGN

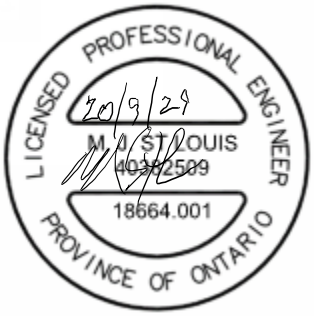
Dear City Building Official:

This letter is to confirm that the sprinkler system for this project will be designed to be fully supervised.

If you have any further questions, please contact the undersigned.

Yours truly,

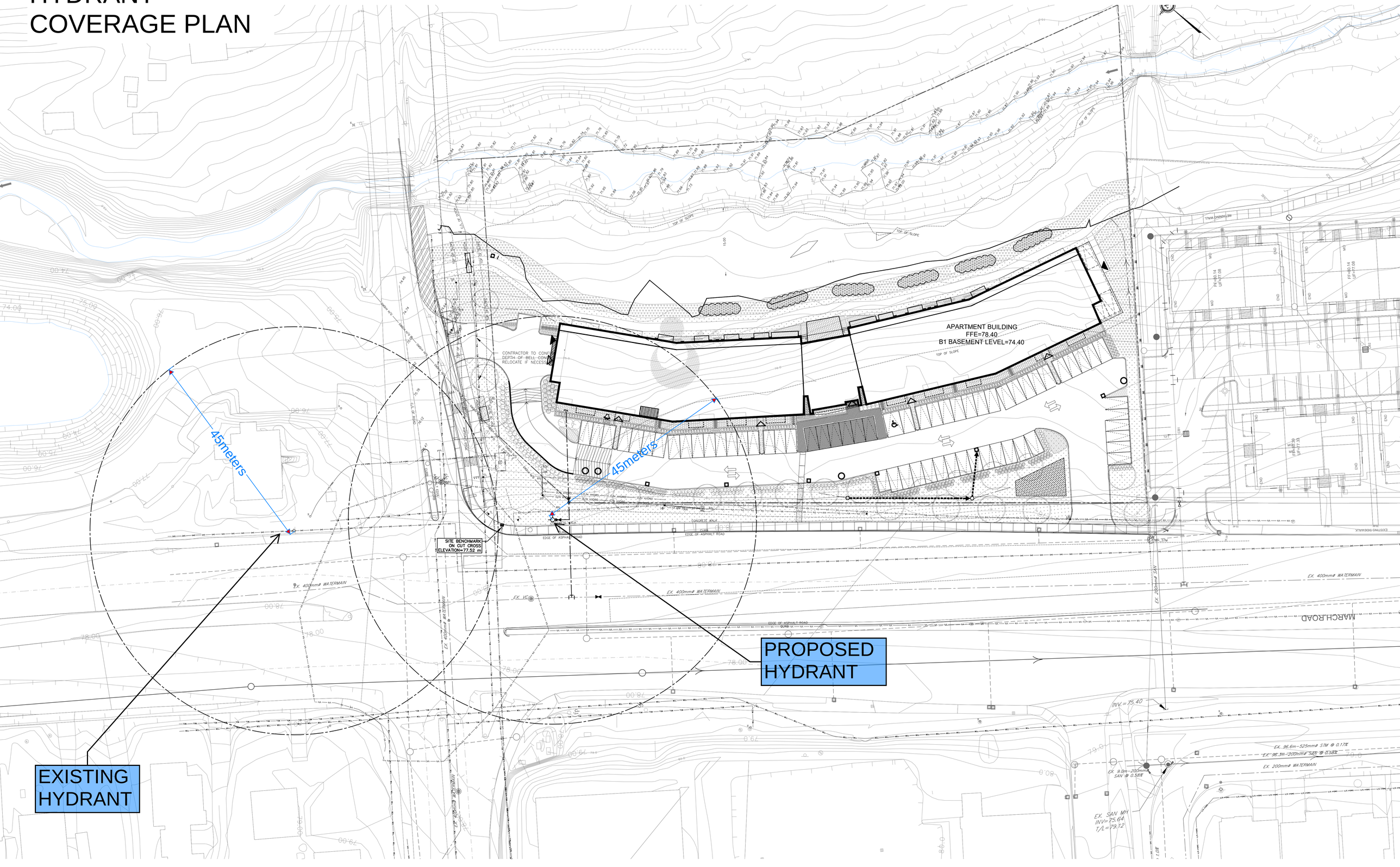
SMITH + ANDERSEN



Michael St. Louis, P. Eng.
Associate Principal

18664.001.m200.let01

HYDRANT COVERAGE PLAN



APPENDIX C

Wastewater Collection

Omnipex
788 March Road
ProposedSanitary Flow

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area 0.593 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.03**	**L/s**
Infiltration / Inflow (Wet)	**0.17**	**L/s**
Infiltration / Inflow (Total)	**0.20**	**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		0
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	92	166

Total Pop	**166**	
Average Domestic Flow	**0.54**	**L/s**
Peaking Factor	**3.54**	
Peak Domestic Flow	**1.91**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$	258	0.36
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	**0.36**
Peak Institutional / Commercial Flow	0.36
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.36**

*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**0.93**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**2.29**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**2.46**	**L/s**

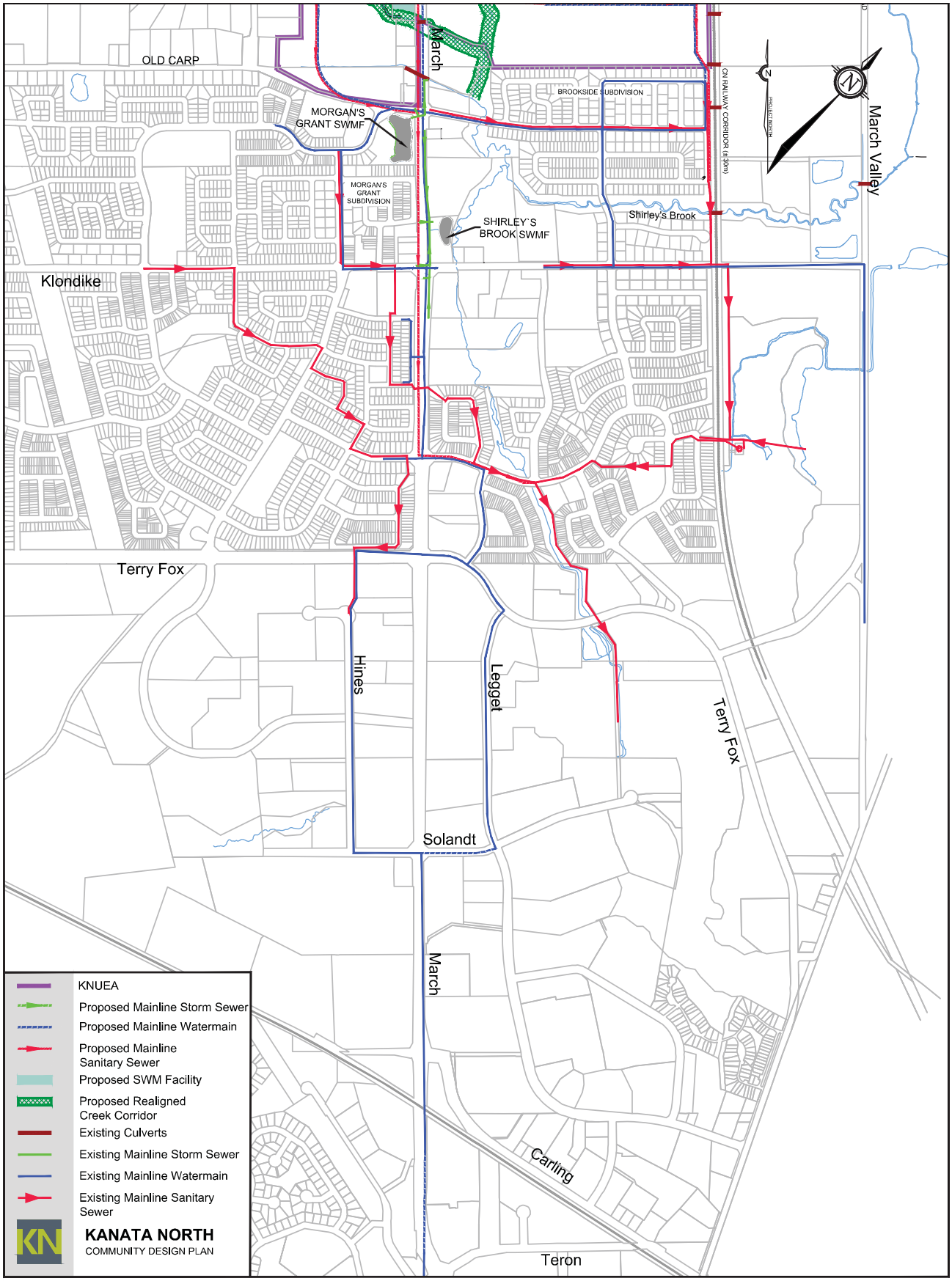


FIGURE 23 | Proposed Combined Infrastructure Offsite

KANATA NORTH URBAN EXPANSION AREA
COMMUNITY DESIGN PLAN

TABLE C-6b:
SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION				RESIDENTIAL AREA AND POPULATION									ICI							INFILTRATION				FLOW	PIPE					
									Cumulative				IND			COMM		INST												
Street	From	To	Total	Dwellings		Density (Net ha)		Pop.	Residential			Peak	Peak	Area	Accu.	Peak	Area	Accu.	Area	Accu.	Peak	Total	Accu. Area		Infiltration	Total	Dia	Dia	Slope	Velocity	Capacity	Ratio
	Node	Node	Area	SFH	SD/TH	Low[3]	High[4]		Area	Pop.		Factor	Flow		Area	Factor		Area		Area	Flow	Area	New	Exist	Flow	Flow	Act	Nom		(Full)	(Full)	Q/Qfull
			(ha)	3.4	2.7	101	161		(ha)	New	Exist		(l/s)	(ha)	(ha)		(ha)	(ha)	(ha)	(ha)	(l/s)	(ha)	(ha)		(l/s)	(l/s)	(mm)	(mm)	(%)	(m/s)	(l/s)	(%)
				pers/ea	pers/ea	pers/ha	per/ha																									
EAST KNCDP																															
E-1	E-1	E-3	4.47			3.00		303.0	3.00	**303**		4.00	4.9								0.0	4.47	4.47		1.3	6.2	203	200	0.40	0.67	21.6	28%
E-2	E-2	E-3	5.91			4.29		433.3	7.29	**736**		3.88	11.6								0.0	5.91	10.38		2.9	14.5	203	200	0.35	0.62	20.2	72%
E-3	E-3	E-6	9.42			6.51		657.5	13.80	**1394**		3.70	20.9								0.0	9.42	19.80		5.5	26.4	254	250	0.40	0.77	39.2	67%
E-4	E-4	E-5	6.89			3.12	1.36	534.1	3.12	**534**		3.96	8.6								0.0	6.89	6.89		1.9	10.5	203	200	1.00	1.05	34.2	31%
E-5	E-5	E-9	4.70			1.46		147.5	4.58	**682**		3.90	10.8						**2.29**	2.29	2.0	4.70	11.59		3.2	16.0	203	200	0.35	0.62	20.2	79%
E-6	E-6	E-9	3.28			2.32		234.3	16.12	**1628**		3.65	24.1								0.0	3.28	23.08		6.5	30.6	305	300	0.25	0.69	50.4	61%
E-7	E-7	E-8	10.04			7.21		728.2	7.21	**728**		3.88	11.5								0.0	10.04	10.04		2.8	14.3	203	200	0.40	0.67	21.6	66%
E-8	E-8	E-9	4.05			2.94		296.9	10.15	**1025**		3.79	15.8								0.0	4.05	14.09		3.9	19.7	254	250	0.30	0.67	33.9	58%
E-9	E-9	*MH 209*	3.98			3.06		309.1	33.91	**3644**		3.37	49.7						2.29	2.29	2.0	3.98	52.74		14.8	66.5	381	375	0.22	0.75	85.7	78%
Total Flows From East KNUEA			**52.74**					**3644**	**33.91**	**3644**		**3.37**	**49.7**						**2.29**	**1.99**			**52.74**		**14.77**	**66.49**						
*X-1 (Brookside Subdivision)**		*MH 209*	*32.80*					*2216.1*	*26.04*		*2216*	*3.55*	*18.2*				*6.76*	*6.76*			*2.3*	*32.80*		*32.80*	*11.5*	*32.0*						
				*Population from Novatech #103106 Sanitary Sewer Design Sheet																												
	MH 209	*MH 208*						*0.0*	*59.95*	**3644**	*2216*	*3.18*	*63.3*					*6.76*		*2.29*	*7.9*	*0.00*	**52.74**	*32.80*	*26.2*	*97.4*	457	450	0.20	0.81	132.9	73%
	MH 208	*MH 207*						*0.0*	*59.95*	**3644**	*2216*	*3.18*	*63.3*					*6.76*		*2.29*	*7.9*	*0.00*	**52.74**	*32.80*	*26.2*	*97.4*	457	450	0.20	0.81	132.9	73%
X-2 (Brookside Subdivision)	*MH 207*	*MH 206*	*3.12*		*44*			*118.8*	*63.07*	**3644**	*2335*	*3.17*	*64.0*					*6.76*		*2.29*	*7.9*	*3.12*	**52.74**	*35.92*	*27.3*	*99.2*	*457*	*450*	*0.20*	*0.81*	*132.9*	*75%*
*X-3 (Brookside Subdivision)**	*MH 206*	*MH 205*	*9.81*		*244*			*658.8*	*72.88*	**3644**	*2994*	*3.13*	*67.9*					*6.76*		*2.29*	*7.9*	*9.81*	**52.74**	*45.73*	*30.8*	*106.5*	*457*	*450*	*0.21*	*0.83*	*136.2*	*78%*
				**244 TH units = 107 Units from Novatech #103106 Sanitary Sewer Design Sheet, plus future 137 units North of Klondike and West of Marconi (5.67ha @ 65pers/ha)																													
X-13 (Future Industrial Lands)	Future	*MH 205*	20.99											15.85	15.85	3.6					13.2	20.99	**20.99**		5.9	19.1						
Briar Ridge Pump Station Access Road	*MH 205*	*MH 204*							*72.88*	**3644**	*2994*	*3.13*	*67.9*		*15.85*	*3.6*		*6.76*		*2.29*	*21.1*	*0.00*	**73.73**	*45.73*	*36.6*	*125.6*	*457*	*450*	*0.20*	*0.81*	*132.9*	*94%*
Briar Ridge Pump Station Access Road	*MH 204*	*MH 203*							*72.88*	**3644**	*2994*	*3.13*	*67.9*		*15.85*	*3.6*		*6.76*		*2.29*	*21.1*	*0.00*	**73.73**	*45.73*	*36.6*	*125.6*	*457*	*450*	*0.20*	*0.81*	*132.9*	*94%*
Briar Ridge Pump Station Access Road	*MH 203*	*MH 202*							*72.88*	**3644**	*2994*	*3.13*	*67.9*		*15.85*	*3.6*		*6.76*		*2.29*	*21.1*	*0.00*	**73.73**	*45.73*	*36.6*	*125.6*	*457*	*450*	*0.25*	*0.91*	*148.6*	*85%*
Briar Ridge Pump Station Access Road	*MH 202*	*MH 201A*							*72.88*	**3644**	*2994*	*3.13*	*67.9*		*15.85*	*3.6*		*6.76*		*2.29*	*21.1*	*0.00*	**73.73**	*45.73*	*36.6*	*125.6*	*457*	*450*	*0.26*	*0.92*	*151.6*	*83%*
Briar Ridge Pump Station Access Road	*MH 201A*	*MH 201*							*72.88*	**3644**	*2994*	*3.13*	*67.9*		*15.85*	*3.6*		*6.76*		*2.29*	*21.1*	*0.00*	**73.73**	*45.73*	*36.6*	*125.6*	*457*	*450*	*0.25*	*0.91*	*148.6*	*85%*
Briar Ridge Pump Station Access Road	*MH 201*	*MH 200*							*72.88*	**3644**	*2994*	*3.13*	*67.9*		*15.85*	*3.6*		*6.76*		*2.29*	*21.1*	*0.00*	**73.73**	*45.73*	*36.6*	*125.6*	*457*	*450*	*0.25*	*0.91*	*148.6*	*85%*
Briar Ridge Pump Station Access Road	*MH 200*	*EXMH1*							*72.88*	**3644**	*2994*	*3.13*	*67.9*		*15.85*	*3.6*		*6.76*		*2.29*	*21.1*	*0.00*	**73.73**	*45.73*	*36.6*	*125.6*	*457*	*450*	*0.23*	*0.87*	*142.5*	*88%*
RIDDELL VILLAGE (X-4)* **		*EXMH1*	*42.42*					*3100*			*3100*	*3.43*	*24.6*						*2.96*	*2.96*	*1.0*	*42.42*		*42.42*	*14.8*	*40.5*						
				***Population from Novatech #103106 Sanitary Sewer Design Sheet																												
	EXMH1	*EXMH2*							*72.88*	**3644**	*6094*	*2.97*	*85.6*		*15.85*	*3.6*		*6.76*		*5.25*	*23.6*	*0.00*	**73.73**	*88.15*	*51.5*	*160.8*	*457*	*450*	*0.30*	*0.99*	*162.8*	*99%*
	EXMH2	*EXMH4*							*72.88*	**3644**	*6094*	*2.97*	*85.6*		*15.85*	*3.6*		*6.76*		*5.25*	*23.6*	*0.00*	**73.73**	*88.15*	*51.5*	*160.8*	*457*	*450*	*0.30*	*0.99*	*162.8*	*99%*
X-14 (Future Industrial Lands east of Marshes Golf Course)	*EXMH4*	*EXMH5*	19.23						*72.88*	**3644**	*6094*	*2.97*	*85.6*	*19.23*	*35.08*	*3.1*		*6.76*		*5.25*	*35.6*	*19.23*	**92.96**	*88.15*	*56.9*	*178.1*	*457*	*450*	*0.44*	*1.20*	*197.2*	*90%*
	EXMH5	*PS*							*72.88*	**3644**	*6094*	*2.97*	*85.6*		*35.08*	*3.1*		*6.76*		*5.25*	*35.6*	*0.00*	**92.96**	*88.15*	*56.9*	*178.1*	*457*	*450*	*0.40*	*1.14*	*188.0*	*95%*
Briar Ridge Pump Station									72.88	**3644**	*6094*	2.97	85.6		35.08	3.1		*6.76*		5.25	35.6	0.00	**92.96**	*88.15*	56.9	178.1						
WEST KNUEA / MARCH ROAD																															
W-1	W-1	W-3	7.51			5.14		519.1	5.14	**519**		3.97	8.3								0.0	7.51	7.51		2.1	10.4	203	200	0.40	0.67	21.6	48%
													0.0																		
W-2	W-2	W-3	8.94			2.36		238.4	2.36	**238**		4.00	3.9						**4.32**	4.32	3.8	8.94	8.94		2.5	10.1	203	200	0.35	0.62	20.2	50%
													0.0																		
W-3	W-3	W-4	6.52			1.97	2.16	546.7	11.63	**1304**		3.72	19.7								0.0	6.52	22.97		6.4	26.1	254	250	0.70	1.02	51.9	50%
W-5	W-5	W-6	4.20			2.74		276.7	2.74	**277**		4.00	4.5								0.0	4.20	4.20		1.2	5.7	203	200	0.35	0.62	20.2	28%
W-6	W-6	W-8	4.29			3.04		307.0	5.78	**584**		3.94	9.3								0.0	4.29	8.49		2.4	11.7	203	200	0.35	0.62	20.2	58%
													0.0																		
W-7	W-7	W-8	7.39			4.24		428.2	4.24	**428**		4.00	6.9								0.0	7.39	7.39		2.1	9.0	203	200	1.60	1.33	43.2	21%
W-8	W-8	W-9	2.85			1.02	0.55	191.6	11.59	**1204**		3.75	18.3								0.0	2.85	18.73		5.2	23.5	254	250	0.35	0.72	36.7	64%
W-4	W-4	MR-1	3.10					0.0	23.22	**2508**		3.51	35.6				**0.35**	0.35	**0.83**	5.15	4.8	3.10	26.07		7.3	47.7	254	250	1.00	1.22	62.0	77%
													0.0																		
W-14	W-14	W-15	3.79			0.36		36.4	0.36	**36**		4.00	0.6						**2.89**	2.89	2.5	3.79	3.79		1.1	4.2	203	200	0.35	0.62	20.2	21%
W-15	W-15	W-17	3.17			2.20		222.2	2.56	**259**		4.00	4.2								0.0	3.17	6.96		1.9	6.1	203	200	0.35	0.62	20.2	30%

