Site Servicing & Storm Water Management Report

LTC Facility (Block 4)
850 Champlain Street Subdivision

Ainley Group
Project No. 17004-1

Prepared for:
Revera Inc.

June 30th, 2020

Ainley
CONSULTING
ENGINEERS
PLANNERS

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1.0 INTRODUCTION

The subject site (Block 4) is located within the 850 Champlain Street Subdivision located at the intersection of Jeanne D'Arc Boulevard and Champlain Street in the City of Ottawa. See Appendix A – Figure 1: Site Location Key Plan.

The subject site is currently an undeveloped grass field, with a total area of 1.05 ha. The proposed development will include a 5 Storey Long Term Care facility.

Water service will be a 150mm PVC service connected into the existing 150mm watermain cap 2.0 meter inside the property line on Famille-Côté Avenue. A 250mm sanitary service will be connected to the existing sanitary manhole 109 on the property line at Famille-Côté Avenue. The storm service will be a 375mm service connected to the existing storm manhole 211 located 2.0 meter inside property line on John Holden Way. Storm water will be treated by a Stormceptor type Oil-Grit interceptor.

This report will address the sanitary, storm, and water servicing requirements for the proposed Long Term Care facility while adhering to the limitations set forward in the Ainley report titled "Site Servicing & Storm Water Management Report" for the 850 Champlain Street Subdivision, dated July 7, 2017.

2.0 MUNICIPAL DRINKING & FIRE PROTECTION WATER SERVICES

As mentioned above, a 150mm diameter water service is proposed to service the long term care facility in Block 4. The proposed layout can be seen on drawing 003-17004 – S1 in Appendix E.

Using the City of Ottawa guideline, this report considers that there will be 320 beds in the long term care facility at 450 L/c/d. Thus, the anticipated average daily demand for Block 4 has been calculated at **1.67 L/s**. Anticipated max daily consumption rates are based on 1.5 (MOE Section 3.4.3 – Commercial and Institutional Water Demands), and will be **2.51 L/s**.

320 beds X 450 L/bed/d = 144,000 L/day = 1.67 L/s

1.67 L/s X 1.5 (peaking factor) = 2.51 L/s

The anticipated fire flow (based on the Fire Underwriters Survey) was calculated to be 12,000 L/min or

200 L/s. A detailed calculation can be seen in Appendix B.

A complete boundary condition analysis has been provided by the City of Ottawa as part of the original subdivision servicing report, which included Block 4. The results are as follows:

Connection 1 - Jeanne D'arc

Demand Scenario	T. Head (m)	Pressure[1] (psi)
Maximum HGL	113.4	80.0
Peak Hour	107.4	71.6
Max Day plus Fire	102.7	64.8

[1] Ground Elevation = 57.1m

Connection 2 - Champlain St at John Holden Way

Demand Scenario	T. Head (m)	Pressure[1] (psi)
Maximum HGL	113.4	75.5
Peak Hour	107.4	67.0
Max Day plus Fire	102.3	59.7

[1] Ground Elevation = 60.3m

Connection 3 - Champlain St at Easement

Demand Scenario	T. Head (m)	Pressure[1] (psi)
Maximum HGL	113.4	72.8
Peak Hour	107.5	64.3
Max Day plus Fire	102.1	56.7

[1] Ground Elevation = 62.2m

Connection 4 - Park and Ride

Demand Scenario	T. Head (m)	Pressure[1] (psi)
Maximum HGL	113.4	70.5
Peak Hour	107.5	62.2
Max Day plus Fire	101.9	54.1

[1] Ground Elevation = 63.8m

Ainley has reviewed the results of the City of Ottawa Network Analysis and find that they meet the requirements set out by the ODG for water distribution, as seen below:

- Normal operating pressure ranges between 50 psi and 80 psi under a condition of maximum daily flow.
- Under maximum hourly demand conditions, the pressures are not less than 40 psi.
- During periods of maximum day and fire flow demand, the residual pressure at any point in the distribution system shall not be less than 20 psi.
- The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way shall not exceed 80 psi.
- The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 100 psi.

3.0 SANITARY SEWER SERVICES

The proposed sanitary service to Block 4 will be a 250mm diameter service draining to the existing sanitary manhole 109 located on the property line at Famille-Côté Avenue. The proposed layout can be seen on drawing 003-17004-S1 in Appendix E. Based on the proposed 320 beds at the long term care facility (at 450 L/bed/d) the anticipated peak sanitary flow is **2.80 L/s**.

320 beds X 450 L/bed/d = 144,000 L/day = 1.67 L/s

1.67 L/s X 1.5 + (1.05 ha X 0.28 L/s/gross ha) = 2.80 L/s

A peaking factor of 1.5 was used for this area, and the standard 0.28 L/s/gross ha was used for infiltration allowance.

4.0 DRAINAGE & STORM SEWER SYSTEM

Based on the 2014 Delcan Dual Drainage Assessment, storm water outflow is limited to 350 L/s for the entire Subdivision. This is accomplished by limiting storm water outflow from each of the blocks. Thus, the total 100 year release rate for Block 4 shall be less or equal to **40.0 L/s**.

As required by the City of Ottawa, our Controlled release rate must equal this 100 year Pre-Development flow. This has been achieved by providing roof top detention and by installing inlet control devices (vertical hydrovex valves) in the storm sewer structures (i.e. in CB, CBMH and in

STMMH) in order to provide the appropriate ponding volumes within the on-site parking lot, (Refer to the Storm Water Management Plan "Dwg. 006-17004 – SWM1" in Appendix 'E').

Roof top detention including maximum release rate has been determined for the building and shall be implemented by the Mechanical Engineer as follows:

Building Roof Controlled Release Rate = 12.0 L/s (Average Ponding Depth = 0.043m)

Ponding volumes have been designed to provide storage for rainfall events up to and including the 100-year event. The maximum ponding depths of 250mm for the 100-year event and 150mm for the 5-year event have been used to provide the necessary storage volumes within the on-site parking lot.

Storage volume requirements were determined by applying the 5-year and 100-year rainfall intensity values at 10-minute intervals until a peak storage volume was attained, (Refer to Storage tables 3 through 14 in Appendix 'C'). The approximate volumes provided within the parking lot were determined by applying the pyramid volume equation of one-third of the depth multiplied by the surface area of the pond.

Table 1 "Stormwater Management Summary Sheet" in appendix 'C' summarizes the drainage areas, composite 'C' values, controlled release rates, ponding depths and the required Hydrovex models. The resulting 100-year release rate from the site is 40.0 L/s, which is equal to the allowable release rate of 40.0 L/s.

The on-site storm sewers however, have been design for the 1:5 year design regardless of the controlled release rates, (Refer to Table 2 – Storm Sewer Design Sheet in Appendix 'C').

An overland flow route to Famille-Côté Avenue and John Holden Way has been provided for less frequent events (greater than the 100-year event).

With respect to quality control of storm water outflow; a stormceptor has been sized to treat the entire block achieving 80% TSS removal. The sizing report can be seen in Appendix D.

The results of the stormwater analysis can be seen in Appendix C, and in Appendix E Drawing 006-17004-SWM1.

5.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures shall be implemented during construction to minimize the migration of sediments from the proposed construction. To accomplish this task, items such as silt fences, and geo-textile membranes shall be installed to capture sediment before it leaves the construction areas. In addition, all stockpiles shall be covered and located away from waterways and exposed areas and shall be vegetated as soon as possible. During construction, all erosion control features shall be maintained and repaired as necessary and adjacent roadways kept free of debris and sediment as required. A mud mat may be required on construction entrances to the site, depending on frequency of heavy vehicle travel and condition of the site.
(Refer to the Erosion and Sediment Control Plan "Dwg. 005-17004 – SC1" in Appendix 'E').

6.0 CONCLUSION

1. The max daily and fire flow water demands for the site were calculated to be 2.51 L/s and 200 L/s respectfully. A building fire sprinkler system is anticipated in this development.

2. The peak wastewater flow for the site was calculated to be 2.80 L/s including the infiltration allowance.

3. The stormwater management measures proposed will result in a 100 year post-development release rate of 40.0 L/s, which is equal to the allowable release rate of 40.0 L/s. An overland flow route to Famille-Côté Avenue and John Holden Way has been provided to prevent any negative impact to proposed or existing structures including adjacent lands during rainfall events up to and beyond the 100 year event.

We trust that this Site Servicing & Stormwater Management report meets all of your requirements. Should you have any questions or require further clarification, please do not hesitate to contact our office.

Sincerely,

Prepared by:

Ainley Graham and Associates Ltd.

Professional Engineers
Ontario
June 30, 2020
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Category: CIVIL: see limitation
Limitations:
This licence is subject to the limitations as detailed on the certificate.
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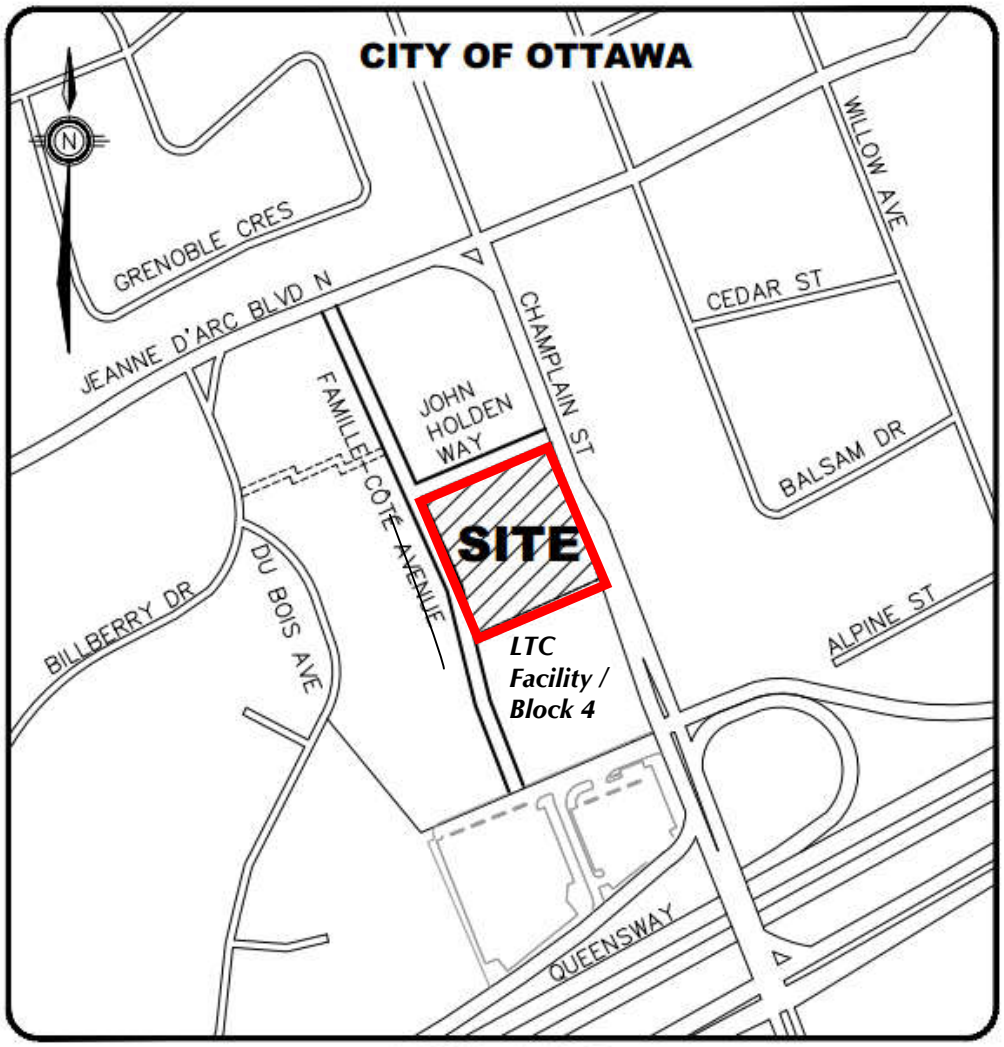
APPENDIX A



KEY MAP
SCALE: N.T.S.

