Functional Servicing and Stormwater Management Report

LeBreton Flats Library Parcel Mixed-use Development

April 2022 — TYLin Ref. 10399
Dream Asset Management

30 Adelaide Street East, Suite 301,
Toronto, Ontario
M5C 3H1

dream | TYLin

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1. Introduction

TYLin has been retained by Dream Asset Management to prepare a detailed Functional Servicing and Stormwater Management Report along with a corresponding grading and servicing design for the redevelopment of LeBreton Flats Library Parcel. The subject property is located at the northeast corner of Booth Street and Albert Street at municipal address 665 Albert Street in the City of Ottawa (refer to **Figure 1.1**).

This report will:

- Provide background information regarding the subject property;
- Summarize the existing site conditions;
- Provide information regarding the proposed development conditions;
- Outline the proposed grading for the development; and
- Outline the existing and proposed municipal servicing.

The recommended servicing has been developed in accordance with the applicable design criteria and requirements of the City of Ottawa.

Figure 1-1 Location Plan

1.1. PROJECT BACKGROUND

The total property is approximately 1.26ha in area at municipal address 665 Albert Street in the City of Ottawa, however this area also includes the air rights reserved by NCC over the Pimisi station and a small parcel located north of the station. Therefore, the proposed development is approximately 0.96ha in area.

The subject site is bound by Booth Street to the west and Albert Street to the south. The site is currently vacant and Ottawa Public Library will be constructed northeast of the subject site.

The existing general topography of the site has a gentle slope from north to south. Existing site drainage primarily is discharged towards the Albert Street right-of-way, which is captured by existing municipal storm infrastructure. At the northern side of the site there is a steep bank sloping down to the transit line.

The overall servicing design and strategy is based on the allocated servicing allowances for the site, as detailed in the Master Servicing Report (MSR) for the LeBreton Flats Development area. This report was prepared by CIMA+ and details the anticipated development and resulting servicing requirements for the surrounding area. As per the MSR, the redevelopment site (conceptual Block 1) was allocated conceptual breakdown of 403 apartment units, 3,063m^2 of retail area, and 19,307m^2 of office/loft area. The MSR was completed based on the LeBreton Flats Master Concept Plan, prepared by O2 Planning and Design in 2020. Relevant excerpts from the MSR can be found in **Appendix D.**

1.2. PROPOSED DEVELOPMENT

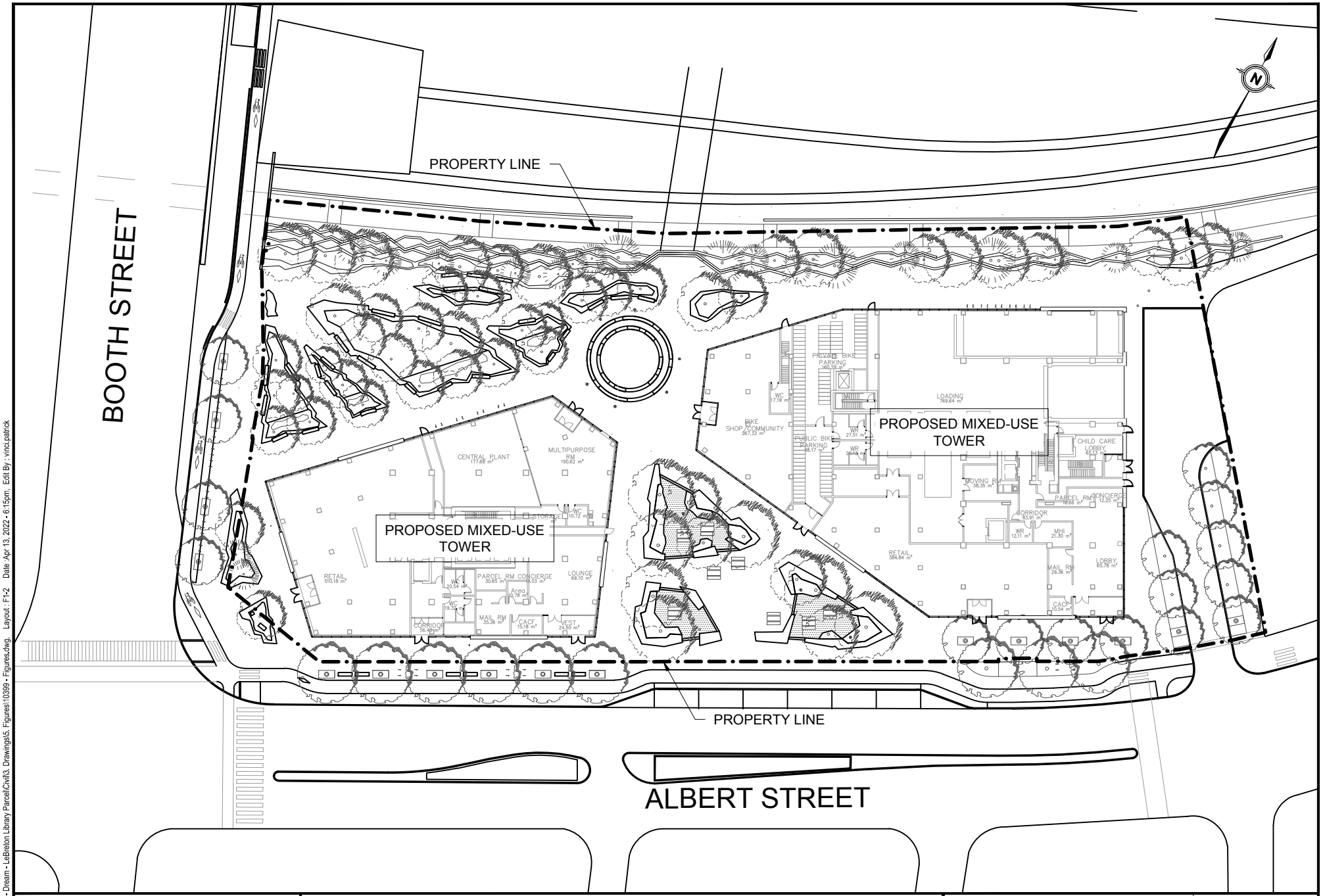
The proposed site includes the construction of a 35-storey (plus penthouse) 2-tower mixed-use development. The development will include 601 residential units, 1,261m^2 of retail space, and a childcare facility. The development will utilize a 2-storey underground parking structure which will cover the majority of the subject site. Refer to **Figure 1.2** for the proposed development plan.

1.3. SITE ACCESS

Vehicular access into the site and underground parking will be through an vehicular entrance at the southeastern corner of the site at the intersection of Albert Street and Empress Avenue. Loading and garbage access will be from the same entrance. Pedestrian access into the site is available along Albert Street and Booth Street.

1.4. UTILITIES

The property is in a well-established location in the City of Ottawa, all utilities including telephone, cable, electricity, and gas are readily available to service the subject property.



TYLin
8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

PROPOSED DEVELOPMENT PLAN

665 ALBERT STREET

DREAM ASSET MANAGEMENT

SCALE:	N.T.S
DATE:	APRIL 2022
DESIGNED BY:	V.P.
CHECKED BY:	C.B.

PROJECT No. 10399

FIGURE No. F1-2

2. Stormwater Management

2.1. Existing Stormwater Management

The existing site servicing details obtained from The City of Ottawa utility plan, engineering plan and profiles and a topographical survey completed of the area indicate that there is a 1050mm diameter storm sewer located within the Albert Street right-of-way that flows southwest. Existing site drainage primarily is discharged towards the Albert Street right-of-way, where the runoff is captured by catch basins, leading into the existing 1050mm municipal storm sewer system. Refer to the **Servicing Drawing (S1)** for the existing storm sewer infrastructure.

2.2. Proposed Stormwater Management

2.2.1. Stormwater Management Design Strategy

The stormwater strategy for the proposed development is based on the MOE 2003 Stormwater Management Planning & Design (SWMPD) and The City of Ottawa Sewer Design Guidelines (2012) for stormwater quality and quantity controls, including water quality treatment, water balance and water quantity treatment through the reduction of peak storm flows.

As per Section 1.1, the allocated storm discharge allowances for the site are based on the Master Servicing Report (MSR) for the LeBreton Flats Development area. As per the MSR, the allowable release rate for the redevelopment site (Block 1) will be limited to the 5-year pre-development flow (0.50 runoff co-efficient), with quantity control on site up to and including the 100-year event. Relevant excerpts from the MSR can be found in **Appendix D**.

The development will be pursuing LEED ND and LEED NC certification and therefore must meet the mandatory requirements for rainwater management. Based on the sustainability requirements, a portion of the rainwater runoff from the developed site must be retained onsite (i.e. infiltrated, evapotranspirated or collected and reused) using low-impact development (LID) and green infrastructure (GI) practices. The site will be designed to retain the 80th percentile of regional or local rainfall events. Based on the City of Ottawa rainfall records, a rainfall depth of 15.7mm will be used to achieve 80th percentile of rainfall retained.

2.2.2. Proposed Stormwater Outlet Connection

Storm servicing for the proposed development will consist of a 300mm diameter connection at a 1.0% slope connecting into the 1050mm storm main within Albert. The service will enter the site adjacent to the stormwater management vault located at the southeast corner of the site. The connection will be made as per City of Ottawa standards.

The proposed sewer infrastructure is shown on the **Servicing Plan (S1).**

2.2.3. Stormwater Quantity Control

As per Section 2.2.1, the allowable release rate for the site will be limited to the 5-year pre-development flow (0.50 runoff co-efficient), with quantity control on site up to and including the 100-year event. A portion of the site along the northern property line and a triangular section at the northwest corner (2,585m^2 area total) will be developed as enhanced landscape area that will provide extensive area for the rainwater runoff to infiltrate onsite. Therefore, this area will act

independently of the remainder of the site in reference to the stormwater management and rainwater retainment requirements.

Based on a remaining development area of 7,044m^2, and a runoff coefficient of 0.5 (as per the MSR), the 5-year allowable release rate from the development site into the storm sewer system is 101.94L/s. Due to design constraints, the site has been designed to allow some area along the property line to flow unrestricted offsite to Albert Street and Booth Street. The total area of uncontrolled flow is 629m^2. The unrestricted portion of the site will release 16.38L/s during the 5-year storm. The stormwater discharge for the remainder of the site will be controlled release from the stormwater management vault. Therefore, the total allowable 100-year post-development release rate is 85.55L/s (101.94L/s total minus the 16.38L/s uncontrolled). The detailed calculations of the discharge rates can be found in **Appendix A**.

Onsite storage will be provided via green roofs equipped with roof drains on the new buildings in addition to a storage vault within the underground parking facility. The 739m^2 of green roof area will provide 26.1m^3 of storage volume through saturation storage and ponding on the roofs. The stormwater storage vault, located on P1 level, will provide the remaining storage volume.

Under proposed conditions, runoff from the rooftops and ground surface will drain via the mechanical system and into the stormwater management vault prior to discharging into the Albert Street storm sewer system. The stormwater management vault is to be located on the south side of the underground parking structure. The restricted outlet rate from the tank will be mechanically pumped to the control maintenance hole at a maximum controlled flow rate in order for the storm service to cross above the 1220mm HPTM watermain. The control maintenance hole will then outlet into the Albert Street storm sewer. The pump will be designed with a maximum pumping rate of 80.00L/s, which is less than the maximum allowable release rate of 85.55L/s.

Controlling flows to the allowable release rate during the 100-year storm event will fill the vault to the designated high-water level (60.70m) and provide an active storage volume within the vault required to meet the reduced peak flow rate from the site. If there is a pump failure inside the stormwater management tank, the emergency flows will spill out the access lid at the surface and discharge out to the Albert Street right of way. Overland emergency flow routes for the site will mainly flow out to Albert Street with a small portion of the northwest corner flowing out to Booth Street.

Pump design and maintenance requirements will be provided by the mechanical engineer.

Refer to **Figure 2.1** for the post-development drainage area plan and **Appendix A** for the detailed stormwater management calculations.

2.2.4. Stormwater Quality Control

As per discussions with the RVCA, they do not require any water quality controls for the subject site based on the current site plan. Correspondence with the RVCA concerning quality control requirements can be found in **Appendix A.** Similarly, there is no specific reference to any required quality control measures associated with the LEED certification. However, surface runoff will be routed to landscaped areas wherever possible in order to increase TSS removal onsite.

2.2.5. Stormwater Water Balance

A portion of the site along the northern property line and a triangular section at the northwest

corner (2,585m^2 area total) will be developed as enhanced landscape area that will be provide extensive area for the rainwater runoff to infiltrate onsite. Therefore, this area will act independently of the remainder of the site in reference to rainwater retainment requirements.

Based on a remaining area of 7,044m^2, the 80th percentile (15.7mm depth) volume required to be retained on site is 110.6m^3. Due to the large underground parking area, infiltration of stormwater into the subsurface is not a viable water balance solution for the remainder of the site. The volume of water to be retained will be captured in the storage vault and reused on site. The proposed vault will be designed with a 1.84m sump below the minimum discharge pumping elevation to store the volume required. This retained volume will be reused onsite via mechanical reuse systems or landscape irrigation.

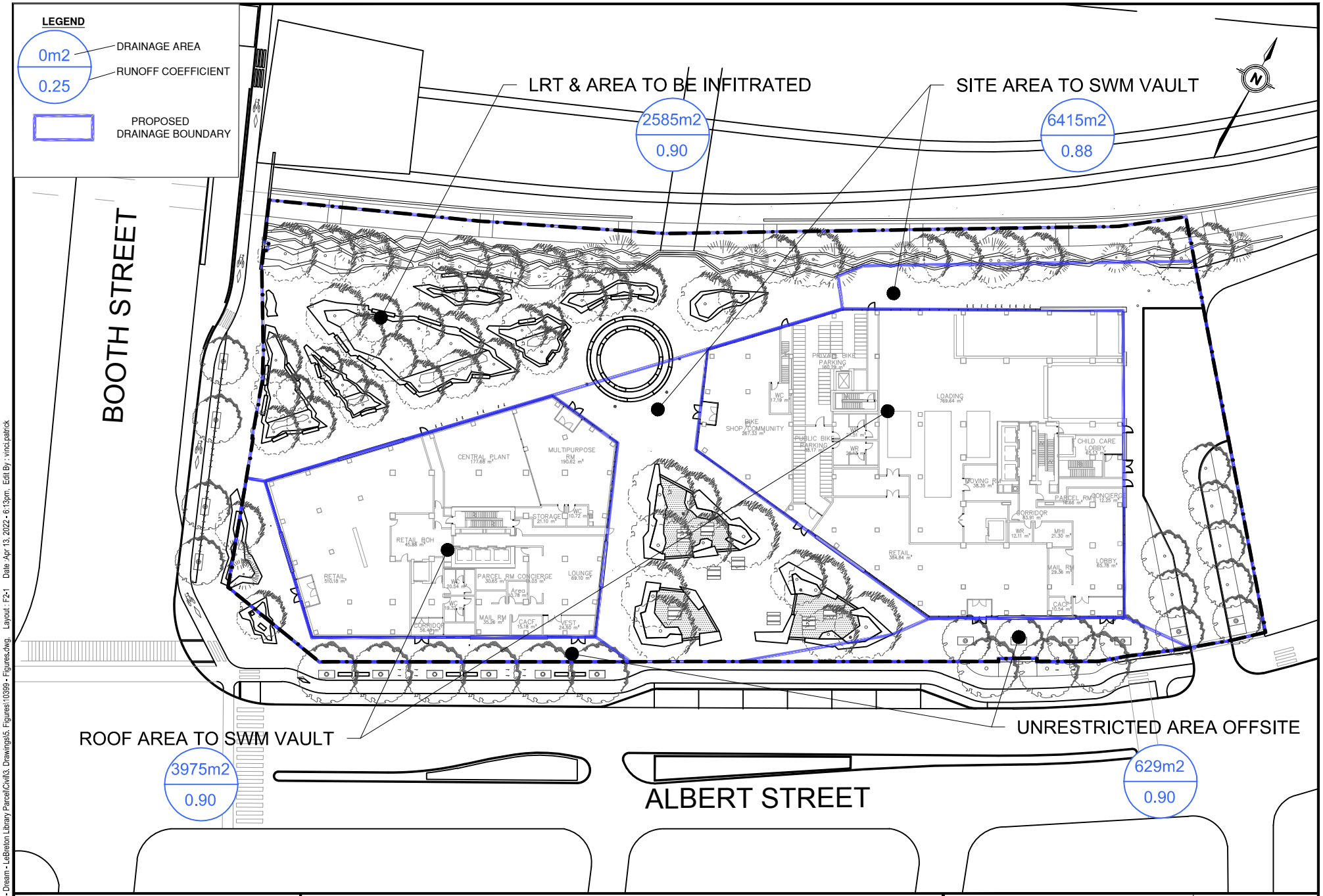
Water balance calculations can be found in **Appendix A**.

2.3. CONSTRUCTION EROSION & SEDIMENT CONTROL

Details for erosion and sedimentation control during construction will be subject to the City of Ottawa approval prior to issuance of Building Permit. During the construction works, there is potential for sediment-laden runoff to be directed toward the adjoining properties, municipal streets, and existing storm infrastructure. Therefore, prior to any grading activity, sediment control and hoarding fencing must be installed along the site perimeter. Additional measures will include construction of an entrance "mud-mat' on the access to be used during construction to minimize mud tracking offsite. Material stockpiles are to be located in appropriate locations. Inlet sediment control devices are to be used on existing catchbasins in municipal rights-of-way that may be affected by the construction of this site. The sequencing of the implementation of the above and additional erosion and sediment control measures is summarized in the following table.

