1495 Heron Road - Adequacy of Services

Stantec

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Prepared by:
Stantec Consulting Ltd. 1331 Clyde Avenue
Ottawa, ON K2C 3G4

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Stantec Consulting Ltd.

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Prepared by

Signature

Michael Wu, EIT

Printed Name

Reviewed by

Signature

Karin Smadella, P.Eng

Printed Name

Approved by

Signature

Dustin Thiffault, P.Eng.

Printed Name

Table of Contents

1 Introduction 1.1
2 Objective 2.2
3 Background 3.3
4 Water Servicing 4.4
4.1 Water Demands 4.4
4.1.1 Domestic Water Demands 4.4
4.1.2 Fire Flow Demands 4.5
4.1.3 Boundary Conditions 4.5

5 Wastewater Servicing 5.7
5.1 Design Criteria 5.7
5.2 Estimated Wastewater Peak Flows 5.7

6 Stormwater Management and Servicing 6.9
6.1 Stormwater Management Criteria 6.9
6.2 Water Quantity Control 6.10
6.2.1 Target Release Rate 6.10
6.2.2 Volumetric Storage Requirements 6.11
6.2.3 Results 6.12
6.3 Water Quality Control 6.13

7 Background Studies 7.14
7.1 Geotechnical Investigation 7.14
7.1.1 Groundwater Control 7.15
7.2 Hydrogeological Investigation 7.15

8 Site Grading and Drainage 8.17
9 Utilities 9.18
10 Erosion Control During Construction 10.19
11 Approvals 11.20
12 Conclusions 12.21
12.1 Water Servicing 12.21
12.2 Wastewater Servicing 12.21
12.3 Stormwater Management and Servicing 12.21
12.4 Geotechnical and Hydrogeological Considerations 12.22
12.5 Grading 12.22
12.6 Utilities 12.22

List of Tables

Table 1 - Proposed Unit Mix 1495 Heron Road 4.4
Table 2 - Water Distribution Boundary Conditions 4.5
Table 3 - Estimated Total Wastewater Peak Flow 5.8
Table 4: Pre-Development Runoff Coefficient 6.10
Table 5 - 100-Year SWM Facility Storage Volume 6.12
Table 6 - 100-Year Storage Volume Requirements and Allowable Release Rate per Subcatchment 6.12
Table 5 - Recommended Pavement Structure 7.14

List of Figures

Figure 1: 1495 Heron Road Development Land 1.1

List of Appendices

Appendix A Conceptual Site Plan
A.1 Conceptual Site Plan
A.2 Conceptual Site Statistics
Appendix B Potable Water Servicing
B.1 Water Demands
B.2 FUS Fire Flow Calculations
B.3 Boundary Conditions
Appendix C Wastewater Servicing
C.1 Sanitary Sewer Design Sheet
C.2 Confirmation of Downstream Sanitary Sewer Capacity
Appendix D Stormwater Management
D.1 City of Ottawa Correspondence
D.2 Correspondence with the Rideau Valley Conservation Authority (RVCA)
D.3 Stormwater Analysis
D.3.1 Modified Rational Method (MRM)
D.3.2 Channel Conveyance Design
D.3.3 Low Impact Development (LID) Analysis
D.4 Storm Sewer Design Sheet
Appendix E Drawings

1 Introduction

Canada Lands Company (CLC) has commissioned Stantec Consulting Ltd. to prepare this Adequacy of Services Report for the 1495 Heron Road development lands to support the Zoning By-law Amendment Application for the subject lands. 1495 Heron Road is located within the City of Ottawa. The north and northwest sides of the site front on City parkland, institutional uses are located to the southwest, residential development exists along the eastern frontage and the site fronts onto Heron Road to the south.

The land is currently occupied by multiple vacant buildings that most recently formed a federal government training centre. The land is currently zoned I1A, minor institutional. The site is being rezoned to permit a mix of uses including residential, commercial and institutional. Many of the existing buildings will remain and will be repurposed as part of future development.

The proposed development land is approximately 7.3 ha in area. The limits of the site are outlined in **Figure 1** below. A conceptual development plan is included in **Appendix A.1**.

Figure 1: 1495 Heron Road Development Land

2 Objective

The intent of this report is to develop a functional servicing strategy specific to the subject property that uses the existing infrastructure surrounding the site and meets the design criteria obtained from the City of Ottawa and Rideau Valley Conservation Authority. The report will establish criteria for future detailed design of the development and private site plan blocks.

Criteria and constraints provided by the City of Ottawa and background studies have been used as a basis for the adequacy of services for the proposed development.

- **Water Servicing**
    - Estimate water demands for the 1495 Heron conceptual development. The development is expected to be serviced with a looped connection to the 305mm cast iron watermain in Heron Road.
    - Watermain servicing for the development is to provide average day, maximum day, and peak hour demands (i.e., non-emergency conditions) at pressures within the acceptable range of 40 to 80 psi (275 to 552 kPa).
    - Under fire flow (emergency) conditions, the water distribution system is to maintain a minimum pressure greater than 20 psi (138 kPa).
- **Wastewater Servicing**
    - Estimate wastewater generation based on the proposed concept and direct flows to the local sanitary sewer system in Heron Road.
- **Storm Sewer Servicing**
    - Define major and minor conveyance systems in conjunction with the conceptual grading plan.
    - Determine the conceptual stormwater management storage requirements to meet the allowable release rate for the site.
    - Provide quantity and quality control meeting the criteria specified in ***Section 5.0***.
- **Grading and Drainage**
    - Prepare a conceptual grading plan in accordance with the conceptual development plan and grading constraints.

The Existing Conditions Plan, ***Drawing EX-1*** details the existing conditions on site. See ***Appendix E***.

3 Background

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

- City of Ottawa Sewer Design Guidelines, 2nd Edition, City of Ottawa, October 2012 and all subsequent Technical Bulletins.
- City of Ottawa Design Guidelines – Water Distribution, First Edition, Infrastructure Services Department, City of Ottawa, July 2010 and all subsequent Technical Bulletins.
- Environmental Impact Statement – 1495 Heron Road Redevelopment (Final Report), Stantec Consulting Ltd., July 20, 2022.
- Phase Two Environmental Site Assessment – 1495 Heron Road, Ottawa, Ontario, DST File No.: OE-OT-019917, DST Consulting Engineers Inc., March 2015.
- Preliminary Geotechnical Investigation Report – Proposed Development – 1495 Heron Road, Ottawa, Ontario, Project No. 160410368, Stantec Consulting Ltd., November 2023.
- Hydrogeological Memo, 1495 Heron Road, Ottawa, ON, Stantec Consulting Ltd., May 19, 2023.

4 Water Servicing

The 1495 Heron development site is located within the City of Ottawa's 2W2C pressure zone. The existing watermain along the Heron Road frontage is 305 mm cast iron. Two connections to the Heron Road watermain will be required provide looping and redundancy to the conceptual development as illustrated on ***Drawing WTR-1***. Fire hydrants will be required along the public ROW to provide required fire flows. Watermain location, sizing and hydrant locations will be established as part of a future site plan control application for the development land.

4.1 Water Demands

4.1.1 Domestic Water Demands

Water demands for the future development blocks were estimated based on the unit mix of the conceptual development concept plan included in ***Appendix A.2***. The site will consist of approximately 761 residential units, approximately 8,169 m^2 of commercial space, and approximately 11,700 m^2 of institutional space. ***Table 1*** indicates the unit mix of the preferred development concept.

Table 1 - Proposed Unit Mix 1495 Heron Road

Development Type	Commercial Institutional Area (m2)	Number of Residential Units	Population	Daily Demand Rate (L/cap/day or L/ha/d)	Avg. Day Demand		Max. Day Demand		Peak Hour Demand	
					(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Stacked Townhouse	-	20	54	280	10.5	0.2	26.3	0.4	57.8	1
Apartment.	-	1079	1942	280	378	6.3	944	15.7	2077	34.6
Commercial	7,633	-	-	28,000	14.8	0.2	22.3	0.4	40.1	0.7
Institutional	10,400	-	-	28,000	20.2	0.3	30.3	0.5	54.6	0.9
Total Site	**18,033**	**1099**	**1996**	**-**	**423.2**	**7.1**	**1023**	**17.0**	**2229.5**	**37.2**

The City of Ottawa's *Water Distribution Guidelines* (2010) were used to estimate the domestic water demand for the proposed development. An average daily rate of 280 L/cap/day for residential units and 28,000 L/ha/d for commercial space and institutional space is applied to the proposed unit mix.

Per the City of Ottawa's Water Distribution Guidelines, peaking factors of 1.5, 1.5, and 2.5 are applied to the average day demands to calculate maximum day demands for commercial, institutional, and residential areas, respectively. Peaking factors of 1.8, 1.8, and 2.2 are applied to the maximum day demands to calculate the peak hour demands for commercial, institutional, and residential areas, respectively. Based

on a total 6,782 m^2 of commercial space, 12,200 m^2 of institutional space, and 1100 residential units, assuming an average population of 1.8 persons per unit for apartment units and 2.7 persons per unit for stacked townhome units, as specified by City of Ottawa guidelines, the average day demand (AVDY) for the proposed site is determined to be 7.1 L/s, with a maximum daily demand (MXDY) of 17.0 L/s and a peak hour demand (PKHR) of 37.2 L/s. Refer to ***Appendix B.1*** for detailed domestic water demand estimates.

4.1.2 Fire Flow Demands

Fire flow requirements were estimated using the 2020 Fire Underwriters Survey (FUS) methodology, based on the measured floor area and number of stories of the proposed buildings, to determine the highest fire flow requirement from the proposed concept plans. The FUS fire flow calculation spreadsheet for the expected governing fire flow demand scenario, provided in ***Appendix B.2***, was produced to show the estimated fire flow demands from the proposed re-development site. The back-to-back townhouse block was used as the governing fire demand given that these types of units are wood frame and typically have the highest fire demand of the type of building construction envisioned on the concept plan.

Assuming the back-to-back townhouse block as a worst-case scenario, fire flow calculations were performed for Building 5. Given that the total ground floor area of Building 5 exceeds 600 m^2, fire separation would be required for the back-to-back townhome block to separate the building into areas of 600 m^2 or less to meet OBC requirements. A building area of 600 m^2 was used for the FUS calculations to estimate fire flow requirements. Calculations included in **Appendix B.2** demonstrate that a fire flow requirement of 13,000 L/min (217 L/s) is estimated to be required for the back-to-back stacked units.

In the absence of building-specific information, two different scenarios were provided to the City of Ottawa as part of the original boundary conditions request. Maximum day demands plus a fire flow requirement of 167 L/s and maximum day demands plus a fire flow demand of 250 L/s are the scenarios that were requested as outlined in the following section.

4.1.3 Boundary Conditions

The boundary conditions provided by the City of Ottawa are shown in ***Table 2***.

Table 2 - Water Distribution Boundary Conditions

Location	**Heron Road – 305 mm Connection** (Elev. 95.58 m)
Minimum HGL	124.3 m
Maximum HGL	130.2 m
Max Day + Fire Demand (167 L/s)	125.0 m
Max Day +Fire Demand (217 L/s) [1]	123.8 m

Max Day +Fire Demand (250 L/s)	123.0 m

1. Governing fire flow requirement (217L/s) HGL determined via linear interpolation from City provided Boundary Conditions.

As shown on Drawing WTR-1, the building with the highest finished floor elevation within the development site was used in the calculation of residual pressure with an elevation of approximately 98.23 m. A residual pressure of 36 psi will be available under the maximum day plus fire flow requirement (217 L/s) which is above the required minimum pressure of 20 psi. The boundary condition request correspondence with the City of Ottawa can be found in Appendix B.3.

On-site pressures are expected to range from 37 psi to 45 psi under normal operating conditions due to the existing pressures in the City of Ottawa distribution system. The peak hour demand scenario results in a pressure value slightly outside the normal operating pressure range as defined by City of Ottawa design guidelines (desired 50 to 80 psi and not less than 40 psi) but consistent with pressures in the neighbouring areas. For any proposed mid-rise and high-rise buildings, booster pumps will be required to provide adequate pressures at the upper stories. These pumps are to be designed by the buildings' mechanical consultant.

There is sufficient domestic water supply and pressure in the existing municipal distribution system to support the development based on the conceptual site plan. The on-site water distribution system can be designed to ensure adequate domestic supply and fire flow meeting City of Ottawa design guidelines.

5 Wastewater Servicing

The development site at 1495 Heron Road fronts on an existing 250mm sanitary sewer within Heron Road. The future site plan development is expected to have a network of private sanitary sewers servicing the site which will outlet to the municipal system. Depending on the final site plan layout, the existing sanitary connection at SAN 3073 may be decommissioned and replaced with a new connection downstream. See ***Drawing SAN-1*** for conceptual servicing based on the conceptual site layout.

The City of Ottawa was asked whether or not there are any capacity constraints in the downstream collection system. The City initially advised that there is a restriction downstream on Walkley Road at Don Reid Drive and that two pipe segments identified as SAN31092 and SAN31093 will have to be upsized to accommodate the 1495 Heron Road development. The sewer replacement was to be funded through development charges. More recently, the City of Ottawa has advised that upgrades to the downstream system are no longer required to support this development. Please see correspondence in ***Appendix C.2***.

5.1 Design Criteria

As outlined in the City of Ottawa's *Sewer Design Guidelines*, the following criteria were used to calculate estimated wastewater flow rates based on the preferred development concept:

- Average wastewater generation – 280 L/cap/day
- Peaking factor - 4.0 (Harmon's residential)
- Peaking factor - 1.5 (Harmon's commercia and Institutional)
- Harmon Correction Factor = 0.8
- Extraneous flow allowance - 0.33 L/s/ha
- Population density for 1-bedroom apartments - 1.4 persons per unit
- Population density for Townhome - 2.7 persons per unit
- Population for Average Apartment - 1.8 persons per unit
- Average wastewater generation (commercial) - 28,000 L/ha/day of building space

5.2 Estimated Wastewater Peak Flows

Private sanitary sewers within the development anticipated to convey wastewater to the existing 250mm diameter sanitary sewer within Heron Road as shown on ***Drawing SAN-1***.

A sanitary sewer design sheet was prepared based on the conceptual site plan and sewer layout and is included in ***Appendix C.1***. The estimated wastewater flows based on the conceptual site plan are outlined in **Table 3** below.

Table 3 - Estimated Total Wastewater Peak Flow

Outlet Location	Residential Units			Commercial/Institutional Areas		Inf. Flow (L/s)	Total Peak Flow (L/s)
	Number of Units	Population	Peak Flow (L/s)	Area (ha)	Peak Flow (L/s)		
Heron Road Connection	1,099	1,996	19.9	1.8	0.9	2.4	23
Total Estimated Wastewater Peak Flow to Heron Road					**23 L/s**		

The peak wastewater flow generated from the proposed re-development will be established as part of the detailed design. Conceptual design flow of 23 L/s is estimated based on the conceptual site plan. Wastewater flow will be conveyed to the existing municipal sanitary sewer in Heron Road which has the capacity to service the development.

6 Stormwater Management and Servicing

The 7.3 ha private development site is being zoned to permit a mix of uses including residential, commercial and institutional, along with a stormwater management facility. There are several existing, vacant buildings on the site that were most recently used for a federal government training centre. Many of the existing buildings will remain and are intended to be renovated and repurposed as part of future development. Parking for the future residential uses is expected to be primarily underground.

Two municipal storm sewers run along the frontage of the site within the Heron Road right-of-way. The stormwater from the existing site development is currently directed to the 750mm concrete sewer on the north side of the roadway. This storm connection is expected to be maintained to provide an outlet to the portion of the existing development that will remain, as well as portions of the lands to the west that share the storm outlet. A new storm outlet to the same storm sewer is expected to be required at the eastern limit of the development lands to provide a controlled outlet for the balance of the lands. ***Drawing STM-1*** illustrates the conceptual layout of the private stormwater infrastructure and connections to the municipal system.

Major system peak flows from the development site will be directed to the stormwater management facility and ultimately to the Heron Road right-of-way. Emergency overland flow from the proposed private development will be directed to adjacent streets and/or the stormwater management facility.

6.1 Stormwater Management Criteria

The criteria used to design the stormwater management (SWM) component will ensure that post-development stormwater peak flows from the site do not exceed the allowable target release rate set forth by the stormwater management criteria. The SWM criteria for the proposed development have been determined through consultation with City of Ottawa staff and the Rideau Valley Conservation Authority as well as review of background information. ***Appendix D.1*** and ***Appendix D.2*** contain correspondence outlining the stormwater management criteria to be used. The SWM criteria are summarized as follows:

- Restrict inflows from the redevelopment portion of the site to the receiving storm sewer by controlling post development flows to the 2-year predevelopment event using a runoff coefficient (C) the lesser of 0.5 or existing (City of Ottawa)
- Post development flow shall not exceed the pre-development release rate for the existing development area for up to the 100-year storm event.
- Stormwater runoff in excess of the target release rates to be stored on-site up to and including the 100-year event (City of Ottawa)
- Time of concentration can be calculated but cannot be less than 10 minutes (City of Ottawa).
- A conservative storage assumption of 50 m3 has been provided for all redevelopment blocks.
- No direct water quality control target provided. LID measures and best management practices encouraged in relation to vehicular surfaces (RVCA).

6.2 Water Quantity Control

The Modified Rational Method (MRM) has been used to assess the rate and volume of runoff expected to be generated during post-development and pre-development conditions.

6.2.1 Target Release Rate

The target release rate for the development has been determined based on criteria established by the City of Ottawa using existing conditions and the IDF curves as provided within the City of Ottawa's *Sewer Design Guidelines*. The site consists of existing vacant buildings, parking areas and landscaped areas as illustrated on ***Drawing EX-1***. The concept plan envisions redevelopment with a mix of residential, commercial and institutional uses. Several of the existing buildings will be retained and repurposed as illustrated on ***Drawing STM-1***.

The central portion of the site and main entrance to the development is 1.5 ha in area and will continue to discharge to the existing storm outlet. As per the design criteria for the development, post development flow shall not exceed predevelopment flow for this developed area. Should there be an increase in impervious area over existing conditions, storage shall be provided on site to account for the increase in runoff volume.