TABLE C-6b:
SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION				RESIDENTIAL AREA AND POPULATION										ICI							INFILTRATION				FLOW	PIPE					
									Cumulative					IND			COMM		INST													
Street	From	To	Total	Dwellings		Density (Net ha)		Pop.	Residential			Peak	Peak	Area	Accu.	Peak	Area	Accu.	Area	Accu.	Peak	Total	Accu. Area		Infiltration	Total	Dia	Dia	Slope	Velocity	Capacity	Ratio
	Node	Node	Area	SFH	SD/TH	Low[3]	High[4]		Area	Pop.		Factor	Flow		Area	Factor		Area		Area	Flow	Area	New	Exist	Flow	Flow	Act	Nom		(Full)	(Full)	Q/Qfull
			(ha)	3.4	2.7	101	161		(ha)	New	Exist		(l/s)	(ha)	(ha)		(ha)	(ha)	(ha)	(ha)	(l/s)	(ha)	(ha)		(l/s)	(l/s)	(mm)	(mm)	(%)	(m/s)	(l/s)	(%)
W-16	W-16	W-17	6.55			3.17	1.78	606.8	4.95	**607**		3.93	9.7								0.0	6.55	6.55		1.8	11.5	203	200	0.35	0.62	20.2	57%
W-17	W-17	MR-1	3.43					0.0	7.51	**865**		3.84	13.5				**3.05**	3.05		8.04	9.6	6.48	19.99		5.6	28.7	254	250	0.30	0.67	33.9	84%
MR-1 (MARCH ROAD)	MR-1	MR-2	1.36					0.0	30.73	**3373**		3.40	46.4					3.40		8.04	9.9	1.36	47.42		13.3	69.6	610	600	0.10	0.69	202.4	34%
W-9	W-9	MR-2	7.17				1.13	181.9	1.13	**182**		4.00	2.9				**1.38**	1.38	**3.77**	3.77	4.5	7.17	25.90		7.3	14.7	203	200	1.20	1.15	37.4	39%
MR-2 (MARCH ROAD)	MR-2	MR-3	1.37					0.0	33.23	**3555**		3.38	48.7					4.78		11.81	14.4	1.37	74.69		20.9	84.0	610	600	0.10	0.69	202.4	41%
W-10	W-10	W-11	1.53				0.78	125.6	0.78	**126**		4.00	2.0								0.0	1.53	1.53		0.4	2.5	203	200	0.70	0.88	28.6	9%
W-11	W-11	MR-3	3.55				1.64	264.0	2.42	**390**		4.00	6.3				**1.08**	1.08			0.9	3.55	5.08		1.4	8.7	203	200	0.70	0.88	28.6	30%
W-18	W-18	W-19	3.90			1.21	1.82	415.2	3.03	**415**		4.00	6.7								0.0	3.90	3.90		1.1	7.8	203	200	0.35	0.62	20.2	39%
W-19	W-19	MR-3	9.23					0.0	3.03	**415**		4.00	6.7				**8.83**	8.83			7.7	9.23	13.13		3.7	18.1	254	250	0.25	0.61	31.0	58%
MR-3 (MARCH ROAD)	MR-3	MR-4	4.74					0.0	38.68	**4360**		3.30	58.3				2.06	16.75		11.81	24.8	4.74	97.64		27.3	110.4	610	600	0.10	0.69	202.4	55%
W-12	W-12	X-12	11.62			2.24	6.98	1350.0	9.22	**1350**		3.71	20.3						**2.01**	2.01	1.7	11.62	11.62		3.3	25.3	254	250	0.30	0.67	33.9	75%
X-12 (BIDGOOD / HALTON TERRACE)	X-12	MR-4	3.54				0.79	127.2	10.01	**1477**		3.68	22.0								0.0	3.54	15.16		4.2	26.3	254	250	1.00	1.22	62.0	42%
X-5 (760 & 788 March Road)	X-5	MR-4	1.76				1.76	283.4	1.76	**283**		4.00	4.6								0.0	1.76	1.76		0.5	5.1						
MR-4 (MARCH ROAD)	MR-4	*MH 186*	4.71					0.0	50.45	**6120**		3.16	78.4					16.75		13.82	26.5	4.71	119.27		33.4	138.3	610	600	0.10	0.69	202.4	68%
*X-6 (750 March Road, Blue Heron Co-op Homes)*****	*X-6*	*X-8*	*1.29*		*83*			*224.1*	*1.29*		*224*	*4.00*	*2.1*								*0.0*	*1.29*		*1.29*	*0.5*	*2.5*						
			**** 83 units obtained from Co-op website (http://www.chaseo.ca/member/blue-heron-co-op/)																													
*X-7 (Morgans Grant) ******	*X-7*	*X-8*	*48.45*					*3188.0*	*49.74*		*3188*	*3.42*	*25.2*								*0.0*	*48.45*		*49.74*	*17.4*	*42.6*						
			***** Information obtained from JL Richards #24566, Sanitary Design Sheet, July 2012																													
X-8 (Inverary Drive)	*X-8*	*MH 186*	*4.31*	*39*	*49*			*264.9*	*54.05*		*3677*	*3.37*	*28.6*								*0.0*	*4.31*		*54.05*	*18.9*	*47.6*						
Shirley's Brooke Drive	*MH 186*	*MH 184*	*0.00*					*0.0*	*104.50*	**6120**	*3677*	*2.96*	*98.7*					*16.75*		*13.82*	*26.5*	*0.00*	*119.27*	*54.05*	*52.3*	*177.5*	610	600	0.10	0.69	202.4	88%
X-9 (Mckinley Drive)	*X-9*	*MH 184*	*7.84*		*117*			*315.9*			*316*	*4.00*	*2.9*				*2.73*	*2.73*			*2.4*	*7.84*		*7.84*	*2.7*	*8.0*						
Shirleys Brooke Drive	*MH 184*	*MH 182*	*0.00*					*0.0*	*104.50*	**6120**	*3993*	*2.95*	*100.4*					*19.48*		*13.82*	*28.9*	*0.00*	*119.27*	*61.89*	*55.1*	*184.4*	610	600	0.10	0.69	202.4	91%
Shirleys Brooke Drive	*MH 182*	*MH 1*	*0.00*					*0.0*	*104.50*	**6120**	*3993*	*2.95*	*100.4*					*19.48*		*13.82*	*28.9*	*0.00*	*119.27*	*61.89*	*55.1*	*184.4*	610	600	0.10	0.69	202.4	91%
X-10 (Sandhill Road)		*MH 1*	*11.62*	*9*	*60*		*5.32*	*1049.1*	*11.62*		*1049*	*3.79*	*9.2*						*2.11*	*2.11*	*1.8*	*11.62*		*11.62*	*4.1*	*15.1*						
X-11		*MH 1*	*0.87*				*0.87*	*140.1*	*0.87*		*140*	*4.00*	*1.3*								*0.0*	*0.87*		*0.87*	*0.3*	*1.6*						
Briar Ridge Pump Station	*PS*	*MH 1*							72.88	**3644**	6094	2.97	85.623	0	35.08	3.1	0.00	6.76	0.00	5.25	35.6	0.00	92.96	88.15	56.9	178.1						
EAST MARCH TRUNK	*MH 1*	*EMT*	0.00					0.0	189.87	**9764**	11276	2.63	172.7		35.08	3.1		26.24		21.18	66.3	0.00	212.23	162.53	116.3	355.3	762	750	0.10	0.80	367.1	97%

DESIGN PARAMETERS

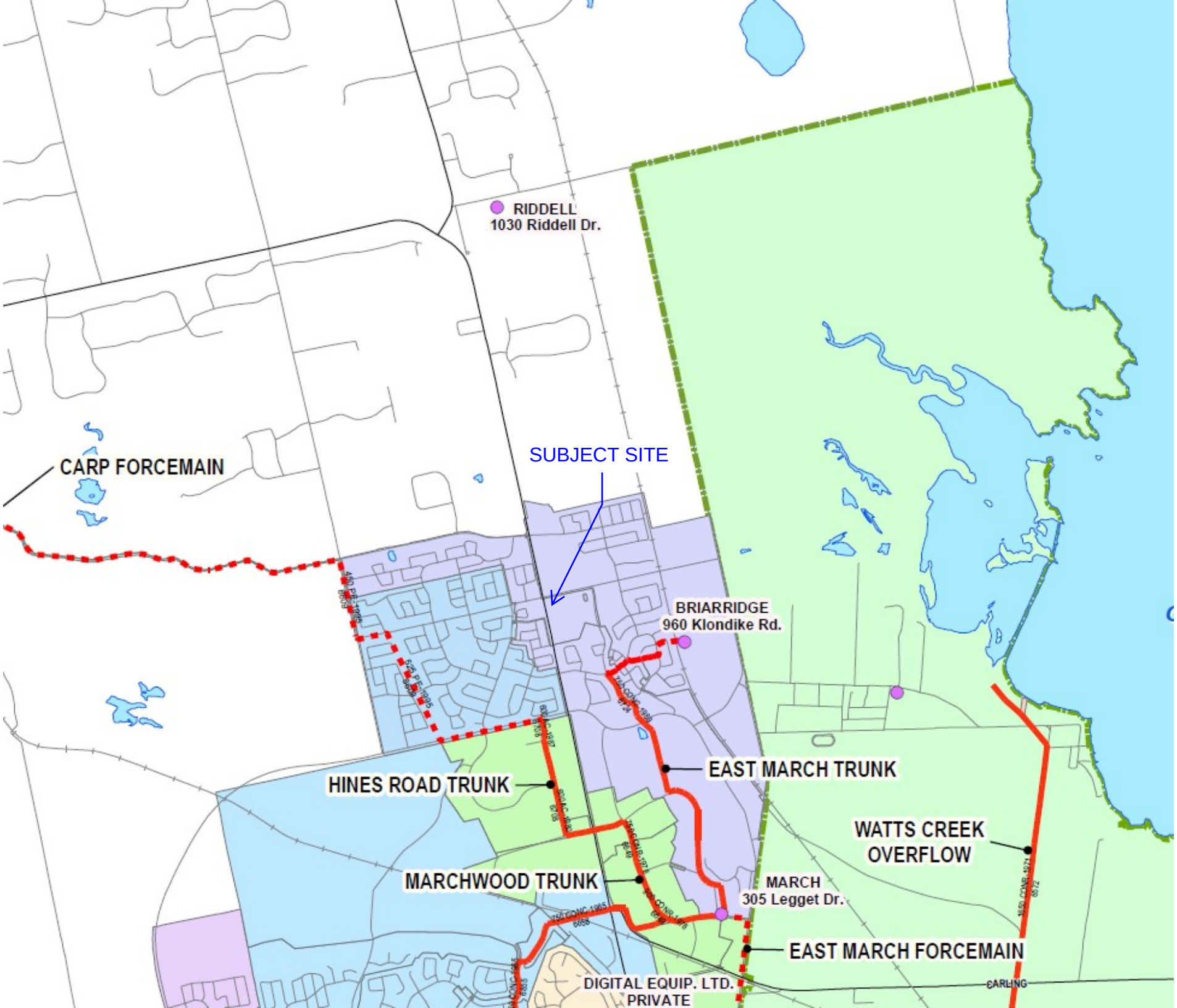
Average Daily Flow (Future)=	350	L/cap/day	Industrial Peak Factor=	per MOE graph	
Average Daily Flow (Existing)=	200	L/cap/day	Extraneous Flow (Future)=	0.28	L/s/ha
Indust/Comm/Inst Flow (Future)=	50000	L/ha/day	Extraneous Flow (Existing)=	0.35	L/s/ha (Jan 2008 monitored event)
Indust/Comm/Inst Flow (Existing)=	20000	L/ha/day	Minimum Velocity=	0.60	m/s
Max Res Peak Factor=	4.00		Manning's n=	0.013	
Comm/Inst Peak Factor=	1.50				