APPENDIX B

FUS Calculations

5 Storey Long Term Care Facility

$F = 220 \times C \times \sqrt{A}$

Where C = 0.6 for fire-resistive construction

A = 3,330 m^2 per floor

Fire-resistive building; therefore, considered two adjoining floors plus 50 percent of the remaining three floors. (Note: could be further reduced if vertical openings and exterior vertical communications are properly protected – one hour rating).

A = 11,655 m^2

$F = 220 \times 0.6 \times \sqrt{11{,}655}$

$F = 14{,}250\ L/min$

$F \sim 14{,}000\ L/min$

FUS Reductions / Increases:

Occupancy

It is noted that 'Nursing, Convalescent and Care Homes' are examples of Low Hazard Occupancies.

Therefore, a "*limited combustibility"* reduction of 15% (2,100 L/min) will be applied.

$F = 11{,}900\ L/min$

Modifier for Sprinkler System

A conservative modifier of 25% will be applied under the assumption that the sprinkler system will conform to the current standards required by the NFPA. It is possible to increase this credit by either providing a standard water supply for both the system and fire department hose lines, and/or providing a fully supervised system.

$M_1 = 2{,}975\ L/min$

Modifier for Exposure

According to preliminary site plans, the proposed building will have the following clearances to proposed existing structures (none are constructed at this time):

East:	38 m	*5% increase*
West:	15 m	*15% increase*
North:	45 m	*5% increase*
South:	47 m	*0% increase*
Total Increase:		*25%*

$M_2 = 2{,}975\ L/min$

The final fire flow, according to the FUS, will be the fire flow as a result of the Occupancy reduction (11,900 L/s), minus the value M_1, and plus the value M_2.

$F = 11{,}900\ L/\min - 2{,}975\ L/\min + 2{,}975\ L/min$

$F = 11{,}900\ L/min$

$F \sim 12{,}000\ L/min$

$F \sim 200\ L/s$

Conclusion:

The conservative FUS fire flow requirement for this building (based on our assumptions noted above) is **200 L/s.**

It should be noted that this value could be further reduced if:

- vertical openings and exterior vertical communications are properly protected – one hour rating;
- non-combustible reduction of 25% is applied instead of 15% (i.e. limited combustibility) for the fire hazard contents / occupancy;
- a fully supervised sprinkler system is provided; and,
- in determining the floor area, fire walls that meet or exceed the requirements (i.e. fire resistance rating of 2 or more hours) may be deemed to subdivide the building into more than one area.

APPENDIX C

AINLEY Project: 17004 - 1
Location: Block 4, LTCF, 850 Champlain Street
Client:

Table 1. Stormwater Management Summary Sheet

Sub Area I.D.	Sub Area (ha)	C = 0.2	C = 0.6	C = 0.9	Composite 'C'	Outlet Location	Controlled Release (L/s)	Top of Grate (m)	Ponding Depth (m)	Invert or Pan Elev. (m)	Pipe dia (if plug type) (mm)	Head on Orifice (if plug) (m)	Diameter of Orifice (mm)	Hydrovex Model	Head on Hydrovex
A1	0.333	0.000	0.000	0.333	0.90	BUILDING	12.0								
A2	0.136	0.076	0.000	0.060	0.51	CB 1	2.0	59.65	0.25	58.15	250	1.63	27	50VHV-1	1.75
A3	0.077	0.032	0.000	0.044	0.60	CB 2	2.0						STMMH 9		
A4	0.131	0.131	0.000	0.000	0.20	CB 3	1.5						STMMH 9		
A5	0.003	0.003	0.000	0.000	0.20	FREE FLOW	0.1								
A6	0.015	0.005	0.000	0.011	0.69	CB 4	1.2	58.75	0.15	57.25	250	1.53	22	32SVHV-1	1.65
A7	0.077	0.018	0.000	0.059	0.74	CB 5	2.0	58.65	0.25	57.15	250	1.63	27	50VHV-1	1.75
A8	0.046	0.009	0.000	0.037	0.77	STMMH 6	5.1	57.75	0.00	56.33	300	1.27	47	75VHV-1	1.42
A9	0.038	0.008	0.000	0.031	0.76	CBMH 4	3.5	60.25	0.15	56.60	250	3.68	30	50VHV-1	3.80
A10	0.027	0.007	0.000	0.020	0.72	CB 6	6.6	60.53	0.15	59.03	250	1.53	51	75VHV-1	1.65
A11	0.081	0.021	0.000	0.061	0.72	CBMH 3	2.5						CBMH 3		
A12	0.078	0.025	0.000	0.053	0.67	CB 7	1.5						CBMH 3		
A3 & A4						STMMH 9	3.5	60.85	0.25	56.43	300	4.52	28	50VHV-1	4.67
A11 & A12						CBMH 3	4.0	60.53	0.22	58.33	300	2.27	36	50VHV-1	2.42
	1.042	0.334	0.000	0.709	0.68		40.0								

Table 2 - Storm Sewer Design Sheet

Table 2. Storm Sewer Design Sheet

Q = 2.78 AIR

Q = peak flow in litres per second (L/s)
A = area in hectares (ha)
I = rainfall intensity in millimetres per hour (mm/hr)
R = runoff coefficient

rainfall intensity = "a" / (T + "c")^"b"

return period	10 year	**5 year**
parameter "a"	1174.184	**998.071**
parameter "b"	0.816	**0.814**
parameter "c"	6.014	**6.053**

N-value 0.013

			AREAS (ha)							TIME OF	RAINFALL			PEAK	SEWER DATA						
								INDIVID	ACCUM	CONC.	INTENSITY			FLOW	DIAMETER	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	% Full
FROM	TO	AREA NO.	0.20	0.35	AREA 0.50	0.64	0.90	AR	AR	Tc	I	DESIGN FLOW	CONTROLLED FLOW	Q (L/s)	(mm)	(%)	(m)	(l/s)	(m/s)	FLOW (min)	
CB 3	MAIN	A4	0.13				0.00	0.03	0.03	10.00	104.19	7.61		7.61	250.00	1.00	3.00	59.46	1.21	0.04	12.79%
CB 2	MAIN	A3	0.03				0.04	0.05	0.05	10.00	104.19	13.42		13.42	250.00	1.00	4.00	59.46	1.21	0.06	22.57%
STMMH 10	STMMH 9							0.00	0.07	10.06	103.90	20.97		20.97	300.00	0.50	44.50	68.37	0.97	0.77	30.67%
CB 1	MAIN	A2	0.08				0.06	0.07	0.07	10.00	104.19	19.97		19.97	250.00	1.00	3.50	59.46	1.21	0.05	33.59%
STMMH 9	STMMH 8							0.00	0.14	10.82	100.04	39.37		39.37	300.00	0.50	43.50	68.37	0.97	0.75	57.58%
STMMH 8	STMMH 5							0.00	0.14	11.57	96.57	38.00		38.00	300.00	0.50	38.50	68.37	0.97	0.66	55.58%
TRENCH	STMMH 7	A8	0.01				0.04	0.04	0.04	10.00	104.19	10.27		10.27	250.00	1.00	8.50	59.46	1.21	0.12	17.26%
STMMH 7	STMMH 6							0.00	0.04	10.12	103.58	10.20		10.20	525.00	0.20	20.00	192.32	0.89	0.38	5.31%
STMMH 6	STMMH 5							0.00	0.04	10.49	101.66	10.02		10.02	300.00	0.50	5.00	68.37	0.97	0.09	14.65%
CB 4	MAIN	A6	0.00				0.01	0.01	0.01	10.00	104.19	3.00		3.00	250.00	1.00	6.50	59.46	1.21	0.09	5.04%
STMMH 5	STMMH 1							0.00	0.19	12.23	93.71	48.80		48.80	300.00	1.00	14.50	96.69	1.37	0.18	50.47%
CB 7	CBMH 3	A12	0.03				0.05	0.05	0.05	10.00	104.19	15.26		15.26	250.00	1.00	19.00	59.46	1.21	0.26	25.66%
CBMH 3	STMMH 2	A11	0.02				0.06	0.06	0.11	10.26	102.83	31.85		31.85	300.00	1.00	10.00	96.69	1.37	0.12	32.94%
BUILDING	STMMH 2	A1	0.00				0.33	0.30	0.30	10.00	104.19	86.81	12.00	12.00	300.00	1.00	19.00	96.69	1.37	0.23	12.41%
CB 6	MAIN	A10	0.01				0.02	0.02	0.02	10.00	104.19	5.62		5.62	250.00	1.00	9.00	59.46	1.21	0.12	9.45%
CBMH 4	MAIN	A9	0.01				0.03	0.03	0.03	10.00	104.19	8.44		8.44	250.00	1.00	7.50	59.46	1.21	0.10	14.19%
CB 5	MAIN	A7	0.02				0.06	0.06	0.06	10.00	104.19	16.50		28.50	250.00	1.00	3.00	59.46	1.21	0.04	47.93%
STMMH 2	STMMH 1							0.00	0.22	10.38	102.21	61.63	12.00	73.63	375.00	0.50	62.00	123.97	1.12	0.92	59.40%
STMMH 1	STM CEPTER							0.00	0.40	12.41	92.97	104.48	12.00	116.48	375.00	0.60	6.50	135.80	1.23	0.09	85.78%
STM CEPTER	EX STMMH 214							0.00	0.40	12.50	92.62	104.08	12.00	116.08	375.00	0.60	5.00	135.80	1.23	0.07	85.48%
			0.33	0.00	0.00	0.00	0.71														

Table 3 - Storage Requirements for A1 (BUILDING)

Area **0.33** hectares
Runoff Coefficient = **0.90** post developmen 100 year ave C 1.00

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	86.81	12.0	74.8	44.9
	20	70.25	58.53	12.0	46.5	55.8
	30	53.93	44.93	12.0	32.9	59.3
	40	44.18	36.81	12.0	24.8	59.6
	50	37.65	31.37	12.0	19.4	58.1
100 Year	50	63.95	59.20	12.0	47.2	141.6
	60	55.89	51.74	12.0	39.7	143.1
	70	49.79	46.09	12.0	34.1	143.2
	80	44.99	41.65	12.0	29.6	142.3
	90	41.11	38.06	12.0	26.1	140.7

Table 4 - Storage Requirements for A2 (CB 1)

Area **0.14** hectares
Runoff Coefficient = **0.51** post developmen 100 year ave C 0.64

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	30	53.93	10.34	2.0	8.3	15.0
	40	44.18	8.47	2.0	6.5	15.5
	50	37.65	7.22	2.0	5.2	15.7
	60	32.94	6.32	2.0	4.3	15.5
	70	29.37	5.63	2.0	3.6	15.2
100 Year	80	44.99	10.78	2.0	8.8	42.2
	90	41.11	9.85	2.0	7.9	42.4
	100	37.90	9.08	2.0	7.1	42.5
	110	35.20	8.44	2.0	6.4	42.5
	120	32.89	7.88	2.0	5.9	42.4

Table 5 - Storage Requirements for A3 (STMMH 9)

Area **0.08** hectares
Runoff Coefficient = **0.60** post developmen 100 year ave C 0.76