The balance of the site will be redeveloped and will discharge to a proposed central stormwater management facility with a new outlet to the receiving sewer on Heron Road. As per the existing storm drainage plan (***Drawing EX-STM***), the pre-development runoff coefficient for the redevelopment area is 0.4. Given that the pre-development runoff coefficient is less than C=0.5, the pre-development value of C=0.4 will govern the design as per the criteria established by the City of Ottawa. A time of concentration of 26.7 minutes for the pre-development area was determined based on Bransby-Williams methodology for calculating overland flow time of concentration. ***Table 4*** shows the area summary used to determine the pre-development runoff coefficient (C).

Table 4: Pre-Development Runoff Coefficient

Subcatchment ID	Total Area (m2)	Hard Surface (m2)	Soft Surface (m2)	Runoff Coefficient
EXT1-3	59599	18379	41220	0.41

An overall target release rate of **294.2 L/s** from the entire site was obtained based on the rational method equation shown below.

$$\boldsymbol{Q} = \mathbf{2.78}\,(\boldsymbol{C})(\boldsymbol{I})(\boldsymbol{A})$$

Where:

$\boldsymbol{Q} = peak\ flow\ rate, L/s$

$\boldsymbol{C} = site\ runoff\ coefficient$

$\boldsymbol{I} = rainfall\ intensity, mm/hr\ (per\ City\ of\ Ottawa\ 2-year\ IDF\ curves)$

$\boldsymbol{A} = drainage\ area, ha$

$$Intensity\ (mm/hr) = \frac{732.951}{(26.7 + 6.199)^{0.81}} = \mathbf{43.3\ mm/hr}$$

$$Q = 2.78(0.41)(43.3mm/hr)(5.96\ ha) = \mathbf{294.2\ L/s}$$

Stormwater runoff from the redevelopment area will be directed to the SWM facility located along the northern and eastern portion of the development site as illustrated in ***Drawing STM-1.***

The stormwater management facility will be a low impact design consisting of a bioswale with a granular infiltration trench. The facility will provide storage volume within the swale and granular trench while removing particulate matter. The controlled outlet from the facility will provide quantity control to meet the allowable release rate to the municipal sewer within Heron Road.

6.2.2 Volumetric Storage Requirements

Runoff coefficients between 0.20 and 0.85 were assigned to the drainage areas based on the expected land use for development areas within the proposed site plan. These C-values were used to determine the runoff generated from each subcatchment within the redevelopment area.

On-site storage measures (i.e. rooftop storage, underground storage, etc.) will be required to attenuate peak flows on all development areas. All areas within the redevelopment boundary have been assigned a conservative storage value of 50 m^3/ha. Additional storage will be provided within the SWM facility to restrict post-development peak flows up to the 100-year storm to the target release rate as detailed in ***Section 5.2.1***.

On-site development areas will be designed with a collection system to direct runoff to the storm sewer within the private roadways or directly to the SWM facility. Post-development peak flows generated on site (up to the 100-year storm) for each subcatchment are anticipated to be restricted to the allowable release rate established based on the on-site storage requirements and assigned C-value.

Post-development peak flows generated by the private roadway will be restricted to the target release rates using inlet control devices (ICDs) with flows directed to the SWM facility.

Preliminary sizing of the SWM corridor has been estimated based on inflows from the development and the restricted release rate from the redevelopment area. A swale with a bottom width of 4.5 m, 3:1 side slopes and an average depth of storage of 0.25 m, along with a granular trench 1.0m deep and 6.0m wide for a length of 507m has been assumed for calculation of storage volume. A perforated subdrain system will run within the granular trench with a controlled outlet to the Heron Road storm sewer system. Detailed design will consider the impacts of seasonal groundwater on overall facility sizing.

Based on the Modified Rational Method (MRM) calculations included in ***Appendix D.3***, the required volume storage for the site within the SWM facility in the 100-year event is 1875m^3. The conceptual facility with dimensions above can provide approximately 1897m^3 of storage.

Table 5 outlines the available storage volume based on the preliminary sizing of the bioswale and granular trench and the runoff volume required to be stored in the 100-year post-development event as determined through the MRM analysis.

Table 5 - 100-Year SWM Facility Storage Volume

Storage Volume Provided in Granular Trench (m^3)	Storage Volume Provided in Surface Bioswale (m^3)	Total Storage Volume Available within SWM Facility (m^3)	100-Year Storage Volume Required in SWM Facility (m^3)
1232	665	1897	1875

6.2.3 Results

Table 6 provides a summary of the allowable release rate and storage requirement for each site subcatchment based on the MRM analysis using the proposed stormwater management plan. The conceptual SWM Facility will provide sufficient storage to control peak flows to the predevelopment target of **294.2 L/s**.

Table 6 - 100-Year Storage Volume Requirements and Allowable Release Rate per Subcatchment

Area Type	Area ID	Design Storage (m3)	Allowable Discharge (L/s)	Total Release to SWM Corridor (L/s)	
SWM Corridor	BIO-1	-	-	1639.2	2029.5
Res./Comm.	L103B	13.5	111.3		
Res./Comm.	L103C	32.4	267.5		
Residential	L105B	79.5	656.4		
Res./Comm.	L105C	14.8	122.0		
Institutional	L106B	51.9	364.0		
Residential	L106C	14.3	118.0		
Private Street	L103A	6.8	47.5	390.3	
	L104A	18.1	126.8		
	L105A	22.8	159.9		
	L106A	8.0	56.2		
Allowable SWM Facility Discharge to Heron Road (L/s)		**294.2**			
Total SWMF Storage Required (m3)		**1875**			

1. Conservative storage volume assumption of 50 m^3/ha for private blocks and roadways.
2. The existing developed portion of the site (EX-STM 25) is tributary to existing storm system and is not included in the above.

Runoff from the existing development area (EX-STM 25) will discharge to its current outlet per existing conditions, as demonstrated in ***Drawing STM-1***.

All sewers will be sized to convey the 2-year uncontrolled flow. The conceptual storm sewer design sheet has been provided in ***Appendix D.4***.

A detailed hydrologic and hydraulic model will be completed at the detailed design stage to further assess the storage requirements, the total surface flow depth on streets during major storm events, and to effectively size ICDs within the roadways and SWM facility to meet the target release rate for the site.

6.3 Water Quality Control

No specific water quality control target was provided by the Rideau Valley Conservation Authority for the site. LID measures and best management practices are encouraged to treat runoff from vehicular surfaces. Correspondence with the RVCA is included in **Appendix D.2**.

The conceptual stormwater management plan for the site has been designed to direct drainage from the proposed roadways and redevelopment portion of the site to a single stormwater management facility (clear stone trench and bioswale) that will encourage settlement of suspended solids and provide filtration for captured runoff.

Erosion and sediment control measures will be implemented during the construction phase as noted in **Section 10** below.

7 Background Studies

7.1 Geotechnical Investigation

A geotechnical investigation for the development site was completed by Stantec Consulting Ltd. (Stantec) in November 2023. Between June 20, 2022 and July 11, 2022, field testing took place and consisted of advancing a total of twelve (12) boreholes to a maximum depth of 7 m below existing ground surface across the site.

The subsurface profile encountered at the boreholes across the site generally consists of surficial topsoil over till materials overlying bedrock. Asphalt was encountered at ground surface in two boreholes with the thickness ranging from 40 mm to 75 mm. The fill consists of silty sand with gravel and ranges in thickness from 0.4 m to 0.6 m. The glacial till layer, encountered in all boreholes, varies throughout the site and is described as silty sand with gravel, clayey sand with gravel, and sandy lean clay with frequent cobbles and boulders. It is noted that the glacial till present in the Ottawa-Gatineau area is often crowded with cobbles and boulders set in a matrix of finer-grained material (gravel, sand, silt, and clay), with boulders more than 1 meter in diameter commonly present. Bedrock was encountered in eight boreholes with the depth to bedrock ranging from 3.1 m to 6.1 m below the existing ground surface. The bedrock consists of shale and limestone, with the shale belonging to the Carlsbad Formation. The RQD ranged from 0% to 100% indicating a very poor to excellent rock quality.

Groundwater levels were measured on July 6th, 2022 from monitoring wells installed at four of the boreholes and it was determined that the groundwater depth below ground surface varied from approximately 1.0 m to 1.7 m. The long-term groundwater table is subject to seasonal fluctuations and variation in groundwater elevation should be anticipated.

Based on the subsurface conditions described above, conventional spread footing foundations have been recommended to support the proposed buildings within the site. It is anticipated that most foundations will be founded on bedrock, therefore bedrock excavation may be required depending on the founding level of the proposed buildings and/or utilities. In addition, measures may be required to protect the shale bedrock given the potential for heaving when exposed to air and water. A grade raise restriction is not recommended within the site, however, if grade raises greater than 2 m above the existing site grades are proposed then a detailed analysis will be required. The pavement structures presented in the geotechnical report have been recommended in the absence of detailed traffic information for the site and will be reviewed once detailed information is available. The recommended pavement structure is as follows:

Table 7 - Recommended Pavement Structure

Roadway Pavement Structure (mm)	Material Description
40	Wear Course – Superpave SP 12.5 Asphalt (PG 58-34, Traffic Level A)
50	Binder Course – Superpave SP 19 Asphalt (PG 58-34, Traffic Level A)

150	Base - OPSS Granular ‘A’ crushed stone
500	Subbase - OPSS Granular ‘B’ Type II

7.1.1 Groundwater Control

It is anticipated that excavations up to 1.5 m below ground surface for utilities and structures may encounter groundwater infiltration and/or surface runoff which should be controlled using open sump and pump methods. Excavations greater than 1.5 m in depth may require special dewatering techniques. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

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

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

7.2 Hydrogeological Investigation

A hydrogeological assessment for the development land was completed on May 19, 2023 by Stantec which provides a summary of the available hydrogeologic details for the site, conceptual SWM facility and site operations, preliminary conclusions, and proposed additional investigations to be undertaken.

The groundwater elevation within the site ranges between 94.2 m and 92.2 m, with the outlet of the conceptual SWM facility having an elevation of 92.65 m. It is anticipated that the presence of the SWM facility will promote groundwater seepage into the facility and consequently lower groundwater levels in the vicinity. The SWM facility is expected to operate as designed and the volume of groundwater entering the system will be minimal relative to the permitted discharge rate from the site. Over time, groundwater elevations are expected to lower at the site, further reducing the infiltration of groundwater into the SWM facility.

Based on expected groundwater levels, the potential for stormwater infiltration from the SWM facility into the surrounding overburden is expected to be minimal. Current functional design of the SWM facility does not assume any stormwater infiltration.

Given that groundwater seepage is expected into the clear stone trench, it is recommended that the detailed design of the SWM facility include mitigation measures to limit the mobilization of fine-grained material into the trench, which will ultimately reduce storage volumes. The results of monitoring activities

should be reviewed and recommendations for modifications to the final design of the SWM facility be adopted if necessary.

8 Site Grading and Drainage

The proposed re-development site measures approximately 7.30 ha in area and is occupied by existing buildings previously owned and used by the federal government as a training centre. The subject site has a relatively flat topography that gradually slopes downward from the western property limit along the park land owned by the City to the eastern property limit towards the residential properties fronting Garand Place and Amberdale Crescent. Additionally, the existing grade slopes downward from the northern property limit towards the southern property limit towards the Heron Road ROW. Based on a topographic survey completed by Stantec Geomatics, the grade difference from the southern limit to the northern limit of the site is approximately 0.6 meter, with an elevation of approximately 96.4 meters at the northwest corner of the site and slightly lower elevations at the southeast corner of the site (approx. 95.8 m).

Please refer to ***Drawing GP-1*** in ***Appendix E*** for the conceptual site grading plan, which maintains the general drainage pattern of the site.

The conceptual grading of the site will direct stormwater runoff to the proposed collection system and to the central stormwater management facility along the northern and eastern limits of the site.

9 Utilities

Enbridge gas, communications services (Rogers and Bell), and Hydro Ottawa utilities are available in proximity to the development.

According to the City of Ottawa-provided UCC plans there is an existing 300 mm gas main along Heron Road fronting the site. Bell and Rogers utilities exist near the subject site along Heron Road and Walkley Road and it is anticipated that the future re-development will be serviced by Bell fibre optic cables which will be extended to the site. Hydro Ottawa utilities exist in proximity to the site along Heron and Walkley Road.

Future correspondence with the utilities will determine whether the existing services have the available capacity required to service the future re-development. Detailed design of the utility services will be completed by the respective utility companies as part of the future detailed design to support the site plan development.

10 Erosion Control During Construction

In order to protect downstream water quality and prevent sediment build up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
6. Provide sediment traps and basins during dewatering works.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

The proposed location of silt fences, straw bales, and other erosion control measures are to be provided at the detailed design stage.

11 Approvals

No additional approvals are required to support the Zoning Bylaw Amendment application.

An Ontario Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA), under the Ontario Water Resources Act may be required for the private sewers and the central stormwater management facility if there be a future severance of the development land.

An MECP Permit to Take Water (PTTW) or reporting on the Environmental Activity and Sector Registry (EASR) may be required in advance of construction. Recommendations for permitting can be provided by by the geotechnical consultant at the detailed design stage.

12 Conclusions

12.1 Water Servicing

Based on the supplied boundary conditions for existing watermain, and the estimated domestic and fire flow demands for the subject site, the 300 mm watermain within Heron Road has sufficient capacity to supply the development site. Domestic demands can be met under normal operating conditions and fire hydrants can be provided within the site to provide the required fire flow. The future private water distribution system can be looped with two connections to Heron Road.

12.2 Wastewater Servicing

The development site can be serviced by a private wastewater collection system directing wastewater to the existing 250 mm diameter concrete sanitary sewer within Heron Road. As detailed in the recent correspondence with the City of Ottawa, the existing municipal system has the capacity to service the development site.

12.3 Stormwater Management and Servicing

The conceptual stormwater management plan meets the design criteria established for the development and demonstrates that the site can be adequately serviced.

The existing storm sewer outlet will continue to service the previously developed portions of the site. Should there be an increase in imperviousness in the contributing area, storage will have to be provided to ensure no increase in flow to the collection system.

A conceptual central stormwater management facility can service the redevelopment portion of the site. It can provide quantity control to meet the allowable release for the redevelopment portion of the site. The facility can be designed to incorporate some low impact development features as best management practices to allow for some quality control for the development. No target quality control criteria were previously assigned for the site during preconsultation.

A private stormwater collection system can be designed to provide an outlet to the redevelopment areas and direct flow to the central stormwater management facility. Some redevelopment areas can be serviced through direct connections to the facility.

Redevelopment areas are to be designed with 50 m^3/ha of volumetric storage to limit peak inflows to the stormwater management facility and meet the allowable release rate. Quantity control storage to be established in future detailed design submissions.

12.4 Geotechnical and Hydrogeological Considerations

A preliminary geotechnical investigation was conducted by Stantec Consulting Ltd. to identify the general subsurface conditions at the site by means of boreholes (twelve (12) boreholes, numbered BH22-1 to BH22-12). Depth of bedrock ranged from approximately 3.1 m to 6.1 m and four groundwater monitoring wells were installed to measure fluctuations in groundwater levels. There is no grade raise restriction for the development however a grade raise in excess of 2.0m shall be subject to detailed analysis.

It is anticipated that the conceptual SWM facility would promote groundwater seepage into the facility and consequently lower groundwater levels in the vicinity. The SWM facility is expected to operate as designed and the volume of groundwater entering the system will be minimal relative to the permitted discharge rate from the site. The hydrogeological assessment recommends that the final detailed SWM facility design include mitigation measures to reduce the mobilization of fine-grained material into the trench.

12.5 Grading

The subject development land has a relatively flat topography that generally slopes downward from the northwest to the southeast.

The conceptual site grading plan maintains the general drainage pattern of the site and matches all perimeter grades. The conceptual grading will accommodate surface storage and the stormwater management facility.

12.6 Utilities

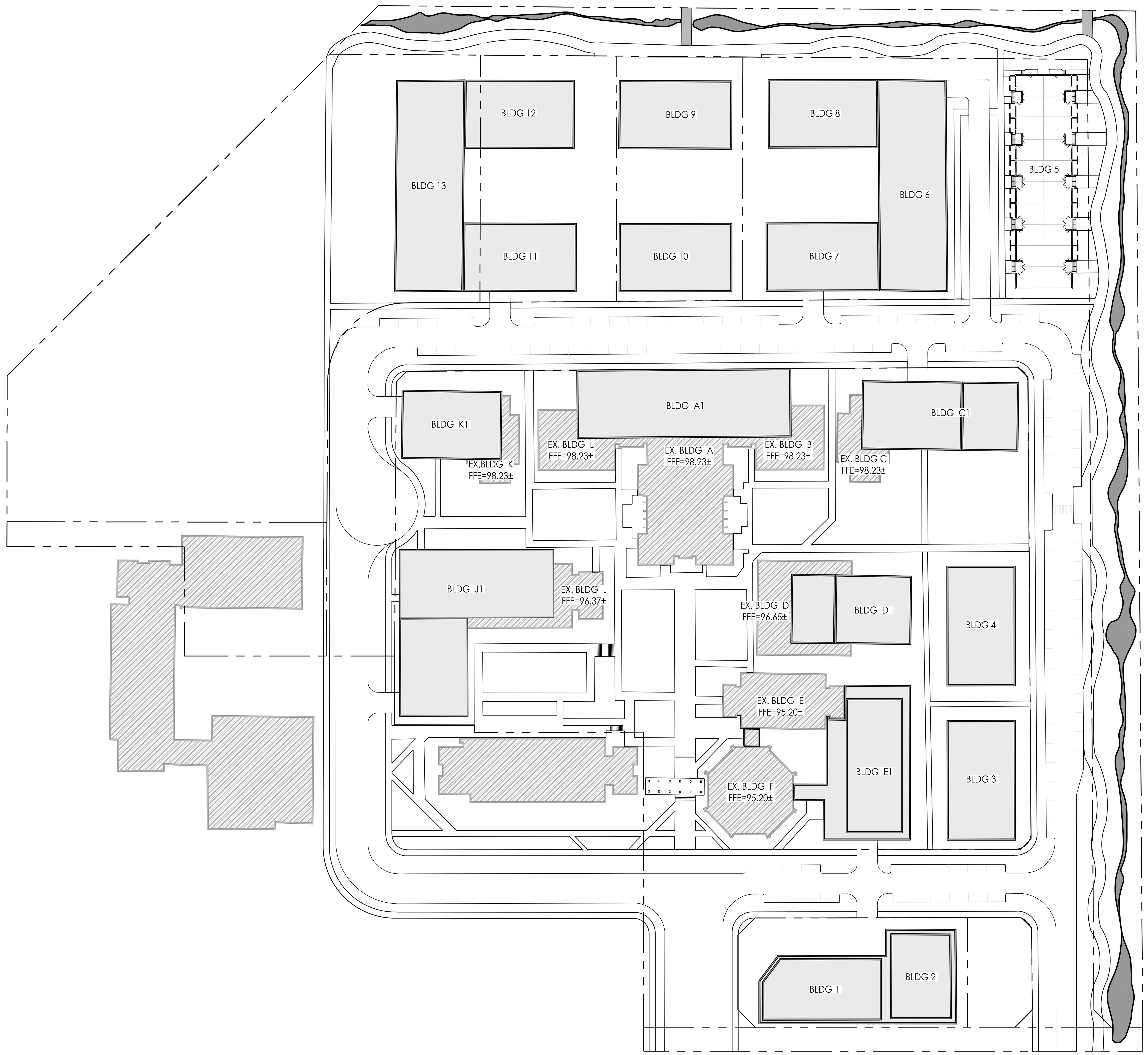
Enbridge Gas, Bell, Rogers, and Hydro Ottawa utility services all exist within the vicinity of the proposed development. The development is anticipated to be serviced through connections to these existing services.