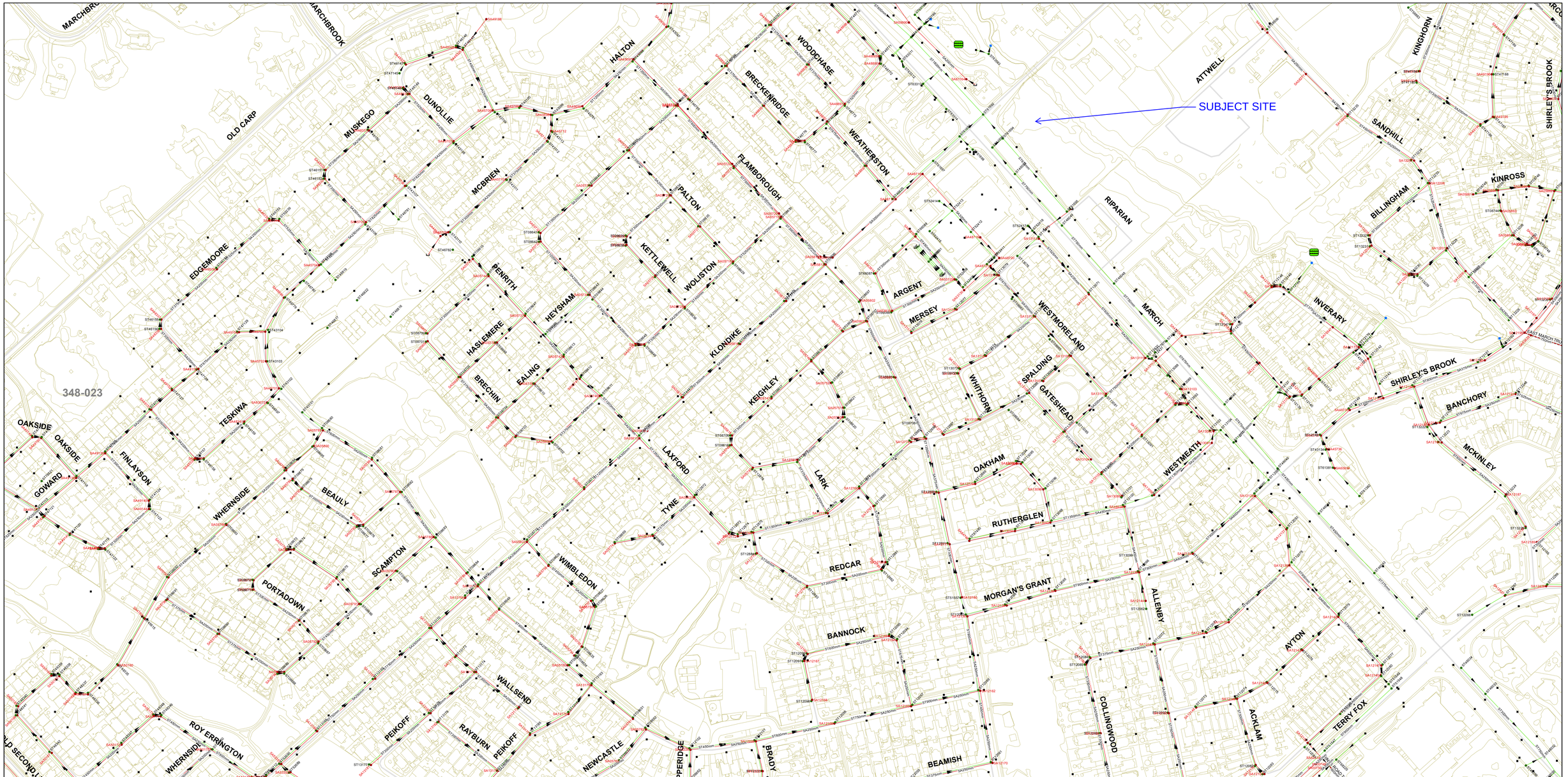
Designed: Alex McAuley
Checked: CJR
Dwg. Reference: 112117-SAN1, 112117-SAN2

PROJECT: Kanata North Community Design Plan
CLIENT: Kanata North Land Owners
Date: May, 2016

Notes:
1. Existing sanitary sewers tributary to, and not receiving flow from the KNUEA Trunk sewer have not been analysed for capacity
2. Existing unit counts obtained from City of Ottawa geoOttawa (2014) parcel counts, unless otherwise indicated
3. Low Density based on (16.6 Singles/net ha * 3.4pers/unit) + (16.5 Towns/net ha * 2.7pers/unit)
4. High Density based on (35.8 Towns/net ha * 2.7pers/unit) + (35.8 Apartments/net ha * 1.8pers/unit)
5. Overall unit counts for the KNCDP are based on Demonstration Plan "A-24", plus 10% to allow for flexibility in unit type distribution

Upgraded Existing Sanitary Sewers


RIDDELL
1030 Riddell Dr.
CARP FORCEMAIN
SUBJECT SITE
BRIARRIDGE
960 Klondike Rd.
EAST MARCH TRUNK
HINES ROAD TRUNK
WATTS CREEK
OVERFLOW
MARCHWOOD TRUNK
MARCH
305 Legget Dr.
EAST MARCH FORCEMAIN
DIGITAL EQUIP. LTD.
PRIVATE
CARLING



2017 Sewer Collection System

Department of Planning, Infrastructure and Economic Development

This map was compiled from existing & collected engineering Information from the City of Ottawa Geographic Information System and is protected by copyright. The location of Infrastructure is approximate and should not be used for construction purposes.

Scale 1:2500

Ottawa

Legend

- Storm Inlet
- Storm Outlet
- Storm Manhole
- Sanitary Manhole
- Combined Manhole
- Combined Pipe
- Sanitary Pipe
- Storm Pipe
- Pipe Cap
- Combined Trunk Sewer
- Sanitary Trunk Sewer
- Storm Trunk Sewer
- Regulator
- Storm Pumping Station
- Storm Water Management Pond
- Sanitary Pumping Station
- Treatment Plant

Pipe Equivalents

nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2850	114
600	24	1650	66	3000	120

Pipe Materials

A - ASBESTOS
CI - CAST IRON
CO - COPPER
CO0 - AWWA C300
CO1 - AWWA C301
CO2 - AWWA C302
CO3 - AWWA C303
DI - DUCTILE IRON
PE - POLYETHYLENE (DR11 TO DR21)
PVC - POLYVINYL CHLORIDE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON
UNK - UNKNOWN MATERIAL

348-023

APPENDIX D

Stormwater Management

Date Modified / Date de modification: 12/20/2017

This map and the associated information displayed are to be used for general illustrative purposes only. Although best efforts have been made to create accuracy; due to the complex and extensive nature of the data, all representations and/or information provided herein are approximate and to be verified by user. User hereby acknowledges that this map is not intended for true and accurate navigational purposes and hereby accepts and assumes all inherent risks associated with the use of this map.

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Digital Elevation Information © City of Ottawa

N
W E
S

SCALE 1:2,000 ÉCHELLE

0 25 50 100 150 200

Meters / Mètres

Cette carte et les renseignements connexes qui sont affichés sont fournis à titre d'exemple général seulement. En dépit de tous les efforts consentis pour en garantir l'exactitude, les représentations ou renseignements que l'on trouvera ici demeurent approximatifs du fait de la nature complexe et de l'étendue des données, et doivent donc être vérifiés par l'utilisateur. L'utilisateur reconnait par la présente que cette carte n'est pas conçue pour une navigation exacte et véridique, accepte et endosse les risques connexes associés à son utilisation.

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Données altimétriques numériques © Ville d'Ottawa

MAP No.
CARTE No. 4

FLOOD RISK MAP
SHIRLEY'S BROOK
CARTE DU RISQUE D'INONDATION

LEGEND / LÉGENDE

- Regulatory Floodplain / La Crue Régulatrice
- Regulatory Limit / Limite Réglementaire
- Contours / Courbes
- Stream / Ruisseau
- Cross Sections / La coupe traversale

Station Number — Numéro de la station
6446
75.7
Regulatory Flood Elevation (m) — Niveau de la crue regulatrice (m)

INDEX CONTOUR INTERVAL 2 METRES
WITH 0.5 METRE INTERMEDIATE CONTOUR
NORTH AMERICAN DATUM 1983

COURBES DE NIVEAU PRINCIPALES DE 2.0 MÈTRE
AVEC COURBES DE NIVEAU INTERMÉDIAIRES DE 0.5 MÈTRES
SYSTÈME DE RÉFÉRENCE GÉODÉSIQUE NORD-AMÉRIQUE 1983

GENERAL INFORMATION

Vertical Datum: CGVD28
Horizontal Datum: North American 1983
Map Projection: Ottawa Transverse Mercator Projection

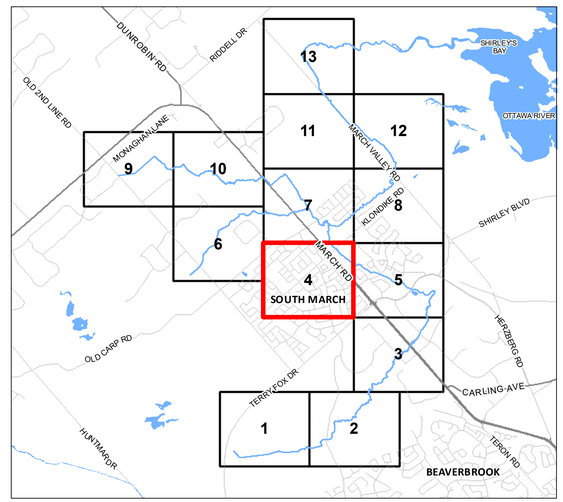
RENSEIGNMENTS GÉNÉRAUX

Niveau de référence vertical: CGVD28
Niveau de référence horizontal: Nord-americain 1983
Projection cartographique: Projection Mercator Transverse d'Ottawa

Mississippi Valley Conservation Authority

Ottawa

SHEET INDEX / TABLEAU D'ASSEMBLAGE



Revision #	Issue
1 - Oct. 25, 2017	Public Review
2 - Dec. 6, 2017	Board approval

LICENSED PROFESSIONAL ENGINEER
J. S. A. PRICE
Nov. 10/17
PROVINCE OF ONTARIO

10731854 CANADA INC
788 March Road
Existing Site Conditions
Tributary to Shirley's Brook

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Existing Drainage Charateristics From Internal Site

Area	0.707	ha
C	0.20	Rational Method runoff coefficient
L	72	m
Up Elev	77.67	m
Dn Elev	71.84	m
Slope	8.1	%
Tc	12.4	min

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Estimated Peak Flow

	2-year	5-year	100-year	
i	68.6	93.0	159.2	mm/hr
Q	27.0	36.5	78.2	L/s

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

10731854 CANADA INC
788 March Road
Proposed Site Conditions
Tributary to Shirley's Brook (EX-1)

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Estimated Post Development Peak Flow from External Drainage

Area ID **EX1**
Total Area 0.112 ha
C 0.33 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}^* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	104.2	10.5	10.5	0.0	0.0	178.6	22.6	22.6	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012

Target Flow Rate

Area (P1, P2, P3, U1, U2, BLDG) 0.595 ha

Q 41.7 L/s **70L/s/Ha per the Shirley's Brook SWM Facility Design Brief prepared by DME, dated April 2009.*

Estimated Post Development Peak Flow from Unattenuated Areas

Area ID **U1, U2, U3**
Total Area 0.067 ha
C 0.22 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	104.2	4.2	4.2	0.0	0.0	178.6	9.1	9.1	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Area ID **P2**

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage (m)	Ponding (m^2)	h_o (m)	delta d (m)	V* (m^3)	V_{acc}** (m^3)	$Q_{release}$† (L/s)	$V_{drawdown}$ (hr)
Orifice INV	75.55		0.00			0.0	0	0.00
Sewer SL	75.70		0.15	0.15	0.0	0.0	2.2	0.00
Sewer OBV	75.85		0.30	0.15	0.0	0.0	3.3	0.00
	76.61		1.06	0.76	0.0	0.0	6.6	0.00
T/L	77.88	0.4	2.33	1.27	0.2	0.2	9.8	0.00
0.10m Ponding	77.98	346.5	2.43	0.10	12.0	12.1	10	0.34
0.15m Ponding	78.03	679.4	2.48	0.05	25.2	37.3	10.2	1.02
0.20m Ponding	78.10	1379.9	2.55	0.07	70.6	108.0	10.4	2.88

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† $Q_{release}$ = Release rate calculated from Tempest LMF Curve

Orifice Location **STM102** **Dia** LMF85
Total Area 0.272 ha
C 0.74 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual}‡ (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}‡ (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
5	141.2	79.4	10.2	69.2	20.8	242.7	170.5	10.4	160.1	48.0
10	104.2	58.6	10.2	48.4	29.0	178.6	125.5	10.4	115.1	69.0
15	83.6	47.0	10.2	36.8	33.1	142.9	100.4	10.4	90.0	81.0
20	70.3	39.5	10.2	29.3	35.2	120.0	84.3	10.4	73.9	88.7
25	60.9	34.2	10.2	24.0	36.1	103.8	73.0	10.4	62.6	93.9
30	53.9	30.3	10.2	20.1	36.2	91.9	64.6	10.4	54.2	97.5
35	48.5	27.3	10.2	17.1	35.9	82.6	58.0	10.4	47.6	100.0
40	44.2	24.8	10.2	14.6	35.1	75.1	52.8	10.4	42.4	101.8
45	40.6	22.8	10.2	12.6	34.1	69.1	48.5	10.4	38.1	103.0
50	37.7	21.2	10.2	11.0	32.9	64.0	44.9	10.4	34.5	103.6
55	35.1	19.7	10.2	9.6	31.5	59.6	41.9	10.4	31.5	104.0
60	32.9	18.5	10.2	8.3	30.0	55.9	39.3	10.4	28.9	104.0
65	31.0	17.5	10.2	7.3	28.3	52.6	37.0	10.4	26.6	103.8
70	29.4	16.5	10.2	6.3	26.5	49.8	35.0	10.4	24.6	103.3
75	27.9	15.7	10.2	5.5	24.7	47.3	33.2	10.4	22.8	102.7
80	26.6	14.9	10.2	4.7	22.8	45.0	31.6	10.4	21.2	101.9
85	25.4	14.3	10.2	4.1	20.8	43.0	30.2	10.4	19.8	100.9
90	24.3	13.7	10.2	3.5	18.7	41.1	28.9	10.4	18.5	99.9
95	23.3	13.1	10.2	2.9	16.6	39.4	27.7	10.4	17.3	98.7
100	22.4	12.6	10.2	2.4	14.4	37.9	26.6	10.4	16.2	97.5
105	21.6	12.1	10.2	1.9	12.2	36.5	25.6	10.4	15.3	96.1

5-year $Q_{attenuated}$ **10.19 L/s** **100-year $Q_{attenuated}$** **10.39 L/s**
5-year Max. Storage Required **36.2 m^3** **100-year Max. Storage Required** **104.0 m^3**
Est. 5-year Storage Elevation **78.03 m** **Est. 100-year Storage Elevation** **78.10 m**

10731854 CANADA INC
788 March Road
Storm Proposed Conditions
Tributary to Shirley's Brook SWM POND

Area ID **P3**

Total Area 0.049 ha
C 0.81 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
5	141.2	15.5	5.3	10.2	3.1	242.7	32.9	11.2	21.7	6.5
10	104.2	11.4	5.3	6.2	3.7	178.6	24.2	11.2	13.1	7.8
15	83.6	9.2	5.3	3.9	3.5	142.9	19.4	11.2	8.2	7.4
20	70.3	7.7	5.3	2.5	2.9	120.0	16.3	11.2	5.1	6.1
25	60.9	6.7	5.3	1.4	2.1	103.8	14.1	11.2	2.9	4.4
30	53.9	5.9	5.3	0.7	1.2	91.9	12.5	11.2	1.3	2.3
35	48.5	5.3	5.3	0.1	0.1	82.6	11.2	11.2	0.0	0.1
40	44.2	4.8	5.3	0.0	0.0	75.1	10.2	11.2	0.0	0.0
45	40.6	4.5	5.3	0.0	0.0	69.1	9.4	11.2	0.0	0.0
50	37.7	4.1	5.3	0.0	0.0	64.0	8.7	11.2	0.0	0.0
55	35.1	3.9	5.3	0.0	0.0	59.6	8.1	11.2	0.0	0.0
60	32.9	3.6	5.3	0.0	0.0	55.9	7.6	11.2	0.0	0.0
65	31.0	3.4	5.3	0.0	0.0	52.6	7.1	11.2	0.0	0.0
70	29.4	3.2	5.3	0.0	0.0	49.8	6.8	11.2	0.0	0.0
75	27.9	3.1	5.3	0.0	0.0	47.3	6.4	11.2	0.0	0.0
80	26.6	2.9	5.3	0.0	0.0	45.0	6.1	11.2	0.0	0.0
85	25.4	2.8	5.3	0.0	0.0	43.0	5.8	11.2	0.0	0.0
90	24.3	2.7	5.3	0.0	0.0	41.1	5.6	11.2	0.0	0.0
95	23.3	2.6	5.3	0.0	0.0	39.4	5.3	11.2	0.0	0.0
100	22.4	2.5	5.3	0.0	0.0	37.9	5.1	11.2	0.0	0.0
105	21.6	2.4	5.3	0.0	0.0	36.5	4.9	11.2	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

5-year $Q_{attenuated}$ **5.25 L/s** **100-year $Q_{attenuated}$** **11.16 L/s**
5-year Max. Storage Required **3.7 m^3** **100-year Max. Storage Required** **7.8 m^3**

10731854 CANADA INC
788 March Road
Storm Proposed Conditions
Tributary to Shirley's Brook SWM POND

Building ID	**BLDG**		
Roof Area	0.207	ha	
Avail Storage Area	0.182	ha	
C	0.90	Rational Method runoff coefficient	*Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*
t_c	10	min, tc at outlet without restriction	

Estimated Number of Roof Drains

Building Length	106	
Building Width	18	
Number of Drains	8	
m^2 / Drain	227.4	max 232.25m^2/notch as recommended by Zurn for Ottawa

Roof Top Rating Curve per Zurn Model Z-105-5

d	A	V_{acc}	V_{avail}	Q_{notch}	Q_{roof}	$V_{drawdown}$
(m)	(m^2)	(m^3)	(m^3)	(L/s)	(L/s)	(hr)
0.000	0	0.0	0.0	0.00	0.00	0.00
0.025	113.7	0.9	0.9	0.32	2.52	0.10
0.050	454.9	6.6	7.6	0.63	5.05	0.47
0.075	1023.5	18.0	25.6	0.95	7.57	1.13
0.100	1819.6	35.1	60.7	1.26	10.10	2.09
0.125	1819.6	45.5	106.1	1.58	12.62	3.10
0.150	1819.6	45.5	151.6	1.89	15.14	3.93

* Assumes one notch opening per drain, assumes maximum slope of 10cm. Each notch estimates a maximum flow rate of 10 GPM (US) (37.8 L/min) per Manufacturer Specifcations (Z105).