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	13.42	2.0	11.4	6.9
	20	70.25	9.05	2.0	7.0	8.5
	30	53.93	6.95	2.0	4.9	8.9
	40	44.18	5.69	2.0	3.7	8.9
	50	37.65	4.85	2.0	2.8	8.5
100 Year	40	75.15	12.10	2.0	10.1	24.2
	50	63.95	10.30	2.0	8.3	24.9
	60	55.89	9.00	2.0	7.0	25.2
	70	49.79	8.02	2.0	6.0	25.3
	80	44.99	7.24	2.0	5.2	25.2

Table 6 - Storage Requirements for A4 (STMMH 9)

Area **0.13** hectares
Runoff Coefficient = **0.20** post developmen 100 year ave C 0.25

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	7.61	1.5	6.1	3.7
	20	70.25	5.13	1.5	3.6	4.4
	30	53.93	3.94	1.5	2.4	4.4
	40	44.18	3.23	1.5	1.7	4.1
	50	37.65	2.75	1.5	1.2	3.7
100 Year	30	91.87	8.38	1.5	6.9	12.4
	40	75.15	6.86	1.5	5.4	12.9
	50	63.95	5.84	1.5	4.3	13.0
	60	55.89	5.10	1.5	3.6	13.0
	70	49.79	4.54	1.5	3.0	12.8

Table 7 - Storage Requirements for A5 (FREE FLOW)

Area **0.00** hectares
Runoff Coefficient = **0.20** post developmen 100 year ave C 0.25

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	0.14	0.1	0.0	0.0
	20	70.25	0.10	0.1	0.0	0.0
	30	53.93	0.07	0.1	0.0	0.0
	40	44.18	0.06	0.1	0.0	-0.1
	50	37.65	0.05	0.1	0.0	-0.1
100 Year	10	178.56	0.31	0.1	0.2	0.1
	20	119.95	0.21	0.1	0.1	0.1
	30	91.87	0.16	0.1	0.1	0.1
	40	75.15	0.13	0.1	0.0	0.1
	50	63.95	0.11	0.1	0.0	0.0

Table 8 - Storage Requirements for A6 (CB 4)

Area **0.02** hectares
Runoff Coefficient = **0.69** post developmen 100 year ave C 0.86

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	3.00	1.2	1.8	1.1
	20	70.25	2.02	1.2	0.8	1.0
	30	53.93	1.55	1.2	0.4	0.6
	40	44.18	1.27	1.2	0.1	0.2
	50	37.65	1.08	1.2	-0.1	-0.3
100 Year	10	178.56	6.42	1.2	5.2	3.1
	20	119.95	4.31	1.2	3.1	3.7
	30	91.87	3.30	1.2	2.1	3.8
	40	75.15	2.70	1.2	1.5	3.6
	50	63.95	2.30	1.2	1.1	3.3

Table 9 - Storage Requirements for A7 (CB 5)

Area **0.08** hectares
Runoff Coefficient = **0.74** post developmen 100 year ave C 0.92

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	16.50	2.0	14.5	8.7
	20	70.25	11.13	2.0	9.1	11.0
	30	53.93	8.54	2.0	6.5	11.8
	40	44.18	7.00	2.0	5.0	12.0
	50	37.65	5.96	2.0	4.0	11.9
100 Year	60	55.89	11.07	2.0	9.1	32.6
	70	49.79	9.86	2.0	7.9	33.0
	80	44.99	8.91	2.0	6.9	33.2
	90	41.11	8.14	2.0	6.1	33.1
	100	37.90	7.50	2.0	5.5	33.0

Table 10 - Storage Requirements for A8 (STMMH 6)

Area **0.05** hectares
Runoff Coefficient = **0.77** post developmen 100 year ave C 0.96

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	10.27	5.1	5.2	3.1
	20	70.25	6.92	5.1	1.8	2.2
	30	53.93	5.31	5.1	0.2	0.4
	40	44.18	4.35	5.1	-0.7	-1.8
	50	37.65	3.71	5.1	-1.4	-4.2
100 Year	10	178.56	21.99	5.1	16.9	10.1
	20	119.95	14.77	5.1	9.7	11.6
	30	91.87	11.31	5.1	6.2	11.2
	40	75.15	9.25	5.1	4.2	10.0
	50	63.95	7.88	5.1	2.8	8.3

Table 11 - Storage Requirements for AREA A9 (CBMH 4)

Area **0.04** hectares
Runoff Coefficient = **0.76** post developmen 100 year ave C 0.95

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	8.44	3.5	4.9	3.0
	20	70.25	5.69	3.5	2.2	2.6
	30	53.93	4.37	3.5	0.9	1.6
	40	44.18	3.58	3.5	0.1	0.2
	50	37.65	3.05	3.5	-0.5	-1.4
100 Year	10	178.56	18.07	3.5	14.6	8.7
	20	119.95	12.14	3.5	8.6	10.4
	30	91.87	9.30	3.5	5.8	10.4
	40	75.15	7.61	3.5	4.1	9.9
	50	63.95	6.47	3.5	3.0	8.9

Table 12 - Storage Requirements for AREA 10 (CB 6)

Area **0.03** hectares
Runoff Coefficient = **0.72** post developmen 100 year ave C 0.90

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	5.62	6.6	-1.0	-0.6
	20	70.25	3.79	6.6	-2.8	-3.4
	30	53.93	2.91	6.6	-3.7	-6.6
	40	44.18	2.38	6.6	-4.2	-10.1
	50	37.65	2.03	6.6	-4.6	-13.7
100 Year	10	178.56	12.04	6.6	5.4	3.3
	20	119.95	8.09	6.6	1.5	1.8
	30	91.87	6.19	6.6	-0.4	-0.7
	40	75.15	5.07	6.6	-1.5	-3.7
	50	63.95	4.31	6.6	-2.3	-6.9

Table 13 - Storage Requirements for AREA A11 (CBMH 3)

Area **0.08** hectares
Runoff Coefficient = **0.72** post developmen 100 year ave C 0.90

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	17.01	2.5	14.5	8.7
	20	70.25	11.47	2.5	9.0	10.8
	30	53.93	8.80	2.5	6.3	11.3
	40	44.18	7.21	2.5	4.7	11.3
	50	37.65	6.15	2.5	3.6	10.9
100 Year	50	63.95	13.05	2.5	10.6	31.7
	60	55.89	11.41	2.5	8.9	32.1
	70	49.79	10.16	2.5	7.7	32.2
	80	44.99	9.18	2.5	6.7	32.1
	90	41.11	8.39	2.5	5.9	31.8

Table 14 - Storage Requirements for AREA A12 (CBMH 3)

Area **0.08** hectares
Runoff Coefficient = **0.67** post developmen 100 year ave C 0.84

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	30	53.93	7.90	1.5	6.4	11.5
	40	44.18	6.47	1.5	5.0	11.9
	50	37.65	5.51	1.5	4.0	12.0
	60	32.94	4.82	1.5	3.3	12.0
	70	29.37	4.30	1.5	2.8	11.8
100 Year	80	44.99	8.23	1.5	6.7	32.3
	90	41.11	7.52	1.5	6.0	32.5
	100	37.90	6.94	1.5	5.4	32.6
	110	35.20	6.44	1.5	4.9	32.6
	120	32.89	6.02	1.5	4.5	32.5

Ainley Project: 17004-1
Location: BLOCK 4, LTCF, 850 Champlain Street

Table 15 - Pipe Storage

	Location		Lenghh	Size (Diameter)	Section area	Volume
	From mh	To mh	m	mm	m^2	m^3
1	CB 7	CBMH 3	19	250	0.0491	0.93
2	TRENCH	STMMH 7	8.5	250	0.0491	0.42
3	STMMH 7	STMMH 6	20	525	0.2165	4.33
4	STMMH 9	STMMH 10	44.5	300	0.0707	3.15
Sum						8.82

Ainley Project: 17004-1
Location: BLOCK 4, LTCF, 850 Champlain Street

Table 16 - MH Storage

	Location	Size (Diameter)	Section area	Max. elevation	Invert elevation	Depth	Volume
	mh number	mm	m^2	m	m	m	m^3
	TRENCH	0.3X0.6	0.18	17.00			3.06
	STMMH 6	1220	1.17	57.75	56.33	1.42	1.66
	STMMH 7	1220	1.17	57.75	56.40	1.35	1.58
	STMMH 9	1220	1.17	61.02	56.43	4.59	5.37
	STMMH 10	1220	1.17	60.90	56.70	4.20	4.91
	CBMH 3	1220	1.17	60.53	58.53	2.00	2.34
	CBMH 4	1530	1.84	60.25	56.60	3.65	6.71
	CB 1	600X600	0.36	59.55	58.05	1.50	0.54
	CB 2	600X600	0.36	60.85	59.35	1.50	0.54
	CB 3	600X600	0.36	60.85	59.35	1.50	0.54
	CB 4	600X600	0.36	58.75	57.25	1.50	0.54
	CB 5	600X600	0.36	58.65	57.15	1.50	0.54
	CB 6	600X600	0.36	60.53	59.03	1.50	0.54
	CB 7	600X600	0.36	60.53	59.03	1.50	0.54
Sum							28.86

Ainley Project: 17004-1
Location: BLOCK 4, LTCF, 850 Champlain Street

Table 17 - Storage Summary-5year

	Location	Storage Required	Surface Storage	Pipe Storage	Structure Storage	Total Storage
	Area ID	m^3	m^3	m^3	m^3	m^3
	A1	59.6	59.6			59.6
	A2	15.7	15.7		0.5	16.2
	A3 & A4	13.3	7.8	3.1	10.3	21.2
	A5	0.0	0.0	0.0		0.0
	A6	1.1	3.9		0.5	4.4
	A7	12.0	16.5		0.5	17.0
	A8	3.1	0.0	4.7	6.8	11.6
	A9	3.0	2.6	0.0	6.7	9.3
	A10	0.0	2.8		0.5	3.3
	A11& A12	23.5	21.7	0.9	2.9	25.5
Sum		131.3	130.6	8.8	28.9	168.3

Ainley Project: 17004-1
Location: BLOCK 4, LTCF, 850 Champlain Street

Table 18 - Storage Summary-100year

	Location	Storage Required	Surface Storage	Pipe Storage	Structure Storage	Total Storage
	Area ID	m^3	m^3	m^3	m^3	m^3
	A1	143.2	143.2			143.2
	A2	42.5	46.5		0.5	47.0
	A3 & A4	38.3	43.6	3.1	10.3	57.0
	A5	0.0	0.0	0.0		0.0
	A6	3.8	3.9		0.5	4.4
	A7	33.2	46.5		0.5	47.0
	A8	11.6	0.0	4.7	6.8	11.6
	A9	10.4	3.7	0.0	6.7	10.4
	A10	3.3	2.8		0.5	3.3
	A11& A12	65.2	61.8	0.9	2.9	65.6
Sum		351.5	352.0	8.8	28.9	389.7

APPENDIX D

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION STORMCEPTOR®

06/11/2020

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA MACDONALD-CARTIER INT'L AP
NCDC Rainfall Station Id:	6000
Years of Rainfall Data:	37

Site Name:	850 Champlain St.