Table 2-1: Erosion Control Sequencing

Activity	Erosion Control Practice
Area Grading	• Construct and maintain entrance "mud-mat". • Construct and maintain sediment control fencing around the downstream perimeter of the site. • Locate stockpiles away from sensitive areas.
Servicing and Asphalt Works	• Limit open trench lengths to minimize erosion potential of excavated material. • Prevent erosion of material stockpiles. • During work stoppages or inclement weather, plug ends of open sewers to prevent downstream sedimentation. • Protect catchbasin inlets with Terrafix 240R non-woven geotextile.
Maintenance	• Remove accumulated sediments when depth exceeds 0.30 m. • Maintain and repair sediment control fencing as required. • Maintain and repair catchbasin sediment controls as required.



TYLin
8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

PROPOSED DRAINAGE AREA PLAN

665 ALBERT STREET

DREAM ASSET MANAGEMENT

SCALE:	N.T.S
DATE:	APRIL 2022
DESIGNED BY:	V.P.
CHECKED BY:	C.B.

PROJECT No. 10399

FIGURE No. F2-1

3. Sanitary Servicing

3.1. Existing Sanitary Servicing

The existing site servicing details obtained from The City of Ottawa utility plan, engineering plan and profiles and a topographical survey completed of the area indicate that there is sanitary sewer infrastructure in the vicinity of the site. The following sanitary infrastructure is adjacent to the subject site;

- A 450mm diameter sanitary sewer located within the Albert Street right-of-way that flows southwest
- A 1.67m × 1.67m sanitary collector sewer located within the Booth Street right-of-way that flows northeast

Refer to the **Servicing Drawing (S1)** for the existing sanitary sewer infrastructure and proposed sanitary service design.

3.2. Proposed Sanitary Servicing

Both the allocated (as per the MSR) and the proposed demand determination for the site has been calculated using the parameters defined in the City of Ottawa Sewer Design Guidelines, 2012 (CoO SDG). A summary of the sanitary design parameters is provided in **Table 3.1**.

Table 3.1 - Sanitary design parameters

Parameter		Value
Residential	Baseflow	280 L/cap/day
Population per Dwelling	Apartment	1.8 person/unit
	Townhome	2.7 person/unit
Harmon Peaking Factor Parameters	Harmon Correction Factor (K)	0.8
	Max Harmon P.F	4
	Min Harmon P.F.	2
Commercial	Baseflow	2.8 L/m^2/day
	Peaking Factor	1.5
	Peaking Factor if Commercial area is <20% of total area	1.0
Infiltration		0.33 L/s/ha

A breakdown of MSR allocated vs proposed sanitary demands for the site is presented in **Table 3.2**, below. Refer to **Appendix B** for the detailed sanitary design calculations and **Appendix D** for the excerpts from the MSR.

Table 3.2 - PROPOSED VS. AS-ZONED SANITARY DESIGN FLOW CALCULATION

		Allocated (as per MSR)	**Proposed Development**
	Area	1.26 ha	1.26 ha
Residential	Apartment Units	403	601
	Population	726	1,082
	Average Design Flow	2.35 L/s	3.51 L/s
	Harmon Correction Factor	0.8	0.8
	Peaking Factor	3.31	3.22
	Peak Residential Flow	**7.78 L/s**	**11.30 L/s**
Non-Residential	Total Non-Res Floor Area	22,370 m^2	2,428 m^2
	Average Design Flow	0.72 L/s	0.08 L/s
	Peaking Factor	1.5	1.0
	Peak Non-Res Flow	**1.09 L/s**	**0.08 L/s**
	Infiltration	**0.32 L/s**	**0.32 L/s**
TOTAL WET WEATHER PEAK FLOW		**9.19 L/s**	**11.69 L/s**

As shown in the table above, the proposed site will result in a 2.50L/s increase in the anticipated design flow as compared to the allocated design flow specified in the MSR downstream sewer calculations. Therefore, further investigation was completed to assess whether the downstream municipal infrastructure has capacity for the increase in density.

As detailed in Section 5.4.4.3 of the MSR, the Library Parcel (Block 1) is part of the Cave Creek Collector system. As per the MSR, the City of Ottawa has indicated that there is likely no capacity limitation for the Cave Creek Collector collector but has provided the current estimated capacity in order to compare the proposed sanitary flows with the current estimated capacity. The Library Parcel discharges into the Albert Street Sewer, which has a current estimated capacity of 110L/s. Using the 9.19L/s MSR allocated design flow, the total sanitary flow into the sewer is 75.08L/s, representing 68.3% of the total estimated capacity. With the 2.50L/s increase in proposed design flow, the new total sanitary flow into the sewer is 77.58L/s. This revised design flow represents only 70.5% of the total estimated capacity, and therefore the receiving sanitary sewer system has adequate capacity to handle the increase in site density.

Under proposed conditions the sanitary flows generated from the site will be redirected via the mechanical system to the sanitary control manhole located in the first level of the underground parking garage, at the south side of the site. The new sanitary service connection will be a 150mm diameter pipes sloped at a 2.0% slope. The proposed service will be connected to the existing 450mm sanitary sewer located within the Albert Street. Access to the sanitary control manhole will

be at-grade, adjacent to the Albert Street property line.

Refer to the **Servicing Drawing (S1)** for the location of the existing sanitary sewers and **Appendix B** for the detailed sanitary design calculations.

4. Water Servicing

4.1. Existing Water Servicing

The existing site servicing details obtained from The City of Ottawa utility plans, engineering plan and profiles and a topographical survey completed of the area, indicate that there are existing watermain infrastructure in the vicinity of the site, including a 406mm diameter watermain running along the south side of Albert Street

Refer to the **Servicing Drawing (S1)** for the location of the existing watermain infrastructure.

4.2. Proposed Water Servicing

The proposed water service connections for the subject site will be made to the existing 406mm watermain located within the Albert Street right-of-way. The primary connection will consist of a 150mm fire main connection and 150mm domestic watermain into the site. As per NFPA 14 "Standard for the Installation of Standpipe and Hose Systems", high-rise buildings greater than 84 m in height shall be equipped with at least two remotely located fire department connections. Therefore, a second 150mm fire connection will be installed at the southeast corner of the site.

Fire protection for the proposed development will be achieved through the existing/proposed hydrants that surround the site and through internal sprinkler systems. Siamese connections for each building will be placed near the main lobby entrances, within the maximum allowable distance (less than 45m) from the nearest hydrant. Because there isn't an existing hydrant within 45m of the eastern tower, a hydrant will be installed at the southeast corner of the site to service the eastern building. The 'principal entrances' to each building are also located no more than 90m from a municipal hydrant.

Booster pumps may be required for fire and domestic pressure at the upper levels of the condominium developments. The internal onsite water supply and distribution system will be designed and specified to comply with the current standards and specifications of the City of Ottawa and the Ontario Building Code and NFPA 13. The mechanical consultant will provide details building permit application stage.

Both the allocated (as per the MSR) and the proposed demand determination for the site has been calculated using the parameters defined in the City of Ottawa Sewer Design Guidelines, 2012 (CoO SDG). A summary of the water design parameters is provided in **Table 4.1**.

Table 4.1 - water demand parameters

Parameter		Value
Residential	Baseflow	350 L/cap/day
	Apartment Population	1.8 person/unit
	Maximum Day Peak Factor	2.5
	Peak Hour Peak Factor	2.2
Non-Residential	Commercial Baseflow	2.8 L/m^2/day
	Office/Childcare Baseflow	8.06 L/m^2/day
	Maximum Day Peak Factor	1.5
	Maximum Day Peak Factor	1.5
	Peak Hour Peak Factor	1.8

A breakdown of MSR allocated vs proposed water demands for the site is presented in **Table 4.2**, below. Refer to **Appendix C** for the detailed water design calculations and **Appendix D** for the excerpts from the MSR.

Table 4.2 - PROPOSED VS. AS-ZONED water demand CALCULATION

		Allocated (as per MSR)	Proposed Development
Residential	Population	726	1,082
	Average Day Demand	2.94 L/s	4.38 L/s
	Maximum Day Demand	7.35 L/s	10.96 L/s
	Peak Hour Demand	16.18 L/s	24.11 L/s
Commercial	Total Floor Area	3,063 m^2	1,261 m^2
	Average Day Demand	0.10 L/s	0.04 L/s
	Maximum Day Demand	0.15 L/s	0.06 L/s
	Peak Hour Demand	0.27 L/s	0.11 L/s
Office & Childcare	Total Floor Area	19,307 m^2	1,167 m^2
	Average Day Demand	1.80 L/s	0.11 L/s
	Maximum Day Demand	2.70 L/s	0.16 L/s
	Peak Hour Demand	4.87 L/s	0.30 L/s
TOTAL AVERAGE DAY DEMAND		**4.84 L/s**	**4.53 L/s**
TOTAL MAXIMUM DAY DEMAND		**10.20 L/s**	**11.18 L/s**
TOTAL PEAK HOUR DEMAND		**21.31 L/s**	**24.52 L/s**

As shown in the table above, the proposed site will result in a decrease in the average day demand (93% of allocated), an increase in the maximum day demand (1.10% of allocated), and an increase in the peak hour demand (1.15% of allocated). As per the MSR, the fire flow demand of 217L/s was considered per the maximum fire demand level of service in core areas as stipulated in the 2013 City of Ottawa Water Master Plan (Stantec, 2013). Under proposed conditions, the site is anticipated to have a maximum fire flow demand of 218L/s, (based on the Fire Underwriters Survey). Therefore, the proposed fire flow demand equals the anticipated demand as per the MRS. Since there is only a small increase in the domestic maximum day and peak hour demand, there is no concern with the revised water demand based on the revised site design.

The water demand calculations are shown in **Appendix C** and the proposed and existing watermain infrastructure are shown on the **Servicing Drawing (S1)**.

5. Conclusion

The proposed development will see the construction of two podium/tower mixed-use development with two levels of below grade parking in the City of Ottawa. The proposed development can be serviced utilizing the existing and proposed infrastructure outlined in the **Servicing Drawing (S1)**. Our conclusions and recommendations for servicing of the proposed development is summarized as follows:

Stormwater Servicing

- The allowable release rate for the site will be limited to the 5-year pre-development flow (0.50 runoff co-efficient), with quantity control on site up to and including the 100-year event.
- The water balance requirement will be achieved by capturing the reuse volume in the sump of the stormwater management vault and reused for mechanical or irrigation purposes on-site.
- There are no additional stormwater quality measures required as per LEED requirements or discussions with the RVCA.
- The site will be serviced by a new 300mm storm sewer with a slope of 1.0%, connected to the 1050mm storm sewer within Albert Street.
- Onsite storage will be provided via green roofs and a storage vault within the underground parking facility. The restricted outlet rate from the tank will be mechanically pumped to the control maintenance hole at a maximum pumping rate of 80.00L/s.
- Sediment and erosion control measures to be taken during construction have been presented in this report.

Sanitary Servicing

- The anticipated peak sanitary peak flow for the proposed development is 11.69L/s.
- Sanitary servicing is proposed to be connected into the existing 450mm sanitary sewer located within the Albert Street right-of-way.
- The proposed site will result in a 2.50L/s increase in the anticipated design flow as compared to the allocated design flow specified in the MSR downstream sewer calculations. Even with the additional flow, the downstream sewer is 29.5% below the total capacity and therefore has adequate capacity to handle the increase in site density.

Water Servicing

- The calculated maximum day and peak hour demands were calculated as 11.18L/s and 24.52L/s, respectively.
- Two 150mm fire service connections and one 150mm domestic connection will be made to the existing 406mm watermain located within the Albert Street.
- Fire protection for the proposed development will be achieved through the existing/proposed hydrants that surround the site and through internal sprinkler systems. Siamese connections for each building will be placed near the main lobby entrances. A new hydrant will be installed at the southeast corner of the site to service the eastern building.

- Under proposed conditions, the site is anticipated to have a maximum fire flow demand of 218L/s, equal to the anticipated the fire flow demand of 217L/s, as per the MSR. Therefore, there is no concern with the revised water demand based on the revised site design.

Recommendations

The following Stormwater Management Report is sufficient for your purposes. If you have any questions or comments, please do not hesitate to contact the undersigned.

Sincerely,

TYLin

Prepared By:

Caitlin Beaudoin, P.Eng.

Site Plan Project Manager, Urban Development

Appendix A

STORMWATER CALCULATIONS

TYLin

Project Name: LeBreton Library Parcel	
Project #: 10399	Prepared by: C.B.
Date: 2022-04-14	Checked by: B.D.

ALLOWABLE RELEASE FLOW

1. Pre, External & Post Development Uncontrolled Area:

Note: Post Dev. Controlled Area is shown in Orifice Calculations

Table 1. a) Total Uncontrolled Area

			Uncontrolled Area (m^2)			
Type of Land	**T (min)**	**Runoff Coef. (C)**	**Pre Dev. Site (A)**	**Pre Dev. Incoming External (A)**	**Total Pre Dev. (A)**	**Post Dev. Uncontrolled (A)**
Total Unrestricted Area			**7044**	**-**	**7044**	**629**
Combined T (min)					**10**	**10**
Combined Runoff Coefficient			**0.50**	**-**	**0.50**	**0.90**
Landscape	10	0.25	0	0	0	0
Impervious	10	0.90	0	0	0	629
General	10	0.50	7044	0	7044	0

2. Formulas, Coefficients & Average Rainfall Intensity:

$i = a(T+b)^{-c}$, where i (mm/h) ; T (min)

$Q = A(i)C/3600$, where A (m^2) ; i (mm/h)

Note: a,b,c = coefficients as per municipal standards

		Return Period (years)					
Description	**Units**	**2**	**5**	**10**	**25**	**50**	**100**
a		732.951	998.071	1174.184	1402.884	1569.58	1735.688
b		6.199	6.053	6.014	6.018	6.014	6.014
c		0.81	0.814	0.816	0.819	0.82	0.82
Total Unrestricted Area	i (mm/h)	**76.81**	**104.19**	**122.14**	**144.69**	**161.47**	**178.56**

3. Pre Development Flow:

		Return Period (years)					
Description	**Units**	**2**	**5**	**10**	**25**	**50**	**100**
Total Unrestricted Area	**Q (L/s)**	**75.14**	**101.94**	**119.50**	**141.56**	**157.97**	**174.69**

Summary: The Pre Development Flow is Q2=75.1L/s, Q5=101.9L/s, Q10=119.5L/s, Q25=141.6L/s, Q50=158L/s, Q100=174.7L/s.

4. Post Development Uncontrolled Flow:

		Return Period (years)					
Description	**Units**	**2**	**5**	**10**	**25**	**50**	**100**
Total Unrestricted Area	Q (L/s)	12.08	16.38	19.21	22.75	25.39	28.08
Cumulative Flow	**Q (L/s)**	**12.08**	**16.38**	**19.21**	**22.75**	**25.39**	**28.08**

Summary: The Post Development Uncontrolled Flow is Q2=12.1L/s, Q5=16.4L/s, Q10=19.2L/s, Q25=22.8L/s, Q50=25.4L/s, Q100=28.1L/s.

5. Allowable Flow:

		Return Period (years)					
Description	**Units**	**2**	**5**	**10**	**25**	**50**	**100**
Pre Development Flow	Q (L/s)	75.14	101.94	119.50	141.56	157.97	174.69
Allowable Release Flow	**Q (L/s)**	**75.14**	**101.94**	**119.50**	**141.56**	**157.97**	**174.69**
Post Development Uncontrolled Flow	Q (L/s)	12.08	16.38	19.21	22.75	25.39	28.08
Remaining Release Flow for Vault	**Q (L/s)**	**63.06**	**85.55**	**100.29**	**118.81**	**132.58**	**146.61**

Summary: The Allowable Release Flow is Q2=75.1L/s, Q5=101.9L/s, Q10=119.5L/s, Q25=141.6L/s, Q50=158L/s, Q100=174.7L/s.
Summary: The Uncontrolled Release Flow is Q2=12.1L/s, Q5=16.4L/s, Q10=19.2L/s, Q25=22.8L/s, Q50=25.4L/s, Q100=28.1L/s.

Summary: The Remaining Release Flow for Vault is Q5=85.6L/s.

TYLin

Project Name: LeBreton Library Parcel	
Project #: 10399	Prepared by: C.B.
Date: 2022-04-14	Checked by: B.D.

ORIFICE CALCULATIONS - POST DEV. CONTROLLED FLOWS

6. Summary Table of Allowable Flow:

		Return Period (years)					
Description	**Units**	**2**	**5**	**10**	**25**	**50**	**100**
Allowable Release Flow	Q (L/s)	75.14	101.94	119.50	141.56	157.97	174.69
Uncontrolled Release Flow	Q (L/s)	12.08	16.38	19.21	22.75	25.39	28.08
Remaining Release Flow for Vault	**Q (L/s)**	**63.06**	**85.55**	**100.29**	**118.81**	**132.58**	**146.61**

Summary: The remaining release flow for the orifice is Q5=85.6L/s.