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
5	141.2	73.0	8.3	64.7	19.4	242.7	139.4	11.0	128.4	38.5
10	104.2	53.9	8.3	45.6	27.4	178.6	102.6	11.0	91.5	54.9
15	83.6	43.2	8.3	34.9	31.4	142.9	82.1	11.0	71.1	63.9
20	70.3	36.3	8.3	28.0	33.7	120.0	68.9	11.0	57.9	69.4
25	60.9	31.5	8.3	23.2	34.8	103.8	59.6	11.0	48.6	72.9
30	53.9	27.9	8.3	19.6	35.3	91.9	52.8	11.0	41.7	75.1
35	48.5	25.1	8.3	16.8	35.3	82.6	47.4	11.0	36.4	76.5
40	44.2	22.8	8.3	14.6	35.0	75.1	43.2	11.0	32.1	77.1
45	40.6	21.0	8.3	12.7	34.4	69.1	39.7	11.0	28.6	77.3
50	37.7	19.5	8.3	11.2	33.6	64.0	36.7	11.0	25.7	77.1
55	35.1	18.2	8.3	9.9	32.6	59.6	34.2	11.0	23.2	76.6
60	32.9	17.0	8.3	8.8	31.5	55.9	32.1	11.0	21.1	75.9
65	31.0	16.0	8.3	7.8	30.3	52.6	30.2	11.0	19.2	74.9
70	29.4	15.2	8.3	6.9	29.0	49.8	28.6	11.0	17.6	73.8
75	27.9	14.4	8.3	6.1	27.7	47.3	27.1	11.0	16.1	72.5
80	26.6	13.7	8.3	5.5	26.2	45.0	25.8	11.0	14.8	71.1
85	25.4	13.1	8.3	4.8	24.7	43.0	24.7	11.0	13.7	69.6
90	24.3	12.6	8.3	4.3	23.1	41.1	23.6	11.0	12.6	68.0
95	23.3	12.0	8.3	3.8	21.5	39.4	22.7	11.0	11.6	66.3
100	22.4	11.6	8.3	3.3	19.9	37.9	21.8	11.0	10.7	64.5
105	21.6	11.2	8.3	2.9	18.2	36.5	21.0	11.0	9.9	62.6

5-year Q_{roof}	**8.27**	**L/s**	**100-year Q_{roof}**	**11.02**	**L/s**
5-year Max. Storage Required	**35.3**	**m^3**	**100-year Max. Storage Required**	**77.3**	**m^3**
5-year Storage Depth	**0.082**	**m**	**100-year Storage Depth**	**0.109**	**m**
5-year Estimated Drawdown Time	**1.40**	**hr**	**00-year Estimated Drawdown Time**	**2.46**	**hr**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Required Storage (m^3)	100-Year Release Rate (L/s)	100-Year Required Storage (m^3)	100-Year Available Storage (m^3)
Unattenuated Areas (UN)	4.2	0.0	9.1	0.0	0.0
Attenuated Areas (P2)	10.2	36.2	10.4	104.0	108.0
Attenuated Areas (P3)	5.3	3.7	11.2	7.8	7.8
Attenuated Areas (BLD)	8.3	35.3	11.0	77.3	151.6
Total	**28.0**	**75.2**	**41.7**	**189.1**	**267.4**

										Sewer Data								
Area ID	**Up**	**Down**	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**I**	**Q**	**DIA**	**Slope**	**Length**	**$A_{hydraulic}$**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**
			(ha)	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(mm)**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**
P1	STM104	STM103	0.272	0.74	0.20	0.20	10.0	104.2	58.3	300	0.40	65.3	0.071	0.075	0.87	61.2	1.3	0.95
P2	STM103	STM102			0.00	0.20	11.3	98.0	54.8	375	0.25	52.5	0.110	0.094	0.79	87.7	1.1	0.63
	STM102	STM101			0.00	0.20	12.4	93.2	52.1	375	0.25	1.6	0.110	0.094	0.79	87.7	0.0	0.59
P3			0.049	0.81	0.04	0.04	10.0	104.2	11.5									
BLDG			0.207	0.90	0.19	0.19	10.0	104.2	53.9									
	BLD	STM101			0.00	0.23	12.4	93.0	58.4	300	1.00	12.1	0.071	0.075	1.37	96.7	0.1	0.60
	STM101	EX. STM			0.00	0.43	12.5	92.4	109.7	375	1.00	17.4	0.110	0.094	1.59	175.3	0.2	0.63
							12.7											

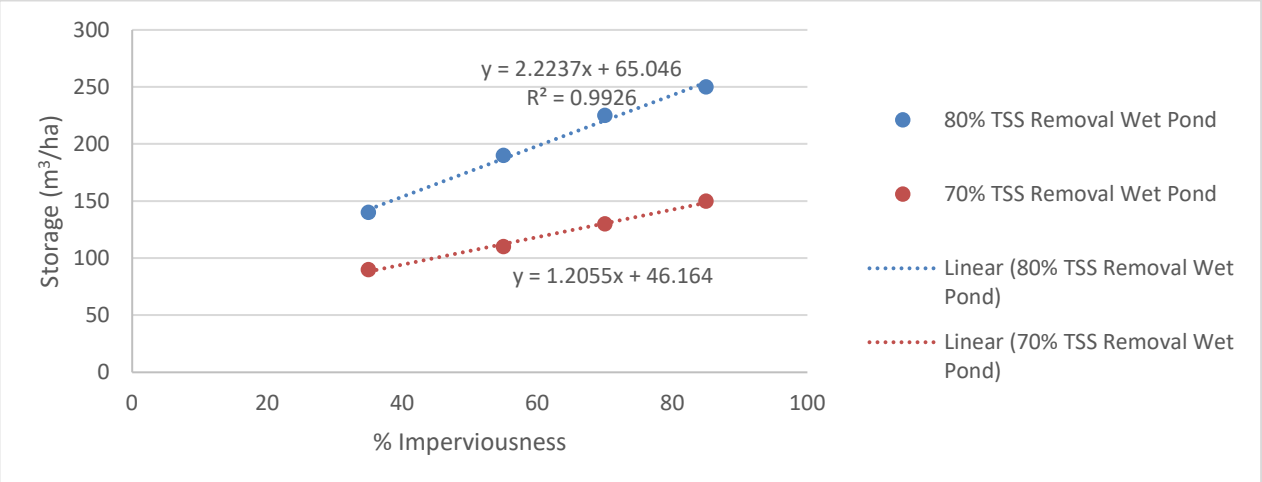
Preliminary Wet Pond Sizing Per MOE - Contemplated Drainage Area from 788 March Road in Shirley's Brook SWM Facility 1 West prepared by DME March 2009

Tributary Area	ha	0.78	
Estimated Imperviousness	(%)	86	
Perm Pool Volume	m^3/ha	110	<-- 40 m3/ha accounted for in ext. detention (86% Imp.
Perm Pool Vol Req	m^3	85.8	Interpolated per graph below)
Extended Detention	m^3	31.2	

Table 3.2 Water Quality Storage Requirements based on Receiving Waters[1, 2]

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

Source: Stormwater Management Planning and Design Manual prepared by the MOE, 2003



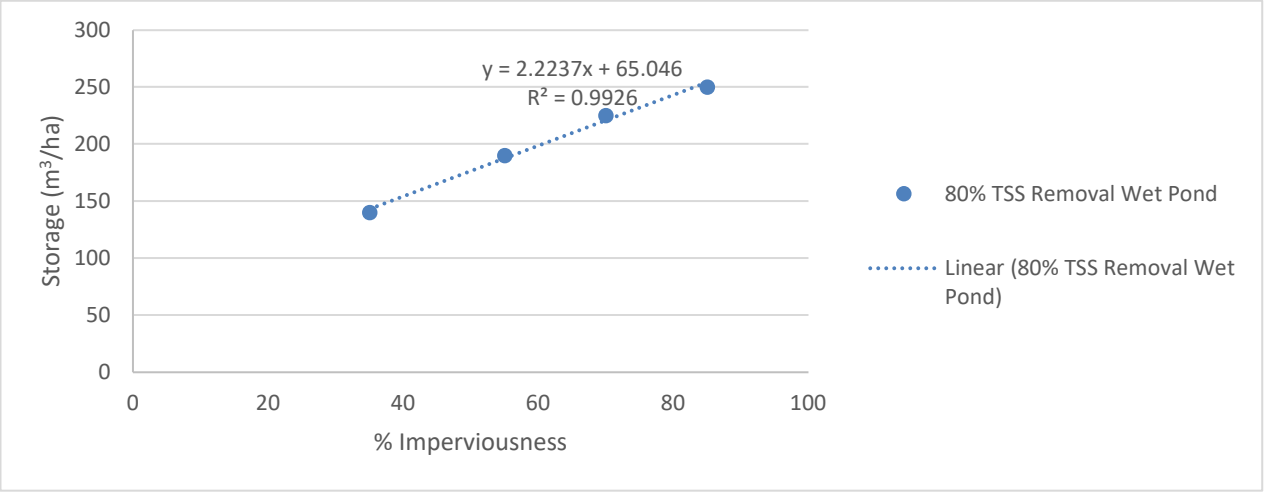
Preliminary Wet Pond Sizing Per MOE - Contemplated Drainage Area from 788 March Road in Shirley's Brook SWM Facility 1 West prepared by DME March 2009

Tributary Area	ha	0.321	<-- Area only includes non-roof runoff (P1, P2, P3)
Estimated Imperviousness	(%)	76	
Perm Pool Volume	m^3/ha	194.0	
Perm Pool Vol Req	m^3	62.3	<-- 40 m3/ha accounted for in ext. detention
Extended Detention	m^3	12.84	

Table 3.2 Water Quality Storage Requirements based on Receiving Waters[1, 2]

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

Source: Stormwater Management Planning and Design Manual prepared by the MOE, 2003



Drawing name: W:\Projects\2600\2654 - Trinity - Kanata Plaza\C - Design Information\Z1 - SWM\

Date of plot: Mar 03 , 2009-4:56 pm

NOTES:

1. DRAINAGE AREAS AND PERCENT IMPERVIOUSNESS DERIVED FROM MARCH ROAD RECONSTRUCTION MINOR SYSTEM DRAINAGE PLAN, NOVEMBER 2008 RECEIVED FROM STANTEC.

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

TRINITY

No.	REVISION	DATE	BY

LICENSED PROFESSIONAL ENGINEER — MAR 4/2009 — H. Gunadasake — 10078136 — PROVINCE OF ONTARIO

DME Ltd.
David McManus Engineering Ltd.
400 - 30 Camelot Drive
Ottawa Ontario, K2G 5X8
E-mail: mcmanus@dmel.on.ca
Ph. 225-1929 Fax 225-7330

BASEPLAN	DME
DESIGN	
CHECKED	
CAD	ACF
PROJ. MGR.	MJG
APPROVED	HGS

SCALE: NOT TO SCALE

TRINITY DEVELOPMENT GROUP
MARCH ROAD
CITY OF OTTAWA

SERVICE AREA DRAINAGE PLAN

PROJECT No. 2654
SURVEY BY STANTEC
DATE MARCH 2009
DRAWING No. STM-AREAS

LEGEND:

- MH3 | 0.391ha C=0.9 | 0.162ha C=0.3 — AREA IDENTIFICATION / AREA HECTARE / RUNOFF COEFFICIENT
- 4 — PROPOSED STORM SEWER, MANHOLE, FLOW DIRECTION AND IDENTIFICATION NUMBER
- DRAINAGE AREA LIMIT
- 170 STMH — EXISTING STORM SEWER, MANHOLE, FLOW DIRECTION AND IDENTIFICATION NUMBER

Stantec

LICENSED PROFESSIONAL ENGINEER — J. G. D'AOUST — PROVINCE OF ONTARIO

Horizontal
30m 15 0 10 20 40m

NO.	REVISION	BY	DATE
1	REVISED DRAINAGE AREAS	J.G.L.	12/15/08
2	ISSUED FOR MOE/COA	S.G.D.	6/22/09

NOTE:
The location of the utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned.
The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

MARCH ROAD RECONSTRUCTION
MORGAN'S GRANT WAY TO OLD CARP ROAD

MINOR SYSTEM DRAINAGE PLAN

Ottawa

CONTRACT NO. 163600607
DWG. NO. DA1
SHEET 1 OF 1
Date: JUNE 2009
Scale: 1:1000

B.M. MASON, P.ENG. — Design and Construction (Municipal) – West
S. STODDARD, P.ENG. — Senior Engineer Infrastructure Projects

Dwn: G.R.L. Chkd: S.G.D. Des: S.G.D. Chkd: J.G.L.