Drainage Area (ha):	1.045
Runoff Coefficient 'c':	0.68

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.0

Require Hydrocarbon Spill Capture?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	

Project Name:	850 Champlain St.
Project Number:	17004
Designer Name:	Brandon O'Leary
Designer Company:	Forterra
Designer Email:	brandon.oleary@forterrabp.com
Designer Phone:	(905) 630-0359
EOR Name:	Jiawu Xu
EOR Company:	Ainley Graham & Associates Ltd.
EOR Email/Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	72
EFO6	81
EFO8	85
EFO10	88
EFO12	90

Recommended Stormceptor EFO Model: EFO6

Estimated Net Annual Sediment (TSS) Load Reduction (%): 81

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	51.3	51.3	1.98	119.0	45.0	93	47.7	47.7
2	8.7	60.0	3.95	237.0	90.0	88	7.6	55.4
3	5.8	65.8	5.93	356.0	135.0	84	4.8	60.2
4	4.6	70.4	7.90	474.0	180.0	78	3.6	63.8
5	4.2	74.6	9.88	593.0	225.0	74	3.1	66.9
6	3.2	77.8	11.85	711.0	270.0	70	2.2	69.1
7	2.6	80.4	13.83	830.0	315.0	66	1.7	70.9
8	2.4	82.8	15.80	948.0	361.0	62	1.5	72.3
9	1.9	84.7	17.78	1067.0	406.0	58	1.1	73.4
10	1.6	86.3	19.75	1185.0	451.0	57	0.9	74.4
11	1.3	87.6	21.73	1304.0	496.0	55	0.7	75.1
12	1.1	88.7	23.71	1422.0	541.0	54	0.6	75.7
13	1.3	90.0	25.68	1541.0	586.0	53	0.7	76.3
14	1.1	91.1	27.66	1659.0	631.0	52	0.6	76.9
15	0.6	91.7	29.63	1778.0	676.0	52	0.3	77.2
16	0.8	92.5	31.61	1896.0	721.0	51	0.4	77.6
17	0.7	93.2	33.58	2015.0	766.0	51	0.4	78.0
18	0.5	93.7	35.56	2134.0	811.0	51	0.3	78.3
19	0.6	94.3	37.53	2252.0	856.0	51	0.3	78.6
20	0.5	94.8	39.51	2371.0	901.0	51	0.3	78.8
21	0.2	95.0	41.48	2489.0	946.0	50	0.1	78.9
22	0.4	95.4	43.46	2608.0	991.0	50	0.2	79.1
23	0.5	95.9	45.44	2726.0	1037.0	50	0.2	79.4
24	0.4	96.3	47.41	2845.0	1082.0	49	0.2	79.6
25	0.1	96.4	49.39	2963.0	1127.0	49	0.0	79.6

Stormceptor® EF Sizing Report

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
26	0.3	96.7	51.36	3082.0	1172.0	48	0.1	79.7
27	0.4	97.1	53.34	3200.0	1217.0	48	0.2	79.9
28	0.2	97.3	55.31	3319.0	1262.0	47	0.1	80.0
29	0.2	97.5	57.29	3437.0	1307.0	47	0.1	80.1
30	0.2	97.7	59.26	3556.0	1352.0	47	0.1	80.2
31	0.1	97.8	61.24	3674.0	1397.0	46	0.0	80.3
32	0.2	98.0	63.21	3793.0	1442.0	45	0.1	80.4
33	0.1	98.1	65.19	3911.0	1487.0	44	0.0	80.4
34	0.1	98.2	67.17	4030.0	1532.0	42	0.0	80.4
35	0.1	98.3	69.14	4148.0	1577.0	41	0.0	80.5
36	0.2	98.5	71.12	4267.0	1622.0	40	0.1	80.6
37	0.0	98.5	73.09	4386.0	1668.0	39	0.0	80.6
38	0.1	98.6	75.07	4504.0	1713.0	38	0.0	80.6
39	0.1	98.7	77.04	4623.0	1758.0	37	0.0	80.6
40	0.1	98.8	79.02	4741.0	1803.0	36	0.0	80.7
41	0.1	98.9	80.99	4860.0	1848.0	35	0.0	80.7
42	0.1	99.0	82.97	4978.0	1893.0	34	0.0	80.7
43	0.2	99.2	84.95	5097.0	1938.0	33	0.1	80.8
44	0.1	99.3	86.92	5215.0	1983.0	33	0.0	80.8
45	0.1	99.4	88.90	5334.0	2028.0	32	0.0	80.9
46	0.0	99.4	90.87	5452.0	2073.0	31	0.0	80.9
47	0.1	99.5	92.85	5571.0	2118.0	31	0.0	80.9
48	0.0	99.5	94.82	5689.0	2163.0	30	0.0	80.9
49	0.0	99.5	96.80	5808.0	2208.0	29	0.0	80.9
50	0.0	99.5	98.77	5926.0	2253.0	29	0.0	80.9
Estimated Net Annual Sediment (TSS) Load Reduction =								**81 %**

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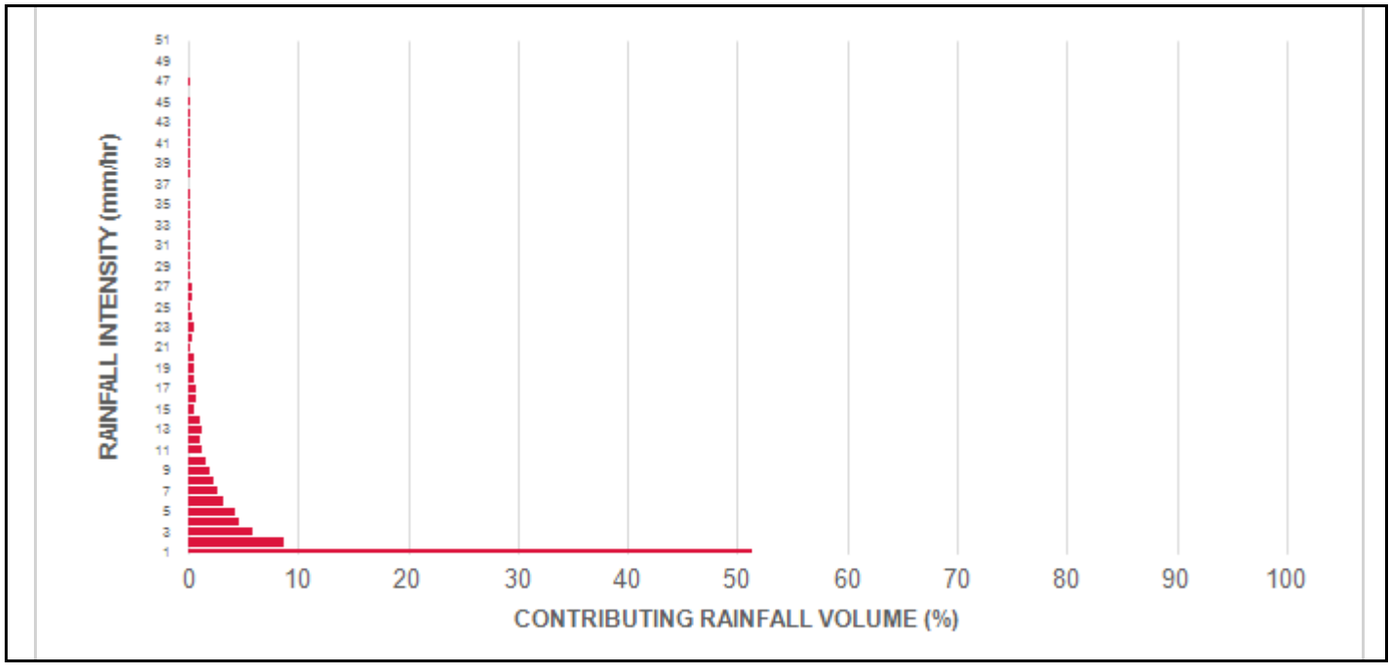
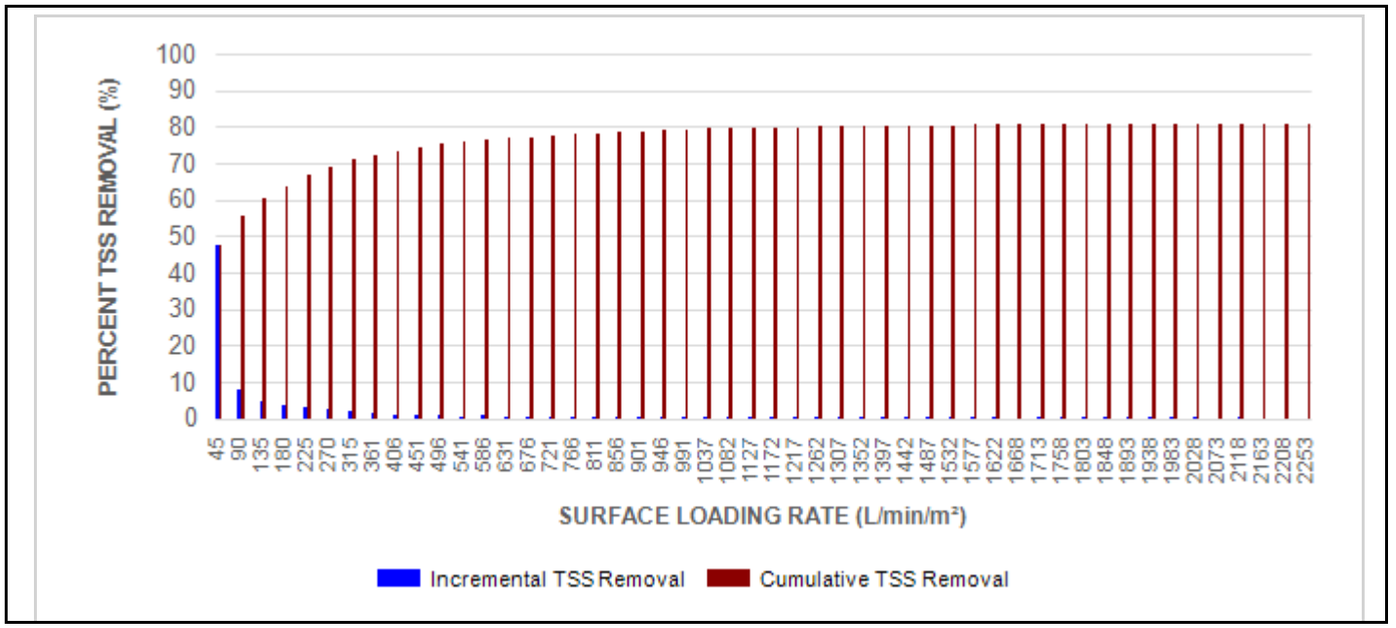
RAINFALL DATA FROM OTTAWA MACDONALD-CARTIER INT'L AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

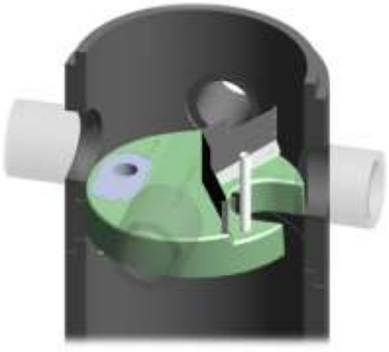
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

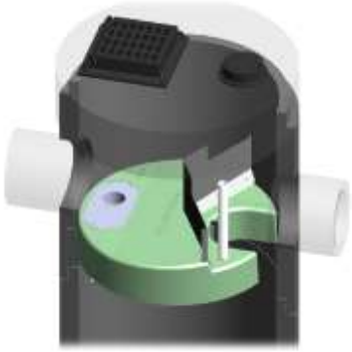
DESIGN FLEXIBILITY

►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.