7. Total Post Development Area:

			Area (m^2)		
Types of Land	**T (min)**	**Runoff Coef. (C)**	**Post Dev. Uncontrolled (A)**	**Post Dev. Controlled (A)**	**Total Post Dev. (A)**
Total Area			**629**	**6415**	**7044**
Combined T (min)			**10**	**10**	**10**
Combined Runoff Coefficient			**0.9**	**0.88**	**0.88**
Total Area (Unrestricted)			**629**	**5676**	**6305**
Combined T (min) (Unrestricted)			**10**	**10**	**10**
Combined Runoff Coefficient (Unrestricted)			**0.9**	**0.87**	**0.87**
Landscape	10	0.25	0	245	245
Impervious	10	0.9	629	1456	2085
Unrestricted Flat Roof	10	0.9	0	3975	3975
Restricted Green Roof (42L/s/ha)	10	0.9	0	739	739
					Total

8. Pump Design:

Pump Details:

Post Development Return Period to be Controlled	=	100	year
Pre Development Return Period to Control to	=	5	year
Allowable Vault Flow (Q)	=	85.55	L/s
Max Pump Flow (Q)	=	80.00	L/s

Summary: The Actual Pump Flow is Q100=80L/s.

9. Storage Facility Design:

Storage Facility	=	Vault	
Storage Volume Required (V_1)	=	107.3	m^3 (Storage Calc's)

Storm Service Connection:

Diameter (mm)	Slope (%)	Velocity (m/s)	Full Flow Capacity (L/s)	Actual Flow (%)
300	1	1.37	96.7	83%

Active Storage Volume using 0% of Dead Storage Volume

Vault Elevations:

Surface Elevation	=	62.93	m
Top of Vault Elevation	=	61.00	m
High Water Level (HWL)	=	60.70	m
Pump Invert Elevation	=	56.44	m
Bottom of Vault Elevation	=	54.60	m
P1 Slab Elevation	=	54.60	m

Vault Details:

Freeboard Height	=	0.30	m
High Water Head from invert (h)	=	4.26	m
Area Required (A_1)	=	V_1 / h	
	=	26	m^2
Area Provided (A_2)	=	60.1	m^2
Sump Height	=	V / A_2	
Sump Height	=	1.84	m
Storage Volume Provided	=	A_2 (h)	
	=	**256.0**	m^3

15.7mm Storm Retention:

Initial Abstraction	**Depth (mm)**	**Area (m^2)**	**IA (m^3)**
TOTAL		**7044**	**16.1**
Landscape	5	245	1.2
Impervious	0.6	2085	1.3
Gravel	5	0	0.0
Building (Flat Roof)	2.5	3975	9.9
Building (Green Roof)	5	739	3.7

80th Percentile Water Reuse

Total Unrestricted Area	A =	7044	m^2
Storm Event to be Captured	E =	15.7	mm
Dead Storage Volume	V =	110.6	m^3
Sump Depth	V / A_2 =	1.84	m

Summary: The Vault Active Storage Volume Required is 107.3m^3.
Summary: The Vault ActiveStorage Volume Provided is 256m^3.

Summary: The Dead Storage Volume Required & Provided is 110.6 m^3.

TYLin

Project Name: LeBreton Library Parcel	
Project #: 10399	Prepared by: C.B.
Date: 2022-04-14	Checked by: B.D.

STORAGE CALCULATIONS

10. Storage Calculations

Controlling the 100 Year Post Development Flow to the 5 Year Pre Development Flow.

i = a[(T+b)/60]$^{-c}$, where i (mm/h) ; T (min) — i = average rainfall intensity (mm/h)
Q = A(i)C/3600, where A (m^2) ; i (mm/h) — a,b,c = coefficients as per municipal standards
T = time of concentration (min)
a = 1735.688 — Q = flow (m^3/s)
b = 6.014 — A = area (m^2)
c = 0.82 — C = runoff coefficient

Note: Restricted Flat Roof & Restricted Green Roof are controlled to 42L/s/ha.

	Total Site	Vault	Restricted Flat Roof	Restricted Green Roof
Area (m^2)	7044	5676	-	739
Runoff Coef.	0.88	0.87	-	0.90
$Q_{controlled}$ (m^3/s)	0.08555	0.08	-	0.0031038

Note: 'Vault' Inflow calculation = 100 year flow + 'restricted flat roof' flow (0m³/s) + 'Green Roof' flow (0.0031m³/s).
Note: Max. 'Vault' Inflow = 0.249m³/s

		Total Site Storage			Vault Storage			Restricted Flat Roof Storage			Restricted Green Roof Storage		
Time (min)	i (mm/h)	Inflow, Q (m^3/s)	Flow Stored, Q (m^3/s)	Req. Storage, V (m^3)	Inflow, Q_1 (m^3/s)	Flow Stored, Q_1 (m^3/s)	Req. Storage, V_1 (m^3)	Inflow, Q_2 (m^3/s)	Flow Stored, Q_2 (m^3/s)	Req. Storage, V_2 (m^3)	Inflow, Q_3 (m^3/s)	Flow Stored, Q_3 (m^3/s)	Req. Storage, V_3 (m^3)
Maximum	-	-	-	**145.2**	**0.249**	-	**107.3**	-	-	**0.0**	-	-	**26.1**
10	178.56	0.307	0.222	133.143	0.248	0.168	100.820	0.000	0.000	0.000	0.033	0.030	17.931
11	169.91	0.293	0.207	136.624	0.236	0.156	103.069	0.000	0.000	0.000	0.031	0.028	18.669
12	162.13	0.279	0.194	139.407	0.226	0.146	104.761	0.000	0.000	0.000	0.030	0.027	19.332
13	155.11	0.267	0.182	141.588	0.216	0.136	105.974	0.000	0.000	0.000	0.029	0.026	19.931
14	148.72	0.256	0.171	143.246	0.207	0.127	106.770	0.000	0.000	0.000	0.027	0.024	20.473
15	142.89	0.246	0.160	144.445	0.199	0.119	107.201	0.000	0.000	0.000	0.026	0.023	20.966
20	119.95	0.207	0.121	145.186	0.168	0.088	105.168	0.000	0.000	0.000	0.022	0.019	22.868
25	103.85	0.179	0.093	139.891	0.146	0.066	98.326	0.000	0.000	0.000	0.019	0.016	24.123
30	91.87	0.158	0.073	130.743	0.129	0.049	88.415	0.000	0.000	0.000	0.017	0.014	24.964
35	82.58	0.142	0.057	118.942	0.116	0.036	76.391	0.000	0.000	0.000	0.015	0.012	25.520
40	75.15	0.129	0.044	105.216	0.106	0.026	62.833	0.000	0.000	0.000	0.014	0.011	25.870
45	69.05	0.119	0.033	90.033	0.098	0.018	48.115	0.000	0.000	0.000	0.013	0.010	26.064
60	55.89	0.096	0.011	38.495	0.080	0.000	0.000	0.000	0.000	0.000	0.010	0.007	26.002
70	49.79	0.086	0.000	0.761	0.071	0.000	0.000	0.000	0.000	0.000	0.009	0.006	25.598
80	44.99	0.077	0.000	0.000	0.065	0.000	0.000	0.000	0.000	0.000	0.008	0.005	25.000
90	41.11	0.071	0.000	0.000	0.059	0.000	0.000	0.000	0.000	0.000	0.008	0.004	24.254
120	32.89	0.057	0.000	0.000	0.048	0.000	0.000	0.000	0.000	0.000	0.006	0.003	21.409
150	27.61	0.048	0.000	0.000	0.041	0.000	0.000	0.000	0.000	0.000	0.005	0.002	17.976
180	23.90	0.041	0.000	0.000	0.036	0.000	0.000	0.000	0.000	0.000	0.004	0.001	14.172

Summary:

Vault Storage

1 'Vault Storage' Required = 107.3m³.
2 'Vault Storage' Provided = 256.026m³.

Restricted Flat Roof Storage

3 'Restricted Flat Roof Storage' Available = 50% (0.5) x flat roof area (0m²) x 150mm ponding depth (0.15m) = 0m³.
4 'Restricted Flat Roof Storage' Utilized < Available. Utilized Storage = 0m³.

Green Roof Storage

5 'Restricted Green Roof Storage' Available (saturation storage) = 25mm (0.025m) x green roof area (739m²) = 18.4m³.
6 'Restricted Green Roof Storage' Utilized > Available storage. Utilized storage = 26.1m³.
7 Ponding Depth = [utilized storage (26.1m³) - available storage (18.4m³)] / green roof area (739m²) x 1000 = 10.42mm.

Total Site Storage

8 'Total Site Storage' Required = 145.2m³.
9 'Total Site Storage' Available = 282.126m³.
10 'Total Site Storage' Utilized = 145.2m³.

SWM Measure	Value
Allowable Release Flow (Q)	101.94L/s
Uncontrolled Release Flow (Q)	16.38L/s
Allowable Vault Flow (Q)	85.55L/s
Max Pump Flow (Q)	80L/s
'Vault Storage' Required	107.3m³
'Vault Storage' Provided	256.03m³
'Restricted Flat Roof Storage' Utilized	0m³
'Restricted Green Roof Storage' Utilized	26.1m³
'Total Site Storage' Required	145.2m³
'Total Site Storage' Utilized	282.13m³
TSS Removal Rate without treatment	0%
TSS Removal with treatment (Max. Inflow = 249L/s)	0%
Vault Area Provided	60.1m²
'Dead Storage' Required & Provided	110.6m³
Sump Height	1.84m

Caitlin Beaudoin

Subject: FW: LeBreton Library Parcel - SWM Enquiry

Caitlin Beaudoin
PROJECT MANAGER, URBAN DEVELOPMENT
T +1 647.914.3008
TYLin

From: Ben Worth <ben.worth@tylin.com>
Sent: April 7, 2022 5:08 PM
To: Eric Lalande <eric.lalande@rvca.ca>; Evelyn Liu <evelyn.liu@rvca.ca>
Cc: Caitlin Beaudoin <caitlin.beaudoin@tylin.com>
Subject: RE: LeBreton Library Parcel - SWM Enquiry

Thanks for confirming Eric – quick response much appreciated.

Yes, we will certainly let you know if there are any significant changes in site design intent, however the plans are relatively well advanced and I wouldn't envision anything changing from this point.

Ben Worth
SENIOR PROJECT MANAGER, WATER RESOURCES
M +1 613.986.8997
TYLin

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: April 7, 2022 5:03 PM
To: Ben Worth <ben.worth@tylin.com>; Evelyn Liu <evelyn.liu@rvca.ca>
Cc: Caitlin Beaudoin <caitlin.beaudoin@tylin.com>
Subject: RE: LeBreton Library Parcel - SWM Enquiry

Hi Ben,

Based on the plan provided, the RVCA will not require any water quality controls for the subject site. Please keep me in the loop should the plan change significantly from what's shown below.

Cheers,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

From: Ben Worth <ben.worth@tylin.com>
Sent: Thursday, April 7, 2022 4:56 PM

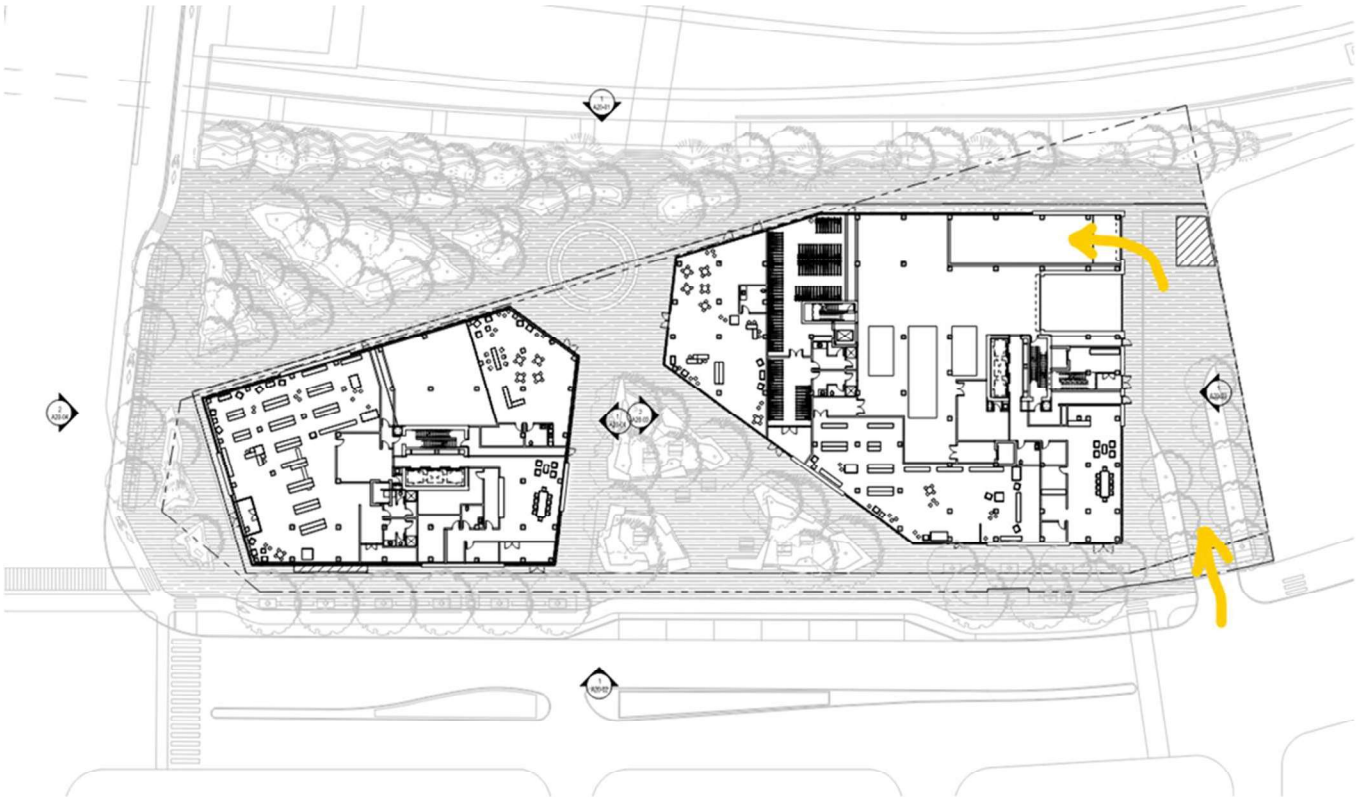
To: Eric Lalande <eric.lalande@rvca.ca>; Evelyn Liu <evelyn.liu@rvca.ca>
Cc: Caitlin Beaudoin <caitlin.beaudoin@tylin.com>
Subject: RE: LeBreton Library Parcel - SWM Enquiry

Hi Eric,

The site plan is still in progress (due to be submitted to the City within the next few weeks), but I've provided a snip below of work-in-progress architectural site plan.

The only vehicular access to the site is at the east end (short extension of Empress Ave, north off Albert) with a basement entry/egress ramp in the north-east corner of the basement structure. The remainder of at-grade areas are a mixture of hard/soft landscaping, no surface parking is proposed on site.