STORM SEWER TO SWM POND

SWM Pond (BY OTHERS)

MH155 0.830ha C=0.8

ST14 0.312ha C=0.9 | 0.104ha C=0.3

MH158 0.195ha C=0.9 | 0.040ha C=0.3

MH160 0.158ha C=0.9 | 0.060ha C=0.3

MH165 0.154ha C=0.9 | 0.044ha C=0.3

MH155 0.740ha C=0.6

MH155 0.748ha C=0.9 | 0.189ha C=0.3

MH3 0.231ha C=0.9 | 0.142ha C=0.3

MH2 0.318ha C=0.9 | 0.133ha C=0.3

MH1 0.519ha C=0.9 | 0.197ha C=0.3

MH154 0.108ha C=0.2 | 4.620ha C=0.6

MH154 0.141ha C=0.7

MH154 0.480ha C=0.85

MH155 0.600ha C=0.8

MH170 0.305ha C=0.9 | 0.059ha C=0.3

MH175 0.311ha C=0.9 | 0.050ha C=0.3

MH181 0.355ha C=0.9 | 0.168ha C=0.3

MH185 0.197ha C=0.9 | 0.007ha C=0.3

MH191 0.374ha C=0.9 | 0.060ha C=0.3

MH196 0.303ha C=0.9 | 0.100ha C=0.3

MH200 0.313ha C=0.9 | 0.060ha C=0.3

CONNECT EXISTING KLONDIKE ROAD 750mm DIA. STORM SEWER

Morgan's Grant Pond

BRECKENRIDGE CRESCENT

WOODCHASE STREET

WEATHERSTON STREET

FLAMBOROUGH WAY

MARCH ROAD

OLD CARP ROAD

KLONDIKE ROAD

SHIRLEY'S BROOK DRIVE

TERRY FOX DRIVE

MORGAN'S GRANT DRIVE

MATCHLINE 'A'

STORM SEWER DESIGN WORKSHEET - MINOR FLOW ANALYSIS

LOCATION			AREAS (ha)				INDIV.	ACCUM.	TIME	RAIN-	PEAK	SEWER DATA							
STREET	FROM	TO	R=0.60	R=0.30	R=0.80	R=0.90	2.78 AR	2.78 AR	OF CONC.	FALL INT. I	FLOW Q (L/s)	TYPE OF PIPE	NOM. DIA. (mm)	SLOPE (%)	LENGTH (m)	FULL CAP. (L/s)	CAP. VEL. (m/s)	TIME OF FLOW (min)	Q/Qcap
MARCH ROAD																			
Existing Storm Sewer - Area 9A	200	196		0.060		0.313	0.83	0.83	10.0	122.1	102	Conc.	375	1.00	80	183	1.60	0.8	0.56
Existing Storm Sewer - Area 9	196	191		0.100		0.303	0.84	1.67	10.8	117.2	196	Conc.	450	1.10	105	312	1.90	0.9	0.63
Existing Storm Sewer - Area 8	191	185		0.060		0.374	0.99	2.66	11.8	112.2	299	Conc.	450	1.10	78	312	1.90	0.7	0.96
Existing Storm Sewer - Area 7	185	181		0.007		0.197	0.50	3.16	12.4	108.8	344	Conc.	675	0.16	107	351	0.95	1.9	0.98
Existing Storm Sewer - Area 6	181	175		0.188		0.325	0.97	4.13	14.3	100.5	415	Conc.	675	0.25	110	438	1.19	1.5	0.95
Existing Storm Sewer - Area 5	175	170		0.050		0.310	0.82	4.95	15.9	94.7	468	Conc.	750	0.16	100	465	1.02	1.6	1.01
Existing Storm Sewer - Area 4	170	165		0.059		0.305	0.81	5.76	17.5	89.3	514	Conc.	750	0.18	100	493	1.08	1.5	1.04
Existing Storm Sewer - Area 3	165	160		0.044		0.154	0.42	6.18	19.0	84.8	524	Conc.	750	0.21	90	532	1.17	1.3	0.98
Existing Storm Sewer - Area 2	160	157		0.060		0.158	0.44	6.62	20.3	81.4	539	Conc.	750	0.95	45	1132	2.48	0.3	0.48
	157	158					0.00	6.62	20.6	80.6	534	Conc.	750	0.50	20	821	1.80	0.2	0.65
Properties east of Klondike-March intersection (5-year)	ST14	158			1.520		3.38	3.38	10.0	104.2	352								
NE half of March Rd (10-yr)	ST14	158		0.104		0.312	0.87	0.87	10.0	122.1	106								
Total to ST14	ST14	158								Total	458	Conc.	675	0.30	125	480	1.30	1.6	0.95
	158	155		0.040		0.195	0.52	8.01	20.8	80.2	995	Conc.	825	0.85	60	1381	2.50	0.4	0.72
KLONDIKE ROAD (minor contribution from 750mm from MG)	1314	154				Controlled discharge from JLR design (w/ ICDs)					367		750	0.20	71	519	1.14	1.0	0.71
	154	156									367		750	1.30	45	1324	2.90	0.3	0.28
KLONDIKE ROAD (Major contribution from DICB at Intersection)	2 DICB	156a		Flow split between 4 leads determined using solvermatching U/S HGLs								2 Leads	610	1.25	6	748	2.48	0.0	0.00
	2 DICB	156a										2 Leads	525	4.50	6	952	4.26	0.0	0.00
										Total	0								
	156a	156									0	Conc.	1500	0.70	23	6170	3.38	0.1	0.00
	156	155									367	Conc.	1650	0.70	42	7955	3.60	0.2	0.05
	155	4	0.74	0.189		0.448	2.51	10.53	21.2	79.2	1,553	Conc.	1800	0.15	136	4644	1.77	1.3	0.33
MARCH ROAD (North of Klondike)	1	2		0.197		0.519	1.46	1.46	10.0	122.1	179	Conc.	450	0.46	110	202	1.23	1.5	0.89
	2	3		0.133		0.318	0.91	2.37	11.5	113.6	269	Conc.	525	0.40	97	284	1.27	1.3	0.95
	3	4		0.142		0.231	0.70	3.07	12.8	107.3	329	Conc.	600	0.75	78	555	1.90	0.7	0.59
MARCH Rd SAG Station 8+050 - (Major from March southbound)		DICB																	
MARCH Rd SAG Station 8+050 - (Major from 0.8 ha property on corner)		DICB																	
MARCH Rd SAG Station 8+050 - (carry over from intersection)		DICB																	
Sum of Above (to DICB)	2 DICB	4									0	twin leads	525	1.75	33	594	2.66	0.2	0.00
Storm Sewer to Diversion Chamber	4	STMH211					0.00	13.59	22.5	76.3	1,756	Conc.	1950	0.15	22	5749	1.87	0.2	0.31
To Pond (neglecting 900mm normal flow pipe to forebay)	STMH211	Pond									1,756	Conc.	1800	0.44	16	7954	3.03	0.1	0.22

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity in millimeters per hour (mm/h)
R = Runoff Coefficient

Notes:
1) 10 yr storm design
2) Accommodates future road widening
3) Mannings n=0.013
n=0.011 PVC
4) 100yr CB Capture = 100% of 10-yr

Designed MT

Checked: SGD

Dwg. Reference:

PROJECT: MARCH ROAD RECONSTRUCTION
Solandt Road to Old Carp Road

LOCATION:
TERRY FOX DRIVE to OLD CARP ROAD

File Ref.: 1636-00607/300 | Date: 09-Jul-09 | Sheet No.:

STORM SEWER DESIGN WORKSHEET - MINOR FLOW ANALYSIS

LOCATION			AREAS (ha)				INDIV.	ACCUM.	TIME	RAIN-FALL	PEAK FLOW	SEWER DATA									SEWER DATA						
												TYPE	NOM.	ACT.	SLOPE	LENGTH	FULL	CAP.	TIME OF	Q/Qcap	MH ELEVATION		INVERT		OBVERT		CO\
STREET	FROM	TO	R=0.60	R=0.30	R=0.80	R=0.90	2.78 AR	2.78 AR	OF CONC.	INT. I	Q (L/s)	OF PIPE	DIA. (mm)	DIA. (m)	(%)	(m)	CAP. (L/s)	VEL. (m/s)	FLOW (min)		U/S (m)	D/S (m)	U/S (m)	D/S (m)	U/S (m)	D/S (m)	U/S (m)
MARCH ROAD																											
Existing Storm Sewer - Area 9A	200	196		0.060		0.313	0.83	0.83	10.0	122.1	122	Conc.	375	0.381	1.00	80	183	1.60	0.8	0.67	83.4	82.541	81.000	80.200	81.381	80.581	2.019
Existing Storm Sewer - Area 9	196	191		0.100		0.303	0.84	1.67	10.8	117.2	236	Conc.	450	0.457	1.10	105	312	1.90	0.9	0.76	82.541	81.2	80.130	78.970	80.587	79.427	1.954
Existing Storm Sewer - Area 8	191	185		0.060		0.374	0.99	2.66	11.8	112.2	358	Conc.	450	0.457	1.10	78	312	1.90	0.7	1.15	81.2	80.7	78.690	77.840	79.147	78.297	2.053
Existing Storm Sewer - Area 7	185	181		0.007		0.197	0.50	3.16	12.4	108.8	413	Conc.	675	0.686	0.16	107	351	0.95	1.9	1.18	80.700	80.100	77.000	76.830	77.686	77.516	3.014
Existing Storm Sewer - Area 6	181	175		0.188		0.325	0.97	4.13	14.3	100.5	498	Conc.	675	0.686	0.25	110	438	1.19	1.5	1.14	80.100	79.616	76.830	76.550	77.516	77.236	2.584
Existing Storm Sewer - Area 5	175	170		0.050		0.310	0.82	4.95	15.9	94.7	562	Conc.	750	0.762	0.16	100	465	1.02	1.6	1.21	79.616	79.141	76.480	76.320	77.242	77.082	2.374
Existing Storm Sewer - Area 4	170	165		0.059		0.305	0.81	5.76	17.5	89.3	617	Conc.	750	0.762	0.18	100	493	1.08	1.5	1.25	79.141	78.688	76.320	76.140	77.082	76.902	2.059
Existing Storm Sewer - Area 3	165	160		0.044		0.154	0.42	6.18	19.0	84.8	629	Conc.	750	0.762	0.21	90	532	1.17	1.3	1.18	78.688	78.420	76.140	75.950	76.902	76.712	1.786
Existing Storm Sewer - Area 2	160	157		0.060		0.158	0.44	6.62	20.3	81.4	647	Conc.	750	0.762	0.95	45	1132	2.48	0.3	0.57	78.420	78.360	75.350	74.923	76.112	75.685	2.308
	157	158					0.00	6.62	20.6	80.6	641	Conc.	750	0.762	0.50	20	821	1.80	0.2	0.78	78.420	78.360	74.850	74.750	75.612	75.512	2.808
Properties east of Klondike-March intersection (5-year)	ST14	158			1.520		3.38	3.38	10.0	104.2	352																
NE half of March Rd (10-yr)	ST14	158		0.104		0.312	0.87	0.87	10.0	122.1	127																
Total to ST14	ST14	158								Total	479	Conc.	675	0.686	0.30	125	480	1.30	1.6	1.00	78.254	77.825	75.168	74.793	75.854	75.479	2.400
	158	155		0.040		0.195	0.52	8.01	20.8	80.2	1,123	Conc.	825	0.838	0.85	60	1381	2.50	0.4	0.81	78.200	78.400	74.641	74.131	75.479	74.969	2.721
KLONDIKE ROAD (minor contribution from 750mm from MG)	1314	154				1:100-yr discharge from JLR design (w/ ICDs)					367		750	0.762	0.20	71	519	1.14	1.0	0.71	80.350	78.600	76.693	76.551	77.455	77.313	2.895
	154	156									367		750	0.762	1.30	45	1324	2.90	0.3	0.28	78.600	78.200	76.000	75.415	76.762	76.177	1.838
KLONDIKE ROAD (Major contribution from DICB at Intersection)	2 DICB	156a	Flow split between 4 leads determined using solvermatching U/S HGLs								2,005	2 Leads	610	0.620	1.25	3	748	2.48	0.0	0.89	77.500	78.200	75.950	75.913	76.570	76.532	0.930
											0																
	2 DICB	156a									1,375	2 Leads	525	0.533	4.50	4	952	4.26	0.0	0.72	77.500	78.200	76.000	75.820	76.533	76.353	0.967
										Total	3,380																
	156a	156									3,380	Conc.	1500	1.524	0.70	23	6170	3.38	0.1	0.55	78.200	78.400	74.231	74.070	75.755	75.594	2.445
	156	155									3,747	Conc.	1650	1.676	0.70	42	7955	3.60	0.2	0.47	78.200	78.400	73.857	73.563	75.534	75.240	2.666
	155	4	0.74	0.189		0.448	2.51	10.53	21.2	79.2	5,100	Conc.	1800	1.829	0.15	136	4644	1.77	1.3	1.10	78.360	78.633	73.411	73.207	75.240	75.036	3.120
MARCH ROAD (North of Klondike)	1	2		0.197		0.519	1.46	1.46	10.0	122.1	214	Conc.	450	0.457	0.46	110	202	1.23	1.5	1.06	78.530	78.060	75.870	75.364	76.327	75.821	2.203
	2	3		0.133		0.318	0.91	2.37	11.5	113.6	323	Conc.	525	0.533	0.40	97	284	1.27	1.3	1.14	78.060	77.430	75.288	74.900	75.821	75.433	2.239
	3	4		0.142		0.231	0.70	3.07	12.8	107.3	395	Conc.	600	0.610	0.75	78	555	1.90	0.7	0.71	77.430	77.230	74.385	73.800	74.995	74.410	2.435
MARCH Rd SAG Station 8+050 - (Major from March southbound)		DICB									207																
MARCH Rd SAG Station 8+050 - (Major from 0.8 ha property on corner)		DICB									181																
MARCH Rd SAG Station 8+050 - (carry over from intersection)		DICB									780																
Sum of Above (to DICB)	2 DICB	4									1,168	twin leads	525	0.533	1.75	33	594	2.66	0.2	0.98	77.000	78.633	75.563	74.986	76.096	75.519	0.904
Storm Sewer to Diversion Chambor	4	STMH211					0.00	13.59	22.5	76.3	6,512	Conc.	1950	1.981	0.15	22	5749	1.87	0.2	1.13	78.633		73.133	73.100	75.114	75.081	3.519
To Pond (neglecting 900mm normal flow pipe to forebay)	STMH211	Pond									6,512	Conc.	1800	1.829	0.44	16	7954	3.03	0.1	0.82	78.633		73.070	73.000	74.899	74.829	3.734

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity in millimeters per hour (mm/h)
R = Runoff Coefficient

Notes:
1) 10 yr storm design
2) Accommodates future road widening
3) Mannings n=0.013
n=0.011 PVC
4) 100yr CB Capture = 120% of 10-yr

Designed MT

Checked: SGD

Dwg. Reference:

PROJECT: MARCH ROAD RECONSTRUCTION
Solandt Road to Old Carp Road

LOCATION: TERRY FOX DRIVE to OLD CARP ROAD

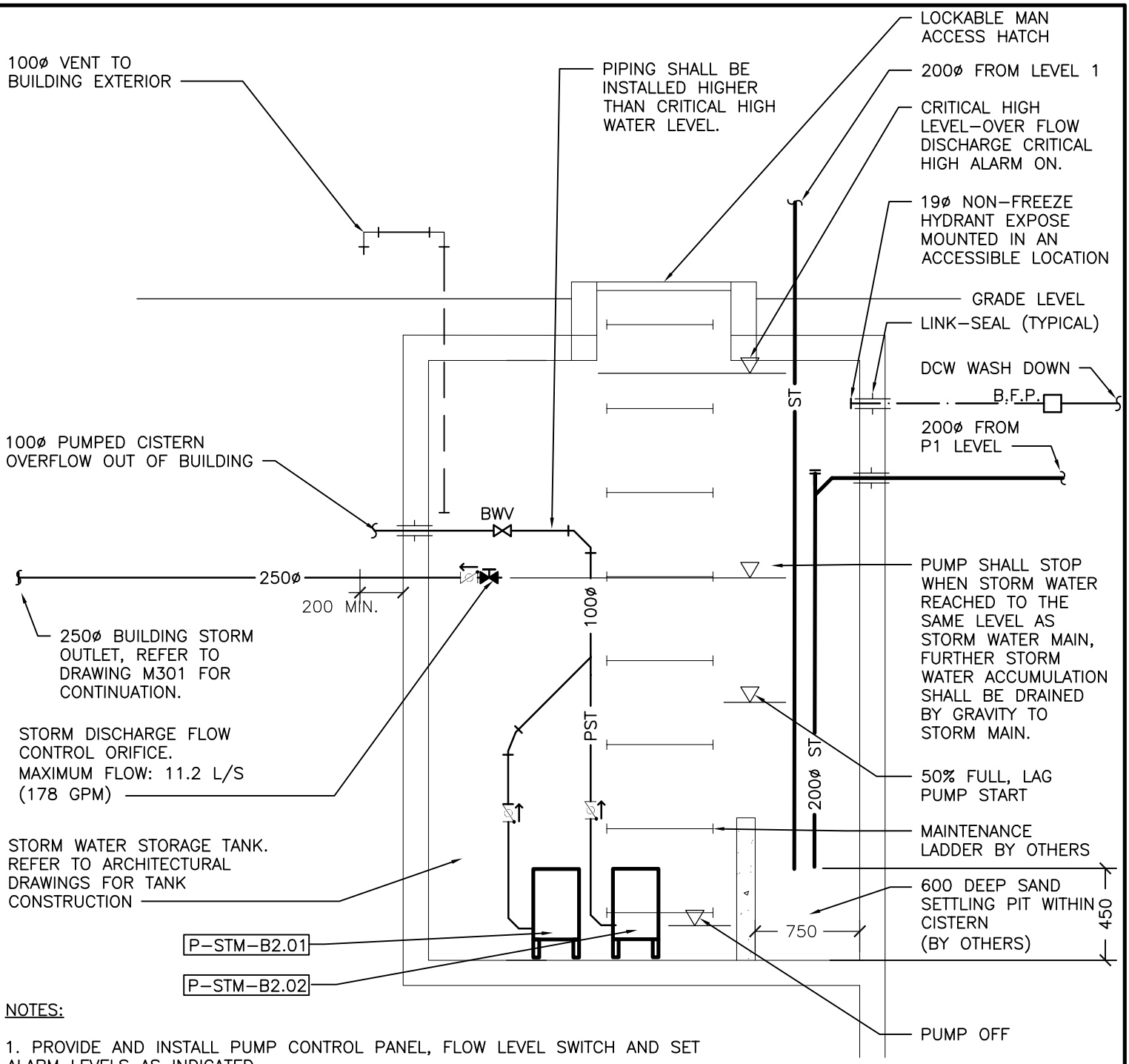
File Ref.: 1636-00607/300 Date: 09-Jul-09 Sheet No.:

STORM SEWER DESIGN WORKSHEET - MINOR FLOW ANALYSIS

LOCATION			/ER D/S	HYDRAULIC GRADE LINE ANALYSIS													
STREET	FROM	TO	(m)	R_h	A (m^2)	V (m/s)	$V^2/2g$ (m)	f'	H_f (m)	K Exit	K Entrance	Kbend Benched	K Losses (m)	Total HL (m)	U/S HGL (m)	U/S HGL FREEBOARD (HGL-T/G)(m)
MARCH ROAD																
Existing Storm Sewer - Area 9A	200	196	1.960	0.095	0.114	1.07	0.058	0.0290	0.357				0.000	0.357	80.68	2.72
Existing Storm Sewer - Area 9	196	191	1.773	0.114	0.164	1.43	0.105	0.0273	0.658				0.000	0.658	80.02	2.52
Existing Storm Sewer - Area 8	191	185	2.403	0.114	0.164	2.18	0.243	0.0273	1.132				0.000	1.132	78.89	2.31
Existing Storm Sewer - Area 7	185	181	2.584	0.171	0.369	1.12	0.064	0.0239	0.237				0.000	0.237	78.65	2.05
Existing Storm Sewer - Area 6	181	175	2.380	0.171	0.369	1.35	0.093	0.0239	0.355				0.000	0.355	78.41	1.69
Existing Storm Sewer - Area 5	175	170	2.059	0.191	0.456	1.23	0.077	0.0231	0.234				0.000	0.234	78.06	1.56
Existing Storm Sewer - Area 4	170	165	1.786	0.191	0.456	1.35	0.093	0.0231	0.282				0.000	0.282	77.82	1.32
Existing Storm Sewer - Area 3	165	160	1.708	0.191	0.456	1.38	0.097	0.0231	0.264				0.000	0.264	77.54	1.15
Existing Storm Sewer - Area 2	160	157	2.676	0.191	0.456	1.42	0.103	0.0231	0.140				0.000	0.140	77.28	1.14
	157	158	2.848	0.191	0.456	1.41	0.101	0.0231	0.061				0.000	0.061	77.14	1.28
Properties east of Klondike-March intersection (5-year)	ST14	158														
NE half of March Rd (10-yr)	ST14	158														
Total to ST14	ST14	158	2.346	0.171	0.369	1.30	0.086	0.0239	0.373	0.5		0.3	0.069	0.442	77.52	0.73
	158	155	3.431	0.210	0.552	2.04	0.211	0.0223	0.338	0.5			0.106	0.443	77.08	1.12
KLONDIKE ROAD (minor contribution from 750mm from MG)	1314	154	1.287	0.191	0.456	0.80	0.033	0.0231	0.071				0.000	0.071	76.95	3.40
	154	156	2.023	0.191	0.456	0.80	0.033	0.0231	0.045	0.5			0.017	0.061	76.88	1.72
KLONDIKE ROAD (Major contribution from DICB at Intersection)	2 DICB	156a	1.668	0.155	0.302	3.32	0.563	0.0177	0.048	1.0	0.5		0.844	0.892	77.90	-0.40
								check 77.90 + 0.111 grate losses <= to 78.05 m which is elevation to keep 1 lane of March Rd. free - OK							
	2 DICB	156a	1.847	0.133	0.223	3.08	0.483	0.0186	0.067	1.0	0.5		0.724	0.791	77.80	-0.30
								check 77.80 + 0.212 grate losses <= to 78.05 m which is elevation to keep 1 lane of March Rd. free - OK							
	156a	156	2.806	0.381	1.824	1.85	0.175	0.0183	0.048	0.5		0.3	0.140	0.188	77.01	1.19
	156	155	3.160	0.419	2.207	1.70	0.147	0.0177	0.065	0.5		0.3	0.118	0.183	76.82	1.38
	155	4	3.597	0.457	2.627	1.94	0.192	0.0172	0.246	0.5		0.3	0.154	0.400	76.63	1.73
MARCH ROAD (North of Klondike)	1	2	2.239	0.114	0.164	1.31	0.087	0.0273	0.572				0.000	0.572	77.68	0.85
	2	3	1.997	0.133	0.223	1.45	0.106	0.0260	0.503				0.000	0.503	77.11	0.95
	3	4	2.820	0.152	0.292	1.35	0.093	0.0248	0.296	0.5		0.3	0.075	0.371	76.61	0.82
MARCH Rd SAG Station 8+050 - (Major from March southbound)		DICB														
MARCH Rd SAG Station 8+050 - (Major from 0.8 ha property on corner)		DICB														
MARCH Rd SAG Station 8+050 - (carry over from intersection)		DICB														
Sum of Above (to DICB)	2 DICB	4	3.114	0.133	0.223	2.61	0.348	0.0260	0.559	0.5	0.5		0.348	0.907	77.14	-0.14
								check 77.14 + 0.038 grate losses <= to 77.50 m which is elevation to keep 1 lane of March Rd free - OK							
Storm Sewer to Diversion Chamber	4	STMH211		0.495	3.083	2.11	0.227	0.0168	0.042	0.3			0.068	0.111	76.23	2.40
To Pond (neglecting 900mm normal flow pipe to forebay)	STMH211	Pond		0.457	2.627	2.48	0.313	0.0172	0.047	1.0	0.3		0.407	0.454	76.12	2.51
								100 year water level in proposed Shirley's Brook pond (Option 4)						75.67	DME April 15, 2009

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity in millimeters per hour (mm/h)
R = Runoff Coefficient

$$h_L = f\frac{L}{d}\frac{V^2}{2g} \qquad f' = \frac{8g}{c^2} \qquad c = \frac{1}{n}R_h^{1/6}$$



NOTES:

1. PROVIDE AND INSTALL PUMP CONTROL PANEL, FLOW LEVEL SWITCH AND SET ALARM LEVELS AS INDICATED.

2. SET OFF SWITCH TO ALLOW PUMP SUCTION TO REMAIN UNDER WATER AT ALL TIMES OR PUMP MAY BECOME AIR–LOCKED.

3. SET ON SWITCH TO ALLOW PUMP TO OPERATE A MINIMUM OF 2 MINUTES PER CYCLE.

4. PUMP MAXIMUM DISCHARGE RATE TO STORM MAIN SHALL BE RESTRICTED BY FLOW CONTROL DEVICE AND NOT EXCEED LIMIT DEFINED BY CIVIL ENGINEERING.

5. BUILDING BAS SHALL MONITOR PUMP OPERATION AND ALL ALARM LEVELS. REFER TO SEQUENCE OF OPERATION OF BAS SYSTEM FOR DETAIL.

Smith + Andersen
1600 Carling Avenue, Suite 530 Ottawa Ontario K1Z 1G3
613 230 1186 f 613 230 2598 smithandandersen.com

PROJECT NAME: **788 MARCH ROAD**				ISSUED FOR: **SITE PLAN REVIEW**
DRAWING TITLE: **CISTERN TANK CONNECTION DETAIL**				DRAWING NO: **MSK-01R3**
DATE: **2020-10-28**	PROJECT NO: 18664.001	SCALE: **N.T.S.**	PART OF DWG: -- REVISION No.: --	

DRAWINGS / FIGURES

TOPOGRAPHIC DETAIL OF
PART OF LOT 10
CONCESSION 4
GEOGRAPHIC TOWNSHIP OF MARCH
CITY OF OTTAWA

SCALE 1 : 250

5 0 5 10 15 metres

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

BEARINGS ARE GRID AND ARE REFERRED TO SOUTHERLY LIMIT OF PART 1, SHOWN ON PLAN 4R-29354, HAVING A BEARING OF N 47°17'45" E .

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
P	DENOTES	PLAN 4R-25367
P1	DENOTES	PLAN 4R-24176
857	DENOTES	FAIRHALL & MOFFATT LIMITED
1692	DENOTES	FARLEY, SMITH AND DENIS SURVEYING LTD.
SG	DENOTES	STANTEC GEOMATICS
C/L	DENOTES	CENTRELINE

ELEVATION NOTES

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.

IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE SITE BENCHMARK HAS NOT BEEN ALTERED OR DISTRUBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.

AREA NOTE

DEVELOPMENT AREA SOUTH WEST OF 30m SETBACK **6684.1** sqm.

CB	DENOTES SINGLE CATCHBASIN
MH	DENOTES MANHOLE
STM MH	DENOTES STORM MANHOLE
WMH	DENOTES WATER MANHOLE
BH	DENOTES BORE HOLE
HP	DENOTES HYDRO POLE
LS	DENOTES LIGHT STANDARD
TP	DENOTES TELEPHONE POLE
TJB	DENOTES TELEPHONE JUNCTION BOX
TL	DENOTES TRAFFIC LIGHT
AN	DENOTES POLE ANCHOR

KLONDIKE ROAD
(ROAD ALLOWANCE BETWEEN LOTS 10 AND 11)
(CONVERTED BY ORDER-IN-COUNCIL DATED MARCH 24, 1928)(A-3-23)

PART 3, PLAN 5R-7561

PART 2, PLAN 4R-26601

PART 4, PLAN 5R-7561

PART 1, PLAN 4R-14643

PART 1, PLAN 5R-13205

PART 1, PLAN 4R-24176
PIN 04517-0801(LT)

PART 1, PLAN 4R-25367
DEDICATED AS PUBLIC HIGHWAY BY BY-LAW NO.2015-351 INST. NO. OC1754486

PART 2, PLAN 4R-25367

PART 2, PLAN 4R-24176

PART 2, PLAN 4R-23954
DEDICATED AS PUBLIC HIGHWAY BY BY-LAW NO.2015-351 INST. NO. OC1754486

PART 2, PLAN 4R-12785
PIN 04517-0780(LT)

PART 1, EXPROPRIATION PLAN 4D-95

MARCH ROAD (REGIONAL ROAD No. 49)

(ROAD ALLOWANCE BETWEEN CONCESSIONS 3 AND 4)

DEPOSITED PLAN MH-3808 (M.T.O. FILE P-1648-3)

LOT 10

CONCESSION 4

SHIRLEYS BROOK

IB (857)

IB (1692)

SIB (1692)

SIB (857)

SIB (SG)

71.49 (P1&MEAS)

N 63°18'20" W (P1& MEAS)

N 42°28'15" W (P1&MEAS)

75.34 (P1&MEAS)

36.91(P)

36.87 (MEAS)

110.01 (P&MEAS)

64.0

N 47°17'45" E (P&MEAS)

37.0

N 47°17'45" E (REFERENCE BEARING) 29.4

R=2727.00 (P&MEAS)

A=127.05 (P&MEAS)

C=127.04

N 39°03'30" W

WATER EDGE

TOP OF SLOPE

BOTTOM OVERHEAD HYDRO CABLE

OVERHEAD TV CABLE

CONCRETE WALK

CURB

EDGE OF ASPHALT ROAD

GROUND CONFIRMED 74.00M CONTOUR LINE

SET 30 METERS FROM SOUTHERLY EDGE OF WATER "SHIRLEYS BROOK"

SITE BENCHMARCH ON CUT CROSS ELEVATION=77.52 m

WESTERLY CORNER OF LOT 10 CONCESSION 4

TOPOGRAPHIC SURVEY UPDATED ON MAY 18, 2018

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
2430 DON REID DRIVE, SUITE 204, OTTAWA, ON K1H 1E1
T: (613) 731-7244 F: (613) 731-8955 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
LH	SS/CF	17-10-136-00

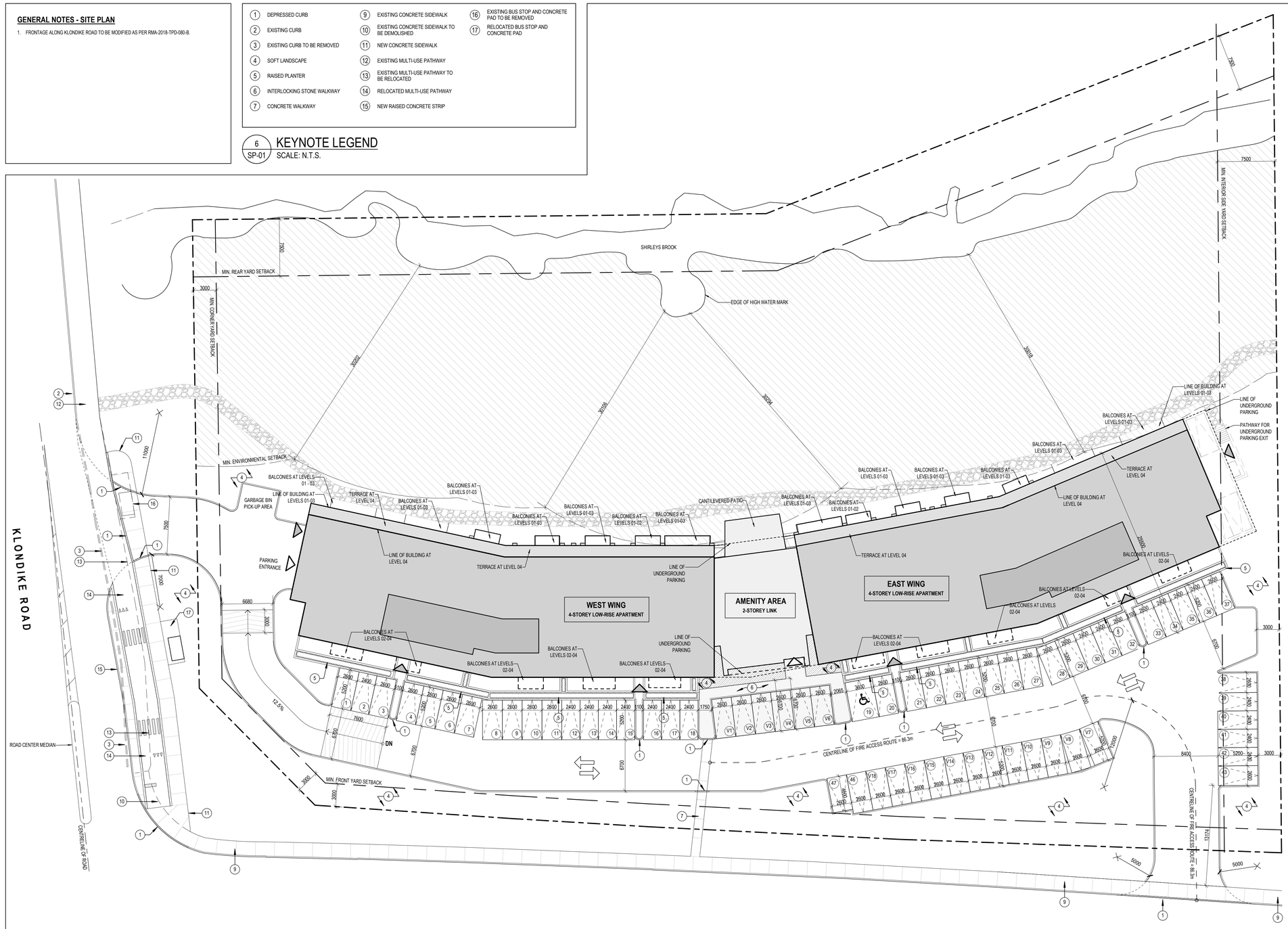
FILE: G:\17-10-136\00\17-10-136 Topo.dgn
DATED: 05/30/18
PLOTTED: 7/18/2018

GENERAL NOTES - SITE PLAN

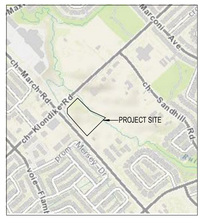
1. FRONTAGE ALONG KLONDIKE ROAD TO BE MODIFIED AS PER RMA-2018-TPD-080-B.