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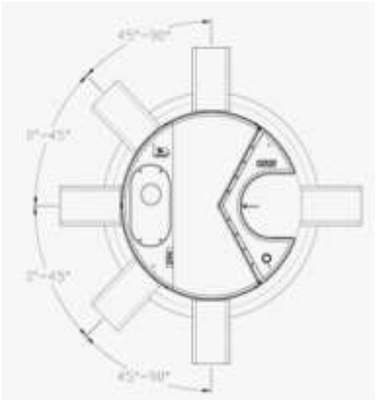


INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	197	52	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	348	92	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	545	144	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	874	231	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	1219	322	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

imbrium

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

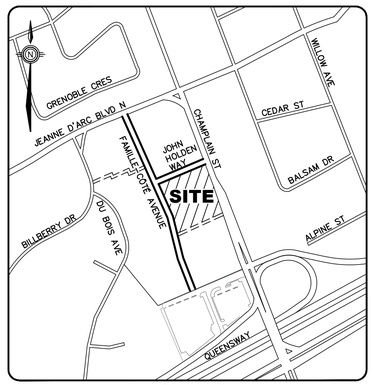
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m2 to 2600 L/min/m2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

APPENDIX E



KEY MAP
SCALE: N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING CATCHBASIN
- EXISTING OVERHEAD HYDRO
- PROPOSED CATCHBASIN (CB 2 & CB 3)
- PROPOSED CATCHBASIN C/W 3m LONG (MIN.) SUBDRAIN IN FOUR ORTHOGONAL DIRECTIONS (CB 1, CB4, CB 5, CB 6 & CB 7)
- PROPOSED CATCHBASIN MANHOLE C/W 3m LONG (MIN.) SUBDRAIN IN FOUR ORTHOGONAL DIRECTIONS (CBMH 3)
- PROPOSED CATCHBASIN MANHOLE C/W 3m LONG (MIN.) SUBDRAIN IN THREE ORTHOGONAL DIRECTIONS (CBMH 4)
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED WATERMAIN

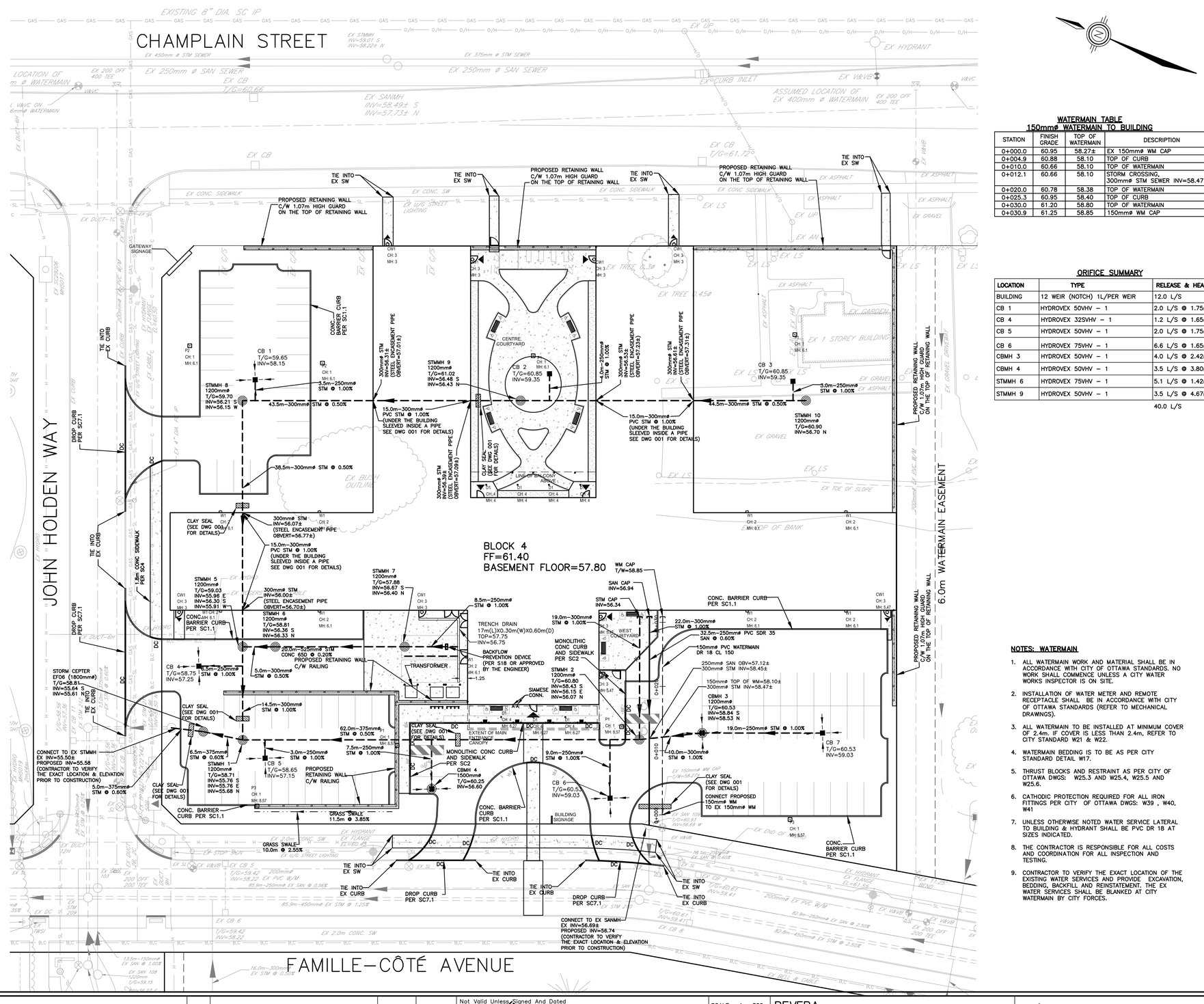
NOTES: GENERAL

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION
2. ALL ELEVATIONS / DIMENSIONS ARE IN METRIC UNITS.
3. JOB BENCH MARK – CONFIRM WITH LEGAL SURVEYOR PRIOR TO UTILIZATION.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCHBASIN OUTLETS ARE PROVIDED.
5. ALL DISTURBED AREAS SHALL BE REINSTATED TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE ENGINEER AND/OR CITY OF OTTAWA.
6. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
7. CURBS TO BE AS PER CITY OF OTTAWA STANDARD SC1.1.
8. CONTRACTOR IS TO COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON PUBLIC ROAD.
9. RESTORE PAVEMENT STRUCTURE AND SURFACES ON PUBLIC ROAD TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE CITY OF OTTAWA.
10. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
11. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
12. CONTRACTOR IS RESPONSIBLE FOR ALL DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS.
13. REFER TO LANDSCAPE ARCHITECT'S PLAN FOR SIDEWALK, PATHWAYS, CONCRETE MEDIAN, WALLS, FENCES, GATES, PLANTING AND OTHER LANDSCAPE FEATURE MATERIALS AND LOCATIONS.
14. ALL CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
15. DESIGN ELEVATIONS AS GIVEN ON THIS PLAN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY THE ENGINEER.
16. U/G CONTRACTOR TO INSTALL AND MAINTAIN A FILTER CLOTH "CATCH" ACROSS ALL MH/CB LIDS TO PREVENT SEDIMENTS AND GRANULARS FROM ENTERING STRUCTURES UNTIL SOD AND PAVING IS COMPLETE. ANY SEDIMENTS/GRANULARS ENTERING STRUCTURES AND SEWERS SHALL BE IMMEDIATELY REMOVED.
17. U/G CONTRACTOR TO CONFIRM LOCATION(S) AND ELEVATION(S) OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS etc THAT ARE FOUND.
18. THE CONTRACTOR SHALL VERIFY ALL SURFACE AND SUBSURFACE CONDITIONS PRIOR TO COMMENCING CONSTRUCTION BY REVIEWING THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP, DATED JANUARY 23, 2017.
19. THE CONTRACTOR SHALL APPRAISE HIS/HER SELF OF ALL SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED AND SHALL CARRY OUT THEIR OWN TEST PITS AS REQUIRED TO MAKE THEIR OWN INDEPENDENT ASSESSMENT OF GROUND CONDITIONS. THE CONTRACTOR SHALL NOT MAKE ANY CLAIM FOR ANY EXTRA COST DUE TO ANY SUCH GROUND CONDITIONS VARYING FROM THOSE ANTICIPATED BY THE CONTRACTOR.
20. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL CONSTRUCTION RELATED PERMITS, FEES, INSPECTIONS AND APPROVALS REQUIRED BY THE CITY OF OTTAWA.
21. IN PREPARATION FOR THE CONSTRUCTION OF THE NEW ASPHALTIC CONCRETE SURFACED ROADWAYS AND PARKING AREAS, ALL TOPSOIL, ORGANIC MATERIAL AND ANY LOOSE/SOFT OR WET SOIL SHOULD BE REMOVED FROM THE PROPOSED SUBGRADE SURFACE AND REPLACED WITH SUITABLE COMPACTED EARTH BORROW OR GRANULAR FILL.
22. PRIOR TO PLACING GRANULAR FILL FOR THE ROADWAYS AND PARKING AREAS, THE EXPOSED SUBGRADE SHOULD BE HEAVILY PROOF ROLLED WITH A WITH A LARGE (10 TONNE) VIBRATORY STEEL DRUM ROLLER UNDER DRY CONDITIONS. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE, COMPACTED EARTH BORROW.
23. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND CONSTRUCTION OF ALL SEDIMENT AND EROSION CONTROL MEASURES TO ENSURE THAT SEDIMENT DOES NOT MIGRATE FROM THE CONSTRUCTION SITE. SEDIMENTS SHALL BE CONTAINED AND DISPOSED OF IN A MANNER CONSISTENT WITH THE CITY OF OTTAWA SPECIFICATIONS. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECIEVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER COLTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES (PER OPSD 219.110) AND OTHER EFFECTIVE SEDIMENT TRAPS.
24. THE CONTRACTOR IS TO PROVIDE 'AS–CONSTRUCTED' INFORMATION (i.e. ASPHALT GRADES, TOP OF CURB GRADES, WATERMAIN OBVERTS, SEWER INVERTS, ETC.) TO THE ENGINEER AND/OR CLIENT.
25. ASPHALTIC CONCRETE SHALL NOT BE PLACED UNTIL FINAL CCTV INSPECTION OF THE SEWERS IN ACCORDANCE WITH OPSS 409 HAVE BEEN COMPLETED AND TO THE ENGINEER AND/OR CLIENT.
26. THE CONTRACTOR IS RESPONSIBLE FOR ALL RE–CCTV RESULTING FROM DEFICIENCY REPAIRS AS DEEMED NECESSARY BY THE ENGINEER. CCTV INSPECTIONS WILL BE CONDUCTED UNTIL SUCH TIME AS THE RESULTS HAVE BEEN APPROVED BY THE ENGINEER AND/OR CITY OF OTTAWA AT NO ADDITIONAL COST TO THE CLIENT.

NOTES: SEWER

1. ALL SANITARY SERVICES ARE TO BE THE SIZES INDICATED AND THE MATERIAL SHALL BE PVC SDR 35.

   ALL STORM SEWERS 375mm OR SMALLER SHALL BE PVC SDR 35. STORM SEWERS LARGER THAN 375mm SHALL BE CONCRETE CLASS 65D. UNLESS OTHERWISE NOTED.
2. THE BEDDING FOR THE PROPOSED STORM AND SANITARY SEWERS AND WATERMAIN SHOULD CONSIST OF AT LEAST 150mm OF CRUSHED STONE MEETING OPSS REQUIREMENTS FOR GRANULAR 'A'. ALLOWANCE SHOULD BE MADE FOR A 150 TO 300 MILLIMETRE THICK SUBBEDDING LAYER OF OPSS GRANULAR 'B' TYPE II IF THE SUBGRADE SOIL BECOMES DISTURBED DURING EXCAVATION.
3. COVER MATERIAL, FROM PIPE SPRING LINE TO AT LEAST 300mm ABOVE THE TOPS OF THE PIPES, SHOULD CONSIST OF OPSS GRANULAR 'A'. THE GRANULAR BEDDING AND COVER MATERIALS FOR THE SERVICE PIPES SHOULD BE COMPACTED IN MAXIMUM 150mm THICK LIFTS TO AT LEAST 95 PERCENT OF THE STANDARD PROCTOR DRY DENSITY VALUE.
4. ALL WORK SHALL BE PERFORMED, AS APPLICABLE, IN ACCORDANCE WITH CITY OF OTTAWA STANDARD SPECIFICATIONS AND IN PARTICULAR WITH O.P.S.S. 407, AND 410.
5. CATCHBASIN SHALL BE PRECAST 600X600 AS PER OPSD STD. 705.010. FRAMES AND COVERS SHALL BE PER CITY OF OTTAWA STANDARDS S19.1.
6. ALL MANHOLES, CATCHBASINS AND CATCHBASIN MANHOLES TO BE BACKFILLED WITH MIN. 0.3m HORZ. THICKNESS OF GRANULAR "A".
7. ALL STORM MANHOLES AND CBMH TO BE OPSD 701.010 AND OPSD 701.011 C/W 300mm SUMP. COVERS TO BE PER CITY OF OTTAWA STANDARDS S24.1.
8. SUPPLY AND INSTALL ALL PIPING AND APPURTENANCES AS SHOWN TO WITHIN 1.0m OF BUILDING WALLS. PROVIDE TEMPORARY CAPS.
9. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS AND COORDINATION FOR ALL INSPECTION AND TESTING.
10. THE FOUNDATION DRAIN IS TO BE CONNECTED TO THE STORM SEWER (IF APPLICABLE).
11. STORM BACKWATER VALVES OR BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED ON TRENCH DRAIN PER CITY OF OTTAWA STANDARDS S24.1 OR APPROVED BY THE ENGINEER.
12. FOUNDATION DRAIN BACKWATER VALVES OR BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED PER CITY STANDARD S14.
13. SANITARY BACKWATER VALVES SHALL BE INSTALLED ON ALL SANITARY SERVICE LATERALS PER CITY STANDARD S14.1.