Thanks,
Ben



Ben Worth
SENIOR PROJECT MANAGER, WATER RESOURCES
M +1 613.986.8997
TYLin

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: April 7, 2022 3:29 PM
To: Ben Worth <ben.worth@tylin.com>; Evelyn Liu <evelyn.liu@rvca.ca>
Cc: Caitlin Beaudoin <caitlin.beaudoin@tylin.com>
Subject: RE: LeBreton Library Parcel - SWM Enquiry

Appendix B

SANITARY CALCULATIONS

Project Name: **LeBreton Library Parcel** Project No.: **10399** Task: **Sanitary Servicing Analysis**	TYLin	Prepared by: CB Checked by: BW Date: April 2022

				ALLOTTED	PROPOSED
				CIMA	**DREAM**
Residential	Apartment	Persons/unit:	1.8	403	601
	Townhome	Persons/unit:	2.7		0
	Population			**726**	**1082**
	Per Capita Flow (Lpcd)			280	280
	Average Flow (L/s)			2.35	3.51
	Harmon Correction Factor			0.8	0.8
	Peaking Factor			3.31	3.22
	Residential Peak Flow (L/s)			**7.78**	**11.30**
Non-Res	Commercial/Retail			3,063	1,261
	Office/Loft			19,307	
	Childcare				1,167
	Total Gross Floor Area (m^2)			22,370	2,428
	Flow (L/m2/day)			2.8	2.8
	Peaking			1.5	1.0
	Average Flow (L/s)			**1.09**	**0.08**
	TOTAL DRY WEATHER DESIGN FLOW (L/s)			**8.87**	**11.38**
Wet-Weather	Site Area (m^2)			9,629	9,629
	Infiltration Allowance (L/ha/s)			0.33	0.33
	Infiltration Flow (L/s)			0.32	0.32
	TOTAL WET WEATHER DESIGN FLOW (L/s)			**9.19**	**11.69**
	PROP INCREASE FROM ALLOTTED SAN FLOW:				**2.51 L/s**

Appendix C

WATER DEMAND CALCULATIONS

Project Name:	**LeBreton Library Parcel**				Prepared by: CB
Project No.:	**10399**				Checked by: BD
Task:	**Water Demand Analysis**				Date: April 2022

				ALLOTTED	PROPOSED
				CIMA	DREAM
Residential	Apartment	Persons/unit:	1.8	403	601
	Townhome	Persons/unit:	2.7		0
	Population			**726**	**1082**
	Baseflow (Lpcd)			350	350
	Average Day Demand Flow (L/s)			**2.94**	**4.38**
	Maximum Day Peaking Factor			2.5	2.5
	Peak Hour Peaking Factor			2.2	2.2
	Maximum Day Demand (L/s)			**7.35**	**10.96**
	Peak Hour Demand (L/s)			**16.18**	**24.11**
Commercial	Commercial/Retail			3,063	1,261
	Baseflow (L/m2/day)			2.8	2.8
	Average Day Demand Flow (L/s)			**0.10**	**0.04**
	Maximum Day Peaking Factor			1.5	1.5
	Peak Hour Peaking Factor			1.8	1.8
	Maximum Day Demand (L/s)			**0.15**	**0.06**
	Peak Hour Demand (L/s)			**0.27**	**0.11**
Office & Childcare	Office/Loft			19,307	
	Childcare				1,167
	Baseflow (L/m2/day)			8.06	8.06
	Average Day Demand Flow (L/s)			**1.80**	**0.11**
	Maximum Day Peaking Factor			1.5	1.5
	Peak Hour Peaking Factor			1.8	1.8
	Maximum Day Demand (L/s)			**2.70**	**0.16**
	Peak Hour Demand (L/s)			**4.87**	**0.30**
	TOTAL AVERAGE DAY DEMAND FLOW (L/s)			**4.84**	**4.53**
	TOTAL MAX DAY DEMAND FLOW (L/s)			**10.20**	**11.18**
	TOTAL PEAK HOUR DEMAND FLOW (L/s)			**21.31**	**24.52**

Project Name:	**LeBreton Library Parcel**	TYLin	Prepared by: CB
Project No.:	**10399**		Checked by: BW
Task:	**Fire Water Calculations**		Date: April 2022

Standards = Based on Fire Underwriters Survey

Where:

C = Coefficient related to construction type

A = Total floor area in m^2 (excluding basements, including above ground garage)

M_A = Area Multiplier (Reduction)

M_O = Occupancy Multiplier (<100% = Reduction, >100% = Increase)

M_{SPR} = Sprinkler Multiplier (Reduction)

M_{SEP} = Separation Multiplier (Increase)

F = Required Flow (L/min)

Initial Required Fire Flow

C = Non-combustible construction

= 0.8

Floor	A_0 (m^2)	M_A
Ground	3,753	100%
2	4,269	100%
3	3,318	50%
4	2,786	50%
5	2,419	50%
6	1,401	50%
7	1,267	50%
8	1,401	50%
9	1,401	50%
10	1,335	50%

$A = \Sigma [A_{0\,i}(M_{A\,i})]$

= 15686 m^2

$F_1 = 220(C)A^{1/2}$

= 22,043 L/min

= 22,000 L/min (round to nearest 1000)

Occupancy Multiplier

M_O = Limited combustible

= 85%

$F_2 = F_1(M_O)$

= 18700 L/min

Sprinkler Multiplier

M_{SPR} = NFPA Sprinkler system

= 70%

$F_3 = F_2(M_{SPR})$

= 13090 L/min

Separation Multiplier

Direction	Separation Distance	M_{SEP}
Total		100%
North Side	45m +	0%
East Side	45m +	0%
South Side	45m +	0%
West Side	45m +	0%

Note: Maximum Multiplier is 175%

Required Fire Flow

$F_4 = F_3(M_{SEP})$ $(2000 \le F \le 45000)$

= 13090 L/min

= **218.17 L/s**

Appendix D

EXCERTS FROM THE MESP

4. Water Servicing

4.1 Existing Infrastructure

A summary of the existing water servicing infrastructure in the vicinity of the LeBreton Flats Development area has been provided in the *LeBreton Flats Servicing Vision*, prepared by Parsons in 2019. A detailed catalogue of the existing infrastructure has also been presented in that report.

Based on a review of available as-built drawings, the principal watermains surrounding the site are a 400mm Dr 18 PVC watermain on Albert St., the 300mm DR 18 PVC watermain on Wellington Street, the 400mm DR 18 PVC stub on Booth Street at Fleet Street. Detailed information on the existing water supply infrastructure can be found on the water servicing plan in Appendix A.

Recommendations have been made in previous reports regarding options for the relocation of the low-pressure transmission main (Parsons, 2019), however, this is no longer required since buildings are no longer conflicting with its existing location as per the LeBreton Flats Development Master Concept Plan (Appendix I).

4.2 Proposed Development

4.2.1 Potable Water Demands

Potable water demands are calculated using the parameters defined in the City of Ottawa Water Design Guidelines 2010, updated with the relevant Technical Bulletins 2020 (CoO WDG), and the Ministry of Environment, Climate and Parks (MECP) Design Guidelines for Water Supply (2008). A summary of those design parameters is provided in the following table:

Table 4.1 : Potable Water Demand Calculation Parameters

Parameter		Value	Units	Source
Residential	Base Demand	350	l/p/d	CoO WDG
Population per dwelling	Apartment	1.8	p/dwelling	CoO WDG
	Townhome	2.7	p/dwelling	CoO WDG
Peaking Factors	Maximum Day	2.5	unitless	CoO WDG
	Peak Hour	2.2	unitless	CoO WDG
Commercial	Base Demand	2.8	L/m2/d	CoO WDG
Peaking Factors	Maximum Day	1.5	unitless	CoO WDG
	Peak Hour	1.8	unitless	CoO WDG
Unit Flows				
Hotel	Baseflow	225	L/bedspace/d	CoO WDG
	beds per room	2	bedspace / room	CIMA+ Assumption
	% rooms	65%	room area/ GFA	
	325 sq.ft / room	30.1	room area (m2) / room	
	rooms per GFA	0.022	Rooms/GFA (m2)	
Parks	Density / acre	75	Person per acre	CoOSDG / Assumption
	Density /hectare	185.33	Person per hectare	CoOSDG / Assumption
	Picnic area; flush toilet	20	L/p/d	CoOSDG
	Contingency	25%	Unitless	CIMA+ Assumption
	Peaking Factor	As per commercial	unitless	CIMA+ / CoO WDG
Flow Monitoring	Arena / Major Event Centre Base Demand	110	L/seat/d	Parsons (2019)

Hotel water demands were determined with a baseflow value per the City of Ottawa Water Design Guidelines, 2010 and based on a value of 0.022 Rooms per m^2 of gross floor area. This value represents a 65% utilization rate for rooms, with 325 sq. ft per room, and was validated with information from previous CIMA+ projects.

Park water demands were determined based on daily sanitary demand unit rates for parks with washrooms only, using a population density of 75 persons per acre, as presented in the City of Ottawa Sewer Design Guidelines with a contingency of 25%. The commercial peaking factors were assumed for this demand.

Major Event Centre demands were based on the values provided in the Parsons Servicing Vision 2019, which is based on flow monitoring of an arena. The value obtained of 110 L/seat/d corresponds to the OBC value (20 L/d) (Ontario Building Code, 2017) multiplied by a factor of 5.5. Commercial peaking factors were assumed for this demand.

A breakdown of the resulting estimated potable water demands for each phase is presented in Table 4.2. The water demand calculation sheet supporting these values is included in Appendix E.

Table 4.2 : LeBreton Water Demands

Concept Dev. Block	Residential Population (persons)	Gross Floor Area (m^2)			Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
		Commercial/ Institutional	Office/ Loft	Hotel			
Block 1	726	3 063	19 307	-	4.84	10.20	21.31
Block 2	512	1 559	-	11 246	2.76	6.21	13.25
Block 3	1 834	5 169	27 000	-	10.12	22.61	48.12
Block 4	-	3 717	24 098	-	2.37	3.55	6.40
Block 5	3 114	3 921	-	7 956	13.19	32.40	70.93
Block 6	1 716	2 687	-	-	28.68	71.62	135.86
Block 7	571	-	-	-	2.31	5.78	12.72
LeBreton Place	-	2722			0.09	0.13	0.24
Parks	-	-	-	-	0.42	0.85	1.87
Total	**8 473**	**22 838**	**70 405**	**19 202**	**64.78**	**153.35**	**310.70**

4.2.2 Fire Protection

Given the design is at a conceptual stage with limited available building information, it would not be appropriate to develop fire flows in accordance with the FUS and City requirements at this time. For a preliminary analysis and determination of boundary conditions, a fire flow demand of 217 L/s (13 000 L/min) was considered per the maximum fire demand level of service in core areas as stipulated in the 2013 City of Ottawa Water Master Plan (Stantec, 2013).

4.2.3 Proposed Connections

The proposed LeBreton Flats water servicing configuration utilizes the connection points proposed in the *LeBreton Flats Servicing Vision* (Parsons, 2019) and the *Servicing and Stormwater Management Report 557-584 Wellington Street & 550 Albert Street* (Stantec, 2017). Table 4.3 summarises the proposed primary and secondary connection points while the water servicing plan provided in Appendix A demonstrates the proposed water servicing layout.

For each individual building, multiple connections will be required if the average day demand is over 50 m^3/d, as per the requirements of the City of Ottawa Water Design Guidelines.

The 2019 Parsons report also highlighted a need for pressure reducing valves at each building. The updated boundary conditions may also highlight this requirement, which will need to be confirmed at detailed design.

Table 4.3 : LeBreton Proposed Watermain Connection Points

Concept Dev. Phase	Primary Connection	Size*	Secondary Connection	Size*
Block 1	Albert St.	406mm PVC	Albert St.	406mm PVC
Block 2	Albert St.	406mm PVC	Albert St.	406mm PVC
Block 3	Preston Street North of Albert	406mm DR 18 PVC	Albert St. near Rochester St.	406mm PVC
Block 4	Preston Street North of Albert	406mm DR 18 PVC	Albert St. near Rochester St.	406mm PVC
Block 5	Wellington St. and Preston St.	305mm Class 52 DI (+300mm PVC and Stubs)	Booth St. and Fleet St.	406 mm booth st. / 305mm Fleet street PVC
Block 6	Albert St. and City Centre Ave.	406mm DR 18 PVC	Preston Street North of Albert	406mm DR 18 PVC
Block 7	Wellington St. and Preston St.	305mm Class 52 DI (+300mm PVC and Stubs)	Booth St. and Fleet St.	406 mm booth st. / 305mm Fleet street PVC
LeBreton Place	Connected to Block 4 Network	-	-	-
Parks	Connected to LeBreton Place Network	-	-	-

**Based on a review of as-built drawings available to CIMA+ at the time of publication of this report*

4.2.4 Watermain Boundary Conditions

The following boundary condition was obtained from the City of Ottawa on March 16th, 2020, using a fire flow of 217 L/s at each connection. The connection points used are shown in Appendix A. Based on the boundary conditions, and the proposed site grading, the resulting pressure at the connection points ranges approximately from 59 to 89 psi. To satisfy the City of Ottawa hydraulic objectives and Ontario Building Code requirements, pressure-reducing valves will be required at the building connections where the watermain pressure exceeds 80 psi, as per the City of Ottawa Water Design Guidelines.

Table 4.4 : LeBreton Proposed Watermain Connection Points

Concept Dev. Phase	Connection points	Min. HGL (m)	Max HGL (m)	Max Day + Fire Flow (m)
Block 1	Connection 1A,1B	107.0	116.5	109.0
Block 2	Connection 2A, 2B*	107.0	116.5	109.0
Block 3	Connection 3A, 3B	107.0	116.0	109.0
Block 4, Block 5, LeBreton Place, Parks	Connection 5A	107.0	116.5	97.0
	Connection 5B	107.0	116.5	107.0
Block 6	Connection 6A, 6B	107.0	116.0	109.0
Block 7	Connection 7A	107.0	116.5	107.0
	Connection 7B, 7C	107.0	116.5	108.0

**Assuming a connection to a future 406mm diameter watermain on Albert St.*

4.3 Conclusions and Recommendations – Water Servicing

Water Servicing for the LeBreton Flats development is feasible and meets the City of Ottawa hydraulic objectives provided that connection 2B connects to a future 406mm dia. watermain. However, it should be noted that actual fire protection requirements may dictate otherwise.

Actual fire flow demands will need to be assessed and fire scenarios analysed as part of the detailed design. It should also be noted that there may be difficulty in achieving FUS fire flow requirements depending on construction type, gross floor area and percent of unprotected openings. The final design will need to meet the available fire flow with capacity of the existing network or provide additional measures to meet the requirements of the Fire Marshall and appropriate governing bodies.

5. Sanitary Servicing

5.1 Existing Infrastructure

The sanitary sewer network in the vicinity of the LeBreton Flats Development Area is complex and consists of multiple components, including infrastructure such as collectors, regulators, and interceptor sewers, as well as local sewers. Sanitary flow distribution to sewers in this area is actively and passively distributed between the major trunk sewers by various diversion and regulating chambers in the area near Booth St., Albert St., and Preston St., south of the LeBreton development.

A detailed catalogue of the existing infrastructure has been presented in the LeBreton Flats Servicing vision prepared by Parsons in 2019 (Appendix K).

The principal infrastructure which will service the LeBreton Flats Development Area as follows:

+ The Albert Street Sanitary Sewer at Brickhill St. (Albert St.)
+ The Fleet Street Sanitary Sewer and LeBreton Flats Sanitary Pumping station (LFPS)
+ The West Nepean collector and Cave Creek Collectors (WNC/CCC)
+ The Interceptor Outfall Sewer (IOS)

Additional information on sanitary allocations for the LeBreton Development Area is presented in the 2004 *LeBreton Flats Master Servicing Report* prepared by Dessau-Soprin (Appendix J). The flows outlined in this report have previously been approved by the City of Ottawa. The City has requested that CIMA+ ensure the sanitary allocations discussed in the 2004 report are adhered to as part of this Master Servicing Report.

5.1.1 Capacity analysis for existing outfall infrastructure

A review of the available information on the principal sanitary infrastructure was undertaken to assess the available capacity in each outlet. Table 5.1 summarises estimated capacities, per the principal outlet and its components.

Table 5.1 : Summary of outlet-specific sanitary flow allocations and estimated capacity, including external contributions

Outlets	Element	Estimated Capacity (L/s)	Source
LFPS	Fleet St. Sewer	117.6	Dessau-Soprin, 2004; Novatech 2017
	Pumping station (Current Capacity)	100	ECA - MOE 2010
	Flowrate until overflow to Storm	140	City of Ottawa 2018
Albert St. Sewer	Sewer + ICD	233	City of Ottawa 2020
	Design Sanitary Flow	110	Robinson 2015
CCC	-	Capacity not limited	Parsons, 2019; City of Ottawa, 2018

5.1.1.1 Fleet street gravity sewer, LFPS and IOS

The Fleet street sanitary sewer conveys sewage to the LFPS, and its capacity was estimated at 117.6 L/s in the 2004 LeBreton Master Servicing Report (Dessau-Soprin, 2004). In discussions with the City, the City has indicated that it could be acceptable for this sewer to surcharge in order to accommodate the required flow, provided acceptable justification and analysis.

The LFPS itself has a current firm rated at a capacity of 100L/s, as indicated in its associated Environmental Compliance Approval No. 8494-84GSRF (MOE, 2010), and in the LFPS Design Brief (Stantec 2006, 2008).

As referred to in the LeBreton Flats Servicing Vision (Parsons, 2019), the City of Ottawa's analysis demonstrated additional capacity of 130 L/s in the downstream pipe connecting the effluent of the LFPS to the IOS (Tousignant, 2018).

5.1.1.2 Albert St. Sanitary Sewer

The Albert St. Sanitary sewer is the planned outlet for the Chaudière and Albert Island developments as well as the outlet of a 600mm combined sewer. The outlet of the combined sewer contains an inlet control device (ICD) to control the flow going into the sanitary sewer. It also has a 450mm overflow pipe that discharges to the 900mm storm sewer when the flow exceeds the ICD's capacity. Design sanitary capacity for this outlet were determined at 110.68 L/s (Robinson, 2015). However, it should be noted that this structure is part of the combined sewer system and that sanitary flows directed to this outlet impact the return period of combined sewer overflow at this location (Tousignant, 2020).

5.1.1.3 Cave Creek Collector Capacity

The City of Ottawa has indicated that there are likely no capacity limitations for this outlet but has requested to be provided with the proposed design flows to this collector in order to update their models. Additionally, the City has provided the HGL within the CCC, at the anticipated connection point ()

Table 5.2 : HGL of the Cave Creek Collector at Preston St.

Return Period	HGL @ MHSA00189 (m)	Source
2-year	52.28	City of Ottawa, 2020
5-year	52.33	
100-year	52.48	

5.2 External Flow Contributions

This section summarises the external developments and constructed infrastructure that are or are expected to discharge to the proposed outlets of the LeBreton Flats Development Area. These flow contributions must be considered when determining allocated flows for the LeBreton Flats Development Area. A summary of the proposed external sanitary flows is indicated in Table 5.3. The external contributions only consider the most recently proposed sanitary flows for each site.