Detailed design of the required utility services will be completed by the respective utility companies at the detailed design stage.

Appendices

Appendix A Conceptual Site Plan

A.1 Conceptual Site Plan


BLDG 13
BLDG 12
BLDG 11
BLDG 9
BLDG 10
BLDG 8
BLDG 7
BLDG 6
BLDG 5
BLDG K1
EX.BLDG K
FFE=98.23±
BLDG A1
EX. BLDG L
FFE=98.23±
EX. BLDG A
FFE=98.23±
EX. BLDG B
FFE=98.23±
EX. BLDG C
FFE=98.23±
BLDG C1
BLDG J1
EX. BLDG J
FFE=96.37±
EX. BLDG D
FFE=96.65±
BLDG D1
BLDG 4
EX. BLDG E
FFE=95.20±
EX. BLDG F
FFE=95.20±
BLDG E1
BLDG 3
BLDG 1
BLDG 2

A.2 Conceptual Site Statistics

	LAND USE	SIZE
BUILDING 1	HIGH-RISE MULTI-FAMILY HOUSING	40 UNITS
BUILDING 1-2	COMMERCIAL / INSTITUTIONAL	13 923 SF
BUILDING 2	HIGH-RISE MULTI-FAMILY HOUSING	32 UNITS
BUILDING 3	LOW-RISE MULTI-FAMILY HOUSING	40 UNITS
BUILDING 4	LOW-RISE MULTI-FAMILY HOUSING	40 UNITS
BUILDING 5	STACKED TOWNHOUSE LOW-RISE MULTI-FAMILY HOUSING	20 UNITS
BUILDING 6	HIGH-RISE MULTI-FAMILY HOUSING	159 UNITS
BUILDING 7	LOW-RISE MULTI-FAMILY HOUSING	28 UNITS
BUILDING 8	LOW-RISE MULTI-FAMILY HOUSING	37 UNITS
BUILDING 9	LOW-RISE MULTI-FAMILY HOUSING	37 UNITS
BUILDING 10	LOW-RISE MULTI-FAMILY HOUSING	37 UNITS
BUILDING 11	LOW-RISE MULTI-FAMILY HOUSING	28 UNITS
BUILDING 12	LOW-RISE MULTI-FAMILY HOUSING	37 UNITS
BUILDING 13	HIGH-RISE MULTI-FAMILY HOUSING	159 UNITS
BUILDING A1	COMMERCIAL / INSTITUTIONAL	13 461 SF
EX BUILDING L-A-B	COMMERCIAL / INSTITUTIONAL	16 958 SF
BUILDING C1	HIGH-RISE MULTI-FAMILY HOUSING	94 UNITS
BUILDING D1	HIGH-RISE MULTI-FAMILY HOUSING	59 UNITS

	LAND USE	SIZE
BUILDING E1	LOW-RISE MULTI-FAMILY HOUSING	43 UNITS
BUILDING E1	COMMERCIAL / INSTITUTIONAL	26 069 SF
EX BUILDING E	COMMERCIAL / INSTITUTIONAL	5 522 SF
EX BUILDING F	COMMERCIAL / INSTITUTIONAL	6 226 SF
BUILDING J1	HIGH-RISE MULTI-FAMILY HOUSING	134 UNITS
BUILDING K1	HIGH-RISE MULTI-FAMILY HOUSING	75 UNITS
TOTAL	HIGH-RISE MULTI-FAMILY HOUSING	752 UNITS
TOTAL	LOW-RISE MULTI-FAMILY HOUSING	347 UNITS
TOTAL	COMMERCIAL / INSTITUTIONAL	82 159 SF

Appendix B Potable Water Servicing

B.1 Water Demands

1495 Heron Road - Domestic Water Demand Estimates

Based on conceptual development plan and site statistics dated July 2024

Ottawa Design Guidelines - Water Distribution

Table 4.1 Per Unit Populations		
Townhouse	2.7	ppu
Average Apt.	1.8	ppu

Development Type	Commercial & Institutional Area (sq.m)	Number of Residential Units	Population	Daily Demand Rate (L/cap/day or L/ha/d)	Avg. Day Demand [1,2]		Max. Day Demand [1, 2]		Peak Hour Demand [1, 2]	
					(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
1495 Heron Road Re-Development										
Stacked Townhouse	-	20	54	280	10.5	0.2	26.3	0.4	57.8	1.0
Average Apt.	-	1079	1942	280	377.7	6.3	944.1	15.7	2077.1	34.6
Commercial Areas	7,633	-	-	28000	14.8	0.2	22.3	0.4	40.1	0.7
Institutional	10,400	-	-	28000	20.2	0.3	30.3	0.5	54.6	0.9
Total Site	**18033**	**1099**	**1996.2**	**-**	**423.2**	**7.1**	**1023.0**	**17.0**	**2229.5**	**37.2**

1 Water demand criteria used to estimate peak demand rates for residential areas at demand rate of 280L/c/d are as follows:
maximum daily demand rate = 2.5 x average day demand rate
peak hour demand rate = 2.2 x maximum day demand rate

2 Water demand criteria used to estimate peak demand rates for commercial/institutional/amenity/lobby areas at demand rate of 28,000L/ha/d are as follows:
maximum daily demand rate = 1.5 x average day demand rate
peak hour demand rate = 1.8 x maximum day demand rate

B.2 FUS Fire Flow Calculations

Stantec

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160410368
Project Name: 1495 Heron Road
Date: 7/16/2024
Fire Flow Calculation #: 1
Description: Back to Back Townhouse Block (Building 5, 3 Storeys, 20 units)

Notes: 3 Storey Back to Back Townhomes. Building information taken from Concept Plan. Back-to-back townhouse units with fire separation to limit building area to a maximum of 600m². Building Classification C.

Step	Task	Notes								Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction								1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas								-	-
		600	600	600						1800	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min								-	14000
4	Determine Occupancy Charge	Limited Combustible								-15%	11900
5	Determine Sprinkler Reduction	None								0%	0
		Non-Standard Water Supply or N/A								0%	
		Not Fully Supervised or N/A								0%	
		% Coverage of Sprinkler System								0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?		-	-
		North	0 to 3	17	3	41-60	Type V	YES		0%	714
		East	20.1 to 30	32	2	61-80	Type V	NO		6%	
		South	> 30	17	3	41-60	Type V	YES		0%	
		West	20.1 to 30	32	3	81-100	Type V	YES		0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min									13000
		Total Required Fire Flow in L/s									216.7
		Required Duration of Fire Flow (hrs)									2.50
		Required Volume of Fire Flow (m^3)									1950

B.3 Boundary Conditions

Mott, Peter

From: Sevigny, John <John.Sevigny@ottawa.ca>
Sent: Friday, August 26, 2022 8:09 AM
To: Mott, Peter
Subject: RE: Boundary Condition Request - 1495 Heron Road
Attachments: 1495 Heron Road August 2022.pdf

Hi Peter,
I just received the boundary conditions. Please find below the requested BC's.

The following are boundary conditions, HGL, for hydraulic analysis at 1495 Heron Road (zone 2W2C) assumed to be a dual connection to the 305 mm on Heron Road (see attached PDF for location).

Minimum HGL: 124.3 m

Maximum HGL: 130.2 m

Max Day + FF (166.67 L/s): 125.0 m

Max Day + FF (250 L/s): 123.0 m

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

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

Regards,

*****Absence alert*****

Please note that I will be away from the office on the following dates:

August 29th, 2022 to September 5th, 2022 Inclusive (returning September 6th, 2022)

John Sevigny, C.E.T.
Senior Project Manager
Development Review, Suburban Services | *Examen des projets d'aménagement, Services suburbains*
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste **14388**, fax/téléc:613-580-2576, john.sevigny@ottawa.ca

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From: Mott, Peter <Peter.Mott@stantec.com>
Sent: August 25, 2022 10:15 AM
To: Sevigny, John <John.Sevigny@ottawa.ca>
Subject: RE: Boundary Condition Request - 1495 Heron Road

Hello John – I hope this email find you well. Just jumping back into this project and was wondering if you could send along the boundary conditions for the 1495 Heron Road redevelopment? Thanks.

Best,

Peter Mott EIT
Engineering Intern, Community Development

Mobile: +1 (343) 999-8172
Peter.Mott@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Sevigny, John <John.Sevigny@ottawa.ca>
Sent: Thursday, June 30, 2022 8:28 AM
To: Mott, Peter <Peter.Mott@stantec.com>
Cc: Smadella, Karin <Karin.Smadella@stantec.com>
Subject: RE: Boundary Condition Request - 1495 Heron Road

Hi Peter,
The boundary condition group usually takes 2 weeks to provide conditions. Please follow up next week if I haven't sent them over yet.
Regards,

John Sevigny, C.E.T.
Senior Project Manager
Development Review, Suburban Services | *Examen des projets d'aménagement, Services suburbains*
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste **14388**, fax/téléc:613-580-2576, john.sevigny@ottawa.ca

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From: Mott, Peter <Peter.Mott@stantec.com>
Sent: June 30, 2022 8:05 AM
To: Sevigny, John <John.Sevigny@ottawa.ca>
Cc: Smadella, Karin <karin.smadella@stantec.com>
Subject: RE: Boundary Condition Request - 1495 Heron Road

Hello John – Wondering if you have any updates regarding the BC request for 1495 Heron Road? Please let me know at your earliest convenience.

Thanks,

Peter Mott EIT
Engineering Intern, Community Development

Mobile: +1 (343) 999-8172
Peter.Mott@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Sevigny, John <John.Sevigny@ottawa.ca>
Sent: Monday, June 20, 2022 3:05 PM
To: Mott, Peter <Peter.Mott@stantec.com>
Cc: Smadella, Karin <Karin.Smadella@stantec.com>
Subject: RE: Boundary Condition Request - 1495 Heron Road

Hi Peter.
Will do.
Thanks.

John Sevigny, C.E.T.
Senior Project Manager
Development Review, Suburban Services | *Examen des projets d'aménagement, Services suburbains*
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste **14388**, fax/téléc:613-580-2576, john.sevigny@ottawa.ca

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From: Mott, Peter <Peter.Mott@stantec.com>
Sent: June 20, 2022 11:29 AM
To: Sevigny, John <John.Sevigny@ottawa.ca>
Cc: Smadella, Karin <karin.smadella@stantec.com>
Subject: Boundary Condition Request - 1495 Heron Road

Hello John,

I would like to request the hydraulic boundary conditions for the proposed site located at 1495 Heron Road. Please find attached the site plan, the key map showing the location of the proposed re-development, and domestic water demand calculations.

A summary of the proposed site is provided below:

We anticipate a connection to the existing watermain infrastructure to service the site. The following connection(s) is expected for servicing:

➢Connection(s) to existing 305 mm (CI) watermain on Heron Road.

*Existing fire hydrant fronting site along Heron Road and adjacent property to the west.

For the purpose of the boundary conditions request, may you please provide us with the boundary conditions for the following servicing options:

i. Watermain connection to the existing 305 mm (CI) watermain on Heron Road; assuming a fire flow requirement of **10,000 L/min** for the site in addition to the domestic water demands provided below.

ii. Watermain connection to the existing 305 mm (CI) watermain on Heron Road; assuming a fire flow requirement of **15,000 L/min** for the site in addition to the domestic water demands provided below.

- The intended land use is primarily residential and some mixed-use development (residential with ground floor retail), per the summary provided in the Domestic Demands spreadsheet. (See attached Site Plan with project stats)
- Provided fire flow demand range is between 10,000 L/min (167 L/s) and 15,000 L/min (250 L/s)
- Domestic water demands for the entire development:
    - **Average day: 491.3 L/min (8.2 L/s)**
    - **Maximum day: 1867.5 L/min (31.1 L/s)**
    - **Peak hour: 2889.4 L/min (48.2 L/s)**

Thank you for your time and please contact me at your earliest convenience if any additional information or clarification is required.

Best,

Peter Mott EIT
Engineering Intern, Community Development

Mobile: +1 (343) 999-8172
Peter.Mott@stantec.com
Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

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Appendix C Wastewater Servicing

C.1 Sanitary Sewer Design Sheet

Stantec

SUBDIVISION: **1495 Heron Road**

DATE: 7/17/2024
REVISION: 2
DESIGNED BY: MJS
CHECKED BY: KS

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160410368

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280	l/p/day	MINIMUM VELOCITY	0.60	m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000	l/ha/day	MAXIMUM VELOCITY	3.00	m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000	l/ha/day	MANNINGS n	0.013	
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000	l/ha/day	BEDDING CLASS	B	
PERSONS / SINGLE	3.4	INSTITUTIONAL	28,000	l/ha/day	MINIMUM COVER	2.50	m
PERSONS / TOWNHOME	2.7	INFILTRATION	0.33	l/s/Ha	HARMON CORRECTION FACTOR	0.8	
PERSONS / APARTMENT	1.8						

LOCATION			RESIDENTIAL AREA AND POPULATION									COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE								
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	SINGLE	UNITS TOWN	APT	POP.	CUMULATIVE AREA	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
			(ha)					(ha)			(l/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(l/s)	(ha)	(ha)	(l/s)	(l/s)	(m)	(mm)			(%)	(l/s)	(%)	(m/s)	(m/s)
R7A, I7A	7	6	0.73	0	0	134	241	0.73	241	3.49	2.7	0.00	0.00	0.00	0.00	0.00	0.00	1.04	1.04	0.00	0.00	0.5	1.77	1.77	0.6	3.8	80.0	250	PVC	SDR 35	0.40	38.3	**9.96%**	0.77	0.41
	6	5	0.00	0	0	0	0	0.73	241	3.49	2.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.00	0.00	0.5	0.00	1.77	0.6	3.8	9.7	250	PVC	SDR 35	0.40	38.3	**9.96%**	0.77	0.41
R5A	5	4	2.36	0	20	691	1298	3.09	1539	3.14	15.6	0.28	0.28	0.00	0.00	0.00	0.00	0.00	1.04	0.00	0.00	0.6	2.64	4.41	1.5	17.7	199.1	250	PVC	SDR 35	0.40	38.3	**46.27%**	0.77	0.65
R4A, G4A	4	1	0.65	0	0	80	144	3.74	1683	3.11	17.0	0.00	0.28	0.00	0.00	0.00	0.00	0.00	1.04	0.72	0.72	0.6	1.37	5.78	1.9	19.5	161.9	250	PVC	SDR 35	0.40	38.3	**50.94%**	0.77	0.67
R3A	EX-3	3	0.44	0	0	102	184	0.44	184	3.53	2.1	0.35	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	0.79	0.79	0.3	2.5	3.8	250	PVC	SDR 35	2.25	90.9	**2.78%**	1.83	0.66
	3	2	0.00	0	0	0	0	0.44	184	3.53	2.1	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	0.00	0.79	0.3	2.5	62.8	250	PVC	SDR 35	0.90	57.5	**4.40%**	1.16	0.48
R2A	2	1	0.47	0	0	72	130	0.91	313	3.46	3.5	0.13	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.2	0.60	1.39	0.5	4.2	40.3	250	PVC	SDR 35	0.40	38.3	**10.95%**	0.77	0.42
G1A	1	EX	0.00	0	0	0	0	4.65	1996	3.07	19.9	0.00	0.76	0.00	0.00	0.00	0.00	0.00	1.04	0.00	0.72	0.9	0.00	7.17	2.4	23.1	63.8	250	PVC	SDR 35	0.40	38.3	**60.23%**	0.77	0.70
																												250							

C.2 Confirmation of Downstream Sanitary Sewer Capacity

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Thursday, February 10, 2022 12:03 PM
To: Smadella, Karin <Karin.Smadella@stantec.com>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road

Good afternoon, Karin

We completed our detailed analysis of the sanitary system using the ultimate future flows and confirmed that by upsizing two sections of pipe (SAN31092 and SAN31093) on Walkley from 450mm to 600 mm, we can reduce the HGL and accommodate the flow from 1495 Heron. I have sent this information to the IMP group to see if it can be added to DC funded projects.

Eric

Eric Tousignant, P.Eng.
Senior Water Resources Engineer/ Ingénieur principal en resources hydriques
Infrastructure and Water Services / *services d'infrastructure et d'eau*
613-580-2424 ext 25129

From: Smadella, Karin <Karin.Smadella@stantec.com>
Sent: February 01, 2022 4:12 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>; Sandanayake, Hiran

<Hiran.Sandanayake@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>; dustin.thiffault@stantec.com
Subject: RE: 1495 Heron Road

Thanks Eric – I appreciate the quick response.

Karin

Karin Smadella, P.Eng.
Project Manager

Direct: 613 724-4371
Mobile: 613 698-8088
Karin.Smadella@stantec.com

Stantec
300-1331 Clyde Avenue
Ottawa, ON K2C 3G4

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Tuesday, February 1, 2022 2:27 PM
To: Smadella, Karin <Karin.Smadella@stantec.com>; Sandanayake, Hiran <hiran.sandanayake@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road

Hi Karin

Unfortunately, there is nothing new to report on this. This is part of a larger re-development problem throughout the City with respect to sanitary capacity, but we are just at the discussion stage at the moment in terms of figuring out how to approach the issue. We have yet to look at site specific problems.