WATERMAIN TABLE
150mmø WATERMAIN TO BUILDING

STATION	FINISH GRADE	TOP OF WATERMAIN	DESCRIPTION
0+000.0	60.95	58.27±	EX 150mmø WM CAP
0+004.9	60.88	58.10	TOP OF CURB
0+010.0	60.66	58.10	TOP OF WATERMAIN
0+012.1	60.66	58.10	STORM CROSSING, 300mmø STM SEWER INV=58.47±
0+020.0	60.78	58.38	TOP OF WATERMAIN
0+025.3	60.95	58.40	TOP OF CURB
0+030.0	61.20	58.80	TOP OF WATERMAIN
0+030.9	61.25	58.85	150mmø WM CAP

ORIFICE SUMMARY

LOCATION	TYPE	RELEASE & HEAD
BUILDING	12 WEIR (NOTCH) 1L/PER WEIR	12.0 L/S
CB 1	HYDROVEX 50VHV – 1	2.0 L/S @ 1.75m
CB 4	HYDROVEX 32SVHV – 1	1.2 L/S @ 1.65m
CB 5	HYDROVEX 50VHV – 1	2.0 L/S @ 1.75m
CB 6	HYDROVEX 75VHV – 1	6.6 L/S @ 1.65m
CBMH 3	HYDROVEX 50VHV – 1	4.0 L/S @ 2.42m
CBMH 4	HYDROVEX 50VHV – 1	3.5 L/S @ 3.80m
STMMH 6	HYDROVEX 75VHV – 1	5.1 L/S @ 1.42m
STMMH 9	HYDROVEX 50VHV – 1	3.5 L/S @ 4.67m
		40.0 L/S

NOTES: WATERMAIN

1. ALL WATERMAIN WORK AND MATERIAL SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS. NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE.
2. INSTALLATION OF WATER METER AND REMOTE RECEPTACLE SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS (REFER TO MECHANICAL DRAWINGS).
3. ALL WATERMAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m. IF COVER IS LESS THAN 2.4m, REFER TO CITY STANDARD W21 & W22.
4. WATERMAIN BEDDING IS TO BE AS PER CITY STANDARD DETAIL W17.
5. THRUST BLOCKS AND RESTRAINT AS PER CITY OF OTTAWA DWGS: W25.3 AND W25.4, W25.5 AND W25.6.
6. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS PER CITY OF OTTAWA DWGS: W39 , W40, W41
7. UNLESS OTHERWISE NOTED WATER SERVICE LATERAL TO BUILDING & HYDRANT SHALL BE PVC DR 18 AT SIZES INDICATED.
8. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS AND COORDINATION FOR ALL INSPECTION AND TESTING.
9. CONTRACTOR TO VERIFY THE EXACT LOCATION OF THE EXISTING WATER SERVICES AND PROVIDE EXCAVATION, BEDDING, BACKFILL AND REINSTATEMENT. THE EX WATER SERVICES SHALL BE BLANKED AT CITY WATERMAIN BY CITY FORCES.

NO.	REVISIONS	DATE	INITIAL
1	CITY SPC SUBMISSION	JUNE 30/20	JX

Not Valid Unless Signed And Dated
Professional Engineers Ontario
JUNE 30, 2020
Limited Licensee
Name: J.W.XU
Number: 100171806
Category: CIVIL see limitation
Limitations:
This licence is subject to the limitations as detailed on the certificate.
Association of Professional Engineers of Ontario

SCALE:	1 : 300
DESIGN:	JX
DRAWN:	MH
CHECKED:	GSC/JX
DATE:	MAY 2020

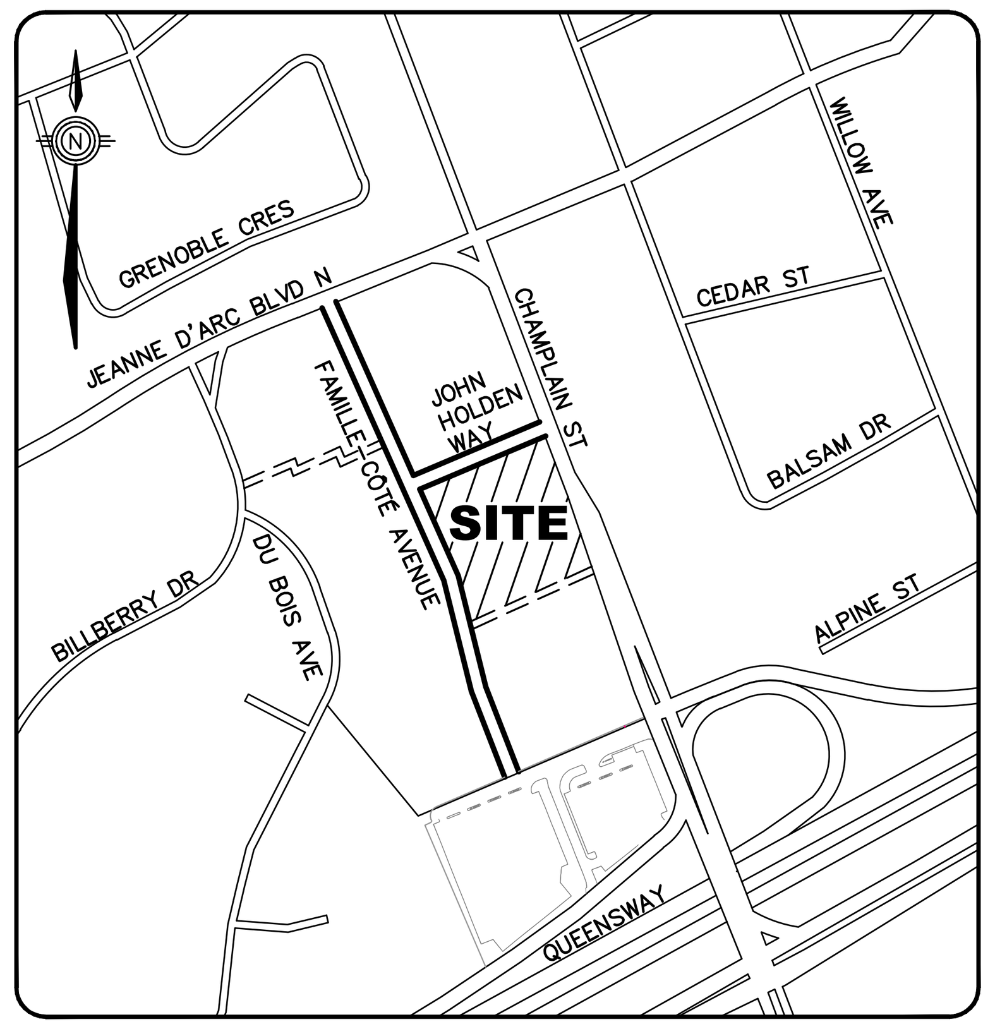
REVERA
LONG TERM CARE BUILDING
850 CHAMPLAIN ST
CITY OF OTTAWA

SITE SERVICING PLAN

Ainley GROUP — CONSULTING ENGINEERS PLANNERS

CONTRACT No. 17004 | 003–17004 – S1

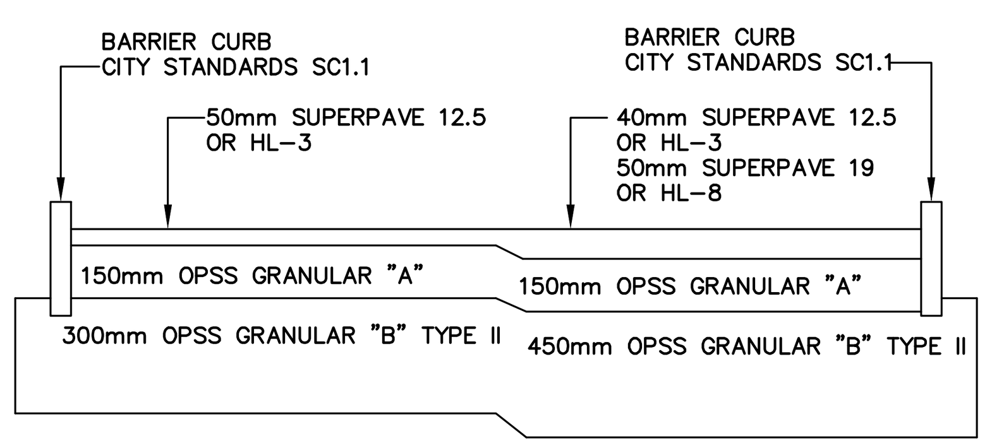
Jun 30, 2020 C:\Users\JuXu\Desktop\17004-1 Revera – LTC Site (Block 4) Civil Services\Design\003-17004-S1.dwg



KEY MAP
SCALE: N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING ELEVATION
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING CATCHBASIN
- EXISTING OVERHEAD HYDRO
- 60.95 PROPOSED GRADE
- 1.0% DIRECTION AND SLOPE
- OVERLAND FLOW ROUTE
- PROPOSED STORM MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN MANHOLE
- HEAVY DUTY ASPHALT PAVEMENT
- H.P. RIDGE LINE