Table 5.3 : External Sanitary Demands

Concept Dev. Phase	Area (ha)	Residential Population	GFA (m^2)			Proposed Outlet	Peak Flow (L/s)	Source
			Commercial/ Institutional	Office/ Loft	Hotel			
External Flow Contributions								
Canadian War Museum	-	-	-	-	-	LFPS	3.18	Parsons, November 2019
Claridge Phase I-V	-	-	-	-	-	LFPS	33.95*	Novatech, March 2020
OPL-LAC Joint Facility	-	-	-	-	-	Albert St.	4.3*	Stantec, September 2017
Chaudière and Albert Isl.	-	-	-	-	-	Forcemain to Albert St.	53.6*	David Shaeffer Engineering, June 2018
Victoria Island	-	-	-	-	-	Portage Bridge/ LFPS	20.0	Dessau-Soprin, 2004
Future Cultural/ Institutional Use	-	-	30 000	-	-	LFPS	1.52*	CIMA+, Parsons 2019

**External demands provided in this table only consider the proposed sanitary flows. Approved flow allocations by the NCC and the City of Ottawa remain to be confirmed.*

5.2.1 Canadian War Museum

Based on the LeBreton Flats Servicing Vision (Parsons, 2019) and the LeBreton Flats Master Servicing Report, the Canadian War Museum contributes 3.18 L/s in peak sanitary flows to the LFPS. This is the allocation considered as part of this MSR.

5.2.2 Claridge Homes Phase I-V

Currently, only phases I, II and III of the Claridge Homes Development are occupied and contribute flows to the LFPS. Based on the most recent servicing brief for this development, a proposed buildout sanitary peak flow of 33.95 L/s (Novatech, 2020; Mottalib, 2020) (Appendix P). This exceeds the allocated capacity of 22.10 L/s from the Dessau-Soprin Master Servicing report that was previously approved by the City of Ottawa (Mottalib, 2020; Dessau-Soprin, 2004).

5.2.3 Ottawa Public Library – Library and Archives Canada Joint Facility

This Master Servicing Report considers developments that were also addressed in a 2017 Servicing Study titled *Servicing and Stormwater Management Report 557-584 Wellington Street & 550 Albert Street* prepared by Stantec (Appendix K, appended to the Parsons report).

The sanitary contributions of the sites addressed by this MSR were reassessed based updated design and land use parameters. For the sanitary contribution of the sites not considered in this Master Servicing Report, the demand totaled 4.3 L/s (Stantec, 2017).

5.2.4 Albert and Chaudière Islands Development (Zibi)

The Albert and Chaudière Islands Development, situated north of the LeBreton Development Area, are currently serviced by a pumping station and twin forcemain discharging to the Albert Street Sewer (DSEL 2018; Parsons 2019; City of Ottawa Wastewater Service Interactive Map 2020). The sanitary forcemain discharges into the Brickhill Dr. and Albert St. gravity sewers.

This allocation was previously determined to be 39.7 L/s discharging to the LFPS in the 2019 *LeBreton Flats Servicing Vision* (Parsons, 2019), but was updated with more recent available information.

Based on a revised version of the Windmill Developments Phase 1 Master Servicing Study (DSEL, 2018), the sanitary flows to the Albert St. sewer via the Brickhill St. sanitary sewer have been revised to 53.6 L/s and discharging to the Albert St. Sewer via a twinned forcemain. This updated information was used in CIMA+'s analysis.

The flow contributions from this development have been revised from 39.7 L/s to 53.6 L/s from the 2019 Parsons report (Appendix M) with the most recent available information.

5.2.5 Victoria Island

Based on previous engineering reports (Dessau-Soprin 2004, Parsons 2019), Victoria Island sanitary servicing is expected to discharge to the LFPS. However, based on information provided by the NCC, Victoria Island is already serviced by its own system of pumping stations and forcemains, ultimately discharging to the IOS near the intersection of Bronson Ave. and Sparks St.

Victoria Island is currently serviced by sanitary sewers and a pumping station to the of Portage bridge, pumping sanitary flows across the Hydro-Ottawa generating station tailrace. Sanitary sewage then is lifted a second time, through a pumping station northeast of the Portage Bridge and Wellington St. Intersection to the IOS. The body of engineering reports also provide for a future allocation of 20 L/s of sanitary flows from Victoria Island to the LFPS (Dessau-Soprin 2004, Parsons 2019). It is anticipated that the NCC uses this allocation to redirect flows from the existing system of pumping stations to the LFPS in the future.

5.3 Proposed Configuration

5.3.1 Design Constraints

The planned outlet from Block 4 is the Cave Creek Collector which was selected to avoid an additional crossing of the covered aqueduct. Due to the currently proposed grading for this block, a sanitary pumping station is likely to be required to service this parcel through to the CCC.

5.3.2 Sanitary Demands

The sanitary demand determination for this site has been performed using the parameters defined in the City of Ottawa Sewer Design Guidelines, 2012 (CoO SDG), as updated with the relevant Technical Bulletins. A summary of those design parameters is provided in Table 5.4.

Table 5.4 : Sanitary Demand Calculation Parameters

Parameter		Value	Units	Source
Residential	Baseflow	280	l/capita/d	CoO SDG
Population per dwelling	Apartment	1.8	p/dwelling	CoO SDG
	Townhome	2.7	p/dwelling	CoO SDG
Harmon Peaking Factor Parameters	Harmon Correction Factor (K):	0.8	unitless	CoO SDG
	Max Harmon P.F.	4	unitless	CoO SDG
	Min Harmon P.F.	2	unitless	CoO SDG
Commercial	Baseflow	2.8	L/m2/d	CoO SDG
	Peaking Factor	1.5	unitless	CoO SDG
	Peaking Factor if Commercial area is <20% of total area	1.0	unitless	CoO SDG
Infiltration		0.33	L/s/ha	CoO SDG
Unit Flows				-
Hotel	Baseflow	225	L/bedspace/d	CoO SDG
	beds per room	2	bedspace / room	CIMA+ Assumption
	% rooms	0.65	room area/ gfa	
	325 sq. ft / room	30.1	room area (m2) / room	
	rooms per GFA	0.022	Rooms/GFA (m2)	
Parks	Density / acre	75	Person per acre	CoO SDG / Assumption
	Density /hectare	185.33	Person per hectare	CoO SDG / Assumption
	Picnic area; flush toilet	20	L/p/d	CoO SDG
	Contingency	25%	unitless	-
Flow Monitoring	Arena / Major Event Centre Baseflow	110	L/seat/d	Parsons (2019)

Assumptions for the sanitary unit flow parameters are identical to the ones discussed for water demands in Section 4.2.1. The assumptions are restated below for the reader's convenience.

Hotel sanitary demands were determined with a baseflow value per the City of Ottawa Sewer Design Guidelines, 2012 and based on a value of 0.022 Rooms per m^2 of gross floor area. This value represents a 65% utilization rate for rooms, with 325 sq. ft per room, and was validated with information from previous CIMA+ projects.

Park sanitary demands were determined based on daily sanitary demand unit rates for parks with washrooms only, using a population density of 75 persons per acre, as presented in the City of Ottawa Sewer Design Guidelines with a contingency of 25%. The commercial peaking factors were assumed for this demand.

Major Event Centre demands were based on the values provided in the Parsons Servicing Vision 2019, which is based on flow monitoring of an arena. The value obtained of 110 L/seat/d corresponds to the OBC value (20 L/d) (Ontario Building Code, 2017) multiplied by a factor of 5.5. Commercial peaking factors were assumed for this demand.

A breakdown of estimated sanitary demands for each development block is presented in Table 5.5, with the proposed outlets identified for each. The sanitary design sheet supporting these values is included in Appendix F, and a preliminary servicing plan is included in Appendix B

Table 5.5 : Sanitary Demand for the LeBreton Flats Development

Concept Dev. Phase	Area (ha)	Residential Population	GFA (m^2)			Proposed Outlet	Peak Flow (L/s)	Source
			Commercial/ Institutional	Office/ Loft	Hotel			
LeBreton Sanitary Demands								
Block 1	1.26	726	3 063	19 307	-	Albert St.	9.29	CIMA+
Block 2	0.97	512	1 559	-	11 246	Albert St.	7.89	CIMA+
Block 3	2.77	1 834	5 169	27 000	-	CCC	20.85	CIMA+
Block 4	3.00	-	3 717	24 098	-	CCC	2.34	CIMA+
Block 5	5.19	2 940	3 921	-	7 956	LFPS	32.43	CIMA+
Block 6	3.75	1 716	2 687	-	-	CCC	40.26	CIMA+
Block 7	1.19	503	-	-	-	LFPS	6.60	CIMA+
LeBreton Place	0.48	-	2722	-	-	CCC	0.29	CIMA+
Park Area	7.91	-	-	-	-	CCC	3.25	CIMA+

5.4 Recommendations – Sanitary Servicing

5.4.1 Cave Creek Collector Relocation

The current alignment of the Cave Creek Collector conflicts with the proposed site plan. In order to develop Blocks 3 and 5, a realignment of the Cave Creek Collector will be required. The NCC and the City of Ottawa have agreed on a re-alignment geometry of the Cave Creek Collector, with a separation distance from the High-Pressure Transmission Main of 5.0m centre to centre, and a future easement extending 4.5m from the Cave Creek Collector centreline (Chakraburtty, 2020) (Appendix N).

The NCC and the City of Ottawa have initiated discussions towards reaching a cost-sharing agreement to relocate the Cave Creek Collector into the Albert Street corridor in upcoming years, as early as 2024.

A pre-feasibility analysis was performed to assess whether the relocation of the CCC to this proposed alignment was possible by micro-tunneling, and to determine the associated constraints and risks related to this undertaking. A feasibility study is required for more detailed information on this aspect.

To confirm the feasibility of this option, the following items will be required as part of a feasibility study supporting this work:

+ Geotechnical Interpretation and validation

  The geotechnical information supporting the pre-feasibility analysis would need to be validated with the appropriate information, as the reality of the site conditions is critical to the construction risk.

  There are records of seven (7) boreholes performed in proximity of the site, but the associated borehole logs were not available for pre-feasibility analysis. This information should be consulted in order to quantify and validate the risks and preliminary information.

  The preparation of a geotechnical interpretation will be required with the support of an additional geotechnical investigation, likely consisting of 2-3 boreholes.

+ Survey and location validation of underground infrastructure

+ Preliminary design and quantity estimation

  The feasibility study should also include preliminary design, quantity estimation and feasibility of the preliminary design.

+ Tender design package

  The relocation would also require the preparation of a detailed design package (drawings and specifications) to support the tender process.

As for geotechnical risks related to construction, the pre-feasibility analysis noted the presence of a limestone bedrock with shale interbedding, some partial mixed-face conditions at the proposed tunnelling elevation, and presence of fill with wood debris in proximity of the proposed alignment.

To this undertaking, mixed-face conditions present risks associated with increased complexity and difficulty of the tunneling operation, and the presence of the wood and debris presents a major risk related to the potential stalling the tunneling operation caused by debris, which would then require an open excavation to free the stalled tunneling equipment.

Additional risks highlighted were related to the provisions required for traffic management and construction laydown.

Consultation with appropriate stakeholders for approvals and coordination will be required as part of the Cave Creek Collector relocation.

5.4.2 Block 4 Sanitary Pumping Station

A sanitary pumping station is required for the sanitary servicing of block 4, the Park Area and LeBreton Place. The following design elements were established on a preliminary design basis:

+ Pump station wet well invert: 48.820m
+ Invert at forcemain outfall to SAN MH 11: 54.850m
+ Design flow rate (subject to modifications): ±5.88 L/s

The proposed outfall for this pumping station must cross underneath the Confederation Line LRT tracks south towards SAN MH 11.

The functional design of this pump station should be completed under a separate mandate once the Park Area sanitary demands have been confirmed.

5.4.3 Sanitary Flow Allocations from Previous Servicing Reports and Studies

The LeBreton Flats Sanitary Pumping Station is shared with existing and planned external developments as well as with the proposed developments in the LeBreton Flats Development area. To alleviate concerns of conflicting sanitary flow allocations, a comparison between the current design flows and the ones presented in the 2004 *LeBreton Flats Master Servicing Report* was undertaken to quantify any discrepancy or conflict.

This exercise concluded that the allocated capacities from the 2004 report were of 66.40 L/s, on basis of allocated sanitary flows; while proposed sanitary flows total 60.55 L/s, corresponding to 91% of allocated. This analysis and calculations are presented in Appendix H.

A similar exercise was undertaken for the sanitary flows provisioned in the Stantec 2017 report which confirmed agreement with present allocations of Blocks 1 and 2.

A comparison of the Master Concept Plan sanitary demands with the sanitary allocations of both the Dessau-Soprin and Stantec reports is presented in Table 5.6.

Table 5.6 : Comparison of demands with previous allocations

Outlet	Sanitary Demands for LeBreton Master Concept Plan (L/s)	2004 Dessau-Soprin Flow Allocation (L/s)	Source
LFPS	60.55	66.40	Appendix H
Albert St. Sewer	17.18	28.9	Stantec, 2017
WNC/CCC	66.99	-	-

5.4.4 Proposed Sanitary Flow Allocations

This section discusses the proposed sanitary allocations vs capacity for each outlet identified in Section 5.1 (LFPS, Albert St., WNC/CCC) for the buildout of the LeBreton Flats Development Area.

5.4.4.1 LeBreton Flats Sanitary Pumping Station

Based on the design sanitary demands for this outlet, 14.17 L/s of pump station capacity remains unallocated (Table 5.7). Thus, this remaining unallocated capacity has been redistributed between the proposed developments, based on their relative contributions to the total sanitary allocations prior to redistribution (Table 5.8).

Table 5.7 : LeBreton Flats Pumping Station proposed sanitary flow allocations per master concept plan.

Outlet	Concept Dev. Phase	Pre-Authorised Sanitary Flow Allocations (L/s)	Proposed Sanitary Flow Allocations (L/s)
LFPS	**Block 5**	-	**32.43**
	Block 7	-	**6.60**
	Victoria Island	20.0[1]	
	Future Cultural/ Institutional	-	**1.52**
	Canadian War Museum	3.18[1]	
	Claridge ph. I-III	8.73[1,2]	
	Claridge ph.IV-V	-	**13.37**[2]
	Subtotal	31.91	53.92
	Total Allocation	85.83	
	LFPS Available Capacity	100.00	
	Remaining Capacity (see Table 5.8 for redistribution)	14.17	

Note: Values in bold denote proposed developments

[1] Values Previously Approved by the City of Ottawa, based on the Dessau-Soprin Servicing Report

[2] Novatech 2020 – RE: Phase 1 LeBreton Flats – Revised Building Statistics & City of Ottawa Comments (May 12th 2020); Flow split confirmed by NCC.

Table 5.8 : LeBreton Flats Pumping Station proposed redistribution of unallocated flows

Outlet	Concept Dev. Phase	Sanitary Flow Allocation (L/s)	Distributed Remaining Capacity (L/s)	Total Sanitary Allocation (L/s)
LFPS	**Block 5**	**32.43**	**8.52 (60.14%)**	**40.95**
	Block 7	**6.60**	**1.73 (12.24%)**	**8.33**
	Victoria Island	20.0[1]		20.0
	Future Cultural/ Institutional	**1.52**	**0.40 (2.82%)**	**1.92**
	Canadian War Museum	3.18[1]		3.18
	Claridge ph. I-III	8.73[1,2]		8.73
	Claridge ph.IV-V	**13.37**[2]	**3.51 (24.80%)**	**16.88**
	Subtotal	85.83	14.17 (100%)	100.00

Note: Values in bold denote proposed developments

[1] Values Previously Approved by the City of Ottawa, based on the Dessau-Soprin Servicing Report

[2] Novatech 2020 – RE: Phase 1 LeBreton Flats – Revised Building Statistics & City of Ottawa Comments (May 12th 2020); Flow split confirmed by NCC.

5.4.4.2 Albert St. Sanitary Sewer

For the Albert Street Sewer, the capacity of the sewers and ICD is sufficient to accommodate both the Windmill Developments Phase 1 (noted as Chaudiere and Albert Isl.) and the LeBreton Developments Block 1 and 2 flows (Stantec, 2017; Robinson Consultants, 2015).

5.4.4.3 Cave Creek Collector

As mentioned previously in Section 5.1.1.3, the City of Ottawa has indicated that there is likely no capacity limitation for this collector but has requested to be provided with the proposed design flows to this collector in order to update their models.

Table 5.9 : Albert Street Sewer and the Cave Creek Collector proposed sanitary flow allocations vs. estimated capacity.

Outlet	Concept Dev. Phase	Sanitary Allocation (L/s)		Total Sanitary Allocation (L/s)	Current Estimated Capacity (L/s)	
Albert St. Sewer	**Block 1**	**9.29**	**17.18**	75.08	110	Capacity OK
	Block 2	**7.89**				
	Ottawa Central Library	4.3[2]				
	Chaudière and Albert Isl.	53.6[3]				
CCC	**Block 3**	**20.85**		**66.99**	Capacity not limited	Capacity OK
	Block 4	**2.34**				
	Block 6	**40.26**				
	LeBreton Place	**0.29**				
	Park Area	**3.25**				

Note: Values in bold denote proposed developments

[1] Values Previously Approved by the City of Ottawa, based on the Dessau-Soprin Servicing Report

[2] Stantec 2017 – Servicing and Stormwater Mangement Report 557-584 Wellington Street & 550 Albert Street (September 11, 2017)

[3] DSEL. 2018. – Master Servicing Study (Phase 1) – Revision 7. Ottawa

5.5 Conclusions – Sanitary Servicing

The proposed servicing and flow allocations for the LeBreton Flats development area are feasible provided that the relocation of the Cave Creek Collector is performed prior to the development of Blocks 3 and 6. A summary of the proposed sanitary flow allocations for each development is shown below.