Eric

Eric Tousignant, P.Eng.
Senior Water Resources Engineer/ Ingénieur principal en resources hydriques
Infrastructure and Water Services / *services d'infrastructure et d'eau*
613-580-2424 ext 25129

From: Smadella, Karin <Karin.Smadella@stantec.com>
Sent: February 01, 2022 1:55 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>; Sandanayake, Hiran <Hiran.Sandanayake@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>; dustin.thiffault@stantec.com
Subject: RE: 1495 Heron Road

Hi Eric/Hiran,

We understand that this is not an easy issue to resolve. Are you able to advise if there has been any movement on this item and if the City has a planned approach to the issue? We have been asked to provide regular updates to our client.

Your assistance is greatly appreciated.

Karin

Karin Smadella, P.Eng.
Project Manager

Direct: 613 724-4371
Mobile: 613 698-8088
Karin.Smadella@stantec.com

Stantec
300-1331 Clyde Avenue
Ottawa, ON K2C 3G4

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Thursday, December 9, 2021 3:39 PM
To: Smadella, Karin <Karin.Smadella@stantec.com>; Sandanayake, Hiran <hiran.sandanayake@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road

Hi Karin

At this time, we cannot allow any additional flow down Heron until we further asses a bottleneck downstream of the Heron/Walkley intersection which is putting basements at risk if we increase flows. We relayed the same information to Development Review regarding the Heron Gate development.

Eric

Eric Tousignant, P.Eng.
Senior Water Resources Engineer
Infrastructure Services
613-580-2424 ext 25129

From: Tousignant, Eric
Sent: November 26, 2021 8:47 AM
To: 'Smadella, Karin' <Karin.Smadella@stantec.com>; Sandanayake, Hiran <Hiran.Sandanayake@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road

Hi Karin

I am still trying to figure out how much flow is coming from the Heron Gate development. I only learned of that development's go ahead recently in your email and thus need to re-evaluate the impact on the local system. I am waiting on flows from DSEL at this time.

Eric

From: Smadella, Karin <Karin.Smadella@stantec.com>
Sent: November 15, 2021 4:07 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>; Sandanayake, Hiran <Hiran.Sandanayake@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road

Hi Eric/Hiran,

I am just checking in to see if you have been able to run the PCSWMM model with the expected flow contributions from the 1495 Heron Road site. Please advise if there are specific pipe segments

downstream constraining the flow as we would like to understand the potential extent of offsite improvements required.

As noted below, there are other planned intensification projects in the area. It would be helpful to know and If the City is looking at the larger servicing requirements and potential solutions.

Thanks,

Karin

Karin Smadella, P.Eng.
Project Manager

Direct: 613 724-4371
Mobile: 613 698-8088
Karin.Smadella@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Thursday, October 21, 2021 2:48 PM
To: Smadella, Karin <Karin.Smadella@stantec.com>
Cc: Sandanayake, Hiran <hiran.sandanayake@ottawa.ca>; Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road

No it hasn't been accounted for in my analysis. My analysis was to let them know that they **could not discharge** to either Walkley or Heron (at least not at the flows they were proposing). This is news to me.

From: Smadella, Karin <Karin.Smadella@stantec.com>
Sent: October 21, 2021 2:45 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Cc: Sandanayake, Hiran <Hiran.Sandanayake@ottawa.ca>; Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road

Thanks Eric

We just had a look at the Timbercreek/Heron Gate Functional Servicing Report in support of their OPA application. The proposed intensification of the lands would increase flow to both the Heron and Walkley sanitary sewers. Has this been accounted for in the current modeling?

The report is available on devapps. Application Details - Development Applications Search (ottawa.ca)

Karin

Karin Smadella, P.Eng.
Project Manager

Direct: 613 724-4371
Mobile: 613 698-8088
Karin.Smadella@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Tuesday, October 19, 2021 3:36 PM
To: Smadella, Karin <Karin.Smadella@stantec.com>
Cc: Sandanayake, Hiran <hiran.sandanayake@ottawa.ca>; Moroz, Peter <peter.moroz@stantec.com>
Subject: RE: 1495 Heron Road

Hi Karin

The analysis in 2019 allocated a normal peak flow of 4.6 L/s to the property and a Critical peak flow (100 year I/I) of 6.9 L/s. These were entered into the XPSWMM model as static flows. I will talk with Hiran to see about using our updated PCSWMM model to do the new flow analysis.

					0.33	0.55		Peak	Peak
	Area ID	Type	Area	DWF	I/I	Peak I/I		Normal	Critical
	1	Institutional	10.3	1.19	3.399	5.665		4.59	6.86
	2	High Den res.	13.3	15.5	4.389	7.315		19.91	22.83

The SWM criteria for a site re-development is to control the 100 year flow to the **2 year** using the lesser of C=0.5 or existing. The TC can be computed but cannot be less than 10 min. Now, if many of the buildings are to remain, this can be adjusted to only be applied to areas of re-development. We can discuss further.

As for spare capacity in the other Direction, I will have to check our flood risk model first, but I think there are also constraints in that direction. I will get back to you on this one.

Eric

From: Smadella, Karin <Karin.Smadella@stantec.com>
Sent: October 19, 2021 2:53 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Cc: Sandanayake, Hiran <Hiran.Sandanayake@ottawa.ca>; Moroz, Peter <peter.moroz@stantec.com>
Subject: RE: 1495 Heron Road

Hi Eric/Hiran

In addition to identifying the sanitary constraints, can you also please advise what the stormwater design criteria will be for this site – both quality and quantity control? It is expected that several of the existing buildings will remain.

Thank you,

Karin

From: Smadella, Karin
Sent: Tuesday, October 12, 2021 3:43 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Cc: Sandanayake, Hiran <hiran.sandanayake@ottawa.ca>; Moroz, Peter <peter.moroz@stantec.com>
Subject: RE: 1495 Heron Road

Hi Eric,

As part of the redevelopment plan for the site, both the former government training centre at 1495 Heron Road and adjacent school board land at 1485 Heron Road are being considered.

1 - You have advised that the system is fine under existing conditions. Can you please advise what peak flow is currently assumed form these two properties under existing conditions?

2 - Conceptual peak flow based for redevelopment of the lands at 1495 and 1485 Heron Road is estimated at 23 L/s. Based on the conceptual increase in flow, can you look at the impacts using PCSWMM and advise if there are specific segments that are problematic downstream?

3 – Lastly, does the sanitary system west of the site along Heron, Alta Vista and Bank have any spare capacity?

Thank you,

Karin

From: Smadella, Karin
Sent: Wednesday, September 29, 2021 3:48 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Cc: Sandanayake, Hiran <hiran.sandanayake@ottawa.ca>; Moroz, Peter <peter.moroz@stantec.com>
Subject: RE: 1495 Heron Road

Thanks Eric – Much appreciated. We will follow up with some conceptual flows. We may have to look at where the downstream constraints in the event that offsite works need to be considered.

Karin

Karin Smadella, P.Eng
Project Manager

Direct: 613 724-4371
Mobile: 613 698-8088
Karin.Smadella@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Wednesday, September 29, 2021 11:16 AM
To: Smadella, Karin <Karin.Smadella@stantec.com>
Cc: Sandanayake, Hiran <hiran.sandanayake@ottawa.ca>
Subject: FW: 1495 Heron Road

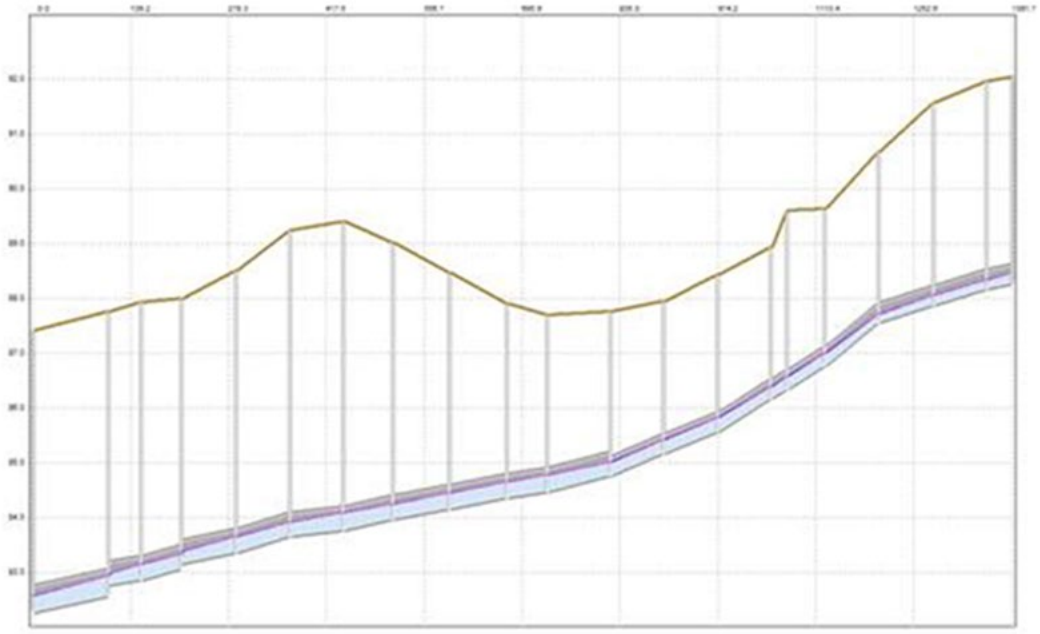
Hi Karin

I am looking into this for Hiran. We looked at this area in 2019 and found that they system is fine under existing conditions, but when we added 20 L/s to the Walkley system we encountered surcharging near basement levels and at 50 L/s we had surface breakout (see figures below). This was done using a static XPSWMM model so it may be a bit conservative. We would need to add the flow increase you are proposing to our PCSWMM model to determine the impact.

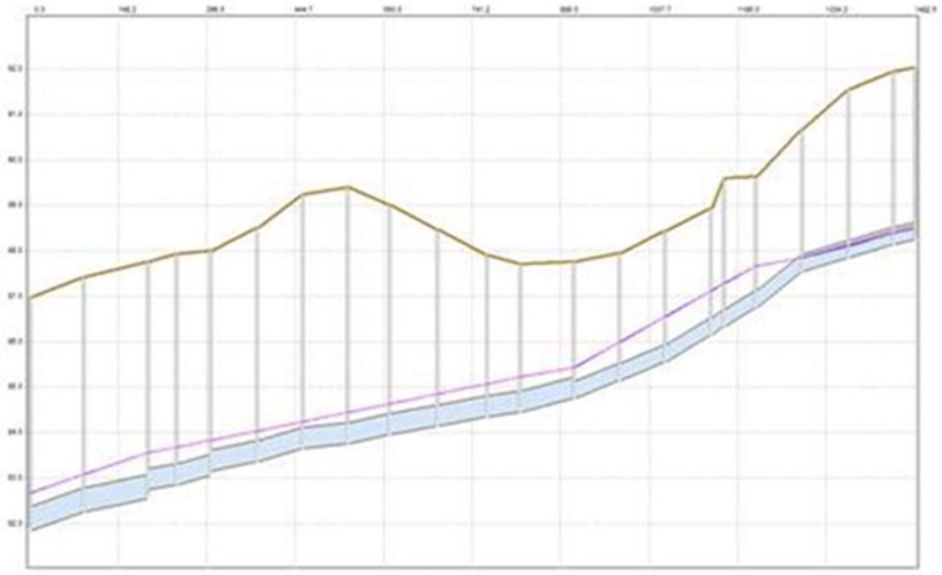
At this time, all I can say is that the system is full, with little room for additional flow

Eric

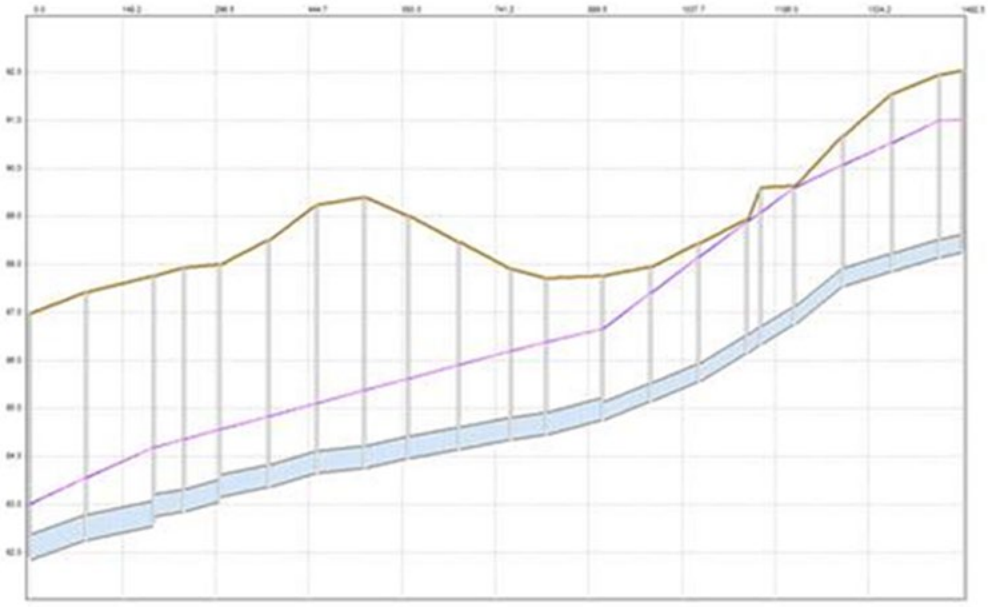
Eric Tousignant, P.Eng.
Senior Water Resources Engineer
Infrastructure Services
613-580-2424 ext 25129



Walkley Existing HGL



Walkley with 20 L/s added

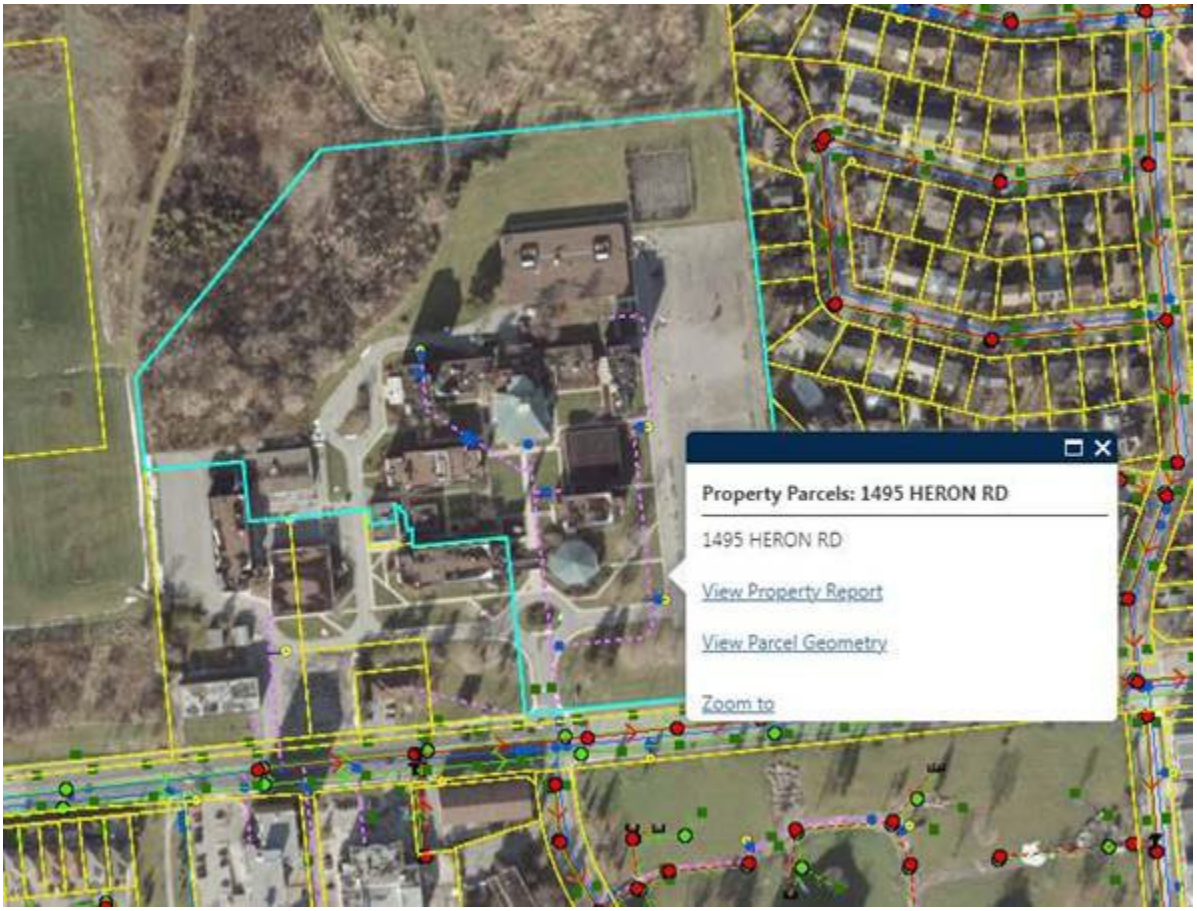


Walkley with 50 L/s added

From: Smadella, Karin <Karin.Smadella@stantec.com>
Sent: September 28, 2021 4:44 PM
To: Sandanayake, Hiran <Hiran.Sandanayake@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>
Subject: 1495 Heron Road

We are working with our client, Canada Lands Company, on a development plan for their parcel at 1495 Heron Road. Are you able to advise if there are any known servicing capacity constraints downstream? We are particularly interested in knowing about capacity in the 305mm sanitary fronting the site and the downstream gravity system.

Let me know if you require more information or would like a high level flow estimate to plug into the City model.



Thanks,

Karin

Karin Smadella, P.Eng
Project Manager

Direct: 613 724-4371
Mobile: 613 698-8088
Karin.Smadella@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

'

Upon further discussions with Asset Management, this development can proceed without an upgrades in the downstream sanitary sewer.