1	DEPRESSED CURB	9	EXISTING CONCRETE SIDEWALK	16	EXISTING BUS STOP AND CONCRETE PAD TO BE REMOVED
2	EXISTING CURB	10	EXISTING CONCRETE SIDEWALK TO BE DEMOLISHED	17	RELOCATED BUS STOP AND CONCRETE PAD
3	EXISTING CURB TO BE REMOVED	11	NEW CONCRETE SIDEWALK		
4	SOFT LANDSCAPE	12	EXISTING MULTI-USE PATHWAY		
5	RAISED PLANTER	13	EXISTING MULTI-USE PATHWAY TO BE RELOCATED		
6	INTERLOCKING STONE WALKWAY	14	RELOCATED MULTI-USE PATHWAY		
7	CONCRETE WALKWAY	15	NEW RAISED CONCRETE STRIP		

6 SP-01 KEYNOTE LEGEND
SCALE: N.T.S.



5 SP-01 SITE PLAN
SCALE: 1 : 250



1 SP-01 LOCATION PLAN
SCALE: N.T.S.

SITE PLAN SYMBOLS LEGEND

- BUILDING ENTRANCE
- BUILDING EXIT
- FIRE HYDRANT
- NEW STREET LIGHT
- STREET LIGHT TO BE REMOVED
- BICYCLE PARKING

2 SP-01 SYMBOLS LEGEND
SCALE: N.T.S.

TOPOGRAPHIC PLAN OF SURVEY OF
PART OF LOT 10
CONCESSION 4
GEOGRAPHIC TOWNSHIP OF MARCH
CITY OF OTTAWA

J.D. BARNES LTD. 2018

3 SP-01 SURVEY INFO
SCALE: 1 : 1

SITE & PROJECT STATISTICS

GENERAL INFORMATION

Zoning:	GM
Min. Lot Area:	No minimum
Min. Front Yard:	3.0m
Min. Corner Yard:	3.0m
Min. Int. Side Yard:	3.0m
Min. Rear Yard:	7.5m
Max. Building Height:	18.0m
Max. Floor Space Index:	2
Mn. Width Landscaped Area:	Street sides - 3.0m South side - 3.0m East side - No minimum

PROJECT STATISTICS

Lot Area:	12,204.3m²
Front Yard:	17.613m
Corner Yard:	12.972m
Int. Side Yard:	7.5m
Rear Yard:	37.844m
Building Height:	13.98m
Number of Residential Units:	92

PARKING CALCULATION

As per Section 101

Parking Space Rate Area:	Area C
Required Resident Parking:	110 spaces
1.2 spaces per unit	
Resident Parking Provided:	110 spaces (65 underground & 45 surface)

VISITOR PARKING CALCULATION

As per Section 102

Required Visitor Parking:	18 spaces
0.2 spaces per unit	
Provided Visitor Parking:	18 spaces

BICYCLE PARKING CALCULATION

As per Table 111A

Required Parking:	46 spaces
0.5 spaces/res. unit - Table 111A(b)(i)	
Total Parking Provided:	47 spaces

AMENITY AREA CALCULATION

As per Table 137

Total Amenity Area Required:	552m²
6m² per res. unit, and 10% of the gross floor area of each rooming unit	
Communal Amenity Required:	276m²
Min. 50% of Total Amenity Area	
Private Amenity Area Provided:	732.20m²
Level 01:	*245.30m²*
Level 02:	*151.00 m²*
Level 03:	*136.04m²*
Level 04:	*199.86m²*
Communal Amenity Provided:	283.56m²
Level 01:	*178.11m²*
Level 02:	*105.45m²*
Total Amenity Area Provided:	1,015.76m²

4 SP-01 ZONING
SCALE: N.T.S.

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5	ISSUED FOR COORDINATION	2020-10-22
4	ISSUED FOR COORDINATION	2020-09-03
3	ISSUED FOR SITE PLAN CONTORL	2020-05-12
2	ISSUED FOR COORDINATION	2020-03-27
1	ISSUED FOR COORDINATION	2020-03-06

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OTTAWA, ON

PROJ	SCALE	DRAWN	REVIEWED
1917	NOTED	SE	RMK

SITE PLAN

SP-01

D07-12-18-0128

#17779

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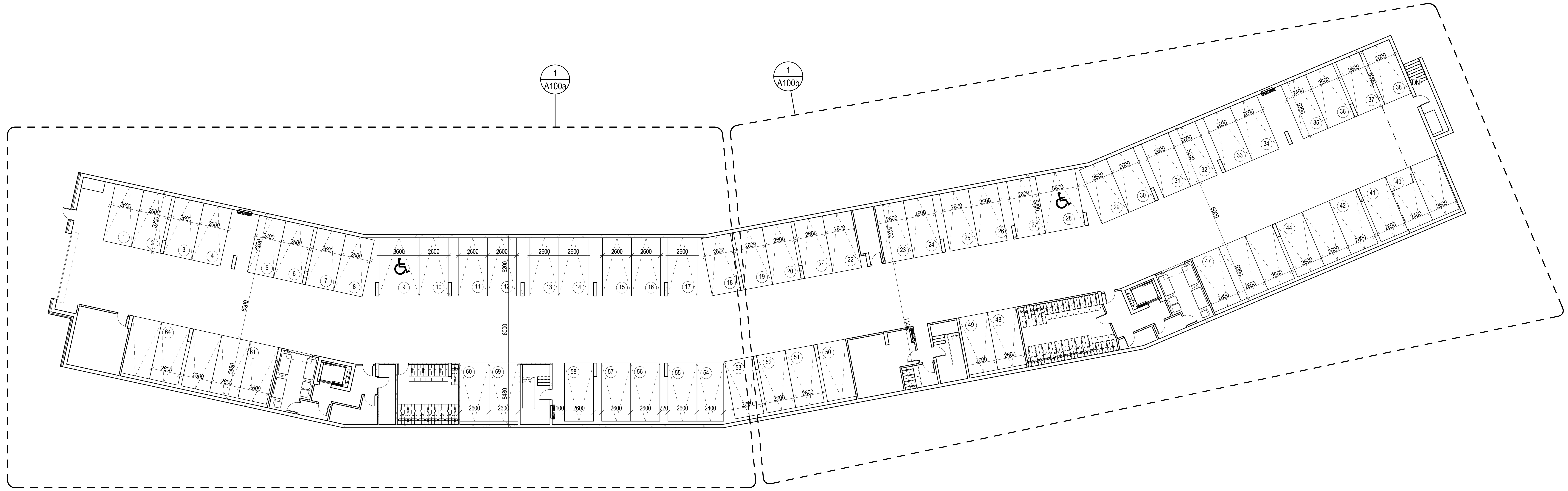
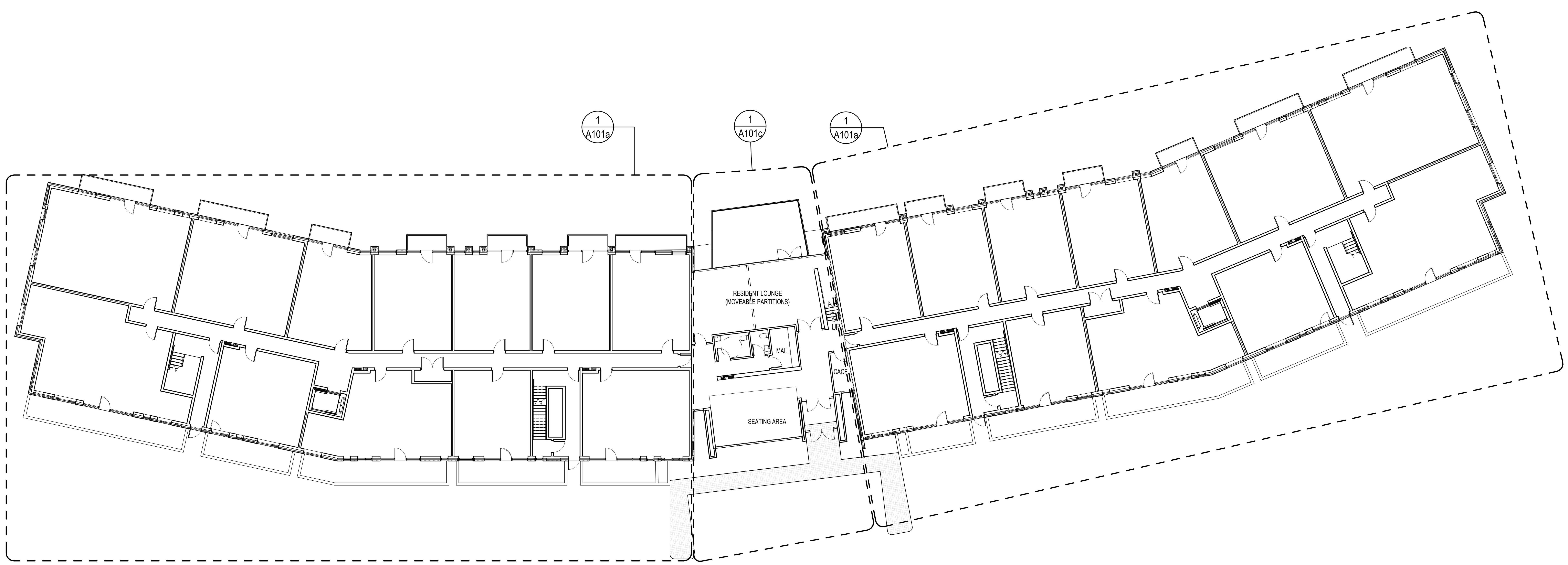


1 A000 **LEVEL P1 - FLOOR PLAN - REFERENCE**
SCALE: 1 : 200



2 A000 **LEVEL 01 - FLOOR PLAN - REFERENCE**
SCALE: 1 : 200

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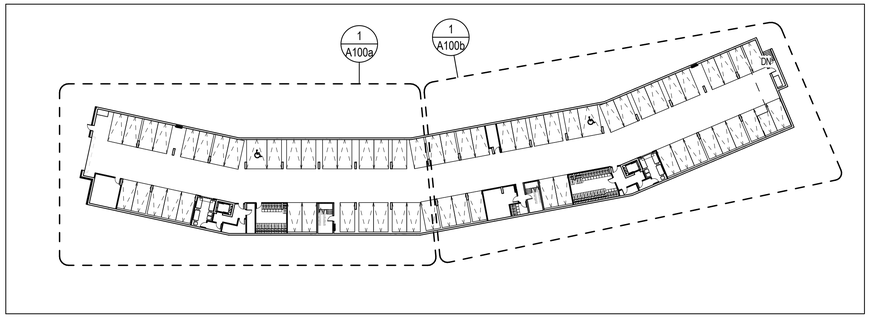
REFERENCE PLAN

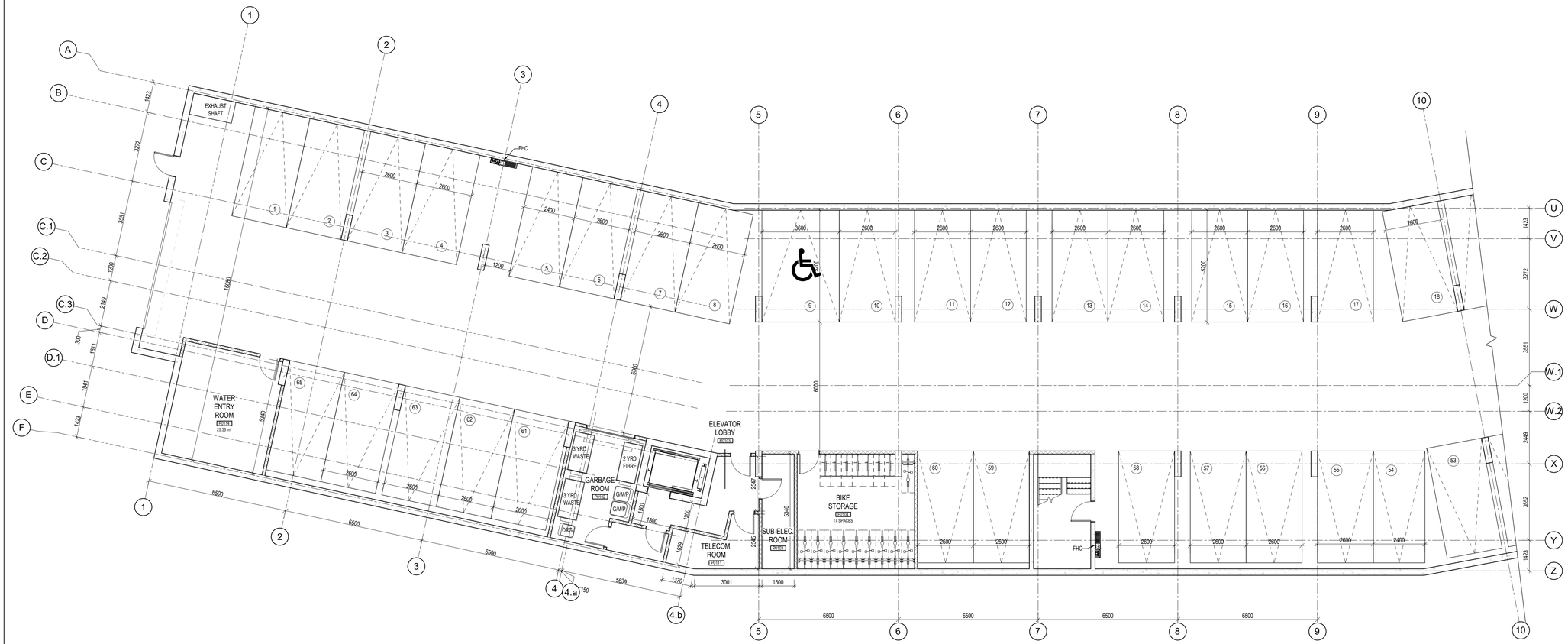
A000

D07-12-18-0128

#17779



2 A100a LEVEL P1 - FLOOR PLAN - KEY PLAN
SCALE: 1 : 500



1 A100a LEVEL P1 - FLOOR PLAN - WEST WING
SCALE: 1 : 100

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3	ISSUED FOR COORDINATION	2020-10-22
2	ISSUED FOR SITE PLAN CONTORL	2020-05-12
1	ISSUED FOR COORDINATION	2020-03-06

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LEVEL P1 - FLOOR PLAN

A100a

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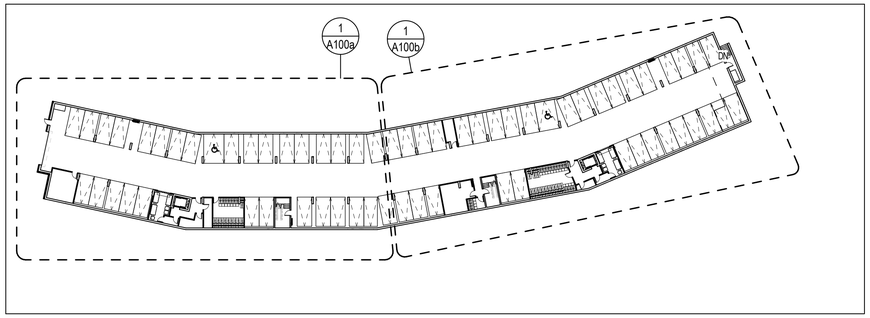
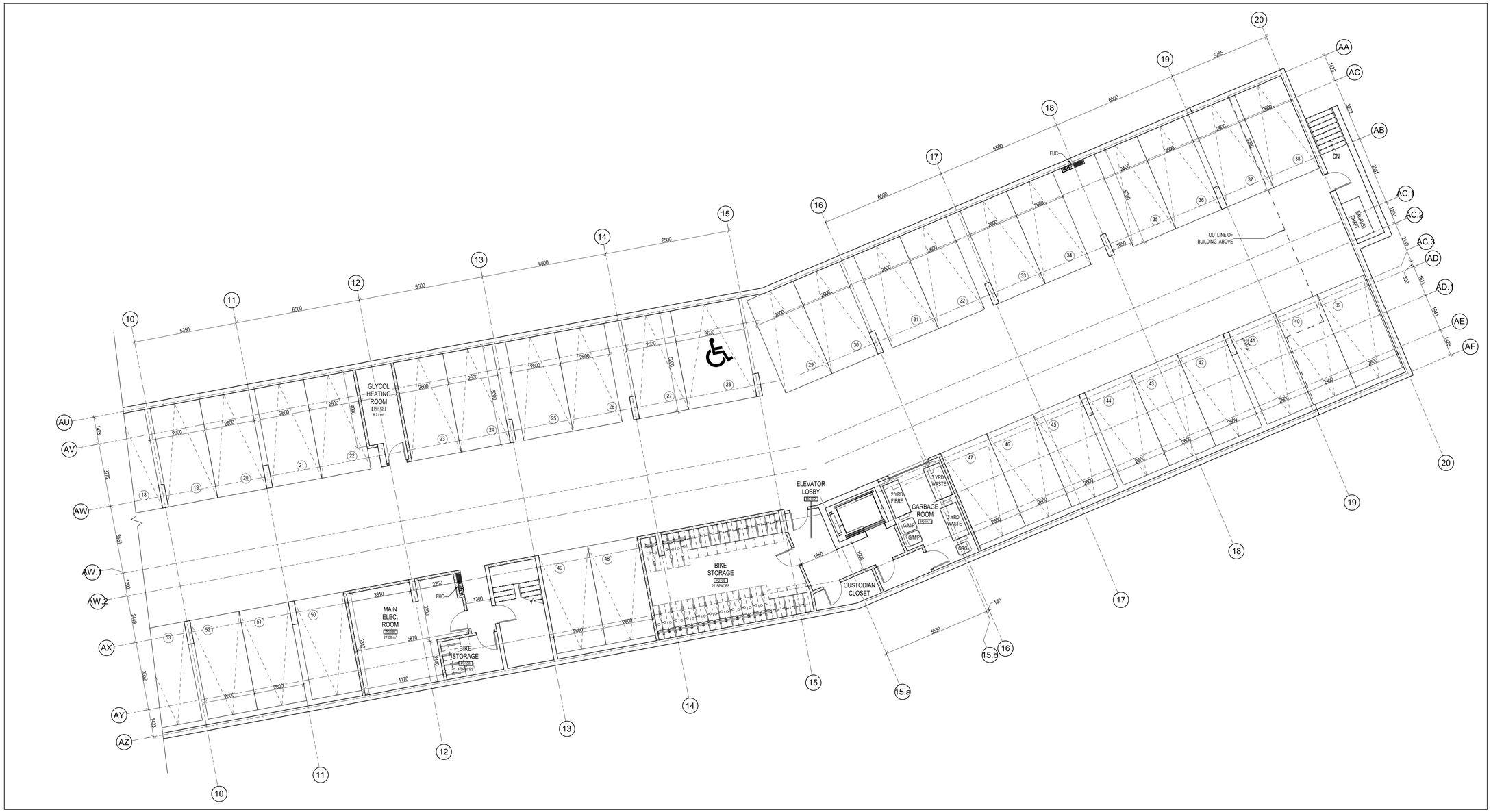