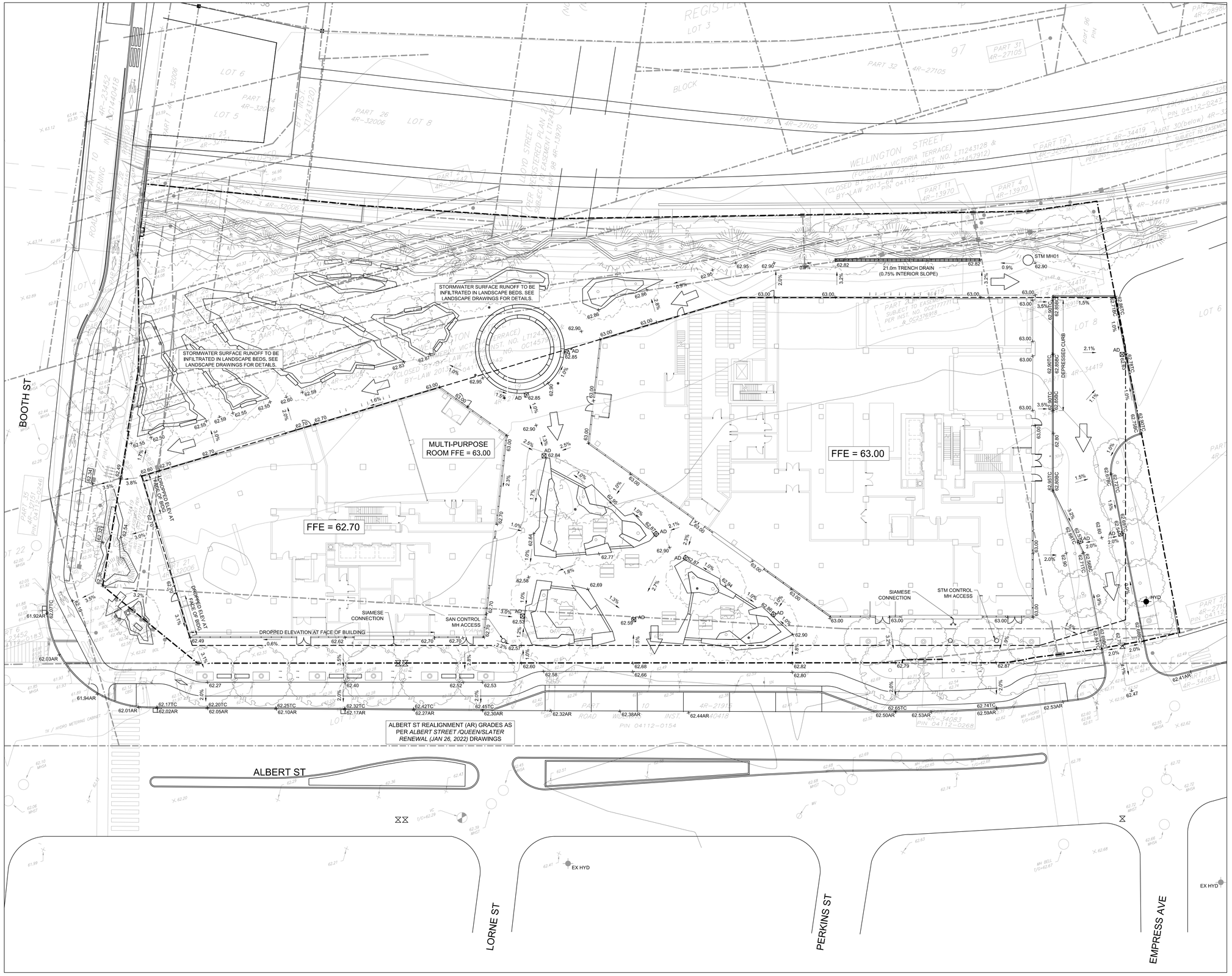
Table 5.10 : Summary of proposed sanitary flow allocations

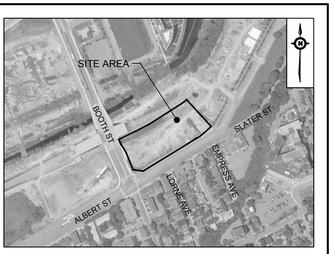
Outlet	Development	Total Sanitary Allocation (L/s)
LFPS	**Block 5**	**40.95**
	Block 7	**8.33**
	Victoria Island	20.0
	Future Cultural/ Institutional	**1.92**
	Canadian War Museum	3.18
	Claridge ph. I-III	8.73
	Claridge ph.IV-V	**16.88**
Albert St. Sewer	**Block 1**	**9.29**
	Block 2	**7.89**
	Ottawa Central Library	4.3
	Chaudière and Albert Isl.	53.6
CCC	**Block 3**	**20.85**
	Block 4	**2.34**
	Block 6	**40.26**
	LeBreton Place	**0.29**
	Park Area	**3.25**

Note: Values in bold denote proposed developments

Appendix E

DRAWINGS





KEY PLAN N.T.S.

ADDRESS:
665 ALBERT STREET
OTTAWA, ONTARIO

LEGEND — SEE ABBREVIATIONS BELOW

- PROPOSED ITEMS
- EXISTING ITEMS
- LIMIT OF PROPERTY LINE
- LIMIT OF UNDERGROUND STRUCTURE
- PROP ELEVATION TO MATCH EXISTING
- EMERGENCY OVERLAND FLOW ROUTE
- MH / CBMH / DCBMH / OGS
- CB / DCB / AD / TD
- HYDRANT / SIAMESE / VALVE BOX

BENCHMARK:	ELEVATIONS ARE GEODETIC, IN METRES, AND DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=65.230
BEARING:	BEARINGS ARE GRID, DERIVED FROM THE CAN-NET VR NETWORK OBSERVATIONS ON NCC HORZ CONTROL MONUMENTS 19773035 & 19680191, CENTRAL MERIDIAN, 76°30' W LONGITUDE MTM ZONE 9
SITE PLAN:	KPMG, PERKINS & WILL
SURVEY:	STANTEC GEOMATICS LDT., 220324

NO.	ISSUE	DATE	BY
1	ISSUED FOR OPA / ZBA / SPA	220414	C.B.

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ABBREVIATIONS

GENERAL:
PROP = PROPOSED
EX = EXISTING

ELEVATIONS:
TC = TOP OF CURB
BC = BOTTOM OF CURB
TW = TOP OF WALL
BW = BOTTOM OF WALL

SERVICING:
STM = STORM
SAN = SANITARY
WAT = WATER
PVC = POLYVINYL CHLORIDE
HDPE = HIGH DENSITY POLYETHYLENE
CONC = CONCRETE
MH = MAINTENANCE HOLE
CB = CATCH BASIN
DCB = DOUBLE CATCH BASIN
AD = AREA DRAIN
TD = TRENCH DRAIN

LICENSED PROFESSIONAL ENGINEER
C. I. BEAUDOIN
100187360
April 14/22
PROVINCE OF ONTARIO

TMIG
A TYLIN INTERNATIONAL COMPANY
8800 DUFFERIN STREET, SUITE 200
VAUGHAN, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

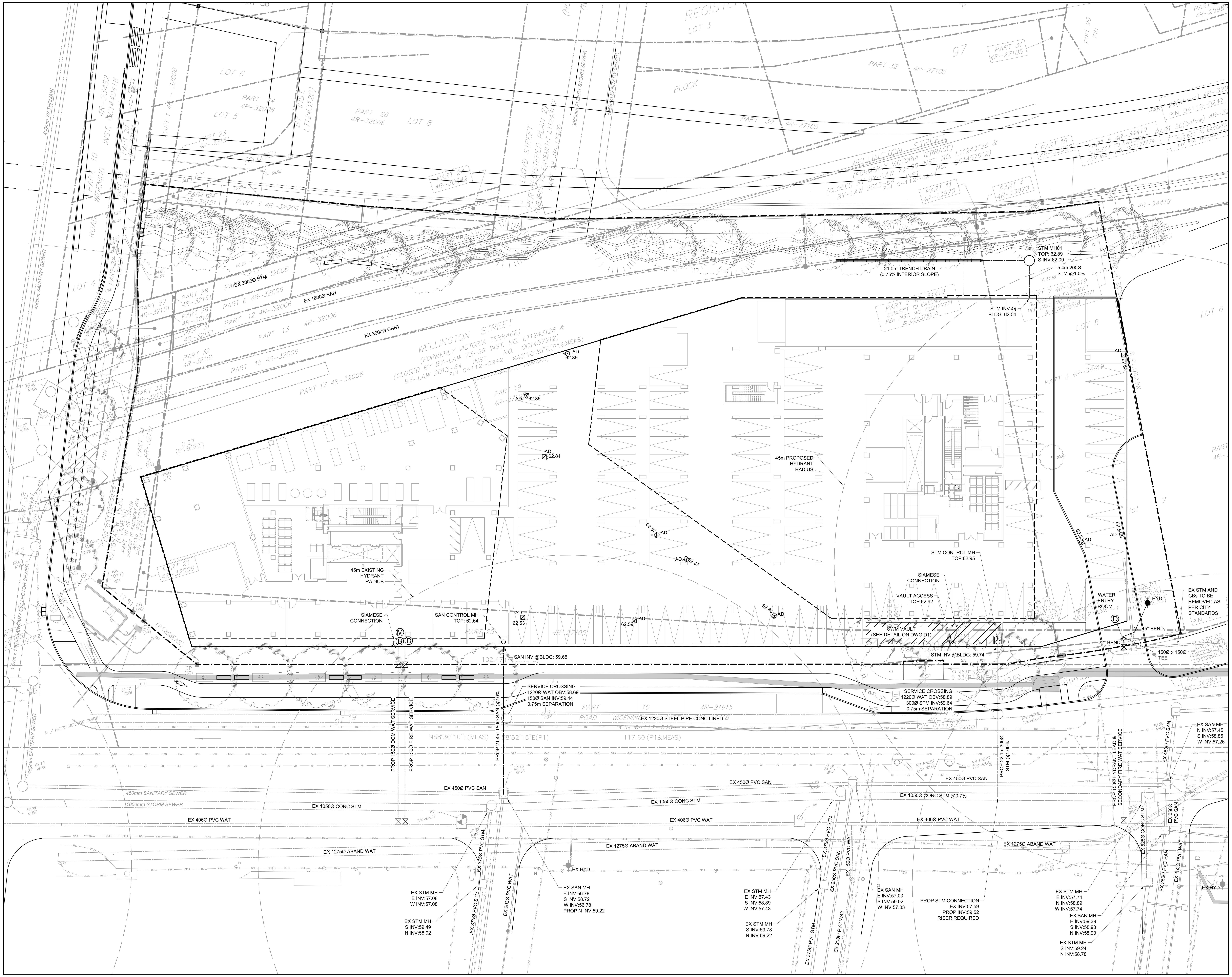
GRADING PLAN

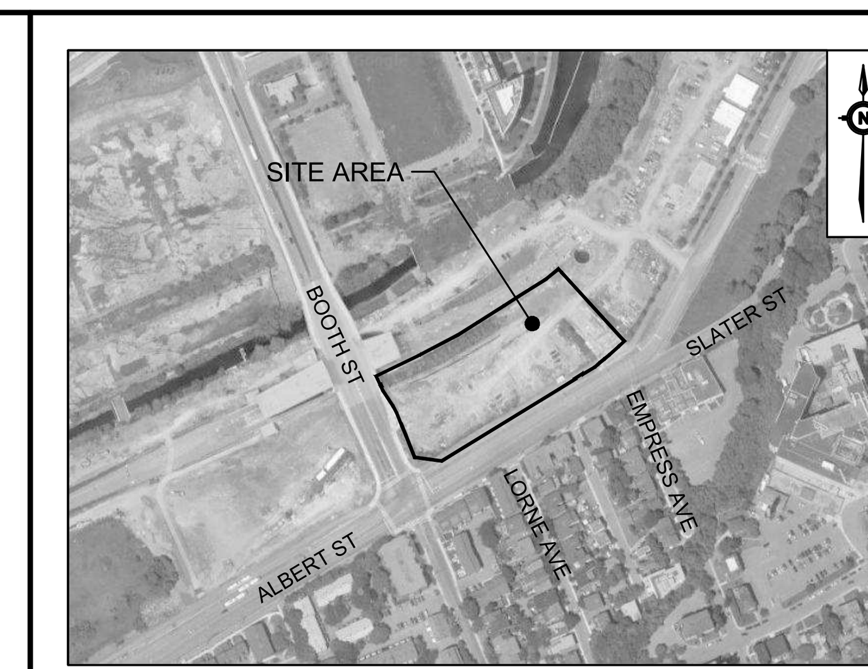
LEBRETON LIBRARY PARCEL

DREAM

SCALE:	1:250 (5m)	PROJECT #	10399
DATE:	APRIL 2022		
DRAWN BY:	C.B.	DRAWING #	G1
DESIGNED BY:	C.B.		
CHECKED BY:	B.D.		

File: G:\Projects\2022\10399 - Dream - LeBreton Library Parcel\CAD\3. Drawings\3. Design Drawings\10399 DESIGN.dwg Layout: G1 Date: Apr 14, 2022 - 2:07pm Edit By: cattlin.beaudoin





KEY PLAN
N.T.S.

ADDRESS:
665 ALBERT STREET
OTTAWA, ONTARIO

LEGEND

SEE ABBREVIATIONS BELOW

- 200.00 0.5% MH 1A — PROPOSED ITEMS
- 200.00 0.5% EX MH 1A — EXISTING ITEMS
- LIMIT OF PROPERTY LINE
- LIMIT OF UNDERGROUND STRUCTURE
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- MH
- CB / DCB / AD / TD
- HYDRANT / SIAMESE / VALVE BOX
- BACKFLOW PREVENTER / WATER METER
- VALVE BOX / DETECTOR ASSEMBLY
- GAS — EX UTILITY - GAS
- JB — EX UTILITY - JOINT BUILD
- BELL — EX UTILITY - BELL
- TRF — EX UTILITY - TRAFFIC
- EX UTILITY - HYDRO

BENCHMARK:	ELEVATIONS ARE GEODETIC, IN METRES, AND DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=95.230
BEARING:	BEARINGS ARE GRID, DERIVED FROM THE CAN-NET VR NETWORK OBSERVATIONS ON NCC HORZ CONTROL MONUMENTS 19773035 & 19680191, CENTRAL MERIDIAN, 76°30' W LONGITUDE MTM ZONE 9
SITE PLAN:	KPMG, PERKINS & WILL
SURVEY:	STANTEC GEOMATICS LDT., 220324

NO.	ISSUE	DATE	BY
1	ISSUED FOR OPA / ZBA / SPA	220414	C.B.

DRAWING NOTES

NOT FOR CONSTRUCTION

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4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, INVERTS AND DATA ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO TMIG 48 HOURS PRIOR TO ANY CONSTRUCTION.