4.0 WASTEWATER SERVICING

The development site at 1495 Heron Road fronts on an existing 250mm sanitary sewer. A new 250mm sanitary sewer within the public ROW is proposed to service each of the development blocks with an outlet to the Heron Road sewer (SAN 30737). The existing sanitary connection at SAN 30736 will be removed and a new sanitary sewer is proposed to extend into Block 9 to replace the existing outlet. See ***Drawing SAN-1***.

The City of Ottawa has been contacted to advise whether there are any capacity constraints in the downstream collection system. The City has advised that there is a restriction downstream on Walkley Road at Don Reid Drive. Two pipe segments identified as SAN31092 and SAN31093 will have to be upsized to accommodate the 1495 Heron Road development. It is expected that the sewer replacement will be funded through development charges. Please see correspondence in ***Appendix C.2***.

4.1 DESIGN CRITERIA

As outlined in the City of Ottawa's *Sewer Design Guidelines*, the following criteria were used to calculate estimated wastewater flow rates based on the preferred development concept:

- Average wastewater generation – 280 L/cap/day
- Peaking factor - 4.0 (Harmon's residential)
- Peaking factor - 1.5 (Harmon's commercia and Institutional)
- Harmon Correction Factor = 0.8
- Extraneous flow allowance - 0.33 L/s/ha
- Population density for 1-bedroom apartments - 1.4 persons per unit
- Population density for Townhome - 2.7 persons per unit
- Population for Average Apartment - 1.8 persons per unit
- Average wastewater generation (commercial) - 28,000 L/ha/day of building space

4.2 ESTIMATED WASTEWATER PEAK FLOWS

Private sanitary sewers within the private blocks are anticipated to collect all sanitary wastewater from the future development sites. Connections will be made to the proposed 250mm sanitary sewer within the public roadway which will convey flows to the sewer in Heron Road as shown on ***Drawing SAN-1***.

A functional sanitary sewer design sheet was prepared and is included in ***Appendix C.1***. The estimated wastewater flows expected to be generated are based on the preferred development concept of the site which includes 80 stacked townhome units and 681 residential apartment units with an estimated population of 1442 persons, 0.82 ha of commercial space, and 1.17 ha of institutional space. The estimated wastewater peak flow generated from the proposed development is summarized in the following table:

Appendix D Stormwater Management

D.1 City of Ottawa Correspondence

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Tuesday, October 19, 2021 3:36 PM
To: Smadella, Karin <Karin.Smadella@stantec.com>
Cc: Sandanayake, Hiran <hiran.sandanayake@ottawa.ca>; Moroz, Peter <peter.moroz@stantec.com>
Subject: RE: 1495 Heron Road

Hi Karin

The analysis in 2019 allocated a normal peak flow of 4.6 L/s to the property and a Critical peak flow (100 year I/I) of 6.9 L/s. These were entered into the XPSWMM model as static flows. I will talk with Hiran to see about using our updated PCSWMM model to do the new flow analysis.

					0.33	0.55		Peak	Peak
	Area ID	Type	Area	DWF	I/I	Peak I/I		Normal	Critical
	1	Institutional	10.3	1.19	3.399	5.665		4.59	6.86
	2	High Den res.	13.3	15.5	4.389	7.315		19.91	22.83

The SWM criteria for a site re-development is to control the 100 year flow to the **2 year** using the lesser of C=0.5 or existing. The TC can be computed but cannot be less than 10 min. Now, if many of the buildings are to remain, this can be adjusted to only be applied to areas of re-development. We can discuss further.

As for spare capacity in the other Direction, I will have to check our flood risk model first, but I think there are also constraints in that direction. I will get back to you on this one.

Eric

From: Smadella, Karin <Karin.Smadella@stantec.com>
Sent: October 19, 2021 2:53 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>

Cc: Sandanayake, Hiran <Hiran.Sandanayake@ottawa.ca>; Moroz, Peter <peter.moroz@stantec.com>
Subject: RE: 1495 Heron Road

Hi Eric/Hiran

In addition to identifying the sanitary constraints, can you also please advise what the stormwater design criteria will be for this site – both quality and quantity control? It is expected that several of the existing buildings will remain.

Thank you,

Karin

D.2 Correspondence with the Rideau Valley Conservation Authority (RVCA)

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Monday, July 4, 2022 9:08 AM
To: Smadella, Karin <Karin.Smadella@stantec.com>
Cc: Eric Lalande <eric.lalande@rvca.ca>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road Water Quality Criteria

Good morning Karen,

The distance from the site to any downstream outlet is over 2km. Therefore, while would not specify a direct water quality target. However, we would strongly encourage the stormwater management strategy to implement LID measures and best management practices to deal with water quality, specifically in relation to any surface parking or drive aisles.

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

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

From: Smadella, Karin <Karin.Smadella@stantec.com>
Sent: Wednesday, June 29, 2022 10:39 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Eric Lalande <eric.lalande@rvca.ca>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: RE: 1495 Heron Road Water Quality Criteria

Hi Jamie,

Just following up on this item Are you able to advise what the quality control criteria are for this site?

Thanks,

Karin

Karin Smadella, P.Eng.
Project Manager

Direct: 613 724-4371
Mobile: 613 698-8088
Karin.Smadella@stantec.com

Stantec
300-1331 Clyde Avenue
Ottawa, ON K2C 3G4

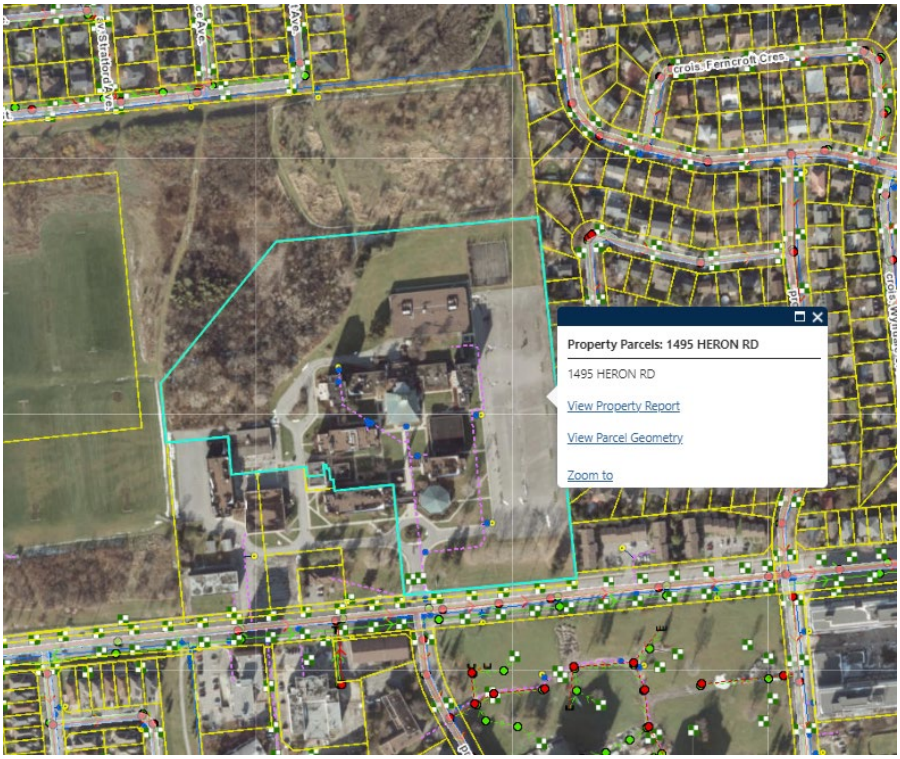
From: Smadella, Karin
Sent: Monday, June 20, 2022 2:47 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Eric Lalande <eric.lalande@rvca.ca>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Subject: 1495 Heron Road Water Quality Criteria

Hi Jamie,

We are working with Canada Lands Company on the redevelopment of their parcel at 1495 Heron Road through a plan of subdivision – see below. Can you please advise what stormwater quality criteria would apply to the development? It appears that the sewers in the north side of Heron Road are eventually directed to a watercourse in the southeast corner of the Walkley and St Laurent intersection tributary to McEwan Creek. The sewers on the south side of Heron outlet to the SWM facility immediately north of Hunt Club Road and west of Russell Road.

Thank you,

Karin



Karin Smadella, P.Eng.
Project Manager

Direct: 613 724-4371
Mobile: 613 698-8088
Karin.Smadella@stantec.com

Stantec
300-1331 Clyde Avenue
Ottawa, ON K2C 3G4

D.3 Stormwater Analysis

D.3.1 Modified Rational Method (MRM)

Stormwater Management Calculations

File No: **160410368**
Project: **1495 Heron Road**
Date: **16-Jul-24**

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table

Catchment Type	Sub-catchment Area ID / Description		Area (ha) "A"		Runoff Coefficient "C"	"A x C"		Overall Runoff Coefficient
Controlled - Tributary	BIO-1	Hard	0.000		0.9	0.000		
		Soft	0.724		0.2	0.145		
		Subtotal		0.72			0.144745	0.200
Controlled - Non-Tributary	EX-STM 25	Hard	0.951		0.9	0.856		
		Soft	0.159		0.2	0.032		
		Subtotal		1.11			0.88784	0.800
Controlled - Non-Tributary	EX-STM 30	Hard	0.111		0.9	0.100		
		Soft	0.044		0.2	0.009		
		Subtotal		0.15			0.108487	0.700
Controlled - Tributary	L103A	Hard	0.097		0.9	0.087		
		Soft	0.039		0.2	0.008		
		Subtotal		0.14			0.094673	0.700
Controlled - Tributary	L103B	Hard	0.250		0.9	0.225		
		Soft	0.019		0.2	0.004		
		Subtotal		0.27			0.22899	0.850
Controlled - Tributary	L103C	Hard	0.601		0.9	0.541		
		Soft	0.046		0.2	0.009		
		Subtotal		0.65			0.55046	0.850
Controlled - Tributary	L104A	Hard	0.258		0.9	0.232		
		Soft	0.103		0.2	0.021		
		Subtotal		0.36			0.25277	0.700
Controlled - Tributary	L105A	Hard	0.325		0.9	0.293		
		Soft	0.130		0.2	0.026		
		Subtotal		0.46			0.31892	0.700
Controlled - Tributary	L105B	Hard	1.476		0.9	1.328		
		Soft	0.114		0.2	0.023		
		Subtotal		1.59			1.35065	0.850
Controlled - Tributary	L105C	Hard	0.274		0.9	0.247		
		Soft	0.021		0.2	0.004		
		Subtotal		0.30			0.251005	0.850
Controlled - Tributary	L106A	Hard	0.114		0.9	0.103		
		Soft	0.046		0.2	0.009		
		Subtotal		0.16			0.11207	0.700
Controlled - Tributary	L106B	Hard	0.741		0.9	0.667		
		Soft	0.296		0.2	0.059		
		Subtotal		1.04			0.72597	0.700
Controlled - Tributary	L106C	Hard	0.265		0.9	0.239		
		Soft	0.020		0.2	0.004		
		Subtotal		0.29			0.242845	0.850
Total				**7.225**			**5.125**	
Overall Runoff Coefficient= C:								**0.71**

Total Tributary Surface Areas (Controlled and Uncontrolled)	**5.960 ha**
Total Tributary Area to Outlet (BIO-1)	**5.960 ha**
Total Controlled Areas (Tributary to Existing STM)	**1.265 ha**
Total Site	**7.225 ha**

Stormwater Management Calculations

Project #160410368, 1495 Heron Road
Modified Rational Method Calculatons for Storage

2 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	732.951
b =	6.199
c =	0.81

t (min)	I (mm/hr)
10	76.81
20	52.03
30	40.04
40	32.86
50	28.04
60	24.56
70	21.91
80	19.83
90	18.14
100	16.75
110	15.57
120	14.56

2 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 5.960
C: 0.41

Typical Time of Concentration

tc (min)	I (2 yr) (mm/hr)	Qtarget (L/s)
26.7	43.3	**294.2**

Subcatchment Storage Allowance	
50	cu.m/ha

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: BIO-1
Area (ha): 0.72
C: 0.20
Bioswale - Exfiltration LID System
Controlled - Tributary
(SWM Corridor)

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	912.4	294.2	618.2	370.9
20	52.0	618.1	294.2	323.9	**388.7**
30	40.0	475.7	294.2	181.5	326.8
40	32.9	390.4	294.2	96.2	231.0
50	28.0	333.1	294.2	39.0	116.9
60	24.6	291.7	291.7	0.0	0.0
70	21.9	260.3	260.3	0.0	0.0
80	19.8	235.6	235.6	0.0	0.0
90	18.1	215.5	215.5	0.0	0.0
100	16.7	198.9	198.9	0.0	0.0
110	15.6	184.9	184.9	0.0	0.0
120	14.6	173.0	173.0	0.0	0.0

Storage: Storage within Bioswale Exfiltration System

Outlet from Bioswale to Heron Road Storm Sewer

Invert Elevation	92.58	m
T/G Elevation	95.48	m
Max Ponding Depth	0.00	m
Downstream W/L	92.56	m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)
2-year Water Level	95.48	2.90	294.2	388.7	1897.2

Subdrainage Area: L103A
Area (ha): 0.14
C: 0.70
Controlled - Tributary

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	20.2	20.2	0.0	**0.0**
20	52.0	13.7	13.7	0.0	**0.0**
30	40.0	10.5	10.5	0.0	**0.0**
40	32.9	8.6	8.6	0.0	**0.0**
50	28.0	7.4	7.4	0.0	**0.0**
60	24.6	6.5	6.5	0.0	**0.0**
70	21.9	5.8	5.8	0.0	**0.0**
80	19.8	5.2	5.2	0.0	**0.0**
90	18.1	4.8	4.8	0.0	**0.0**
100	16.7	4.4	4.4	0.0	**0.0**
110	15.6	4.1	4.1	0.0	**0.0**
120	14.6	3.8	3.8	0.0	**0.0**

Storage: Surface Storage within Street 3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	20.2	0.0	6.8	OK

Subdrainage Area: L103B
Area (ha): 0.27
C: 0.85
Controlled - Tributary

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	48.9	48.9	0.0	**0.0**
20	52.0	33.1	33.1	0.0	**0.0**
30	40.0	25.5	25.5	0.0	**0.0**
40	32.9	20.9	20.9	0.0	**0.0**
50	28.0	17.9	17.9	0.0	**0.0**
60	24.6	15.6	15.6	0.0	**0.0**
70	21.9	13.9	13.9	0.0	**0.0**
80	19.8	12.6	12.6	0.0	**0.0**
90	18.1	11.5	11.5	0.0	**0.0**
100	16.7	10.7	10.7	0.0	**0.0**
110	15.6	9.9	9.9	0.0	**0.0**
120	14.6	9.3	9.3	0.0	**0.0**

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	48.9	0.0	13.5	OK

Subdrainage Area: L103C
Area (ha): 0.65
C: 0.85
Controlled - Tributary

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	117.5	117.5	0.0	**0.0**
20	52.0	79.6	79.6	0.0	**0.0**
30	40.0	61.3	61.3	0.0	**0.0**
40	32.9	50.3	50.3	0.0	**0.0**
50	28.0	42.9	42.9	0.0	**0.0**
60	24.6	37.6	37.6	0.0	**0.0**
70	21.9	33.5	33.5	0.0	**0.0**
80	19.8	30.3	30.3	0.0	**0.0**
90	18.1	27.8	27.8	0.0	**0.0**
100	16.7	25.6	25.6	0.0	**0.0**
110	15.6	23.8	23.8	0.0	**0.0**
120	14.6	22.3	22.3	0.0	**0.0**

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	117.5	0.0	32.4	OK

Subdrainage Area: L104A
Area (ha): 0.36
C: 0.70
Controlled - Tributary

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	54.0	54.0	0.0	**0.0**
20	52.0	36.6	36.6	0.0	**0.0**
30	40.0	28.1	28.1	0.0	**0.0**
40	32.9	23.1	23.1	0.0	**0.0**
50	28.0	19.7	19.7	0.0	**0.0**
60	24.6	17.3	17.3	0.0	**0.0**
70	21.9	15.4	15.4	0.0	**0.0**
80	19.8	13.9	13.9	0.0	**0.0**
90	18.1	12.7	12.7	0.0	**0.0**
100	16.7	11.8	11.8	0.0	**0.0**
110	15.6	10.9	10.9	0.0	**0.0**
120	14.6	10.2	10.2	0.0	**0.0**

Storage: Surface Storage within Street 3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	54.0	0.0	18.1	OK

Subdrainage Area: L105A
Area (ha): 0.46
C: 0.70
Controlled - Tributary

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	68.1	68.1	0.0	**0.0**
20	52.0	46.1	46.1	0.0	**0.0**
30	40.0	35.5	35.5	0.0	**0.0**
40	32.9	29.1	29.1	0.0	**0.0**
50	28.0	24.9	24.9	0.0	**0.0**
60	24.6	21.8	21.8	0.0	**0.0**
70	21.9	19.4	19.4	0.0	**0.0**
80	19.8	17.6	17.6	0.0	**0.0**
90	18.1	16.1	16.1	0.0	**0.0**
100	16.7	14.8	14.8	0.0	**0.0**
110	15.6	13.8	13.8	0.0	**0.0**
120	14.6	12.9	12.9	0.0	**0.0**

Storage: Surface Storage within Street 3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	68.1	0.0	22.8	OK

Subdrainage Area: L105B
Area (ha): 1.59
C: 0.85
Controlled - Tributary

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	288.4	288.4	0.0	**0.0**
20	52.0	195.4	195.4	0.0	**0.0**
30	40.0	150.4	150.4	0.0	**0.0**
40	32.9	123.4	123.4	0.0	**0.0**
50	28.0	105.3	105.3	0.0	**0.0**
60	24.6	92.2	92.2	0.0	**0.0**
70	21.9	82.3	82.3	0.0	**0.0**
80	19.8	74.5	74.5	0.0	**0.0**

Project #160410368, 1495 Heron Road
Modified Rational Method Calculatons for Storage

100 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	1735.688
b =	6.014
c =	0.820

t (min)	I (mm/hr)
10	178.56
20	119.95
30	91.87
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

100 YEAR Predevelopment Target Release from Portion of Site

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: BIO-1
Area (ha): 0.72
C: 0.25
Bioswale - Exfiltration LID System
Controlled - Tributary
(SWM Corridor)