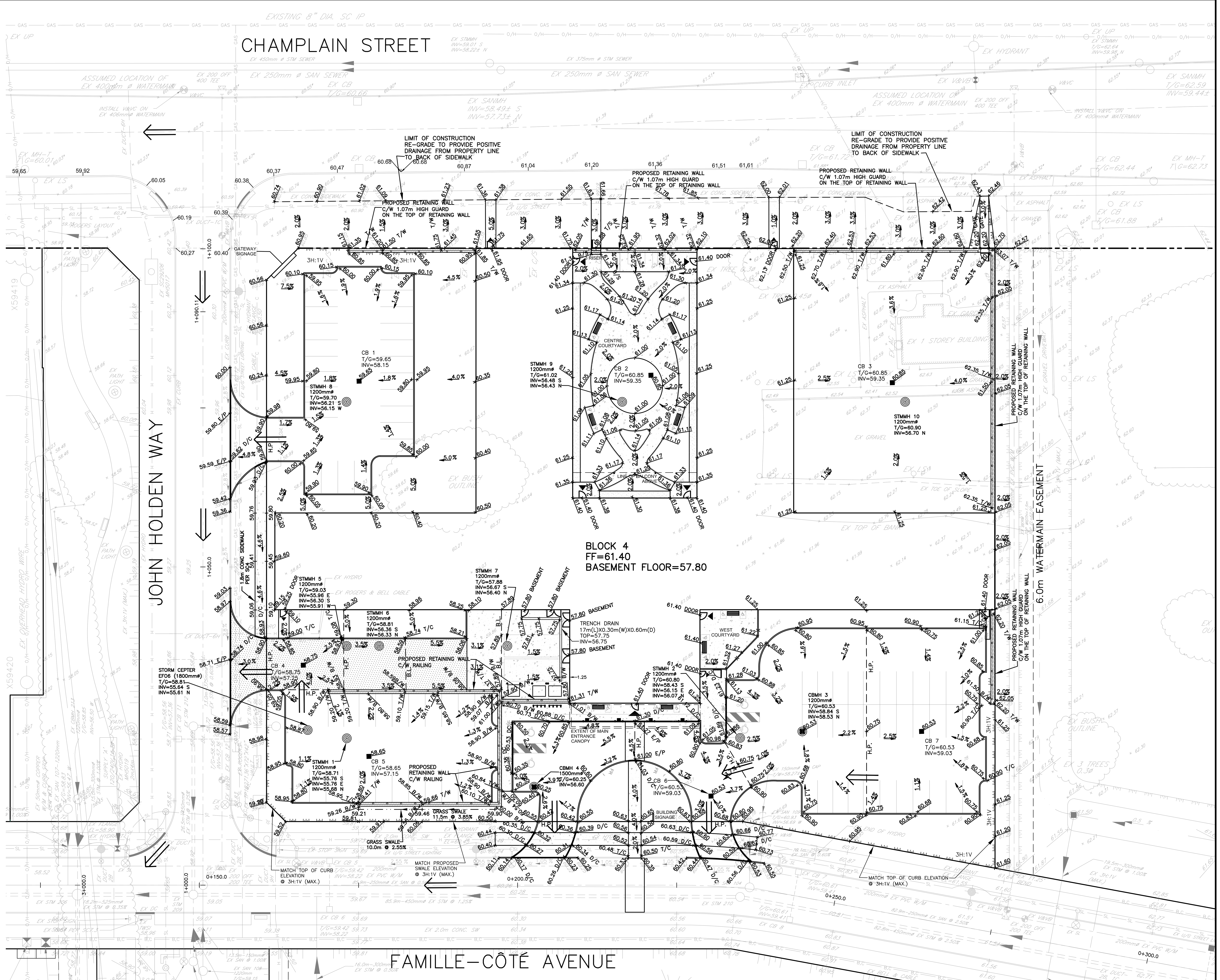
PARKING AREAS (LIGHT DUTY) N.T.S.

ACCESS LANES (HEAVY DUTY) N.T.S.

(REFER TO GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP DATED MARCH 30, 2020)

NOTES: GENERAL

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION
2. ALL ELEVATIONS / DIMENSIONS ARE IN METRIC UNITS.
3. JOB BENCH MARK – CONFIRM WITH LEGAL SURVEYOR PRIOR TO UTILIZATION.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCHBASIN OUTLETS ARE PROVIDED.
5. ALL DISTURBED AREAS SHALL BE REINSTATED TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE ENGINEER AND/OR CITY OF OTTAWA.
6. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
7. CURBS TO BE AS PER CITY OF OTTAWA STANDARD SC1.1.
8. CONTRACTOR IS TO COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON PUBLIC ROADS .
9. RESTORE PAVEMENT STRUCTURE AND SURFACES ON PUBLIC ROADS TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE CITY OF OTTAWA.
10. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
11. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
12. CONTRACTOR IS RESPONSIBLE FOR ALL DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS.
13. REFER TO LANDSCAPE ARCHITECT'S PLAN FOR SIDEWALK, PATHWAYS, CONCRETE MEDIAN, WALLS, FENCES, GATES, PLANTING AND OTHER LANDSCAPE FEATURE MATERIALS AND LOCATIONS.
14. ALL CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
15. DESIGN ELEVATIONS AS GIVEN ON THIS PLAN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY THE ENGINEER.
16. U/G CONTRACTOR TO INSTALL AND MAINTAIN A FILTER CLOTH "CATCH" ACROSS ALL MH/CB LIDS TO PREVENT SEDIMENTS AND GRANULARS FROM ENTERING STRUCTURES UNTIL SOD AND PAVING IS COMPLETE. ANY SEDIMENTS/GRANULARS ENTERING STRUCTURES AND SEWERS SHALL BE IMMEDIATELY REMOVED.
17. U/G CONTRACTOR TO CONFIRM LOCATION(S) AND ELEVATION(S) OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS etc THAT ARE FOUND.
18. THE CONTRACTOR SHALL VERIFY ALL SURFACE AND SUBSURFACE CONDITIONS PRIOR TO COMMENCING CONSTRUCTION BY REVIEWING THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP, DATED JANUARY 23, 2017.
19. THE CONTRACTOR SHALL APPRAISE HIS/HER SELF OF ALL SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED AND SHALL CARRY OUT THEIR OWN TEST PITS AS REQUIRED TO MAKE THEIR OWN INDEPENDENT ASSESSMENT OF GROUND CONDITIONS. THE CONTRACTOR SHALL NOT MAKE ANY CLAIM FOR ANY EXTRA COST DUE TO ANY SUCH GROUND CONDITIONS VARYING FROM THOSE ANTICIPATED BY THE CONTRACTOR.
20. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL CONSTRUCTION RELATED PERMITS, FEES, INSPECTIONS AND APPROVALS REQUIRED BY THE CITY OF OTTAWA.
21. IN PREPARATION FOR THE CONSTRUCTION OF THE NEW ASPHALTIC CONCRETE SURFACED ROADWAYS AND PARKING AREAS, ALL TOPSOIL, ORGANIC MATERIAL AND ANY LOOSE/SOFT OR WET SOIL SHOULD BE REMOVED FROM THE PROPOSED SUBGRADE SURFACE AND REPLACED WITH SUITABLE COMPACTED EARTH BORROW OR GRANULAR FILL.
22. PRIOR TO PLACING GRANULAR FILL FOR THE ROADWAYS AND PARKING AREAS, THE EXPOSED SUBGRADE SHOULD BE HEAVILY PROOF ROLLED WITH A LARGE (10 TONNE) VIBRATORY STEEL DRUM ROLLER UNDER DRY CONDITIONS. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE, COMPACTED EARTH BORROW.
23. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND CONSTRUCTION OF ALL SEDIMENT AND EROSION CONTROL MEASURES TO ENSURE THAT SEDIMENT DOES NOT MIGRATE FROM THE CONSTRUCTION SITE. SEDIMENTS SHALL BE CONTAINED AND DISPOSED OF IN A MANNER CONSISTENT WITH THE CITY OF OTTAWA SPECIFICATIONS. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECIEVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES (PER OPSD 219.110) AND OTHER EFFECTIVE SEDIMENT TRAPS.
24. THE CONTRACTOR IS TO PROVIDE 'AS-BUILT' INFORMATION (i.e. ASPHALT GRADES, TOP OF CURB GRADES, WATERMAIN OBVERTS, SEWER INVERTS, ETC.) TO THE ENGINEER AND/OR CLIENT.
25. ASPHALTIC CONCRETE SHALL NOT BE PLACED UNTIL FINAL CCTV INSPECTION OF THE SEWERS IN ACCORDANCE WITH OPSS 409 HAVE BEEN COMPLETED AND TO THE ENGINEER AND/OR CLIENT.
26. THE CONTRACTOR IS RESPONSIBLE FOR ALL RE-CCTV RESULTING FROM DEFICIENCY REPAIRS AS DEEMED NECESSARY BY THE ENGINEER. CCTV INSPECTIONS WILL BE CONDUCTED UNTIL SUCH TIME AS THE RESULTS HAVE BEEN APPROVED BY THE ENGINEER AND/OR CITY OF OTTAWA AT NO ADDITIONAL COST TO THE CLIENT.
27. A MUD MAT IS TO BE INSTALLED AT EACH CONSTRUCTION ENTRANCE AND SHALL BE MAINTAINED UNTIL THE PLACEMENT OF THE GRANULAR SUB-BASE. MUD MAT SHALL BE CONSTRUCTED OF 100mm ø CLEAR STONE, 400mm THICK. MUD MAT SHALL BE OF SUFFICIENT LENGTH TO ENSURE THAT A MINIMUM AMOUNT OF MATERIALS IS TRUCKED OFF SITE ONTO ADJACENT ROADS.



CONTRACT DRAWINGS:	Contractor must verify all dimensions and be responsible for same. Any discrepancies must be reported to the Engineer before commencing work. Drawings are not to be scaled. Drawings may not be used for any purpose other than that stipulated in the contract agreement between the owner/client and the Engineer without the express written consent of Ainley Graham & Associates Limited. Use of these drawings by any party for any other purpose is subject to the following caution.

NO.	REVISIONS	DATE	INITIAL
1	CITY SPC SUBMISSION	JUNE 30/20	JX

Not Valid Unless Signed And Dated

Professional Engineers Ontario — JUNE 30, 2020

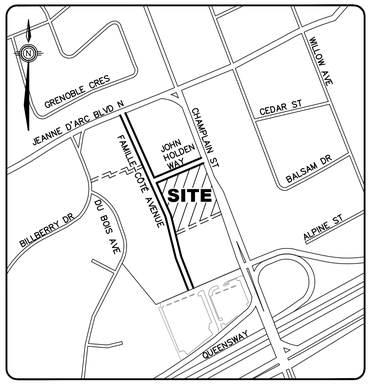
Limited Licensee
Name: J.W.XU
Number: 100171806
Category: CIVIL: see limitation
Limitations:
This licence is subject to the limitations as detailed on the certificate.
Association of Professional Engineers of Ontario

SCALE: 1 : 300	REVERA LONG TERM CARE BUILDING 850 CHAMPLAIN ST CITY OF OTTAWA
DESIGN: JX	
DRAWN: MH	
CHECKED: GSC/JX	GRADING AND DRAINAGE PLAN
DATE: MAY 2020	

Ainley GROUP — CONSULTING ENGINEERS PLANNERS

CONTRACT No. 17004 — 004-17004-GR1

Jun 30, 2020 C:\Users\jxu\Desktop\17004-1 Revera - LTC Site (Block 4) Civil Services\Design\004-17004-GR1.dwg