ABBREVIATIONS

GENERAL:
PROP = PROPOSED
EX = EXISTING

ELEVATIONS:
TC = TOP OF CURB
BC = BOTTOM OF CURB

TW = TOP OF WALL
BW = BOTTOM OF WALL

SERVICING:
STM = STORM
SAN = SANITARY
WAT = WATER
PVC = POLYVINYL CHLORIDE

HDPE = HIGH DENSITY POLYETHYLENE
CONC = CONCRETE
MH = MAINTENANCE HOLE
CB = CATCH BASIN
DCB = DOUBLE CATCH BASIN
AD = AREA DRAIN
TD = TRENCH DRAIN

LICENSED PROFESSIONAL ENGINEER
C. I. BEAUDOIN
100187360
April 14/22
PROVINCE OF ONTARIO

TMIG
A T·Y·LIN INTERNATIONAL COMPANY

8800 DUFFERIN STREET,
SUITE 200
VAUGHAN, ON
L4K 0C5

p: 905.738.5700
f: 905.738.0065

SERVICING PLAN

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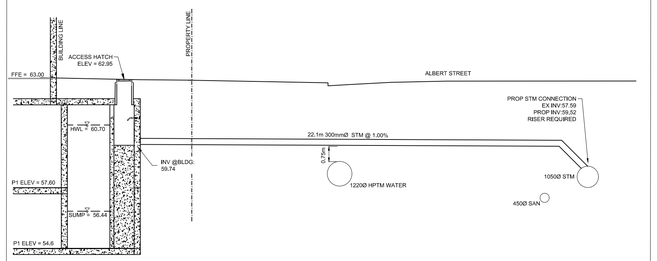
File: G:\Projects\2022\10399 - Dream - LeBreton Library Parcel\Civil\3. Design Drawings\10399 DESIGN.dwg, Layout: S1 Date: Apr 14, 2022 - 1:56pm, Edit By: caitlin.beaudoin

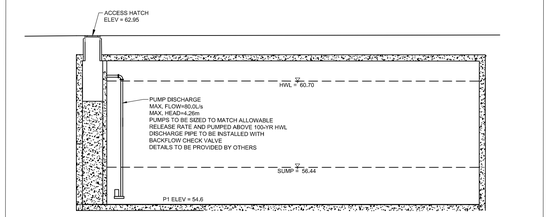
STORM SERVICE & N-S SWM VAULT CROSS-SECTION

SCALE 1:100



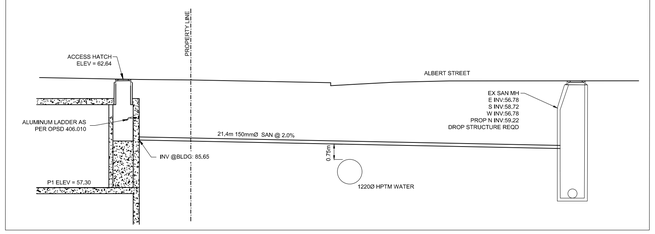
E-W SWM VAULT CROSS-SECTION

SCALE 1:100



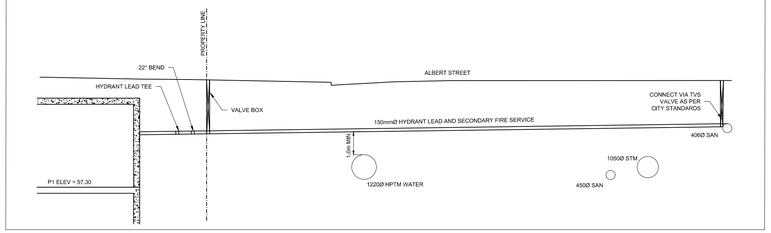
SANITARY SERVICE CROSS-SECTION

SCALE 1:100



EASTERN FIRE SERVICE CROSS-SECTION

SCALE 1:100



GENERAL NOTES:

1. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CURRENT "*OCCUPATIONAL HEALTH AND SAFETY ACT* AND *REGULATIONS FOR CONSTRUCTION PROJECTS*". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE *ACT*.
2. ALL TEMPORARY TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT ONTARIO TRAFFIC MANUAL BOOK 7: TEMPORARY CONDITIONS FIELD EDITION.
3. ALL THE CONSTRUCTION WORK FOR THIS PROJECT SHALL COMPLY WITH THE STANDARD DRAWINGS AND SPECIFICATIONS OF THE CITY , THE REGION AND THE ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
4. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH ALL OTHER CONTRACTORS AND PREVENT CONSTRUCTION CONFLICTS.
5. THE INFORMATION SHOWN FOR EXISTING UTILITIES WAS PROVIDED BY OTHERS. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. ALL EXISTING UTILITIES MUST BE LOCATED AND VERIFIED BY EACH UTILITY PRIOR TO COMMENCEMENT OF WORK. ANY VARIANCE IS TO BE IMMEDIATELY REPORTED TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO CONFIRM UTILITY LOCATIONS AND NOTIFY THE ENGINEER OF CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT THE CONTRACTORS EXPENSE.
5. PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL RIGHT OF WAY, THE CONTRACTOR OR DEVELOPER OR CONSULTANT WILL OBTAIN ALL NECESSARY ROAD OCCUPANCY PERMITS FROM THE CITY'S RIGHT-OF-WAY MANAGEMENT UNIT. ROAD OCCUPANCY/ACCESS PERMIT MUST BE OBTAINED 48 HOURS PRIOR TO COMMENCING ANY WORKS WITHIN THE MUNICIPAL ROAD ALLOW.
6. ALL WORK TO BE DESIGNED AND COMPLETED AS PER OPSS, OPSD, AND MTOD.
7. NO ALTERATIONS TO EXISTING BOUNDARY ELEVATIONS OR ADJACENT LANDS SHALL BE UNDERTAKEN UNLESS WRITTEN AGREEMENT WITH THE ADJACENT PROPERTY OWNER IS OBTAINED AND SUBMITTED IN A FORMAT ACCEPTABLE TO THE CITY.

SITE GRADING:

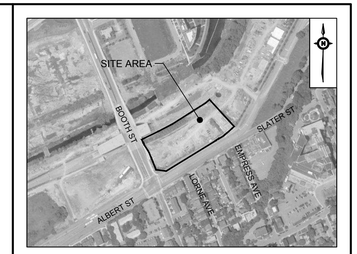
1. ALL DISTURBED GRASSED AREAS SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER WITH SOD ON MIN 100mm TOPSOIL. THE RELOCATION OF TREES AND SHRUBS SHALL BE SUBJECT TO APPROVAL BY THE PROJECT LANDSCAPE ARCHITECT OR ENGINEER.
2. ALL GRANULAR BASE AND SUB-BASE MATERIALS SHALL BE GRADED AND COMPACTED TO 98% STANDARD PROCTOR DENSITY, FREE OF DEPRESSIONS AS PER THE GEOTECHNICAL REPORT.
3. THE PAVEMENT STRUCTURE SHALL BE CONSTRUCTED BASED ON SPECIFICATIONS AS PER THE GEOTECHNICAL REPORT.
4. TRENCH BACKFILL WITHIN THE RIGHT OF WAY SHALL BE UNSHRINKABLE FILL AND SHALL EXTEND TO THE BASE OF ASPHALT. LANDSCAPED AREA MAY BE EXEMPTED.
5. ALL WORK SHALL BE SUBJECT TO THE CONDITIONS AND REQUIREMENTS OF CITY ROAD OCCUPANCY PERMIT.
6. INSPECTIONS: ALL WORK ON THE MUNICIPAL RIGHT OF WAY AND EASEMENTS TO BE INSPECTED BY THE MUNICIPALITY PRIOR TO BACKFILLING. ALL WORK RELATING TO WATERMAINS AND SEWERS TO BE INSPECTED BY THE MUNICIPALITY WHEN REQUIRED BY THE MUNICIPALITY.
7. EMBANKMENTS TO BE SLOPED AT MAX. 3:1, UNLESS OTHERWISE SPECIFIED.
8. ALL PAVEMENT MARKING, LINE PAINTING, DIRECTIONAL LINES/ARROWS ETC. SHALL BE PLACED IN ACCORDANCE WITH THE ARCHITECTURAL SITE PLAN OR THE OWNER'S TRAFFIC ENGINEERING CONSULTANT'S DRAWINGS. LINE PAINTING AND DIRECTIONAL SYMBOLS SHALL BE APPLIED WITH A MINIMUM OF TWO COATS OF ORGANIC SOLVENT BASED PAINT IN ACCORDANCE WITH OPSS 1712.
9. THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER 1 (ONE) SET OF AS CONSTRUCTED SITE SERVICING, GRADING, AND SITE ELECTRICAL DRAWINGS.

WATERMAINS:

1. WATERMAIN SHALL BE POLYVINYL CHLORIDE (PVC) CLASS 150 DR-18 PIPE MANUFACTURED TO AWWA C900-89 AND CSA CAN3 B137.3-M1986 WITH GASKETED BELL END C/W #14 AWG SOLID COPPER TRACER WIRE.
2. WATERMAINS SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 300mm OVER AND 500mm UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING. ALL WATERMAINS AND SERVICES SHALL HAVE 1.80m MINIMUM COVER.
3. BEDDING FOR WATERMAINS SHALL BE AS PER OPSD 802.030.
4. COVER REQUIRED ON WATERMAIN IS 1.8m MINIMUM.
5. ALL WATERMAIN HORIZONTAL AND VERTICAL BENDS, JOINTS AND PLUGS TO BE MECHANICALLY RESTRAINED. THRUST BLOCKS/MECHANICAL RESTRAINERS MUST BE INSTALLED ON ALL WATERMAIN BENDS, TEES, AND PLUGS AS PER LOCAL MUNICIPAL STANDARDS.
6. ALL WATERMAIN STUBS SHALL BE TERMINATED WITH A PLUG AND 50mm BLOW OFF UNLESS OTHERWISE NOTED.
7. HYDRANT AND VALVE TO BE AS PER OPSD 1105.010.
8. ALL HYDRANT FLANGE ELEVATIONS TO BE INSTALLED 0.15m ABOVE PROPOSED FINISHED GRADE AT HYDRANT.
9. BUILDING SERVICE VALVES TO BE 3.0m OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED AND MUST BE RESTRAINED A MINIMUM OF 12m BACK FROM STUB.
10. PROVISIONS FOR FLUSHING WATERMAINS MUST BE PROVIDED WITH A MINIMUM 50mm OUTLET FOR MAINS 100mm AND LARGER. FLUSHING POINTS MATCHING THE SIZE OF THE PIPE MUST BE PROVIDED AT THE END OF EACH COPPER MAIN. FIRE MAIN FLUSHING OUTLETS TO BE 100mm DIAMETER MINIMUM OR A HYDRANT. FLUSHING POINTS MUST BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN.
11. ALL WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH LOCAL MUNICIPAL AND PROVINCIAL GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED.
12. ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING MAINS IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATION.
13. BOTH THE FIRE AND DOMESTIC WATER SERVICES MUST COMPLY WITH THE CURRENT BUILDING CODE ACT, THE CURRENT WATER SUPPLY BY-LAW, CHAPTER 851 AND CSA B-64 SERIES STANDARDS.

SANITARY & STORM SEWER:

1. MANHOLES SHALL BE AS PER OPSD DIVISION 700 SERIES; FRAMES AND COVERS SHALL BE AS PER OPSD 401.010. SAFETY PLATFORMS TO BE INSTALLED WHERE DEPTH EXCEEDS 5.0m.
2. MAIN LINE PVC PIPE AS PER SDR-35 CSA B182.2-06 CERTIFIED ASTM D3034-04A, F679-03. SERVICE CONNECTION PVC PIPE TO BE AS PER SDR-28 CSA B 182.2-06 CERTIFIED ASTM D3034-04A.
3. SINGLE CATCHBASINS SHALL BE AS PER OPSD 705.010, WITH FRAMES AND COVERS AS PER OPSD 400.020. DOUBLE CATCHBASINS SHALL BE AS PER OPSD 705.020.
4. CONCRETE PIPE SEWER BEDDING SHALL BE CLASS 'B' AS PER OPSD 802.030. PVC PIPE SEWER BEDDING SHALL BE CLASS 'B' AS PER OPSD 802.030 TO TOP OF SEWER WITH A MINIMUM 300mm SAND COVER OVER PIPE NATIVE BACKFILL TO BE COMPACTED TO A MIN. 98% STANDARD PROCTOR DENSITY.
5. ALL STORM SEWER PIPES UP TO 450mm DIA. SHALL BE PVC SDR-35 OR APPROVED EQUIVALENT. ALL STORM SEWER PIPES 525mm DIA. AND LARGER SHALL BE CONCRETE AND EQUAL TO C.S.A. SPECIFICATIONS A257.2 REINFORCED CLASSES AS SPECIFIED (65-D, 100-D, 140-D,) OR LATEST AMENDMENT UNLESS OTHERWISE SPECIFIED.
6. ALL SANITARY PVC SEWER PIPES SHALL BE SDR-35 EQUAL CSA SPECIFICATIONS B182.2-M1990 OR LATEST AMENDMENT UNLESS OTHERWISE NOTED.
7. SANITARY SERVICE CONNECTIONS SHALL BE SINGLE, 150mmØ MINIMUM, PVC CLASS DR 28 INSTALLED AT 2 % AND ANY COLOUR EXCEPT WHITE, FOR SINGLE RESIDENTIAL DWELLINGS.
8. SANITARY MAINTENANCE HOLE SHALL HAVE WATERTIGHT FRAME AND COVER IN PONDING AREAS AS PER OPSD 401.030
9. NON-REINFORCED CONCRETE PIPE 150mm TO 250mm SHALL BE AS PER CSA A257.1-03 CLASS 3. HEIGHT OF FILL TO BE VERIFIED USING OPSD TABLES 807.040. BEDDING FOR RIGID PIPE SHALL BE CLASS B AS PER OPSD 802.030, 802.031, 802.032 OR 802.033
10. BEDDING FOR RIGID PIPE SHALL BE CLASS B AS PER OPSD 802.030, 802.031, 802.032 OR 802.033
11. ALL MANHOLE AND CATCH BASIN EXCAVATIONS TO BE BACKFILLED WITH GRANULAR MATERIAL COMPACTED TO 98% STANDARD PROCTOR DENSITY.
12. ALL BLIND CONNECTIONS TO MATCH THE INVERT OF THE CATCH BASIN LEAD TO THE SPRINGLINE OF THE STORM PIPE. OTHERWISE INSTALL THE CATCH BASIN LEAD AT A MAXIMUM 2.00% AND DROP INTO PIPE.
13. UNLESS OTHERWISE NOTED, CATCHBASIN LEADS SHALL BE 250mmØ AT MINIMUM 1.00% SLOPE.
14. THE CONTRACTOR IS TO PROVIDE CCTV CAMERA INSPECTIONS OF ALL SANITARY AND STORM SEWERS, INCLUDING PICTORIAL REPORT, TWO (2) CD COPIES AND ONE (1) VIDEO TAPE IN A FORMAT SATISFACTORY TO THE ENGINEER. ALL SEWERS ARE TO BE FLUSHED PRIOR TO CAMERA INSPECTION.
15. THE CONTRACTOR SHALL CONTACT THE MUNICIPALITY AT LEAST 48 HOURS PRIOR TO CONNECTING TO THE EXISTING SANITARY& STORM MANHOLE.
16. SERVICE CONNECTIONS AND UTILITY CUTS TO BE BACKFILLED WITH UNSHRINKABLE FILL.



KEY PLAN N.T.S.

ADDRESS:
665 ALBERT STREET
OTTAWA, ONTARIO

LEGEND — SEE ABBREVIATIONS BELOW

BENCHMARK:	ELEVATIONS ARE GEODETIC, IN METRES, AND DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=95.230
BEARING:	BEARINGS ARE GRID, DERIVED FROM THE CAN-NET VR NETWORK OBSERVATIONS ON NCC HORZ CONTROL MONUMENTS 19773035 & 19680191, CENTRAL MERIDIAN, 76°30' W LONGITUDE MTM ZONE 9
SITE PLAN:	KPMG, PERKINS & WILL
SURVEY:	STANTEC GEOMATICS LDT., 220324

NO.	ISSUE	DATE	BY
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ABBREVIATIONS

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PROP = PROPOSED
EX = EXISTING

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WAT = WATER
PVC = POLYVINYL CHLORIDE
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MH = MAINTENANCE HOLE
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LICENSED PROFESSIONAL ENGINEER
C. I. BEAUDOIN
100187360
April 14/22
PROVINCE OF ONTARIO

TMIG
A TYLIN INTERNATIONAL COMPANY
8800 DUFFERIN STREET, SUITE 200
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DETAILS

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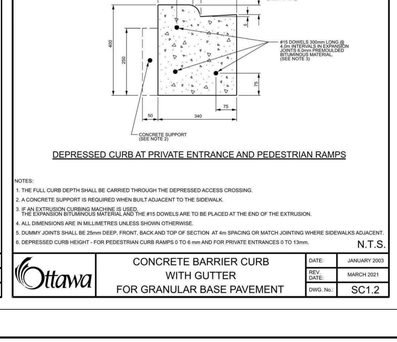
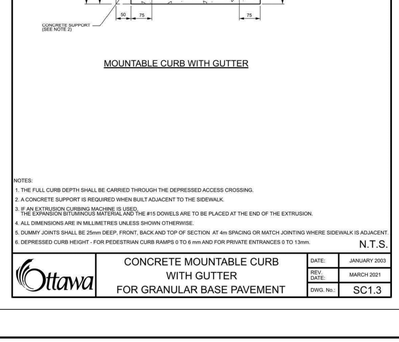


DRIVEWAY DIMENSIONS							
	WIDTH m				RADIUS m	
LAND USE	One-Way		Two-Way			
	min	max	min	max	min	max
Light Industrial, Commercial, and Apartment	4.5	7.5	7.2	12.0	4.5	12.0
Heavy Industrial	5.0	9.0	9.0	15.0	9.0	15.0

NOTES:
All dimensions are in millimetres unless otherwise shown.

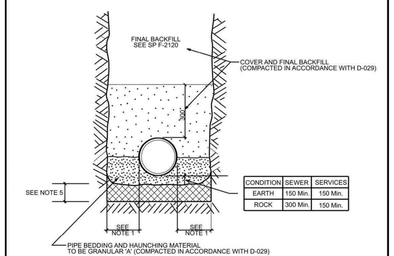
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 2
URBAN INDUSTRIAL, COMMERCIAL, AND APARTMENT ENTRANCES		OPSD 350.010



SIZE OF DROP PIPE		
SEWER ID	DROP PIPE ID	APPLICATION
200	200	Storm and Sanitary
250	200	Storm and Sanitary
300	250	Storm and Sanitary
375	300	Storm and Sanitary
450	375	Storm
525	450	Storm
600	525	Storm
675	600	Storm

NOTES:
1. Concrete shall be placed to undisturbed ground and the outside face of the maintenance hole, but there shall be a minimum of 150mm of 15MPa concrete around the drop pipe.
2. Concrete shall be secured to the maintenance hole with 450mm long, 13mm diameter threaded rods and drilled expansion anchors down either side of the drop pipe at 300mm centres.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 3
CAST-IN-PLACE MAINTENANCE HOLE DROP STRUCTURE TEE		OPSD 1003.010



CONDITION	SEWER	SERVICES
EARTH	150 Min.	150 Min.
ROCK	300 Min.	150 Min.

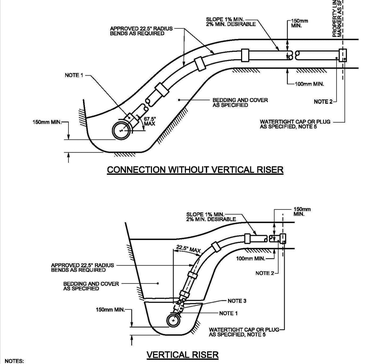
NOTES:
1.