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	2119.3	294.2	1825.2	1095.1
20	120.0	1843.3	294.2	1549.1	1859.0
30	91.9	1314.9	294.2	1020.7	1837.3
40	75.1	1075.5	294.2	781.4	**1875.3**
50	64.0	915.4	294.2	621.2	1863.6
60	55.9	800.0	294.2	505.8	1821.0
70	49.8	712.6	294.2	418.5	1757.6
80	45.0	643.9	294.2	349.8	1679.0
90	41.1	588.4	294.2	294.3	1589.0
100	37.9	542.5	294.2	248.3	1490.0
110	35.2	503.8	294.2	209.7	1383.9
120	32.9	470.8	294.2	176.7	1271.9

Storage: Storage within Bioswale Exfiltration System

Outlet from Bioswale to Heron Road Storm Sewer

Invert Elevation	92.58	m
T/G Elevation	95.48	m
Max Ponding Depth	0.30	m
Downstream W/L	92.56	m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)
100-year Water Level	95.78	3.20	294.2	1875.3	1897.2
					21.90

Subdrainage Area: L103A
Area (ha): 0.14
C: 0.88
Controlled - Tributary

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	58.7	47.5	11.3	**6.8**
20	120.0	39.5	39.5	0.0	0.0
30	91.9	30.2	30.2	0.0	0.0
40	75.1	24.7	24.7	0.0	0.0
50	64.0	21.0	21.0	0.0	0.0
60	55.9	18.4	18.4	0.0	0.0
70	49.8	16.4	16.4	0.0	0.0
80	45.0	14.8	14.8	0.0	0.0
90	41.1	13.5	13.5	0.0	0.0
100	37.9	12.5	12.5	0.0	0.0
110	35.2	11.6	11.6	0.0	0.0
120	32.9	10.8	10.8	0.0	0.0

Storage: Surface Storage within Street 3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	47.5	6.8	6.8	OK
					0.00	

Subdrainage Area: L103B
Area (ha): 0.27
C: 1.00
Controlled - Tributary

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	133.7	111.3	22.5	**13.5**
20	120.0	89.8	89.8	0.0	0.0
30	91.9	68.8	68.8	0.0	0.0
40	75.1	56.3	56.3	0.0	0.0
50	64.0	47.9	47.9	0.0	0.0
60	55.9	41.9	41.9	0.0	0.0
70	49.8	37.3	37.3	0.0	0.0
80	45.0	33.7	33.7	0.0	0.0
90	41.1	30.8	30.8	0.0	0.0
100	37.9	28.4	28.4	0.0	0.0
110	35.2	26.4	26.4	0.0	0.0
120	32.9	24.6	24.6	0.0	0.0

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	111.3	13.5	13.5	OK
					0.00	

Subdrainage Area: L103C
Area (ha): 0.65
C: 1.00
Controlled - Tributary

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	321.5	267.5	54.0	**32.4**
20	120.0	216.0	216.0	0.0	0.0
30	91.9	165.4	165.4	0.0	0.0
40	75.1	135.3	135.3	0.0	0.0
50	64.0	115.1	115.1	0.0	0.0
60	55.9	100.6	100.6	0.0	0.0
70	49.8	89.6	89.6	0.0	0.0
80	45.0	81.0	81.0	0.0	0.0
90	41.1	74.0	74.0	0.0	0.0
100	37.9	68.2	68.2	0.0	0.0
110	35.2	63.4	63.4	0.0	0.0
120	32.9	59.2	59.2	0.0	0.0

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	267.5	32.4	32.4	OK
					0.00	

Subdrainage Area: L104A
Area (ha): 0.36
C: 0.88
Controlled - Tributary

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	156.8	126.8	30.1	**18.1**
20	120.0	105.4	105.4	0.0	0.0
30	91.9	80.7	80.7	0.0	0.0
40	75.1	66.0	66.0	0.0	0.0
50	64.0	56.2	56.2	0.0	0.0
60	55.9	49.1	49.1	0.0	0.0
70	49.8	43.7	43.7	0.0	0.0
80	45.0	39.5	39.5	0.0	0.0
90	41.1	36.1	36.1	0.0	0.0
100	37.9	33.3	33.3	0.0	0.0
110	35.2	30.9	30.9	0.0	0.0
120	32.9	28.9	28.9	0.0	0.0

Storage: Surface Storage within Street 3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	126.8	18.1	18.1	OK
					0.00	

Subdrainage Area: L105A
Area (ha): 0.46
C: 0.88
Controlled - Tributary

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	197.9	159.9	38.0	**22.8**
20	120.0	132.9	132.9	0.0	0.0
30	91.9	101.8	101.8	0.0	0.0
40	75.1	83.3	83.3	0.0	0.0
50	64.0	70.9	70.9	0.0	0.0
60	55.9	61.9	61.9	0.0	0.0
70	49.8	55.2	55.2	0.0	0.0
80	45.0	49.9	49.9	0.0	0.0
90	41.1	45.6	45.6	0.0	0.0
100	37.9	42.0	42.0	0.0	0.0
110	35.2	39.0	39.0	0.0	0.0
120	32.9	36.5	36.5	0.0	0.0

Storage: Surface Storage within Street 3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	159.9	22.8	22.8	OK
					0.00	

Subdrainage Area: L105B
Area (ha): 1.59
C: 1.00
Controlled - Tributary

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	788.8	656.4	132.4	**79.5**
20	120.0	529.9	656.4	0.0	0.0
30	91.9	405.8	405.8	0.0	0.0
40	75.1	331.9	331.9	0.0	0.0
50	64.0	282.5	282.5	0.0	0.0
60	55.9	246.9	246.9	0.0	0.0
70	49.8	219.9	219.9	0.0	0.0
80	45.0	198.7	198.7	0.0	0.0

Stormwater Management Calculations

Project #160410368, 1495 Heron Road
Modified Rational Method Calculatons for Storage

90	18.1	68.1	68.1	0.0	**0.0**
100	16.7	62.9	62.9	0.0	**0.0**
110	15.6	58.5	58.5	0.0	**0.0**
120	14.6	54.7	54.7	0.0	**0.0**

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	288.4	0.0	79.5	OK

Subdrainage Area: L105C — Controlled - Tributary
Area (ha): 0.30
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	53.6	53.6	0.0	**0.0**
20	52.0	36.3	36.3	0.0	**0.0**
30	40.0	27.9	27.9	0.0	**0.0**
40	32.9	22.9	22.9	0.0	**0.0**
50	28.0	19.6	19.6	0.0	**0.0**
60	24.6	17.1	17.1	0.0	**0.0**
70	21.9	15.3	15.3	0.0	**0.0**
80	19.8	13.8	13.8	0.0	**0.0**
90	18.1	12.7	12.7	0.0	**0.0**
100	16.7	11.7	11.7	0.0	**0.0**
110	15.6	10.9	10.9	0.0	**0.0**
120	14.6	10.2	10.2	0.0	**0.0**

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	53.6	0.0	14.8	OK

Subdrainage Area: L106A — Controlled - Tributary
Area (ha): 0.16
C: 0.70

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	23.9	23.9	0.0	**0.0**
20	52.0	16.2	16.2	0.0	**0.0**
30	40.0	12.5	12.5	0.0	**0.0**
40	32.9	10.2	10.2	0.0	**0.0**
50	28.0	8.7	8.7	0.0	**0.0**
60	24.6	7.7	7.7	0.0	**0.0**
70	21.9	6.8	6.8	0.0	**0.0**
80	19.8	6.2	6.2	0.0	**0.0**
90	18.1	5.7	5.7	0.0	**0.0**
100	16.7	5.2	5.2	0.0	**0.0**
110	15.6	4.9	4.9	0.0	**0.0**
120	14.6	4.5	4.5	0.0	**0.0**

Storage: Surface Storage within Street 3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	23.9	0.0	8.0	OK

Subdrainage Area: L106B — Controlled - Tributary
Area (ha): 1.04
C: 0.70

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	155.0	155.0	0.0	**0.0**
20	52.0	105.0	105.0	0.0	**0.0**
30	40.0	80.8	80.8	0.0	**0.0**
40	32.9	66.3	66.3	0.0	**0.0**
50	28.0	56.6	56.6	0.0	**0.0**
60	24.6	49.6	49.6	0.0	**0.0**
70	21.9	44.2	44.2	0.0	**0.0**
80	19.8	40.0	40.0	0.0	**0.0**
90	18.1	36.6	36.6	0.0	**0.0**
100	16.7	33.8	33.8	0.0	**0.0**
110	15.6	31.4	31.4	0.0	**0.0**
120	14.6	29.4	29.4	0.0	**0.0**

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	155.0	0.0	51.9	OK

Subdrainage Area: L106C — Controlled - Tributary
Area (ha): 0.29
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	51.9	51.9	0.0	**0.0**
20	52.0	35.1	35.1	0.0	**0.0**
30	40.0	27.0	27.0	0.0	**0.0**
40	32.9	22.2	22.2	0.0	**0.0**
50	28.0	18.9	18.9	0.0	**0.0**
60	24.6	16.6	16.6	0.0	**0.0**
70	21.9	14.8	14.8	0.0	**0.0**
80	19.8	13.4	13.4	0.0	**0.0**
90	18.1	12.2	12.2	0.0	**0.0**
100	16.7	11.3	11.3	0.0	**0.0**
110	15.6	10.5	10.5	0.0	**0.0**
120	14.6	9.8	9.8	0.0	**0.0**

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	-	-	51.9	0.0	14.3	OK

SUMMARY TO OUTLET

Tributary Area to Bioswale	5.96	**ha**
Total 2yr Flow to Bioswale	912	**L/s**
Site Allowable Release Rate	294	**L/s**
BIO-1 Volume Requirement	388.7	**cu.m**

Area Type	Area ID	Design Surface Storage (m³)	Allowable Discharge (L/s)	Release Rate To Bioswale (BIO-1) (L/s)
SWM Corridor	BIO-1	-	-	715.3
Residential/Commercial	L103B	-	48.9	
Residential/Commercial	L103C	-	117.5	
Residential	L105B	-	288.4	
Residential/Commercial	L105C	-	53.6	
Institutional	L106B	-	155.0	
Residential	L106C	-	51.9	
Private Street	L103A	-	20.2	166.2
	L104A	-	54.0	
	L105A	-	68.1	
	L106A	-	23.9	
Total				**881.5**

Project #160410368, 1495 Heron Road
Modified Rational Method Calculatons for Storage

90	41.1	181.6	181.6	0.0	0.0
100	37.9	167.4	167.4	0.0	0.0
110	35.2	155.5	155.5	0.0	0.0
120	32.9	145.3	145.3	0.0	0.0

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	656.4	79.5	79.5	OK
					0.00	

Subdrainage Area: L105C — Controlled - Tributary
Area (ha): 0.30
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	146.6	122.0	24.6	**14.8**
20	120.0	98.5	98.5	0.0	0.0
30	91.9	75.4	75.4	0.0	0.0
40	75.1	61.7	61.7	0.0	0.0
50	64.0	52.5	52.5	0.0	0.0
60	55.9	45.9	45.9	0.0	0.0
70	49.8	40.9	40.9	0.0	0.0
80	45.0	36.9	36.9	0.0	0.0
90	41.1	33.7	33.7	0.0	0.0
100	37.9	31.1	31.1	0.0	0.0
110	35.2	28.9	28.9	0.0	0.0
120	32.9	27.0	27.0	0.0	0.0

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	122.0	14.8	14.8	OK
					0.00	

Subdrainage Area: L106A — Controlled - Tributary
Area (ha): 0.16
C: 0.88

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	69.5	56.2	13.3	**8.0**
20	120.0	46.7	46.7	0.0	0.0
30	91.9	35.8	35.8	0.0	0.0
40	75.1	29.3	29.3	0.0	0.0
50	64.0	24.9	24.9	0.0	0.0
60	55.9	21.8	21.8	0.0	0.0
70	49.8	19.4	19.4	0.0	0.0
80	45.0	17.5	17.5	0.0	0.0
90	41.1	16.0	16.0	0.0	0.0
100	37.9	14.8	14.8	0.0	0.0
110	35.2	13.7	13.7	0.0	0.0
120	32.9	12.8	12.8	0.0	0.0

Storage: Surface Storage within Street 3

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	56.2	8.0	8.0	OK
					0.00	

Subdrainage Area: L106B — Controlled - Tributary
Area (ha): 1.04
C: 0.88

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	450.5	364.0	86.4	**51.9**
20	120.0	302.6	302.6	0.0	0.0
30	91.9	231.8	231.8	0.0	0.0
40	75.1	189.6	189.6	0.0	0.0
50	64.0	161.3	161.3	0.0	0.0
60	55.9	141.0	141.0	0.0	0.0
70	49.8	125.6	125.6	0.0	0.0
80	45.0	113.5	113.5	0.0	0.0
90	41.1	103.7	103.7	0.0	0.0
100	37.9	95.6	95.6	0.0	0.0
110	35.2	88.8	88.8	0.0	0.0
120	32.9	83.0	83.0	0.0	0.0

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	364.0	51.9	51.9	OK
					0.00	

Subdrainage Area: L106C — Controlled - Tributary
Area (ha): 0.29
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	141.8	118.0	23.8	**14.3**
20	120.0	95.3	95.3	0.0	0.0
30	91.9	73.0	73.0	0.0	0.0
40	75.1	59.7	59.7	0.0	0.0
50	64.0	50.8	50.8	0.0	0.0
60	55.9	44.4	44.4	0.0	0.0
70	49.8	39.5	39.5	0.0	0.0
80	45.0	35.7	35.7	0.0	0.0
90	41.1	32.7	32.7	0.0	0.0
100	37.9	30.1	30.1	0.0	0.0
110	35.2	28.0	28.0	0.0	0.0
120	32.9	26.1	26.1	0.0	0.0

Storage: Surface/Subsurface Storage within Development Area

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	118.0	14.3	14.3	OK
					0.00	

SUMMARY TO OUTLET

Tributary Area to Bioswale (Block 4)	5.96	**ha**
Total 100yr Flow to Bioswale (Block 4)	2,119	**L/s**
Site Allowable Release Rate	294	**L/s**
BIO-1 Volume Requirement	1875.3	**cu.m**

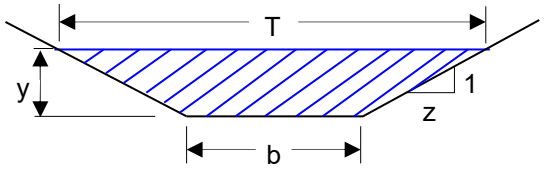
Area Type	Area ID	Design Surface Storage (m³)	Allowable Discharge (L/s)	Total Release to Bioswale (BIO-1) (L/s)
SWM Corridor	BIO-1	-	-	1639.2
Residential/Commercial	L103B	13.5	111.3	
Residential/Commercial	L103C	32.4	267.5	
Residential	L105B	79.5	656.4	
Residential/Commercial	L105C	14.8	122.0	
Institutional	L106B	51.9	364.0	
Residential	L106C	14.3	118.0	
Private Street	L103A	6.8	47.5	390.3
	L104A	18.1	126.8	
	L105A	22.8	159.9	
	L106A	8.0	56.2	
Total				**2029.5**

D.3.2 Channel Conveyance Design

Job # 160410368 - 1945 Heron Road

Date: 6-Oct-22

Channel Conveyance Design



$$A = (b + z \cdot y)y$$

$$P = b + 2 \cdot y \cdot \sqrt{1 + z^2}$$

$$R = \frac{A}{P}$$

$$T = b + 2zy$$

$$Q = \frac{A}{n} R^{2/3} \sqrt{S}$$

$$V = \frac{Q}{A}$$

$$Fr = \sqrt{\frac{Q^2 T}{gA^3}}$$

Expected Flow Depth	
n=	0.03
z=	3.00
b=	4.50
y=	0.25
A=	1.31
P=	6.08
R=	0.22
S=	0.10
T=	6.00

Available Swale Volume **665.4** **cu.m**

D.3.3 Low Impact Development (LID) Analysis

1495 Heron Road
Low Impact Development (LID) Analysis - 2024

Design Parameters

Assum. Filler Media Void Ratio
0.4

Available Bed Area and Volume

		Pipe Characteristics			Bedding Characteristics					Exfiltration Storage (cu.m)
From M.H.	To M.H.	STM Pipe Length (m)	Subdrain Diameter (mm)	Pipe Volume (cu.m)	Bedding Depth (m)	Bedding Width (m)	Bedding Length (m)	Bedding Area (sq.m)	Granular Volume (cu.m)	Volume Storage (cu.m)
U/S	Inlet 1	305.0	250	14.972	1.000	6.000	305.0	1830.0	1815.0	741.0
Inlet 1	Inlet 2	162.0	250	7.952	1.000	6.000	162.0	972.0	964.0	393.6
Inlet 2	Outlet	40.0	250	1.963	1.000	6.000	40.0	240.0	238.0	97.2