2 A100b LEVEL P1 - FLOOR PLAN - KEY PLAN -
SCALE: 1 : 500



1 A100b LEVEL P1 - FLOOR PLAN - EAST WING
SCALE: 1 : 100

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LEVEL P1 - FLOOR PLAN

A100b

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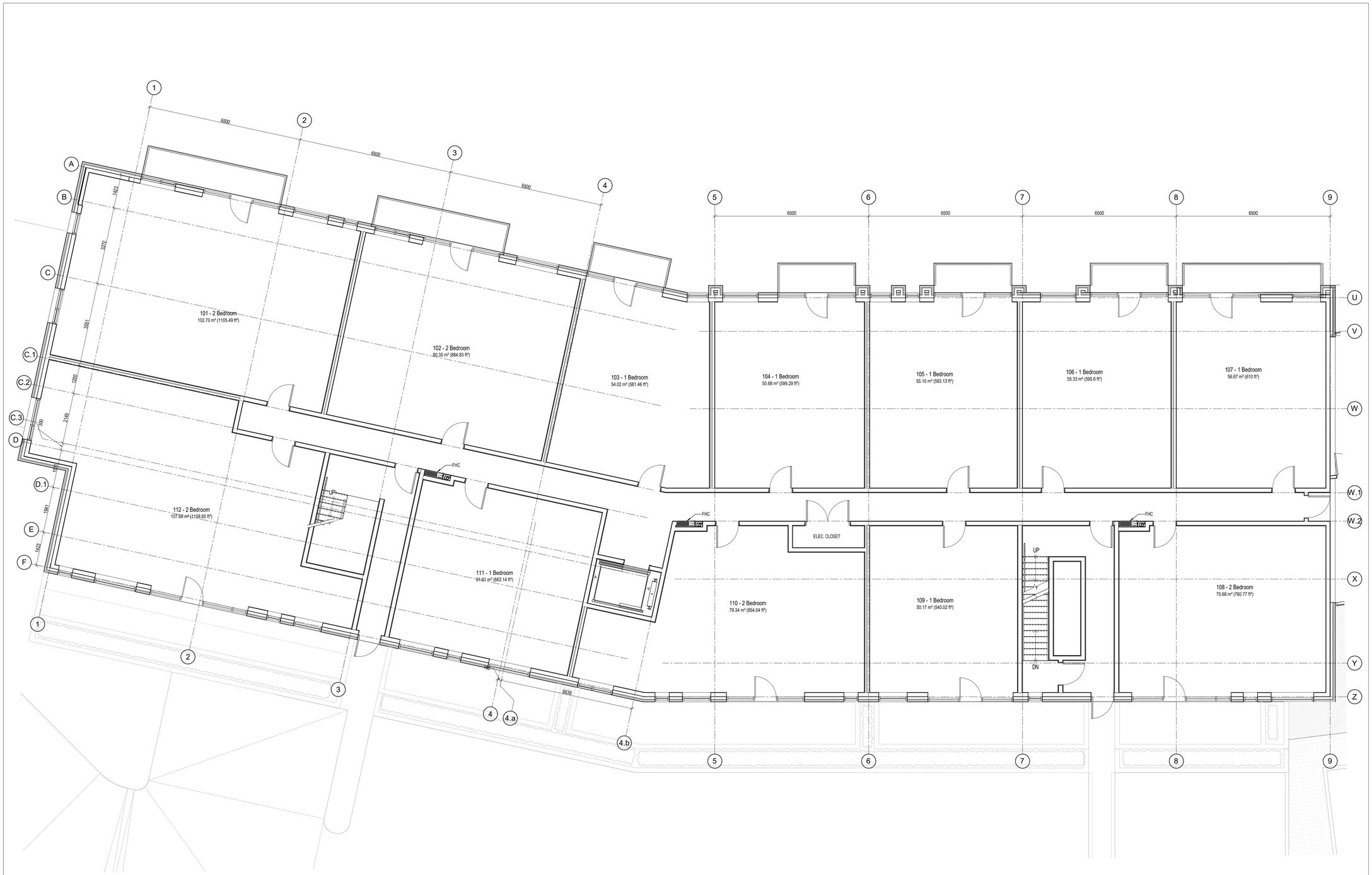

1 / A101a LEVEL 01 - FLOOR PLAN
SCALE: 1 : 75

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LEVEL 01 - FLOOR PLAN

A101a

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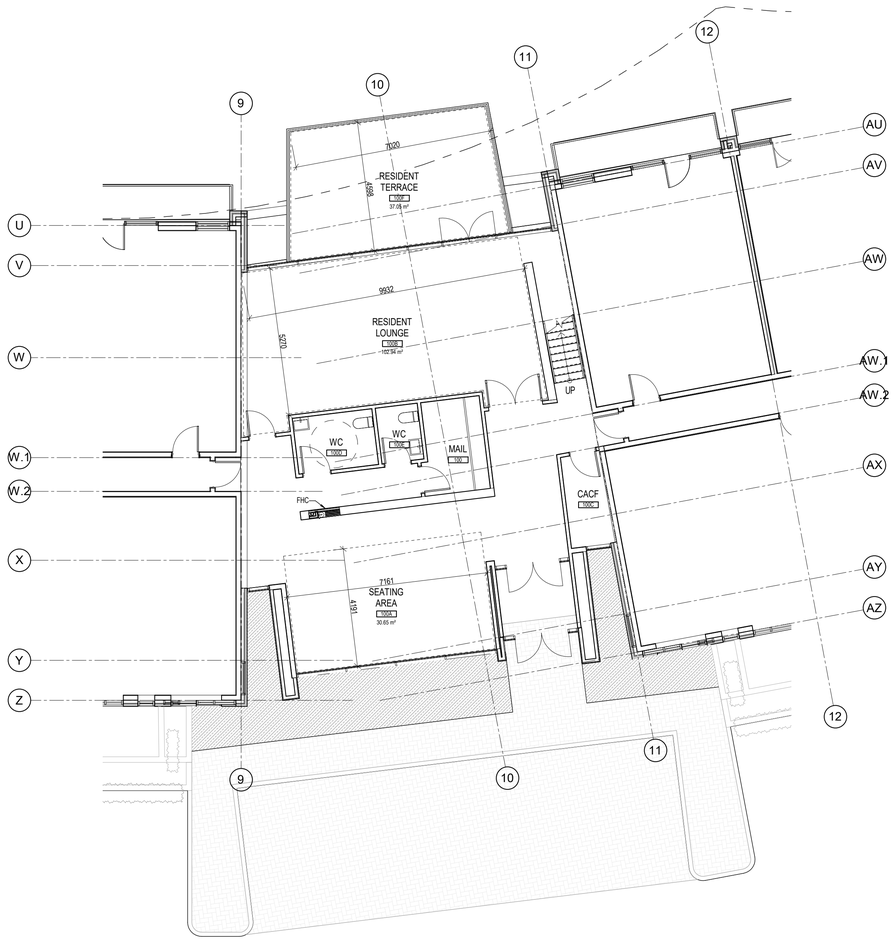
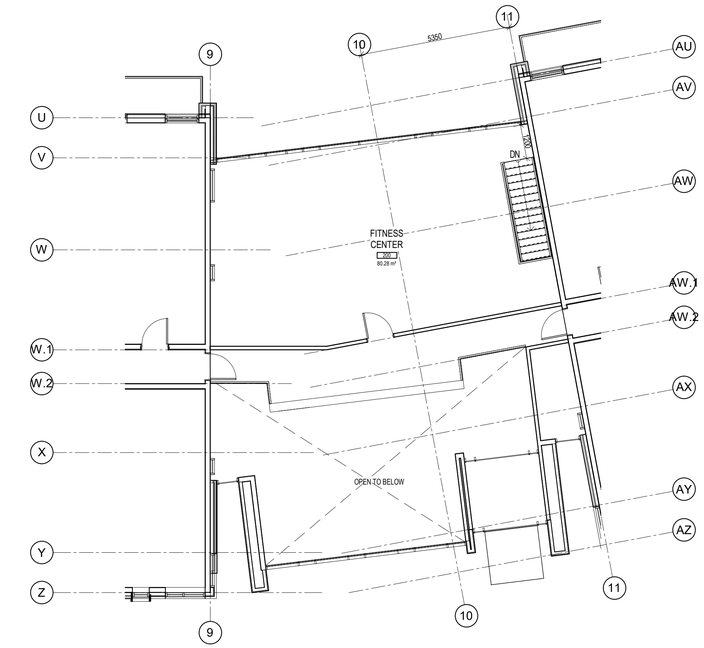
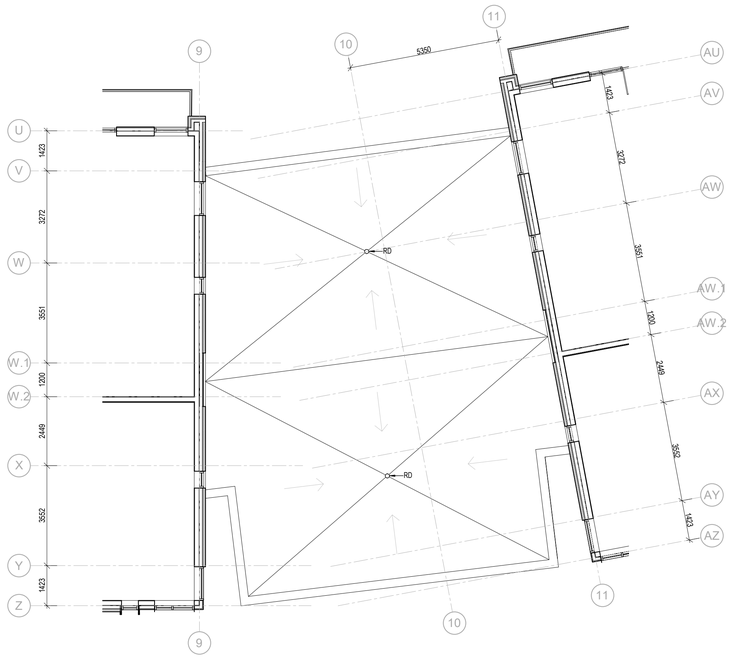


1 A101c LEVEL 01 - AMENITY
SCALE: 1 : 100



2 A101c LEVEL 02 - AMENITY
SCALE: 1 : 100



3 A101c ROOF PLAN - AMENITY
SCALE: 1 : 100

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FLOOR PLANS - AMENITY

A101c

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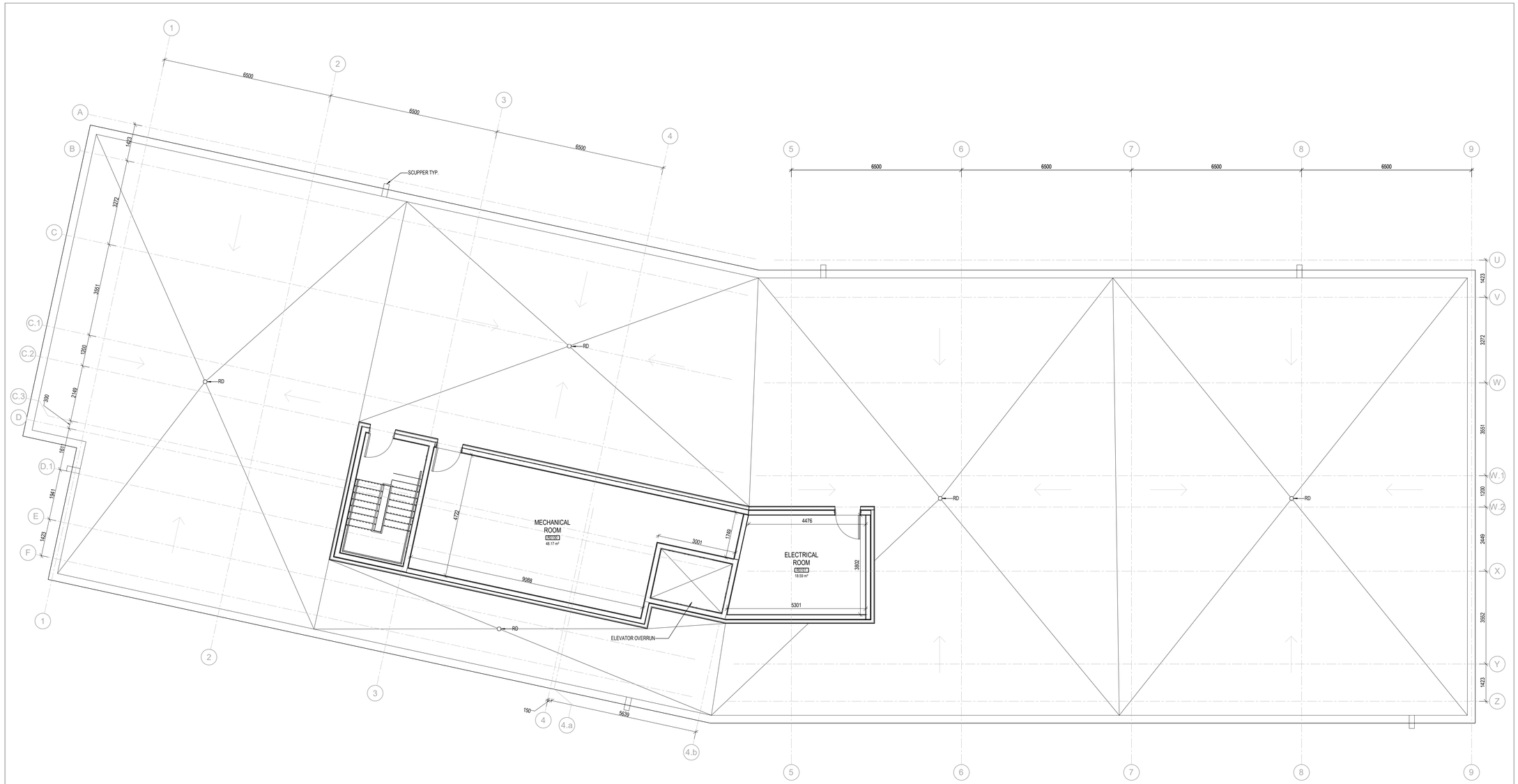

1 A107 LEVEL ROOF
SCALE: 1 : 75

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ROOF PLAN & UPPER ROOF

A107