PIPE INSIDE DIAMETER (mm)	CLEARANCE (mm)	
900 OR LESS	CONC	450
	PVC	450
OVER 900	500	

2. FINAL BACKFILL - APPROVED NATIVE MATERIAL OR SELECT SUBGRADE IN ACCORDANCE WITH F-2120.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
4. INITIAL BACKFILL MATERIAL
- CONCRETE PIPE - GRANULAR 'A', GRANULAR 'B', OR SELECT SUBGRADE MATERIAL WITH 100% PASSING THE 37.5 mm SIEVE
- PVC PIPE - GRANULAR 'A'
5. WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, POOR SOILS SHALL BE EXCAVATED TO CREATE A FOUNDATION THAT SHALL BE FILLED TO THE BOTTOM OF THE BEDDING WITH GRANULAR 'B'.

N.T.S.

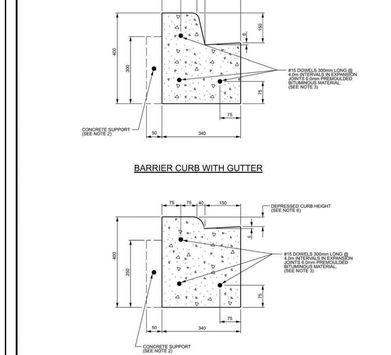
SINGLE TRENCH (SEWER & SEWER SERVICES)	DATE:	MAY 2001
	REV. DATE:	MARCH 2021
	DWG. No.:	S6



NOTES:
1. ALL DIAMETERS OF SERVICE CONNECTIONS THAT HAVE NOMINAL DIAMETERS NO GREATER THAN 50% OF THE NOMINAL DIAMETER OF THE SEWER BEING PIPE SHALL BE MADE USING A BELL END INSERT AS PER 811.2 OR AN APPROVED RUBBER GASKETED INSERT, INSTALLED ABOVE THE SPRING LINE.
2. SANITARY SERVICES TO BE 150mm AND STORM SERVICES TO BE 100mm FOR NEW RESIDENCES UNLESS SPECIFIED OTHERWISE. SERVICE PIPE AND RADIUS BENDS TO BE APPROVED CSA B182.2, SDR35 PRODUCTS UNLESS SPECIFIED OTHERWISE.
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 6m DEEP. WHERE APPROVED, CONNECTIONS TO SEWERS OVER 6m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS.
4. VERTICAL RISER SHALL BE SAME AS SERVICE PIPE UNLESS OTHERWISE SPECIFIED.
5. CAP OR PLUG AT THE PROPERTY LINE SHALL BE ADEQUATELY BRACED TO WITHSTAND TESTING PRESSURE.
6. FOR NEW CONSTRUCTION, INSERTS MUST BE INSTALLED ON THE MAIN PIPE BEFORE THAT PIPE IS LAID. FOR SERVICES/BRANCHES 375mm DIA. OR LESS, APPROVED "CORED TEES" MAY BE USED.
7. APPROVED CUT-IN TOOL MUST BE USED FOR FIELD MADE CONNECTIONS.
8. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

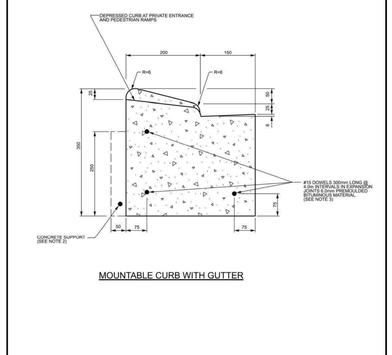
SEWER SERVICE CONNECTIONS FOR RIGID MAIN SEWER PIPE (MODIFIED OPSD-1006.010)	DATE:	MARCH 2008
	REV. DATE:	MARCH 2014
	DWG. No.:	S11



NOTES:
1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE EXPANSION BITUMINOUS MATERIAL AND THE #15 DOWELS ARE TO BE PLACED AT THE END OF THE EXTRUSION.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. DUMMY JOINTS SHALL BE 25mm DEEP, FRONT, BACK AND TOP OF SECTION AT 4m SPACING OR MATCH JOINTING WHERE SIDEWALKS ADJACENT.
6. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm.

N.T.S.

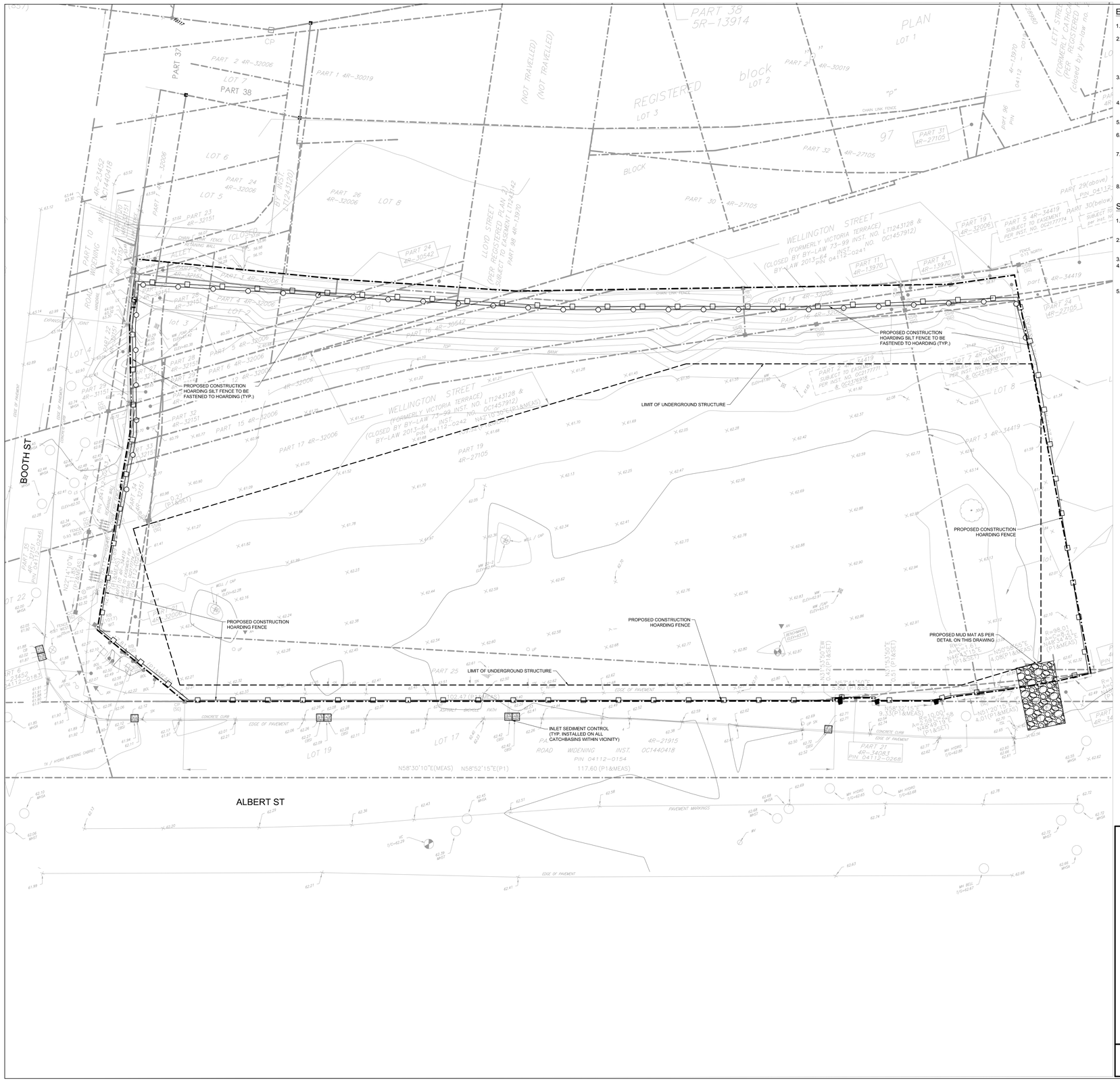
CONCRETE BARRIER CURB WITH GUTTER FOR GRANULAR BASE PAVEMENT	DATE:	JANUARY 2003
	REV. DATE:	MARCH 2021
	DWG. No.:	SC1.2



NOTES:
1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE EXPANSION BITUMINOUS MATERIAL AND THE #15 DOWELS ARE TO BE PLACED AT THE END OF THE EXTRUSION.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. DUMMY JOINTS SHALL BE 25mm DEEP, FRONT, BACK AND TOP OF SECTION AT 4m SPACING OR MATCH JOINTING WHERE SIDEWALK IS ADJACENT.
6. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm.

N.T.S.

CONCRETE MOUNTABLE CURB WITH GUTTER FOR GRANULAR BASE PAVEMENT	DATE:	JANUARY 2003
	REV. DATE:	MARCH 2021
	DWG. No.:	SC1.3

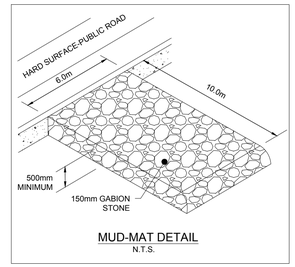


EROSION &SEDIMENT CONTROL NOTES:

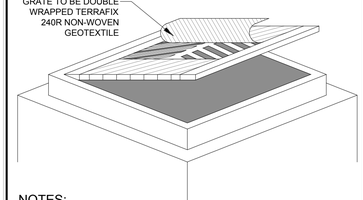
1. ALL SEDIMENT CONTROL AND EROSION PROTECTION DEVICES ARE TO BE IN PLACE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
2. ALL NEW AND EXISTING CATCHBASINS AND CATCHBASIN MANHOLES ON-SITE OR IN ADJACENT STREETS SHALL HAVE THE UNDERSIDE OF THE GRATE COVERED WITH TERRAFIX 240R NON-WOVEN GEOTEXTILE DURING CONSTRUCTION. CONTRACTOR SHALL REGULARLY CLEAN SEDIMENT AND DEBRIS FROM THESE GEOTEXTILE PIECES. CONTRACTOR SHALL DISPOSE WITH THESE PIECES AT THE END OF CONSTRUCTION OR AS DIRECTED BY THE ENGINEER.
3. CONTRACTOR SHALL MAINTAIN ADJACENT STREETS AND PROPERTIES FREE OF DUST, MUD, AND OTHER REFUSE THROUGHOUT DURATION OF CONSTRUCTION. ANY CLEANING OF ADJACENT AREAS DURING CONSTRUCTION SHALL BE PAID BY THE CONTRACTOR.
4. ALL SEDIMENT AND EROSION CONTROL WORKS WILL BE INSPECTED AFTER EACH RAINFALL, AND REPAIRED / MAINTAINED TO THE SATISFACTION OF THE CITY ENGINEERS.
5. SEDIMENT CONTROL FENCES SHALL BE INSTALLED AND MAINTAINED AS REQUIRED TO PREVENT SEDIMENT FROM FLOWING ONTO THE ADJACENT LANDS.
6. HOARDING OR SNOW FENCING SHALL BE ERECTED AND MAINTAINED PRIOR TO ANY GRADING OR CONSTRUCTION AND SHALL REMAIN IN PLACE AND IN GOOD REPAIR THROUGHOUT THE CONSTRUCTION AND GRADING PHASE.
7. FILTER FABRIC SHALL BE PLACED UNDER ALL STREET CATCHBASINS GRATES. SILT TRAPS ARE TO BE CLEANED REGULARLY AND ARE NOT TO BE REMOVED UNTIL CURBS ARE CONSTRUCTED AND BOULEVARDS AND BACKYARDS ARE GRADED AND SODDED. FILTER FABRIC USED FOR SEDIMENT CONTROL SHALL BE TERRA FIX 240R AN APPROVED EQUIVALENT.
8. MUD TRACKING AND DUST MUST BE CONTROLLED ON ALL ROADWAYS TO THE SATISFACTION OF THE CITY.

SEDIMENT CONTROL INSTRUCTIONS:

1. THE CONTRACTOR SHALL MAINTAIN A SUPPLY OF SEDIMENT FENCE, CLEAR STONE AND FILTER FABRIC ON SITE FOR EMERGENCY USE. SEDIMENT FENCE WILL BE INSTALLED BEFORE THE COMMENCEMENT OF ANY CONSTRUCTION WORKS.
2. SITE INSPECTOR SHALL VERIFY THAT THE SEDIMENTATION CONTROLS ARE INTACT ON WEEKLY BASIS AND AFTER ALL RAINFALL EVENTS. DEFICIENCIES SHALL BE REPORTED TO THE CONTRACTOR AND REPAIRED IMMEDIATELY.
3. MONTHLY INSPECTION REPORTS SHALL BE PREPARED BY THE INSPECTOR.
4. UPON IMPLEMENTATION OF EROSION SEDIMENT CONTROL THE CONTRACTOR IS TO CONFIRM WITH THE INSPECTOR THAT THE CONTROLS ARE OPERATING TO THEIR SATISFACTION. ADDITIONAL MEASURES MAY BE REQUIRED AT THE RECOMMENDATIONS OF THE ENGINEER AND/OR INSPECTOR.
5. POSITIVE DRAINAGE TO THE SEDIMENT BASINS SHALL BE MAINTAINED DURING CONSTRUCTION.



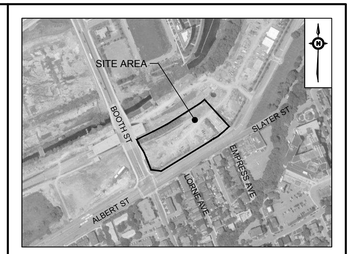
MUD-MAT DETAIL
N.T.S.



NOTES:

- WOVEN GEOTEXTILE TO HAVE A MINIMUM EQUIVALENT OPENING SIZE OF 0.15mm AND A MAXIMUM EQUIVALENT OPENING SIZE OF 0.25mm.
- WOVEN GEOTEXTILE TO BE MAINTAINED AND REINSTATED PERIODICALLY WHEN ACCUMULATED SEDIMENTS INTERFERES WITH DRAINAGE.
- CLEAR STONE TO BE PLACE ON TOP OF WRAPPED CATCHBASIN TO PROTECT GEOTEXTILE FROM LARGE OBJECTS.

INLET SEDIMENT CONTROL
N.T.S.



KEY PLAN
N.T.S.

ADDRESS:
665 ALBERT STREET
OTTAWA, ONTARIO

LEGEND

SEE ABBREVIATIONS BELOW

200.00 0.5% MH 1A — PROP ITEMS

200.00 0.5% EX MH 1A — EX ITEMS

LIMIT OF PROPERTY LINE

LIMIT OF ROOF STRUCTURE

SILT FENCE

CONSTRUCTION HOARDING

CONSTRUCTION ENTRANCE/ MUDMAT

INLET SEDIMENT CONTROL DEVICE

BENCHMARK:	ELEVATIONS ARE GEODETIC, IN METRES, AND DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA ELEVATION=95.230
BEARING:	BEARINGS ARE GRID, DERIVED FROM THE CAN-NET VR NETWORK OBSERVATIONS ON NCC HORZ CONTROL MONUMENTS 19773035 & 19680191, CENTRAL MERIDIAN, 76°30' W LONGITUDE MTM ZONE 9
SITE PLAN:	KPMG, PERKINS & WILL
SURVEY:	STANTEC GEOMATICS LDT., 220324

NO.	ISSUE	DATE	BY
1	ISSUED FOR OPA / ZBA / SPA	220414	C.B.

DRAWING NOTES — NOT FOR CONSTRUCTION

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3. THIS DRAWING IS NOT TO BE ISSUED FOR CONSTRUCTION UNTIL ALL REQUIRED PERMITS HAVE BEEN ISSUED.
4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, INVERTS AND DATA ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO TMIG 48 HOURS PRIOR TO ANY CONSTRUCTION.

ABBREVIATIONS

GENERAL:
PROP = PROPOSED
EX = EXISTING

ELEVATIONS:
TC = TOP OF CURB
BC = BOTTOM OF CURB
TW = TOP OF WALL
BW = BOTTOM OF WALL

SERVICING:
STM = STORM
SAN = SANITARY
WAT = WATER
PVC = POLYVINYL CHLORIDE
HDPE = HIGH DENSITY POLYETHYLENE
CONC = CONCRETE
MH = MAINTENANCE HOLE
CB = CATCH BASIN
DCB = DOUBLE CATCH BASIN
AD = AREA DRAIN
TD = TRENCH DRAIN

LICENSED PROFESSIONAL ENGINEER
C. I. BEAUDOIN
100187360
April 14/22
PROVINCE OF ONTARIO

TMIG
A TYLIN INTERNATIONAL COMPANY
8800 DUFFERIN STREET, SUITE 200
VAUGHAN, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

EROSION & SEDIMENT CONTROL AND PRELIMINARY CONSTRUCTION MANAGEMENT PLAN

LEBRETON LIBRARY PARCEL

DREAM

SCALE:	
DATE:	APRIL 2022
DRAWN BY:	C.B.
DESIGNED BY:	C.B.
CHECKED BY:	B.D.
PROJECT #	10399
DRAWING #	E1

File : G:\Projects\2022\10399 - Dream - LeBreton Library Parcel\Civil\3. Drawings\3. Design Drawings\10399 ECS.dwg Layout : E1 Date : Apr 14, 2022 - 2:06pm, Edit By : caillin.beaudoin