D.4 Storm Sewer Design Sheet

Stantec

1495 Heron Road

DATE: 2024-07-17
REVISION: 2
DESIGNED BY: MJS
CHECKED BY: DT

STORM SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160410368

DESIGN PARAMETERS

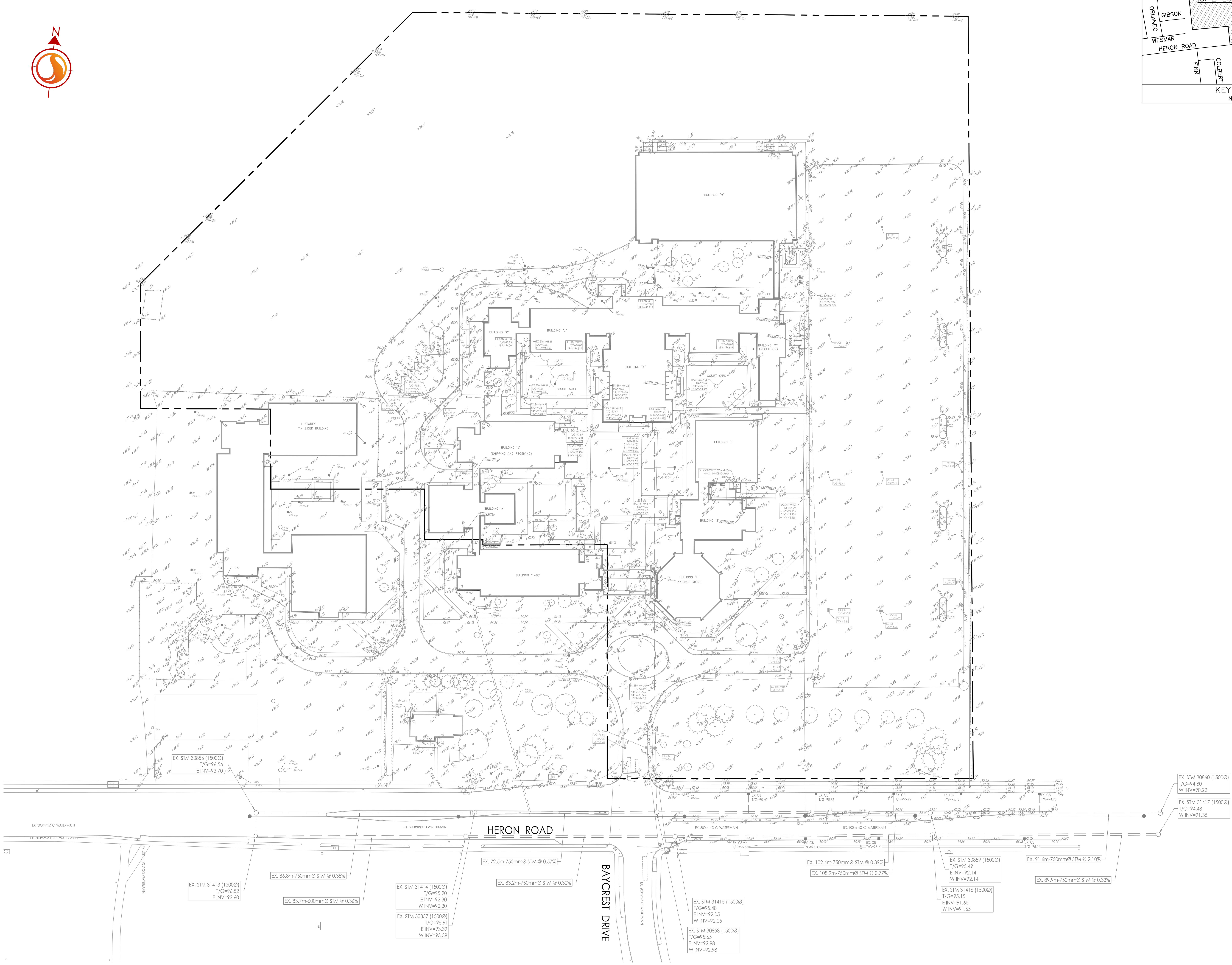
$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

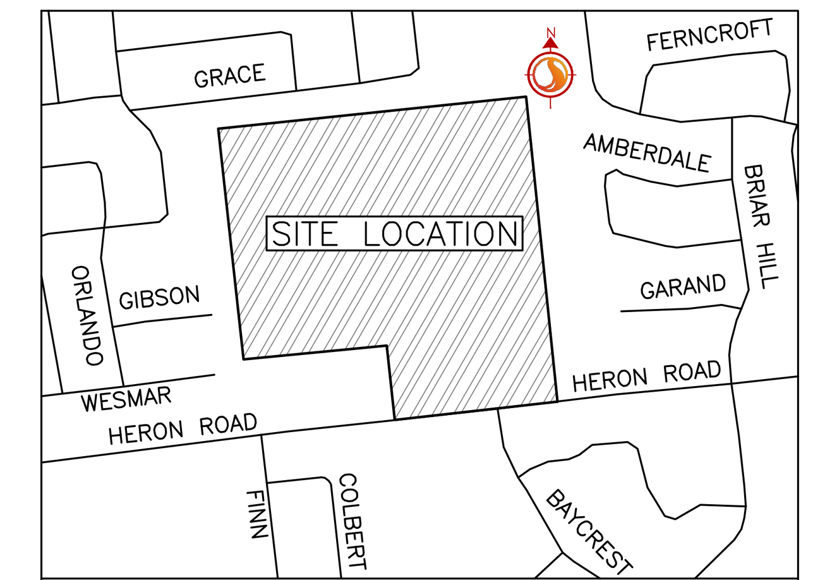
	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min
BEDDING CLASS = B

LOCATION			DRAINAGE AREA																				PIPE SELECTION										
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETEI (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
L106C, L106B, L106A	106	105	1.49	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.00	1.087	1.087	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	231.8	90.0	525	525	CIRCULAR	CONCRETE	-	0.40	283.8	**81.69%**	1.27	1.26	1.19
L105C, L105B, L105A	105	INLET 1	2.35	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.00	1.929	3.015	0.000	0.000	0.000	0.000	0.000	0.000	11.19	72.51	98.29	115.19	168.35	0.0	0.0	607.3	218.6	675	675	CIRCULAR	CONCRETE	-	0.50	620.1	**97.94%**	1.68	1.75	2.08
																				13.27									675	675									
	OUTLET	101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	294.2	294.2	294.2	3.2	750	750	CIRCULAR	CONCRETE	-	0.10	367.3	**80.10%**	0.81	0.79	0.07
	101	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.07	76.55	103.84	121.72	177.95	0.0	294.2	294.2	22.6	600	600	CIRCULAR	CONCRETE	-	0.30	350.8	**83.85%**	1.20	1.20	0.31
																				10.38									600	600									
L103A, L103C, L103B	103	102	1.05	0.00	0.00	0.00	0.00	0.83	0.00	0.00	0.00	0.874	0.874	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	186.5	42.0	450	450	CIRCULAR	CONCRETE	-	0.60	230.4	**80.95%**	1.40	1.39	0.50
																				10.50																			
L104A	104	102	0.36	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.253	0.253	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	53.9	124.3	375	375	CIRCULAR	CONCRETE	-	0.40	104.3	**51.73%**	0.99	0.85	2.43
																				12.43																			
	102	INLET 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.127	0.000	0.000	0.000	0.000	0.000	0.000	12.43	68.59	92.91	108.85	159.04	0.0	0.0	214.7	13.3	525	525	CIRCULAR	CONCRETE	-	0.40	283.8	**75.67%**	1.27	1.23	0.18
																				12.61									525	525									

Appendix E Drawings





KEY PLAN
N.T.S.

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- EXISTING SPOT ELEVATION
- EXISTING WATERMAIN
- EXISTING VALVE AND VALVE BOX
- EXISTING VALVE CHAMBER
- EXISTING FIRE HYDRANT
- EXISTING SANITARY MH AND SEWER
- EXISTING STORM MH AND SEWER
- EXISTING CATCHBASIN MANHOLE
- EXISTING CATCHBASIN
- EXISTING UNDERGROUND HYDRO
- EXISTING OVERHEAD WIRES
- EXISTING UNDERGROUND BELL CONDUIT
- EXISTING UNDERGROUND CABLE CONDUIT
- EXISTING UNDERGROUND GASMAIN
- EXISTING UNDERGROUND STREET LIGHT CONDUIT
- EXISTING UNDERGROUND TRAFFIC CONDUIT

Notes

		By	Appd.	YY.MM.DD
2	REVISED AS PER DRAFT PLAN	MJS	DT	24.07.16
1	REVISED AS PER CITY COMMENTS	MJS	DT	23.10.20
0	ISSUED TO CITY FOR REVIEW	MJS	DT	22.10.04

Revision

File Name: 160410368 DB-DRAFT	MJS	KS	MJS	22.06.10
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
CANADA LANDS COMPANY

1495 HERON ROAD

OTTAWA, ON, CANADA

Title
EXISTING CONDITIONS PLAN

Project No. 160410368
Scale 1:750 (0 7.5 22.5 37.5m)

Drawing No. EX-1
Sheet 1 of 6
Revision 2

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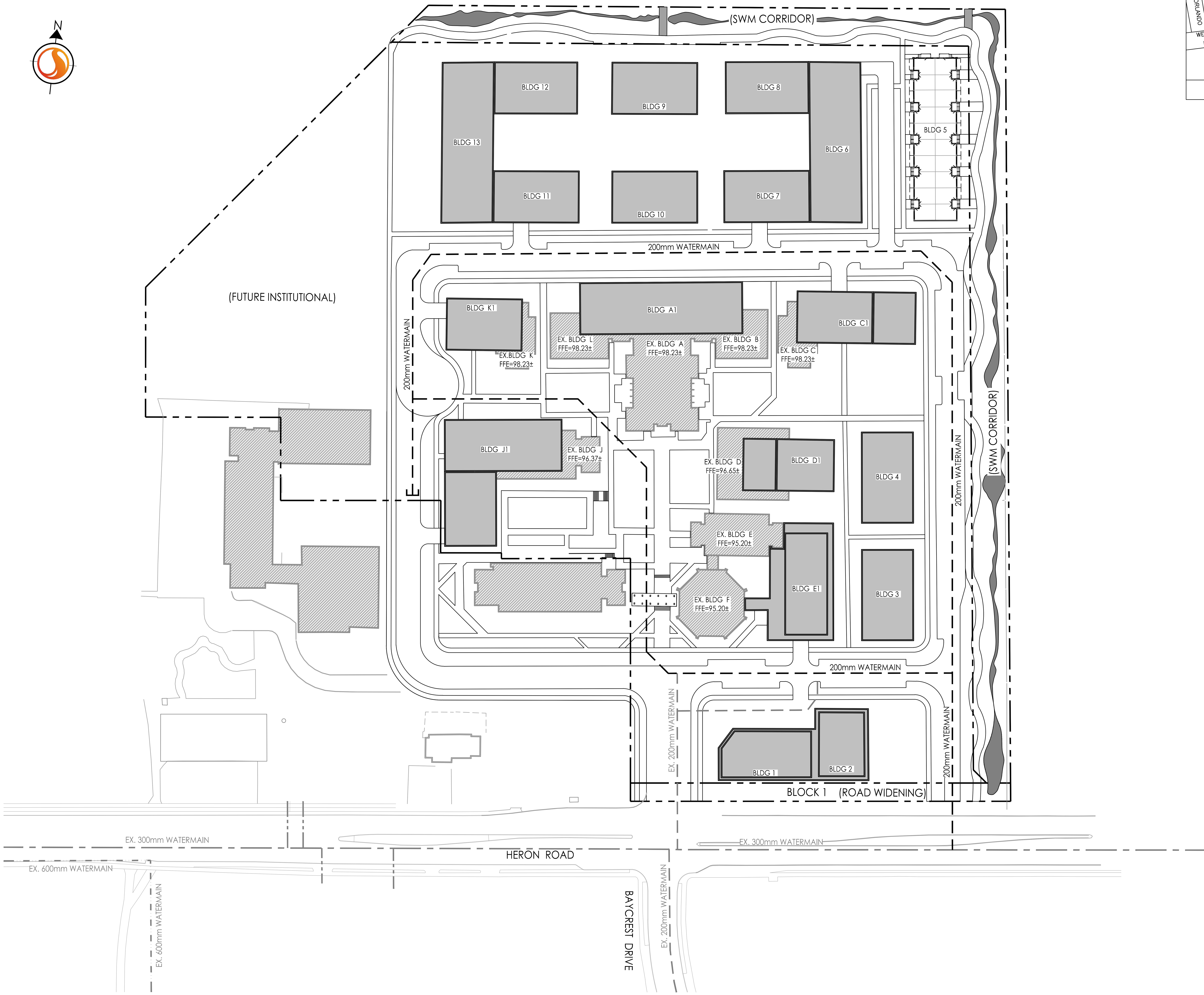
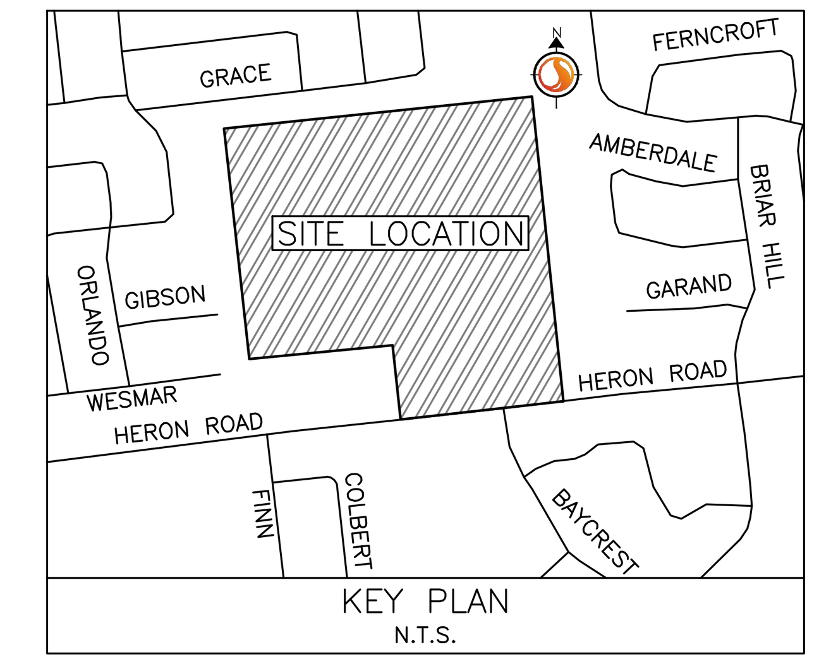
2024/07/17 2:25 PM By: Sharp, Mike

ORIGINAL SHEET - ARCH D





KEY PLAN
N.T.S.

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- PROPERTY LINE
- 600mm WATERMAIN
- 400mm WATERMAIN
- 300mm WATERMAIN
- 200mm WATERMAIN
- 150mm WATERMAIN
- EX. 600mm WATERMAIN
- EX. 400mm WATERMAIN
- EX. 300mm WATERMAIN
- EX. 200mm WATERMAIN
- EX. 150mm WATERMAIN

Notes

Revision		By	Appd.	YY.MM.DD
2	REVISED AS PER DRAFT PLAN	MJS	DT	24.07.16
1	REVISED AS PER CITY COMMENTS	MJS	DT	23.10.20
0	ISSUED TO CITY FOR REVIEW	MJS	DT	22.10.04

File Name:	Dwn.	Chkd.	Dsgn.	YY.MM.DD
160410368 DB-DRAFT	MJS	KS	MJS	22.06.10

Permit-Seal

Client/Project
CANADA LANDS COMPANY

1495 HERON ROAD

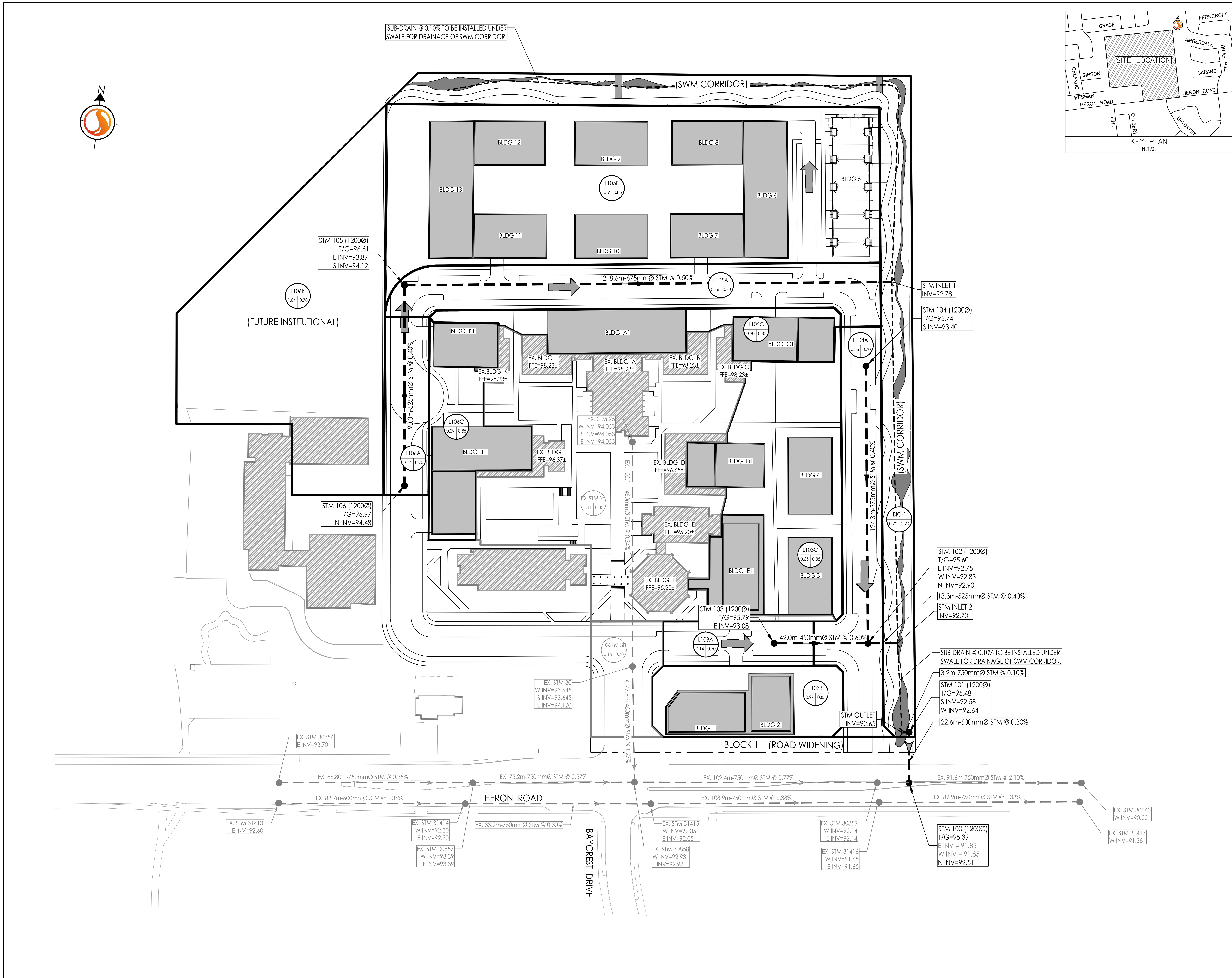
OTTAWA, ON, CANADA

Title
CONCEPTUAL WATERMAIN SYSTEM

Project No. 160410368
Scale 1:750 (0, 7.5, 22.5, 37.5m)