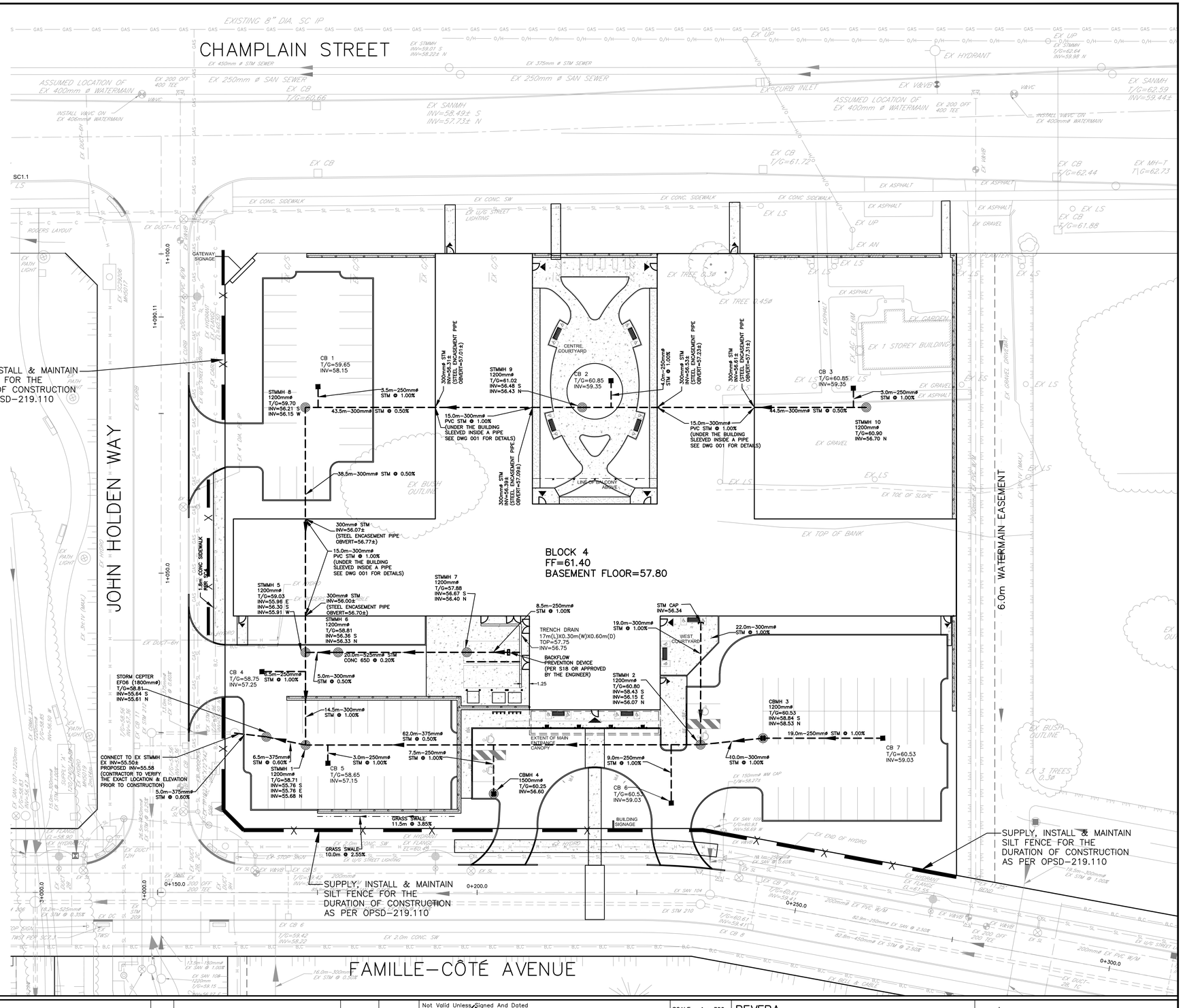
KEY MAP
SCALE: N.T.S.

LEGEND

X — SILT FENCE (PER OPSD-219.110)

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND CONSTRUCTION OF ALL SEDIMENT AND EROSION CONTROL MEASURES TO ENSURE THAT SEDIMENT DOES NOT MIGRATE FROM THE CONSTRUCTION SITE. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES (SEE NOTE 2) AND INSTALLING SILT FENCES (PER OPSD 219.110) AND OTHER EFFECTIVE SEDIMENT TRAPS.
2. THE CONTRACTOR IS TO SUPPLY, INSTALL AND MAINTAIN FILTER CLOTH BETWEEN THE FRAME AND COVER ON ALL PLANNED CATCH BASINS AND MANHOLES FOR THE DURATION OF CONSTRUCTION.
3. A MUD MAT IS TO BE INSTALLED AT EACH CONSTRUCTION ENTRANCE AND SHALL BE MAINTAINED UNTIL THE PLACEMENT OF THE GRANULAR SUB-BASE. MUD MAT SHALL BE CONSTRUCTED OF 100mmø CLEAR STONE, 400mm THICK. MUD MAT SHALL BE OF SUFFICIENT LENGTH TO ENSURE THAT A MINIMUM AMOUNT OF MATERIALS IS TRUCKED OFF SITE ONTO ADJACENT ROADS.
4. IN ORDER TO AVOID POLLUTANTS FROM BEING DISCHARGED, THE CONTRACTOR MUST MINIMIZE THE GENERATION OF DUST THROUGH APPROPRIATE APPLICATION OF WATER OR OTHER DUST SUPPRESSION TECHNIQUES.
5. THE CONTRACTOR IS PROHIBITED FROM DISCHARGING GROUND WATER OR ACCUMULATED STORMWATER THAT IS REMOVED FROM EXCAVATIONS, TRENCHES, FOUNDATIONS, ECT. UNLESS SUCH WATERS ARE FIRST EFFECTIVELY TREATED BY APPROPRIATE CONTROLS AS SEDIMENT SOCKS, DEWATERING TANKS, ETC.
6. THE CONTRACTOR MUST INITIATE SOIL STABILIZATION MEASURES IMMEDIATELY WHENEVER EARTH-DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE.
7. THE CONTRACTOR MUST VERIFY SEDIMENT CONTROL DEVICES ON A DAILY BASIS, MONITOR CONTROL MEASURES PERIODICALLY THROUGH SITE INSPECTIONS AND RECORD MAINTENANCE ACTIVITIES TAKEN DURING CONSTRUCTION. INSPECTIONS MUST BE RECORDED REGULARLY VIA DATE-STAMPED PHOTOGRAPHS, INSPECTION REPORTS, OR OTHER RECORDING PROCESS.
8. EACH SUBCONTRACTOR IS REQUIRED TO COMPLY WITH THE EROSION AND SEDIMENT CONTROL PLAN.
9. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.



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SCALE:	1 : 300
DESIGN:	JX
DRAWN:	MH
CHECKED:	GSC/JX
DATE:	MAY 2020

REVERA
LONG TERM CARE BUILDING
850 CHAMPLAIN ST
CITY OF OTTAWA

EROSION AND SEDIMENT CONTROL PLAN

Ainley GROUP — CONSULTING ENGINEERS PLANNERS

CONTRACT No. 17004 | 005-17004 - SC1

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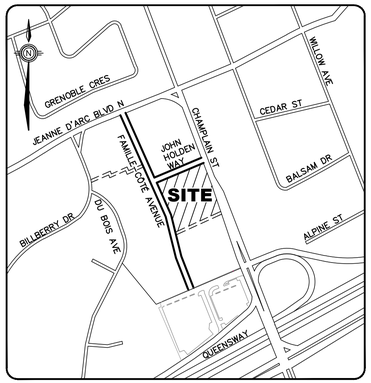


KEY MAP
SCALE: N.T.S.

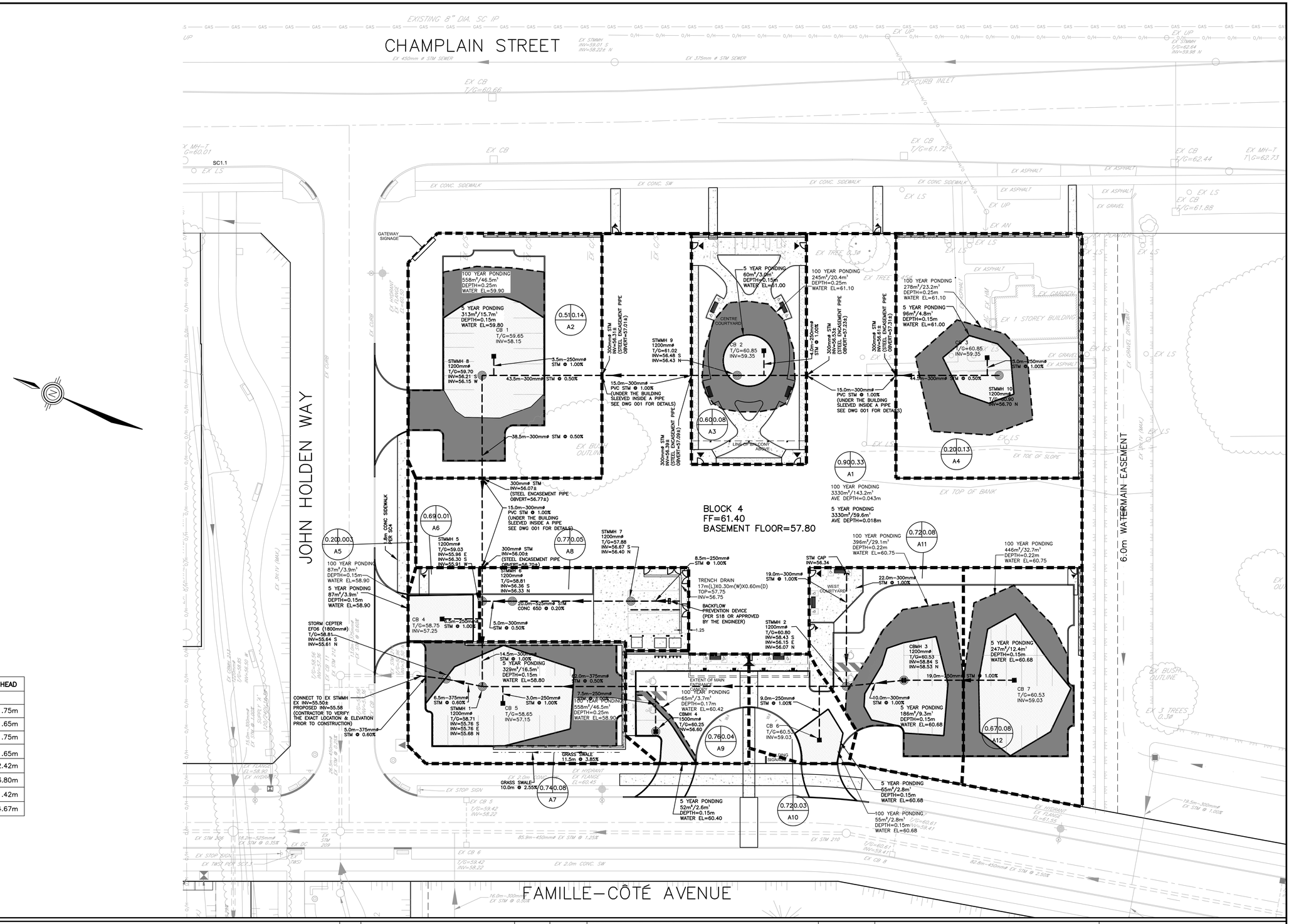
LEGEND

- STORM DRAINAGE AREA
- OVERLAND DRAINAGE DIRECTION
- RUNOFF COEFFICIENT
- AREA (ha)
- AREA NUMBER
- 5 YEARPONDING AREA
- 100 YEAR PONDING AREA

ORIFICE SUMMARY

LOCATION	TYPE	RELEASE & HEAD
BUILDING	12 WEIR (NOTCH) 1L/PER WEIR	12.0 L/S
CB 1	HYDROVEX 50VHV – 1	2.0 L/S @ 1.75m
CB 4	HYDROVEX 32SVHV – 1	1.2 L/S @ 1.65m
CB 5	HYDROVEX 50VHV – 1	2.0 L/S @ 1.75m
CB 6	HYDROVEX 75VHV – 1	6.6 L/S @ 1.65m
CBMH 3	HYDROVEX 50VHV – 1	4.0 L/S @ 2.42m
CBMH 4	HYDROVEX 50VHV – 1	3.5 L/S @ 3.80m
STMMH 6	HYDROVEX 75VHV – 1	5.1 L/S @ 1.42m
STMMH 9	HYDROVEX 50VHV – 1	3.5 L/S @ 4.67m

40.0 L/S



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CHECKED:	GSC/JX
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REVERA
LONG TERM CARE BUILDING
850 CHAMPLAIN ST
CITY OF OTTAWA

STORM WATER MANAGEMENT PLAN

Ainley GROUP CONSULTING ENGINEERS PLANNERS

CONTRACT No. 17004 | 006-17004-SWM1

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