Drawing No. WTR-1
Sheet 2 of 6
Revision 2

ORIGINAL SHEET - ARCH D



Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- PROPERTY LINE
- TRUNK STORM SEWER
- EXISTING TRUNK STORM SEWER
- MAJOR OVERLAND FLOW ROUTE
- EXISTING MAJOR OVERLAND FLOW ROUTE
- DRAINAGE AREA No. (L4000A)
- RUNOFF COEFFICIENT (0.80)
- STORM DRAINAGE AREA (ha) (1.00)
- STORM DRAINAGE BOUNDARY

Notes

2	REVISED AS PER DRAFT PLAN	MJS	DT	24.07.16
1	REVISED AS PER CITY COMMENTS	MJS	DT	23.10.20
0	ISSUED TO CITY FOR REVIEW	MJS	DT	22.10.04
Revision		By	Appd.	YY.MM.DD

File Name: 160410368 DB-DRAFT	MJS	KS	MJS	22.06.10
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

CANADA LANDS COMPANY

1495 HERON ROAD

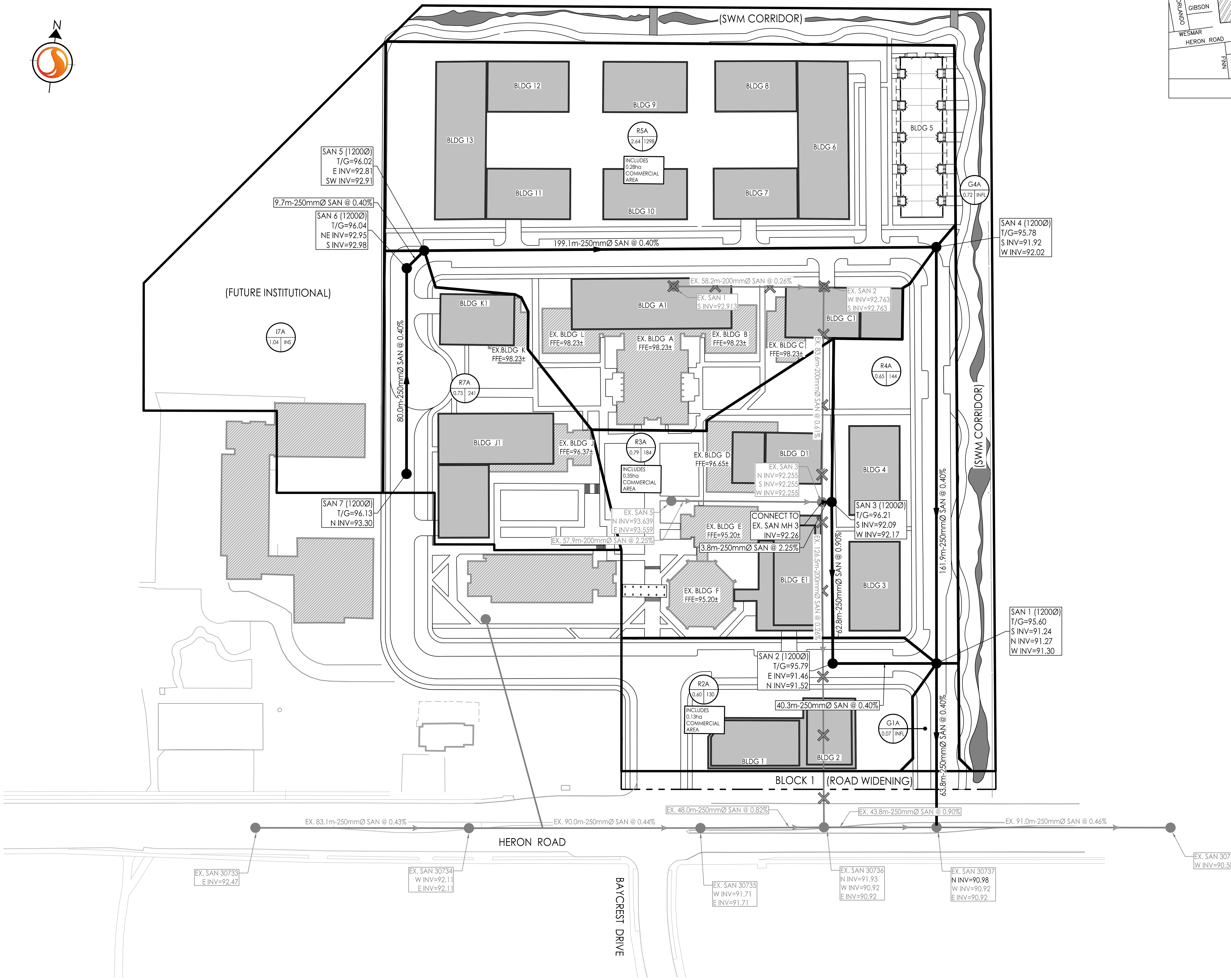
OTTAWA, ON, CANADA

Title

CONCEPTUAL STORM SEWER SYSTEM

Project No.	Scale
160410368	1:750 (0 7.5 22.5 37.5m)

Drawing No.	Sheet	Revision
STM-1	3 of 6	2



KEY PLAN
N.T.S.

Stantec

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Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- PROPOSED TRUNK SANITARY SEWER
- EXISTING TRUNK SANITARY SEWER
- SANITARY DRAINAGE BOUNDARY
- EXISTING SANITARY DRAINAGE BOUNDARY
- PROPERTY LINE
- R400A / 0.50 / 50: AREA ID; POPULATION; SANITARY DRAINAGE AREA (ha)
- C100A / 0.50 / COM: AREA ID; COMMERCIAL FLOW RATES USED; SANITARY DRAINAGE AREA (ha)
- I100A / 0.50 / INST: AREA ID; INSTITUTIONAL FLOW RATES USED; SANITARY DRAINAGE AREA (ha)
- G100A / 0.50 / INFL: AREA ID; INFILTRATION FLOW RATES USED; SANITARY DRAINAGE AREA (ha)
- R100A / 0.50 / 50: EXISTING AREA ID; EXISTING POPULATION; EXISTING SANITARY DRAINAGE AREA (ha)
- G100A / 0.50 / INFL: EXISTING AREA ID; EXISTING POPULATION; EXISTING SANITARY DRAINAGE AREA (ha)
- X: REMOVAL ITEMS

Notes

2	REVISED AS PER DRAFT PLAN	MJS	DT	24.07.16
1	REVISED AS PER CITY COMMENTS	MJS	DT	23.10.20
0	ISSUED TO CITY FOR REVIEW	MJS	DT	22.10.04
Revision		By	Appd.	YY.MM.DD

File Name: 160410368 DB-DRAFT	MJS	KS	MJS	22.06.10
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

CANADA LANDS COMPANY

1495 HERON ROAD

OTTAWA, ON, CANADA

Title

CONCEPTUAL SANITARY SEWER SYSTEM

Project No. 160410368

Scale 1:750 (0 7.5 22.5 37.5m)

Drawing No. SAN-1

Sheet 4 of 6

Revision 2

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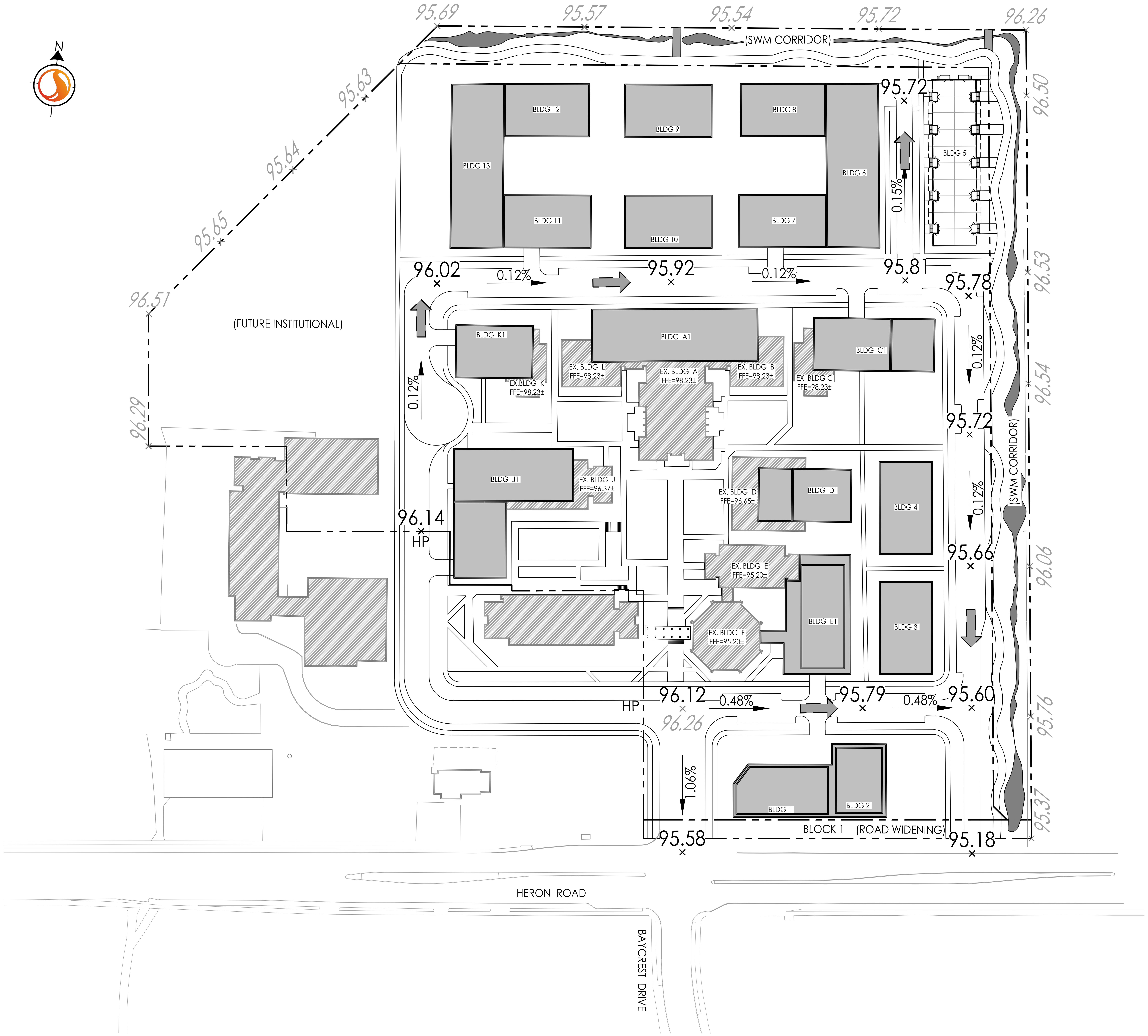
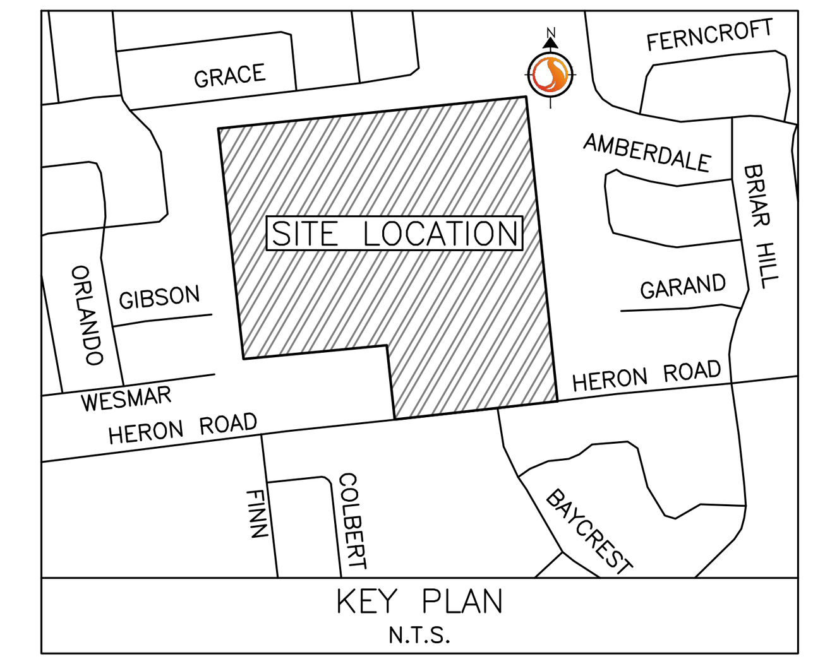
2024/07/17 2:53 PM By: Sharp, Mike

ORIGINAL SHEET - ARCH D





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Legend

89.40 ×	EXISTING ELEVATION
89.40 ×	PROPOSED ELEVATION
(arrow)	MAJOR OVERLAND FLOW ROUTE
— — —	PROPERTY LINE

Notes

2	REVISED AS PER DRAFT PLAN	MJS	DT	24.07.16
1	REVISED AS PER CITY COMMENTS	MJS	DT	23.10.20
0	ISSUED TO CITY FOR REVIEW	MJS	DT	22.10.04
Revision		By	Appd.	YY.MM.DD

File Name: 160410368 DB-DRAFT	MJS	KS	MJS	22.06.10
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
CANADA LANDS COMPANY

1495 HERON ROAD

OTTAWA, ON, CANADA

Title
CONCEPTUAL GRADE CONTROL PLAN

Project No.	Scale	
160410368	1:750 (0, 7.5, 22.5, 37.5m)	
Drawing No.	Sheet	Revision
GP-1	5 of 6	2

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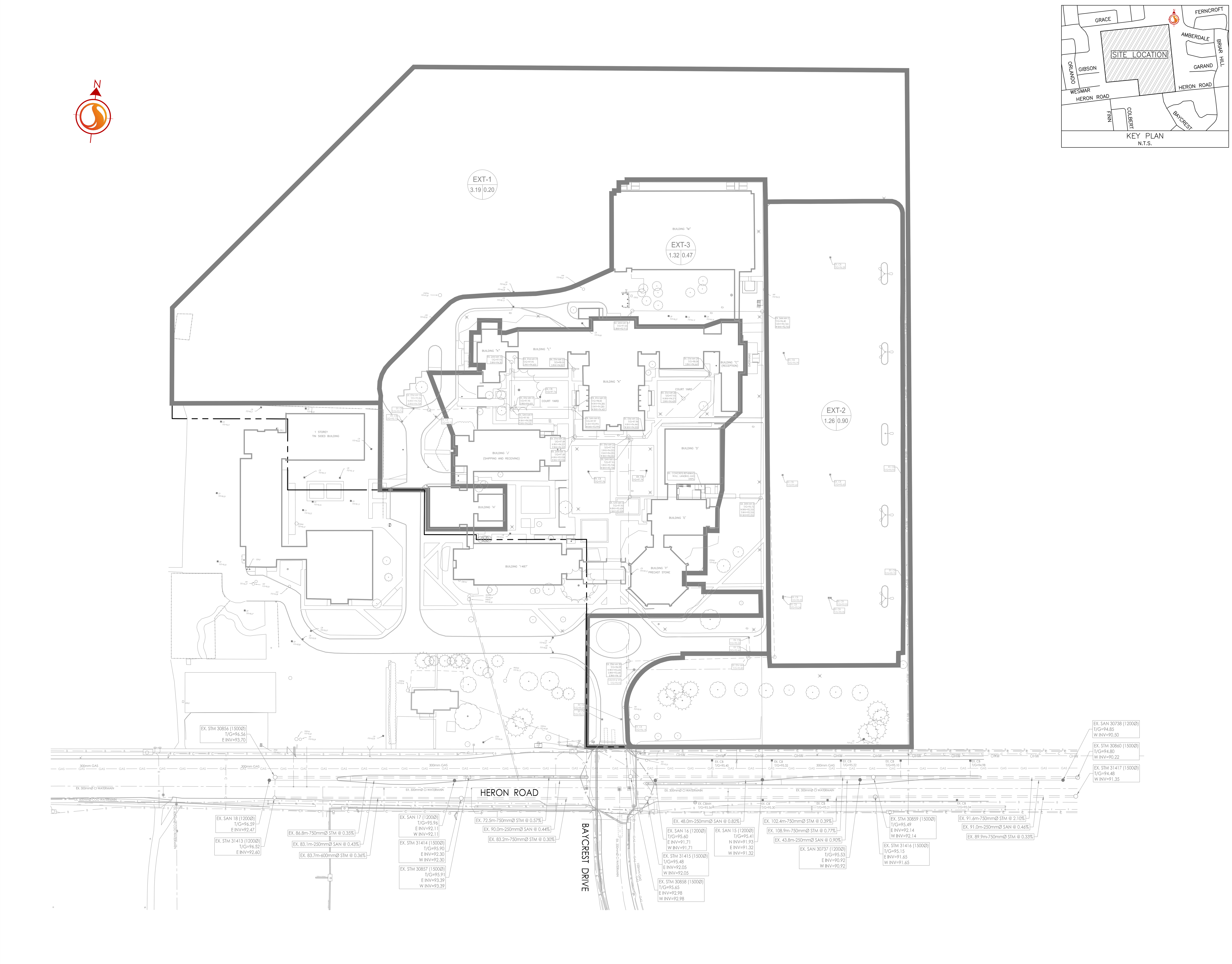
2024/07/17 2:55 PM By: Sharp, Mike

ORIGINAL SHEET - ARCH D



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Legend

PROPERTY LINE
EXISTING TRUNK STORM SEWER
DRAINAGE AREA No.
RUNOFF COEFFICIENT
STORM DRAINAGE AREA (ha)
EXISTING STORM DRAINAGE BOUNDARY

		By	Appd.	YY.MM.DD
2	REVISED AS PER DRAFT PLAN	MJS	DT	24.07.16
1	REVISED AS PER CITY COMMENTS	MJS	DT	23.10.20
0	ISSUED TO CITY FOR REVIEW	MJS	DT	22.10.04

Revision

File Name: 160410368 DB-DRAFT	MJS	KS	MJS	22.06.10
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
CANADA LANDS COMPANY

1495 HERON ROAD

OTTAWA, ON, CANADA

Title
EXISTING STORM DRAINAGE PLAN

Project No. 160410368

Scale 1:750 (0 7.5 22.5 37.5m)

Drawing No. EX-STM

Sheet 6 of 6

Revision 2

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2024/07/17 2:56 PM By: Sharp, Mike

ORIGINAL SHEET - ARCH D

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Stantec is a global leader in sustainable architecture, engineering, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.